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 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
  - Shoreline Assessment
  - Aquatic Plant Surveys
  - Fisheries Data Integration
  - 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

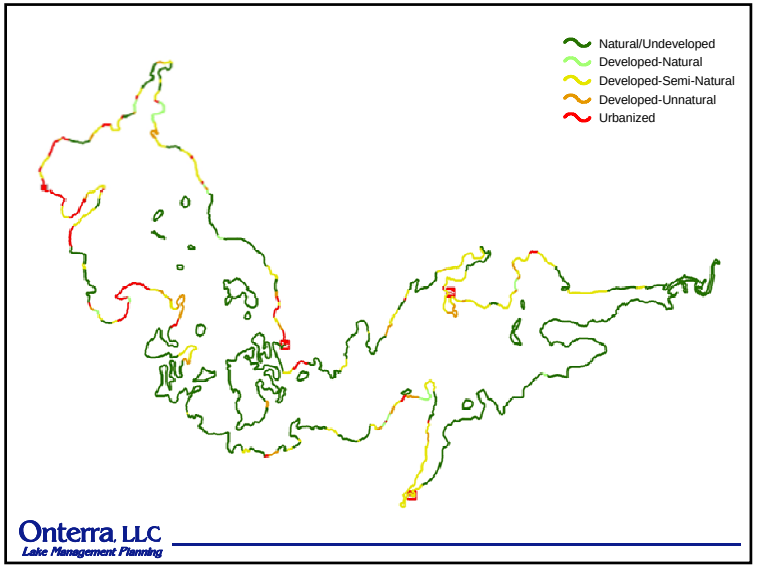
Onterra LLC
Lake Management Planning

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



Onterra LLC
Lake Management Planning

Non-native Aquatic Plants

Curly-leaf Pondweed

Not observed in 2011

Onterra LLC
Lake Management Planning

Non-native Aquatic Plants

Eurasian Water Milfoil

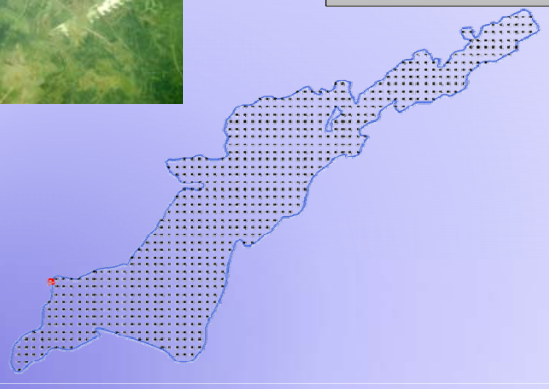
Onterra LLC
Lake Management Planning

Aquatic Plant Surveys

- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Curly-leaf pondweed survey
  - Point-intercept survey

Onterra LLC
Lake Management Planning

Lake Julia
47-meter resolution
741 total points

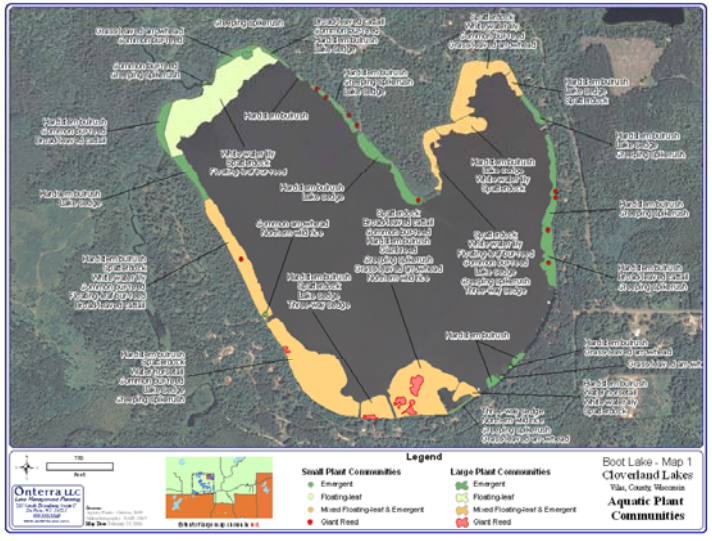


Onterra LLC
Lake Management Planning

Aquatic Plant Surveys

- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Curly-leaf pondweed survey
  - Point-intercept survey
  - Plant community mapping

Onterra LLC
Lake Management Planning



Aquatic Plant Surveys

- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Curly-leaf pondweed survey
  - Point-intercept survey
  - Plant community mapping
  - Volunteer survey findings

Onterra LLC
Lake Management Planning

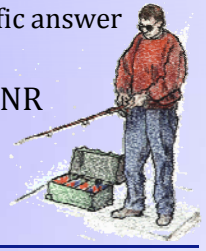
Fisheries Data Integration

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

Onterra LLC
Lake Management Planning

Stakeholder Survey

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



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

Thank You

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

Wisconsin Lakes Partnership

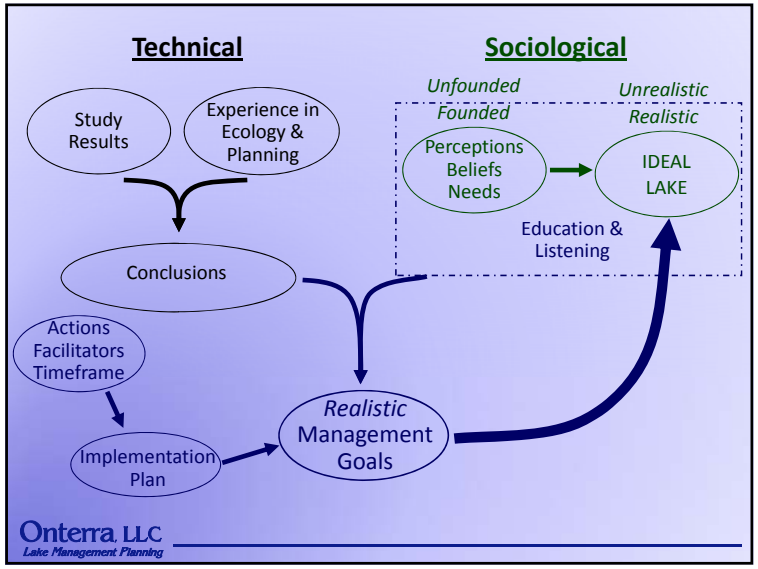
UWEX Extension

Wisconsin Dept. of Natural Resources

Onterra LLC
Lake Management Planning

The Planning Process

…it's not as easy as you may think.



B

APPENDIX B

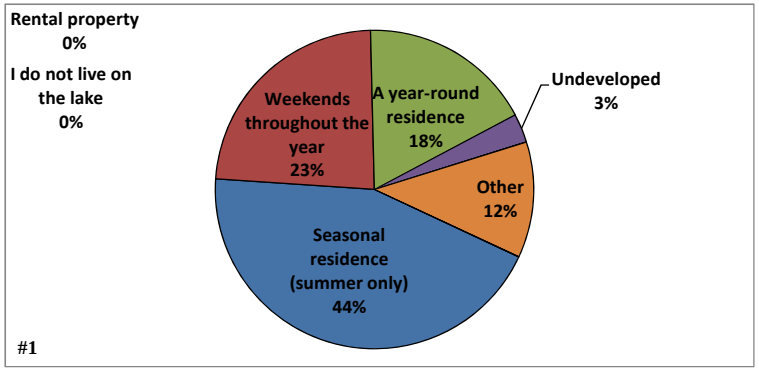
Stakeholder Survey Response Charts and Comments

Returned Surveys	33
Sent Surveys	43
Response Rate (%)	76.7

LAKE JULIA PROPERTY

#1 What type of property do you own on or near Lake Julia?

	Total	%
Seasonal residence (summer only)	15	*44.1*
Weekends throughout the year	8	*23.5*
A year-round residence	6	*17.6*
Undeveloped	1	*2.9*
Rental property	0	*0.0*
Other	4	*11.8*
I do not live on the lake	0	*0.0*
	34	*100.0*

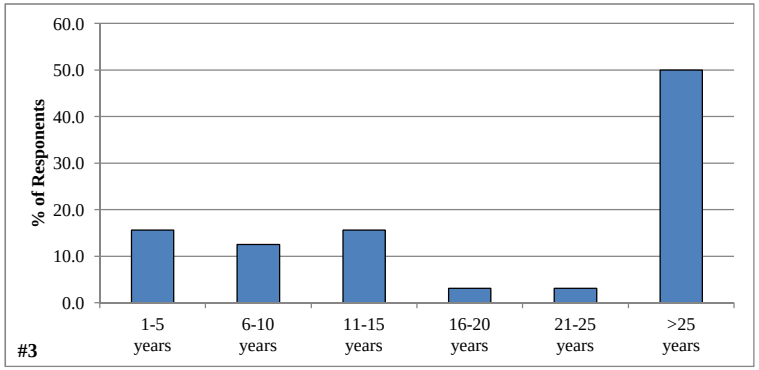


#2 How many days each year is your property used by you or others?

Answered Question	30
Average	73.2
Standard deviation	37.8

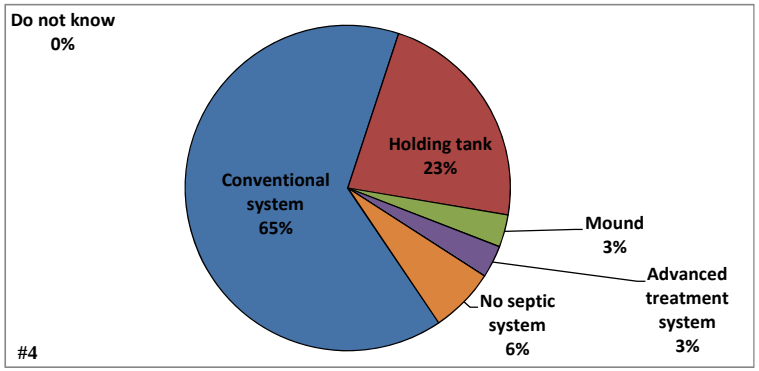
#3 How long have you owned your property on Lake Julia?

	Total	%
1-5 years	5	*15.6*
6-10 years	4	*12.5*
11-15 years	5	*15.6*
16-20 years	1	*3.1*
21-25 years	1	*3.1*
>25 years	16	*50.0*
	32	*100.0*



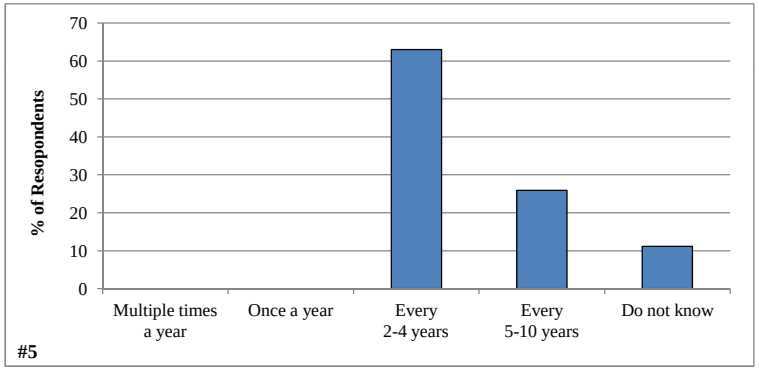
#4 What type of septic system does your property utilize?

	Total	%
Conventional system	20	*64.5*
Holding tank	7	*22.6*
Mound	1	*3.2*
Advanced treatment system	1	*3.2*
Do not know	0	*0.0*
No septic system	2	*6.5*
	31	*100.0*



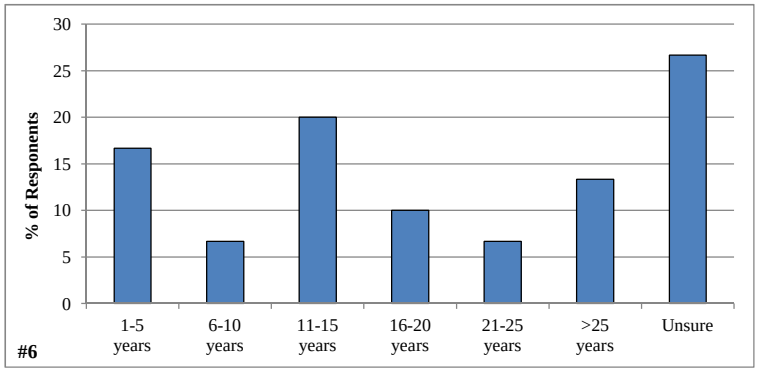
#5 How often is the septic tank on your property pumped?

	Total	%
Multiple times a year	0	*0.0*
Once a year	0	*0.0*
Every 2-4 years	17	*63.0*
Every 5-10 years	7	*25.9*
Do not know	3	*11.1*
	27	*100.0*



#6 How old is your septic system?

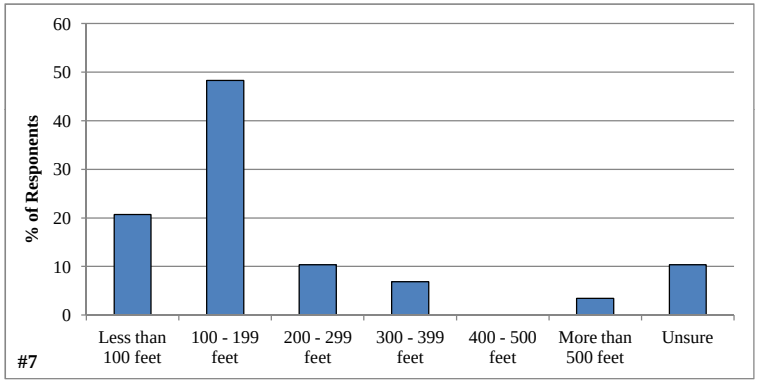
	Total	%
1-5 years	5	*16.7*
6-10 years	2	*6.7*
11-15 years	6	*20.0*
16-20 years	3	*10.0*
21-25 years	2	*6.7*
>25 years	4	*13.3*
Unsure	8	*26.7*
	30	*100.0*



#7 Approximately how many feet from the lake is your septic drain field (leach field)?

	Total	%
Less than 100 ft	6	*20.7*
100 - 199 ft	14	*48.3*
200 - 299 ft	3	*10.3*
300 - 399 ft	2	*6.9*
400 - 500 ft	0	*0.0*
More than 500 ft	1	*3.4*
Unsure	3	*10.3*
	29	*100.0*

Average (ft)	169
Min (ft)	55
Max (ft)	1,000



Recreational Use on Lake Julia

#8 How many years ago did you first visit Lake Julia?

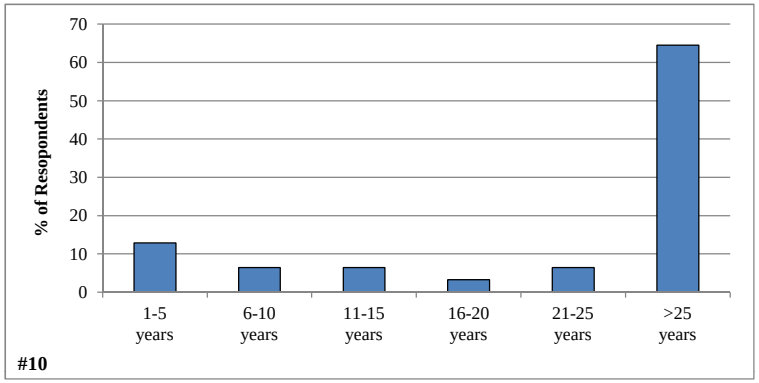
Answered Question	33
Average	46.9
Standard deviation	22.1

#9 Have you personally fished on Lake Julia?

	Total	%
Yes	31	*96.9*
No	1	*3.1*
	32	*100.0*

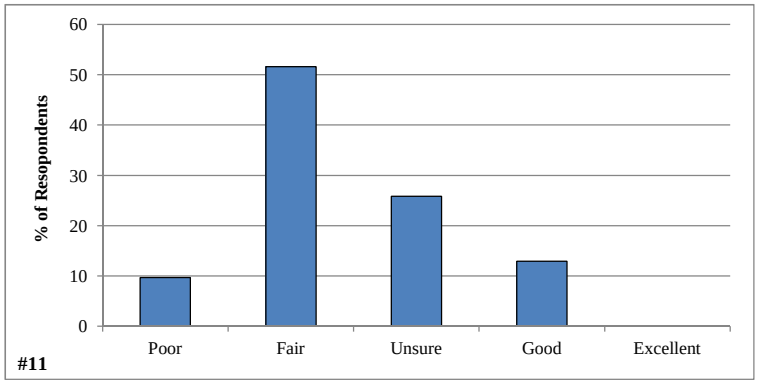
#10 For how many years have you fished Lake Julia?

