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

- 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

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.

Elements of an Effective Lake Management Planning Project

Data and Information Gathering

Environmental & Sociological

Planning Process

Brings it all together

Data and information gathering

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

Water Quality Analysis

- General water chemistry (current & historic)
  - CLMN, Agencies, & Onterra
- Nutrient analysis
  - Limiting plant nutrient
  - Lake trophic state (Eutrophication)
- Supporting data for watershed modeling

Watershed Assessment

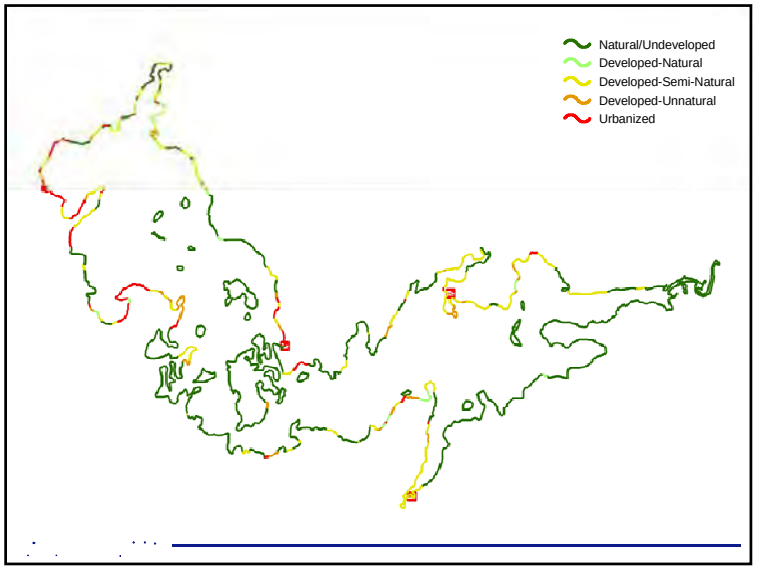
- Delineation of drainage basin
- Modeling
  - Land cover
  - Phosphorus loading
  - Scenario development

Shoreland Assessment

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

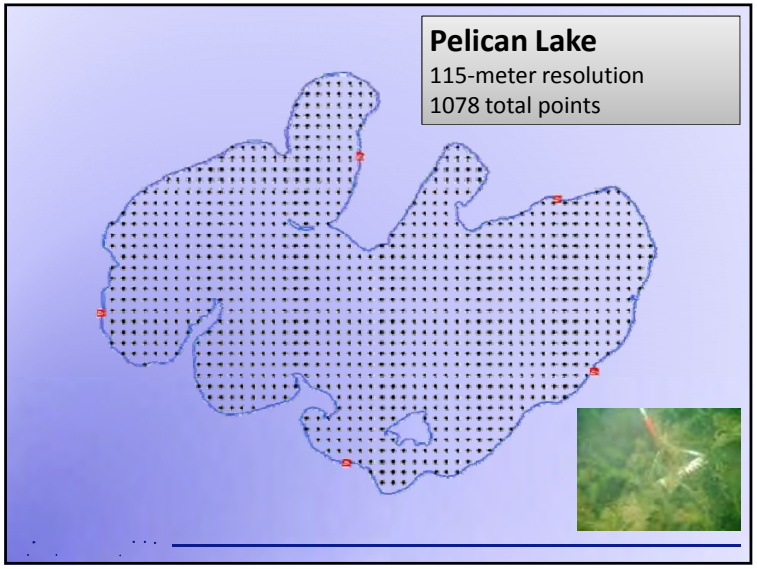
Urbanized **Natural**

Range



Aquatic Plant Surveys

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



Aquatic Plant Surveys

- Concerned with both native and non-native plants
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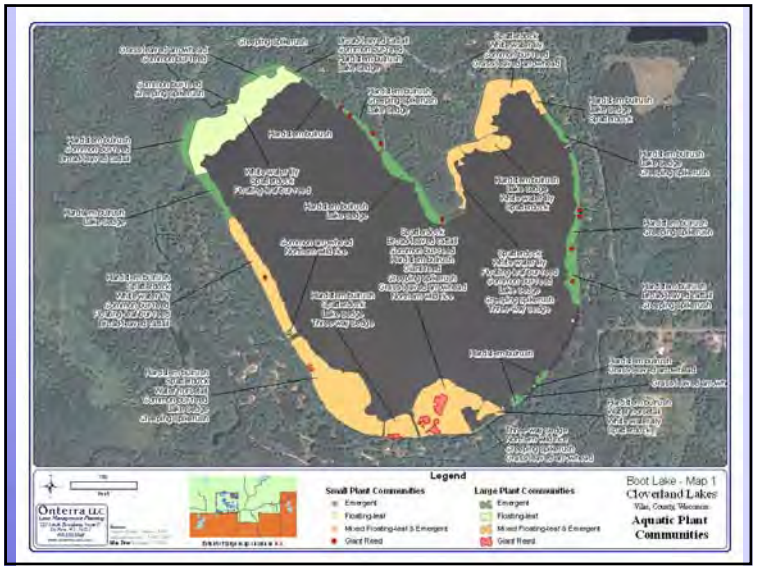
  - Point-intercept survey
  - Plant community mapping



Aquatic Plant Surveys

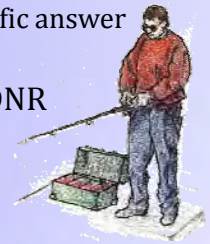
- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Curly-leaf pondweed survey
  - Point-intercept survey
  - Plant community mapping
  - Volunteer and agency survey findings

Fisheries Data Integration

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

Stakeholder Survey

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



Planning Process

Planning Committee Meetings

Study Results (including a stakeholder survey)
Conclusions & Initial Recommendations
Management Goals
Management Actions
Timeframe
Facilitator(s)

↓

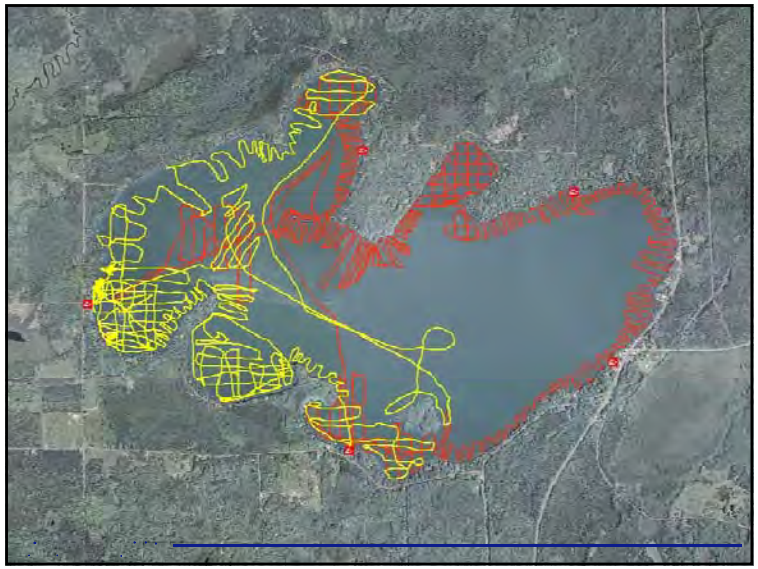
Implementation Plan

Aquatic Plant Surveys

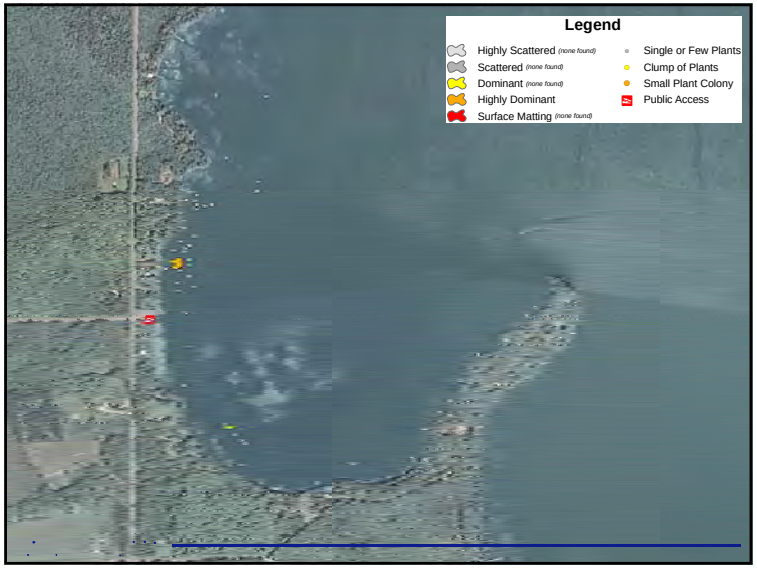
- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Curly-leaf pondweed survey
  - Point-intercept survey
  - Plant community mapping
  - Volunteer or agency survey findings

Non-native Aquatic Plants

Curly-leaf Pondweed



Non-native Aquatic Plants
Eurasian Water Milfoil


Legend
Highly Scattered (none found)
Scattered (none found)
Dominant (none found)
Highly Dominant
Surface Matting (none found)
Single or Few Plants
Clump of Plants
Small Plant Colony
Public Access

EWM Action Timeline

- **What has happened…**
  - *June 16th* - Onterra finds EWM, notifies PLPOA & WDNR
  - *June 21st* - Onterra provides survey results map
  - *June 28th* - Onterra marks main EWM bed with orange buoys
  - *July 12th* - Michelle Sadauskas (Oneida County AIS Coordinator) and Chris Hamerla (Lumberjack AIS Coordinator) meet with PLPOA volunteers and train them on plant ID and removal
- **What will happen…**
  - *Week of Aug. 22nd* – Onterra to complete PI and community mapping surveys
    - Known sites resurveyed
    - Additional findings mapped
  - *Fall / Winter of 2011/2012* – Create EWM Control Plan
    - Monitor
    - Continue hand removal efforts
    - Consider herbicide treatment
    - Integrated strategy using all above options

Thank You

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

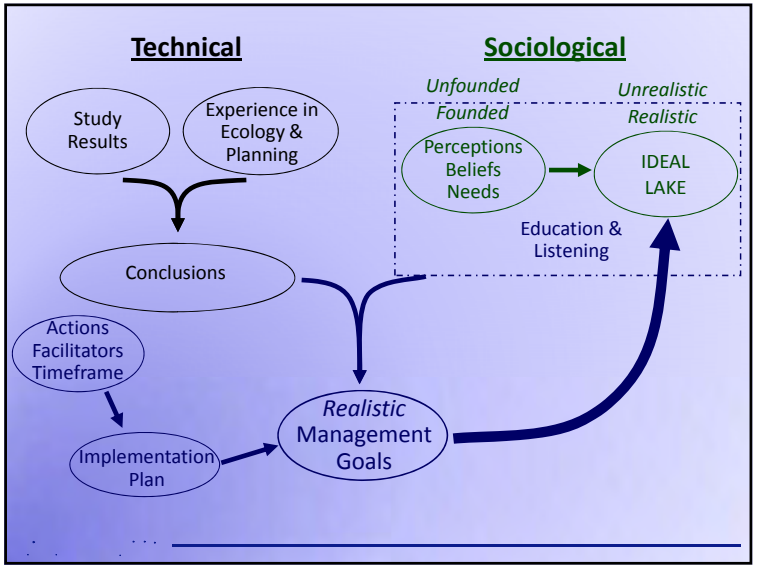
Wisconsin Lakes Partnership

Extension

WISCONSIN DEPT. OF NATURAL RESOURCES

The Planning Process

…it's not as easy as you may think.

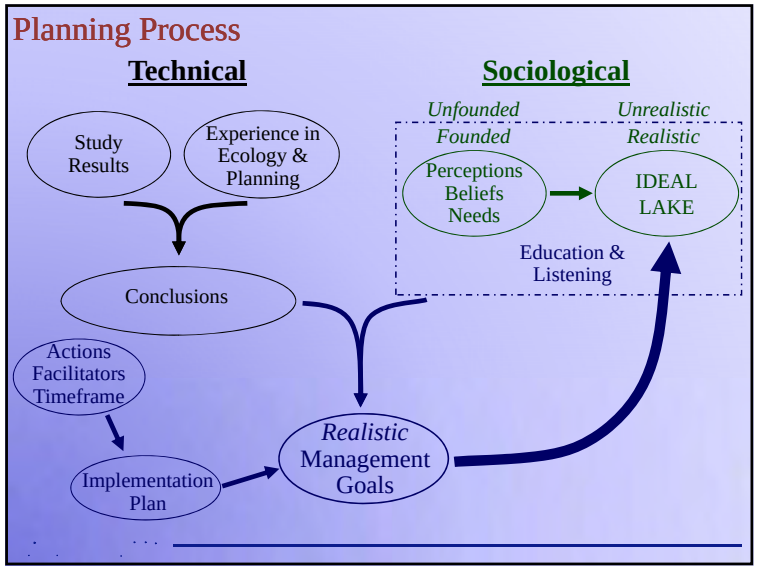


Presentation Outline

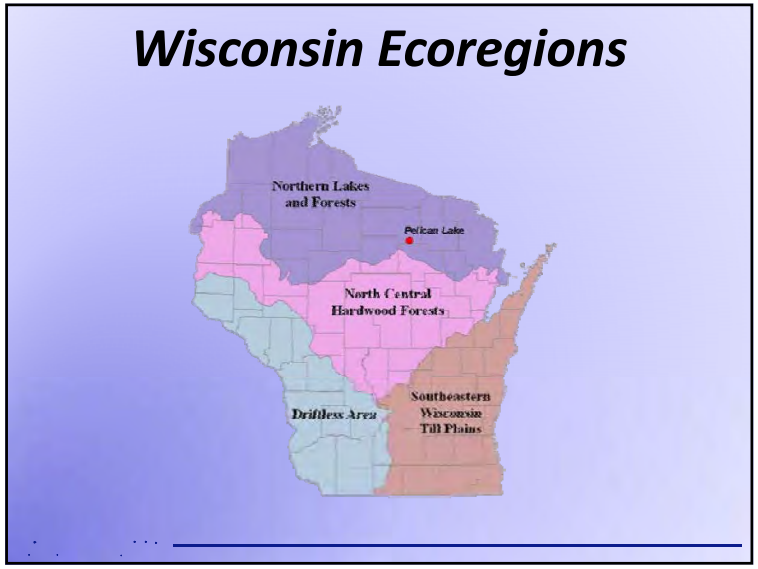
- **Lake Management Planning Project Overview**
- **Study Results**
  - Water Quality
  - Watershed
  - Aquatic Plants
  - Fisheries
- **"Big Picture"**

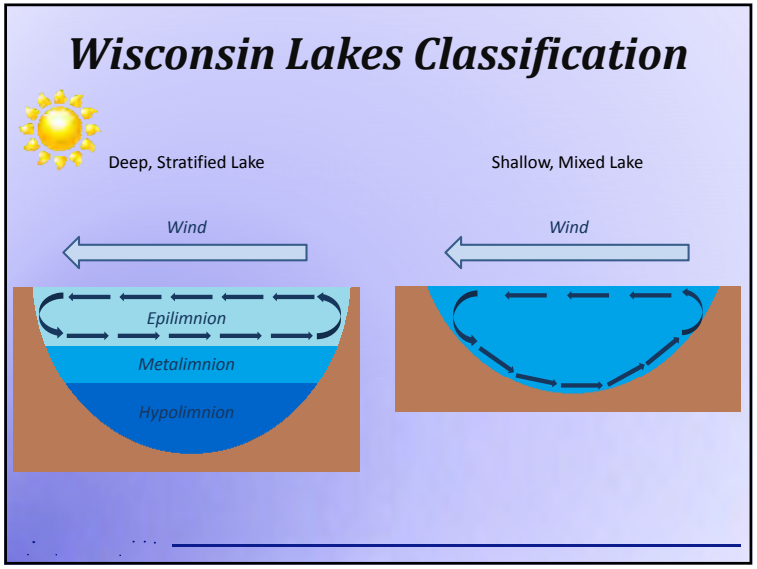
Study and Plan Goals

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

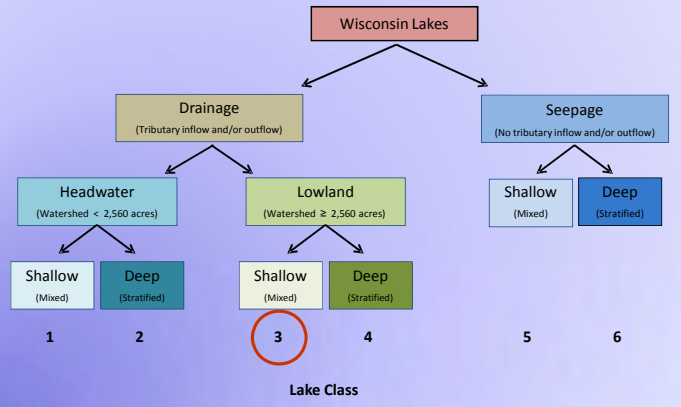

Planning Process
Technical
Sociological
Unfounded
Founded
Unrealistic
Realistic
Study Results
Experience in Ecology & Planning
Perceptions Beliefs Needs
IDEAL LAKE
Education & Listening
Conclusions
Actions Facilitators Timeframe
Implementation Plan
Realistic Management Goals

Water Quality


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


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

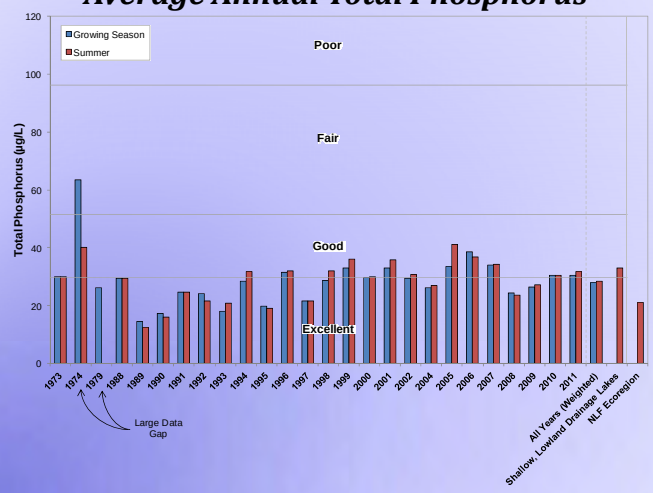
Wisconsin Lakes Classification



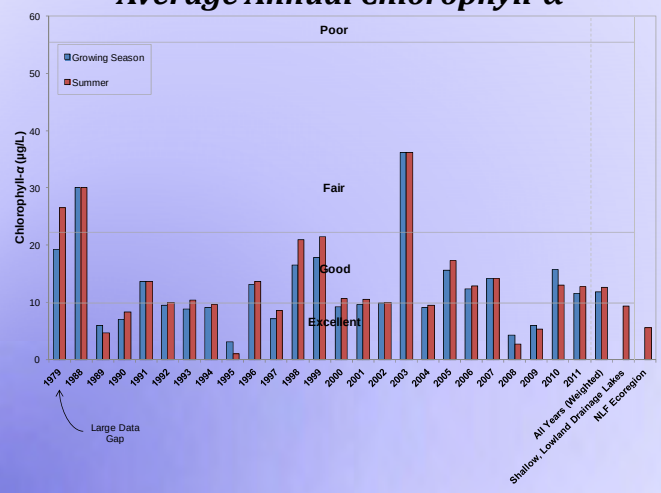
Water Quality

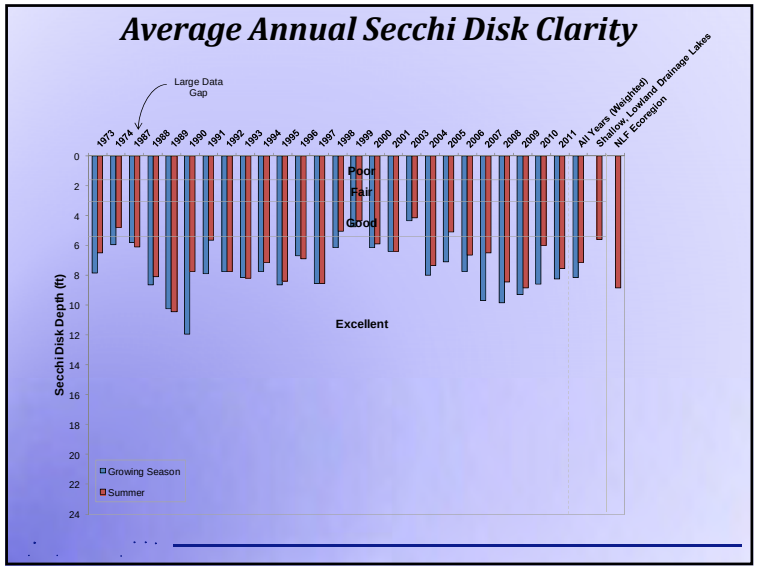
- **Phosphorus (Limiting Plant Nutrient)**
  - Nitrogen:Phosphorus = 24:1
- **Chlorophyll-*a* (Algal Abundance)**
  - Low to moderate abundance
- **Water Clarity (Secchi Disk)**
  - High Water Clarity

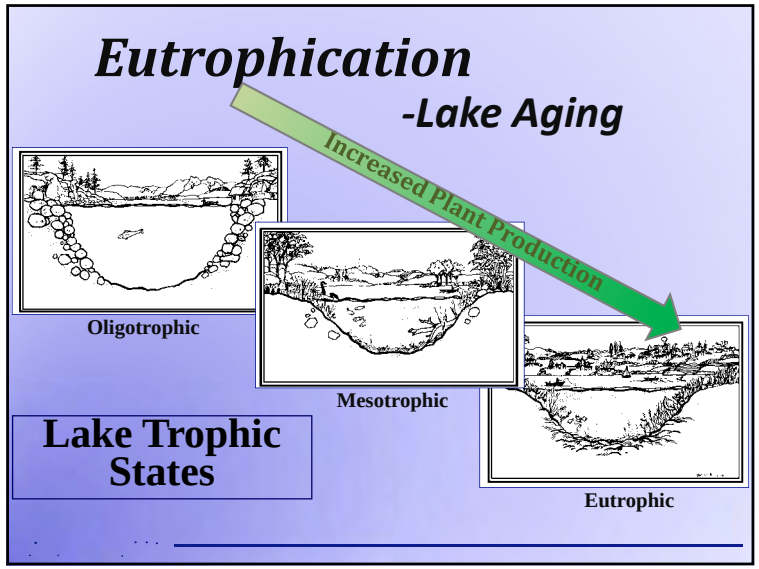
Average Annual Total Phosphorus

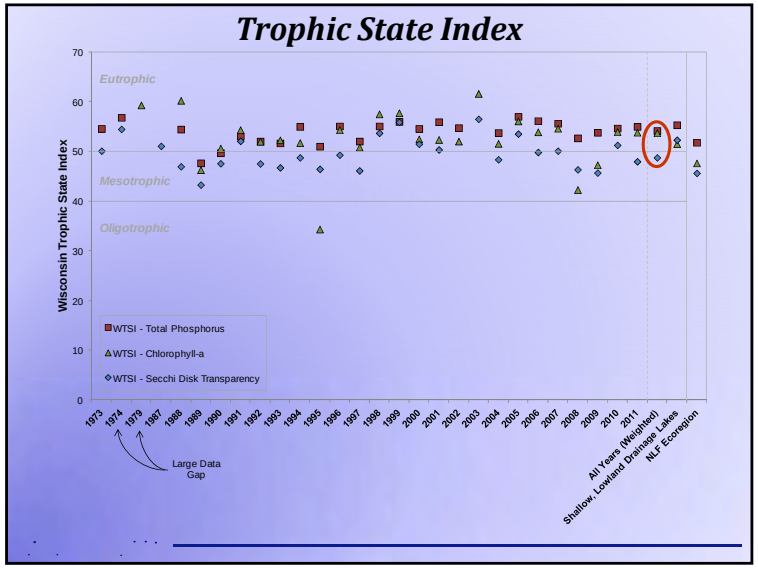


Average Annual Chlorophyll-α





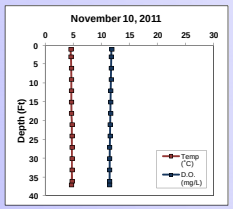


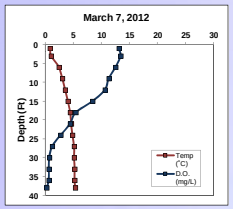


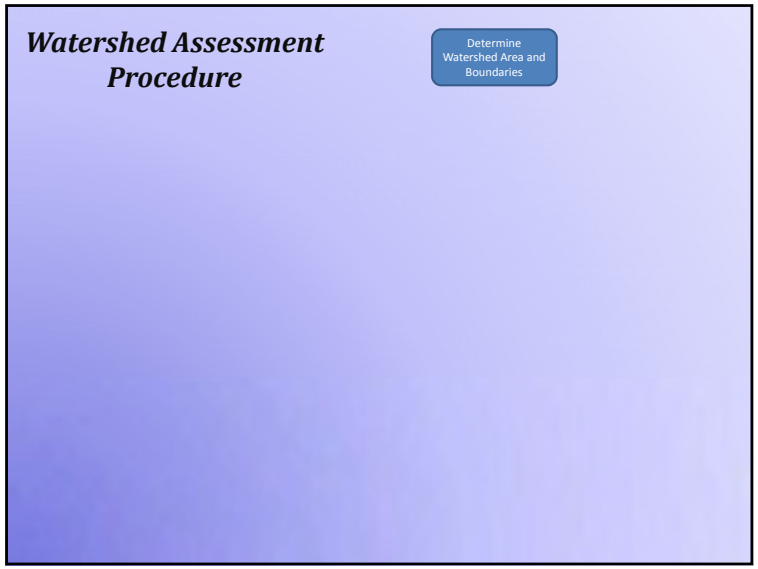
Other Water Quality Results

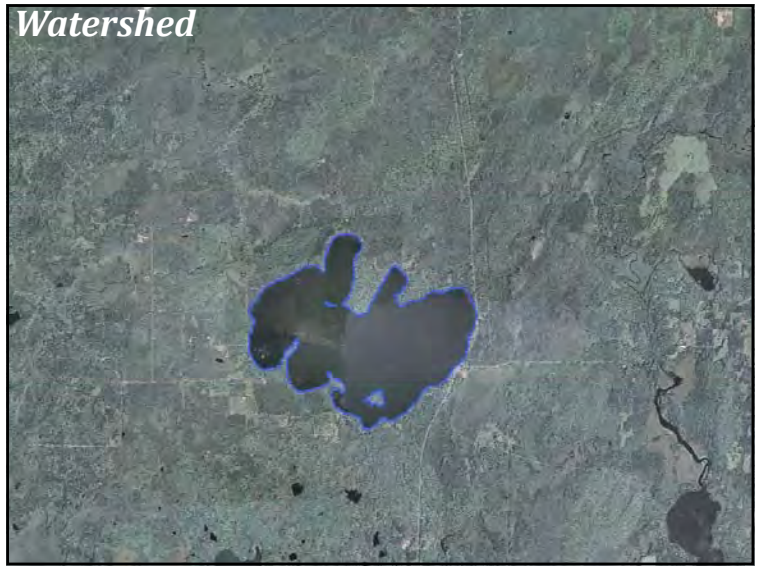
- No indication of low winter dissolved oxygen
- pH: 7.0
- Alkalinity = 41.9 mg/L as $CaCO_3$ – indicates very little sensitivity to acid rain
- High calcium concentrations (12.1 mg/L)
  - High susceptibility to zebra mussel establishment

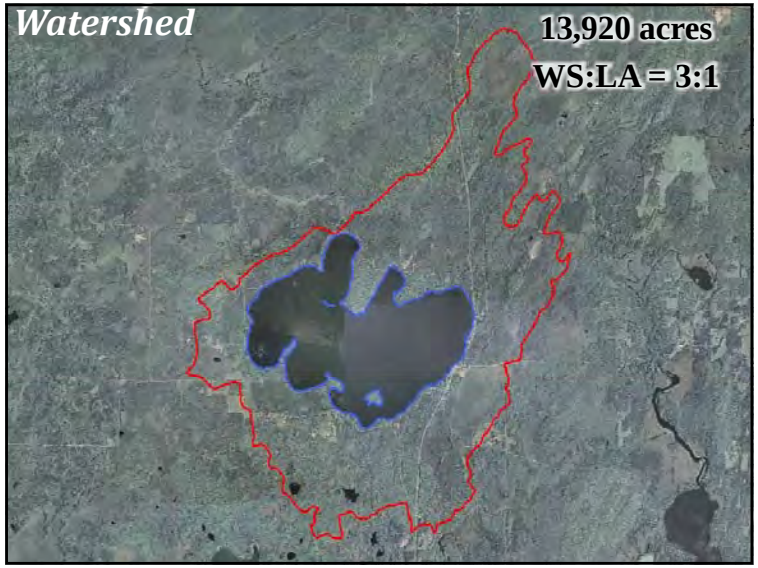
No veligers observed in 2011 samples

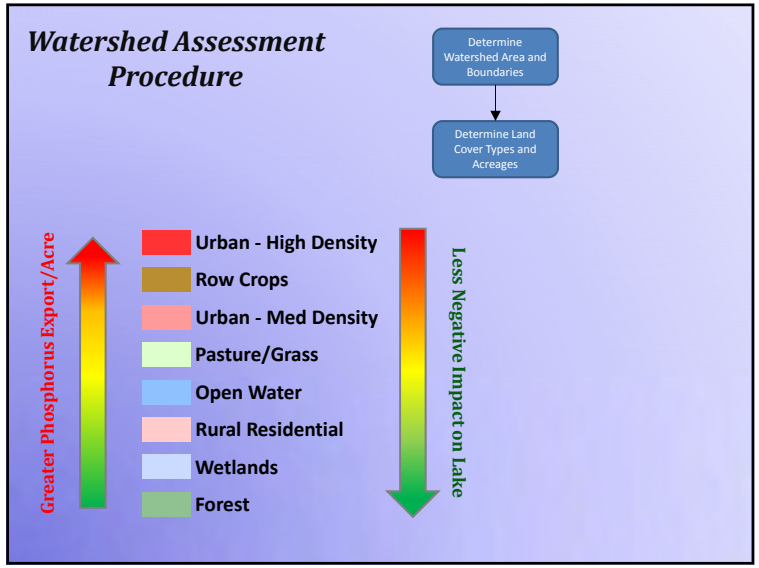


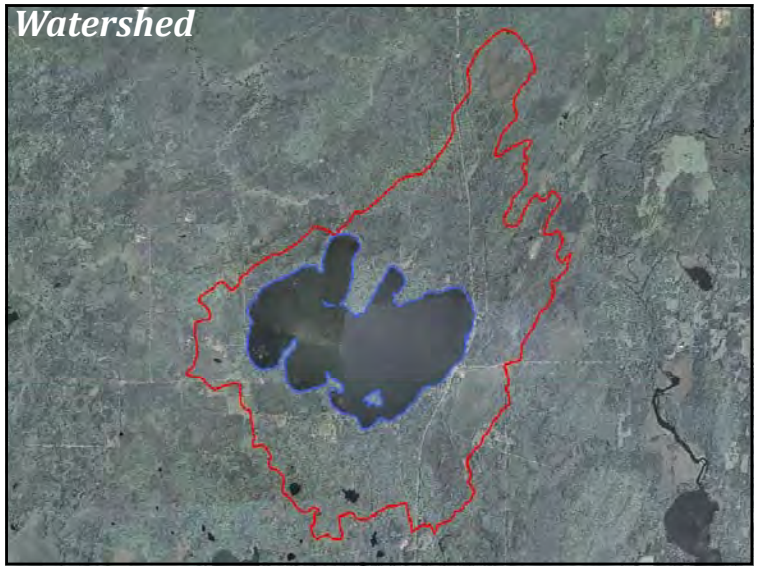


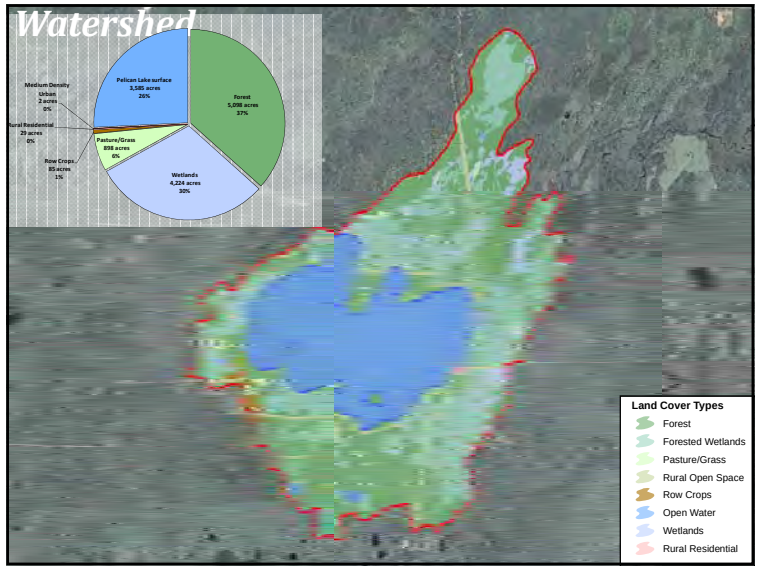

Watershed Assessment Procedure
Determine Watershed Area and Boundaries

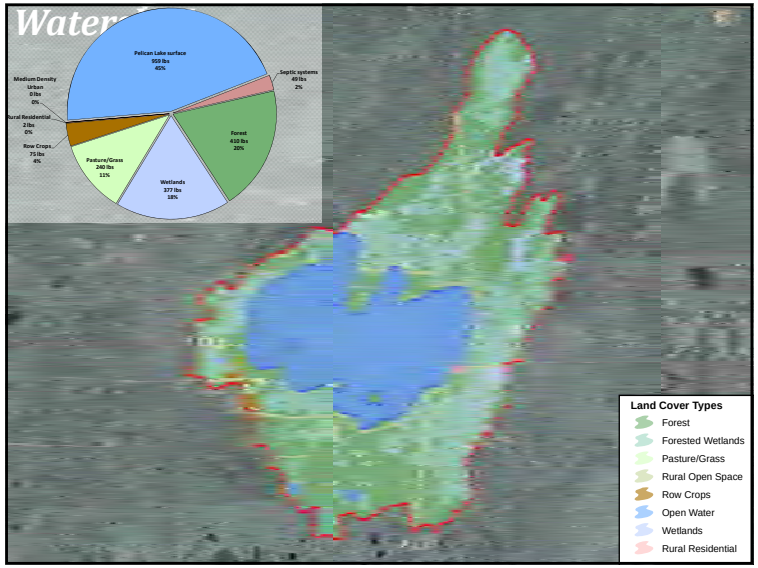

Watershed

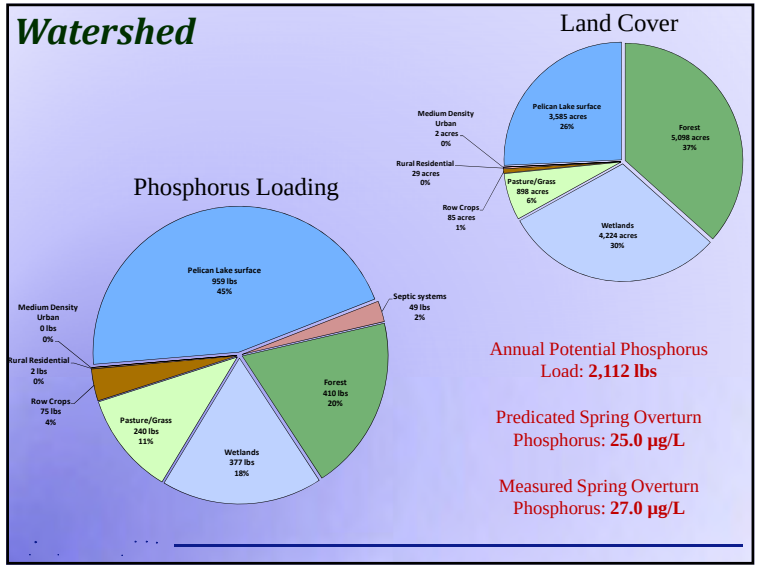

Watershed
13,920 acres
WS:LA = 3:1

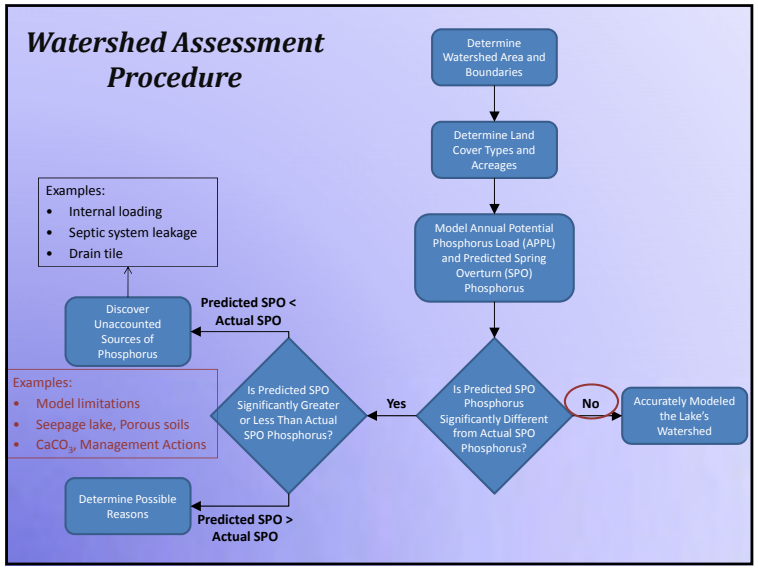

Watershed Assessment Procedure
Determine Watershed Area and Boundaries
Determine Land Cover Types and Acreages
Greater Phosphorus Export/Acre
Urban - High Density
Row Crops
Urban - Med Density
Pasture/Grass
Open Water
Rural Residential
Wetlands
Forest
Less Negative Impact on Lake