	Total	%
1-5 years	4	*12.9*
6-10 years	2	*6.5*
11-15 years	2	*6.5*
16-20 years	1	*3.2*
20-25 years	2	*6.5*
25+ years	20	*64.5*
	31	*100.0*



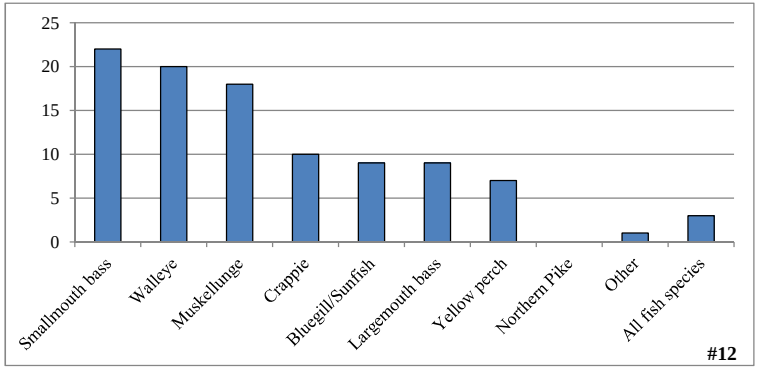
#11 How would you describe the current quality of fishing on Lake Julia?

	Total	%
Poor	3	*9.7*
Fair	16	*51.6*
Unsure	8	*25.8*
Good	4	*12.9*
Excellent	0	*0.0*
	31	*100.0*



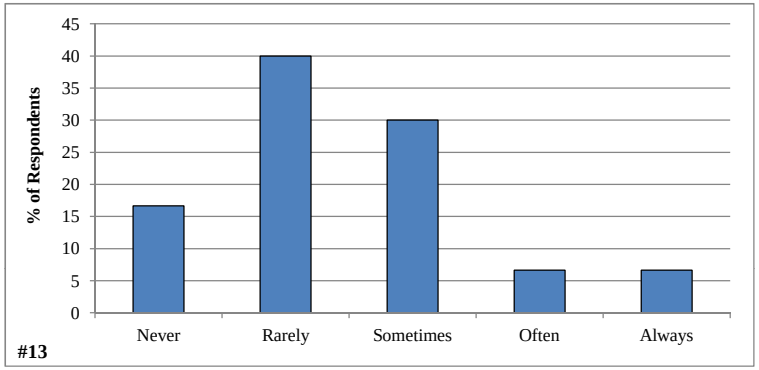
#12 What species of fish do you like to catch on Lake Julia?

	Total
Smallmouth bass	22
Walleye	20
Muskellunge	18
Crappie	10
Bluegill/Sunfish	9
Largemouth bass	9
Yellow perch	7
Northern Pike	0
Other	1
All fish species	3



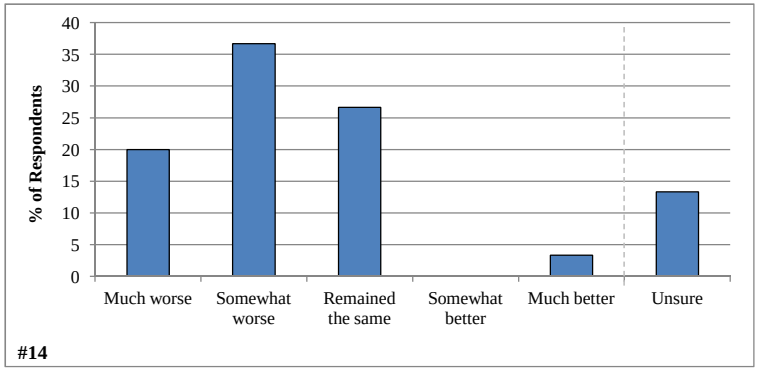
#13 How often do you keep the fish you catch on Lake Julia?

	Total	%
Never	5	*16.7*
Rarely	12	*40.0*
Sometimes	9	*30.0*
Often	2	*6.7*
Always	2	*6.7*
	30	*100.0*



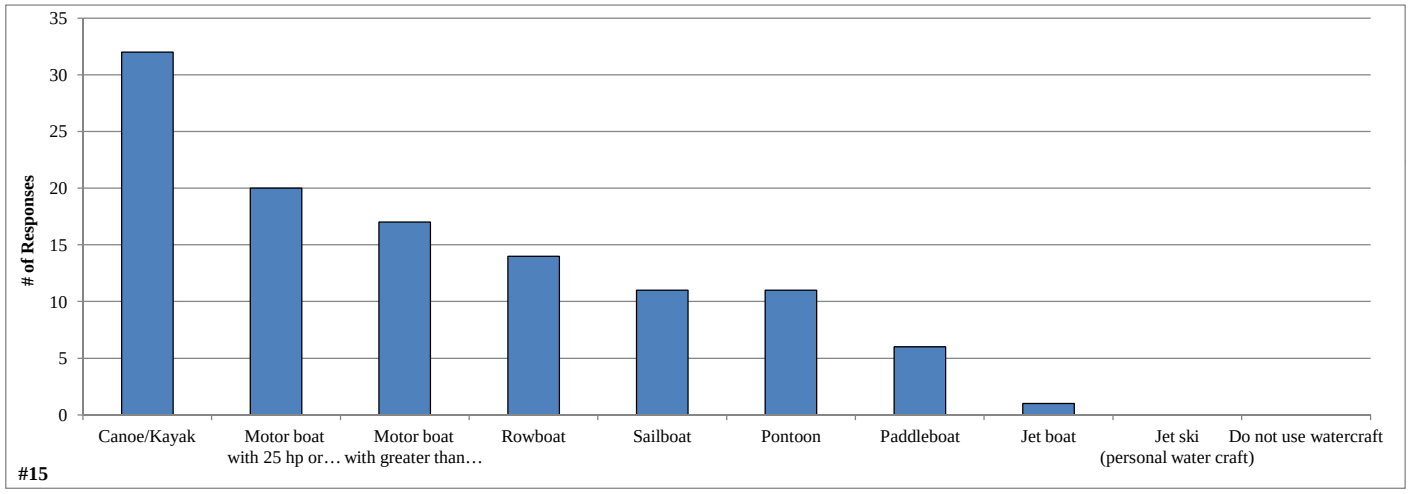
#14 How has the quality of fishing changed since you started fishing on the lake?

	Total	%
Much worse	6	*20.0*
Somewhat worse	11	*36.7*
Remained the Same	8	*26.7*
Somewhat better	0	*0.0*
Much better	1	*3.3*
Unsure	4	*13.3*
	30	*100.0*



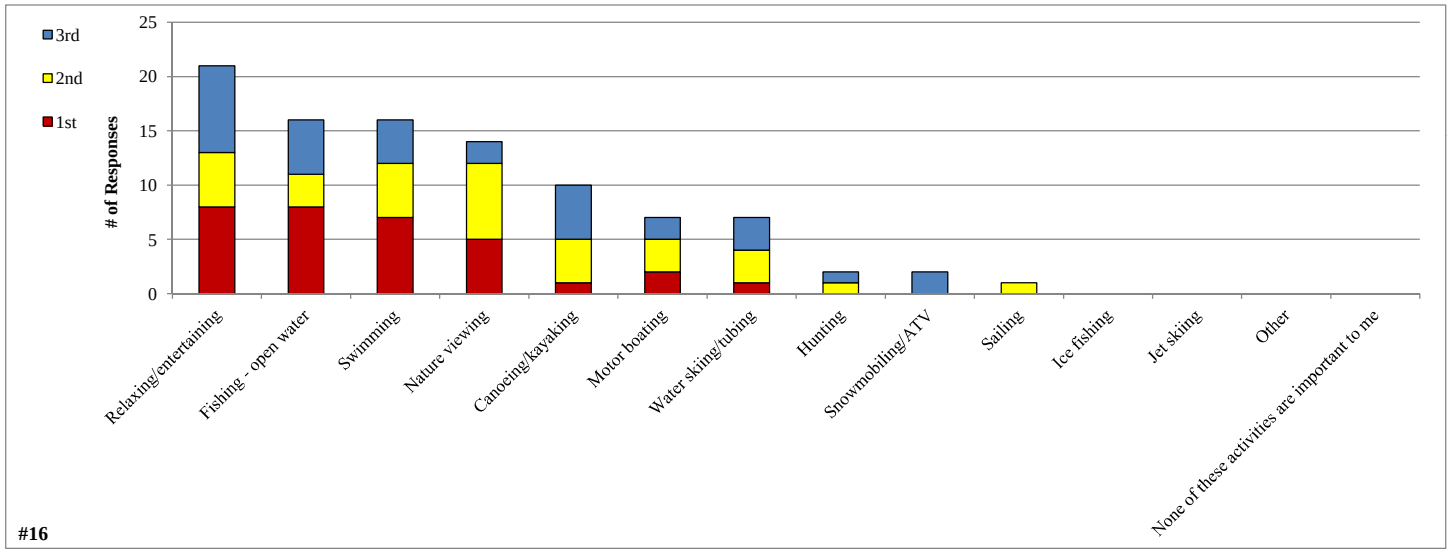
#15 What types of watercraft do you currently use on the lake?

	Total
Canoe/Kayak	32
Motor boat with 25 hp or less motor	20
Motor boat with greater than 25 hp motor	17
Rowboat	14
Sailboat	11
Pontoon	11
Paddleboat	6
Jet boat	1
Jet ski (personal water craft)	0
Do not use watercraft	0



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

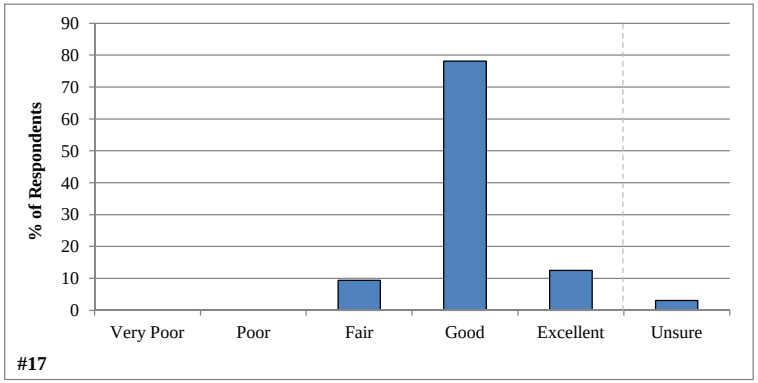
	1st	2nd	3rd	*% ranked*
Relaxing/entertaining	8	5	8	*21.9*
Fishing - open water	8	3	5	*16.7*
Swimming	7	5	4	*16.7*
Nature viewing	5	7	2	*14.6*
Canoeing/kayaking	1	4	5	*10.4*
Motor boating	2	3	2	*7.3*
Water skiing/tubing	1	3	3	*7.3*
Hunting	0	1	1	*2.1*
Snowmobiling/ATV	0	0	2	*2.1*
Sailing	0	1	0	*1.0*
Ice fishing	0	0	0	*0.0*
Jet skiing	0	0	0	*0.0*
Other	0	0	0	*0.0*
None of these activities are important to me	0	0	0	*0.0*
	32	32	32	*100.0*



Lake Julia Current and Historic Condition, Health and Management

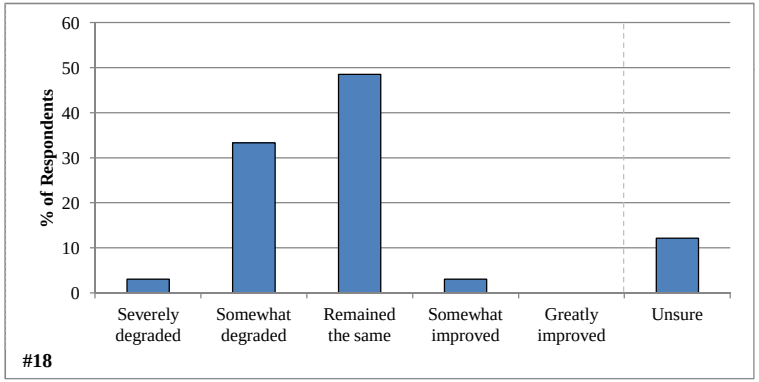
#17 How would you describe the current water quality of Lake Julia?

	Total	%
Very Poor	0	*0.0*
Poor	0	*0.0*
Fair	3	*9.4*
Good	25	*78.1*
Excellent	4	*12.5*
Unsure	1	*3.1*
	32	*100.0*



#18 How has the water quality changed in Lake Julia since you first visited the lake?

	Total	%
Severely degraded	1	*3.0*
Somewhat degraded	11	*33.3*
Remained the same	16	*48.5*
Somewhat improved	1	*3.0*
Greatly improved	0	*0.0*
Unsure	4	*12.1*
	33	*100.0*



#19 Have you ever heard of aquatic invasive species?

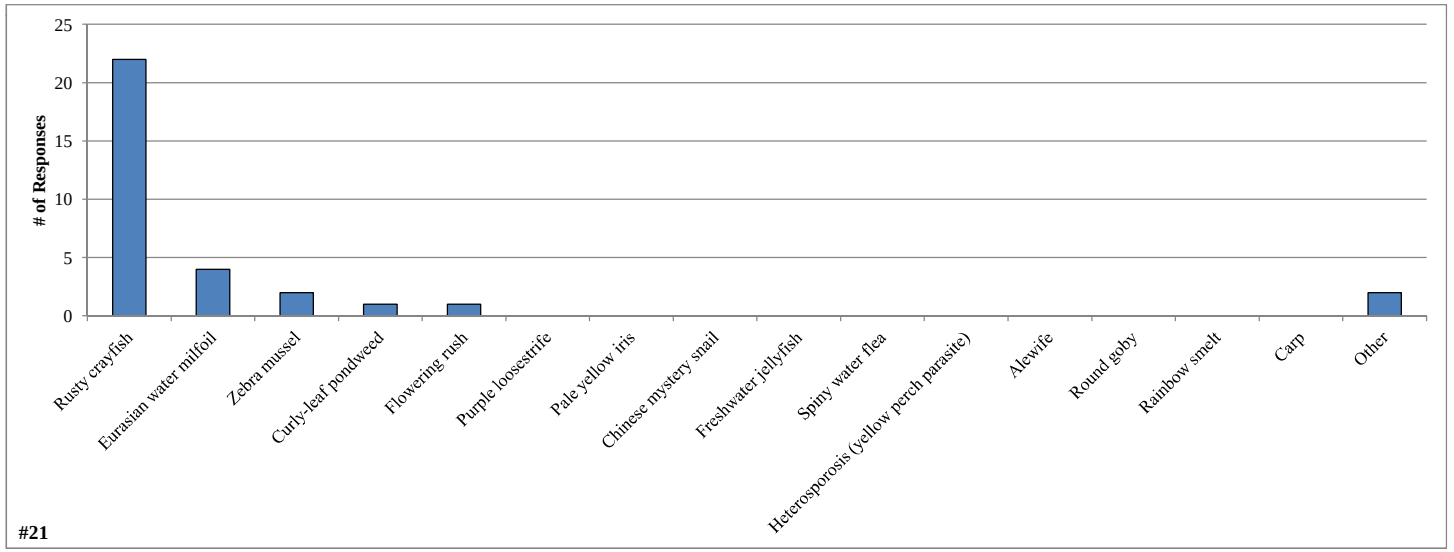
	Total	%
Yes	33	*100.0*
No	0	*0.0*
	33	*100.0*

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

	Total	%
Yes	21	*65.6*
No	11	*34.4*
	32	*100.0*

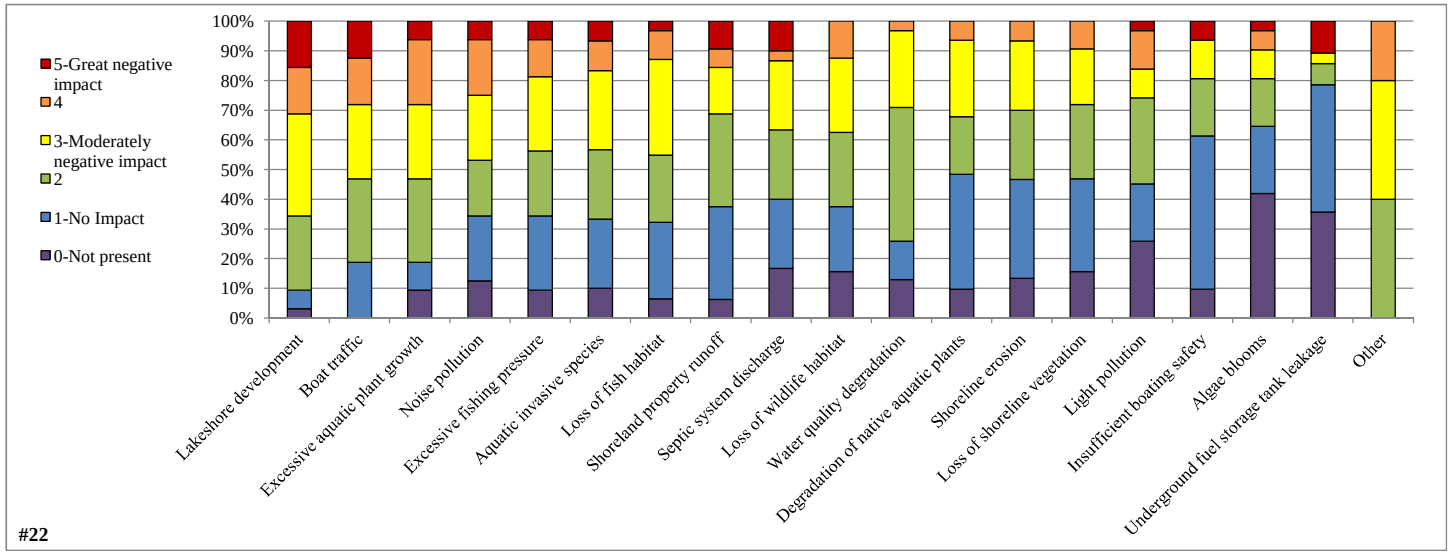
#21 Which aquatic invasive species are you aware of in the lake?

	Total
Rusty crayfish	22
Eurasian water milfoil	4
Zebra mussel	2
Curly-leaf pondweed	1
Flowering rush	1
Purple loosestrife	0
Pale yellow iris	0
Chinese mystery snail	0
Freshwater jellyfish	0
Spiny water flea	0
Heterosporosis (yellow perch parasite)	0
Alewife	0
Round goby	0
Rainbow smelt	0
Carp	0
Other	2



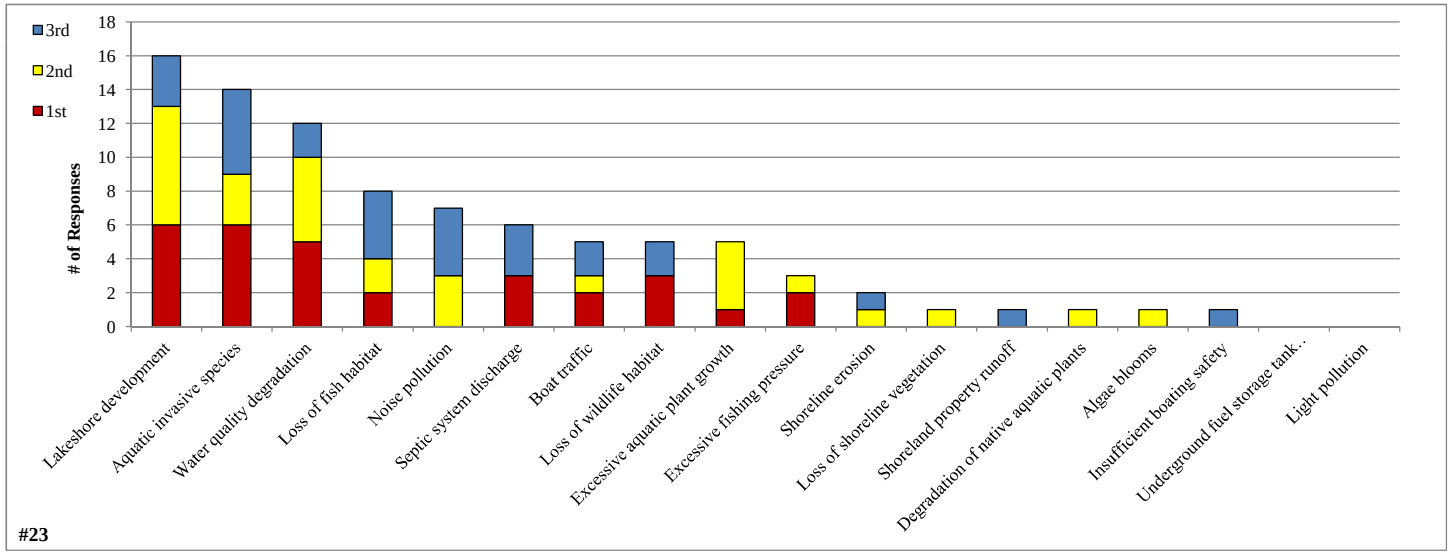
#22 To what level do you believe each of the following factors may be negatively impacting Lake Julia?

	0-Not present	1-No Impact	2	3-Moderately negative impact	4	5-Great negative impact	*Total*	*Average*
Lakeshore development	1	2	8	11	5	5	*31*	*3.0*
Boat traffic	0	6	9	8	5	4	*32*	*2.8*
Excessive aquatic plant growth	3	3	9	8	7	2	*29*	*2.6*
Noise pollution	4	7	6	7	6	2	*28*	*2.3*
Excessive fishing pressure	3	8	7	8	4	2	*29*	*2.3*
Aquatic invasive species	3	7	7	8	3	2	*27*	*2.2*
Loss of fish habitat	2	8	7	10	3	1	*29*	*2.2*
Shoreland property runoff	2	10	10	5	2	3	*30*	*2.1*
Septic system discharge	5	7	7	7	1	3	*25*	*2.0*
Loss of wildlife habitat	5	7	8	8	4	0	*27*	*2.0*
Water quality degradation	4	4	14	8	1	0	*27*	*1.9*
Degradation of native aquatic plants	3	12	6	8	2	0	*28*	*1.8*
Shoreline erosion	4	10	7	7	2	0	*26*	*1.8*
Loss of shoreline vegetation	5	10	8	6	3	0	*27*	*1.8*
Light pollution	8	6	9	3	4	1	*23*	*1.7*
Insufficient boating safety	3	16	6	4	0	2	*28*	*1.6*
Algae blooms	13	7	5	3	2	1	*18*	*1.3*
Underground fuel storage tank leakage	10	12	2	1	0	3	*18*	*1.2*
Other	0	0	2	2	1	0	*5*	*2.8*



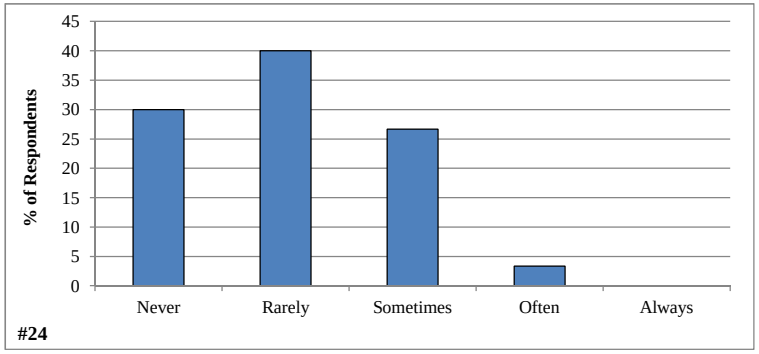
#23 From the list below, please rank your top three concerns regarding the lake.

	1st	2nd	3rd	*% Ranked*
Lakeshore development	6	7	3	*18.0*
Aquatic invasive species	6	3	5	*15.7*
Water quality degradation	5	5	2	*13.5*
Loss of fish habitat	2	2	4	*9.0*
Noise pollution	0	3	4	*7.9*
Septic system discharge	3	0	3	*6.7*
Boat traffic	2	1	2	*5.6*
Loss of wildlife habitat	3	0	2	*5.6*
Excessive aquatic plant growth	1	4	0	*5.6*
Excessive fishing pressure	2	1	0	*3.4*
Shoreline erosion	0	1	1	*2.2*
Loss of shoreline vegetation	0	1	0	*1.1*
Shoreland property runoff	0	0	1	*1.1*
Degradation of native aquatic plants	0	1	0	*1.1*
Algae blooms	0	1	0	*1.1*
Insufficient boating safety	0	0	1	*1.1*
Underground fuel storage tank leakage	0	0	0	*0.0*
Light pollution	0	0	0	*0.0*
Other	1	0	0	*1.1*
	31	30	28	*100.0*



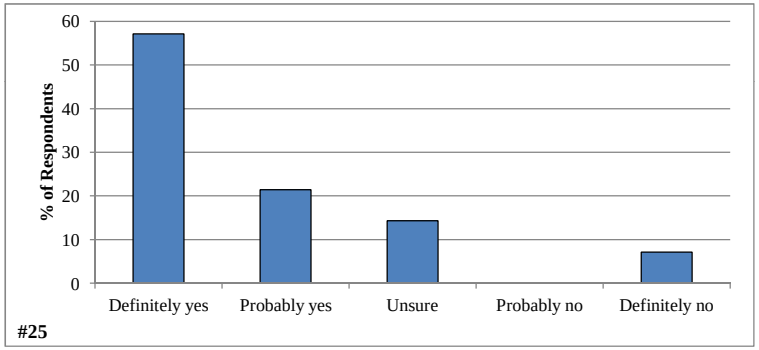
#24 During open water season how often does aquatic plant growth, including algae, negatively impact your enjoyment of Lake Julia?

	Total	%
Never	9	*30.0*
Rarely	12	*40.0*
Sometimes	8	*26.7*
Often	1	*3.3*
Always	0	*0.0*
	30	*100.0*



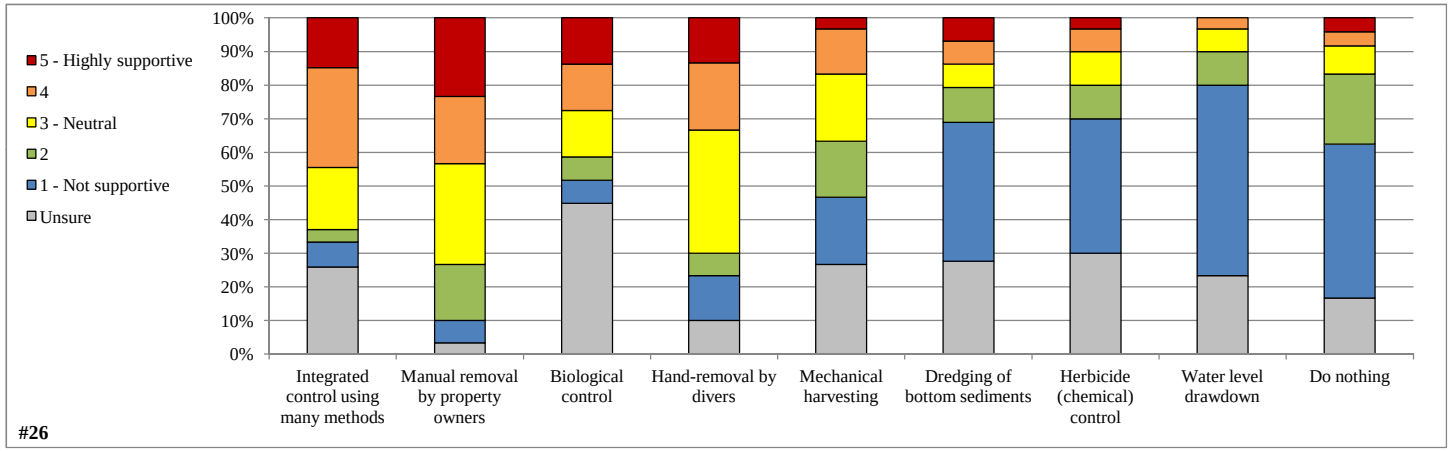
#25 Considering your answer to the question above, do you believe aquatic plant control is needed on the lake?

	Total	%
Definitely yes	16	*57.1*
Probably yes	6	*21.4*
Unsure	4	*14.3*
Probably no	0	*0.0*
Definitely no	2	*7.1*
	28	*100.0*



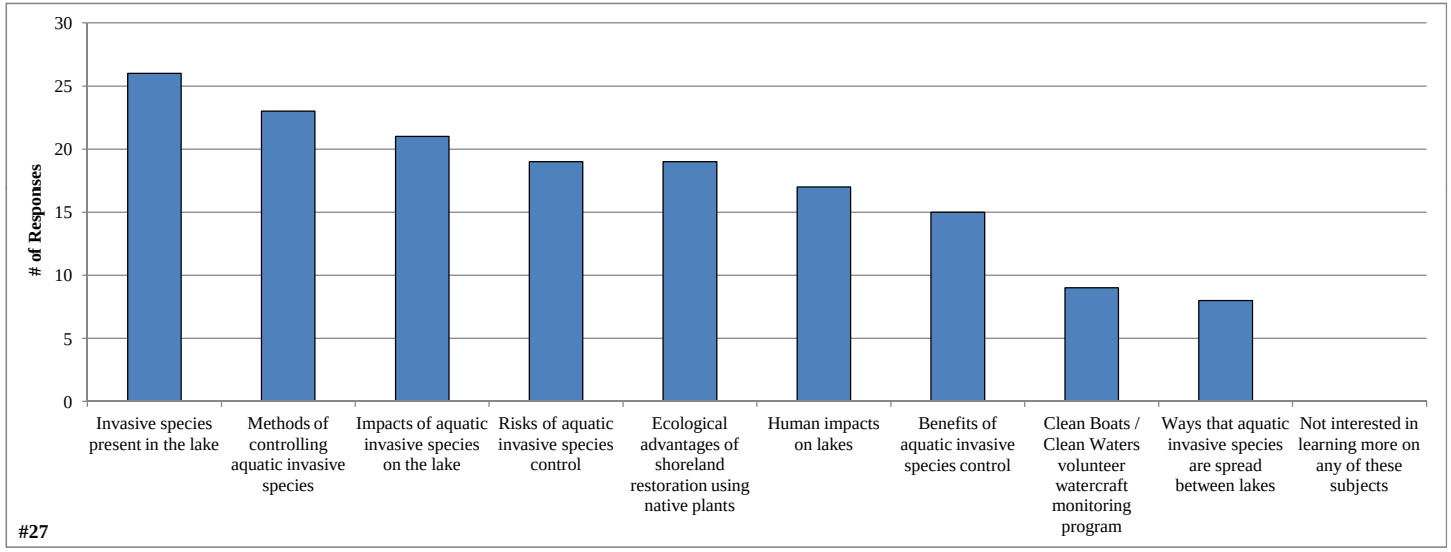
#26 What is your level of support for the responsible use of the following techniques on the lake?

	1 - Not supportive	2	3 - Neutral	4	5 - Highly supportive	Unsure	Total	Average
Integrated control using many methods	2	1	5	8	4	7	*20*	*3.6*
Manual removal by property owners	2	5	9	6	7	1	*29*	*3.4*
Biological control	2	2	4	4	4	13	*16*	*3.4*
Hand-removal by divers	4	2	11	6	4	3	*27*	*3.1*
Mechanical harvesting	6	5	6	4	1	8	*22*	*2.5*
Dredging of bottom sediments	12	3	2	2	2	8	*21*	*2.0*
Herbicide (chemical) control	12	3	3	2	1	9	*21*	*1.9*
Water level drawdown	17	3	2	1	0	7	*23*	*1.4*
Do nothing	11	5	2	1	1	4	*20*	*1.8*



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

	Total
Invasive species present in the lake	26
Methods of controlling aquatic invasive species	23
Impacts of aquatic invasive species on the lake	21
Risks of aquatic invasive species control	19
Ecological advantages of shoreland restoration using native plants	19
Human impacts on lakes	17
Benefits of aquatic invasive species control	15
Clean Boats / Clean Waters volunteer watercraft monitoring program	9
Ways that aquatic invasive species are spread between lakes	8
Not interested in learning more on any of these subjects	0



Lake Julia Association, Inc.

#28 Before receiving this mailing, have you ever heard of the Lake Julia Association, Inc.?

	Total	%
Yes	31	*96.9*
No	1	*3.1*
	32	*100.0*

#29 What is your membership status with the Lake Julia Association, Inc.?