Watershed

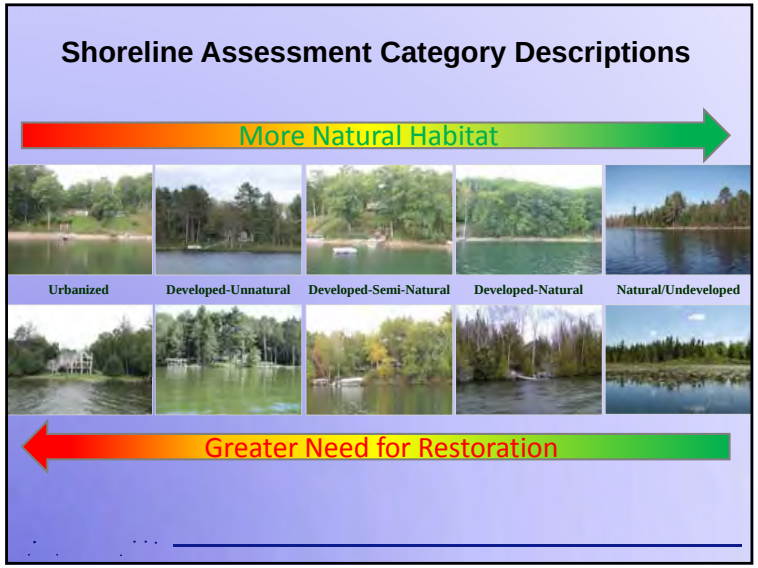

Watershed
Pelican Lake surface
3,585 acres
26%
Forest
5,098 acres
37%
Medium Density
Urban
2 acres
0%
Rural Residential
29 acres
0%
Pasture/Grass
898 acres
6%
Row Crops
85 acres
1%
Wetlands
4,224 acres
30%
Land Cover Types
Forest
Forested Wetlands
Pasture/Grass
Rural Open Space
Row Crops
Open Water
Wetlands
Rural Residential

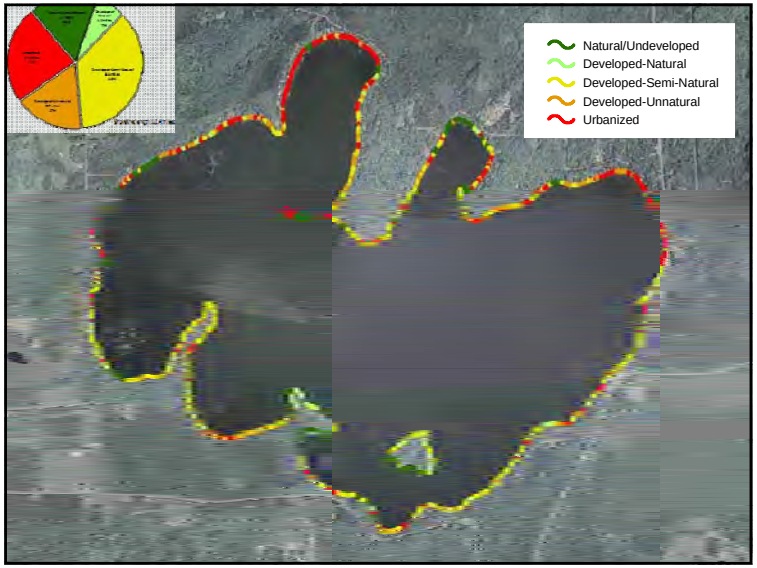

Pelican Lake surface
959 lbs
45%
Septic systems
49 lbs
2%
Forest
410 lbs
20%
Medium Density
Urban
0 lbs
0%
Rural Residential
2 lbs
0%
Row Crops
75 lbs
4%
Pasture/Grass
240 lbs
11%
Wetlands
377 lbs
18%
Land Cover Types
Forest
Forested Wetlands
Pasture/Grass
Rural Open Space
Row Crops
Open Water
Wetlands
Rural Residential


Watershed
Land Cover
Pelican Lake surface
3,585 acres
26%
Forest
5,098 acres
37%
Medium Density
Urban
2 acres
0%
Rural Residential
29 acres
0%
Pasture/Grass
898 acres
6%
Row Crops
85 acres
1%
Wetlands
4,224 acres
30%
Phosphorus Loading
Pelican Lake surface
959 lbs
45%
Septic systems
49 lbs
2%
Medium Density
Urban
0 lbs
0%
Rural Residential
2 lbs
0%
Row Crops
75 lbs
4%
Pasture/Grass
240 lbs
11%
Wetlands
377 lbs
18%
Forest
410 lbs
20%
Annual Potential Phosphorus Load: 2,112 lbs
Predicated Spring Overturn Phosphorus: 25.0 µg/L
Measured Spring Overturn Phosphorus: 27.0 µg/L


Watershed Assessment Procedure
Determine Watershed Area and Boundaries
Determine Land Cover Types and Acreages
Model Annual Potential Phosphorus Load (APPL) and Predicted Spring Overturn (SPO) Phosphorus
Is Predicted SPO Phosphorus Significantly Different from Actual SPO Phosphorus?
No
Accurately Modeled the Lake's Watershed
Yes
Is Predicted SPO Significantly Greater or Less Than Actual SPO Phosphorus?
Predicted SPO < Actual SPO
Discover Unaccounted Sources of Phosphorus
Examples:
Internal loading
Septic system leakage
Drain tile
Predicted SPO > Actual SPO
Determine Possible Reasons
Examples:
Model limitations
Seepage lake, Porous soils
CaCO3, Management Actions

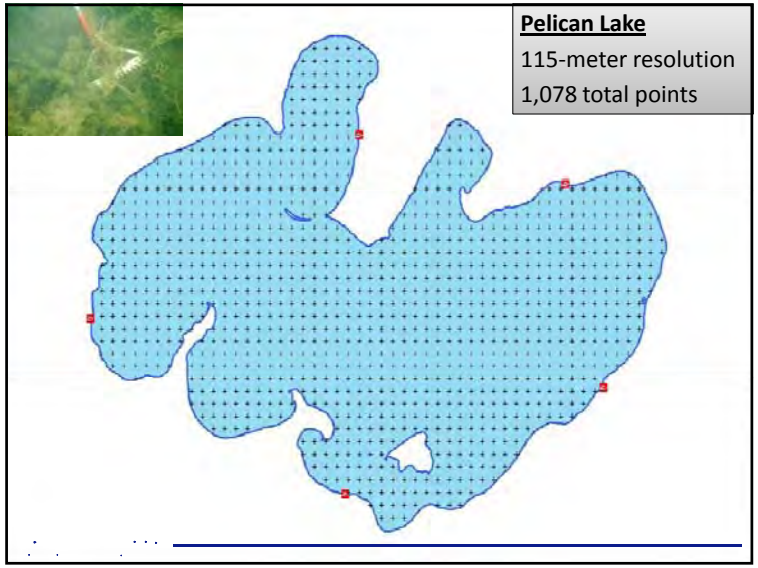
Shoreland Assessment
Shoreland area is important for buffering runoff and provides valuable habitat for aquatic and terrestrial wildlife.
It does not look at lake shoreline on a property-by-property basis.
Assessment ranks shoreland area from shoreline back 35 feet
Urbanized
Natural
Range

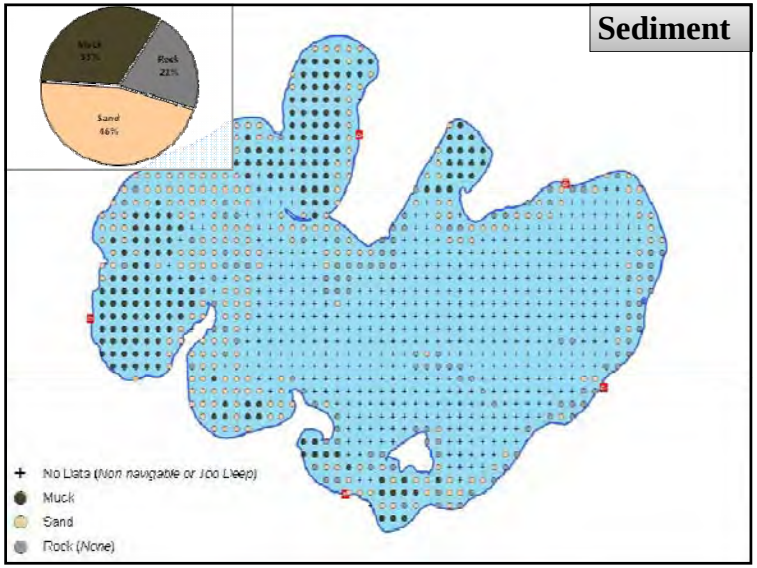

Shoreline Assessment Category Descriptions
More Natural Habitat
Urbanized
Developed-Unnatural
Developed-Semi-Natural
Developed-Natural
Natural/Undeveloped
Greater Need for Restoration

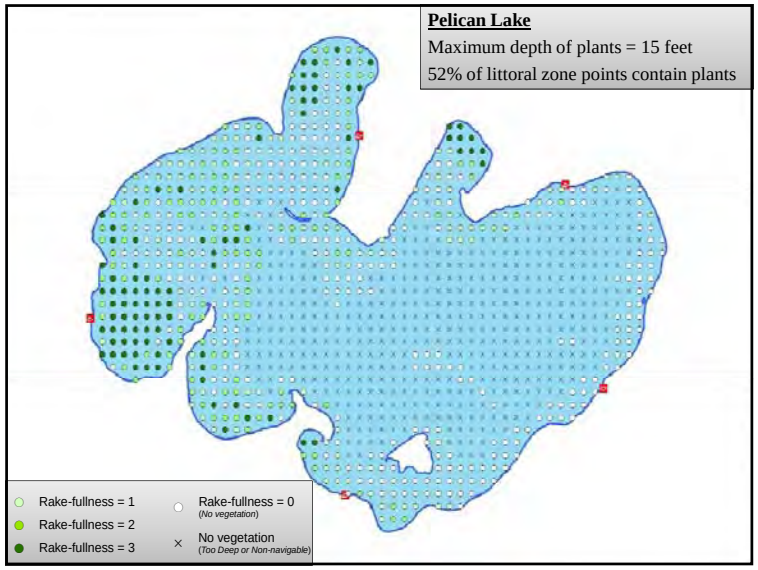

Natural/Undeveloped
Developed-Natural
Developed-Semi-Natural
Developed-Unnatural
Urbanized

Aquatic Plant Surveys

- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Early-season AIS survey
  - Point-intercept survey
    - Systematic sampling method
    - Can compare lakes within same ecoregion
  - Plant community mapping
    - Accurately map floating-leaf & emergent communities
    - May compare to future surveys







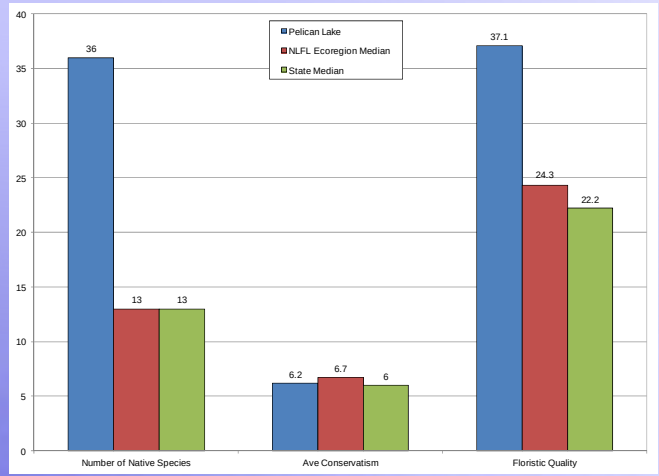
Species List

- **50 Native Species**
  - 36 from the PI survey
- **2 Non-native Species**
  - Eurasian water milfoil
  - *Nymphaea odorata var. rosea* (pink water lily)

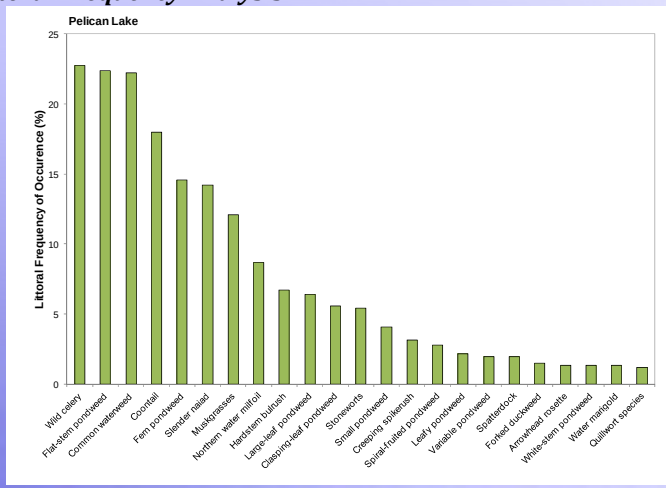
Life Form	Scientific Name	Common Name	Coefficient of Conservatism (c)	2011 (Onterra)
Emergent	Acorus calamus	Sweetflag	7	I
	Bolboschoenus fluviatilis	River bulrush	5	I
	Carex comosa	Bristly sedge	5	I
	Calla palustris	Water arum	9	I
	Carex lasiocarpa	Woolly/hair sedge	8	I
	Equisetum fluviatile	Water horsetail	7	X
	Eleocharis palustris	Creeping spikerush	6	X
	Iris versicolor	Northern blue flag	5	I
	Justicia americana	Water willow	9	I
	Phragmites australis	Giant reed (native)	N/A	X
	Pontederia cordata	Pickerelweed	9	X
	Sagittaria latifolia	Common arrowhead	3	I
	Schoenoplectus tabernaemontani	Softstem bulrush	4	X
	Schoenoplectus acutus	Hardstem bulrush	5	X
	Typha spp.	Cattail spp.	1	I
	Zizania sp.	Wild rice Species	8	I
FL	Nymphaea odorata var. rosea	Water lily (pink)	Exotic	I
	Nymphaea odorata	White water lily	6	X
	Nuphar variegata	Spatterdock	6	X
	Polygonum amphibium	Water smartweed	5	I
FLIE	Sparganium fluctuans	Floating-leaf bur-reed	10	I
	Sparganium angustifolium	Narrow-leaf bur-reed	9	I
	Sparganium emersum	Short-stemmed bur-reed	8	I
	Sparganium eurycarpum	Common bur-reed	5	X
Submergent	Chara spp.	Muskgrasses	7	X
	Ceratophyllum demersum	Coontail	3	X
	Elodea canadensis	Common waterweed	3	X
	Najas spp.	Naiads/Bushy pondweed	N/A	X
	Myriophyllum spicatum	Eurasian water milfoil	Exotic	I
	Megalodonta beckii	Water marigold	8	X
	Myriophyllum sibiricum	Northern water milfoil	7	X
	Nitella sp.	Stoneworts	7	X
	Najas flexilis	Slender naiad	6	X
	Potamogeton friesii	Fries' pondweed	8	X
	Potamogeton illinoensis	Illinois pondweed	6	X
	Potamogeton praelongus	White-stem pondweed	8	X
	Potamogeton gramineus	Variable pondweed	7	X
	Potamogeton foliosus	Leafy pondweed	6	X
	Potamogeton spirillus	Spiral-fruited pondweed	8	X
	Potamogeton pusillus	Small pondweed	7	X
	Potamogeton richardsonii	Clasping-leaf pondweed	5	X
	Potamogeton amplifolius	Large-leaf pondweed	7	X
	Potamogeton robbinsii	Fern pondweed	8	X
	Potamogeton zosteriformis	Flat-stem pondweed	6	X
	Sagitaria sp. (rosette)	Arrowhead rosette	N/A	X
	Utricularia vulgaris	Common bladderwort	7	X
	Vallisneria americana	Wild celery	6	X
S/E	Eleocharis acicularis	Needle spikerush	5	X
	Juncus pelocarpus	Brown-fruited rush	8	X
FF	Lemna turionifera	Turion duckweed	2	X
	Lemna trisulca	Forked duckweed	6	X
	Spirodela polyrhiza	Greater duckweed	5	X

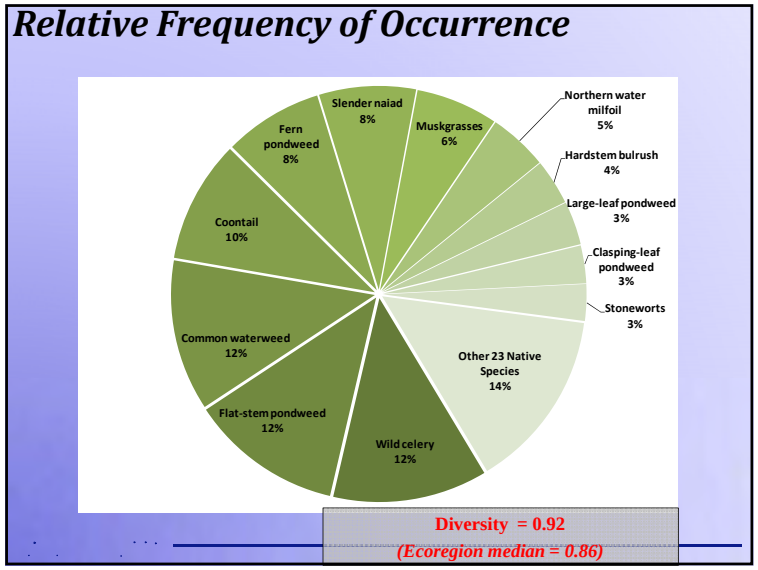
FL = Floating Leaf; FLIE = Floating Leaf and Emergent; S/E = Submergent and Emergent; FF = Free Floating
X = Located on rake during point-intercept survey; I = Incidental Species

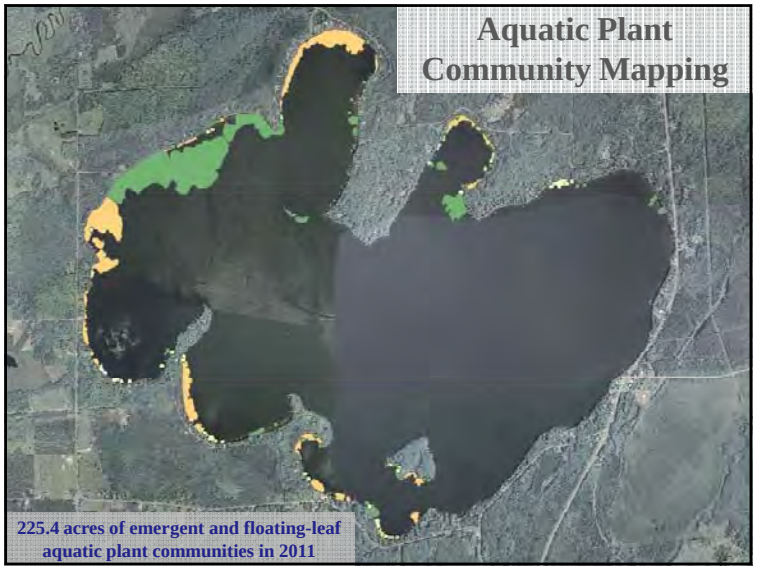
Floristic Quality Analysis



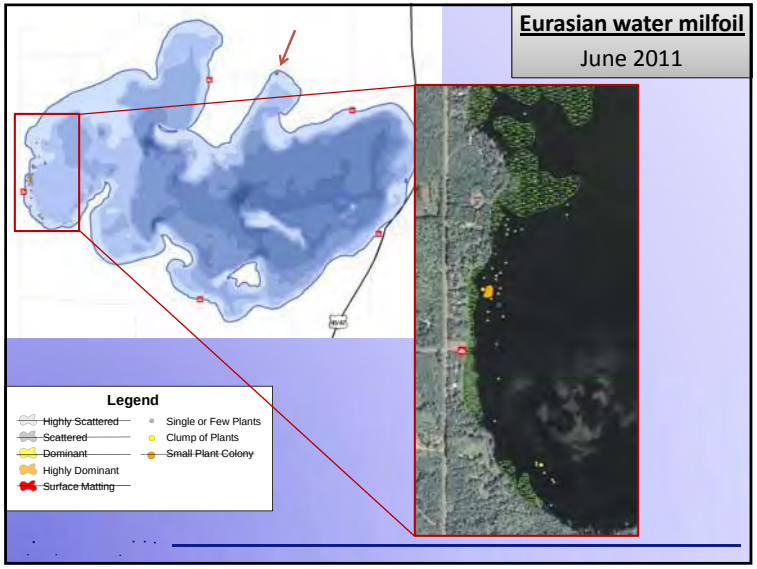
Littoral Frequency Analysis

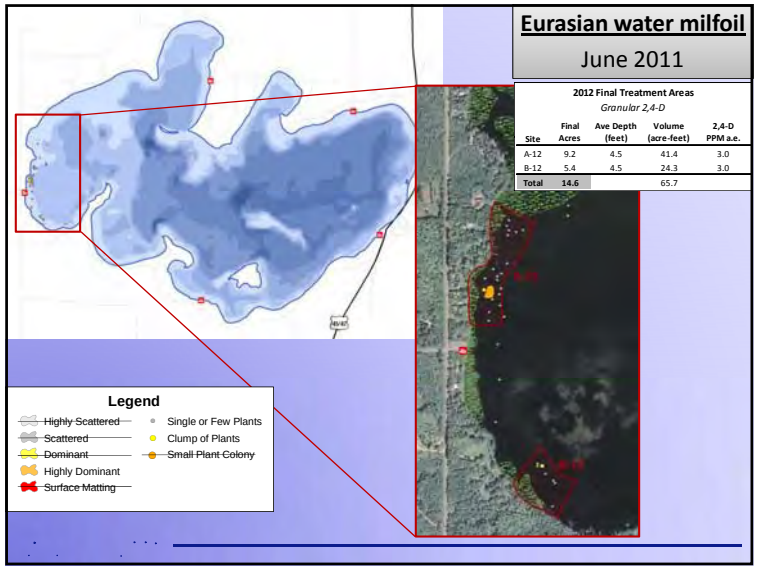


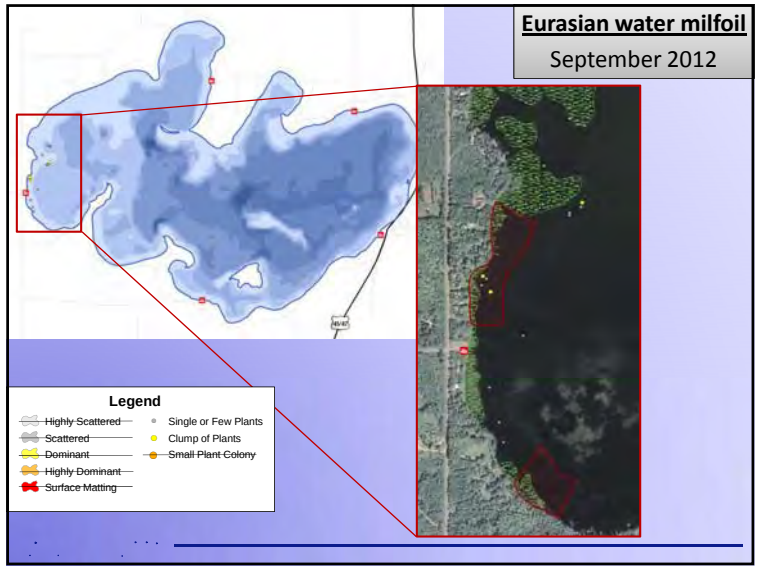

Relative Frequency of Occurrence
Slender naiad 8%
Muskgrasses 6%
Northern water milfoil 5%
Hardstem bulrush 4%
Large-leaf pondweed 3%
Clasping-leaf pondweed 3%
Stoneworts 3%
Other 23 Native Species 14%
Wild celery 12%
Flat-stem pondweed 12%
Common waterweed 12%
Coontail 10%
Fern pondweed 8%
Diversity = 0.92
(Ecoregion median = 0.86)

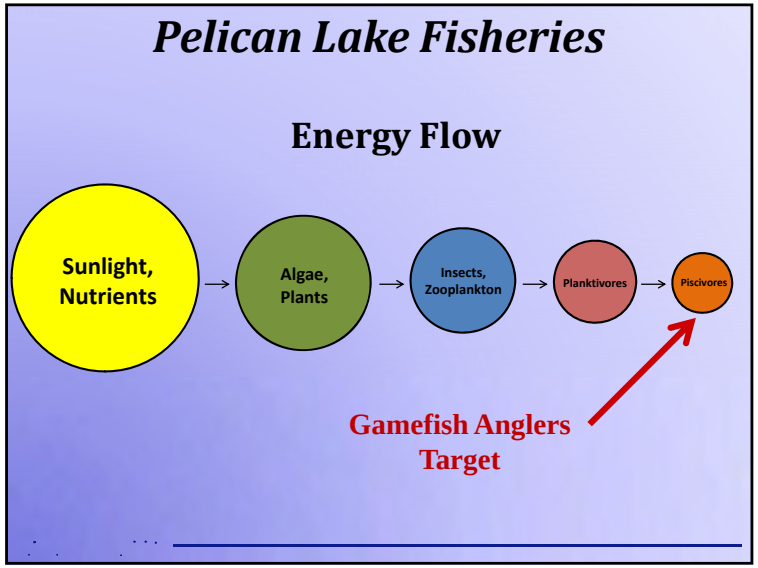

Aquatic Plant Community Mapping
225.4 acres of emergent and floating-leaf aquatic plant communities in 2011

Eurasian water milfoil


Eurasian water milfoil
June 2011
Legend
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clump of Plants
Small Plant Colony

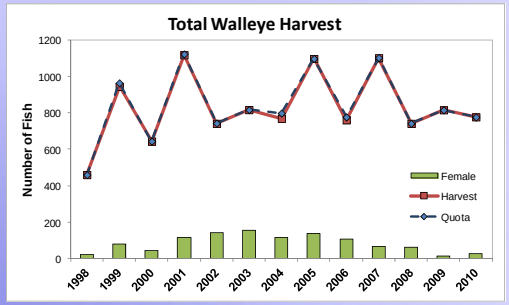

Eurasian water milfoil
June 2011
2012 Final Treatment Areas
Granular 2,4-D
Site | Final Acres | Ave Depth (feet) | Volume (acre-feet) | 2,4-D PPM a.e.
A-12 | 9.2 | 4.5 | 41.4 | 3.0
B-12 | 5.4 | 4.5 | 24.3 | 3.0
Total | 14.6 | | 65.7 |
Legend
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clump of Plants
Small Plant Colony


Eurasian water milfoil
September 2012
Legend
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Clump of Plants
Small Plant Colony

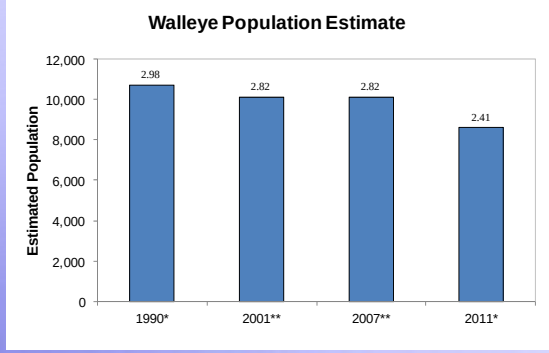

Pelican Lake Fisheries
Energy Flow
Sunlight, Nutrients
Algae, Plants
Insects, Zooplankton
Planktivores
Piscivores
Gamefish Anglers Target

Pelican Lake Fisheries
Treaty of 1837
Treaty of 1842
Pelican Lake

Pelican Lake Fisheries



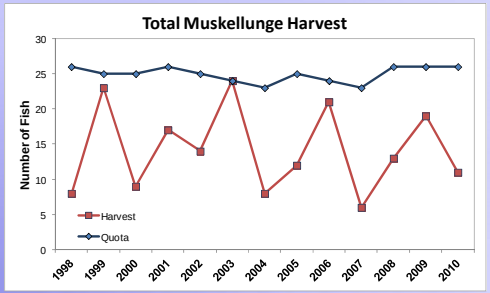
Pelican Lake Fisheries



** = WDNR Data ** = GLIFWC Data*

2011 Creel Survey: Report expected Fall 2012

Pelican Lake Fisheries



Conclusions

- Water quality is good to excellent
- Overall watershed is largely in healthy condition
  - Minimal phosphorus input; ecologically valuable land cover types present
  - Shoreline displays signs of human disturbance
- Aquatic plant community
  - Based on standard analysis, native community is of high quality compared to other lakes in the region and the state
  - EWM infestation is early on. Treatment results have been met with success but continued attention is needed.

B

APPENDIX B

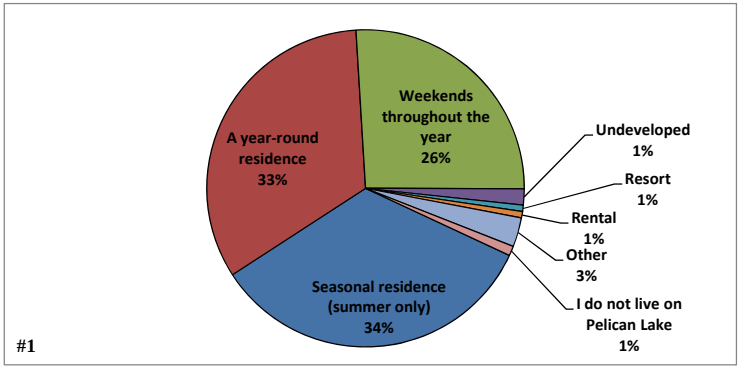
Stakeholder Survey Response Charts and Comments

Returned Surveys	296
Sent Surveys	486
Response Rate (%)	60.9

PELICAN LAKE PROPERTY

#1 What type of property do you own on Pelican Lake?

	Total	*%*
Seasonal residence (summer only)	103	*33.9*
A year-round residence	101	*33.2*
Weekends throughout the year	79	*26.0*
Undeveloped	5	*1.6*
Resort	2	*0.7*
Rental	2	*0.7*
Other	9	*3.0*
I do not live on Pelican Lake	3	*1.0*
	304	*100.0*

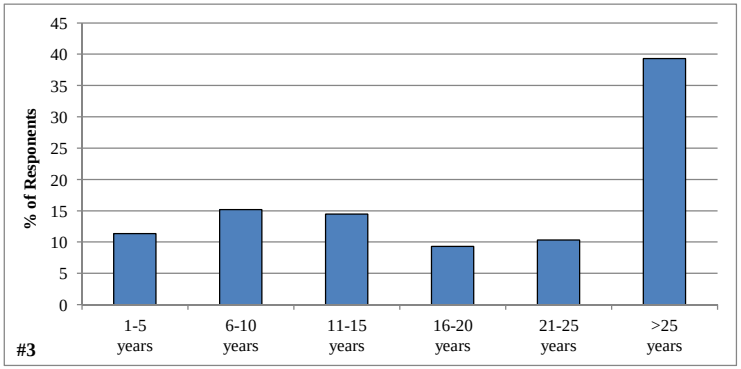


#2 How many days each year is your property used by you or others?

Answered Question	273
Average	132
Standard deviation	120

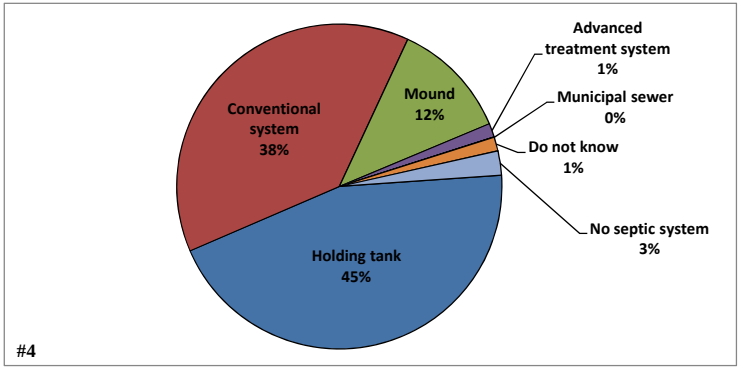
#3 How long have you owned your property on Pelican Lake?

	Total	*%*
1-5 years	33	*11.4*
6-10 years	44	*15.2*
11-15 years	42	*14.5*
16-20 years	27	*9.3*
21-25 years	30	*10.3*
>25 years	114	*39.3*
	290	*100.0*



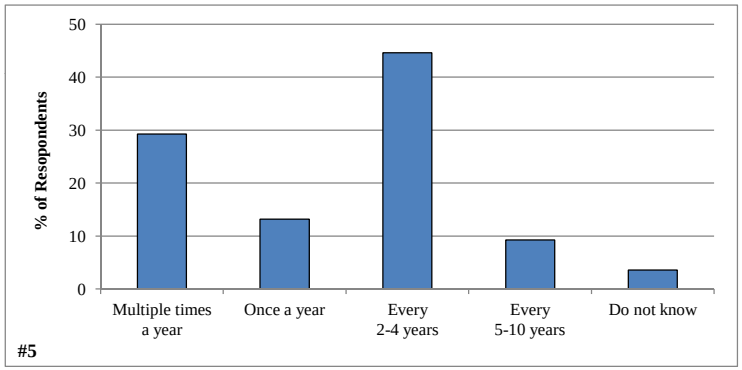
#4 What type of septic system does your property utilize?

	Total	%
Holding tank	129	*44.6*
Conventional system	111	*38.4*
Mound	34	*11.8*
Advanced treatment system	4	*1.4*
Municipal sewer	0	*0.0*
Do not know	4	*1.4*
No septic system	7	*2.4*
	289	*100.0*



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

	Total	%
Multiple times a year	82	*29.3*
Once a year	37	*13.2*
Every 2-4 years	125	*44.6*
Every 5-10 years	26	*9.3*
Do not know	10	*3.6*
	280	*100.0*



RECREATIONAL USE ON PELICAN LAKE

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

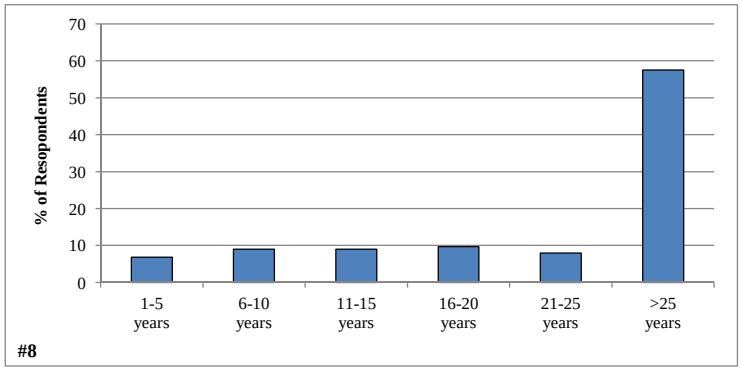
Answered Question	293
Average	38.9
Standard deviation	39.4

#7 Have you personally fished on Pelican Lake?