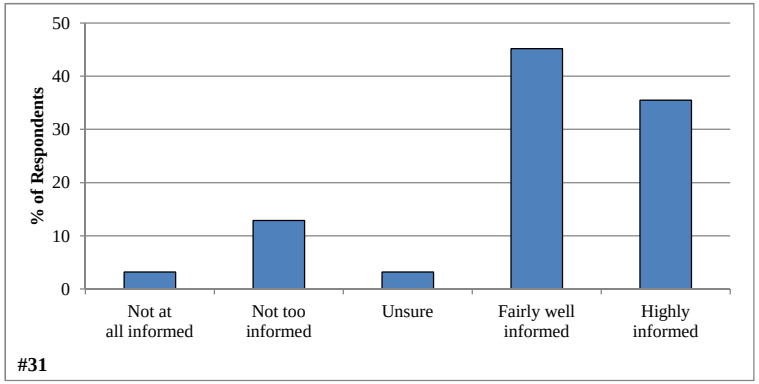
	Total	%
Current member	26	*86.7*
Former member	0	*0.0*
Never been a member	4	*13.3*
	30	*100.0*

#30 Do you participate in the Lake Julia electronic mail distribution system?

	Total	%
Yes	29	*96.7*
No	1	*3.3*
No - I have not heard of this	1	*3.3*
	30	*100.0*

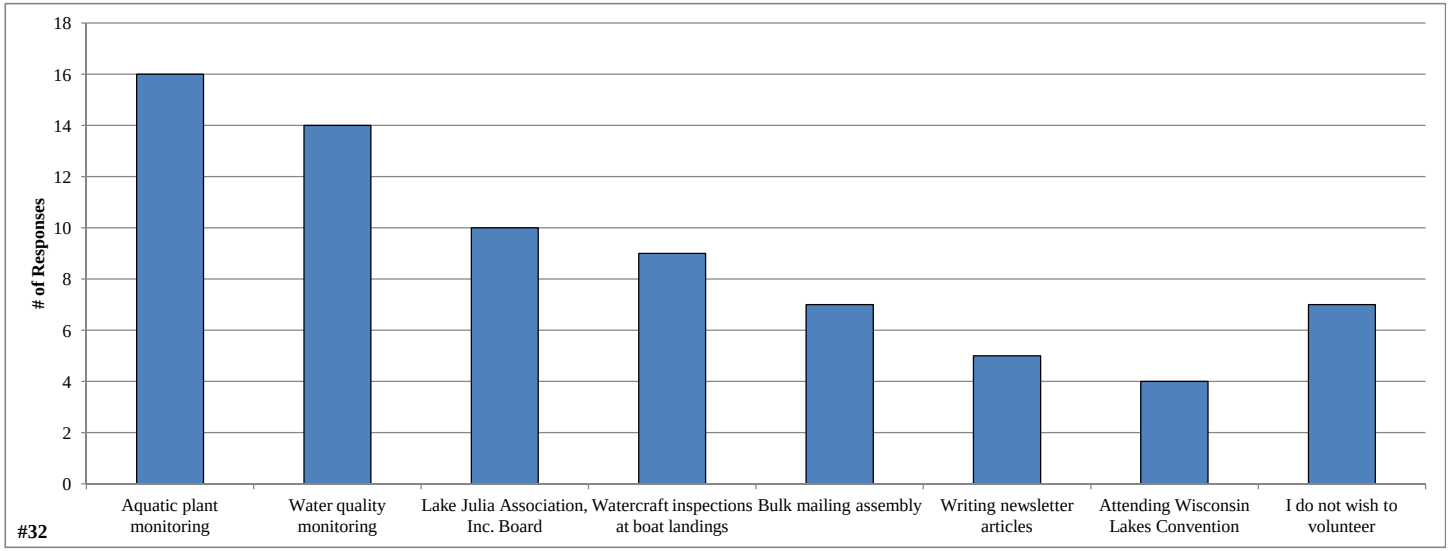
#31 How informed has the Lake Julia Association, Inc. kept you regarding issues with Lake Julia and its management?

	Total	%
Not at all informed	1	*3.2*
Not too informed	4	*12.9*
Unsure	1	*3.2*
Fairly well informed	14	*45.2*
Highly informed	11	*35.5*
	31	*100.0*



#32 Please circle the activities you would be willing to participate in if the Lake Julia Association, Inc. requires additional assistance.

	Total
Aquatic plant monitoring	16
Water quality monitoring	14
Lake Julia Association, Inc. Board	10
Watercraft inspections at boat landings	9
Bulk mailing assembly	7
Writing newsletter articles	5
Attending Wisconsin Lakes Convention	4
I do not wish to volunteer	7



Survey Number	1f Comment	12i Comment	14 Comment	16m Comment	18 Comment	21p Comment	22s Comment	23s Comment	Other Comments (and Question 33)
1			We always caught our limit of Walleyes every night 4-5 when I was a kid in the 1950's. Now it is a big deal if we catch any walleye. Used to be lots of crappie even in the 1970's--- now not so much. It was good fishing years ago. Now anything decent is seldom except for bass. Even Muskie are less frequent!		It look Dark due to iron and maybe tree stuff.	Leeches maybe you don't think of them as invasive but are bad - especially as a bait dealer sells right on lake Julia road. It is disgusting.	Increase pop leads to polluted for more septics.		Why has the email system broken down? I saw the research boat on lake several times, after we had the meeting at the town hall. It was a great fishing lake growing up. Now it is so poor. When I was a kid it was highly stocked. We always talked to the officers as they planted it each year. then they quit-- they said because of "spearing rights" but I never saw it speared by Native Americans. I guess I have seen ???? chubs???? that they plant now but??? used to see really big Muskies- now they are smaller so you cant blame it all on the Muskies. I hate the "endless" chruning by tubers. We have tubed our grandkids, but now are teaching skiing and we try to make long, straighter runs rather than spoil the lake for those canoing, kayaking, and skiiing. Fish in general are so small ----rarely keep any. We dont keep Muskies -- but maybe we should to give others a better chance? The lake is much more shallow than even 15 years ago. I fear the guides and visitors that put in and out for 1 day at a time they will bring us all the invasive species.
2									
3			"rusty" crayfish have killed a lot of weed beds.			BURBOT			
4					more weeds				
5		any I can	Lack of lake Perch.						My main concern is lake shore development. Both off and on shore. Next - loss of forest habitat. While I understand that property owners have certain rights. I do wish they would not build structures such as boat houses directly on the shoreline. They can launch and moor their boats but please do not ruin the shoreline.
6	May through Oct visits 1-2 weeks at a time.	panfish	fewer panfish -smaller fish- rusty crabs (eating fish eggs)	Relaxation	Growth of underwater grasses.Summer of 2010 lots of floating weeds. I swam along rolling quantities in a long "row" - pushing out to finally float into a bay. Creeks are "plugged up" by August. Bays are filling with plants- trouble breaking through with canoe or kayak.				Since my parents arrival, they usually comment on the increasing absence of birds and animals, whippoorwills are gone. We no longer have raccoons, skunks, foxes in our "yard". Chipmunks, squirrels and rabbits….songbirds are also down. I have felt a change in the last 2-3 summers in regards to seaweads especailly in August. Is there some spruce bud worm returning? It has been an interesting journey. Lake Julia has been an Oasis from "Hustle-stress and the metropolis". Now, in the once 'Hideaway hermitage' I am connected to other lake julia people via technology- strange but necessary. I thank all of you who have taken the initiative to care enough for Lake Julia,s future to take on the work and keep it and us healthy.
7	Havnt seen northerns in about 40 years Smallmouth bass, panfish fishing dropped off about 50 years ago; bass picked up somewhat about 20 years ago. Havnt ished much in recent years. In the 1950s panfishing was good (including "jumbo" perch)								
8									
9	spring Summer and Fall.		Many more and larger small mouth bass.						We are unaware of leaking underground fuel storage tanks, but we do know of a property owner nearby that uses such a tank and we are very concerned about a leak and a resultant damage to lake and our well and property.
10									
11									
12						not aware			
13					color darker than I rememeber as a child more weeds at deeper depthsnow than in the past.				
14			Less Walleye more Muskie.			Thistle along shoreline.			
15			We would catch fish all morning and evening in the 1950s and 1960s Now……..it takes many hours to catch 1.		About 15 years ago the lake was FULL of rusty crayfish very detrimental to swimming now its much better				My family has been on lake Julia Since the 1920's. Fishing was Phenominal. Muskies, Perch, Crappies walleye. I don't see these today. I think the Bass I see came with the huge crayfish explosion. I personally think Lake Julia water is wonderful I didnt know we had these issues. I do have a problem with shoreline erosion but always have. We have used rocks to try and help. and the crayfish have decreased. i also feel strongly we should maintain and/or improve what we have. With retirement soon approaching who knows what i could do to help!! Since i only have a 25hp motor.....dont use landing.....mainly interested in quiet nature.....clean septic.....dont use fuel except wood.....i am unsure how I could help.

Survey Number	1f Comment	12i Comment	14 Comment	16m Comment	18 Comment	21p Comment	22s Comment	23s Comment	Other Comments (and Question 33)
16				water skiing and boat rides				if septic system is discharging then this is a top priority.	We are very concerned about the increased number of homes being built and the impact on the lake and the environment. We are very concerned about motorized vehicles speeding around the forest and the noise and pollution and environmental impact on wildlife and environment. we are also concerned in the increase in the number of motorized boats with large noisy engines and would like to put a sign up at the boat landing about NO JET SKIS. Thanks for doing this survey yoiur tme is appreciated.
17									
18		don't care	Large fish seem to have disappeared onlseee bass and perch these days.						Being a Michigan resident and only visits the lake 2 weeks a year I do not have the concerns the other residents may have. My 83 year old mother lives there all Summer and does not use watercraft or swin in the lake. She is there for peace and quiet and has never complained of noise or neighbors. From my perspective little has changed in the years childhood to present except more homes and lack of fish. I have seen crawdads are no longer in the lake in the past 10 years.
19			only fished for 5 years been consistently fair quality of fishng.						Im newer to the lake. It seems to be in good condition. My objective would be to create a baseline and work to maintain its quality. It is a smaller lake with fewer homes. We all have a stake to keep the lake in the best shape we can while respecting that owners want to use the lake for their enjoyment.
20	year round lake vacation home.		smaller fish, more weeds, fish not as plenitiful		more weeds				
21									
22									Please do not asssume that everyone on the lake is in a financial position to support the lake studies.
23			less crappie than 4 years ago,less walleye, small miskies,fewer panfish it seems.		Seems like the water has gotten more "stained"				
24							Fireworks		
25									too many small muskie I have seen a large decline in the # of Walleye and Crappie
26			smaller not as many, rusticus crayfishfishing pressure summer and winter.						
27	with no access in winter month due to woodbury lake rd access (unplowed)		After indians speared walleyes and increase in lake cottages 7 outside pressure.		rapid increase in aquatic weeds.		septic system discharge bradford area house		
28						I am told rusty crayfish but I have not seen them			
29	Building now								
30									
31					darker, more pollen and allergins, more aquatic plants.		Early and late traffic should be discouraged, development south shore, ATV's Fireworks, dogs, etc... turn off lights at night!!!!!!		
32			More weeds which makes fishing more difficult, more boats from off the lake, no more crappie, few norther pike, large mouth bass more prevelent, big small mouth bass, mud puppies are in the lake.		watrer is not as stained (more clarity)	small snails are now prevelent		large boats, invasive species would be a top concern if found in the lake (other than rustys)	We are supporters of preserving the natural beauty of Lake Julia. Some lakefront development and boat traffic has at times negatively affected the enjoyment of some stakeholders and the natural shoreline habitat of reptiles and amphibians, ducks, loons and mergansers. For these reasons and others we are in support of leaving fallen logs along the shoreline and not mowing grass close to the lake. We remember years ago when the largest outboard engine was 75hp. We are in support of boats limited to 18 feet and we are glad the lake Association has agreed to an" anti wave runner/jetski rule". We are thankful for the stakeholders that have common beliefs and open communication. It is nice to see more people swimming across the lake, kayaking and canoing, and fishing. The Lake Julia Corporation has done a great job with thier anual summer meetings and emails.
33									
34									

C

APPENDIX C

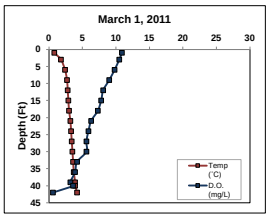
Water Quality Data

Lake Julia

Date: 3/1/2011
Time: 9:25
Weather: 80% clouds, very windy
Entry: TWH

Max Depth: 42.7
LJS Depth (ft): 3.0
LJB Depth (ft): 40.0
Secchi Depth (ft): 6.1

Depth (ft)	Temp (°C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	0.8	10.9		
3	1.8	10.5		
6	2.4	9.8		
9	2.7	9.0		
12	2.8	8.1		
15	2.9	7.8		
18	3.0	7.3		
21	3.2	6.3		
24	3.3	5.9		
27	3.4	5.6		
30	3.5	5.6		
33	3.6	4.2		
36	3.7	3.9		
39	3.9	3.2		
40	3.9	3.6		
42	4.2	0.6		



Parameter	LJS	LJB
Total P (µg/L)	15.00	22.00
Dissolved P (µg/L)	2.00	6.00
Chl-a (µg/L)		
TKN (µg/L)	470.00	570.00
$NO_3 + NO_2$-N (µg/L)	151.00	169.00
NH_3-N (µg/L)	ND	68.00
Total N (µg/L)	470.00	570.00
Lab Cond. (µS/cm)		
Lab pH		
Alkalinity (mg/L $CaCO_3$)		
Total Susp. Solids (mg/L)	ND	ND
Calcium (mg/L)		

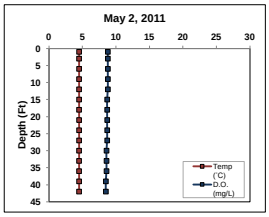
Data collected by DAC and TWH (Onterra)

Lake Julia

Date: 5/2/2011
Time: 12:30
Weather: 100% clouds, light breeze, 32°F
Entry: TWH

Max Depth: 43.2
LJS Depth (ft): 3.0
LJB Depth (ft): 40.0
Secchi Depth (ft): 4.2

Depth (ft)	Temp (°C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	4.5	8.8	7.5	97.0
3	4.5	8.8	7.5	98.0
6	4.5	8.8	7.5	98.0
9	4.5	8.8	7.5	97.0
12	4.5	8.8	7.5	98.0
15	4.5	8.7	7.5	98.0
18	4.5	8.7	7.5	98.0
21	4.5	8.7	7.5	98.0
24	4.5	8.7	7.5	97.0
27	4.5	8.7	7.5	98.0
30	4.5	8.6	7.5	98.0
33	4.5	8.6	7.5	98.0
36	4.5	8.6	7.5	98.0
39	4.5	8.5	7.5	98.0
42	4.5	8.5	7.5	98.0



Parameter	LJS	LJB
Total P (µg/L)	17.00	18.00
Dissolved P (µg/L)	2.00	2.00
Chl-a (µg/L)	3.30	
TKN (µg/L)	570.00	400.00
$NO_3 + NO_2$-N (µg/L)	139.00	138.00
NH_3-N (µg/L)	19.00	20.00
Total N (µg/L)	570.00	400.00
Lab Cond. (µS/cm)		
Lab pH		7.39
Alkalinity (mg/L $CaCO_3$)		46.50
Total Susp. Solids (mg/L)	ND	ND
Calcium (mg/L)	11.50	

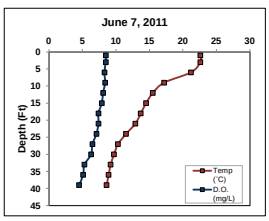
Data collected by TAH (Onterra)

Lake Julia

Date: 6/7/2011
Time: 10:25
Weather: 100% sun, hazy, 80°F
Entry: TWH

Max Depth: 42.0
LJS Depth (ft): 3.0
LJB Depth (ft): 39.0
Secchi Depth (ft): 6.4

Depth (ft)	Temp (°C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	22.6	8.5	8.2	96.0
3	22.6	8.5	8.2	97.0
6	21.2	8.3	8.1	96.0
9	17.2	8.4	7.9	95.0
12	15.5	8.1	7.8	95.0
15	14.5	7.9	7.7	95.0
18	13.7	7.4	7.6	95.0
21	12.9	7.4	7.6	96.0
24	11.5	7.1	7.5	96.0
27	10.3	6.5	7.4	96.0
30	9.7	6.3	7.4	96.0
33	9.2	5.3	7.3	96.0
36	8.9	5.1	7.3	96.0
39	8.6	4.5	7.2	96.0



Parameter	LJS	LJB
Total P (µg/L)	18.00	36.00
Dissolved P (µg/L)		
Chl-a (µg/L)	3.41	
TKN (µg/L)		
$NO_3 + NO_2$-N (µg/L)		
NH_3-N (µg/L)		
Total N (µg/L)		
Lab Cond. (µS/cm)		
Lab pH		
Alkalinity (mg/L $CaCO_3$)		
Total Susp. Solids (mg/L)	ND	2.00
Calcium (mg/L)		

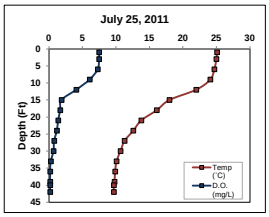
Data collected by TWH, MMF and EEC (Onterra)

Lake Julia

Date: 7/25/2011
Time: 10:35
Weather: 75°F 90% sun, light wind
Entry: MMF

Max Depth: 43.3
LJS Depth (ft): 3
LJB Depth (ft): 40
Secchi Depth (ft): 5.1

Depth (ft)	Temp (°C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	25.1	7.5	8.3	98
3	25	7.5	8.3	97
6	24.7	7.3	8.3	98
9	24.1	6.1	8	98
12	22	4.1	7.6	99
15	18	1.9	7.4	98
18	16.1	1.7	7.4	98
21	13.8	1.4	7.3	98
24	12.6	1.2	7.3	99
27	11.3	0.8	7.2	102
30	10.7	0.7	7.2	103
33	10.1	0.3	7.2	107
36	9.9	0.2	7.2	107
39	9.8	0.2	7.2	108
40	9.7	0.2	7.2	108
42	9.7	0.2	7.2	109



Parameter	LJS	LJB
Total P (µg/L)	14.00	25.00
Dissolved P (µg/L)	ND	5.00
Chl-a (µg/L)	4.95	
TKN (µg/L)	420.00	530.00
$NO_3 + NO_2$-N (µg/L)	ND	157.00
NH_3-N (µg/L)	ND	45.00
Total N (µg/L)	420.00	530.00
Lab Cond. (µS/cm)	99.00	113.00
Lab pH	7.86	7.21
Alkalinity (mg/L $CaCO_3$)	44.80	51.70
Total Susp. Solids (mg/L)	ND	ND
Calcium (mg/L)		

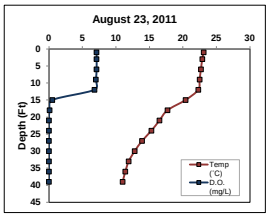
Data collected by TWH and MMF (Onterra)

Lake Julia

Date: 8/23/2011
Time: 13:30
Weather: 75% couds, breezy, 77°
Entry: TWH

Max Depth: 42.4
LJS Depth (ft): 3
LJB Depth (ft): 39
Secchi Depth (ft): 6.1

Depth (ft)	Temp (°C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	23.1	7.1		
3	22.9	7.1		
6	22.7	7.1		
9	22.5	7		
12	22.3	6.8		
15	20.4	0.5		
18	17.7	0.1		
21	16.5	0		
24	15.3	0		
27	13.9	0		
30	12.8	0		
33	11.9	0		
36	11.4	0		
39	11	0		



Parameter	LJS	LJB
Total P (µg/L)	12.00	23.00
Dissolved P (µg/L)		
Chl-a (µg/L)	3.29	
TKN (µg/L)		
$NO_3 + NO_2$-N (µg/L)		
NH_3-N (µg/L)		
Total N (µg/L)		
Lab Cond. (µS/cm)		
Lab pH		
Alkalinity (mg/L $CaCO_3$)		
Total Susp. Solids (mg/L)	ND	2.00
Calcium (mg/L)		

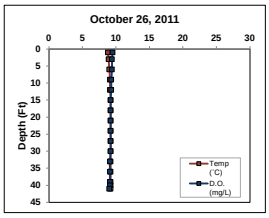
Data collected by TAH (Onterra)

Lake Julia

Date: 10/26/2011
Time: 10:06
Weather: 90% clouds, light breeze, 42°
Entry: TWH

Max Depth: 42.9
LJS Depth (ft): 3
LJB Depth (ft): 40
Secchi Depth (ft): 5

Depth (ft)	Temp (°C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	8.8	9.5		
3	8.9	9.4		
6	9	9.4		
9	9.1	9.3		
12	9.1	9.3		
15	9.2	9.2		
18	9.2	9.2		
21	9.2	9.2		
24	9.2	9.2		
27	9.2	9.2		
30	9.2	9.2		
33	9.2	9.1		
36	9.2	9.1		
39	9.2	9.1		
40	9.2	9.1		
41	9.2	9		



Parameter	LJS	LJB
Total P (µg/L)	14.00	14.00
Dissolved P (µg/L)		
Chl-a (µg/L)	2.07	
TKN (µg/L)		
$NO_3 + NO_2$-N (µg/L)		
NH_3-N (µg/L)		
Total N (µg/L)		
Lab Cond. (µS/cm)		
Lab pH		
Alkalinity (mg/L $CaCO_3$)		
Total Susp. Solids (mg/L)	ND	ND
Calcium (mg/L)		

Data collected by TWH (Onterra)

Water Quality Data

2011	Surface		Bottom	
Parameter	Count	Mean	Count	Mean
Secchi Depth (feet)	6	5.5	NA	NA
Total P (µg/L)	6	15.0	6	23.0
Dissolved P (µg/L)	3	2.0	3	4.3
Chl a (µg/L)	5	3.4	0	NA
TKN (µg/L	3	486.7	3	500.0
NO3+NO2-N (µg/L)	3	145.0	3	154.7
NH3-N (µg/L)	3	19.0	3	44.3
Total N (µg/L)	3	486.7	3	500.0
Lab Cond. (µS/cm)	1	99.0	1	113.0
Lab pH	1	7.9	2	7.3
Alkal (mg/l CaCO3)	1	44.8	2	49.1
Total Susp Sol (mg/l)	6	ND	6	2.0
Calcium (µg/L)	1	11.5	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 (WTSI)

Year	TP	Chl-a	Secchi
1990			46.3
1991			55.3
1992			46.9
1993	47.3	46.3	48.3
1994	38.7	34.6	48.8
1995	36.6	30.9	46.7
2011	42.9	43.9	51.5
All Years (Weighted)	41.6	41.0	49.0
ep, Lowland Drainage Lak	49.4	49.7	46.2
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
1979												
1986												
1987												
1988												
1989												
1990	12	8.1	9	8.5								
1991	9	4.6	9	4.6								
1992	6	8.1	6	8.1								
1993	10	7.1	8	7.4	3	4.1	1	5.0	3	13.7	1.0	20.0
1994	15	7.2	11	7.2	2	1.9	1	1.5	2	10.5	1.0	11.0
1995	2	8.3	2	8.3	2	1.0	2	1.0	2	9.5	2.0	9.5
1996												
1997												
1998												
1999												
2000												
2001												
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												
2011	6	5.5	4	5.9	5	3.4	3	3.9	5	15.0	3.0	14.7
All Years (Weighted)		6.9		7.0		2.9		2.9		13.0		13.4
Deep, Lowland Drainage Lakes				8.5				7.0				23.0
NLF Ecoregion				8.9				5.6				21.0

Summer 2011 N: 420.0
Summer 2011 P: 14.7

Summer 2011 N:P 29 :1

D

APPENDIX D

Watershed Analysis WiLMS Results

Date: 3/22/2012 Scenario: Lake Julia current

Lake Id: 1614300
Watershed Id: 0

Hydrologic and Morphometric Data

Tributary Drainage Area: 4962.0 acre
Total Unit Runoff: 12.2 in.
Annual Runoff Volume: 5044.7 acre-ft
Lake Surface Area <As>: 401 acre
Lake Volume <V>: 7217 acre-ft
Lake Mean Depth <z>: 18.0 ft
Precipitation - Evaporation: 5.8 in.
Hydraulic Loading: 5238.5 acre-ft/year
Areal Water Load <qs>: 13.1 ft/year
Lake Flushing Rate <p>: 0.73 1/year
Water Residence Time: 1.38 year
Observed spring overturn total phosphorus (SPO): 17.0 mg/m^3
Observed growing season mean phosphorus (GSM): 15.0 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre	Low	Most Likely	High	Loading %	Low	Most Likely	High
	(ac)	Loading (kg/ha-year)				Loading (kg/year)		
Row Crop AG	0.0	0.50	1.00	3.00	0.0	0	0	0
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	195	0.10	0.30	0.50	9.2	8	24	39
HD Urban (1/8 Ac)	0.0	1.00	1.50	2.00	0.0	0	0	0
MD Urban (1/4 Ac)	0.0	0.30	0.50	0.80	0.0	0	0	0
Rural Res (>1 Ac)	0.0	0.05	0.10	0.25	0.0	0	0	0
Wetlands	3110	0.10	0.10	0.10	48.7	126	126	126
Forest	1657	0.05	0.09	0.18	23.3	34	60	121
Lake Surface	401.0	0.10	0.30	1.00	18.8	16	49	162

POINT SOURCE DATA

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

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.3	0.5	0.8	
# capita-years	0.0				
% Phosphorus Retained by Soil		98	90	80	
Septic Tank Loading (kg/year)		0.00	0.00	0.00	0.0

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	404.6	570.1	988.3	100.0
Total Loading (kg)	183.5	258.6	448.3	100.0
Areal Loading (lb/ac-year)	1.01	1.42	2.46	0.0
Areal Loading (mg/m^2-year)	113.08	159.34	276.26	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)	368.8	462.7	630.6	100.0
Total NPS Loading (kg)	167.3	209.9	286.0	100.0

Phosphorus Prediction and Uncertainty Analysis Module

Date: 3/22/2012 Scenario: 33
Observed spring overturn total phosphorus (SPO): 17.0 mg/m^3
Observed growing season mean phosphorus (GSM): 15.0 mg/m^3
Back calculation for SPO total phosphorus: 0.0 mg/m^3
Back calculation GSM phosphorus: 0.0 mg/m^3
% Confidence Range: 70%
Nurenberg Model Input - Est. Gross Int. Loading: 0 kg

Lake Phosphorus Model	Low Total P (mg/m^3)	Most Likely Total P (mg/m^3)	High Total P (mg/m^3)	Predicted -Observed (mg/m^3)	% Dif.
Walker, 1987 Reservoir	14	19	34	4	27
Canfield-Bachmann, 1981 Natural Lake	15	20	30	5	33
Canfield-Bachmann, 1981 Artificial Lake	15	19	27	4	27
Rechow, 1979 General	7	10	17	-5	-33
Rechow, 1977 Anoxic	21	29	51	14	93
Rechow, 1977 water load<50m/year	11	15	26	0	0
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	15	20	36	3	18
Vollenweider, 1982 Combined OECD	13	17	27	1	6
Dillon-Rigler-Kirchner	8	11	19	-6	-35
Vollenweider, 1982 Shallow Lake/Res.	10	13	21	-3	-19
Larsen-Mercier, 1976	13	18	32	1	6
Nurnberg, 1984 Oxic	9	13	22	-2	-13

Lake Phosphorus Model	Confidence Lower Bound	Confidence Upper Bound	Parameter Fit?	Back Calculation (kg/year)	Model Type
Walker, 1987 Reservoir	13	30	FIT	0	GSM
Canfield-Bachmann, 1981 Natural Lake	6	58	FIT	1	GSM
Canfield-Bachmann, 1981 Artificial Lake	6	55	FIT	1	GSM
Rechow, 1979 General	6	16	FIT	0	GSM
Rechow, 1977 Anoxic	20	46	FIT	0	GSM
Rechow, 1977 water load<50m/year	10	24	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	12	35	FIT	0	SPO
Vollenweider, 1982 Combined OECD	9	30	FIT	0	ANN
Dillon-Rigler-Kirchner	8	17	FIT	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	7	23	FIT	0	ANN
Larsen-Mercier, 1976	13	28	P Pin	0	SPO
Nurnberg, 1984 Oxic	8	22	FIT	0	ANN

Water and Nutrient Outflow Module

Date: 3/22/2012 Scenario: 20
Average Annual Surface Total Phosphorus: 15.0mg/m^3
Annual Discharge: 5.24E+003 AF => 6.46E+006 m^3
Annual Outflow Loading: 204.1 LB => 92.6 kg