	Total	%
Yes	277	*95.8*
No	12	*4.2*
	289	*100.0*

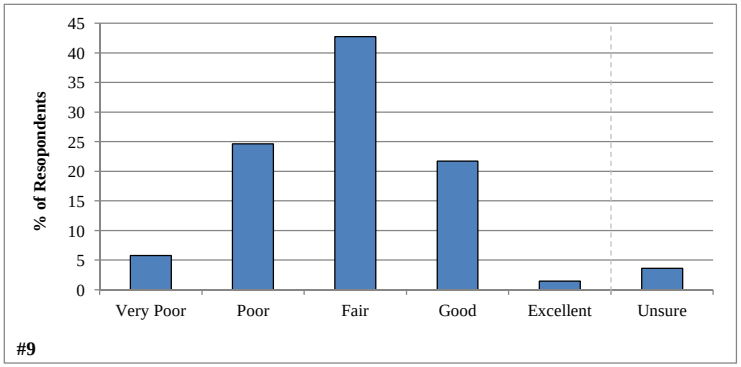
#8 For how many years have you fished Pelican Lake?

	Total	%
1-5 years	19	*6.8*
6-10 years	25	*9.0*
11-15 years	25	*9.0*
16-20 years	27	*9.7*
21-25 years	22	*7.9*
>25 years	160	*57.6*
	278	*100.0*



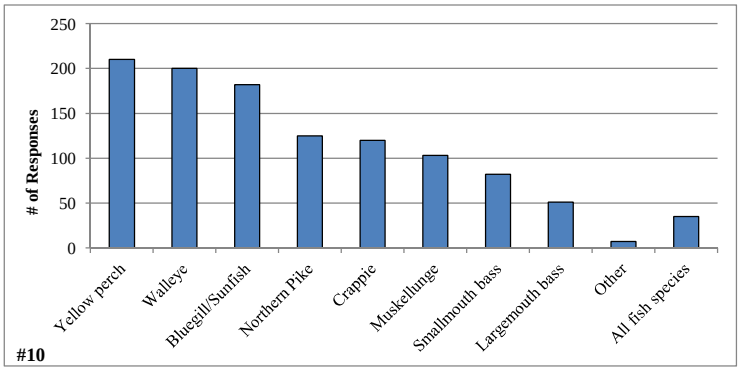
#9 How would you describe the current quality of fishing on Pelican Lake?

	Total	%
Very Poor	16	*5.8*
Poor	68	*24.6*
Fair	118	*42.8*
Good	60	*21.7*
Excellent	4	*1.4*
Unsure	10	*3.6*
	276	*100.0*



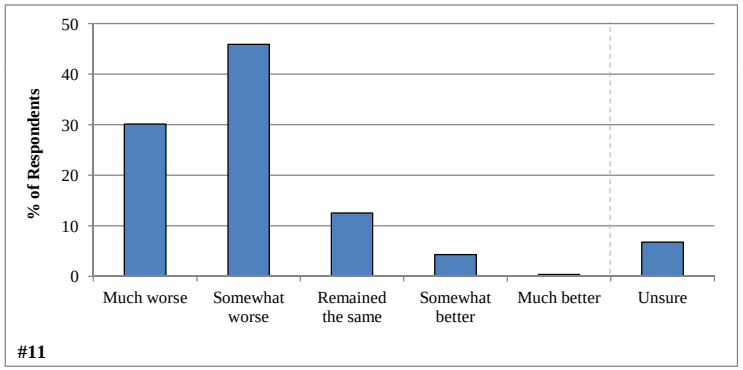
#10 What species of fish do you like to catch on Pelican Lake?

	Total
Yellow perch	210
Walleye	200
Bluegill/Sunfish	182
Northern Pike	125
Crappie	120
Muskellunge	103
Smallmouth bass	82
Largemouth bass	51
Other	7
All fish species	35



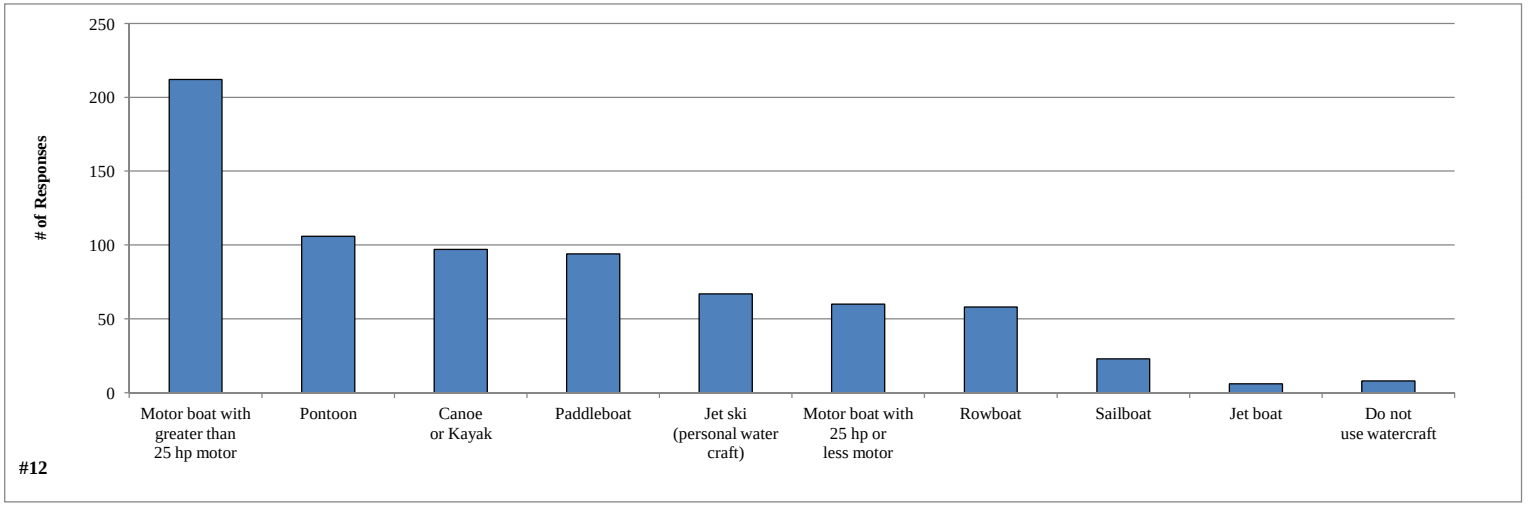
#11 How has the quality of fishing changed since you started fishing on Pelican Lake?

	Total	%
Much worse	84	*30.1*
Somewhat worse	128	*45.9*
Remained the Same	35	*12.5*
Somewhat better	12	*4.3*
Much better	1	*0.4*
Unsure	19	*6.8*
	279	*100.0*



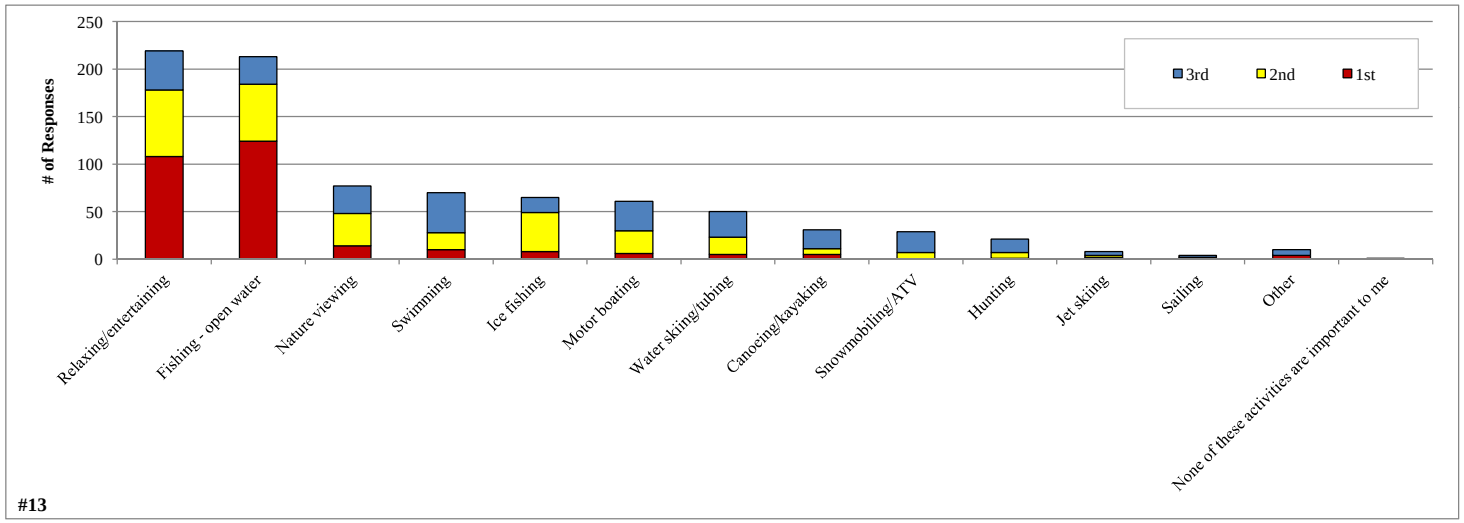
#12 What types of watercraft do you currently use on Pelican Lake?

	Total
Motor boat with greater than 25 hp motor	212
Pontoon	106
Canoe/Kayak	97
Paddleboat	94
Jet ski (personal water craft)	67
Motor boat with 25 hp or less motor	60
Rowboat	58
Sailboat	23
Jet boat	6
Do not use watercraft	8



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

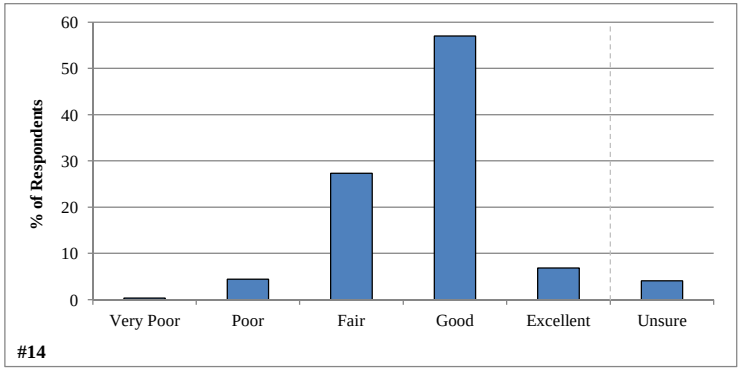
	1st	2nd	3rd	*% ranked*
Relaxing/entertaining	108	70	41	*25.5*
Fishing - open water	124	60	29	*24.8*
Nature viewing	14	34	29	*9.0*
Swimming	10	18	42	*8.1*
Ice fishing	8	41	16	*7.6*
Motor boating	6	24	31	*7.1*
Water skiing/tubing	5	18	27	*5.8*
Canoeing/kayaking	5	6	20	*3.6*
Snowmobiling/ATV	0	7	22	*3.4*
Hunting	1	6	14	*2.4*
Jet skiing	2	2	4	*0.9*
Sailing	1	1	2	*0.5*
Other	4	0	6	*1.2*
None of these activities are important to me	1	0	0	*0.1*
	289	287	283	*100.0*



PELICAN LAKE CURRENT AND HISTORIC CONDITION, HEALTH AND MANAGEMENT

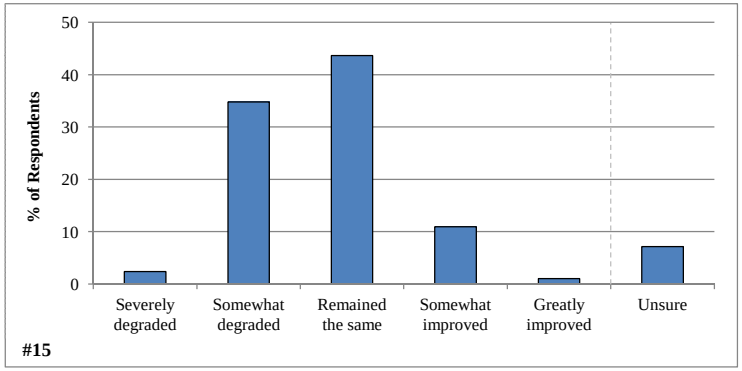
#14 How would you describe the current water quality of Pelican Lake?

	Total	%
Very Poor	1	*0.3*
Poor	13	*4.4*
Fair	80	*27.3*
Good	167	*57.0*
Excellent	20	*6.8*
Unsure	12	*4.1*
	293	*100.0*



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

	Total	%
Severely degraded	7	*2.4*
Somewhat degraded	102	*34.8*
Remained the same	128	*43.7*
Somewhat improved	32	*10.9*
Greatly improved	3	*1.0*
Unsure	21	*7.2*
	293	*100.0*



#16 Have you ever heard of aquatic invasive species?

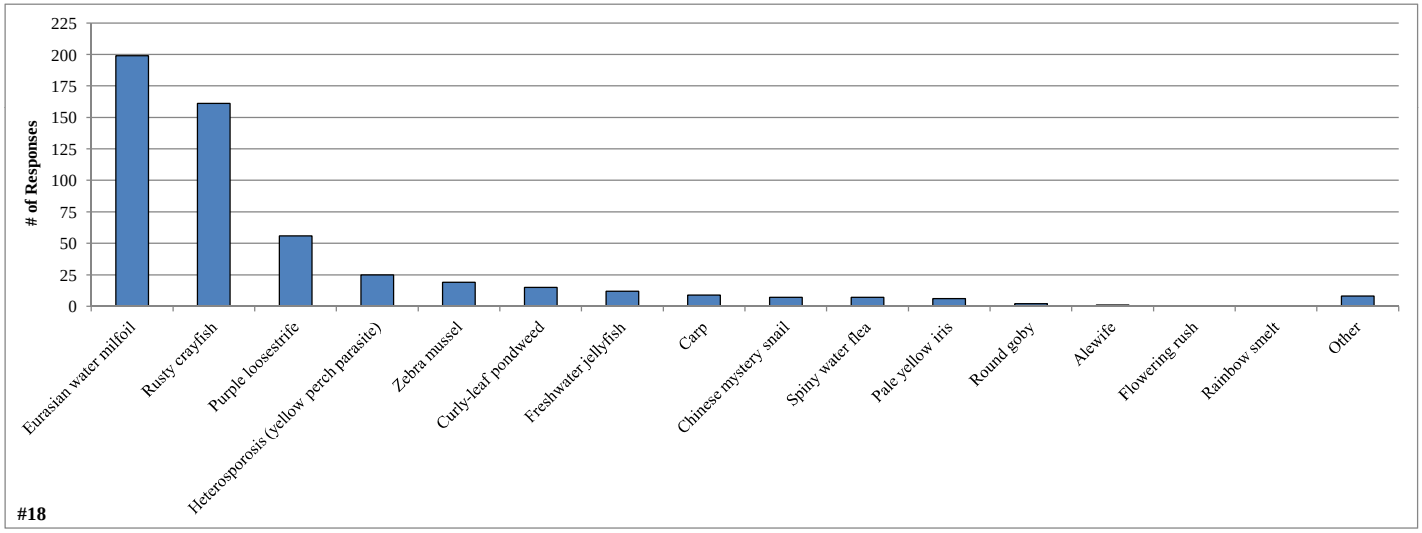
	Total	%
Yes	289	*98.3*
No	5	*1.7*
	294	*100.0*

#17 Are you aware of aquatic invasive species in Pelican Lake?

	Total	%
Yes	232	*81.1*
No	54	*18.9*
	286	*100.0*

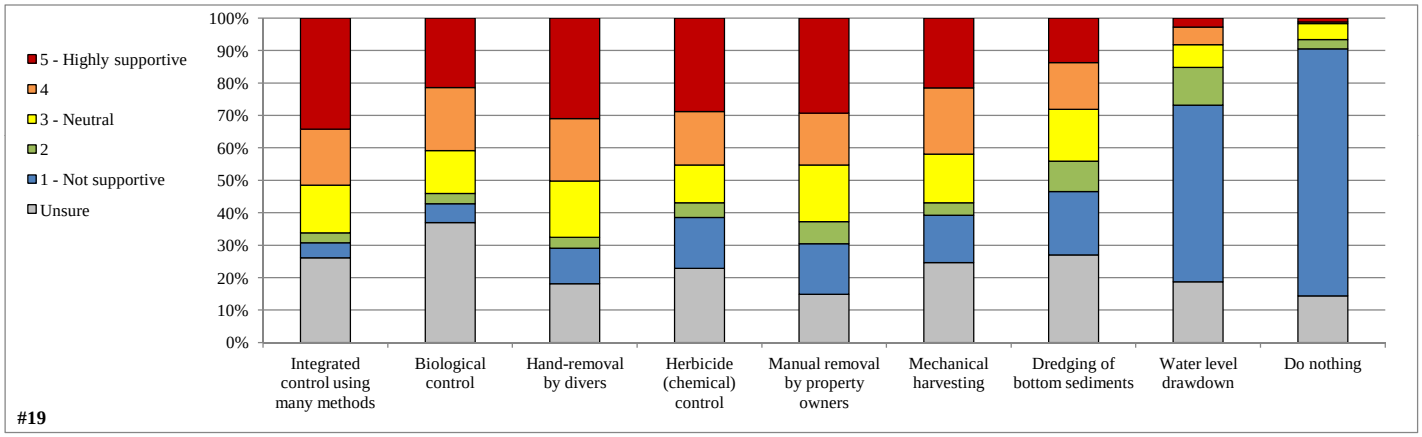
#18 Which aquatic invasive species are you aware of in Pelican Lake?

	Total
Eurasian water milfoil	199
Rusty crayfish	161
Purple loosestrife	56
Heterosporosis (yellow perch parasite)	25
Zebra mussel	19
Curly-leaf pondweed	15
Freshwater jellyfish	12
Carp	9
Chinese mystery snail	7
Spiny water flea	7
Pale yellow iris	6
Round goby	2
Alewife	1
Flowering rush	0
Rainbow smelt	0
Other	8



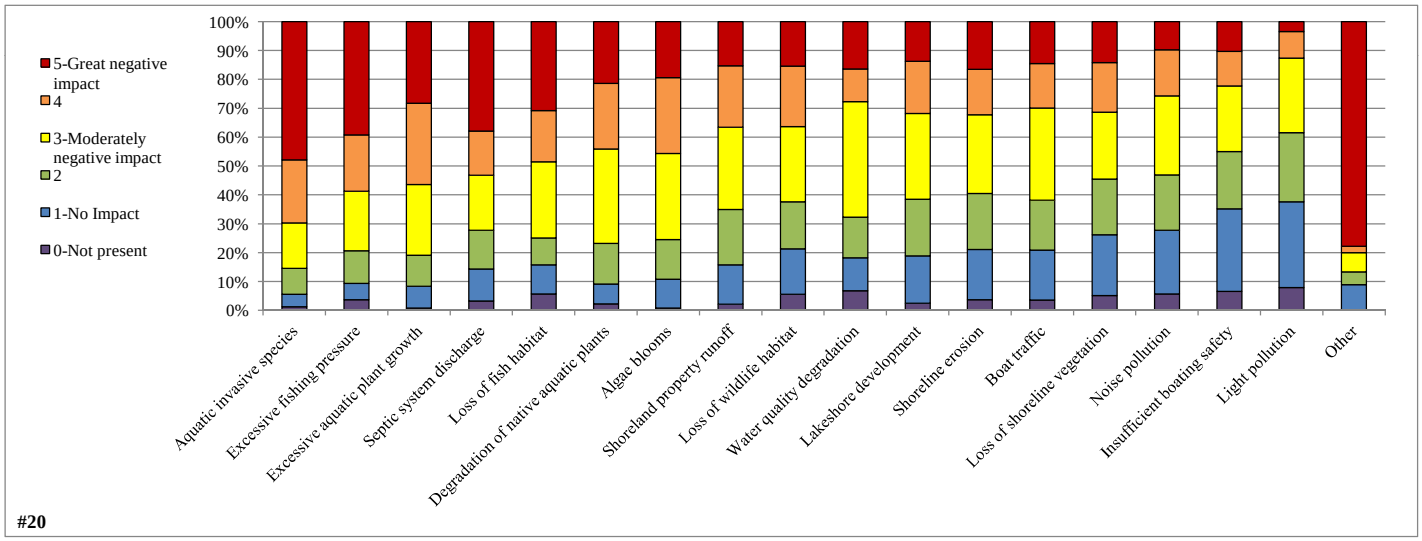
#19 Invasive aquatic plants can be managed using many techniques. What is your level of support for the responsible use of the following techniques on Pelican Lake?

	1 - Not supportive	2	3 - Neutral	4	5 - Highly supportive	Unsure	Total	Average
Integrated control using many methods	12	8	38	45	89	68	*192*	*4.0*
Biological control	15	8	34	50	55	95	*162*	*3.7*
Hand-removal by divers	29	9	46	51	82	48	*217*	*3.7*
Herbicide (chemical) control	42	12	31	44	77	61	*206*	*3.5*
Manual removal by property owners	41	18	46	42	77	39	*224*	*3.4*
Mechanical harvesting	38	10	39	53	56	64	*196*	*3.4*
Dredging of bottom sediments	50	24	41	37	35	69	*187*	*2.9*
Water level drawdown	140	30	18	14	7	48	*209*	*1.7*
Do nothing	185	7	12	1	3	35	*208*	*1.2*



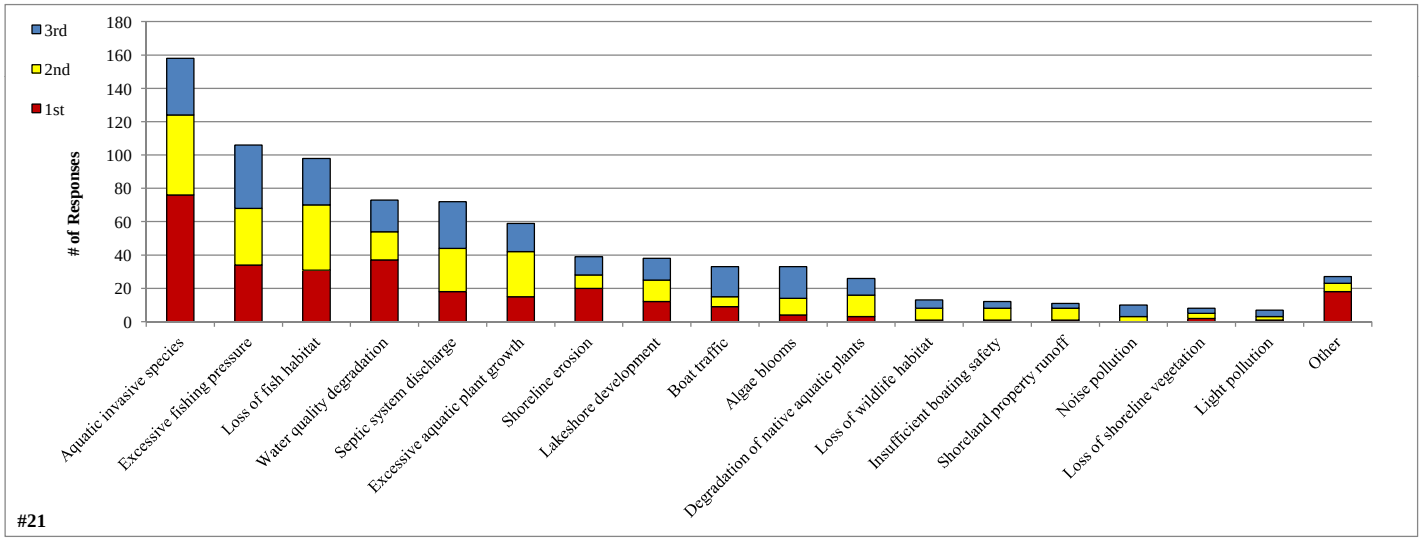
#20 To what level do you believe each of the following factors may be negatively impacting Pelican Lake?

	0-Not present	1-No Impact	2	3-Moderately negative impact	4	5-Great negative impact	*Total*	*Average*
Aquatic invasive species	3	10	21	37	51	112	*231*	*4.0*
Excessive fishing pressure	9	14	28	51	48	97	*238*	*3.6*
Excessive aquatic plant growth	2	18	26	59	68	68	*239*	*3.6*
Septic system discharge	7	24	29	41	33	82	*209*	*3.5*
Loss of fish habitat	14	25	23	65	44	76	*233*	*3.3*
Degradation of native aquatic plants	5	15	31	72	50	47	*215*	*3.3*
Algae blooms	2	23	32	69	61	45	*230*	*3.3*
Shoreland property runoff	5	32	45	67	50	36	*230*	*3.0*
Loss of wildlife habitat	13	37	38	61	49	36	*221*	*2.9*
Water quality degradation	15	25	31	88	25	36	*205*	*2.9*
Lakeshore development	6	39	47	71	43	33	*233*	*2.9*
Shoreline erosion	9	42	47	66	38	40	*233*	*2.8*
Boat traffic	9	44	44	81	39	37	*245*	*2.8*
Loss of shoreline vegetation	12	49	45	54	40	33	*221*	*2.7*
Noise pollution	14	54	47	67	39	24	*231*	*2.6*
Insufficient boating safety	16	69	48	55	29	25	*226*	*2.4*
Light pollution	18	68	55	59	21	8	*211*	*2.1*
Other	0	4	2	3	1	35	*45*	*4.4*



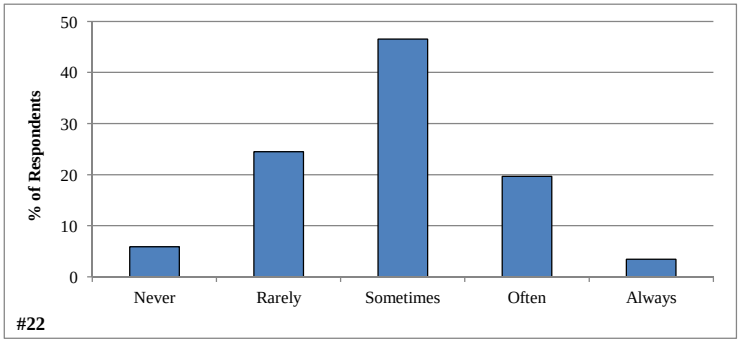
#21 From the list below, please rank your top three concerns regarding Pelican Lake.

	1st	2nd	3rd	*% Ranked*
Aquatic invasive species	76	48	34	*19.2*
Excessive fishing pressure	34	34	38	*12.9*
Loss of fish habitat	31	39	28	*11.9*
Water quality degradation	37	17	19	*8.9*
Septic system discharge	18	26	28	*8.7*
Excessive aquatic plant growth	15	27	17	*7.2*
Shoreline erosion	20	8	11	*4.7*
Lakeshore development	12	13	13	*4.6*
Boat traffic	9	6	18	*4.0*
Algae blooms	4	10	19	*4.0*
Degradation of native aquatic plants	3	13	10	*3.2*
Loss of wildlife habitat	1	7	5	*1.6*
Insufficient boating safety	1	7	4	*1.5*
Shoreland property runoff	1	7	3	*1.3*
Noise pollution	0	3	7	*1.2*
Loss of shoreline vegetation	2	3	3	*1.0*
Light pollution	1	2	4	*0.9*
Other	18	5	4	*3.3*
	283	275	265	*100.0*



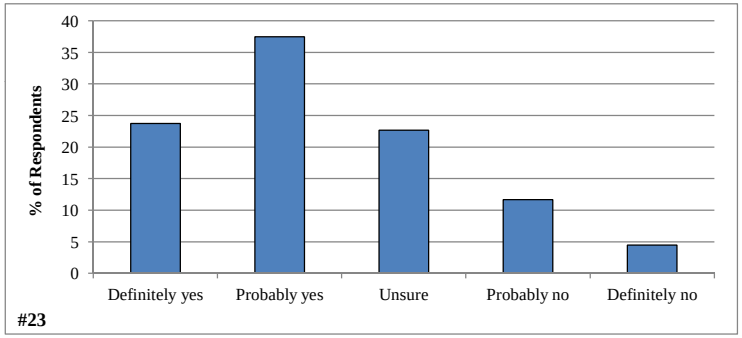
#22 During open water season how often does aquatic plant growth, including algae, negatively impact your enjoyment of Pelican Lake?

	Total	%
Never	17	*5.9*
Rarely	71	*24.5*
Sometimes	135	*46.6*
Often	57	*19.7*
Always	10	*3.4*
	290	*100.0*



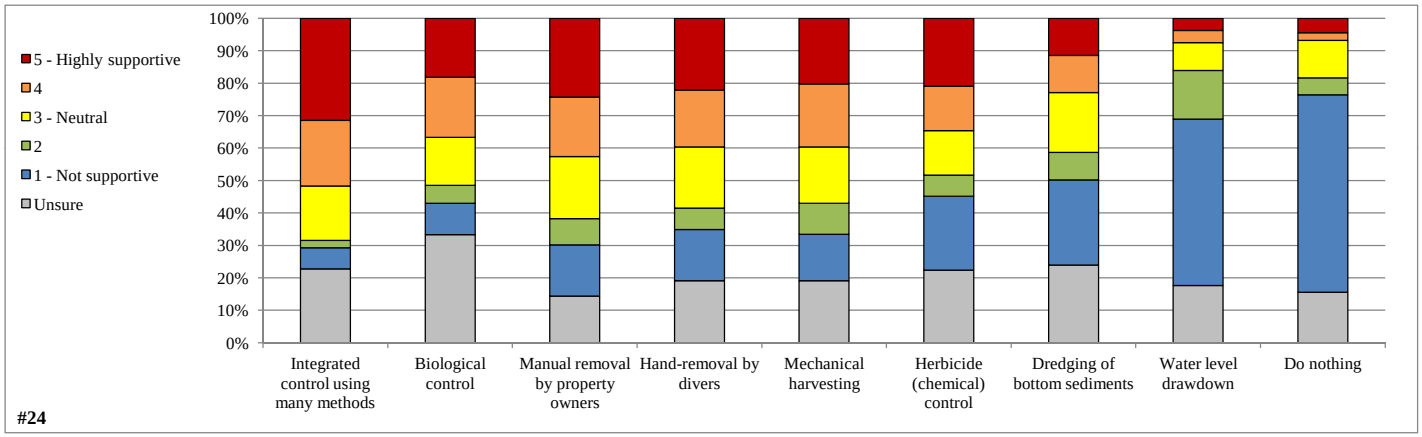
#23 Considering your answer to the question above, do you believe aquatic plant control is needed on Pelican Lake?

	Total	%
Definitely yes	69	*23.7*
Probably yes	109	*37.5*
Unsure	66	*22.7*
Probably no	34	*11.7*
Definitely no	13	*4.5*
	291	*100.0*



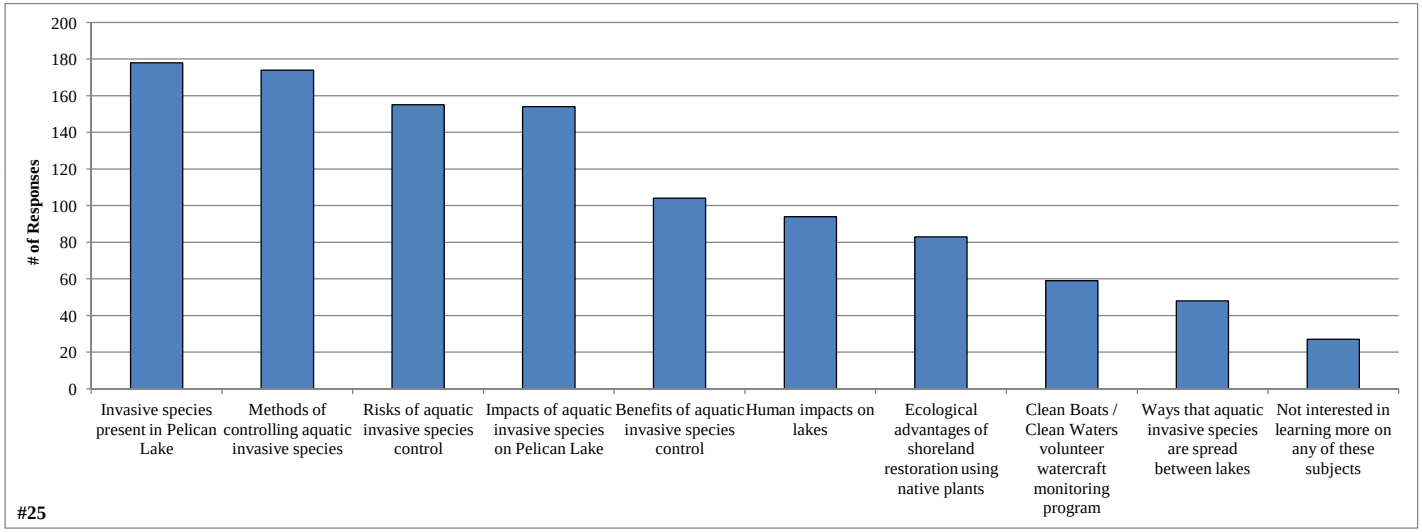
#24 Native aquatic plants can be managed using many techniques. What is your level of support for the responsible use of the following techniques on Pelican Lake?

	1 - Not supportive	2	3 - Neutral	4	5 - Highly supportive	Unsure	Total	Average
Integrated control using many methods	18	6	46	55	86	62	*211*	*3.9*
Biological control	26	15	40	50	49	90	*180*	*3.5*
Manual removal by property owners	43	22	52	50	66	39	*233*	*3.3*
Hand-removal by divers	43	18	51	48	60	52	*220*	*3.3*
Mechanical harvesting	39	26	47	53	55	52	*220*	*3.3*
Herbicide (chemical) control	63	18	38	38	58	62	*215*	*3.0*
Dredging of bottom sediments	71	23	50	31	31	65	*206*	*2.7*
Water level drawdown	137	40	23	10	10	47	*220*	*1.7*
Do nothing	152	13	29	6	11	39	*211*	*1.6*



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

	Total
Invasive species present in Pelican Lake	178
Methods of controlling aquatic invasive species	174
Risks of aquatic invasive species control	155
Impacts of aquatic invasive species on Pelican Lake	154
Benefits of aquatic invasive species control	104
Human impacts on lakes	94
Ecological advantages of shoreland restoration using native plants	83
Clean Boats / Clean Waters volunteer watercraft monitoring program	59
Ways that aquatic invasive species are spread between lakes	48
Not interested in learning more on any of these subjects	27



PELICAN LAKE PROPERTY OWNERS ASSOCIATION, INC.

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

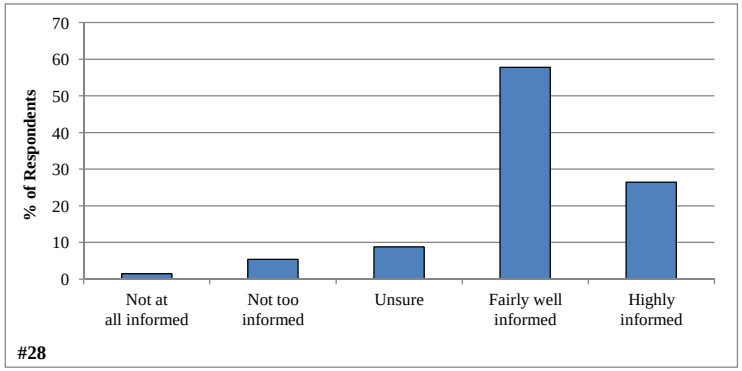
	Total	%
Yes	277	*94.5*
No	16	*5.5*
	293	*100.0*

#27 What is your membership status with the Pelican Lake Property Owners Association?