E

APPENDIX E

Aquatic Plant Survey Data

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Brasenia schreberi	Ceratophyllum demersum	Ceratophyllum echinatum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Heteranthera dubia	Isoetes sp.	Lemna trisulca	Megalodonta beckii	Myriophyllum alterniflorum	Myriophyllum sibiricum	Najas flexilis	Najas sp.	Naphar variegata	Nymphaea odorata	Pontederia cordata	Potamogeton alpinus	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton natans	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton strictifolius	Potamogeton zosteriformis	Ranunculus aquatilis	Sagitaria sp. (rosette)	Sagittaria latifolia	Schoenoplectus acutus	Schoenoplectus pungens	Utricularia intermedia	Utricularia vulgaris	Vallisneria americana	Zizania sp.	Aquatic Moss	Freshwater Sponge	Schoenoplectus subterminalis	Utricularia minor	Najas guadalupensis
1	-89.06129144	45.78635913	7	Sand	Pole										1					1								1					1	1										1				
2	-89.06128434	45.78678210	0			DEEP																																											
3	-89.06067976	45.78677713	15	Muck	Pole																																											
4	-89.06127724	45.78720508	0			DEEP																																										
5	-89.06067265	45.78720011	0			DEEP																																										
6	-89.06006807	45.78719514	0			DEEP																																										
7	-89.05946348	45.78719016	8	Sand	Pole																													1													
8	-89.04858096	45.78710006	6	Muck	Pole					1			1							1							1						2					1					1				
9	-89.04797637	45.78709502	7	Muck	Pole								1							1							1											1				1	1				
10	-89.04737179	45.78708998	5	Muck	Pole			1					1																						2			1								
11	-89.06127014	45.78762805	15	Sand	Pole																																										
12	-89.06066555	45.78762308	0			DEEP																																										
13	-89.06006096	45.78761811	0			DEEP																																										
14	-89.05945637	45.78761314	0			DEEP																																										
15	-89.05885178	45.78760816	0			DEEP																																										
16	-89.05824719	45.78760318	10	Sand	Pole																																								1				
17	-89.05764260	45.78759819	10	Sand	Pole										1																													1				
18	-89.05703801	45.78759320	6	Sand	Pole					1										1													1											1		1		
19	-89.04978294	45.78753309	3	Sand	Pole																1																						1					
20	-89.04917835	45.78752806	8	Sand	Pole																																											
21	-89.04857376	45.78752303	7	Sand	Pole																												2														
22	-89.04796917	45.78751799	7	Muck	Pole								1							1													1					1					2				
23	-89.04736458	45.78751295	5	Sand	Pole				1	1			1							1										2												1				
24	-89.04676000	45.78750791	4	Sand	Pole															1		1								2			1					1				1				
25	-89.06065844	45.78804606	13	Sand	Pole																																										
26	-89.06005385	45.78804109	0			DEEP																																										
27	-89.05944925	45.78803611	0			DEEP																																										
28	-89.05884466	45.78803113	0			DEEP																																										
29	-89.05824006	45.78802615	0			DEEP																																										
30	-89.05763547	45.78802117	0			DEEP																																										
31	-89.05703087	45.78801618	0			DEEP																																										
32	-89.05642628	45.78801119	0			DEEP																																										
33	-89.05582168	45.78800619	10	Sand	Pole																																										
34	-89.05158953	45.78797114	2	Sand	Pole																																										
35	-89.05098493	45.78796612	4	Sand	Pole																																								1		
36	-89.05038034	45.78796109	12	Sand	Pole																																										
37	-89.04977575	45.78795607	12	Sand	Pole																																										
38	-89.04917116	45.78795104	13		Rope																																										
39	-89.04856656	45.78794600	12	Sand	Pole																																										
40	-89.04796197	45.78794097	6	Sand	Pole					1			1							1													1										1				
41	-89.04735738	45.78793593	5	Sand	Pole																1																										
42	-89.04675279	45.78793088	4	Sand	Pole		1		1						1				1	1	1	1					1		2																	
43	-89.06004674	45.78846406	2	Sand	Pole									1	1						1	1							1																	
44	-89.05944214	45.78845909	0			DEEP																																										
45	-89.05883754	45.78845411	0			DEEP																																										
46	-89.05823294	45.78844913	0			DEEP																																										
47	-89.05762834	45.78844414	0			DEEP																																										
48	-89.05702374	45.78843915	0			DEEP																																										
49	-89.05641914	45.78843416	0			DEEP																																										
50	-89.05581454	45.78842916	0			DEEP																																										
51	-89.05520994	45.78842417	11	Sand	Pole					1					1																												1				
52	-89.05339615	45.78840915	2	Sand	Pole						1										1																					1					
53	-89.05279155	45.78840414	9	Sand	Pole																													1													
54	-89.05218695	45.78839913	14		Rope																																										
55	-89.05158235	45.78839411	17		Rope																																										
56	-89.05097776	45.78838909	0			DEEP																																										
57	-89.05037316	45.78838407	0			DEEP																																										
58	-89.04976856	45.78837904	0			DEEP																																										
59	-89.04916396	45.78837401	0			DEEP																																										
60	-89.04855937	45.78836898	11	Sand	Pole																																										
61	-89.04795477	45.78836394	6	Sand	Pole								1								1	1																									
62	-89.04735017	45.78835890	5	Sand	Pole																1												1													
63	-89.04674558	45.78835386	4	Sand	Pole																2															1										
64	-89.05883042	45.78887708	0			DEEP																																										
65	-89.05822582	45.78887210	0			DEEP																																										
66	-89.05762121	45.78886711	0			DEEP																																										
67	-89.05701661	45.78886213	0			DEEP																																										
68	-89.05641200	45.78885713	0			DEEP																																										
69	-89.05580740	45.78885214	0			DEEP																																										
70	-89.05520280	45.78884714	0			DEEP																																										
71	-89.05459819	45.78884214	16		Rope																																										
72	-89.05399359	45.78883713	8	Sand	Pole										1					2										1							1									
73	-89.05338899	45.78883213	11	Sand	Pole																																										
74	-89.05278438	45.78882712	0			DEEP																																										
75	-89.05217978	45.78882210	0			DEEP																																										
76	-89.05157518	45.78881708	0			DEEP																																										
77	-89.05097058	45.78881206	0			DEEP																																										
78	-89.05036597	45.78880704	0			DEEP																																										
79	-89.04976137	45.78880201	0			DEEP																																										
80	-89.04915677	45.78879698	0			DEEP																																										
81	-89.04855217	45.78879195	15		Rope																																										
82	-89.04794757	45.78878691	6	Rock	Pole					1													1																								
83	-89.04734297	45.78878187	5	Sand	Pole																			1																			1				
84	-89.04673836	45.78877683	3	Sand	Pole					1																																	1				
85	-89.05882330	45.78930006	5	Rock	Pole					2											1									1														1	1			
86	-89.05821869	45.78929507	19			DEEP																																										
87	-89.05761408	45.78929009	0			DEEP																																										
88	-89.05700947	45.78928510	0			DEEP																																										
89	-89.05640487	45.78928011	0			DEEP																																										
90	-89.05580026	45.78927511	0			DEEP																																										
91	-89.05519565	45.78927012	0			DEEP																																										
92	-89.05459104	45.78926511	0			DEEP																																										
93	-89.05398643	45.78926011	0			DEEP																																										
94	-89.05338183	45.78925510	0			DEEP																																										
95	-89.05277722	45.78925009	0			DEEP																																										
96	-89.05217261	45.78924508	0			DEEP																																										
97	-89.05156800	45.78924006	0			DEEP																																										
98	-89.05096340	45.78923504	0			DEEP																																										
99	-89.05035879	45.78923001	0			DEEP																																										
100	-89.04975418	45.78922499	0			DEEP																																										
101	-89.04914958	45.78921996	0			DEEP																																										
102	-89.04854497	45.78921492	0			DEEP																																										
103	-89.04794037	45.78920989	0			DEEP																																										
104	-89.04733576	45.78920485	5	Sand	Pole					1																																				
105	-89.04673115	45.78919980	3	Sand	Pole																																						1				
106	-89.04612655	45.78919476	3	Sand	Pole																1																										
107	-89.05881618	45.78972303	4	Sand	Pole					2										1			1							1	1													1				
108	-89.05821157	45.78971805	12	Sand	Pole																													1													
109	-89.05760695	45.78971306	0			DEEP																																										
110	-89.05700234	45.78970807	0			DEEP																																										
111	-89.05639773	45.78970308	0			DEEP																																										
112	-89.05579312	45.78969809	0			DEEP																																										
113	-89.05518850	45.78969309	0			DEEP																																										
114	-89.05458389	45.78968809	0			DEEP																																										
115	-89.05397928	45.78968308	0			DEEP																																										
116	-89.05337467	45.78967808	0			DEEP																																										
117	-89.05277005	45.78967306	0			DEEP																																										
118	-89.05216544	45.78966805	0			DEEP																																										
119	-89.05156083	45.78966303	0			DEEP																																										
120	-89.05095622	45.78965801	0			DEEP																																										
121	-89.05035161	45.78965299	0			DEEP																																										
122	-89.04974700	45.78964798	0			DEEP																																										
123	-89.04914239	45.78964293	0			DEEP																																										
124	-89.04853777	45.78963790	0			DEEP																																										
125	-89.04793316	45.78963286	0			DEEP																																										
126	-89.04732855	45.78962782	0			DEEP																																										
127	-89.04672394	45.78962278	8	Rock	Pole																																										
128	-89.04611933	45.78961773	4	Sand	Pole																																						1				
129	-89.05880906	45.79014601	1	Sand	Pole															1		1																							V				
130	-89.05820444	45.79014102	8	Sand	Pole								1							1							1							1										2				
131	-89.05759982	45.79013604	13	Sand	Pole																																										
132	-89.05699521	45.79013105	20		Rope																																										
133	-89.05639059	45.79012606	0			DEEP																																										
134	-89.05578597	45.79012106	0			DEEP																																										
135	-89.05518136	45.79011606	0			DEEP																																										
136	-89.05457674	45.79011106	0			DEEP																																										
137	-89.05397212	45.79010606	0			DEEP																																										
138	-89.05336750	45.79010105	0			DEEP																																										
139	-89.05276289	45.79009604	0			DEEP																																										
140	-89.05215827	45.79009102	0			DEEP																																										
141	-89.05155366	45.79008601	0			DEEP																																										
142	-89.05094904	45.79008099	0			DEEP																																										
143	-89.05034442	45.79007596	0			DEEP																																										
144	-89.04973981	45.79007093	0			DEEP																																										
145	-89.04913519	45.79006590	0			DEEP																																										
146	-89.04853058	45.79006087	0			DEEP																																										
147	-89.04792596	45.79005583	0			DEEP																																										
148	-89.04732135	45.79005079	0			DEEP																																										
149	-89.04671673	45.79004575	22			DEEP																																										
150	-89.04611212	45.79004070	5	Sand	Pole																																										
151	-89.04550750	45.79003565	3	Sand	Pole																																										
152	-89.05819732	45.79056400	4	Sand	Pole					2			1							1		1								1									1								
153	-89.05759270	45.79055901	5	Sand	Pole								1							1		1											1										1				1
154	-89.05698807	45.79055402	16		Rope																																										
155	-89.05638345	45.79054903	21		Rope																																										
156	-89.05577883	45.79054404	0			DEEP																																										

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE, ROPE	COMMENTS	Brasenia schreberi	Ceratophyllum demersum	Ceratophyllum echinatum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Heteranthera dubia	Isoetes sp.	Lemna trisulca	Megalodonta beckii	Myriophyllum alterniflorum	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Pontederia cordata	Potamogeton alpinus	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton natans	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton strictifolius	Potamogeton zosteriformis	Ranunculus aquatilis	Sagitaria sp. (rosette)	Sagittaria latifolia	Schoenoplectus acutus	Schoenoplectus pungens	Utricularia intermedia	Utricularia vulgaris	Vallisneria americana	Zizania sp.	Aquatic Moss	Freshwater Sponge	Schoenoplectus subterminalis	Utricularia minor	Najas guadalupensis
157	-89.05517421	45.79053904	0			DEEP																																											
158	-89.05456959	45.79053404	0			DEEP																																											
159	-89.05396496	45.79052903	0			DEEP																																											
160	-89.05336034	45.79052402	0			DEEP																																											
161	-89.05275572	45.79051901	0			DEEP																																											
162	-89.05215110	45.79051400	0			DEEP																																											
163	-89.05154648	45.79050898	0			DEEP																																											
164	-89.05094186	45.79050396	0			DEEP																																											
165	-89.05033724	45.79049893	0			DEEP																																											
166	-89.04973262	45.79049391	0			DEEP																																											
167	-89.04912800	45.79048888	0			DEEP																																											
168	-89.04852338	45.79048384	0			DEEP																																											
169	-89.04791876	45.79047881	0			DEEP																																											
170	-89.04731414	45.79047377	0			DEEP																																											
171	-89.04670952	45.79046872	0			DEEP																																											
172	-89.04610490	45.79046368	16		Rope																																												
173	-89.04550028	45.79045863	4	Sand	Pole																																									1				
174	-89.05819019	45.79098697	6	Muck	Pole															1							1												1							1				
175	-89.05758557	45.79098199	12	Muck	Pole																											2																	
176	-89.05698094	45.79097700	17		Rope																																												
177	-89.05637631	45.79097201	17		Rope																																												
178	-89.05577169	45.79096701	18		Rope																																												
179	-89.05516706	45.79096201	24		Rope																																												
180	-89.05456243	45.79095701	0			DEEP																																											
181	-89.05395781	45.79095201	0			DEEP																																											
182	-89.05335318	45.79094700	0			DEEP																																											
183	-89.05274856	45.79094199	0			DEEP																																											
184	-89.05214393	45.79093697	0			DEEP																																											
185	-89.05153931	45.79093195	0			DEEP																																											
186	-89.05093468	45.79092693	0			DEEP																																											
187	-89.05033006	45.79092191	0			DEEP																																											
188	-89.04972543	45.79091688	0			DEEP																																											
189	-89.04912081	45.79091185	0			DEEP																																											
190	-89.04851618	45.79090682	0			DEEP																																											
191	-89.04791156	45.79090178	0			DEEP																																											
192	-89.04730693	45.79089674	0			DEEP																																											
193	-89.04670231	45.79089170	0			DEEP																																											
194	-89.04609768	45.79088665	0			DEEP																																											
195	-89.04549306	45.79088160	5	Rock	Pole																																												
196	-89.04488844	45.79087655	2	Sand	Pole																																								1				
197	-89.05818307	45.79140995	3	Sand	Pole		V			1			1		1					1	1		V											1											1				
198	-89.05757844	45.79140496	4	Sand	Pole								1		1					1							1							1	1				1						1				
199	-89.05697381	45.79139997	2	Sand	Pole																1																	1											
200	-89.05636917	45.79139498	2	Sand	Pole				1												1								1																				
201	-89.05576454	45.79138998	8	Sand	Pole																								1									1								1			
202	-89.05515991	45.79138489	16		Rope																																												
203	-89.05455528	45.79137998	23		Rope																																												
204	-89.05395065	45.79137498	25		Rope																																												
205	-89.05334602	45.79136997	0			DEEP																																											
206	-89.05274139	45.79136496	0			DEEP																																											
207	-89.05213676	45.79135994	0			DEEP																																											
208	-89.05153213	45.79135493	0			DEEP																																											
209	-89.05092750	45.79134991	0			DEEP																																											
210	-89.05032287	45.79134488	0			DEEP																																											
211	-89.04971824	45.79133985	0			DEEP																																											
212	-89.04911361	45.79133482	0			DEEP																																											
213	-89.04850898	45.79132979	0			DEEP																																											
214	-89.04790435	45.79132475	0			DEEP																																											
215	-89.04729973	45.79131971	0			DEEP																																											
216	-89.04669510	45.79131467	0			DEEP																																											
217	-89.04609047	45.79130962	0			DEEP																																											
218	-89.04548584	45.79130457	13		Rope																																												
219	-89.04488121	45.79129952	3	Sand	Pole																																											
220	-89.05515277	45.79180796	2	Sand	Pole																	1																									1			
221	-89.05454813	45.79180296	13		Rope																																												
222	-89.05394349	45.79179795	13		Rope																																												
223	-89.05333886	45.79179294	19		Rope																																												
224	-89.05273422	45.79178793	0			DEEP																																											
225	-89.05212959	45.79178292	0			DEEP																																											
226	-89.05152496	45.79177790	0			DEEP																																											
227	-89.05092032	45.79177288	0			DEEP																																											
228	-89.05031569	45.79176786	0			DEEP																																											
229	-89.04971105	45.79176283	0			DEEP																																											
230	-89.04910642	45.79175780	0			DEEP																																											
231	-89.04850179	45.79175276	0			DEEP																																											
232	-89.04789715	45.79174773	0			DEEP																																											
233	-89.04729252	45.79174269	0			DEEP																																											
234	-89.04668789	45.79173764	0			DEEP																																											
235	-89.04608325	45.79173260	0			DEEP																																											
236	-89.04547862	45.79172755	8	Sand	P																																												
237	-89.04487399	45.79172249	3	Rock	Pole																																								1				
238	-89.05212242	45.79220589	6	Sand	Pole										1					1										1				1											1				
239	-89.05151778	45.79220087	0			DEEP																																											
240	-89.05091314	45.79219585	0			DEEP																																											
241	-89.05030850	45.79219083	0			DEEP																																											
242	-89.04970386	45.79218580	0			DEEP																																											
243	-89.04909923	45.79218077	0			DEEP																																											
244	-89.04849459	45.79217574	0			DEEP																																											
245	-89.04788995	45.79217070	0			DEEP																																											
246	-89.04728531	45.79216566	0			DEEP																																											
247	-89.04668067	45.79216062	0			DEEP																																											
248	-89.04607604	45.79215557	0			DEEP																																											
249	-89.04547140	45.79215052	8	Sand	Pole																																												
250	-89.04486678	45.79214547	4	Rock	Pole																1																									1				
251	-89.05211525	45.79262887	4	Sand	Pole					1												1										1							1							1				
252	-89.05151060	45.79262385	0			DEEP																																											
253	-89.05090596	45.79261883	0			DEEP																																											
254	-89.05030132	45.79261380	0			DEEP																																											
255	-89.04969667	45.79260877	0			DEEP																																											
256	-89.04909203	45.79260374	0			DEEP																																											
257	-89.04848739	45.79259871	0			DEEP																																											
258	-89.04788275	45.79259367	0			DEEP																																											
259	-89.04727810	45.79258863	0			DEEP																																											
260	-89.04667346	45.79258359	0			DEEP																																											
261	-89.04606882	45.79257854	0			DEEP																																											
262	-89.04546418	45.79257349	10	Sand	Pole																																												
263	-89.04485954	45.79256844	6	Sand	Pole																																												
264	-89.05150343	45.79304682	20		Rope																																												
265	-89.05089878	45.79304180	0			DEEP																																											
266	-89.05029413	45.79303678	0			DEEP																																											
267	-89.04968949	45.79303175	0			DEEP																																											
268	-89.04908484	45.79302672	0			DEEP																																											
269	-89.04848019	45.79302168	0			DEEP																																											
270	-89.04787554	45.79301665	0			DEEP																																											
271	-89.04727090	45.79301160	0			DEEP																																											
272	-89.04666625	45.79300656	0			DEEP																																											
273	-89.04606160	45.79300151	0			DEEP																																											
274	-89.04545696	45.79299646	0			DEEP																																											
275	-89.04485231	45.79299141	12		Rope																																												
276	-89.04424766	45.79298635	4	Sand	Pole																																												
277	-89.05089160	45.79346477	4	Sand	Pole																						1																						
278	-89.05028695	45.79345975	16		Rope																																												
279	-89.04968230	45.79345472	0			DEEP																																											
280	-89.04907764	45.79344969	0			DEEP																																											
281	-89.04847299	45.79344466	0			DEEP																																											
282	-89.04786834	45.79343962	0			DEEP																																											
283	-89.04726369	45.79343458	0			DEEP																																											
284	-89.04665904	45.79342953	0			DEEP																																											
285	-89.04605439	45.79342449	0			DEEP																																											
286	-89.04544973	45.79341944	0			DEEP																																											
287	-89.04484508	45.79341438	0			DEEP																																											
288	-89.04424043	45.79340933	13		Rope																																												
289	-89.04303113	45.79339920	5	Sand	Pole																																											
290	-89.04242648	45.79339414	3	Rock	Pole																																											
291	-89.05027976	45.79388272	6	Sand	Pole																2																	1											
292	-89.04967511	45.79387769	25		Rope																																													
293	-89.04907045	45.79387266	0			DEEP																																											
294	-89.04846579	45.79386763	0			DEEP																																											
295	-89.04786114	45.79386259	0			DEEP																																											
296	-89.04725648	45.79385755	0			DEEP																																											
297	-89.04665182	45.79385251	0			DEEP																																											
298	-89.04604717	45.79384746	0			DEEP																																											
299	-89.04544251	45.79384241	0			DEEP																																											
300	-89.04483786	45.79383739	0			DEEP																																											
301	-89.04423320	45.79383230	0			DEEP																																											
302	-89.04362855	45.79382724	83	Sand	Pole																																												
303	-89.04302389	45.79382218	13	Rock	Pole																																												
304	-89.04241924	45.79381711	9	Rock	Pole																	1																											
305	-89.04181458	45.79381204	3	Rock	Pole																																												
306	-89.04966792	45.79430067	12	Sand	Pole																1																											
307	-89.04906325	45.79429564	0			DEEP																																											
308	-89.04845859	45.79429060	0			DEEP																																											
309	-89.04785393	45.79428556	0			DEEP																																											
310	-89.04724927	45.79428052	0			DEEP																																											
311	-89.04664461	45.79427548	0			DEEP																																											
312	-89.04603995	45.79427043	0			DEEP																																											

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Brasenia schreberi	Ceratophyllum demersum	Ceratophyllum echinatum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Heteranthera dubia	Isoetes sp.	Lemna trisulca	Megalodonta beckii	Myriophyllum alterniflorum	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Pontederia cordata	Potamogeton alpinus	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton natans	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton strictifolius	Potamogeton zosteriformis	Ranunculus aquatilis	Sagitaria sp. (rosette)	Sagittaria latifolia	Schoenoplectus acutus	Schoenoplectus pungens	Utricularia intermedia	Utricularia vulgaris	Vallisneria americana	Zizania sp.	Aquatic Moss	Freshwater Sponge	Schoenoplectus subterminalis	Utricularia minor	Najas guadalupensis
313	-89.04543529	45.79426538	0			DEEP																																										
314	-89.04483063	45.79426033	0			DEEP																																										
315	-89.04422597	45.79425527	0			DEEP																																										
316	-89.04362131	45.79425021	0			DEEP																																										
317	-89.04301665	45.79424515	0			DEEP																																										
318	-89.04241199	45.79424008	10	Rock	Pole																																										
319	-89.04180733	45.79423501	3	Rock	Pole																																										
320	-89.04120267	45.79422994	2	Rock	Pole																																										
321	-89.04066073	45.79472364	2	Sand	Pole																	1								1													1					
322	-89.04005606	45.79471861	20		Rope																																										
323	-89.04845139	45.79471358	0			DEEP																																										
324	-89.04784673	45.79470854	0			DEEP																																										
325	-89.04724206	45.79470350	0			DEEP																																										
326	-89.04663740	45.79469845	0			DEEP																																										
327	-89.04603273	45.79469341	0			DEEP																																										
328	-89.04542807	45.79468836	0			DEEP																																										
329	-89.04482340	45.79468330	0			DEEP																																										
330	-89.04421874	45.79467824	0			DEEP																																										
331	-89.04361407	45.79467318	0			DEEP																																										
332	-89.04300941	45.79466812	0			DEEP																																										
333	-89.04240475	45.79466305	0			DEEP																																										
334	-89.04180008	45.79465799	13	Rock	Pole																																										
335	-89.04119542	45.79465291	7	Rock	Pole																																										
336	-89.04059075	45.79464784	2	Rock	Pole																																										
337	-89.04904887	45.79514158	5	Sand	Pole										1					1													1						1								
338	-89.04844420	45.79513655	0			DEEP																																										
339	-89.04783952	45.79513151	0			DEEP																																										
340	-89.04723485	45.79512647	0			DEEP																																										
341	-89.04663019	45.79512143	0			DEEP																																										
342	-89.04602552	45.79511638	0			DEEP																																										
343	-89.04542085	45.79511133	0			DEEP																																										
344	-89.04481618	45.79510627	0			DEEP																																										
345	-89.04421151	45.79510122	0			DEEP																																										
346	-89.04360684	45.79509616	0			DEEP																																										
347	-89.04300217	45.79509109	0			DEEP																																										
348	-89.04239750	45.79508603	0			DEEP																																										
349	-89.04179283	45.79508096	0			DEEP																																										
350	-89.04118816	45.79507588	0			DEEP																																										
351	-89.04058350	45.79507081	7	Rock	Pole																																										
352	-89.03997883	45.79506573	3	Rock	Pole																																										
353	-89.03937416	45.79506065	5	Muck	Pole																						1																				
354	-89.04843700	45.79555952	17		Rope																																										
355	-89.04783232	45.79555448	0			DEEP																																										
356	-89.04722765	45.79554944	20		Rope																																										
357	-89.04662297	45.79554440	19		Pole																																										
358	-89.04601830	45.79553935	0			DEEP																																										
359	-89.04541362	45.79553430	0			DEEP																																										
360	-89.04480895	45.79552925	0			DEEP																																										
361	-89.04420428	45.79552419	0			DEEP																																										
362	-89.04359960	45.79551913	0			DEEP																																										
363	-89.04299493	45.79551407	0			DEEP																																										
364	-89.04239026	45.79550900	0			DEEP																																										
365	-89.04178558	45.79550393	0			DEEP																																										
366	-89.04118091	45.79549886	0			DEEP																																										
367	-89.04057624	45.79549378	16		Rope																																										
368	-89.03997156	45.79548870	12	Rock	Pole																																										
369	-89.03936689	45.79548362	8	Sand	Pole																																										
370	-89.03876222	45.79547853	3	Rock	Pole																																										
371	-89.04842980	45.79598249	1	Sand	Pole																																										
372	-89.04782512	45.79597746	20		Rope																																										
373	-89.04722044	45.79597242	0			DEEP																																										
374	-89.04661576	45.79596737	4	Sand	Pole							1																															1					
375	-89.04601108	45.79596232	19		Rope																																										
376	-89.04540640	45.79595727	0			DEEP																																										
377	-89.04480172	45.79595222	0			DEEP																																										
378	-89.04419704	45.79594716	0			DEEP																																										
379	-89.04359237	45.79594210	0			DEEP																																										
380	-89.04298769	45.79593704	0			DEEP																																										
381	-89.04238301	45.79593197	0			DEEP																																										
382	-89.04177833	45.79592690	0			DEEP																																										
383	-89.04117366	45.79592183	0			DEEP																																										
384	-89.04056898	45.79591675	14		Rope																																										
385	-89.03996430	45.79591167	8	Rock	Pole																																										
386	-89.03935962	45.79590659	5	Rock	Pole																																										
387	-89.03875495	45.79590150	7	Sand	Pole																																										
388	-89.04781791	45.79640043	3	Sand	Pole											1																											1					
389	-89.04721323	45.79639539	0			TERRESTRIAL																																										
390	-89.04660854	45.79639034	1	Sand	Pole																1																						1		1				
391	-89.04600386	45.79638530	15		Rope																																										
392	-89.04539918	45.79638025	0			DEEP																																										
393	-89.04479450	45.79637519	0			DEEP																																										
394	-89.04418981	45.79637013	0			DEEP																																										
395	-89.04358513	45.79636507	0			DEEP																																										
396	-89.04298045	45.79636001	0			DEEP																																										
397	-89.04237578	45.79635494	0			DEEP																																										
398	-89.04177108	45.79634987	0			DEEP																																										
399	-89.04116640	45.79634480	0			DEEP																																										
400	-89.04056172	45.79633972	12	Rock	Pole																																										
401	-89.03995704	45.79633465	6	Rock	Pole																																										
402	-89.03935236	45.79632956	6	Rock	Pole																																										
403	-89.03874767	45.79632448	8	Rock	Pole																																										
404	-89.03814299	45.79631939	2	Rock	Pole																																										
405	-89.04781071	45.79682340	5	Sand	Pole												1		1															1		1							1					
406	-89.04720602	45.79681836	7	Muck	Pole														1																									1					
407	-89.04660133	45.79681332	6	Rock	Pole														1		1									1													1	1				
408	-89.04599664	45.79680827	20		Rope																																										
409	-89.04539196	45.79680322	0			DEEP																																										
410	-89.04478727	45.79679816	0			DEEP																																										
411	-89.04418258	45.79679311	0			DEEP																																										
412	-89.04357789	45.79678805	0			DEEP																																										
413	-89.04297321	45.79678298	0			DEEP																																										
414	-89.04236852	45.79677792	0			DEEP																																										
415	-89.04176383	45.79677285	0			DEEP																																										
416	-89.04115915	45.79676777	0			DEEP																																										
417	-89.04055446	45.79676270	0			DEEP																																										
418	-89.03994977	45.79675762	11	Sand	Pole																																										
419	-89.03934509	45.79675253	8	Rock	Pole																																										
420	-89.03874040	45.79674745	8	Sand	Pole																																										
421	-89.03813571	45.79674236	4	Rock	Pole																																										
422	-89.04840820	45.79725141	6	Muck	Pole		1	1											1															2			1					1					
423	-89.04780350	45.79724637	6	Muck	Pole			1									1																2			1									
424	-89.04719881	45.79724133	8	Muck	Pole			1											1													1			1											
425	-89.04659412	45.79723629	7	Rock	Pole												1		2			1							1			1		1									1				
426	-89.04598942	45.79723124	0			DEEP																																										
427	-89.04538473	45.79722619	0			DEEP																																										
428	-89.04478004	45.79722114	0			DEEP																																										
429	-89.04417535	45.79721608	0			DEEP																																										
430	-89.04357066	45.79721102	0			DEEP																																										
431	-89.04296596	45.79720595	0			DEEP																																										
432	-89.04236127	45.79720089	0			DEEP																																										
433	-89.04175658	45.79719582	0			DEEP																																										
434	-89.04115189	45.79719074	0			DEEP																																										
435	-89.04054720	45.79718567	0			DEEP																																										
436	-89.03994251	45.79718059	13	Rock	Pole																																										
437	-89.03933782	45.79717551	6	Rock	Pole																																										
438	-89.03873313	45.79717042	6	Rock	Pole																																										
439	-89.03812844	45.79716533	11	Rock	Pole																																										
440	-89.03752375	45.79716024	4	Rock	Pole																																										
441	-89.04900569	45.79767942	2	Muck	Pole		1					1					1				1		1	1	1	1																	1					
442	-89.04840100	45.79767439	4	Muck	Pole		1																																						1				
443	-89.04779630	45.79766935	5	Muck	Pole		2																																						1	1			
444	-89.04719160	45.79766431	5	Muck	Pole							1								1														2			1							1				
445	-89.04658690	45.79765926	3	Sand	Pole					1		1								1	1	1	1							1																	
446	-89.04598221	45.79765421	17		Rope																																											
447	-89.04537751	45.79764916	0			DEEP																																										
448	-89.04477281	45.79764411	12	Rock	Pole																																										
449	-89.04416812	45.79763905	0			DEEP																																										
450	-89.04356342	45.79763399	0			DEEP																																										
451	-89.04295872	45.79762893	0			DEEP																																										
452	-89.04235403	45.79762386	0			DEEP																																										
453	-89.04174933	45.79761879	0			DEEP																																										
454	-89.04114464	45.79761372	0			DEEP																																										
455	-89.04053994	45.79760864	0			DEEP																																										
456	-89.03993524	45.79760358	0			DEEP																																										
457	-89.03933055	45.79759848	12	Rock	Pole																																										
458	-89.03872585	45.79759339	6	Rock	Pole																																										
459	-89.03812116	45.79758830	9	Rock	Pole																																										
460	-89.03751646	45.79758321	13	Sand	Pole																																										
461	-89.03691177	45.79757811	8	Sand	Pole																																										
462	-89.04778909	45.79809232	0			NONNAVIGABLE (PLANTS)																																											
463	-89.04718439	45.79808728	1	Sand	Pole							1									1		1							1													1	1				
464	-89.04657969	45.79808223	3	Muck	Pole		1														1		1																					1				
465	-89.04597499	45.79807719	1	Sand	Pole																																										
466	-89.04476558	45.79806708	0			TERRESTRIAL																																										
467	-89.04416088	45.79806202	5	Rock	Pole																	1								2		1											1				
468	-89.04355618	45.79805696	22			DEEP																																										