	Total	%
Current member	182	*65.7*
Former member	43	*15.5*
Never been a member	52	*18.8*
	277	*100.0*

#28 How informed has the Pelican Lake Property Owners Association kept you regarding issues with Pelican Lake and its management?

	Total	%
Not at all informed	3	*1.5*
Not too informed	11	*5.4*
Unsure	18	*8.8*
Fairly well informed	118	*57.8*
Highly informed	54	*26.5*
	204	*100.0*



#29 Have you visited the newly developed Association website?

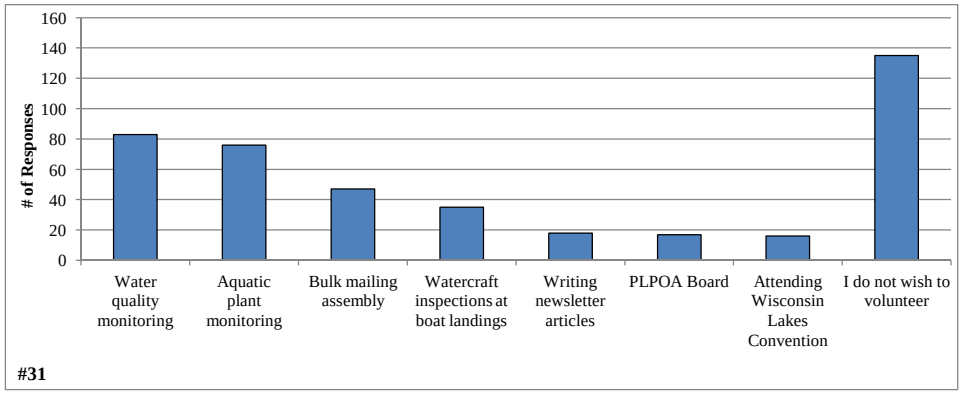
	Total	%
Yes	63	*22.4*
No	218	*77.6*
	281	*100.0*

#30 Please rate the various areas/links of the PLPOA website. In the space below list any items that should be added to the website.

	Enjoyed or found useful	Did not enjoy or find useful	Unsure - Did not visit this area of site
Shop	32	7	31
Meeting dates/times/calendar	57	1	19
Newsletters	60	0	17
AIS Update	53	1	20
Gallery	33	4	31

#31 Please circle the activities you would be willing to participate in if the Pelican Lake Property Owners Association requires additional assistance.

	Total
Water quality monitoring	83
Aquatic plant monitoring	76
Bulk mailing assembly	47
Watercraft inspections at boat landings	35
Writing newsletter articles	18
PLPOA Board	17
Attending Wisconsin Lakes Convention	16
I do not wish to volunteer	135

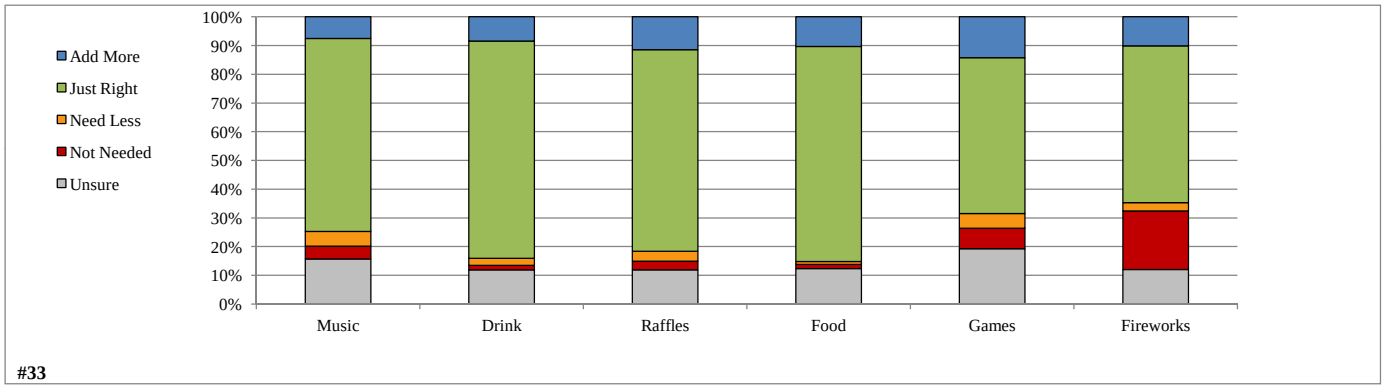


#32 The Pelican Lake Property Owners Association hosts a Summerfest Fundraiser Meeting & Event each year. Are you familiar with this event?

	Total	*%*
Yes	219	*75.8*
No	70	*24.2*
	289	*100.0*

#33 The Summerfest Fundraiser Meeting & Event includes activities such as food, music, drink, games and raffles. Please circle the response which best describes your feelings about each activity.

	Not Needed	Need Less	Just Right	Add More	Unsure	Total	Average
Music	9	10	133	15	31	*167*	*3.0*
Drink	3	5	152	17	24	*177*	*3.0*
Raffles	6	7	141	23	24	*177*	*2.9*
Food	3	2	152	21	25	*178*	*2.9*
Games	14	10	107	28	38	*159*	*2.6*
Fireworks	42	6	113	21	25	*182*	*0.4*



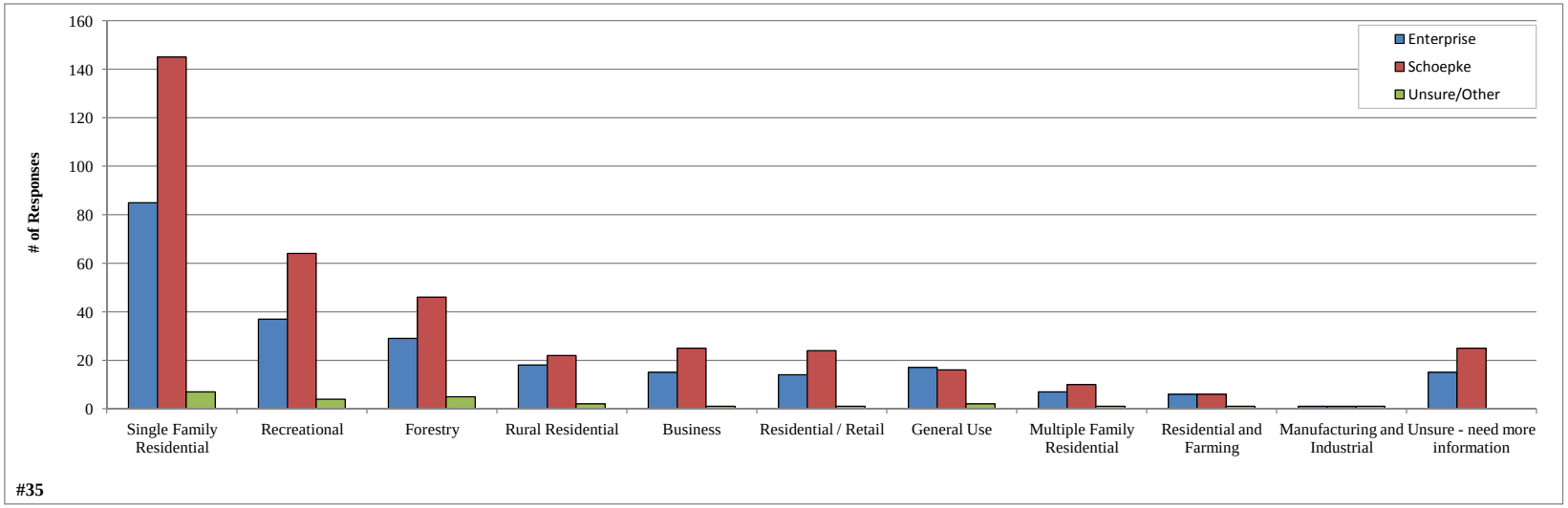
PELICAN LAKE PROPERTY USE AND ZONING

#34 Which township is your Pelican Lake residence located in?

	Total	%
Enterprise	106	*36.8*
Schoepke	178	*61.8*
Unsure	4	*1.4*
	288	*100.0*

#35 Which type of Oneida County approved land-use districts would be acceptable to you for the shoreland around Pelican Lake?

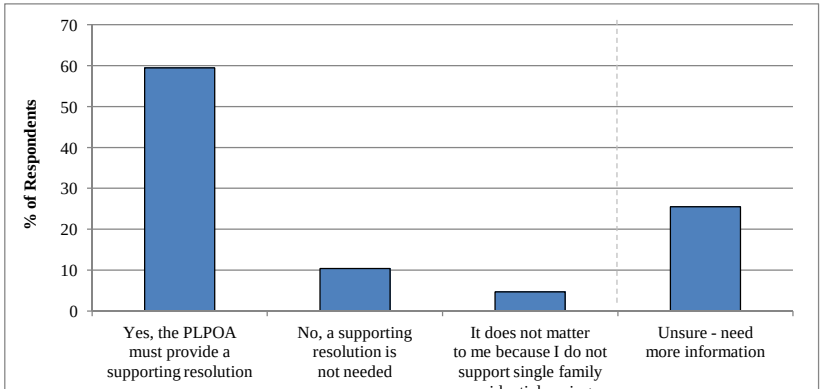
	Enterprise	Schoepke	Unsure/Other	Total
Single Family Residential	85	145	7	237
Recreational	37	64	4	105
Forestry	29	46	5	80
Rural Residential	18	22	2	42
Business	15	25	1	41
Residential / Retail	14	24	1	39
General Use	17	16	2	35
Multiple Family Residential	7	10	1	18
Residential and Farming	6	6	1	13
Manufacturing and Industrial	1	1	1	3
Unsure - need more information	15	25	0	40



#36 Should support of single family residential zoning (along with currently existing businesses), by Pelican Lake residents require the PLPOA to draft a resolution in support of this zoning?

Enterprise Residents

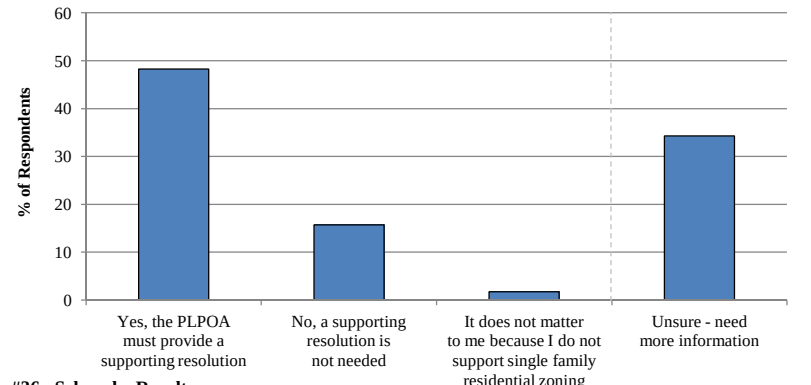
	Total	%
Yes, the PLPOA must provide a supporting resolution	63	*59.4*
No, a supporting resolution is not needed	11	*10.4*
It does not matter to me because I do not support single family residential zoning	5	*4.7*
Unsure - need more information	27	*25.5*
	106	*100.0*



#36 - Enterprise Results

Schoepke Residents

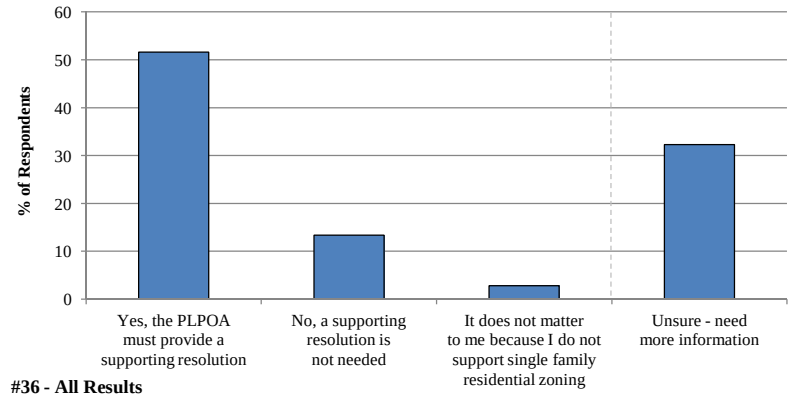
	Total	%
Yes, the PLPOA must provide a supporting resolution	83	*48.3*
No, a supporting resolution is not needed	27	*15.7*
It does not matter to me because I do not support single family residential zoning	3	*1.7*
Unsure - need more information	59	*34.3*
	172	*100.0*



#36 - Schoepke Results

All Residents

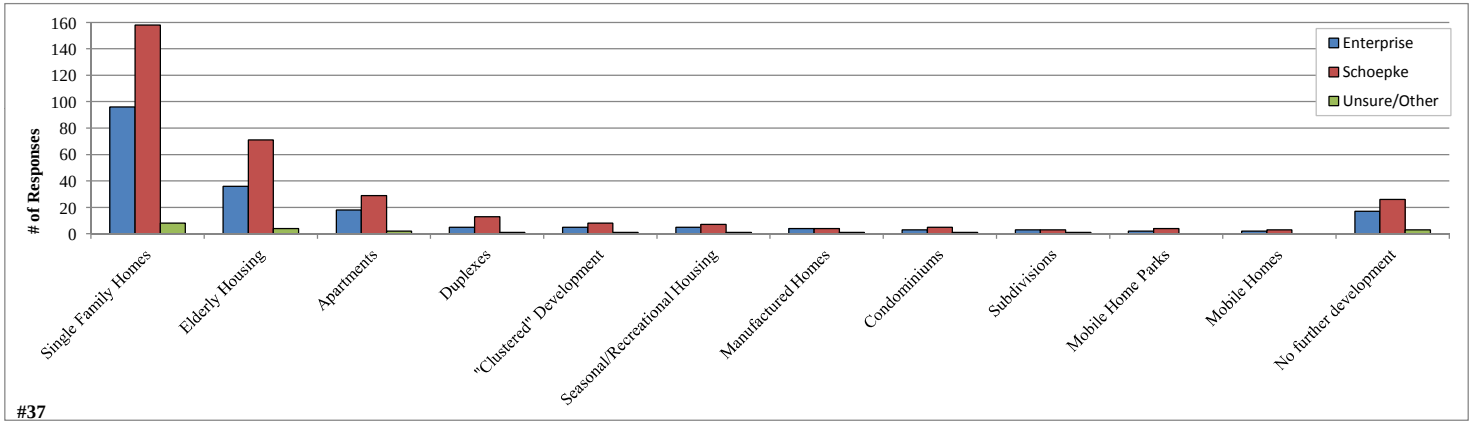
	Total	%
Yes, the PLPOA must provide a supporting resolution	147	*51.6*
No, a supporting resolution is not needed	38	*13.3*
It does not matter to me because I do not support single family residential zoning	8	*2.8*
Unsure - need more information	92	*32.3*
	285	*100.0*



#36 - All Results

#37 What type of housing development would be acceptable to you as shoreland property on Pelican Lake?

	Enterprise	Schoepke	Unsure/Other	Total
Single Family Homes	96	158	8	262
Elderly Housing	36	71	4	111
Apartments	18	29	2	49
Duplexes	5	13	1	19
"Clustered" Development	5	8	1	14
Seasonal/Recreational Housing	5	7	1	13
Manufactured Homes	4	4	1	9
Condominiums	3	5	1	9
Subdivisions	3	3	1	7
Mobile Home Parks	2	4	0	6
Mobile Homes	2	3	0	5
No further development	17	26	3	46



Survey Number	1g Comment	10i Comment	13m Comment	18p Comment	20r Comment	21r Comment	30 Comment	33 Comment	Other Comments (and Question 38)
1							snowmobile trail condition, lake property history		water level management, inhibit shoreland erosian, limnit spearfishing, reduced limits of panfish/perch
2					loss of trees				
3			being with grandkids						overdevelopment degredates shoreline,excessive tree removal, large homes replace small,close Keelers landing because of milfoil and no further development, purchase and put in land trust,try to obtain state stewardship funds -research area for burial grounds, artifacts etc and team with Nicolet/ St. Point to research and support
4									
5		Anything	Family	Snails				Love it	
6								waste of money causes additional pollution due to fireworks	know of lake association members raping the lake - undersize fish and excessive amounts- freezers full' excessive noise from jet skiis too close to dock and boats;atvs on roads not authorized- adults and kids w/o headgear- need patrols; fireworks by homeowners should be controlled- excessive noise;
7									
8									
9									
10									
11									
12									
13						Bass size limits			
14	year around over 100 days								
15									wondering who is responsible for putting signs on corner of G and S. Shore Road- sign w/owners names missing
16									
17									
18									
19									
20									
21									
22									
23					Spearing	Spearing	links to the Key West slide show		Unsure what is meant by retail-- some people sell firewood, maple syrup, craft items, not on a grand scale
24									After survey set PLPOA website as a favorite ; excellent tool.
25						Jet skiis-don't respect rules	laundry discharge into lake		
26									Find a way to manage the weed patches that have gotten out of hand
27									Your decision to make property owners aware of these issues is excellent- thank you.
28									
29									
30									
31									
32									Sent map of Mentonga -highlited- stock walleye;notspeared;trolling allowed;3 bag walleye;wants walleye stocked in Pelican since DNR refuses, use all firework $ for stocking
33					Too many jet skis				
34									
35									
36									
37									
38				weeds/algae				Due to constaints of age, I no longer attend but my family attends	I have been coming here for 60 years and enjoy the beauty and recreation of this lake. As noted I favor attention to water quality, invasive species, and single family zoning lakeshore, to protect the lure of this property for family use. Thanks for the concern of the PLPOA to continue helping this endeavor.
39									
40								The exception would be if specific individuals would decide to fund the fireworks.	I support the issues of single family housing; I believe the Schoepke Town Board did a good overall job developing/writing/discussing Coordination. I do not want to see the PLPOA become an adversarial entity as demonstrated at a recent town board meeting. However, there should be open discussions done in a mature professional manner. One of my concerns for Pelican Lake is the appearance of the use of parked motor homes/campers to extend living space of residences. They pay no taxes and are an eyesore.
41			Relatives lived on lake						
42									
43									
44									
45								More vendors	Problem with too much water being released; try to renegotiate the amount.
46									
47					spearing fish and illegal fish harvesting				The overharvesting of game and pan fish is one of the biggest roadblocks keeping Pelican L:ake from becoming a great fishery again

Survey Number	1g Comment	10i Comment	13m Comment	18p Comment	20r Comment	21r Comment	30 Comment	33 Comment	Other Comments (and Question 38)
48									Fishing has been going downhill. To catch a meal of perch or walleye is almost an impossibility. Musky fishing may be better (probably why perch and walleye have declined-- along with spearing.) However, it's almost impossible to cast for musky w/o hooking submerged or floating weeds. Because of fishing Pelican Lake is a " bluecollar" lake. However I see this changing. I see more and more recreational activity. The small cottage is being replaced by a mansion.
49									
50									
51									Overbagging on large crappie by large group of ice fishing. More shoreland vegetation for nesting waterfowl. Stop tribal spearing of stock walleye.
52									
53					Commercial Development	Fast traffic	Link to township lakes on enterprise and schoepke need a PLPOA laiason on both		
54									
55								It should last longer than early afternoon - maybe make it like Elcho street dance	
56									Our Townchairman does not care about anyone living on the lake - we can not voice our concerns. We need new supervisors and chairman. We hope it changes
57									
58									Lake buoys not maintained properly and located
59					Overcrowded residences				PLPOA needs to spend money previously raised - incuding fish stocking (abr.)
60									What impacts do the campgrounds have? Pontoon flotillas? (abr.)
61					Spearing	Spearing			
62					Boat wave action	Boat wave action - bulrushes are being eliminated			Concerned about bulrushes (abr.)
63									Thanks for asking our opinion
64									
65									
66					Spearing	Spearing			
67									I think we're doing just fine - new residents are stirring up the pot (abr.)
68				Snails		Jet Skis			
69					Spearing			Did not attend last year	
70					Ice fishing	Spearing			Need more vegetation, eliminate spearing & fishing during spawning etc. (abr.)
71									
72			Hope to retire		Spearing	Spearing			
73									
74									
75									
76									Thanks for all you do PLPOA
77									Water quality has decreased due to no blood suckers and loss of bullheads
78					The itch				Loss of shoreline - 1 foot a year and party flotillas at NE area of lake (abr.)
79									Ice fishing needs to stop this lake is overfished
80									
81						Spearing		This is first I have heard about this	52 years ago the lake was better (abr.)
82									
83									
84									
85									Too many weeds in lake and summer's itch is worse; spearfishing an issue (abr.)
86									Wrong for PLPOA to allow unsigned editorial in newsletter on zoning issue (abr.)
87									
88									
89									
90					Heavy use of large horsepower boats too shallow: jetski tricks.				
91			Investment			Too many people telling me what I can or cannot do to my property			This lake used to be affordable waterfront property- no longer. Any changes to what we have must only be done after consideration of keeping the property affordable. With the collapse of the real estate market fewer can afford property here. With my taxes few people can afford to buy my property.
92			Paddleboat			.			
93									
94								Car show enlarged- vote on cars-- maybe trophies	
95									Years ago Pelican Lake was full of fish. All of the things in this survey should be addressed for the lake. It is a beautiful lake.

Survey Number	1g Comment	10i Comment	13m Comment	18p Comment	20r Comment	21r Comment	30 Comment	33 Comment	Other Comments (and Question 38)
96									
97									
98									
99									Would like to know more of its history
100								Need more activities for kids Concerned with proper management of water levels during the winter because ice is heaving and shorleand destruction. A better monitoring should be put in place. Would sewers be a better solution for septic runoff and a cleaner lake?	
101									
102									
103									
104									
105								Consider expanding the size to attract more visitors. Please strongly consider stocking musky. We are not catching them like we should since Pelican is " The Home of the Musky." Thank you for doing the survey.	
106									
107									
108					Indian spearing				
109									Water quality is number one priority in my opinion. I don't see fresh water mussels, swimming leeches, or do I catch bullheads.
110									
111									Shoreline erosion is a concern for me. ATV trails need to be addressed for people on the north end of the lake. It makes good business sense and the roads are blacktop so dust should not be an issue. Speed limit should be posted so noise is at a minimum.
112									
113									
114		pumpkinseed		There are a lot of snail shells that was into shore - not seen until last year.	water level going down	rip rap must go down- it's murder on the turtles during egg laying season			I am alarmed by falling lake levels and the increase in weed and algae growth. The overgrowth interferes with fishing and swimming. There is also too much shoreline development. Indian Point Road is like a lakefront ghetto. Rip rap should be banned due to its negative effect on turtle and frog populations.
115					Too many public landings- difficult to monitor AIS			Old timers were not very friendly at the picnic.Add more crafts, etc.Have enjoyed the lake immensely which is why we are currently building. We plan on retiring here someday and being active members.	
116							Maybe an open forum		The purpose is to preserve, protect, and enhance the waters of Pelican Lake. If you don't support a resolution, I don't believe your purpose is " real." A greast lake obviously facing some major issues; I am very glad we have a committed association that clearly cares. Thank you.
117									
118									Both townships should be zoned the same.
119									
120						Jet skiis	Jet skiis and speed boatsStop paying people at boat landings looking for weeds; use money for stocking fish.		
121									Resolution is important; I think we need a sewage treatment system; I can't think water quality will improve without it. There is too much waste water being put into the soil for it to keep absorbing it all. It is going to end up in the lake. I don't know what Enterprise Township is up to but General Use zoning is wrong.
122									

Survey Number	1g Comment	10i Comment	13m Comment	18p Comment	20r Comment	21r Comment	30 Comment	33 Comment	Other Comments (and Question 38)
123			Ice skating					Save money on fireworks; apply it toward ASI management. Summerfeste does not bring in that large a profit. The meeting is more important The PLPOA should stay out of the political zoning issues. It should not be used to advance the agendas of a small group who are misguided advocates for imposing their will on the majority. The mechanism for expressing opinions is already in place- voting in elections. Pelican Lake and its shoreland propertiesn have been loved and enjoyed for many years while the PLPOA may be recently incorporated; it has existed for many years; many many members have contributed time and money over the years; this should have been stated in the website.	
124									
125					Spearing				
126									Love our Pelican lake home - would get more involved here but time restaints between 2 places prevent that. Appreciate what you do-- always keep us informed.
127									I started musky fishing thirteen years ago. I've seen a steady decline; the lack of muskies between 1- and 30 inches is disturbing as is a decline in northerns over 30 inches. P.S. I'm catch and release
128									
129								Summerfeste has only slight interest to me. I attend the meeting and donate to PLPOA.	
130									As far as for question number 36, I voted yes because single family I think it should be. If everyone is not in agreement that is a member, then it may be hard for PLPOA to say one way or another. Great job everyone, thanks.
131									I have fished Pelican for over 50 years; rusty crayfish has all but ruined that. It is still a great recreational lake.
132									
133					Parking and fishing 8 feet from our dock.				While not an avid fisherman. I have noticed a decline in the fishery. Also note decline in civility. July 4 our loon mailbox was beheaded. Every summer holiday boats of adults anchor and fish less than 10 feet from our dock. Beer bottles on the road. Aquatic plants made Guth's Bay unattractive for swimming and fishing. Great job -- invasive monitors at landings; buoys and cribs; policing unsafe boating; and fireworks.
134									
135									
136									
137									Thanks to the PLPOA for helping maintain our lake. As I am a weekend only resident, I am unable to help as much as I would like.
138									
139									
140								Laundry runoff Too much over regulation I think people who put their laundry water in the lake need to be stopped. It is apparent on Saturday morning--from Antigo Island?Changing zoning from business multiple family is not correct. Setbacks are fine but current rebuilding rules are extremely poor. Dictating that everyone needs their holding tank/septic pumped every "x" years is illogical. Some don't need it ; it is wasting people's money.	

Survey Number	1g Comment	10i Comment	13m Comment	18p Comment	20r Comment	21r Comment	30 Comment	33 Comment	Other Comments (and Question 38)
141									A long commntary is presented that suggests in 1.5 pages that the increase in boat and jet ski traffic is ruining the hiatorical presence of Pelican Lake as a fishing lake. Routinely the writer is disturbed by jet skiis and botas coming close to the dock areas or fishing boats at a high rate of speed. The writer wants the PLPOA and the DNR to meet to decide how to control this problem. One option suggested is a " No Wake Period" suggested 5pm to noon the next day would be No Wake. The onslaught is destroying the beayty, serenity, and fishing heritage of Pelican Lake. The PLPOA has been active in attempting to keep AIS from the lake. It needs to be as proactive about maintaining and preserving the fishing heritage. Let's face it, either we support the fishing or we succumb to the water traffic. The PLPOA needs to choose wisely.
142									We would like the spearing on Pelican Lake discontinued. We highly support what the association is trying to do.
143									
144									
145		White bass							The primary issue is fishing. No more Indian spearing. Ice fishing should end January 31. Leave the lake to itself from January 31 to May. Allow the fish to recover and successfully spawn. Check the results of the creel survey. It speaks the truth.
146									
147				White perch					
148								I have not attend this event in the past but plan to attend in the future I would like the town board members to take into consideration the wishes of both residents and property owners who are not full time residents (all taxpayers.)	
149									Back in the 60's and 80's you could catch a limit of perch. Now it takes 3 days to get a meal. Maybe netting out the small bullheads was a bad idea in the 80's since the bullhead will eat crayfish eggs and we know the crayfish destroy weed beds like the one that used to be off Chicago Point and Mud Bay. Also we need to find out what the DNR is going to do for us. I heard that the DNR has been stripping walleye every spring for years. We know the walleye population is way down. We should also consider closing some of the winter access down. Way too many slobs fishing. It is common to pick up wrappers and beer cans every weekend off the ice.
150									
151									
152									Musky and bass rules need an overhaul. Lower size on bass and musky. Bass and musky are eating up small perch and walleye. 40 years ago it was easy to catch a meal of perch and walleye.
153							Did not know about website but will now use regularly. Especially helpful daily temps.		
154									
155									
156									
157									
158									
159									
160		Whitebass and bullheads						I really only attended one.I wished the past lake association actions to suspend DNR fish stocking was based on sound biology versus the type of fish the board liked to catch or that they believed was the underlying reason for not catching fish. This is why I did not renew my membership. I think the association should not try to control or manage things they are not experts in. Pelican Lake has the most potential of any lake in Oneida County. I wish that potential could be realized through the cooperative efforts of the PLPOA, the DNR, the tribal council, and all visitors to the lake.	
161						Hard to choose-most are interconnected.	Ice conditions		Figure out a way to give nonresident taxpayers a say in local government.
162									I do not want sewer around Pelican Lake.

Survey Number	1g Comment	10i Comment	13m Comment	18p Comment	20r Comment	21r Comment	30 Comment	33 Comment	Other Comments (and Question 38)
163									
164									I fish mainly for perch. Perch fishing has really declined the last few years. There are a great number of bluegills and sunfish present. Years ago there were large bloodsuckers- now gone. Then came a large population of snails. Now we have algae blooms each summer along with water itch if we go in the water.
165									The state should move the 55 mph speed limit on Hwy. 45 to north of Q. You start to slow down to turn left on Q and people run you over.
166									
167		Whitebass							If four wheelers are permitted on township roads, they should be forced to stay within proper 4-wheel speed limits. Post them correctly in plain view.
168						Spearing and no fish planting	Spearing and no fish planting A cottage was just built on Pelican Lake on Outlet Bay. It has a new foundation and the cottage is new construction. It is only 50 feet from the shoreline. How is this possible? The 50 inch musky limit is a huge step forward. If it stays and the lake is stocked again, it may one day become again the Home of the Musky.		
169							With the spearing quotas the way they are, walleye fishing will never return to pre 1990 levels.		
170								Bingo would be nice. Concern of too much ice fishing, garbage left behind by them, and number of fish taken. Concern with trailer homes on existing landowners property, adding to septic use, and degredation of neighbor's property. Concern for fertilizer used on luch lawns and runoff into lake. Concern for increased amount of weeds not seen over last 50 years.	
171									Support legislation that 1. limits boat/motor size to 25hp. 2. provides 25 foot mandatory shoreline vegetation buffer. 3. Provides a 1/4 mile no-wake zone adjacent to shoreline
172									
173									
174									
175									
176				Spotted knapweed					
177									
178					Jet skis	Jet skis			It would be nice if we could come up to Pelican Lake on a weekend without the constant noise and aggression caused by jet skis and speed boats zipping by our property. We are also bothered by the amounts of loose grass and other aquatic vegetation that washes up on our shoreline. We would use our vacation property more if we enjoyed the time we spend there.
179									
180									
181								vendors, local artists etc. Although we enjoy the quiet nature of the lake, we would like to see a bit more restaurant and other business offerings. When I was a child the lake was abuzz with activity-- sort of miss that.	
182									
183									
184									I would like to see a small park with a beach similar to what Summit Lake has.
185									
186									

Survey Number	1g Comment	10i Comment	13m Comment	18p Comment	20r Comment	21r Comment	30 Comment	33 Comment	Other Comments (and Question 38)
187									I volunteered for several projects and was told my help was not wanted because I did not live on the lake full time.
188									
189									
190									
191					Perch limits				1. Need more Walleys Ploanted!!! 2. None/Less Pre Spawn Spearing 3. No Swer Around the Lake 4. Lsower Speed Limit on Hwy B with speed Bumps. 5. Boat Launching Fee 6. Lake Litter "Ice Fishing" 7. Use of Local Raods as ATV Trails 8. House to House Inspections for "Grey Water" 9. Lower Tax's !
192									
193									
194									I answered Qustion 11 as somewhat worse.By that I meant the Musky fishing is worse. I believe that the Walleye and Panfish is about the same as it has been over the years ---------- Enterprise was zoned single Family Residential for 40 yrs - 1960 - 2000. Then was changed by default by town chariman in 2000. WE NEED TO GET THIS BACK TO SINGLE FAMILY EXCEPT FOR CURRENT BUSSINISES. ----------THANKS!! I hope we can get some results Becuase current chair in Enterprise will not listen
195									
196									
197					Indian Spearing				Somehow with the residents of Town of Enterprise residents (underlined three times) and the town of Schoepke residents (underlined three times) and the PLPOA (underlined three times) We must keep the residential areas around Pelican Lake. ----- Single Family Residential Zoning (underlined 5 times.
198								I think the location is not rigght -- maybe take it back to Lakeside -- will gert more people to stop.	I think the boat parade should be organized better and small prizes given out for the best decorartes and stop the people that disrupt it from joining in -- Ex Throwing water balloons at other boats --- Color code the top of buoys on the westside of the lake so you know which buous go together.
199						Spearing			Need to Stop Spear Fishing! It is Ruining the Lake Period and all That Fish It. Stop Spear Fishing! And Spending Money At The Casino's
200									
201									
202									
203				bull heads					Several years ago the cooridinates for fish cribs were published but never again These were very helpful. Why can' t these be made known to all again?
204									
205					PWC Noise & operation of				#1 Pelican Lake can not be fished all year and be a good fishing lake. #2 I have a septic next door to me that is draining swer water into the lake. It should have a holding tank! #3 Control the abuse to the lake by personal water craft. Stop the round and round running, it is ripping up the lake!
206									Wish we were able to participate more -- we have limited time to spend at Pelican but definetly support all the effortsw to keep the lake beautiful health and safe.
207					Exess icd Fishing due to uncontrolled access to cars/trucks driving on and fishing out on the Lake. Any winter weekend hundreds of cars are out on the lake. Please cut off vehicor (sp) lake access wiping out the bait fish.				I'm a Fisherman. I have witnessed a significant decline in both quality and quantity of fishing over the past 16 years. I believe the signle biggest negative factor is the "over fishing" which occurs during ice fishing. Pelican Lake has 5 open access points on to the lake during winter ice fishing. During winter weekends, there can be 200 cars/trucks parked on the ice (Most are not property owners). This unlimited access is resulting in serverly reducing the bait fish and N. Pike populations, which in turn Reduces the game fish populations. I Strongly favor closing off all Lake Access to Cars/Trucks. If people want to walk out or 4-wheel/snowmobile out to sigh that is fine. But we must reduce winter fishing pressure befoe we wipe out al the game fish.
208								Money paid for fireworks could be used for lake problems. There is already enough fireworks around the lake.	
209									
210									
211									Will there ever be a "sewer system" for the entiure lake residents?
212									you Failed to address Indian Spearing which still affects tourisim and the Over Harvest of Walleyes & Muskies. What about none functioning septic systmes and out houses still in existance around the lake shouldn't that be corrected! Boating activity with glass beverage contaioners should not be permitted. Dangerous to see glass containers being consumed in the lake.
213	Periodic throught out the year					speed boat and jet ski			I am appauled how it is allowed by the DNR & Indian Nation to adversely affect the perpetual growth of the Walley population in Pelican Lake. Algae grwoth & Spearing needs to be reduced.
214									
215									
216									The only way to ensure a pristine, quiet atmosphere for future years and protect property values is to have the entire Lake Shore zoned single Family homes only!
217									

Survey Number	1g Comment	10i Comment	13m Comment	18p Comment	20r Comment	21r Comment	30 Comment	33 Comment	Other Comments (and Question 38)
218								While I have been there during the FR I have seldom come down town. Therefore have no opionion	
219						Lake Level Dam Control		Move Fireworks to the 3 or 4th of July	I think to mximize the efforts of controlling Foreign plants & fish from entering the lake, the lake should only have one public boat landing, the state landiing on G. -- Can the PLPOA make an effort to aquire the Dam from the Wisconsin Valley Athorrity. Those people have no interest in Pelican Lake Quality. They just want the water for their porivate bussiness use. Server Lake level changes the sunlght depth in the lake. Low water increases vegitation around as stated by the DNR (???)
220									
221									
222									
223									
224									
225	Business		My Business			micromanaging			
226									Pelican Lake is a great place to visit but is in need of more recreational oppurtunities to draw people in. IE restaurrants, resorts, golf courses. Also the lake lacks lodgfing for temporary tuests. Nosey residentws is also a problem on the lake.
227								Do Not Attend	
228								Very Poor Fireworks	
229									
230	6 mos			I think j & f I don't know officail name					In the 50 years I have been coming to Pelican Lake there has been many changes. For instance we have loons again. Changing mature is difficult and it requires knowledge and planning. Sounds like tht is what you are trying to do. Hope we can help.
231								More promotio in surrounding areas, bands for broader demograpic would increase attendence	
232									
233									
234									
235		Bullhead							I grew up living on Pelican Lake. 60+ years. I feel the lake has gone down hill somewhat. Yes its had its ups and downs - week growth up and down, water levels up and down. Aquatic species ups and downs - ex. Snail populatin way up. Large leeches pop - way down - back in the 50's & 60's population was very high - Where are they now? We need them to help degrade dead fish etc. Rescently crayfish population was up but in the passed couple of yers has gone down. What happened to the population. Boating activity has increased tremendously. Maybe3 the resason some are loosing shoeline. Due to a drought period areund the 1960's the overall head of the lake was raised from 16-18" to 20-22". Maybe another reason for shoreline loss. Weed growth recently has come back again espicailly in the submerget speiceis. Emergent species has dissappered. Some bullrushes and lily pads. Maybe due to people running them and cutting paths to get their big boarts and 100 hp motors out. I'd like see all of us go back to cane poles and rwoboats for a while and see what happens to the lake.
236									
237									I'm addressing concerns in regards to boat traffic-- What followings is a well written Page and a half paper on partying very close to shore by some on or around the 4th of July. I did not feel it was worth it to type all of it in here as it would have taken up a lot of space. But the letter is included in the hard copy of the survey and is well written and informative.
238									
239	Seasonal 6-7 mon/yr				Spring Spearing		Like thje lnks		"Form seemed to have a missing page"
240									
241					Excessive Harvest by Indian Tribes only to go to waste				Pelican Lake is a Great Lake. However threre is no reason this can't be one of the premier fisheries in the "State" for many spieces. I kow this has been a difficult battle with the DNR however there are prperites that have been recently been put up for sale for this reason alone. Fish stocking programs are lacking but are needed. Please let me know how we can help. I believe one person with some help and the right attitudes can make a difference! Keep up the Good work. Your efforts are greatly appreciated.
242									1. Ban the use of lawn fertilizers within 1,000 yards of thre lake or its tributarites. 2. Requiore a one-time inspection of all septic systmes and require owners to repair or replace within 24 months. 3. Reduce the speed limit and County roads Q, B, and G to 35 mpm.
243									
244									Pelican Lake is a wonderful recreation area but has some draw backs. Not enough entertainment or eating facilities. Very limited rental options for family & friends who would spend more time on the lake if they could. Land appreceations on the lake would be much improved with the addition of some of the above mentioned options. Finally, there are way too many busy bodies living on the lake who should worry more aobut themselves rather than their neighbors.
245					ice fishing				
246						Low water			
247							any lake releated development or general current info.		
248									

Survey Number	1g Comment	10i Comment	13m Comment	18p Comment	20r Comment	21r Comment	30 Comment	33 Comment	Other Comments (and Question 38)
249									
250									
251									It's a great lake. Let's Protect it! Stop worring about the Musky. How can we get more Walleye in the lake?
252									
253									Town of Schoepke needs tyo conswider some type of winter fee --- Road Pass -- Daily or Yearly for ice access from Keelers Landing. A summer time fee is now institued but nothing for the winter.
254									
255									Fish speraring is hurting our lake. (A) I find dead fish on my shore in the spring every year. I also know this is about Government!
256									
257					Spearing Walleye	Spearing Walleye			The Spearing is the major issue effecting the lake. Since spearing commenced I have gone to Ontario Canada for 3 weeks every year. We rarely use our Pelican Lake property anymore. I am usually part of a group of 8 to 12 individuals that regually go to Canada. Before spearing we staryed and spent considerable money at Pelican Lakeadn teh surrounding area. We would like to dos again; but it appears this will never happen because of the poor Walley fishing related to spearing and the fact we can not keep enough fish for a family fish fry. Before spearing we could always do so!!!
258							Great Start		1. Limit Jet Ski use: 10 am - 5 pm 2. Limit use fo outdoor yard lights. They must not pollute neighbors yards. 3. Create public beach area along 45
259									
260									
261					Spearing muskies	Spearing muskies			How can we stop native spearing musky and walleyes?
262									In general we want the lake to remain quiet with less wave runners etc. Also the beauty of the lake property is important. Some rules should be in place that eliminate excessive junk, rotting firewood, old vehicles, etc.
263									
264									
265					Indian Point home with lights all along shore and lining a long pier and granting a business permit to cut wood close to neighbors on the lake			Perhaps a social hour - drinks and snacks available one hour before the meeting would be useful for property owners to meet and visit with neighbors. The music later makes conversation difficult.	
266							Incompatible lakeshore use i.e. business in a residential area. I/we feel that the PLPOA should undertake a program to educate all property owners on what has happened recently regarding shoreline zoning. Most homeowners believe they are protected by shoreline zoning when, in fact they are not.		
267						Party boaters			Being a spring fed lake, our lake is especially vulnerable to pollutants. In the 1950's much of the swampland which previously filled with water during rainy periods, providing cleansing to the lake and food for fish was filled in. This swampland was filled in for housing and has affected the entire ecosystem of the lake.
268									
269									
270									
271				snails					Al sanitary systems need to be inspected. My neighbor found that his old tank had so many holes in it that it was just flowing into water table. At least make sure they're in good condition and not piped into the ground. I have heard that they take a huge amount of fish out during ice fishing. If true it should be limited. Try and negotiate with the Indians not to take so many spawning fish in the spring.
272									I think we should clear some of the weeds - ruining frontage on the lake. Musky Bay is filled with weeds-lets control them.
273									Would like to see some weed control on the lake. Musky Bay is getting worse every year.
274									Too many weeds in the lake. We need to have removal of them instead of letting them spread in front of the shoreline Instead of looking at the aquatic plant as a native of the lake that we aren't allowed to remove; look at the impact the spread of the plant is having and allow removal.
275									
276									Stop spearing.
277								Always an awesome event.	

Survey Number	1g Comment	10i Comment	13m Comment	18p Comment	20r Comment	21r Comment	30 Comment	33 Comment	Other Comments (and Question 38)
278									
279					Police/DNR harassment				
280									
281									
282									There is too much ice fishing pressure on this lake. Catch and release must be reinforced to those who don't practice it. Those are the ice fishermen. My family has been on this land since the 1940's and camped on it before that. We want to preserve and keep this lake for the future. Thank you for doing this much needed project.
283									
284					Jet ski	Rezoning for commercial			Thank you for all of the work you do.
285						Spearing			
286						Spearing			I don't know if anything can be done but the walleye and musky spearing has degraded the fishing a whole lot. When we bought our place in 1995 we could go out a 1 pm and catch and release 20 walleye in an hour mid-summer. Winter fishing was great too. We have not caught a legal waleye all summer. for the past two years. Walleye where we used to catch them in the winter has stopped too. At times I thought the lake association was in bed with the spearers!! That's why I quit the association. When they target the spawners, they hurt the resource. Ask Larry Smith- retired DNR fish biologist. He'll tell you. Many times we would also catch a musky by accident while fishing panfish. That also is not happeneing anymore. When Kirby Ament was president he made a nasty comment in the newsletter to the effect that the people who fish the cribs don't help put them in on December 31. That may be mostly true but how many can be there at that time of the winter. The association's support for the 15" limit on the 2 walleye limit only gives the dam Indians bigger fish to spear. I also believe they supported the 50" musky size limit. Another mistake, I feel. All in all, I'm ready to sell and look for better fishing. I don't feel it can ever come back-- too bad!
287									
288									
289									It would nice to have an ATV trail around the lake legally. At least on Hwy 45 from Q to the gas station. How about the snowmobile trail along 45?
290									I would suggest that the town boards of Enterprise and Schoepke consider Pelican Lake and its residents both full time and part time when setting policy. Without it and its tax base both the community of Pelican Lake and the townships would struggle to provide needed services. Cooperation and mutual respect of ideas is much needed.
291									
292									
293									
294									
295									
296					Indian Fishing	Indian Fishing			Enterprise needs new township board and commissioner - do not need business around pelican lake anymore; do not need 4wheelers on our township roads
297									
298									
299									
300									

C

APPENDIX C

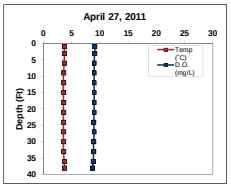
Water Quality Data

Pelican Lake

Date: 4/27/2011
Time: 12:00
Weather: 100% clouds, misting, no wind, 43°F
Entry: TWH

Max Depth: 39.9
PELS Depth (ft): 3.0
PELB Depth (ft): 36.0
Secchi Depth (ft): 7.8

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	3.7	9.1	7.0	
3	3.7	9.1	7.1	
6	3.7	9.0	7.1	
9	3.6	9.0	7.2	
12	3.6	9.0	7.2	
15	3.6	9.0	7.2	
18	3.6	9.0	7.2	
21	3.6	9.0	7.2	
24	3.6	8.9	7.2	
27	3.6	9.0	7.3	
30	3.6	8.9	7.3	
33	3.6	8.9	7.3	
36	3.7	8.8	7.3	
38	3.7	8.7	7.3	



Parameter	PELS	PELB
Total P (µg/L)	27.00	
Dissolved P (µg/L)	ND	ND
Chl-a (µg/L)	4.14	
TKN (µg/L)	480.00	
$NO_3 + NO_2$-N (µg/L)	184.00	
NH_3-N (µg/L)	28.00	
Total N (µg/L)	480.00	
Lab Cond. (µS/cm)	131.00	133.00
Lab pH		7.28
Alkalinity (mg/L $CaCO_3$)	41.90	42.40
Total Susp. Solids (mg/L)	2.00	ND
Calcium (mg/L)	12.10	

Data collected by TWH (Onterra)
Note: Took new WQ point as given one was not in a deep spot. Ice went out on the lake yesterday.
Ice chunks floating near shore at south landing.

Pelican Lake

Date: 6/29/2011
Time:
Weather:
Entry: TWH

Max Depth:
PELS Depth (ft):
PELB Depth (ft):
Secchi Depth (ft):

Parameter	PELS	PELB
Total P (µg/L)	25.00	
Dissolved P (µg/L)		
Chl-a (µg/L)	7.41	
TKN (µg/L)	640.00	
$NO_3 + NO_2$-N (µg/L)	ND	
NH_3-N (µg/L)	18.00	
Total N (µg/L)	540.00	
Lab Cond. (µS/cm)		
Lab pH		
Alkalinity (mg/L $CaCO_3$)		
Total Susp. Solids (mg/L)		
Calcium (mg/L)		

Data collected by CLMN.

Pelican Lake

Date: 7/26/2011
Time:
Weather: sunny, light wind from north
Entry: TWH

Max Depth:
PELS Depth (ft):
PELB Depth (ft):
Secchi Depth (ft): 5.0

Parameter	PELS	PELB
Total P (µg/L)	36.00	
Dissolved P (µg/L)		
Chl-a (µg/L)	10.90	
TKN (µg/L)	870.00	
$NO_3 + NO_2$-N (µg/L)	ND	
NH_3-N (µg/L)	ND	
Total N (µg/L)		
Lab Cond. (µS/cm)		
Lab pH		
Alkalinity (mg/L $CaCO_3$)		
Total Susp. Solids (mg/L)		
Calcium (mg/L)		

Data collected by CLMN

Pelican Lake

Date: 8/22/2011
Time:
Weather:
Entry: TWH

Max Depth:
PELS Depth (ft):
PELB Depth (ft):
Secchi Depth (ft): 6

Parameter	PELS	PELB
Total P (µg/L)	41.00	
Dissolved P (µg/L)		
Chl-a (µg/L)	18.30	
TKN (µg/L)	650.00	
$NO_3 + NO_2$-N (µg/L)	ND	
NH_3-N (µg/L)	ND	
Total N (µg/L)		
Lab Cond. (µS/cm)		
Lab pH		
Alkalinity (mg/L $CaCO_3$)		
Total Susp. Solids (mg/L)		
Calcium (mg/L)		

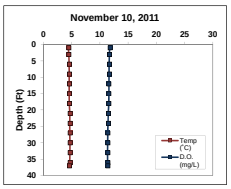
Data collected by CLMN.

Pelican Lake

Date: 11/10/2011
Time: 10:00
Weather: 100% clouds, 8-10 in snow yesterday, 3", flurries, breezy
Entry: EEC

Max Depth: 39.8
PELS Depth (ft): 3
PELB Depth (ft): 37
Secchi Depth (ft): 9.1

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	4.5	11.8		
3	4.5	11.7		
6	4.6	11.7		
9	4.6	11.7		
12	4.6	11.6		
15	4.6	11.6		
18	4.6	11.6		
21	4.7	11.5		
24	4.7	11.5		
27	4.7	11.4		
30	4.7	11.4		
33	4.7	11.4		
36	4.7	11.4		
37	4.6	11.4		



Parameter	PELS	PELB
Total P (µg/L)	39.00	26.00
Dissolved P (µg/L)		
Chl-a (µg/L)	4.42	
TKN (µg/L)	590.00	
$NO_3 + NO_2$-N (µg/L)	22.00	
NH_3-N (µg/L)	15.00	
Total N (µg/L)	590.00	
Lab Cond. (µS/cm)		
Lab pH		
Alkalinity (mg/L $CaCO_3$)		
Total Susp. Solids (mg/L)	3.00	ND
Calcium (mg/L)		

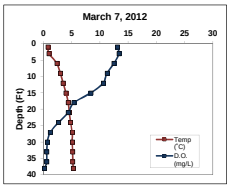
Data collected by TWH (Onterra)

Pelican Lake

Date: 3/7/2012
Time: 8:50
Weather: 40°F
Entry: TWH

Max Depth: 38.9
PELS Depth (ft): 3
PELB Depth (ft): 36
Secchi Depth (ft): 15.6

Depth (ft)	Temp (˚C)	D.O. (mg/L)	pH	Sp. Cond. (µS/cm)
1	0.8	13.1		
3	1	13.4		
6	2.4	12.5		
9	3	11.3		
12	3.5	10.6		
15	4	8.4		
18	4.4	5.4		
21	4.6	4.4		
24	4.8	2.7		
27	5.1	1.2		
30	5.1	0.7		
33	5.2	0.6		
36	5.2	0.6		
38	5.3	0.2		



Parameter	PELS	PELB
Total P (µg/L)	19.00	98.00
Dissolved P (µg/L)	ND	50.00
Chl-a (µg/L)		
TKN (µg/L)	580.00	790.00
$NO_3 + NO_2$-N (µg/L)	23.00	172.00
NH_3-N (µg/L)	49.00	288.00
Total N (µg/L)	580.00	790.00
Lab Cond. (µS/cm)		
Lab pH		
Alkalinity (mg/L $CaCO_3$)		
Total Susp. Solids (mg/L)	3.00	2.00
Calcium (mg/L)		

Data collected by TAH and TWH (Onterra)
Ice depth: 1.8ft.
Note: Much zooplankton observed in surface and bottom samples.

Water Quality Data

2010	Surface		Bottom	
Parameter	Count	Mean	Count	Mean
Secchi Depth (feet)	5	8.7	NA	NA
Total P (µg/L)	6	31.2	2	62.0
Dissolved P (µg/L)	2	ND	2	50.0
Chl a (µg/L)	5	9.0	0	NA
TKN (µg/L	6	635.0	1	790.0
NO3+NO2-N (µg/L)	6	76.3	1	172.0
NH3-N (µg/L)	6	27.5	1	288.0
Total N (µg/L)	4	547.5	1	790.0
Lab Cond. (µS/cm)	1	131.0	1	133.0
Lab pH	0	NA	1	7.3
Alkal (mg/l CaCO3)	1	41.9	1	42.4
Total Susp Sol (mg/l)	3	2.7	3	2.0
Calcium (µg/L)	1	12.1	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			

Wisconsin Trophic State Index (WTSI)

Year	TP	Chl-a	Secchi
1973	54.6		50.1
1974	56.8		54.5
1975			
1976			
1977			
1978			
1979		59.3	
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987			51.1
1988	54.5	60.3	47.0
1989	47.7	46.3	43.3
1990	49.7	50.7	47.6
1991	53.1	54.4	52.1
1992	52.1	52.0	47.6
1993	51.7	52.3	46.8
1994	55.0	51.8	48.8
1995	51.1	34.4	46.5
1996	55.1	54.4	49.3
1997	52.1	50.9	46.2
1998	55.1	57.6	53.7
1999	56.0	57.8	55.9
2000	54.6	52.5	51.5
2001	56.0	52.4	50.8
2002	54.8	52.1	
2003		61.7	56.6
2004	53.8	51.6	48.4
2005	57.0	56.1	53.6
2006	56.2	53.9	49.9
2007	55.7	54.7	50.1
2008	52.7	42.3	46.4
2009	53.8	47.3	45.7
2010	54.7	54.0	51.3
2011	55.0	54.5	48.2
All Years (Weighted)	54.3	53.8	48.7
Shallow, Lowland Drainage Lakes	55.4	51.6	52.3
NLF Ecoregion	51.8	47.7	45.7

	Secchi (feet)				Chlorophyll-a (µg/L)				Total Phosphorus (µg/L)			
	Growing Season		Summer		Growing Season		Summer		Growing Season		Summer	
Year	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean	Count	Mean
1973	2	7.9	1	6.5					2	30.0	1.0	30.0
1974	3	6.0	1	4.8					3	63.3	1.0	40.0
1975	0		0						0		0.0	
1976	0		0						0		0.0	
1977	0		0						0		0.0	
1978	0		0						0		0.0	
1979	0		0		2	19.2	1	26.5	1	26.0	0.0	
1980	2	9.4	1	7.9	0		0		2	25.0	1.0	34.0
1981	2	8.2	1	5.9	0		0		2	22.5	1.0	24.0
1982	1	8.5	1	8.5	0		0		1	57.0	1.0	57.0
1983	3	9.7	1	10.5	0		0		3	32.0	1.0	27.0
1984	0		0		0		0		0		0.0	
1985	0		0		0		0		0		0.0	
1986	0		0		0		0		0		0.0	
1987	4	5.8	3	6.1	0		0		0		0.0	
1988	6	8.6	3	8.1	2	30.0	2	30.0	2	29.5	2.0	29.5
1989	6	10.3	4	10.4	5	6.0	3	4.7	4	14.5	3.0	12.3
1990	5	12.0	2	7.8	4	7.0	3	8.3	4	17.3	3.0	16.0
1991	6	7.9	3	5.7	3	13.7	3	13.7	3	24.7	3.0	24.7
1992	3	7.8	3	7.8	4	9.5	3	10.0	4	24.0	3.0	21.7
1993	6	8.1	5	8.2	4	8.9	3	10.4	4	18.0	3.0	20.7
1994	4	7.7	3	7.1	4	9.1	3	9.7	4	28.5	3.0	31.7
1995	4	8.7	3	8.4	3	3.1	2	0.9	3	19.7	2.0	19.0
1996	5	6.7	4	6.9	4	13.2	3	13.7	4	31.5	3.0	32.0
1997	5	8.6	4	8.6	4	7.2	3	8.6	3	21.7	3.0	21.7
1998	4	6.2	3	5.1	4	16.5	3	20.9	4	28.8	3.0	32.0
1999	3	4.7	2	4.4	3	17.8	2	21.5	3	33.0	2.0	36.0
2000	4	6.2	3	5.9	4	9.3	3	10.7	4	29.8	3.0	30.0
2001	4	6.9	3	6.2	5	9.6	4	10.5	5	33.0	4.0	35.8
2002	3	8.1	2	8.4	4	9.8	3	10.1	4	29.5	3.0	30.7
2003	4	4.4	3	4.2	3	36.1	3	36.1	0		0.0	
2004	4	8.0	3	7.3	7	9.1	6	9.5	9	26.2	6.0	27.0
2005	6	7.1	4	5.1	4	15.6	3	17.3	5	33.6	3.0	41.0
2006	6	7.8	4	6.6	4	12.3	3	12.9	5	38.6	3.0	36.7
2007	7	9.7	4	6.5	3	14.2	3	14.2	4	34.0	3.0	34.3
2008	7	9.9	4	8.4	3	4.3	2	2.7	5	24.4	2.0	23.5
2009	9	9.3	7	8.8	6	5.9	5	5.3	7	26.3	5.0	27.2
2010	11	8.6	6	6.0	9	15.7	6	13.0	10	30.5	6.0	30.3
2011	13	8.4	8	7.5	11	11.9	8	13.9	13	29.8	8.0	31.6
All Years (Weighted)		8.2		7.2		11.8		12.7		28.0		28.8
Shallow, Lowland Drainage Lakes				5.6				9.4				33.0
NLF Ecoregion				8.9				5.6				21.0

Summer 2011 N: 870.0
Summer 2011 P: 36.0

Summer 2011 N:P 24 :1

D

APPENDIX D

Watershed Analysis WiLMS Results

Date: 10/22/2012 Scenario: 93

Lake Id: 157990
Watershed Id: 0

Hydrologic and Morphometric Data

Tributary Drainage Area: 10336.0 acre
Total Unit Runoff: 12.20 in.
Annual Runoff Volume: 10508.3 acre-ft
Lake Surface Area <As>: 3585.0 acre
Lake Volume <V>: 46274.8 acre-ft
Lake Mean Depth <z>: 12.9 ft
Precipitation - Evaporation: 5.8 in.
Hydraulic Loading: 12241.0 acre-ft/year
Areal Water Load <qs>: 3.4 ft/year
Lake Flushing Rate <p>: 0.26 1/year
Water Residence Time: 3.78 year
Observed spring overturn total phosphorus (SPO): 27.0 mg/m^3
Observed growing season mean phosphorus (GSM): 27.8 mg/m^3
% NPS Change: 0%
% PS Change: 0%

NON-POINT SOURCE DATA

Land Use	Acre (ac)	Loading (kg/ha-year) Low	Loading (kg/ha-year) Most Likely	Loading (kg/ha-year) High	Loading %	Loading (kg/year) Low	Loading (kg/year) Most Likely	Loading (kg/year) High
Row Crop AG	85.0	0.50	1.00	3.00	3.6	17	34	103
Mixed AG	0.0	0.30	0.80	1.40	0.0	0	0	0
Pasture/Grass	898.0	0.10	0.30	0.50	11.4	36	109	182
HD Urban (1/8 Ac)	0.0	1.00	1.50	2.00	0.0	0	0	0
MD Urban (1/4 Ac)	2.0	0.30	0.50	0.80	0.0	0	0	1
Rural Res (>1 Ac)	29.0	0.05	0.10	0.25	0.1	1	1	3
Wetlands	4224.0	0.10	0.10	0.10	17.8	171	171	171
Forest	5098.0	0.05	0.09	0.18	19.4	103	186	371
Lake Surface	3585.0	0.10	0.30	1.00	45.4	145	435	1451

POINT SOURCE DATA

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

SEPTIC TANK DATA

Description		Low	Most Likely	High	Loading %
Septic Tank Output (kg/capita-year)		0.30	0.50	0.80	
# capita-years	443				
% Phosphorus Retained by Soil		98.0	90.0	80.0	
Septic Tank Loading (kg/year)		2.66	22.15	70.88	2.3

TOTALS DATA

Description	Low	Most Likely	High	Loading %
Total Loading (lb)	1049.9	2114.3	5186.4	100.0
Total Loading (kg)	476.2	959.0	2352.5	100.0
Areal Loading (lb/ac-year)	0.29	0.59	1.45	
Areal Loading (mg/m^2-year)	32.82	66.10	162.15	
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)	724.2	1105.9	1831.6	97.7
Total NPS Loading (kg)	328.5	501.6	830.8	97.7

Phosphorus Prediction and Uncertainty Analysis Module

Date: 10/22/2012 Scenario: 62
Observed spring overturn total phosphorus (SPO): 27.0 mg/m^3
Observed growing season mean phosphorus (GSM): 27.8 mg/m^3
Back calculation for SPO total phosphorus: 0.0 mg/m^3
Back calculation GSM phosphorus: 0.0 mg/m^3
% Confidence Range: 70%
Nurenberg Model Input - Est. Gross Int. Loading: 0 kg

Lake Phosphorus Model	Low Total P (mg/m^3)	Most Likely Total P (mg/m^3)	High Total P (mg/m^3)	Predicted -Observed (mg/m^3)	% Dif.
Walker, 1987 Reservoir	14	28	68	0	0
Canfield-Bachmann, 1981 Natural Lake	12	20	36	-8	-29
Canfield-Bachmann, 1981 Artificial Lake	13	19	32	-9	-32
Rechow, 1979 General	3	5	13	-23	-83
Rechow, 1977 Anoxic	18	36	88	8	29
Rechow, 1977 water load<50m/year	5	11	26	-17	-61
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	13	25	62	-2	-7
Vollenweider, 1982 Combined OECD	11	19	40	-8	-29
Dillon-Rigler-Kirchner	8	15	37	-12	-44
Vollenweider, 1982 Shallow Lake/Res.	8	15	34	-12	-44

Larsen-Mercier, 1976	11	22	53	-5	-19
Nurnberg, 1984 Oxic	7	13	33	-15	-54

Lake Phosphorus Model	**Confidence** Lower Bound	**Confidence** Upper Bound	**Parameter** Fit?	**Back** Calculation (kg/year)	**Model** Type
Walker, 1987 Reservoir	16	54	Tw	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	3	10	L	0	GSM
Rechow, 1977 Anoxic	22	70	FIT	0	GSM
Rechow, 1977 water load<50m/year	6	21	FIT	0	GSM
Rechow, 1977 water load>50m/year	N/A	N/A	N/A	N/A	N/A
Walker, 1977 General	13	52	FIT	0	SPO
Vollenweider, 1982 Combined OECD	9	37	FIT	0	ANN
Dillon-Rigler-Kirchner	9	29	L qs	0	SPO
Vollenweider, 1982 Shallow Lake/Res.	7	30	FIT	0	ANN
Larsen-Mercier, 1976	14	42	P Pin	0	SPO
Nurnberg, 1984 Oxic	7	27	FIT	0	ANN

Water and Nutrient Outflow Module

Date: 10/22/2012 Scenario: 47
Average Annual Surface Total Phosphorus: 27.4mg/m^3
Annual Discharge: 1.22E+004 AF => 1.51E+007 m^3
Annual Outflow Loading: 871.9 LB => 395.5 kg

E

APPENDIX E

Aquatic Plant Survey Data

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton bicirrosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberculatus	Sparganium eurycarpum	Spirodela polyrhiza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
1	45.487674	-89.198217	7	Muck	Pole							1																																				
2	45.487664	-89.196746	9	Muck	Pole			2	1			1																								1										1		
3	45.487654	-89.195274	6	Muck	Pole			1				2																								1												
4	45.488720	-89.199674	0			NO INFORMATION																																										
5	45.488709	-89.198203	5	Sand	Pole				1											1												1			1								1					
6	45.488699	-89.196731	6	Sand	Pole				1											1							1																		1		1
7	45.488689	-89.195260	6	Rock	Pole							1															1																		1		
8	45.488678	-89.193788	3	Sand	Pole																																		1								
9	45.488657	-89.190845	3	Rock	Pole															1																											
10	45.488647	-89.189374	5	Sand	Pole															1																											
11	45.488637	-89.187902	4	Rock	Pole																																										
12	45.489775	-89.202603	2	Sand	Pole						1		1																										1								
13	45.489765	-89.201131	4	Sand	Pole				1			1								1																							1				
14	45.489755	-89.199660	5	Sand	Pole															1																1											
15	45.489744	-89.198188	13	Muck	Pole																																										
16	45.489734	-89.196717	12	Muck	Pole																																										
17	45.489724	-89.195245	12	Muck	Pole																																										
18	45.489713	-89.193773	11	Muck	Pole																																										
19	45.489703	-89.192302	9	Sand	Pole																																										
20	45.489692	-89.190830	6	Rock	Pole																																										
21	45.489682	-89.189359	9	Sand	Pole																																										
22	45.489672	-89.187887	9	Sand	Pole																																										
23	45.489661	-89.186416	5	Rock	Pole																																										
24	45.490831	-89.205531	4	Rock	Pole			1													1					1																	1				
25	45.490821	-89.204060	6	Rock	Pole															1	1					1																					
26	45.490810	-89.202588	7	Sand	Pole				1																																						1
27	45.490800	-89.201117	13		Rope																																										
28	45.490790	-89.199645	14		Pole																																										
29	45.490779	-89.198173	12	Muck	Pole																																										
30	45.490769	-89.196702	8	Sand	Pole																																										
31	45.490759	-89.195230	10	Muck	Pole																																										
32	45.490748	-89.193759	3	Sand	Pole																																										
33	45.490738	-89.192287	9	Sand	Pole																																										
34	45.490728	-89.190815	12	Muck	Pole																																										
35	45.490717	-89.189344	13	Sand	Pole																																										
36	45.490707	-89.187872	15		Rope																																										
37	45.490696	-89.186401	13	Sand	Pole																																										
38	45.490686	-89.184929	10	Sand	Pole																																										
39	45.490675	-89.183458	5	Rock	Pole																																										
40	45.491876	-89.206988	6	Rock	Pole			1												2															2												
41	45.491866	-89.205517	10	Sand	Pole			1																												1									1		
42	45.491856	-89.204045	10	Sand	Pole							1																																	1		
43	45.491845	-89.202574	13	Muck	Pole																																										
44	45.491835	-89.201102	11	Sand	Pole																																										
45	45.491825	-89.199630	2	Rock	Pole																																										
46	45.491814	-89.198159	9	Sand	Pole																																										
47	45.491804	-89.196687	4	Rock	Pole																																										
48	45.491763	-89.190801	7	Sand	Pole																																										
49	45.491752	-89.189329	14		Rope																																										
50	45.491742	-89.187857	14		Rope																																										
51	45.491731	-89.186386	13		Rope																																										
52	45.491721	-89.184914	15		Rope																																										
53	45.491710	-89.183443	12	Sand	Pole																																										
54	45.491700	-89.181971	4	Rock	Pole																																										
55	45.492921	-89.208445	4	Muck	Pole																					1										1							2				
56	45.492911	-89.206974	9	Muck	Pole			1				1																						1		1									1		
57	45.492901	-89.205502	11	Muck	Pole																																										
58	45.492891	-89.204031	13	Muck	Pole							1																																			
59	45.492880	-89.202559	0			DEEP																																									
60	45.492870	-89.201087	0			DEEP																																									
61	45.492860	-89.199616	9	Rock	Pole																																										
62	45.492849	-89.198144	2	Rock	Pole																																										
63	45.492798	-89.190786	8	Rock	Pole																																										
64	45.492787	-89.189314	14		Rope																																										
65	45.492777	-89.187843	0			DEEP																																									
66	45.492766	-89.186371	0			DEEP																																									
67	45.492756	-89.184899	0			DEEP																																									
68	45.492745	-89.183428	14		Rope																																										
69	45.492735	-89.181956	11	Sand	Pole																																										
70	45.492724	-89.180484	5	Rock	Pole																																										
71	45.493956	-89.208431	4	Muck	Pole			2				2							1																1							3				
72	45.493946	-89.206959	6	Muck	Pole			2				1				1										1								1		1											1

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberiaemontani	Sparganium eurycarpum	Spirodela polyhriza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
73	45.493936	-89.205488	2	Rock	Pole			1												1																												
74	45.493926	-89.204016	10	Rock	Pole																																											
75	45.493915	-89.202544	0			DEEP																																										
76	45.493905	-89.201073	0			DEEP																																										
77	45.493895	-89.199601	0			DEEP																																										
78	45.493884	-89.198129	0			DEEP																																										
79	45.493874	-89.196658	14		Rope																																											
80	45.493843	-89.192243	2	Rock	Pole																																											
81	45.493833	-89.190771	8	Rock	Pole																																											
82	45.493822	-89.189299	0			DEEP																																										
83	45.493812	-89.187828	0			DEEP																																										
84	45.493801	-89.186356	0			DEEP																																										
85	45.493791	-89.184884	0			DEEP																																										
86	45.493780	-89.183413	15		Rope																																											
87	45.493770	-89.181941	15		Rope																																											
88	45.493759	-89.180469	14		Rope																																											
89	45.495072	-89.220190	3	Sand	Pole			1				1								1															1													
90	45.495062	-89.218718	6	Sand	Pole							1							3																	1							3					
91	45.495052	-89.217247	5	Sand	Pole														1																								1					
92	45.495042	-89.215775	4	Sand	Pole															1	2											1																
93	45.494961	-89.204001	6	Rock	Pole															1															1													
94	45.494950	-89.202530	0			DEEP																																										
95	45.494940	-89.201058	0			DEEP																																										
96	45.494930	-89.199586	0			DEEP																																										
97	45.494920	-89.198115	0			DEEP																																										
98	45.494909	-89.196643	0			DEEP																																										
99	45.494899	-89.195171	0			DEEP																																										
100	45.494888	-89.193700	6	Rock	Pole																																											
101	45.494878	-89.192228	4	Rock	Pole																																											
102	45.494868	-89.190756	13	Sand	Pole																																											
103	45.494857	-89.189284	0			DEEP																																										
104	45.494847	-89.187813	0			DEEP																																										
105	45.494836	-89.186341	0			DEEP																																										
106	45.494826	-89.184869	0			DEEP																																										
107	45.494815	-89.183398	0			DEEP																																										
108	45.494805	-89.181926	0			DEEP																																										
109	45.494794	-89.180454	15		Rope																																											
110	45.494784	-89.178983	13	Rock	Pole																																											
111	45.496117	-89.221647	4	Sand	Pole			1				1							1		1																						1					
112	45.496107	-89.220176	7	Muck	Pole																										1			1		1											
113	45.496097	-89.218704	9	Muck	Pole							1							1																	2										1	1	
114	45.496087	-89.217232	6	Sand	Pole							1								1															1													
115	45.496077	-89.215761	10	Muck	Pole			1																												2										1		
116	45.496067	-89.214289	10	Muck	Pole			1																																							1	
117	45.496057	-89.212817	6	Sand	Pole															1	3											1				1												
118	45.496047	-89.211345	3	Sand	Pole																																											
119	45.495996	-89.203987	10	Rock	Pole																																											
120	45.495985	-89.202515	0			DEEP																																										
121	45.495975	-89.201043	0			DEEP																																										
122	45.495965	-89.199572	0			DEEP																																										
123	45.495955	-89.198100	0			DEEP																																										
124	45.495944	-89.196628	0			DEEP																																										
125	45.495934	-89.195156	0			DEEP																																										
126	45.495923	-89.193685	0			DEEP																																										
127	45.495913	-89.192213	0			DEEP																																										
128	45.495903	-89.190741	0			DEEP																																										
129	45.495892	-89.189270	0			DEEP																																										
130	45.495882	-89.187798	0			DEEP																																										
131	45.495871	-89.186326	0			DEEP																																										
132	45.495861	-89.184855	0			DEEP																																										
133	45.495850	-89.183383	0			DEEP																																										
134	45.495840	-89.181911	0			DEEP																																										
135	45.495829	-89.180439	0			DEEP																																										
136	45.495819	-89.178968	0			DEEP																																										
137	45.495808	-89.177496	14		Rope																																											
138	45.495797	-89.176024	5	Rock	Pole																																											
139	45.495787	-89.174553	7	Sand	Pole																																											
140	45.495776	-89.173081	2	Rock	Pole																																											
141	45.497162	-89.223105	1	Sand	Pole								1									1																1									
142	45.497152	-89.221633	6	Sand	Pole							2								1	1																											
143	45.497142	-89.220161	8	Sand	Pole																										1			3		1											
144	45.497132	-89.218690	9	Muck	Pole																																											