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Brasenia schreberi	Ceratophyllum demersum	Ceratophyllum echinatum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Heteranthera dubia	Isoetes sp.	Lemna trisulca	Megalodonta beckii	Myriophyllum alterniflorum	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Pontederia cordata	Potamogeton alpinus	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton natans	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton strictifolius	Potamogeton zosteriformis	Ranunculus aquatilis	Sagitaria sp. (rosette)	Sagittaria latifolia	Schoenoplectus acutus	Schoenoplectus pungens	Utricularia intermedia	Utricularia vulgaris	Vallisneria americana	Zizania sp.	Aquatic Moss	Freshwater Sponge	Schoenoplectus subterminalis	Utricularia minor	Najas guadalupensis
469	-89.04295148	45.79805190	0			DEEP																																										
470	-89.04234678	45.79804683	0			DEEP																																										
471	-89.04174208	45.79804176	0			DEEP																																										
472	-89.04113738	45.79803669	0			DEEP																																										
473	-89.04053268	45.79803161	0			DEEP																																										
474	-89.03992798	45.79802653	0			DEEP																																										
475	-89.03932328	45.79802145	0			DEEP																																										
476	-89.03871858	45.79801636	0			DEEP																																										
477	-89.03811388	45.79801127	0			DEEP																																										
478	-89.03750918	45.79800618	6	Rock	Pole																																										
479	-89.03690448	45.79800109	9	Rock	Pole																																										
480	-89.03629978	45.79799599	8	Sand	Pole																																										
481	-89.04415365	45.79848500	10	Sand	Pole																																										
482	-89.04354895	45.79847994	0			DEEP																																										
483	-89.04294424	45.79847487	0			DEEP																																										
484	-89.04233953	45.79846980	0			DEEP																																										
485	-89.04173483	45.79846473	0			DEEP																																										
486	-89.04113012	45.79845966	0			DEEP																																										
487	-89.04052542	45.79845458	0			DEEP																																										
488	-89.03992071	45.79844950	0			DEEP																																										
489	-89.03931601	45.79844442	0			DEEP																																										
490	-89.03871131	45.79843933	0			DEEP																																										
491	-89.03810660	45.79843425	0			DEEP																																										
492	-89.03750190	45.79842915	0			DEEP																																										
493	-89.03689719	45.79842406	2	Rock	Pole																																										
494	-89.03629249	45.79841896	12	Muck	Pole																																										
495	-89.03568779	45.79841386	9	Rock	Pole																																										
496	-89.03508308	45.79840875	6	Muck	Pole																																										
497	-89.03447838	45.79840364	5	Muck	Pole																																										
498	-89.03387368	45.79839853	3	Sand	Pole																																										
499	-89.04414642	45.79890797	11	Sand	Pole																																										
500	-89.04354171	45.79890291	18		Rope																																										
501	-89.04293700	45.79889784	16		Rope																																										
502	-89.04233229	45.79889278	0			DEEP																																										
503	-89.04172758	45.79888771	0			DEEP																																										
504	-89.04112287	45.79888263	0			DEEP																																										
505	-89.04051816	45.79887756	0			DEEP																																										
506	-89.03991345	45.79887248	0			DEEP																																										
507	-89.03930874	45.79886739	0			DEEP																																										
508	-89.03870403	45.79886231	0			DEEP																																										
509	-89.03809932	45.79885722	0			DEEP																																										
510	-89.03749461	45.79885212	0			DEEP																																										
511	-89.03688991	45.79884703	0			DEEP																																										
512	-89.03628520	45.79884193	0			DEEP																																										
513	-89.03568049	45.79883683	0			DEEP																																										
514	-89.03507578	45.79883172	7	Muck	Pole																																										
515	-89.03447107	45.79882661	7	Muck	Pole																																										
516	-89.03386637	45.79882150	6	Muck	Pole																																										
517	-89.04413918	45.79933094	3	Sand	Pole				1						1				1							1		1																		
518	-89.04353447	45.79932588	0			DEEP																																										
519	-89.04292976	45.79932082	16		Rope																																										
520	-89.04232504	45.79931575	2	Sand	Pole															1								1																	1		
521	-89.04172033	45.79931068	0			DEEP																																										
522	-89.04111561	45.79930560	0			DEEP																																										
523	-89.04051090	45.79930053	0			DEEP																																										
524	-89.03990619	45.79929545	0			DEEP																																										
525	-89.03930147	45.79929036	0			DEEP																																										
526	-89.03869676	45.79928528	0			DEEP																																										
527	-89.03809204	45.79928019	0			DEEP																																										
528	-89.03748733	45.79927510	0			DEEP																																										
529	-89.03688262	45.79927000	0			DEEP																																										
530	-89.03627791	45.79926490	15		Rope																																										
531	-89.03567319	45.79925980	0			DEEP																																										
532	-89.03506848	45.79925469	14		Rope																																										
533	-89.03446377	45.79924958	9	Muck	Pole																																										
534	-89.03385906	45.79924447	3	Sand	Pole							1																																		
535	-89.03325434	45.79923936	2	Sand	Pole			1					2							1	1		1		1																			1		
536	-89.04413195	45.79975391	7	Muck	Pole			1												1																									1		
537	-89.04352723	45.79974885	15		Rope																																										
538	-89.04292251	45.79974379	16		Rope																																										
539	-89.04231779	45.79973872	7	Muck	Pole			1					1							1													1												
540	-89.04171308	45.79973365	7	Rock	Pole			3					1							1									1																
541	-89.04110836	45.79972858	0			DEEP																																										
542	-89.04050364	45.79972350	0			DEEP																																										
543	-89.03989892	45.79971842	0			DEEP																																										
544	-89.03929420	45.79971334	0			DEEP																																										
545	-89.03868948	45.79970825	0			DEEP																																										
546	-89.03808477	45.79970316	0			DEEP																																										
547	-89.03748005	45.79969807	0			DEEP																																										
548	-89.03687533	45.79969297	6	Sand	Pole																																										
549	-89.03566590	45.79968277	13		Rope																																										
550	-89.03506118	45.79967766	0			DEEP																																										
551	-89.03445646	45.79967255	14		Rope																																										
552	-89.03385175	45.79966744	9	Rock	Pole																																										
553	-89.04412472	45.80017688	3	Sand	Pole		1						1		1								1																								
554	-89.04351999	45.80017182	7	Muck	Pole			1												1												2														
555	-89.04291527	45.80016676	15		Rope																																										
556	-89.04231055	45.80016169	6	Sand	Pole								1							1									1																	
557	-89.04170582	45.80015662	8	Muck	Pole			1																								1														
558	-89.04110110	45.80015155	0			DEEP																																										
559	-89.04049638	45.80014647	0			DEEP																																										
560	-89.03989165	45.80014139	0			DEEP																																										
561	-89.03928693	45.80013631	0			DEEP																																										
562	-89.03868221	45.80013122	0			DEEP																																										
563	-89.03807749	45.80012613	0			DEEP																																										
564	-89.03747276	45.80012104	0			DEEP																																										
565	-89.03686804	45.80011594	0			DEEP																																										
566	-89.03565860	45.80010574	9	Muck	Pole																																										
567	-89.03505388	45.80010063	13		Rope																																										
568	-89.03444916	45.80009552	0			DEEP																																										
569	-89.03384443	45.80009041	13		Rope																																										
570	-89.03323971	45.80008530	8	Muck	Pole																		1																								
571	-89.04351276	45.80059480	3	Sand	Pole																		1				1																	1		
572	-89.04290803	45.80058973	4	Sand	Pole								1				1						1			1						1														
573	-89.04230330	45.80058466	6	Muck	Pole								1							1										1		2										1	1			
574	-89.04169857	45.80057959	6	Muck	Pole			1					1																	1		1														
575	-89.04109384	45.80057452	15		Rope																																										
576	-89.04048912	45.80056944	0			DEEP																																										
577	-89.03988439	45.80056436	0			DEEP																																										
578	-89.03927966	45.80055928	0			DEEP																																										
579	-89.03867493	45.80055419	0			DEEP																																										
580	-89.03807021	45.80054910	11		Rope															1													1													
581	-89.03746548	45.80054401	13		Rope																																										
582	-89.03686075	45.80053891	0			DEEP																																										
583	-89.03625603	45.80053381	8	Sand	Pole																																										
584	-89.03504657	45.80052360	6	Rock	Pole																	1							1																	
585	-89.03443185	45.80051850	7	Muck	Pole				1						1				1	1						1			1														1	1			
586	-89.03383712	45.80051338	0			DEEP																																										
587	-89.03323240	45.80050827	14		Rope																																										
588	-89.03262767	45.80050315	11	Muck	Pole																																										
589	-89.04290079	45.80101270	1	Sand	Pole																1								1																	
590	-89.04229605	45.80100764	2	Sand	Pole																1		1											1												
591	-89.04169132	45.80100256	4	Muck	Pole								1					1		1						1																	1				
592	-89.04108659	45.80099749	12	Muck	Pole																																										
593	-89.04048186	45.80099241	5	Rock	Pole				1						1				1				1						1																	
594	-89.03987712	45.80098733	13		Rope																																										
595	-89.03927239	45.80098225	9	Rock	Pole			1									1		1															1									1			
596	-89.03866766	45.80097716	13		Rope			1																									1												
597	-89.03806293	45.80097207	7	Rock	Pole								1						2		1								1																	
598	-89.03745820	45.80096698	13		Rope																																										
599	-89.03685347	45.80096188	14		Rope																																										
600	-89.03624873	45.80095678	13	Sand	Pole																																									
601	-89.03564400	45.80095168	7	Muck	Pole																																					1				
602	-89.03503927	45.80094658	4	Muck	Pole								1																													1				
603	-89.03443454	45.80094147	4	Muck	Pole			1															1																			3				
604	-89.03382981	45.80093635	7	Sand	Pole			1												1										1													1				1
605	-89.03322508	45.80093124	15		Rope																																									
606	-89.03262035	45.80092612	0			DEEP																																										
607	-89.03201562	45.80092100	13	Sand	Pole																																										
608	-89.03080616	45.80091070	2	Sand	Pole																	1								1																
609	-89.03020143	45.80090561	8	Sand	Pole																								1															1			
610	-89.04168407	45.80142554	1	Muck	Pole											1					1								1					1								1				
611	-89.04107933	45.80142046	2	Sand	Pole																1								1															1			
612	-89.04047459	45.80141539	1	Sand	Pole									1						1	1					1															1	V	1			
613	-89.03986986	45.80141030	3	Sand	Pole																1								1															1			
614	-89.03926512	45.80140522	6	Muck	Pole																								1					1											1		
615	-89.03866038	45.80140013	11	Sand	Pole																																									
616	-89.03805565	45.80139504	10	Sand	Pole			1																																	1				
617	-89.03745091	45.80138995	5	Rock	Pole																																					1				
618	-89.03684618	45.80138485	2	Sand	Pole																																					1		1		
619	-89.03624144	45.80137976	9	Sand	Pole															1																							1				
620	-89.03563671	45.80137465	7	Sand	Pole																							1														1				
621	-89.03502197	45.80136955	5	Muck	Pole			1																				1														2				
622	-89.03442724	45.80136444	2	Muck	Pole		1								1								1	1										1								1	1			
623	-89.03321777	45.80135421	8	Muck	Pole			3											1																							1				
624	-89.03261303	45.80134909	0			DEEP																																										

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Brasenia schreberi	Ceratophyllum demersum	Ceratophyllum echinatum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Heteranthera dubia	Isoetes sp.	Lemna trisulca	Megadodonta beckii	Myriophyllum alterniflorum	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Pontederia cordata	Potamogeton alpinus	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton natans	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton strictifolius	Potamogeton zosteriformis	Ranunculus aquatilis	Sagittaria sp. (rosette)	Sagittaria latifolia	Schoenoplectus acutus	Schoenoplectus pungens	Utricularia intermedia	Utricularia vulgaris	Vallisneria americana	Zizania sp.	Aquatic Moss	Freshwater Sponge	Schoenoplectus subterminalis	Utricularia minor	Najas guadalupensis
625	-89.03200830	45.80134397	17			DEEP																																										
626	-89.03140356	45.80133884	13	Sand	Pole																												1																
627	-89.03079883	45.80133371	8	Rock	Pole																																											
628	-89.03019409	45.80132858	16		Rope																																											
629	-89.02958936	45.80132345	14		Rope																																											
630	-89.02898463	45.80131831	9	Sand	Pole																																										
631	-89.02837989	45.80131317	13	Sand	Pole																																										
632	-89.02777516	45.80130802	4	Sand	Pole			1					2														1												1									
633	-89.03865311	45.80182311	1	Rock	Pole																						1																				
634	-89.03804837	45.80181802	6	Muck	Pole								1					1									1									1								1	1			
635	-89.03744363	45.80181292	1	Sand	Pole																																						V					
636	-89.03683889	45.80180783	3	Muck	Pole		1						1							1				1																								1
637	-89.03623415	45.80180273	0			TERRESTRIAL																																										
638	-89.03562941	45.80179762	5	Sand	Pole																1																										
639	-89.03502467	45.80179252	4	Muck	Pole								1														1									1								1			
640	-89.03260571	45.80177206	10	Muck	Pole																														1												
641	-89.03200097	45.80176694	16		Rope																																										
642	-89.03139623	45.80176181	0			DEEP																																										
643	-89.03079149	45.80175669	0			DEEP																																										
644	-89.03018675	45.80175155	14		Rope																																											
645	-89.02958202	45.80174642	0			DEEP																																										
646	-89.02897728	45.80174128	12		Rope			1																																								
647	-89.02837254	45.80173614	0			DEEP																																										
648	-89.02776780	45.80173099	16		Rope																																											
649	-89.02716306	45.80172585	10	Muck	Pole			3												1														1					1								
650	-89.02655833	45.80172070	6	Muck	Pole		2	1					1							1																			1								
651	-89.02595359	45.80171554	2	Muck	Pole		1	1					1				1	1				1										1		0					1								
652	-89.03562211	45.80222059	1	Sand	Pole								1											1																		1						
653	-89.03501736	45.80221549	3	Sand	Pole															1				1															1								
654	-89.03199364	45.80218991	8	Sand	Pole																																											
655	-89.03138890	45.80218478	12		Rope																																											
656	-89.03078416	45.80217966	9	Muck	Pole																																1										
657	-89.03017941	45.80217452	9	Rock	Pole															2													1														
658	-89.02957467	45.80216939	2	Rock	Pole		1														1																											
659	-89.02896993	45.80216425	13		Rope																																											
660	-89.02836519	45.80215911	16		Rope																																											
661	-89.02776044	45.80215396	14		Rope																																											
662	-89.02715570	45.80214882	10	Muck	Pole			1																																							
663	-89.02655096	45.80214367	4	Muck	Pole			3					1										1												1		1			1								
664	-89.02594622	45.80213851	12		Rope																																											
665	-89.02534148	45.80213335	2	Muck	Pole			1		2											1																		1								
666	-89.02138157	45.80260775	7	Muck	Pole			1												1															1				1								
667	-89.03077682	45.80260263	16		Rope																																											
668	-89.03017208	45.80259749	0			DEEP																																										
669	-89.02956733	45.80259236	0			DEEP																																										
670	-89.02896258	45.80258722	2	Rock	Pole																	1																									
671	-89.02835783	45.80258208	6	Muck	Pole								1																	1			1			1				2								
672	-89.02775309	45.80257693	5	Muck	Pole		1						1							1															1									1			
673	-89.02714834	45.80257179	13		Rope																																											
674	-89.02654359	45.80256664	14		Rope																																											
675	-89.02593885	45.80256148	13		Rope																																											
676	-89.02533410	45.80255632	8	Muck	Pole															1															1												
677	-89.03076949	45.80302560	9	Sand	Pole																														1												
678	-89.03016474	45.80302046	13		Rope																																											
679	-89.02955998	45.80301533	0			DEEP																																										
680	-89.02895523	45.80301019	0			DEEP																																										
681	-89.02835048	45.80300505	7	Muck	Pole			1																														1			2								
682	-89.02774573	45.80299990	5	Muck	Pole								1																							1	2			1				1	1			
683	-89.02714098	45.80299476	5	Muck	Pole		1						1							1															1	1			1				1				
684	-89.02653623	45.80298961	14		Rope																																											
685	-89.02593147	45.80298445	15		Rope																																											
686	-89.02532672	45.80297929	12		Rope																																											
687	-89.02472197	45.80297413	0			TERRESTRIAL																																										
688	-89.03015740	45.80342343	4	Sand	Pole								1					1		1			1											1														
689	-89.02955264	45.80343830	6	Rock	Pole															1														1		1			1				1				
690	-89.02894788	45.80343316	8	Muck	Pole			3																															1								
691	-89.02834313	45.80342802	7	Muck	Pole			1		1																												2			1							
692	-89.02773837	45.80342287	1	Rock	Pole		1	1													1																										
693	-89.02652886	45.80341258	2	Sand	Pole		1			1											1		1		1					1																	
694	-89.02592410	45.80340742	15		Rope																																											
695	-89.02531935	45.80340226	0			DEEP																																										
696	-89.02471459	45.80339710	15		Rope																																											
697	-89.02410984	45.80339194	2	Rock	Pole																										1																
698	-89.02350508	45.80338677	0			TERRESTRIAL																																										
699	-89.02894053	45.80385613	0			NONNAVIGABLE (PLANTS)																																												
700	-89.02833577	45.80385099	1	Rock	Pole																1																										
701	-89.02591673	45.80383039	8	Muck	Pole																		1																								
702	-89.02531197	45.80382523	14		Rope																																											
703	-89.02470721	45.80382007	15		Rope																																											
704	-89.02410245	45.80381491	15		Rope																																											
705	-89.02349769	45.80380974	13		Rope																																											
706	-89.02289293	45.80380457	14		Rope			1																																							
707	-89.02228817	45.80379940	7	Muck	Pole			1																													1		1									
708	-89.02168341	45.80379422	0			TERRESTRIAL																																										
709	-89.02469983	45.80424304	11	Muck	Pole			1																																							
710	-89.02409506	45.80423788	14		Rope																																											
711	-89.02349030	45.80423271	15		Rope																																											
712	-89.02288554	45.80422754	14		Rope																																											
713	-89.02228077	45.80422237	15		Rope																																											
714	-89.02167601	45.80421719	14		Rope																																											
715	-89.02107124	45.80421201	0			TERRESTRIAL																																										
716	-89.02469245	45.80466601	1	Muck	Pole		1	1															1	1				1					1													1		
717	-89.02408768	45.80466085	3	Muck	Pole		1	1					1											1							1								1								
718	-89.02348291	45.80465568	0			DEEP																																										
719	-89.02287814	45.80465051	0			DEEP																																										
720	-89.02227337	45.80464533	0			DEEP																																										
721	-89.02166860	45.80464016	0			DEEP																																										
722	-89.02106384	45.80463498	8	Muck	Pole				3																																						
723	-89.02528984	45.80509414	7	Muck	Pole			1																																							
724	-89.02468507	45.80508998	4	Muck	Pole		1	3																1																				1			
725	-89.02347552	45.80507865	11	Muck	Pole			1																																							
726	-89.02287075	45.80507348	13	Muck	Pole																																										
727	-89.02226597	45.80506830	0			DEEP																																										
728	-89.02166120	45.80506313	0			DEEP																																										
729	-89.02105643	45.80505795	0			DEEP																																										
730	-89.02045165	45.80505276	14		Rope																																											
731	-89.01984688	45.80504758	4	Muck	Pole		1	1					1					1																												1			
732	-89.02286335	45.80549645	2	Sand	Pole		1														1		1	1																				1			
733	-89.02225857	45.80549127	12	Muck	Pole																																										
734	-89.02165379	45.80548610	0			DEEP																																										
735	-89.02104902	45.80548092	0			DEEP																																										
736	-89.02044424	45.80547573	15		Rope																																											
737	-89.01983946	45.80547054	6	Muck	Pole			1																														3									
738	-89.02164639	45.80590906	1	Muck	Pole			3					1												1			1								1											
739	-89.02104161	45.80590388	11	Muck	Pole			2																																							
740	-89.02043683	45.80589870	9	Muck	Pole			1																														1			1						
741	-89.01983204	45.80589351	0			TERRESTRIAL																																										