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagitaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tabernaemontani	Sparganium eurycarpum	Spirodela polyrhiza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
145	45.497122	-89.217218	7	Sand	Pole							1																	1																		1
146	45.497112	-89.215746	11	Muck	Pole																																										
147	45.497102	-89.214274	11	Muck	Pole																																										
148	45.497092	-89.212803	6	Sand	Pole							1								1	2																										
149	45.497082	-89.211331	6	Sand	Pole							2									1														2	1											
150	45.497072	-89.209859	3	Sand	Pole															1												1	1	1		1											
151	45.497051	-89.206916	6	Rock	Pole																																										
152	45.497041	-89.205444	7	Sand	Pole															2															2												
153	45.497031	-89.203972	0			DEEP																																									
154	45.497020	-89.202500	0			DEEP																																									
155	45.497010	-89.201029	0			DEEP																																									
156	45.497000	-89.199557	0			DEEP																																									
157	45.496990	-89.198085	0			DEEP																																									
158	45.496979	-89.196613	0			DEEP																																									
159	45.496969	-89.195142	0			DEEP																																									
160	45.496958	-89.193670	0			DEEP																																									
161	45.496948	-89.192198	0			DEEP																																									
162	45.496938	-89.190727	0			DEEP																																									
163	45.496927	-89.189255	0			DEEP																																									
164	45.496917	-89.187783	0			DEEP																																									
165	45.496906	-89.186311	0			DEEP																																									
166	45.496896	-89.184840	0			DEEP																																									
167	45.496885	-89.183368	7	Rock	Pole																																										
168	45.496875	-89.181896	0			DEEP																																									
169	45.496864	-89.180424	0			DEEP																																									
170	45.496854	-89.178953	0			DEEP																																									
171	45.496843	-89.177481	0			DEEP																																									
172	45.496832	-89.176009	15		Rope																																										
173	45.496822	-89.174537	11	Rock	Pole																																										
174	45.496811	-89.173066	8	Rock	Pole																																										
175	45.496801	-89.171594	5	Rock	Pole																																										
176	45.498198	-89.223091	3	Sand	Pole				1		1								1			1																1					1				
177	45.498188	-89.221619	9	Sand	Pole			1											1																	1											
178	45.498177	-89.220147	8	Sand	Pole																																										
179	45.498167	-89.218675	6	Sand	Pole							2																				1		1									1				
180	45.498157	-89.217204	6	Sand	Pole							1								1	1														1								1				
181	45.498147	-89.215732	6	Sand	Pole															1																											
182	45.498137	-89.214260	13	Sand	Pole																																										
183	45.498127	-89.212788	0			DEEP																																									
184	45.498117	-89.211317	7	Sand	Pole							1								1							1								1								1				
185	45.4980965	-89.2083729	6	Rock	Pole															1																											
186	45.4980863	-89.2069012	0			DEEP																																									
187	45.498076	-89.2054294	0			DEEP																																									
188	45.4980658	-89.2039576	0			DEEP																																									
189	45.4980555	-89.2024859	0			DEEP																																									
190	45.4980452	-89.2010141	0			DEEP																																									
191	45.4980349	-89.1995423	0			DEEP																																									
192	45.4980246	-89.1980705	0			DEEP																																									
193	45.4980143	-89.1965988	0			DEEP																																									
194	45.4980039	-89.195127	0			DEEP																																									
195	45.4979935	-89.1936552	0			DEEP																																									
196	45.4979831	-89.1921835	0			DEEP																																									
197	45.4979727	-89.1907117	0			DEEP																																									
198	45.4979623	-89.1892399	0			DEEP																																									
199	45.4979518	-89.1877682	0			DEEP																																									
200	45.4979413	-89.1862964	0			DEEP																																									
201	45.4979308	-89.1848246	5	Rock	Pole																																										
202	45.4979203	-89.1833529	0			DEEP																																									
203	45.4979098	-89.1818811	0			DEEP																																									
204	45.4978992	-89.1804094	0			DEEP																																									
205	45.4978887	-89.1789376	0			DEEP																																									
206	45.4978781	-89.1774658	0			DEEP																																									
207	45.4978675	-89.1759941	0			DEEP																																									
208	45.4978569	-89.1745223	0			DEEP																																									
209	45.4978462	-89.1730506	17		Rope																																										
210	45.4978355	-89.1715788	8	Rock	Pole																																										
211	45.4978249	-89.170107	5	Rock	Pole																																										
212	45.4992824	-89.2304356	2	Sand	Pole			1				1								1							1									1											
213	45.4992326	-89.2230765	3	Sand	Pole						1										2																	1									
214	45.4992225	-89.2216047	7	Sand	Pole							1							1													1															
215	45.4992125	-89.2201329	12	Muck	Pole																																										
216	45.4992024	-89.2186611	13	Sand	Pole																																										

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagitaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tabernaemontani	Sparganium eurycarpum	Spirodela polyrhiza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
217	45.4991924	-89.2171893	8	Sand	Pole							2																				1		1		1											
218	45.4991823	-89.2157175	10	Sand	Pole																																										
219	45.4991722	-89.2142457	0			DEEP																																									
220	45.499162	-89.2127739	0			DEEP																																									
221	45.4991519	-89.2113021	10	Sand	Pole																																										
222	45.4991417	-89.2098302	6	Rock	Pole																																										
223	45.4991315	-89.2083584	0			DEEP																																									
224	45.4991213	-89.2068866	0			DEEP																																									
225	45.4991111	-89.2054148	0			DEEP																																									
226	45.4991008	-89.203943	0			DEEP																																									
227	45.4990905	-89.2024712	0			DEEP																																									
228	45.4990803	-89.2009994	0			DEEP																																									
229	45.49907	-89.1995276	0			DEEP																																									
230	45.4990596	-89.1980558	0			DEEP																																									
231	45.4990493	-89.196584	0			DEEP																																									
232	45.4990389	-89.1951123	0			DEEP																																									
233	45.4990285	-89.1936405	0			DEEP																																									
234	45.4990181	-89.1921687	0			DEEP																																									
235	45.4990077	-89.1906969	0			DEEP																																									
236	45.4989973	-89.1892251	0			DEEP																																									
237	45.4989868	-89.1877533	10	Rock	Pole																																										
238	45.4989764	-89.1862815	6	Rock	Pole																																										
239	45.4989659	-89.1848097	0			DEEP																																									
240	45.4989554	-89.1833379	0			DEEP																																									
241	45.4989448	-89.1818661	0			DEEP																																									
242	45.4989343	-89.1803943	0			DEEP																																									
243	45.4989237	-89.1789225	0			DEEP																																									
244	45.4989131	-89.1774508	0			DEEP																																									
245	45.4989025	-89.175979	0			DEEP																																									
246	45.4988919	-89.1745072	0			DEEP																																									
247	45.4988812	-89.1730354	0			DEEP																																									
248	45.4988706	-89.1715636	13	Sand	Pole																																										
249	45.4988599	-89.1700918	10	Sand	Pole																																										
250	45.5003372	-89.2333652	4	Muck	Pole							1																																			
251	45.5003273	-89.2318933	4	Muck	Pole							1																						1													
252	45.5003174	-89.2304215	5	Muck	Pole			1				1																					1	3		1											
253	45.5003075	-89.2289496	7	Muck	Pole			3																										1		1											
254	45.5002975	-89.2274778	6	Muck	Pole			1				1																								1							1				
255	45.5002876	-89.226006	2	Sand	Pole			2																										1		1							1				
256	45.5002676	-89.2230623	3	Rock	Pole				1		1											1																1									
257	45.5002576	-89.2215904	6	Sand	Pole							3							1		1						2																				
258	45.5002475	-89.2201186	8	Sand	Pole							1																						1													
259	45.5002375	-89.2186468	14		Rope																																										
260	45.5002274	-89.2171749	11	Sand	Pole																																										
261	45.5002173	-89.2157031	0			DEEP																																									
262	45.5002072	-89.2142313	0			DEEP																																									
263	45.5001971	-89.2127594	0			DEEP																																									
264	45.5001869	-89.2112876	0			DEEP																																									
265	45.5001767	-89.2098158	0			DEEP																																									
266	45.5001665	-89.2083439	0			DEEP																																									
267	45.5001563	-89.2068721	0			DEEP																																									
268	45.5001461	-89.2054003	0			DEEP																																									
269	45.5001358	-89.2039285	0			DEEP																																									
270	45.5001256	-89.2024566	0			DEEP																																									
271	45.5001153	-89.2009848	0			DEEP																																									
272	45.500105	-89.199513	0			DEEP																																									
273	45.5000947	-89.1980412	0			DEEP																																									
274	45.5000843	-89.1965693	0			DEEP																																									
275	45.500074	-89.1950975	0			DEEP																																									
276	45.5000636	-89.1936257	7	Rock	Pole																																										
277	45.5000532	-89.1921539	4	Rock	Pole																																										
278	45.5000428	-89.190682	2	Rock	Pole																																										
279	45.5000323	-89.1892102	7	Rock	Pole																																										
280	45.5000219	-89.1877384	7	Rock	Pole																																										
281	45.5000114	-89.1862666	0			DEEP																																									
282	45.5000009	-89.1847948	0			DEEP																																									
283	45.4999904	-89.1833229	0			DEEP																																									
284	45.4999798	-89.1818511	0			DEEP																																									
285	45.4999693	-89.1803793	0			DEEP																																									
286	45.4999587	-89.1789075	0			DEEP																																									
287	45.4999481	-89.1774357	0			DEEP																																									
288	45.4999375	-89.1759639	0			DEEP																																									

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton bicirrosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberiaemontani	Sparganium eurycarpum	Spirodela polyhriza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
289	45.4999269	-89.1744921	0			DEEP																																										
290	45.4999162	-89.1730203	0			DEEP																																										
291	45.4999056	-89.1715484	0			DEEP																																										
292	45.4998949	-89.1700766	0			DEEP																																										
293	45.4998842	-89.1686048	7	Rock	Pole																																											
294	45.4998735	-89.167133	3	Rock	Pole																																											
295	45.5013821	-89.234823	2	Muck	Pole			1				1															3																1				
296	45.5013722	-89.2333511	6	Muck	Pole			1				1							1															1		1											
297	45.5013624	-89.2318792	6	Muck	Pole							1														1								3		1											
298	45.5013524	-89.2304074	6	Muck	Pole			1				1														1								3													
299	45.5013425	-89.2289355	9	Muck	Pole			1																		1										1											
300	45.5013326	-89.2274636	6	Muck	Pole							1							1							1										2								1			
301	45.5013226	-89.2259918	1	Sand	Pole				2																												1										
302	45.5013026	-89.223048	3	Sand	Pole				1																																		1				
303	45.5012926	-89.2215762	8	Sand	Pole																										1			2		2										
304	45.5012826	-89.2201043	5	Sand	Pole							2															1																				
305	45.5012725	-89.2186324	6	Rock	Pole							2																																			
306	45.5012624	-89.2171606	9	Sand	Pole																																											
307	45.5012523	-89.2156887	0			DEEP																																										
308	45.5012422	-89.2142169	0			DEEP																																										
309	45.5012321	-89.212745	0			DEEP																																										
310	45.5012219	-89.2112731	0			DEEP																																										
311	45.5012118	-89.2098013	0			DEEP																																										
312	45.5012016	-89.2083294	0			DEEP																																										
313	45.5011914	-89.2068576	0			DEEP																																										
314	45.5011811	-89.2053857	0			DEEP																																										
315	45.5011709	-89.2039139	0			DEEP																																										
316	45.5011606	-89.202442	0			DEEP																																										
317	45.5011503	-89.2009702	0			DEEP																																										
318	45.50114	-89.1994983	0			DEEP																																										
319	45.5011297	-89.1980265	0			DEEP																																										
320	45.5011193	-89.1965546	0			DEEP																																										
321	45.501109	-89.1950828	0			DEEP																																										
322	45.5010986	-89.1936109	7	Rock	Pole																																											
323	45.5010882	-89.1921391	7	Sand	Pole																																											
324	45.5010778	-89.1906672	5	Rock	Pole																																											
325	45.5010673	-89.1891954	0			DEEP																																										
326	45.5010569	-89.1877235	0			DEEP																																										
327	45.5010464	-89.1862517	0			DEEP																																										
328	45.5010359	-89.1847798	0			DEEP																																										
329	45.5010254	-89.183308	0			DEEP																																										
330	45.5010149	-89.1818361	0			DEEP																																										
331	45.5010043	-89.1803643	0			DEEP																																										
332	45.5009937	-89.1788925	0			DEEP																																										
333	45.5009832	-89.1774206	0			DEEP																																										
334	45.5009725	-89.1759488	0			DEEP																																										
335	45.5009619	-89.1744769	0			DEEP																																										
336	45.5009513	-89.1730051	0			DEEP																																										
337	45.5009406	-89.1715333	0			DEEP																																										
338	45.5009299	-89.1700614	0			DEEP																																										
339	45.5009192	-89.1685896	16		Rope																																											
340	45.5009085	-89.1671178	8	Rock	Pole																																											
341	45.5008978	-89.1656459	4	Rock	Pole																																											
342	45.5024172	-89.234809	5	Muck	Pole		V					1																								1											
343	45.5024073	-89.2333371	6	Muck	Pole			1				1																						3													
344	45.5023974	-89.2318652	6	Muck	Pole			1				1																						3													
345	45.5023875	-89.2303933	6	Muck	Pole			3				1																					1			1											
346	45.5023776	-89.2289214	6	Muck	Pole			1				1														1								3		1											
347	45.5023676	-89.2274495	11	Muck	Pole																																											
348	45.5023576	-89.2259776	6	Sand	Pole			2											1																	1								2				
349	45.5023477	-89.2245057	2	Sand	Pole							1																						1		1	1						1				
350	45.5023276	-89.2215619	4	Sand	Pole															2																												
351	45.5023176	-89.22009	8	Sand	Pole																											1															
352	45.5023075	-89.2186181	6	Sand	Pole																																											
353	45.5022975	-89.2171462	6	Rock	Pole																																											
354	45.5022874	-89.2156744	0			DEEP																																										
355	45.5022773	-89.2142025	0			DEEP																																										
356	45.5022671	-89.2127306	0			DEEP																																										
357	45.502257	-89.2112587	0			DEEP																																										
358	45.5022468	-89.2097868	0			DEEP																																										
359	45.5022366	-89.2083149	0			DEEP																																										
360	45.5022264	-89.206843	0			DEEP																																										

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberiaemontani	Sparganium eurycarpum	Spirodela polyhriza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
361	45.5022162	-89.2053712	0			DEEP																																											
362	45.5022059	-89.2038993	0			DEEP																																											
363	45.5021956	-89.2024274	0			DEEP																																											
364	45.5021854	-89.2009555	0			DEEP																																											
365	45.502175	-89.1994836	0			DEEP																																											
366	45.5021647	-89.1980118	0			DEEP																																											
367	45.5021544	-89.1965399	0			DEEP																																											
368	45.502144	-89.195068	0			DEEP																																											
369	45.5021336	-89.1935961	0			DEEP																																											
370	45.5021232	-89.1921243	0			DEEP																																											
371	45.5021128	-89.1906524	0			DEEP																																											
372	45.5021024	-89.1891805	0			DEEP																																											
373	45.5020919	-89.1877086	0			DEEP																																											
374	45.5020814	-89.1862368	0			DEEP																																											
375	45.5020709	-89.1847649	0			DEEP																																											
376	45.5020604	-89.183293	0			DEEP																																											
377	45.5020499	-89.1818211	0			DEEP																																											
378	45.5020393	-89.1803493	0			DEEP																																											
379	45.5020288	-89.1788774	0			DEEP																																											
380	45.5020182	-89.1774055	0			DEEP																																											
381	45.5020076	-89.1759337	0			DEEP																																											
382	45.5019969	-89.1744618	5	Rock	Pole																																												
383	45.5019863	-89.1729899	5	Rock	Pole																																												
384	45.5019756	-89.1715181	0			DEEP																																											
385	45.5019649	-89.1700462	0			DEEP																																											
386	45.5019542	-89.1685744	0			DEEP																																											
387	45.5019435	-89.1671025	11	Sand	Pole																																												
388	45.5019328	-89.1656306	6	Rock	Pole																																												
389	45.5034522	-89.2347949	4	Muck	Pole							1							1														1	1		1							2			1	
390	45.5034423	-89.233323	6	Muck	Pole			1				1																						3														
391	45.5034324	-89.2318511	6	Muck	Pole			1				1																					1	1														
392	45.5034225	-89.2303792	7	Muck	Pole			1																								1	1	1		1												
393	45.5034126	-89.2289072	6	Muck	Pole			1				1																					1	1		1												
394	45.5034027	-89.2274353	5	Muck	Pole							1														1										1							2				
395	45.5033927	-89.2259634	12	Muck	Pole																																												
396	45.5033827	-89.2244915	6	Sand	Pole							1							1																	1							2				
397	45.5033727	-89.2230196	0			TERRESTRIAL																																											
398	45.5033526	-89.2200757	4	Rock	Pole																																												
399	45.5033426	-89.2186038	6	Rock	Pole																																												
400	45.5033325	-89.2171319	8	Sand	Pole																																												
401	45.5033224	-89.21566	0			DEEP																																											
402	45.5033123	-89.2141881	0			DEEP																																											
403	45.5033021	-89.2127162	0			DEEP																																											
404	45.503292	-89.2112442	0			DEEP																																											
405	45.5032818	-89.2097723	0			DEEP																																											
406	45.5032716	-89.2083004	0			DEEP																																											
407	45.5032614	-89.2068285	0			DEEP																																											
408	45.5032512	-89.2053566	0			DEEP																																											
409	45.5032409	-89.2038847	0			DEEP																																											
410	45.5032307	-89.2024128	0			DEEP																																											
411	45.5032204	-89.2009409	0			DEEP																																											
412	45.5032101	-89.199469	0			DEEP																																											
413	45.5031997	-89.1979971	0			DEEP																																											
414	45.5031894	-89.1965252	0			DEEP																																											
415	45.503179	-89.1950533	0			DEEP																																											
416	45.5031687	-89.1935814	0			DEEP																																											
417	45.5031583	-89.1921094	0			DEEP																																											
418	45.5031478	-89.1906375	0			DEEP																																											
419	45.5031374	-89.1891656	0			DEEP																																											
420	45.5031269	-89.1876937	0			DEEP																																											
421	45.5031165	-89.1862218	0			DEEP																																											
422	45.503106	-89.18475	0			DEEP																																											
423	45.5030955	-89.1832781	0			DEEP																																											
424	45.5030849	-89.1818062	0			DEEP																																											
425	45.5030744	-89.1803343	0			DEEP																																											
426	45.5030638	-89.1788624	0			DEEP																																											
427	45.5030532	-89.1773905	0			DEEP																																											
428	45.5030426	-89.1759186	0			DEEP																																											
429	45.503032	-89.1744467	0			DEEP																																											
430	45.5030213	-89.1729748	0			DEEP																																											
431	45.5030107	-89.1715029	0			DEEP																																											
432	45.503	-89.170031	0			DEEP																																											

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spiriflus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberiaemontani	Sparganium eurycarpum	Spirodela polyhiza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
433	45.5029893	-89.1685591	0			DEEP																																										
434	45.5029785	-89.1670872	6	Rock	Pole																																											
435	45.5029678	-89.1656153	11	Sand	Pole																																											
436	45.502957	-89.1641435	4	Rock	Pole																																											
437	45.5044872	-89.2347809	5	Muck	Pole																						1							1														
438	45.5044774	-89.233309	6	Muck	Pole			1				1														1							1	1														
439	45.5044675	-89.231837	6	Muck	Pole			1				1														1								3		1												
440	45.5044576	-89.2303651	7	Muck	Pole			1																		1								3														
441	45.5044476	-89.2288931	7	Muck	Pole			3				1														1						1	1	1		1												
442	45.5044377	-89.2274212	8	Muck	Pole			1				1														1							1	1		1												
443	45.5044277	-89.2259492	6	Muck	Pole			1				1																					1	1		1								1				
444	45.5044177	-89.2244773	11	Muck	Pole																																											
445	45.5044077	-89.2230053	6	Sand	Pole			1				1								1														1												1		
446	45.5043977	-89.2215334	2	Sand	Pole				1			1								1														1		1	1							1				
447	45.5043776	-89.2185895	6	Sand	Pole							1																																				
448	45.5043675	-89.2171175	8	Sand	Pole							2								1						1						1																
449	45.5043574	-89.2156456	10	Sand	Pole			1				1																						1		1												
450	45.5043473	-89.2141737	0			DEEP																																										
451	45.5043372	-89.2127017	0			DEEP																																										
452	45.504327	-89.2112298	0			DEEP																																										
453	45.5043169	-89.2097578	0			DEEP																																										
454	45.5043067	-89.2082859	0			DEEP																																										
455	45.5042964	-89.206814	0			DEEP																																										
456	45.5042862	-89.205342	0			DEEP																																										
457	45.504276	-89.2038701	0			DEEP																																										
458	45.5042657	-89.2023982	0			DEEP																																										
459	45.5042554	-89.2009262	0			DEEP																																										
460	45.5042451	-89.1994543	0			DEEP																																										
461	45.5042348	-89.1979824	0			DEEP																																										
462	45.5042244	-89.1965104	0			DEEP																																										
463	45.5042141	-89.1950385	0			DEEP																																										
464	45.5042037	-89.1935666	0			DEEP																																										
465	45.5041933	-89.1920946	0			DEEP																																										
466	45.5041829	-89.1906227	0			DEEP																																										
467	45.5041724	-89.1891508	0			DEEP																																										
468	45.504162	-89.1876789	0			DEEP																																										
469	45.5041515	-89.1862069	0			DEEP																																										
470	45.504141	-89.184735	0			DEEP																																										
471	45.5041305	-89.1832631	0			DEEP																																										
472	45.5041199	-89.1817912	0			DEEP																																										
473	45.5041094	-89.1803192	0			DEEP																																										
474	45.5040988	-89.1788473	0			DEEP																																										
475	45.5040882	-89.1773754	0			DEEP																																										
476	45.5040776	-89.1759035	0			DEEP																																										
477	45.504067	-89.1744316	0			DEEP																																										
478	45.5040563	-89.1729596	0			DEEP																																										
479	45.5040457	-89.1714877	0			DEEP																																										
480	45.504035	-89.1700158	0			DEEP																																										
481	45.5040243	-89.1685439	0			DEEP																																										
482	45.5040136	-89.167072	13		Rope																																											
483	45.5040028	-89.1656001	4	Rock	Pole																																											
484	45.5039921	-89.1641281	3	Rock	Pole																																											
485	45.5055223	-89.2347669	5	Muck	Pole			1																										1		1												
486	45.5055124	-89.2332949	6	Muck	Pole			2																		1					1					1												1
487	45.5055025	-89.2318229	7	Muck	Pole			2				1														1								1		1												
488	45.5054926	-89.230351	8	Muck	Pole			1				1																						3														
489	45.5054827	-89.228879	7	Muck	Pole			2				1																					1	1		1												
490	45.5054727	-89.227407	7	Muck	Pole			1				1																					1	2		1												
491	45.5054628	-89.225935	7	Muck	Pole			1																		1							1											3				
492	45.5054528	-89.2244631	10	Muck	Pole																																											
493	45.5054428	-89.2229911	13	Muck	Pole																															1												
494	45.5054327	-89.2215191	6	Sand	Pole							1								1												1																
495	45.5054227	-89.2200471	4	Rock	Pole																																											
496	45.5054126	-89.2185752	5	Sand	Pole																																											
497	45.5054026	-89.2171032	8	Sand	Pole															1	1											1																
498	45.5053925	-89.2156312	10	Sand	Pole							2								1												1																
499	45.5053823	-89.2141593	0			DEEP																																										
500	45.5053722	-89.2126873	0			DEEP																																										
501	45.5053621	-89.2112153	0			DEEP																																										
502	45.5053519	-89.2097434	0			DEEP																																										
503	45.5053417	-89.2082714	0			DEEP																																										
504	45.5053315	-89.2067994	0			DEEP																																										

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberculatus	Sparganium eurycarpum	Spirodela polyrhiza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
505	45.5053212	-89.2053275	0			DEEP																																											
506	45.505311	-89.2038555	12	Sand	Pole																																												
507	45.5053007	-89.2023835	0			DEEP																																											
508	45.5052904	-89.2009116	0			DEEP																																											
509	45.5052801	-89.1994396	0			DEEP																																											
510	45.5052698	-89.1979677	0			DEEP																																											
511	45.5052595	-89.1964957	0			DEEP																																											
512	45.5052491	-89.1950238	0			DEEP																																											
513	45.5052387	-89.1935518	0			DEEP																																											
514	45.5052283	-89.1920798	0			DEEP																																											
515	45.5052179	-89.1906079	0			DEEP																																											
516	45.5052075	-89.1891359	0			DEEP																																											
517	45.505197	-89.187664	0			DEEP																																											
518	45.5051865	-89.186192	0			DEEP																																											
519	45.505176	-89.1847201	0			DEEP																																											
520	45.5051655	-89.1832481	0			DEEP																																											
521	45.505155	-89.1817762	0			DEEP																																											
522	45.5051444	-89.1803042	0			DEEP																																											
523	45.5051338	-89.1788323	0			DEEP																																											
524	45.5051232	-89.1773603	0			DEEP																																											
525	45.5051126	-89.1758884	0			DEEP																																											
526	45.505102	-89.1744164	0			DEEP																																											
527	45.5050914	-89.1729445	0			DEEP																																											
528	45.5050807	-89.1714725	0			DEEP																																											
529	45.50507	-89.1700006	0			DEEP																																											
530	45.5050593	-89.1685287	0			DEEP																																											
531	45.5050486	-89.1670567	0			DEEP																																											
532	45.5050378	-89.1655848	11	Rock	Pole																																												
533	45.5050271	-89.1641128	4	Rock	Pole																																												
534	45.5065573	-89.2347529	5	Muck	Pole		V					1							1								1																3				
535	45.5065474	-89.2332809	6	Muck	Pole			1				1														1								3														
536	45.5065375	-89.2318089	7	Muck	Pole			1				1														1								3		1												
537	45.5065276	-89.2303368	7	Muck	Pole			1				1														1								2														
538	45.5065177	-89.2288648	6	Muck	Pole			1				1																						3		1												
539	45.5065078	-89.2273928	7	Muck	Pole			1				3																					1	1		1												
540	45.5064978	-89.2259208	7	Muck	Pole							1																					1			3												
541	45.5064878	-89.2244488	9	Muck	Pole																															1												
542	45.5064778	-89.2229768	11	Muck	Pole																																												
543	45.5064678	-89.2215048	8	Rock	Pole																																												
544	45.5064577	-89.2200328	0			DEEP																																											
545	45.5064477	-89.2185608	8	Sand	Pole																																												
546	45.5064376	-89.2170889	8	Sand	Pole							1																																					
547	45.5064275	-89.2156169	8	Sand	Pole							1								1	1																							2					
548	45.5064174	-89.2141449	0			DEEP																																											
549	45.5064072	-89.2126729	0			DEEP																																											
550	45.5063971	-89.2112009	0			DEEP																																											
551	45.5063869	-89.2097289	0			DEEP																																											
552	45.5063767	-89.2082569	0			DEEP																																											
553	45.5063665	-89.2067849	0			DEEP																																											
554	45.5063563	-89.2053129	6	Rock	Pole																																												
555	45.506346	-89.2038409	5	Rock	Pole																																												
556	45.5063358	-89.2023689	8	Rock	Pole																																												
557	45.5063255	-89.2008969	15		Rope																																												
558	45.5063152	-89.199425	14		Rope																																												
559	45.5063048	-89.197953	0			DEEP																																											
560	45.5062945	-89.196481	0			DEEP																																											
561	45.5062841	-89.195009	0			DEEP																																											
562	45.5062737	-89.193537	0			DEEP																																											
563	45.5062633	-89.192065	0			DEEP																																											
564	45.5062529	-89.190593	0			DEEP																																											
565	45.5062425	-89.1891211	0			DEEP																																											
566	45.506232	-89.1876491	0			DEEP																																											
567	45.5062215	-89.1861771	0			DEEP																																											
568	45.506211	-89.1847051	0			DEEP																																											
569	45.5062005	-89.1832331	0			DEEP																																											
570	45.50619	-89.1817612	0			DEEP																																											
571	45.5061794	-89.1802892	0			DEEP																																											
572	45.5061689	-89.1788172	0			DEEP																																											
573	45.5061583	-89.1773452	0			DEEP																																											
574	45.5061477	-89.1758733	0			DEEP																																											
575	45.506137	-89.1744013	0			DEEP																																											
576	45.5061264	-89.1729293	0			DEEP																																											

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberiaemontani	Sparganium eurycarpum	Spirodela polyhriza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
577	45.5061157	-89.1714574	0			DEEP																																										
578	45.506105	-89.1699854	0			DEEP																																										
579	45.5060943	-89.1685134	0			DEEP																																										
580	45.5060836	-89.1670414	0			DEEP																																										
581	45.5060729	-89.1655695	0			DEEP																																										
582	45.5060621	-89.1640975	11	Sand	Pole																																											
583	45.5060513	-89.1626255	4	Rock	Pole																																											
584	45.5075923	-89.2347388	2	Sand	Pole							1									1											1											2				
585	45.5075825	-89.2332668	7	Muck	Pole			1				1							1																	2												
586	45.5075726	-89.2317948	6	Muck	Pole			2				1																								1												
587	45.5075627	-89.2303227	8	Muck	Pole			1				1																								1												
588	45.5075527	-89.2288507	7	Muck	Pole			2																									1			1												
589	45.5075428	-89.2273787	10	Muck	Pole			1																												1												
590	45.5075328	-89.2259067	11	Muck	Pole																																											
591	45.5075228	-89.2244346	15		Rope																																											
592	45.5075128	-89.2229626	12	Muck	Pole																																											
593	45.5075028	-89.2214906	0			DEEP																																										
594	45.5074928	-89.2200186	9	Rock	Pole																																											
595	45.5074827	-89.2185465	0			DEEP																																										
596	45.5074726	-89.2170745	8	Sand	Pole																																											
597	45.5074625	-89.2156025	8	Sand	Pole			1												1	2																						1					
598	45.5074524	-89.2141305	0			DEEP																																										
599	45.5074423	-89.2126584	0			DEEP																																										
600	45.5074321	-89.2111864	0			DEEP																																										
601	45.5074219	-89.2097144	0			DEEP																																										
602	45.5074117	-89.2082424	0			DEEP																																										
603	45.5074015	-89.2067704	0			DEEP																																										
604	45.5073913	-89.2052983	6	Rock	Pole																																											
605	45.5073811	-89.2038263	4	Rock	Pole																																											
606	45.5073708	-89.2023543	6	Rock	Pole																																											
607	45.5073605	-89.2008823	15		Rope																																											
608	45.5073502	-89.1994103	0			DEEP																																										
609	45.5073399	-89.1979383	0			DEEP																																										
610	45.5073295	-89.1964663	0			DEEP																																										
611	45.5073191	-89.1949942	0			DEEP																																										
612	45.5073088	-89.1935222	0			DEEP																																										
613	45.5072984	-89.1920502	0			DEEP																																										
614	45.5072879	-89.1905782	0			DEEP																																										
615	45.5072775	-89.1891062	0			DEEP																																										
616	45.507267	-89.1876342	0			DEEP																																										
617	45.5072566	-89.1861622	0			DEEP																																										
618	45.5072461	-89.1846902	0			DEEP																																										
619	45.5072355	-89.1832182	0			DEEP																																										
620	45.507225	-89.1817462	0			DEEP																																										
621	45.5072145	-89.1802742	0			DEEP																																										
622	45.5072039	-89.1788022	0			DEEP																																										
623	45.5071933	-89.1773302	0			DEEP																																										
624	45.5071827	-89.1758582	0			DEEP																																										
625	45.5071721	-89.1743862	0			DEEP																																										
626	45.5071614	-89.1729142	0			DEEP																																										
627	45.5071507	-89.1714422	0			DEEP																																										
628	45.50714	-89.1699702	0			DEEP																																										
629	45.5071293	-89.1684982	0			DEEP																																										
630	45.5071186	-89.1670262	13		Rope																																											
631	45.5071079	-89.1655542	10	Rock	Pole																																											
632	45.5070971	-89.1640822	13	Sand	Pole																																											
633	45.5070863	-89.1626102	8	Rock	Pole																																											
634	45.5086274	-89.2347248	1	Sand	Pole			3									1					1	1													1				1	1							
635	45.5086175	-89.2332528	2	Sand	Pole						1									1	1													1		1		1										
636	45.5086076	-89.2317807	4	Rock	Pole																															1												
637	45.5085977	-89.2303086	7	Muck	Pole			1				3																								1												
638	45.5085878	-89.2288366	11	Muck	Pole																																											
639	45.5085778	-89.2273645	13	Sand	Pole																																											
640	45.5085679	-89.2258925	15		Rope																																											
641	45.5085579	-89.2244204	10	Sand	Pole							1																						1														
642	45.5085479	-89.2229484	11	Sand	Pole																																											
643	45.5085378	-89.2214763	10	Sand	Pole																																											
644	45.5085278	-89.2200043	5	Sand	Pole							2							1	1																1							1					
645	45.5085177	-89.2185322	2	Rock	Pole																																											
646	45.5085077	-89.2170602	4	Rock	Pole																																											
647	45.5084976	-89.2155881	5	Rock	Pole																1																											
648	45.5084874	-89.2141161	8	Sand	Pole							1								1	2													1		1										1		

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberiaemontani	Sparganium eurycarpum	Spirodela polyhiza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
649	45.5084773	-89.212644	0			DEEP																																										
650	45.5084671	-89.211172	0			DEEP																																										
651	45.508457	-89.2096999	0			DEEP																																										
652	45.5084468	-89.2082279	0			DEEP																																										
653	45.5084366	-89.2067558	0			DEEP																																										
654	45.5084263	-89.2052838	9	Sand	Pole																																											
655	45.5084161	-89.2038117	5	Rock	Pole							1																															1				1
656	45.5084058	-89.2023397	3	Rock	Pole							1		1																																	1
657	45.5083955	-89.2008676	6	Rock	Pole																																											
658	45.5083852	-89.1993956	5	Rock	Pole																																											
659	45.5083749	-89.1979236	6	Rock	Pole																																											
660	45.5083645	-89.1964515	6	Rock	Pole																																											
661	45.5083542	-89.1949795	0			DEEP																																										
662	45.5083438	-89.1935075	0			DEEP																																										
663	45.5083334	-89.1920354	0			DEEP																																										
664	45.508323	-89.1905634	0			DEEP																																										
665	45.5083125	-89.1890913	0			DEEP																																										
666	45.5083021	-89.1876193	0			DEEP																																										
667	45.5082916	-89.1861473	0			DEEP																																										
668	45.5082811	-89.1846752	0			DEEP																																										
669	45.5082706	-89.1832032	0			DEEP																																										
670	45.50826	-89.1817312	0			DEEP																																										
671	45.5082495	-89.1802591	0			DEEP																																										
672	45.5082389	-89.1787871	0			DEEP																																										
673	45.5082283	-89.1773151	0			DEEP																																										
674	45.5082177	-89.1758431	0			DEEP																																										
675	45.5082071	-89.174371	0			DEEP																																										
676	45.5081964	-89.172899	0			DEEP																																										
677	45.5081858	-89.171427	0			DEEP																																										
678	45.5081751	-89.169955	0			DEEP																																										
679	45.5081644	-89.1684829	0			DEEP																																										
680	45.5081536	-89.1670109	0			DEEP																																										
681	45.5081429	-89.1655389	11	Sand	Pole																																											
682	45.5081321	-89.1640669	10	Rock	Pole																																											
683	45.5081213	-89.1625948	9	Rock	Pole																																											
684	45.5096525	-89.2332387	5	Sand	Pole														1		1											1				1												
685	45.5096426	-89.2317666	8	Muck	Pole																																											
686	45.5096327	-89.2302945	7	Sand	Pole																																											
687	45.5096228	-89.2288224	11	Muck	Pole																																											
688	45.5096129	-89.2273504	10	Muck	Pole																																											
689	45.5096029	-89.2258783	12	Muck	Pole																																											
690	45.5095929	-89.2244062	8	Sand	Pole			2				1							1															1		1							1					
691	45.5095829	-89.2229341	3	Sand	Pole							1								1																							1					
692	45.5095729	-89.221462	7	Sand	Pole																																											
693	45.5095628	-89.21999	6	Sand	Pole							1								1	1					1						1		1									2					
694	45.5095528	-89.2185179	5	Rock	Pole															1	2															1												
695	45.5095427	-89.2170458	6	Sand	Pole				1											1	2														1								1					
696	45.5095326	-89.2155737	5	Sand	Pole				1											1	2																						1					
697	45.5095225	-89.2141016	7	Sand	Pole							1								1	1															1							1			1		
698	45.5095123	-89.2126296	0			DEEP																																										
699	45.5095022	-89.2111575	0			DEEP																																										
700	45.509492	-89.2096854	0			DEEP																																										
701	45.5094818	-89.2082134	0			DEEP																																										
702	45.5094716	-89.2067413	19		Rope																																											
703	45.5094614	-89.2052692	11	Sand	Pole																																											
704	45.5094511	-89.2037971	5	Sand	Pole							1								1	1																						1					
705	45.5094408	-89.2023251	7	Sand	Pole							1								1	1																											
706	45.5094306	-89.200853	6	Sand	Pole																																											
707	45.5094202	-89.1993809	6	Sand	Pole							1								1																							1					
708	45.5094099	-89.1979089	6	Rock	Pole																																											
709	45.5093996	-89.1964368	6	Rock	Pole																																											
710	45.5093892	-89.1949647	0			DEEP																																										
711	45.5093788	-89.1934927	0			DEEP																																										
712	45.5093684	-89.1920206	0			DEEP																																										
713	45.509358	-89.1905485	0			DEEP																																										
714	45.5093476	-89.1890765	0			DEEP																																										
715	45.5093371	-89.1876044	0			DEEP																																										
716	45.5093266	-89.1861324	0			DEEP																																										
717	45.5093161	-89.1846603	0			DEEP																																										
718	45.5093056	-89.1831882	0			DEEP																																										
719	45.5092951	-89.1817162	0			DEEP																																										
720	45.5092845	-89.1802441	0			DEEP																																										

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberiniomontani	Sparganium eurycarpum	Spirodela polyrhiza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
721	45.5092739	-89.1787721	0			DEEP																																										
722	45.5092633	-89.1773	0			DEEP																																										
723	45.5092527	-89.175828	0			DEEP																																										
724	45.5092421	-89.1743559	0			DEEP																																										
725	45.5092314	-89.1728838	0			DEEP																																										
726	45.5092208	-89.1714118	0			DEEP																																										
727	45.5092101	-89.1699397	0			DEEP																																										
728	45.5091994	-89.1684677	0			DEEP																																										
729	45.5091887	-89.1669956	0			DEEP																																										
730	45.5091779	-89.1655236	0			DEEP																																										
731	45.5091671	-89.1640515	10	Sand	Pole																																											
732	45.5091564	-89.1625795	10	Rock	Pole																																											
733	45.5091456	-89.1611074	3	Rock	Pole																																											
734	45.5106974	-89.2346968	4	Sand	Pole			2	1							1			1			1										1		1									1				
735	45.5106876	-89.2332246	5	Muck	Pole			2				1							1															1		1												
736	45.5106777	-89.2317525	5	Sand	Pole			1													1											1		1		1		1						1				
737	45.5106678	-89.2302804	8	Muck	Pole			1																												2									1		
738	45.5106578	-89.2288083	11	Muck	Pole																																											
739	45.5106479	-89.2273362	10	Muck	Pole														1																													
740	45.5106379	-89.2258641	10	Muck	Pole																																											
741	45.5106279	-89.224392	14		Rope																																											
742	45.5106179	-89.2229199	2	Rock	Pole																																											
743	45.5106079	-89.2214478	6	Sand	Pole			1				1							1	1	1						2							1													
744	45.5105979	-89.2199757	5	Sand	Pole																	2												1	1	1								1				
745	45.5105878	-89.2185036	6	Sand	Pole							1								1	3					1	1																1		1		
746	45.5105777	-89.2170315	8	Sand	Pole							1									3													1		1								1				
747	45.5105676	-89.2155593	6	Sand	Pole							1								1	2					1																	1				
748	45.5105575	-89.2140872	0			DEEP																																										
749	45.5105474	-89.2126151	0			DEEP																																										
750	45.5105372	-89.211143	15		Rope																																											
751	45.510527	-89.2096709	6	Sand	Pole															1	2																											
752	45.5105168	-89.2081988	4	Rock	Pole																																											
753	45.5105066	-89.2067267	15		Rope																																											
754	45.5104964	-89.2052546	14		Rope																																											
755	45.5104861	-89.2037825	5	Rock	Pole																																											
756	45.5104759	-89.2023104	6	Sand	Pole																																											
757	45.5104449	-89.1978942	3	Rock	Pole															1																												
758	45.5104346	-89.1964221	4	Rock	Pole																																											
759	45.5104242	-89.19495	0			DEEP																																										
760	45.5104138	-89.1934779	0			DEEP																																										
761	45.5104034	-89.1920058	0			DEEP																																										
762	45.510393	-89.1905337	0			DEEP																																										
763	45.5103826	-89.1890616	6	Sand	Pole															1															1												
764	45.5103721	-89.1875895	5	Sand	Pole																																						1				1
765	45.5103616	-89.1861174	5	Sand	Pole									1						1																							1				1
766	45.5103511	-89.1846454	0			DEEP																																										
767	45.5103406	-89.1831733	0			DEEP																																										
768	45.5103301	-89.1817012	0			DEEP																																										
769	45.5103195	-89.1802291	0			DEEP																																										
770	45.510309	-89.178757	0			DEEP																																										
771	45.5102984	-89.1772849	0			DEEP																																										
772	45.5102877	-89.1758128	0			DEEP																																										
773	45.5102771	-89.1743408	0			DEEP																																										
774	45.5102665	-89.1728687	0			DEEP																																										
775	45.5102558	-89.1713966	0			DEEP																																										
776	45.5102451	-89.1699245	0			DEEP																																										
777	45.5102344	-89.1684525	0			DEEP																																										
778	45.5102237	-89.1669804	0			DEEP																																										
779	45.5102129	-89.1655083	0			DEEP																																										
780	45.5102022	-89.1640362	0			DEEP																																										
781	45.5101914	-89.1625641	7	Sand	Pole																																											
782	45.5101806	-89.1610921	3	Sand	Pole																																											
783	45.5117325	-89.2346827	3	Sand	Pole				2										1																				1				1					
784	45.5117226	-89.2332106	5	Sand	Pole			2	1			1				1																		1		1		1					1				
785	45.5117127	-89.2317384	4	Sand	Pole		V		1			1							1	1							1							1		1							1		1		
786	45.5117028	-89.2302663	11	Muck	Pole				1			1																																				
787	45.5116929	-89.2287942	10	Muck	Pole																																											
788	45.5116829	-89.227322	11	Muck	Pole																																											
789	45.511673	-89.2258499	12	Muck	Pole																																											
790	45.511663	-89.2243778	13	Muck	Pole																																											
791	45.511653	-89.2229056	0			DEEP																																										
792	45.5116429	-89.2214335	0			DEEP																																										

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberiaemontani	Sparganium eurycarpum	Spirodela polyhriza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
793	45.5116329	-89.2199614	5	Sand	Pole				2											1																							1				
794	45.5116228	-89.2184892	5	Sand	Pole				1											2																							1				
795	45.5116128	-89.2170171	6	Sand	Pole				2			1																						1									1				
796	45.5116027	-89.215545	7	Sand	Pole							1									3																						1				
797	45.5115925	-89.2140728	0			DEEP																																									
798	45.5115824	-89.2126007	23		Rope																																										
799	45.5115722	-89.2111286	4	Sand	Pole				1			1																														1				
800	45.5115621	-89.2096565	3	Sand	Pole				2																																	1				
801	45.5115519	-89.2081843	3	Sand	Pole				1			1		1																												1				
802	45.5115417	-89.2067122	3	Sand	Pole				2																																	1				
803	45.5115314	-89.2052401	3	Sand	Pole				1			1								1																						1				
804	45.5115212	-89.203768	3	Sand	Pole							1		1						1																											
805	45.5114696	-89.1964073	3	Rock	Pole																																										
806	45.5114593	-89.1949352	9	Rock	Pole																																										
807	45.5114489	-89.1934631	0			DEEP																																									
808	45.5114385	-89.191991	0			DEEP																																									
809	45.511428	-89.1905189	10	Sand	Pole																																										
810	45.5114176	-89.1890468	3	Rock	Pole																																					1				1
811	45.5114071	-89.1875746	4	Rock	Pole				1																																					1
812	45.5113967	-89.1861025	4	Sand	Pole				1																																	1				1
813	45.5113862	-89.1846304	5	Sand	Pole				1																								1									1				1
814	45.5113756	-89.1831583	4	Sand	Pole				1																																	1				1
815	45.5113651	-89.1816862	6	Sand	Pole																														1											
816	45.5113546	-89.1802141	0			DEEP																																									
817	45.511344	-89.178742	0			DEEP																																									
818	45.5113334	-89.1772698	0			DEEP																																									
819	45.5113228	-89.1757977	0			DEEP																																									
820	45.5113121	-89.1743256	0			DEEP																																									
821	45.5113015	-89.1728535	0			DEEP																																									
822	45.5112908	-89.1713814	0			DEEP																																									
823	45.5112801	-89.1699093	0			DEEP																																									
824	45.5112694	-89.1684372	0			DEEP																																									
825	45.5112587	-89.1669651	0			DEEP																																									
826	45.5112479	-89.165493	0			DEEP																																									
827	45.5112372	-89.1640209	14		Rope																																										
828	45.5112264	-89.1625488	3	Sand	Pole																																										
829	45.5127675	-89.2346687	1	Sand	Pole			1	1			1							1			1			1		1		1			1			1						1	1		1		
830	45.5127576	-89.2331965	3	Sand	Pole				1										1										1									1									
831	45.5127478	-89.2317244	4	Sand	Pole				2			1							1	1																											
832	45.5127378	-89.2302522	10	Muck	Pole																																										
833	45.5127279	-89.22878	10	Muck	Pole			2																																							
834	45.512718	-89.2273079	12	Muck	Pole																																										
835	45.512708	-89.2258357	11	Muck	Pole																																										
836	45.512698	-89.2243635	8	Sand	Pole			1				1							1																	1						2				
837	45.512688	-89.2228914	7	Sand	Pole							1																						1		1						1					
838	45.512678	-89.2214192	15		Rope																																										
839	45.5126679	-89.2199471	9	Sand	Pole																																										
840	45.5126579	-89.2184749	3	Rock	Pole				1																																	1					
841	45.5126478	-89.2170027	4	Rock	Pole				1											2																									1		
842	45.5126377	-89.2155306	0			DEEP																																									
843	45.5126276	-89.2140584	16		Rope																																										
844	45.5126174	-89.2125863	0			DEEP																																									
845	45.5126073	-89.2111141	6	Sand	Pole																																										
846	45.5125869	-89.2081698	7	Sand	Pole			1				1							1													1				1											
847	45.5125767	-89.2066977	12	Muck	Pole																																										
848	45.5125664	-89.2052255	2	Sand	Pole															2																							1		1		
849	45.5124943	-89.1949205	6	Rock	Pole																																										
850	45.5124839	-89.1934483	14		Rope																																										
851	45.5124735	-89.1919762	15	1				1																																							
852	45.5124631	-89.190504	6	Sand	Pole																																					1			2	
853	45.5124526	-89.1890319	4	Sand	Pole																			1															1							
854	45.5124422	-89.1875597	0			NONNAVIGABLE (PLANTS)																																									
855	45.5124107	-89.1831433	4	Rock	Pole															1																											
856	45.5124001	-89.1816712	5	Rock	Pole																																										
857	45.5123896	-89.180199	4	Sand	Pole				2					1						1																1						1				
858	45.512379	-89.1787269	6	Sand	Pole																																										
859	45.5123684	-89.1772548	6	Sand	Pole																																										
860	45.5123578	-89.1757826	6	Sand	Pole																																										
861	45.5123472	-89.1743105	0			DEEP																																									
862	45.5123365	-89.1728384	0			DEEP																																									
863	45.5123258	-89.1713662	0			DEEP																																									
864	45.5123151	-89.1698941	0			DEEP																																									

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton foliosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton praelongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tuberosus/americanus	Sparganium eurycarpum	Spirodela polyrhiza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
865	45.5123044	-89.168422	0			DEEP																																										
866	45.5122937	-89.1669498	0			DEEP																																										
867	45.512283	-89.1654777	0			DEEP																																										
868	45.5122722	-89.1640056	11	Sand	Pole																																											
869	45.5122614	-89.1625334	3	Sand	Pole																																		1									
870	45.5137927	-89.2331825	1	Sand	Pole			1			1	1													1					1																		
871	45.5137828	-89.2317103	4	Rock	Pole			1	1																									1		1		1										
872	45.5137729	-89.2302381	5	Sand	Pole			2	1										1																	1							1				
873	45.5137629	-89.2287659	7	Sand	Pole			1										1	1													1		1		1							1				
874	45.513753	-89.2272937	13	Muck	Pole																																											
875	45.513743	-89.2258215	8	Sand	Pole			1				1							1																	1											
876	45.513733	-89.2243493	6	Sand	Pole															1																1							1				
877	45.513723	-89.2228771	5	Sand	Pole			1				1																															1				
878	45.513713	-89.221405	6	Sand	Pole															1														1									1				
879	45.513703	-89.2199328	4	Sand	Pole				1											2																												
880	45.5136929	-89.2184606	2	Rock	Pole																																											
881	45.5136828	-89.2169884	4	Sand	Pole				2											1									1																			
882	45.5136727	-89.2155162	14	Sand	Pole																																											
883	45.5136626	-89.214044	0			DEEP																																										
884	45.5136525	-89.2125718	15		Rope																																											
885	45.5136423	-89.2110997	0			DEEP																																										
886	45.5136321	-89.2096275	14		Rope																																											
887	45.5136219	-89.2081553	13	Muck	Pole																																											
888	45.5136117	-89.2066831	10	Muck	Pole																																											
889	45.5136015	-89.2052109	13	Muck	Pole																																											
890	45.5135912	-89.2037388	2	Sand	Pole				1	1										1																		1						1				
891	45.5135189	-89.1934335	10	Sand	Pole																																											
892	45.5135085	-89.1919614	0			DEEP																																										
893	45.5134981	-89.1904892	6	Sand	Pole																														1								1				
894	45.5134877	-89.189017	4	Sand	Pole				1																														v									
895	45.513414	-89.1787118	3	Rock	Pole																																											
896	45.5134034	-89.1772397	3	Sand	Pole																								1		1																	
897	45.5133928	-89.1757675	3	Rock	Pole																																											
898	45.5133822	-89.1742954	5	Sand	Pole																					1			1		1		1										1				
899	45.5133715	-89.1728232	15		Rope																																											
900	45.5133609	-89.171351	16		Rope																																											
901	45.5133502	-89.1698789	0			DEEP																																										
902	45.5133395	-89.1684067	0			DEEP																																										
903	45.5133287	-89.1669346	0			DEEP																																										
904	45.513318	-89.1654624	0			DEEP																																										
905	45.5133072	-89.1639902	2	Sand	Pole																																											
906	45.5148178	-89.2316962	2	Sand	Pole						1									1														1				1										
907	45.5148079	-89.230224	3	Rock	Pole															1																		1										
908	45.514798	-89.2287518	4	Sand	Pole																													1		1		1					1				
909	45.514788	-89.2272795	9	Sand	Pole			3										1	1																	1							1				
910	45.5147781	-89.2258073	6	Sand	Pole			1										1	1															1		1											
911	45.5147681	-89.2243351	7	Sand	Pole			1										1																2		1							1				
912	45.5147581	-89.2228629	4	Sand	Pole						1																											1										
913	45.514748	-89.2213907	5	Sand	Pole															1																		1						1				
914	45.514738	-89.2199185	5	Sand	Pole				1											1														1		1		1						1				
915	45.5147279	-89.2184462	5	Sand	Pole				2											1												1			1									1				
916	45.5147179	-89.216974	5	Sand	Pole				1			1								1												1	1				1							1		1		
917	45.5147077	-89.2155018	10	Sand	Pole																																											
918	45.5146976	-89.2140296	15		Rope																																											
919	45.5146875	-89.2125574	14		Pole																																											
920	45.5146773	-89.2110852	15		Rope																																											
921	45.5146672	-89.209613	15		Rope																																											
922	45.514657	-89.2081408	13	Muck	Pole																																											
923	45.5146467	-89.2066686	12	Muck	Pole																																											
924	45.5146365	-89.2051964	11	Muck	Pole																																											
925	45.5146263	-89.2037242	4	Sand	Pole				2	1										1									1			1						1					1		1		
926	45.5145539	-89.1934187	4	Rock	Pole															1																												
927	45.5145435	-89.1919465	13	Muck	Pole																																											
928	45.5145331	-89.1904743	12	Muck	Pole																																											
929	45.5145227	-89.1890022	10	Muck	Pole			1																										1														
930	45.5144278	-89.1757524	2	Rock	Pole				1													1																										
931	45.5144172	-89.1742802	2	Sand	Pole				1					1																													1					
932	45.5144065	-89.172808	2	Rock	Pole				1					1																													1					
933	45.5143959	-89.1713358	4	Rock	Pole																																											
934	45.5143852	-89.1698637	5	Sand	Pole															1																						1				1		
935	45.5143745	-89.1683915	15		Rope																																											
936	45.5143638	-89.1669193	0			DEEP																																										
937	45.514353	-89.1654471	4	Sand	Pole																																											
938	45.5143422	-89.1639749	2	Sand	Pole																																											

Point Number	LATITUDE	LONGITUDE	DEPTH	SEDIMENT	POLE_ROPE	COMMENTS	Myriophyllum spicatum	Ceratophyllum demersum	Chara spp.	Eleocharis acicularis	Eleocharis palustris	Elodea canadensis	Equisetum fluviatile	Isoetes sp.	Juncus pelocarpus	Lemna trisulca	Lemna turionifera	Megalodonta beckii	Myriophyllum sibiricum	Najas flexilis	Nitella sp.	Nuphar variegata	Nymphaea odorata	Phragmites australis	Pontederia cordata	Potamogeton amplifolius	Potamogeton bolosus	Potamogeton friesii	Potamogeton gramineus	Potamogeton illinoensis	Potamogeton pradongus	Potamogeton pusillus	Potamogeton richardsonii	Potamogeton robbinsii	Potamogeton spirillus	Potamogeton zosteriformis	Sagittaria sp. (rosette)	Schoenoplectus acutus	Schoenoplectus tabernaemontani	Sparganium eurycarpum	Spirodela polyrhiza	Utricularia vulgaris	Vallisneria americana	KNOWN_1	POT_HB_1	POT_HB_2	Filamentous Algae
939	45.5158429	-89.2302099	2	Sand	Pole				1		1				1														1							1		1						1				
940	45.515833	-89.2287376	2	Sand	Pole																																											
941	45.5158231	-89.2272654	3	Sand	Pole			1	1																													1										
942	45.5158131	-89.2257931	3	Sand	Pole				1																													1										
943	45.5158031	-89.2243209	2	Sand	Pole			1			1																									1		1					1				
944	45.5157931	-89.2228486	3	Sand	Pole				1																				1									1					1				
945	45.5157831	-89.2213764	4	Sand	Pole						1							1																				1										
946	45.515773	-89.2199042	4	Sand	Pole							1							1									1										1										
947	45.515763	-89.2184319	5	Sand	Pole				1			1								1								1					2	1									1				
948	45.5157529	-89.2169597	10	Sand	Pole																															1												
949	45.5157428	-89.2154874	14	Muck	Pole																																											
950	45.5157327	-89.2140152	15		Rope																																											
951	45.5157225	-89.212543	13	Muck	Pole																																											
952	45.5157124	-89.2110707	13	Muck	Pole																																											
953	45.5157022	-89.2095985	13	Muck	Pole																																											
954	45.515692	-89.2081263	13	Muck	Pole																																											
955	45.5156818	-89.206654	13	Muck	Pole																																											
956	45.5156715	-89.2051818	11	Muck	Pole																																											
957	45.5156613	-89.2037096	6	Sand	Pole																															1							2				
958	45.515651	-89.2022373	2	Sand	Pole																																						1					
959	45.5155786	-89.1919317	5	Sand	Pole																																											
960	45.5155681	-89.1904595	6	Sand	Pole																																						1				1	
961	45.5155577	-89.1889873	11	Muck	Pole																																											
962	45.5155472	-89.1875151	9	Muck	Pole																																											
963	45.5155368	-89.1860428	6	Muck	Pole											1																	1	1		1							1	1			
964	45.5154095	-89.1683762	2	Sand	Pole				1											1															1								1					
965	45.5153988	-89.166904	2	Rock	Pole																																						1					
966	45.515388	-89.1654318	1	Sand																																												
967	45.5168581	-89.2272512	2	Sand	Pole																																											
968	45.5168481	-89.2257789	3	Sand	Pole														1																			1					1					
969	45.5168381	-89.2243067	2	Sand	Pole						1		1																	1								1										
970	45.5168281	-89.2228344	3	Sand	Pole				1																									1														
971	45.5168181	-89.2213621	3	Sand	Pole						1								1	1									1									1						1					
972	45.5168081	-89.2198899	3	Sand	Pole														1					1																									
973	45.516798	-89.2184176	4	Sand	Pole			1				1							1	1												1	1			1		1					1					
974	45.5167879	-89.2169453	11	Muck	Pole																																											
975	45.5167778	-89.2154731	13	Muck	Pole							1																								1												
976	45.5167677	-89.2140008	14	Muck	Pole																																											
977	45.5167575	-89.2125285	14	Muck	Pole																																											
978	45.5167474	-89.2110563	12	Muck	Pole																																											
979	45.5167372	-89.209584	13	Muck	Pole																																											
980	45.516727	-89.2081117	14	Muck	Pole																																											
981	45.5167168	-89.2066395	12	Muck	Pole																																											
982	45.5167066	-89.2051672	12	Muck	Pole																															1												
983	45.5166963	-89.203695	10	Sand	Pole							1																																				
984	45.516686	-89.2022227	4	Sand	Pole				1											2																1							1					
985	45.5166032	-89.1904447	4	Sand	Pole																																											
986	45.5165927	-89.1889724	9	Muck	Pole																																											
987	45.5165823	-89.1875002	8	Muck	Pole																													1									2				
988	45.5165718	-89.1860279	6	Muck	Pole			1								1										1								1		1							1				
989	45.5165613	-89.1845557	5	Muck	Pole			2				1				1										1								2									1			1	
990	45.5178732	-89.2242924	1	Sand	Pole				1	1		1																					1				1						1				
991	45.5178632	-89.2228201	2	Sand	Pole																								1									1										
992	45.5178531	-89.221479	3	Sand	Pole				1																													1										
993	45.5178431	-89.2198756	3	Sand	Pole				2		1												1															1										
994	45.517833	-89.2184033	3	Sand	Pole			1	1		1									1									1									1										
995	45.5178229	-89.216931	7	Sand	Pole							1																						1		1							2				
996	45.5178128	-89.2154587	13	Muck	Pole																																											
997	45.5178027	-89.2139864	11	Muck	Pole																																											
998	45.5177926	-89.2125141	13	Muck	Pole																																											
999	45.5177824	-89.2110418	13	Muck	Pole																																											
1000	45.5177722	-89.2095695	14		Rope																																											
1001	45.517762	-89.2080972	12	Muck	Pole																																											
1002	45.5177518	-89.2066249	12	Muck	Pole																																											
1003	45.5177416	-89.2051527	12	Muck	Pole																																											
1004	45.5177313	-89.2036804	10	Muck	Pole																																											
1005	45.5177211	-89.2022081	4	Sand	Pole				2											1																1							1					
1006	45.5176382	-89.1904298	3	Sand	Pole			1	1																	1																	1					
1007	45.5176277	-89.1889575	7	Muck	Pole											1			1															1														
1008	45.5176173	-89.1874853	6	Muck	Pole			1																		1																	3			1	
1009	45.5176068	-89.186013	5	Muck	Pole			1																		1																	2				
1010	45.5175963	-89.1845407	4	Muck	Pole													1																									3			1	
1011	45.5188781	-89.2198613	3	Sand	Pole															1										1																	
1012	45.5188681	-89.2183889	3	Sand	Pole				1																											1											
1013	45.518858	-89.2169166	4	Sand	Pole														1																			1									
1014	45.5188479	-89.2154443	11	Muck	Pole																																											
1015	45.5188377	-89.213972	6	Sand	Pole				1			1							1															1		1							1				
1016	45.5188276	-89.2124997	3	Sand	Pole				1		1																											1					1				
1017	45.5188174	-89.2110273	4	Rock	Pole															1																		1					1				
1018	45.5188073	-89.209555	14	Muck	Pole																																											
1019	45.5187971	-89.2080827	10	Muck	Pole																																											
1020	45.5187869	-89.2066104	11	Muck	Pole																																											
1021	45.5187766	-89.2051381	12	Muck	Pole																																											
1022	45.5187664	-89.2036658	12	Muck	Pole																																											
1023	45.5187561	-89.2021935	5	Sand	Pole				2																	1							1	1		1	1						1				
1024	45.5186628	-89.1889427	6	Muck	Pole											1																				1							3				
1025	45.5186523	-89.1874704	5	Muck	Pole			1																																			3			1	
1026	45.5186418	-89.1859981	4	Muck	Pole			1																																			3				
1027	45.5199031	-89.2183746	1	Sand	Pole					1										1													1											1				
1028	45.519893	-89.2169023	2	Sand	Pole																																											
1029	45.5198829	-89.2154299	4	Sand	Pole						1								1															1				1										
1030	45.5198728	-89.2139576	4	Sand	Pole							1							2							1							1			1							1				
1031	45.5198423	-89.2095405	11	Muck	Pole																																											
1032	45.5198321	-89.2080682	11	Muck	Pole																																											
1033	45.5198219	-89.2065958	11	Muck	Pole																																											
1034	45.5198116	-89.2051235	12	Muck	Pole																																											
1035	45.5198014	-89.2036512	11	Muck	Pole																																											
1036	45.5197911	-89.2021788	5	Sand	Pole				1																								1	1		1		1					1				
1037	45.5196978	-89.1889278	3	Sand	Pole				1							1						2														1							2				
1038	45.5196873	-89.1874555	4	Muck	Pole																													2		1							3				
1039	45.5208773	-89.209526	9	Muck	Pole																																											
1040	45.5208671	-89.2080537	7	Muck	Pole																															1							3				
1041	45.5208569	-89.2065813	10	Muck	Pole																																											
1042	45.5208467	-89.2051089	12	Muck	Pole																																											
1043	45.5208364	-89.2036366	9	Muck	Pole			1																																					1			
1044	45.5208261	-89.2021642	5	Sand	Pole			1																									1			1							2				
1045	45.5219124	-89.2095115	7	Muck	Pole																															1												
1046	45.5219022	-89.2080391	8	Muck	Pole																					1							2	1		1												
1047	45.5218919	-89.2065667	8	Muck	Pole			1																												1							3				
1048	45.5218817	-89.2050944	11	Muck	Pole																																											
1049	45.5218714	-89.203622	9	Muck	Pole																																											
1050	45.5218612	-89.2021496	5	Sand	Pole				1											1																1							1					
1051	45.5218509	-89.2006772	0			DOCK																																										
1052	45.5229474	-89.209497	4	Sand	Pole			1	1			1							1			1				1																	1				
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1055	45.5229167	-89.2050798	10	Muck	Pole																																											
1056	45.5229065	-89.2036074	10	Muck	Pole																																											
1057	45.5228962	-89.2021349	6	Sand	Pole			1																												1							2				
1058	45.5228859	-89.2006625	5	Sand	Pole			1											1																	2							2				
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1063	45.5239415	-89.2035927	8	Muck	Pole			1																								1				1												
1064	45.5239312	-89.2021203	7	Muck	Pole																					1								1		1							2				
1065	45.5239209	-89.2006479	7	Muck	Pole													1																1		1							1				
1066	45.5239106	-89.1991754	3	Sand	Pole			1	1											1													1			2							1				
1067	45.5250072	-89.2079956	3	Muck	Pole			3	1			1										1														1									1		
1068	45.524997	-89.2065231	6	Muck	Pole			2				1														1							1			1												
1069	45.5249868	-89.2050506	7	Muck	Pole			1																												1												
1070	45.5249765	-89.2035781	8	Muck	Pole																																											
1071	45.5249662	-89.2021057	6	Sand	Pole			1	1			1																															3				
1072	45.524956	-89.2006332	6	Muck	Pole																															1												
1073	45.5249456	-89.1991607	5	Muck	Pole			1				1																						1		2												
1074	45.526032	-89.2065085	2	Sand	Pole							1							1			1														1												
1075	45.5260218	-89.205036	3	Sand	Pole			1			1	1							1																	1		1										
1076	45.5260115	-89.2035635	4	Sand	Pole						1								1														1	1		1		1										
1077	45.5260013	-89.202091	4	Sand	Pole														1															1		2		1							1		
1078	45.525991	-89.2006185	3	Sand	Pole				2			1							1																									1				

F

APPENDIX F

WDNR Fisheries Studies

Panfish Survey and bluegill stocking evaluation on Pelican Lake, Oneida County Wisconsin during 2005.

Waterbody Identification Code 1579900

John Kubisiak
Senior Fisheries Biologist
Rhinelander
February, 2006

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Panfish Survey and bluegill stocking evaluation on Pelican Lake, Oneida County Wisconsin during 2005.

John Kubisiak
Senior Fisheries Biologist
February, 2006

EXECUTIVE SUMMARY

A panfish netting survey of Pelican Lake was conducted during June, 2005. I evaluated relative abundance and population parameters of panfish species, and measured the contribution of 34,670 bluegill stocked by Pelican Lake Property Owners Association during October, 2004. Pelican Lake has a diverse, high-quality panfish fishery. Panfish species found include black crappie, bluegill, pumpkinseed, bluegillxpumpkinseed hybrids, yellow perch, rock bass and a few black and yellow bullheads. Panfish abundance was high, with good size structure. Bluegill showed very strong abundance with a catch rate of 60 per net night. Bluegill were growing about a year ahead of the regional average and annual mortality was low at 51%. Stocked bluegill showed minimal contribution to the population, comprising only 0.27 % of the bluegill catch. I recommend continuing to manage Pelican Lake for a diverse fishery including walleye, muskellunge, northern pike, bass and panfish. Fish populations show adequate natural reproduction, and no stocking is currently needed.

Lake and location:
Pelican Lake, Oneida County, T35N R10E Sec23. Located in south-east Oneida County in the towns of Enterprise and Schoepke. The City of Pelican Lake is located on the east shore of the lake. Pelican Lake is part of the Upper Wisconsin River watershed and is drained by the Pelican River.

Physical/Chemical attributes (Andrews and Threinen 1966):
Morphometry: 3,585 acres, maximum depth 39 feet. Outlet dam raises the water level about 2 feet.
Watershed: 10 square miles, including 361 acres of wetlands.
Lake type: Drainage. Two unnamed streams feed the lake; outlet is controlled by a low-head dam and is the source of the Pelican River.
Basic water chemistry: Soft – alkalinity 39 mg/l, conductance 104 μmhos.
Water clarity: Clear water of moderate transparency.
Littoral substrate: 40% sand, 30% muck, 20% gravel and some rubble.
Aquatic vegetation: Submerged vegetation moderate in density.
Winterkill: None.
Boat landings: Two asphalt and concrete ramps with parking for 63 vehicles with trailers and 63 additional vehicles; one asphalt ramp and one gravel ramp with roadside parking.
Other features: Shoreline 95% upland with bog and meadow wetlands adjoining a limited portion of the lake basin. Rusty crayfish are present.

Purpose of Survey: Assess status of panfish and non-game species and develop management recommendations.

Dates of fieldwork: Panfish netting June 6 - 10 2005.

INTRODUCTION

Walleye fry were stocked in Pelican Lake at least as early as 1933, while walleye fingerlings were stocked fairly regularly from 1942 to 1976. Muskellunge fry were stocked as early as 1934 and fingerlings were stocked during 1938 through 1998 (Table 1). In years past, it was common to stock on top of naturally reproducing populations and to "plant-back" fry or fingerlings in years when eggs were taken for DNR hatcheries. However, recent studies indicate that walleye stocking to supplement natural reproduction is usually ineffective (Li et al. 1996). Other risks associated with stocking include genetic, fish health and aquatic invasive species issues. Genetic issues associated with stocking fish are described in Fields et al. (1997); they recommend: "If there is substantive natural reproduction…fish should not be introduced from any source." Fish health risks include a variety of pathogens and parasites (e.g., *Heterosporis* sp.) that may be introduced with the fish. Health inspections required by Wisconsin Department of Agriculture and Consumer Protection (DATCP, the agency that regulates private hatcheries in Wisconsin) are a step in the right direction, although no health inspection can detect everything. Currently, health inspections of private hatcheries that stock fish in Wisconsin waters are not required annually and testing is not required for all pathogens of concern (e.g., testing for largemouth bass virus is not required, despite a 2001 fish health advisory issued by DATCP). The list of potential non-native and aquatic invasive species that could potentially be introduced from a fish-stocking event includes plants (e.g., Eurasian water milfoil), mussels (e.g., zebra mussel), zooplankton (e.g., spiny water flea) and fish (e.g., round gobi, green sunfish).

It is against current DNR policy to permit walleye stocking in lakes with adequate natural reproduction because the potential risks outweigh the benefits. Nevertheless, Pelican Lake Property Owners Association (PLPOA) established a 'Pelican Lake Stocking Fund', financed by a large raffle. Their initial goal was to stock walleyes. However, when the WDNR Fisheries Biologist refused to authorize walleye stocking, the PLPOA turned towards panfish stocking as an alternative. Perch stocking was permitted in 2001-03. At the same time, large naturally-reproduced perch yearclasses were documented in 2002 and 2004. The PLPOA requested a permit to stock bluegill beginning in 2004, but I withheld permission pending the results of a baseline netting survey in August, 2004. After the netting results showed good adult bluegill numbers, size structure and growth rates, a permit was granted the PLPOA to stock bluegill on condition that the stocked fish be fin clipped to allow a more thorough evaluation of the Pelican Lake bluegill population and the relative contribution of stocked bluegill to the population (i.e., the present study). Additional stocking would only be permitted if the bluegill population showed low abundance (i.e., a netting catch rate less than 15 per net night) and stocked bluegill contributed to the population (i.e., if stocked fish contribute 10% or more of the 2005 bluegill catch).

BACKGROUND

A netting survey during August 3 to 7, 1945 found good numbers of walleye, perch and rock bass, along with northern pike, crappie, smallmouth bass, sunfish, sucker and lawyer (burbot). "The [length] distribution sheet shows that Pelican Lake has a good supply of fish. Muskies are known to be present though none were taken in the nets. Minnows, fry, crayfish and insects are abundant, indicating adequate forage for game fish." (Churchill 1945)

Unpublished data summaries indicate that three crews conducted 189 net-lifts on Pelican Lake during April 18 -27 1948, likely for spawning operations. Catch per net night included 110 walleye, 0.81 northern pike, 0.053 muskellunge, 17 perch and 0.72 suckers (Table 2). Other species recorded by one or two crews on 71 of the net lifts include 0.25 rock bass per net night, 0.38 lawyer (burbot) and 1.76 crappies (74 net lifts).

Various netting summaries from April and May spawning operations during 1953-57, 1960, 1973, 1975 and 1976 are contained in the file, but the panfish catch and the amount of effort were only recorded sporadically. However, the data summary from a netting survey during September 26-30, 1955 (42 net-

Table 1. Fish stocking record during 1975 through 2005 in Pelican Lake, Oneida County Wisconsin.

Year	Species	Size	Number	Comments
1975	walleye	lg fingerling	20,000	
1976	walleye	lg fingerling	20,000	
1976	muskellunge	lg fingerling (10 inch)	1,390	
1977	muskellunge	lg fingerling (11 inch)	2,369	
1980	muskellunge	lg fingerling (8 inch)	2,500	
1981	muskellunge	lg fingerling (12 inch)	890	
1982	muskellunge	lg fingerling (11 inch)	2,500	
1984	walleye	fry	3,000,000	
1984	muskellunge	lg fingerling (9 inch)	1,186	
1985	muskellunge	lg fingerling (11 inch)	2,500	
1986	muskellunge	lg fingerling	1,176	
1988	muskellunge	lg fingerling (11 inch)	2,500	
1988	muskellunge	lg fingerling	1,000	Permit to Dave's Musky Club
1989	muskellunge	lg fingerling	750	Permit to Dave's Musky Club
1989	muskellunge	lg fingerling (9-11 inch)	2,210	
1991	muskellunge	lg fingerling	910	
1991	muskellunge	lg fingerling (10.4 inch)	1,750	
1991	walleye	fry	400,000	Mole Lake
1993	muskellunge	lg fingerling	2,500	
1996	muskellunge	fry (0.5 inch)	100,000	
1996	muskellunge	lg fingerling (10.8 inch)	2,500	
1998	muskellunge	lg fingerling (12 inch)	2,500	
1999	walleye	fry	440,000	Mole Lake
2000	walleye	fry	460,000	Mole Lake
2000	smallmouth bass	lg fingerling	250	PLPOA
2000	largemouth bass	lg fingerling	250	PLPOA
2001	yellow perch	adult	12,000	PLPOA
2002	yellow perch	adult	20,000	PLPOA
2003	yellow perch	adult (5.5 inch)	22,250	PLPOA
2004	bluegill	adult (4.2 inch)	34,670	PLPOA

nights) gives numbers of panfish rounded to the nearest 50 or 100 fish (Table 2). Six nets set during October 3-5, 1973 (presumably 12 net-nights) found moderate catches of 11 species, dominated by black crappie (11 per net night) and yellow perch (4 per net night, Table 2)

A seine haul was made on August 10, 1955 with a 2000 by 14 foot (fishing depth) seine. A number of fish were counted and measured, including 57 walleyes, 63 northern pike and 1 muskellunge. An estimated 15,000 fish were released, consisting of 80% crappies and perch, 15% sunfish and bluegills and 5% suckers. According to Burdick (1956), "…the seine catch ranks among the highest ever obtained in the area." Growth rates were characterized as normal for young walleyes but below average for older fish, while crappies and perch were growing about average (Burdick 1956).

Bullheads were removed from Pelican Lake by seining during 1954. Bullhead removals were conducted during 1959 through about 1986, initially by commercial fishermen and (after around 1980) by volunteers. A May 21, 1959 sample of 514 bullheads ranged from 8.1 to 13.3 inches with an average length of 10.4 inches. Fifty-one of the bullheads (species not identified) were aged using dorsal spines, and the results indicate that 39% of the bullheads were age 2, 51% were age 3 and 10% were age 4 (Priegel, 1960)

Table 2. Catch per unit effort of gamefish and panfish species during historic and current netting surveys of Pelican Lake, Oneida County Wisconsin. Netting catch rates are reported as number of fish per net night. If available, mean lengths are given with number of fish measured (N) in parentheses.

species	Apr 18-27 1948	Sep 26-30 1955	Oct 3-5 1973	Aug 2-3 2004	June 6-10 2005
walleye	110 14.2” (N = 114)	2.3	1.8 16.3” (N = 21)	0.5 6.3” (N= 1)	0.3
largemouth bass	0	0.5	2.0 15” (N = 1) 3” (N = 3)	0	0.1
smallmouth bass	0	0	0.25 16.8” (N = 3)	0	0.5
muskellunge	0.053	0	0.33 37.5” (N = 4)	0	0.1 26.0” (N = 3)
northern pike	0.81 18.8” (N = 40)	0.3	0.25 16.4” (N = 3)	0.5 11.3” (N = 1)	0.9
bullheads		2.2		0.5 7” (N = 1)	1.0 9.7” (N = 31)
black crappie	1.76 7.2” (N = 29)	79	11 9.1” (N = 72) 3” (N = 60)	3.0 8.7” (N = 6)	5.0 8.1” (N = 191)
bluegill		62	2.2 6.9” (N = 10) 2.5” (N = 16)	107.5 5.1” (N = 50)	60.0 5.7” (N = 267)
hybrid bluegill xpumpkinseed				1.5 6.1” (N = 3)	1.6 6.4” (N = 53)
pumpkinseed (‘sunfish’)			0.50 5.0” (N = 6)	28.5 4.3” (N = 49)	6.9 5.3” (N = 214)
rock bass	0.25		2.5 6.8” (N = 18) 2.5” (N = 12)	14.5 5.1” (N = 26)	8.7 6.5” (N = 292)
white bass			0.08 13.0” (N = 1)	0	0
yellow perch	17 9.5” (N = 112)	20	4.0 6.8” (N = 8)	186.5 5.3” (N = 50)	7.8 6.8” (N = 235)

A shocking survey was conducted on July 6, 1960. Most of the shoreline was shocked from the west side of Antigo Island to the west shore of Outlet Bay. Large numbers of perch of all sizes were noted. "The other panfish were quite abundant but not in anywhere near the numbers of the perch." (Morehouse 1960) Moderate numbers of larger bullheads and walleyes were also noted, along with large numbers of lake shiners (species was not identified). The report recommended "With the continuation of the good perch population in Pelican Lake, because of the size and fertility of it, it is recommended that the lake be continued on the muskellunge stocking quota and stocked at a high rate. In those years when walleye spawning is necessary there, an additional bolster to the walleye population can be accomplished through the re-stocking of a percent of the spawn taken." (Morehouse 1960) This recommendation changed in the Oneida County annual report: "With the heavy harvest of perch that is normally experienced here during the winter months, and with other panfish populations in reasonable numbers, and the fact that no young of the year walleyes were noted, it is recommended that Pelican Lake be stocked with walleye fingerling again in 1961 followed by muskellunge stocking in 1962 to keep the panfish and forage populations in control…Commercial removal of bullheads is to be continued."

Periodic single-day angler creel-checks were conducted in 1954, 56, 58, 59, 60, 63, 64 and 67. All but one were during the ice-fishing period. A full (9-month) creel survey was conducted during May 5 1990 through March 1 1991, excluding November. The 1990-91 survey estimated total annual fishing effort of 62.3 hours per acre, nearly double the 1990-2001 Oneida County average of 33.7 hours per acre. Catch was focused on yellow perch (110,462 caught), bluegill (58,995), and black crappie (22,995). Catch of all game species combined was estimated at 26,173, dominated by walleye and northern pike.

Mark-recapture population estimates of the adult walleye population were conducted by WDNR in 1990 and by Great Lakes Indian Fish and Wildlife Commission (GLIFWC) in 1995, 96, 98 and 2001. Estimated walleye populations averaged 2.4 and ranged from 1.2 to 3.0 adults per acre. Fall young-of-year surveys were conducted by WDNR in 1984, 86, 87, 90 and 2002; by GLIFWC in 1988 and 1991 through 2001 [Sakagoan Chippewa Band (Mole Lake) assisted in 2001] and by WDNR and Mole Lake (one boat each) in 2003 through 2005. Young-of-year walleye catch in fall surveys during 1990 through 2005 (average of 44.7 young-of-year per mile) compares favorably with other regional lakes supported by natural reproduction over the same period (32.4 per mile).

A summer baseline survey with late-summer netting and fall shocking was conducted during 2004. The summer netting consisted of eight mini-fyke nets (3/16 inch bar-measure mesh with 1" exclusion netting to keep out predator fish and turtles) and two full-size fyke nets (1/2 and 3/4 inch mesh). Nets were fished for one night, August 2 – 3, 2004. Mini-fyke catch of minnow and darter species was very good, with 12 forage species represented including high catches of bluntnose minnow and johnny darter. The mini-fyke nets held moderate to good numbers of largemouth and smallmouth bass, while high catches of young-of-year yellow perch, johnny darter and Iowa darter indicated strong reproduction by Percids in 2004. Bluegill catch was low, with no young-of-year in the nets. This was consistent with other lakes in the region: the cold summer apparently caused a very poor 2004 yearclass. Panfish catch in the two full-size nets was very high at 107.5 bluegill and 186.5 perch per net night (Table 2).

METHODS

Two of three shipments of bluegill stocked during October, 2004 (26,431 of 34,671 total fish) were marked by clipping half the left-ventral fin. The fish were held in two large net pens in the lake until they could be clipped. Clipping was performed by PLPOA volunteers and DNR staff. Clipping took about 2.5 hours on each day and about 300 fish were clipped per person per hour. Average length of bluegill in the two shipments was 4.8 and 4.1 inches. Mortality was 30 and 289 bluegill, respectively. Physical appearance of fish in the first shipment was very good. In contrast, a number of fish in the second shipment had poor color, cloudy eyes and generally looked stressed. The majority of stocked fish appeared healthy, but some

fish from the second shipment that were in poor condition swam or floated away from the clipping site and are not included in the 289 that died immediately. Other fish species mixed in with the stocked bluegill include pumpkinseed, yellow bullhead, fathead minnow (not native to Pelican Lake), green sunfish (not native to Pelican Lake) and bluegillxgreen sunfish hybrid.

Seven standard (3/4" bar mesh) and one small-mesh (1/2" bar mesh) fyke nets were set June 6. These nets targeted panfish and were fished through June 10. All bluegills were individually examined for presence of a fin clip. Length or length category (nearest half-inch) was recorded for a random sample of about 250 individuals for each panfish species. Age structures (scales) were removed from ten panfish per species, per half-inch group.

RESULTS AND DISCUSSION

Bluegill

June, 2005 fyke net catch of bluegill was excellent, at 60 per net night (Table 2). In Oneida County, June bluegill catch rates were about 20 to 80 per net night during recent surveys (an exception was Booth Lake, with 290 stunted bluegill per net night). Catch rates range as low as single digits in drawdown reservoirs, where water-level fluctuations during spawning result in low-density bluegill populations but excellent growth rates and size structure (Coon 1998). Bluegill catch rates above 100 per net night are considered high density and are commonly associated with stunted populations (Snow 1990). The Pelican Lake bluegill catch far exceeded my benchmark of 15 per net night that would indicate a relatively low bluegill population. It was nearly identical to the bluegill catch in 1955 (Table 2).

Lengths were recorded for a random sample of 267 bluegill. Bluegill length peaked at 5 to 6 inches, with an average of 5.7 inches (Figure 1). A few 8 to 9.5 inch bluegill were found in most nets. Age analysis found bluegill as old as 11+, and indicated that Pelican Lake bluegill are growing about a year ahead of the regional average (Figure 2, Table 3). Based on this sample, 30% of the bluegill population was quality ($\geq$ 6 inch) size (i.e., RSD_6 = 30%) and 6% was preferred ($\geq$ 8 inch) size (RSD_8 = 6%).

Total annual mortality of the Pelican Lake bluegill population was estimated at 51%, using a catch curve (Figure 3). Panfish populations generally have high mortality rates because of their role as forage for many other species. Coble (1988) reported that seven annual mortality estimates for bluegill populations from five lakes in the upper Midwest averaged 70% and ranged from 59 to 87%. The relatively low mortality rate and fast growth measured in Pelican Lake indicate very good survival to larger sizes.

Bluegill Stocking Evaluation

Each bluegill captured in fyke nets was examined for fin clips by pulling the ventral fins away from the body. Of 1,944 bluegill captured during June netting, 4 possessed a fin clip. Stocked fish contributed 0.27% of the bluegill catch, even after expanding to account for 8,240 fish stocked without a clip. This is well short of the 10% benchmark I set as an indication that stocking contributed to the population.

Other Panfish Species

June net catch was dominated by bluegill, as is typical during early June netting. Crappies and perch are typically caught during April and May but net poorly during in June. However, June netting on Pelican Lake produced moderate catches of rock bass, yellow perch, pumpkinseed and black crappie (Table 2, Figures 4-7). Rock bass and pumpkinseed had stable length-frequencies (Figures 4 and 6), suggesting consistent recruitment. Yellow perch showed a strong yearclass of 5.5 to 7.5 inch fish (Figure 5), most likely 3-year-old fish from an abundant 2002 yearclass observed during fall shocking that year. Perch

smaller than about 6 inches are able to slip through the fyke net mesh, so another abundant yearclass from 2004 was not captured. The 2004 yearclass of perch was observed in 2004 mini-fykes and during 2004 and 2005 fall shocking. The black crappie length distribution (Figure 7) suggests dominance by a single yearclass, which is typical for crappies.

Figure 1. Length-frequency of bluegill during 2005 in Pelican Lake, Oneida County Wisconsin.

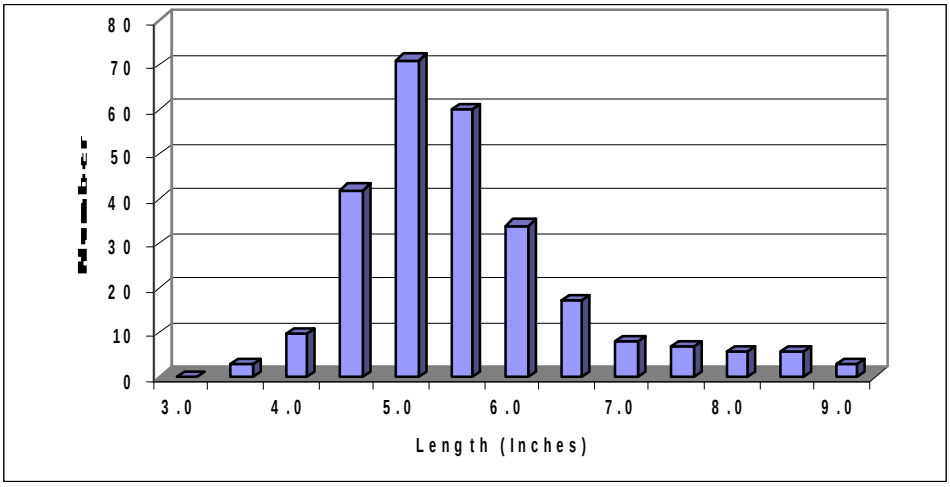


Figure 2. Length-at-age of bluegill in Pelican Lake, Oneida County Wisconsin during 2005 vs. Wisconsin River Headwaters regional average.

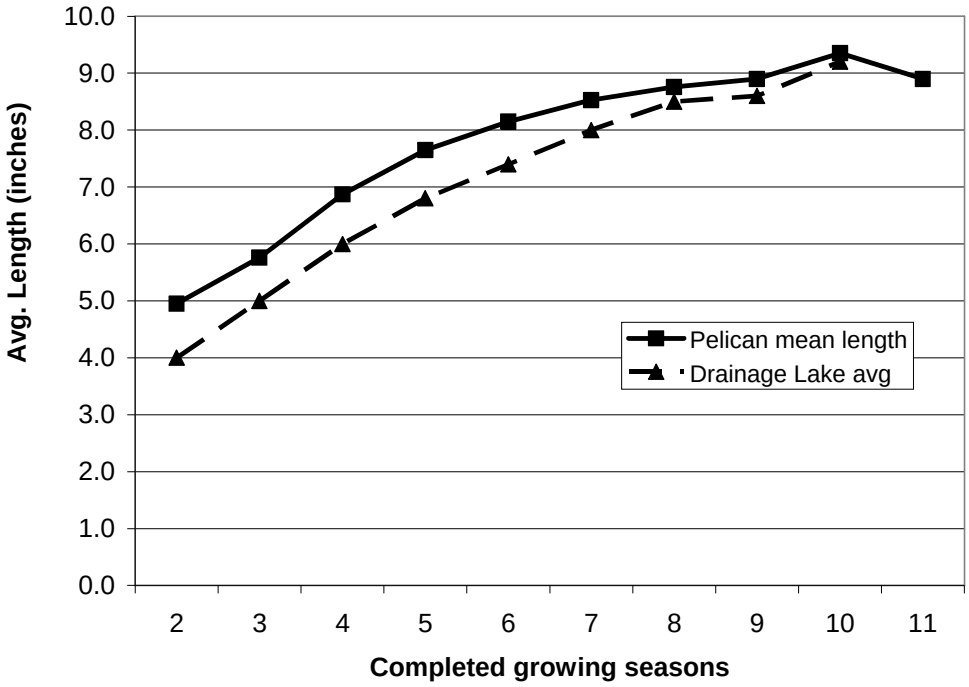


Table 3. Bluegill length-at-age in Pelican Lake, Oneida County Wisconsin during 2005. The Pelican Lake aged subsample was weighted against the length-frequency to ensure representative results

Age	Number of fish	Pelican avg length	Drainage lake avg
2	34	5.2	4.0
3	26	5.7	5.0
4	10	6.7	6.0
5	8	7.6	6.8
6	6	7.9	7.4
7	7	8.6	8.0
8	7	8.7	8.5
9	7	8.8	8.6
10	4	9.2	9.2

Figure 3. Bluegill catch curve (log of weighted catch by age) from Pelican Lake, Oneida County Wisconsin during 2005. Regression line is weighted by the number of fish in each age class and indicates a total annual mortality of 51%.

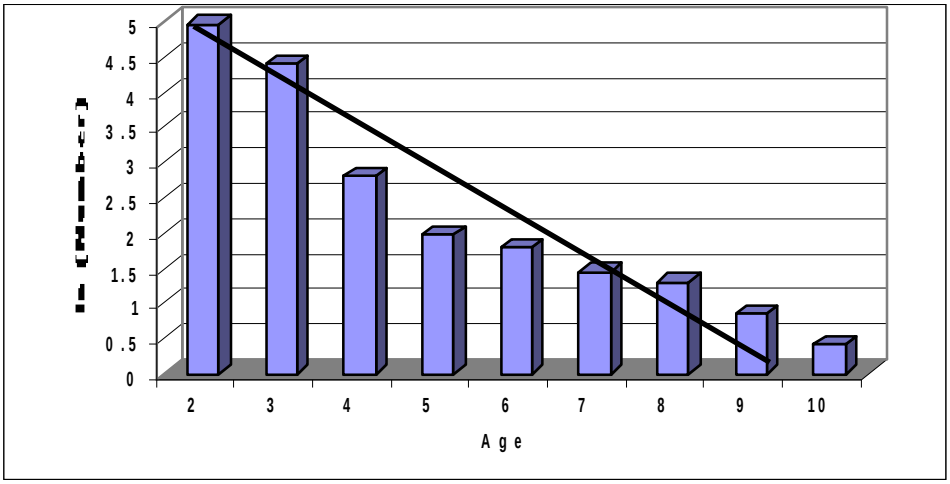


Figure 4. Length-frequency of rock bass during 2005 in Pelican Lake, Oneida County WI.

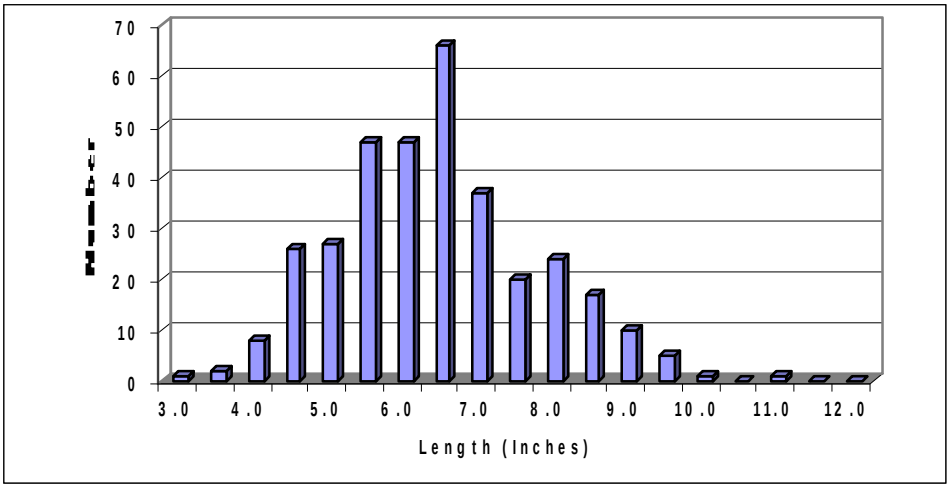


Figure 5. Length-frequency of yellow perch during 2005 in Pelican Lake, Oneida County WI.

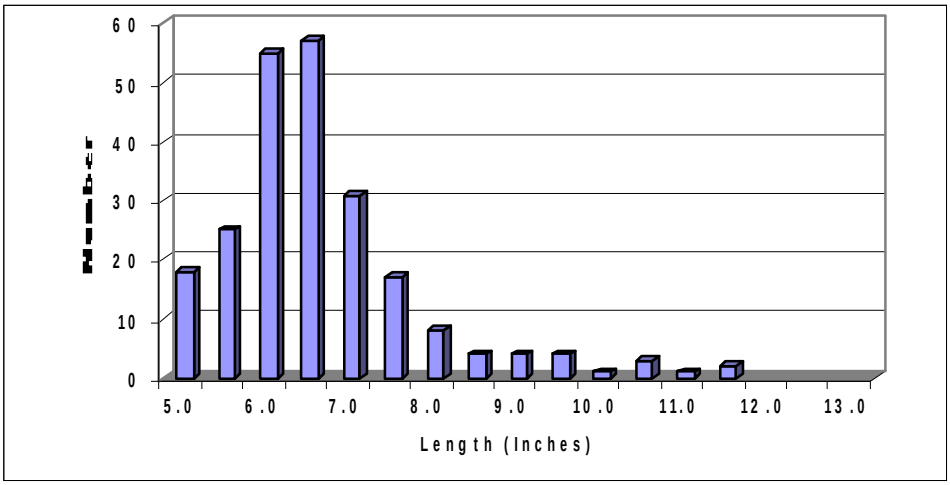


Figure 6. Length-frequency of pumpkinseed during 2005 in Pelican Lake, Oneida County WI.

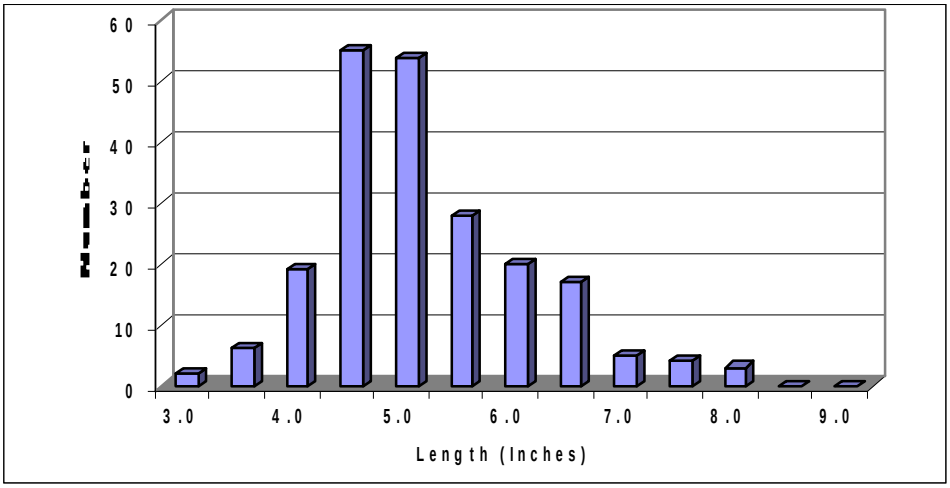
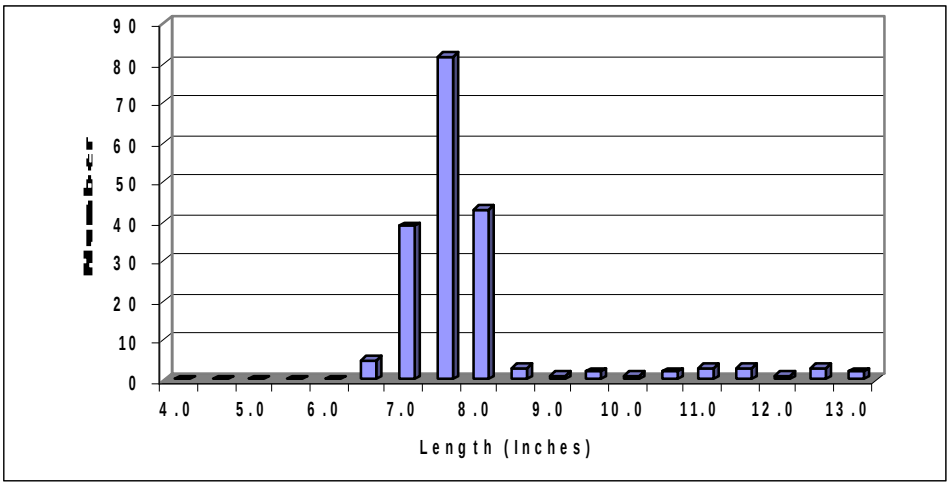


Figure 7. Length-frequency of black crappie during 2005 in Pelican Lake, Oneida County WI.



MANAGEMENT RECOMMENDATIONS

Despite high bluegill abundance, their growth rates and size structure were above average. This indicates that the gamefish populations are in balance and are providing adequate predation on panfish. I recommend continuing to manage Pelican Lake for a diverse fishery, including panfish, walleye, northern pike and quality-size bass and muskellunge. The stocking evaluation showed negligible contribution of stocked fish to the Pelican Lake bluegill population. No stocking is currently recommended for any species of fish.

ACKNOWLEDGEMENTS

Steve Timler and Pelican Lake Property Owners Association volunteers Ben Mott, Gina Javurek, Mike Schwartz, Ed Gengler and Bob Mott assisted in June netting. I especially appreciate the coordination efforts of Ben Mott. I assigned bluegill ages from scales. Aaron Nelson entered and summarized data.

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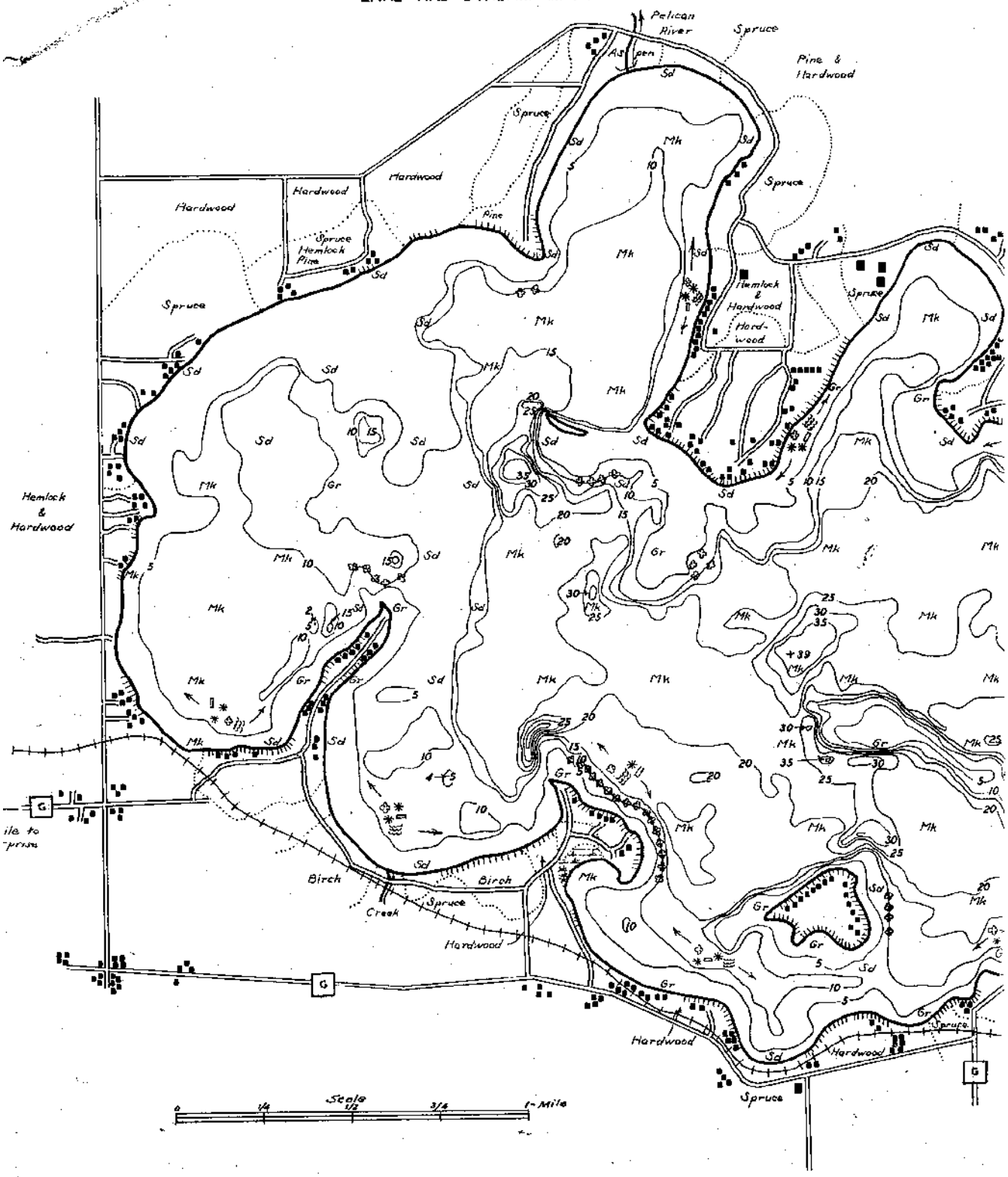
Cover image courtesy of TerraServer-USA website and the United States Geological Survey. http://terraserver-usa.com

WISCONSIN CONSERVATION DEPARTMENT
BIOLOGY DIVISION
LAKE AND STREAM IMPROVEMENT SECTION

LAKE SURVEY M.



DATE MAY 10, 1940
COMPILED BY L.E.H. C.C.C.
TRACED BY T.J.W. C.C.C.
SOURCE OF INFORMATION
LAKE SURVEY PROJECT
C.C.C. CAMP ELCHO
SOUNDINGS 250' INTERVALS

DATES OF MAP REVISION

WORK AGENCY C.C.C.

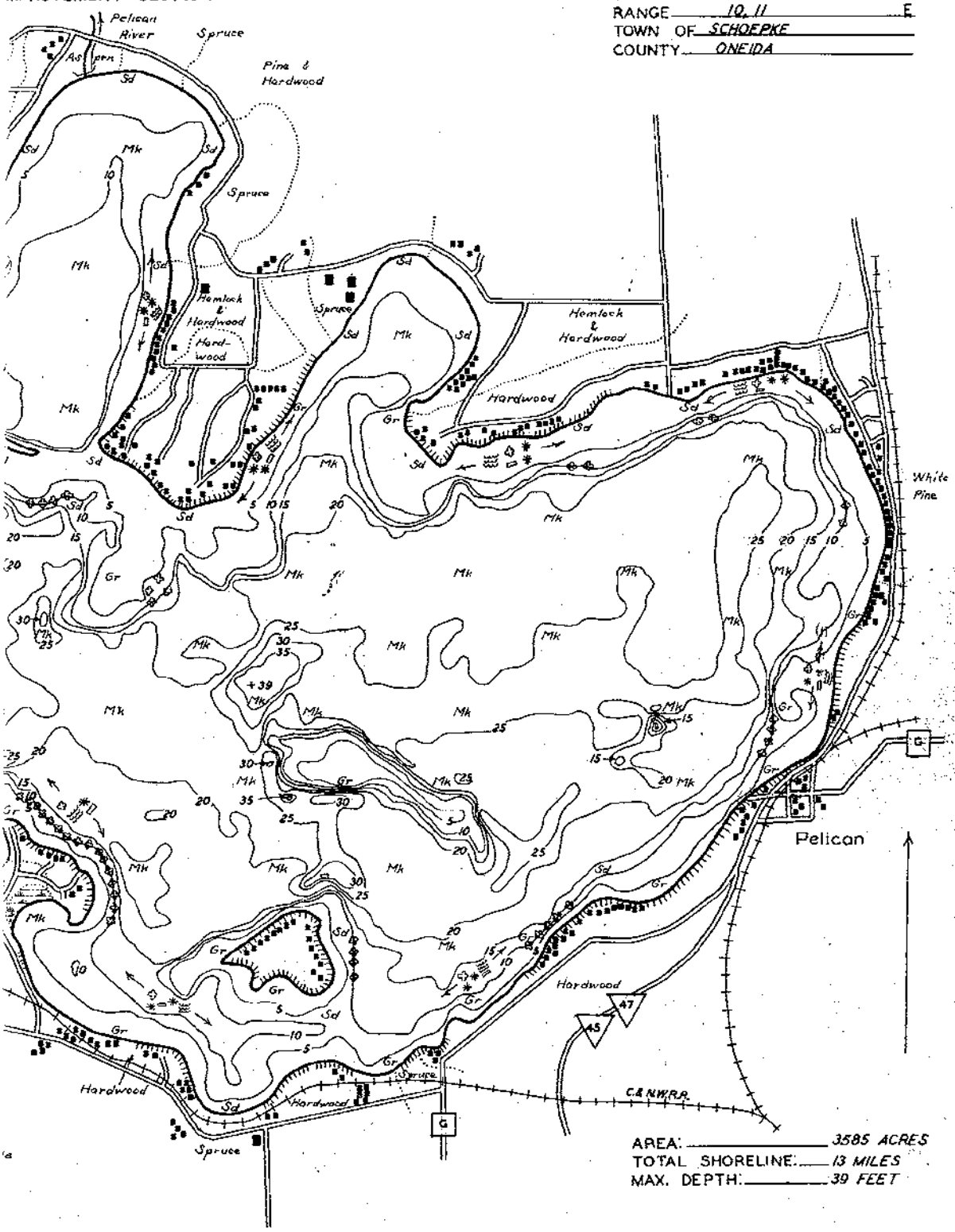
LAKE IMPROVEMENT RECOI

TYPE	DATE	1936	1961
BRUSH REFUGES		51	50
SAPLING TANGLES		67	
SPAWNING BOXES		58	
MINNOW SPAWNERS		111	
TOTAL		287	50

ATION DEPARTMENT
DIVISION
MPROVEMENT SECTION

LAKE SURVEY MAP

LAKE PELICAN
SECTION 14, 19, 22, 23, 24, 25
TOWNSHIP 35 N
RANGE 10, 11 E
TOWN OF SCHOEPKE
COUNTY ONEIDA



AREA: 3585 ACRES
TOTAL SHORELINE: 13 MILES
MAX. DEPTH: 39 FEET

SCALE: 1" = 1320'

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LAKE IMPROVEMENT RECORD

TYPE	DATE	1936	1961	
BRUSH REFUGES		51	60	
SAPLING TANGLES		67		
SPAWNING BOXES		58		
MINNOW SPAWNERS		111		
TOTAL		287	50	

LEGEND
WEED BEDS
ROCKY SHOALS
Sd SAND
Cl CLAY
Gr GRAVEL
Mk MUCK
DWELLING
ABANDONED DWELLING
RESORT

Comprehensive Fisheries Survey of Pelican Lake, Oneida County Wisconsin during 2011.

Waterbody Identification Code 1579900

John Kubisiak
Senior Fisheries Biologist
Rhinelander
January, 2012

WISCONSIN
DEPT. OF NATURAL RESOURCES

SPORT FISH RESTORATION

Your purchase of fishing equipment and motor boat fuel supports boating access and Sport Fish Restoration.

Comprehensive Fisheries Survey of Pelican Lake, Oneida County Wisconsin during 2011.

John Kubisiak
Senior Fisheries Biologist
January, 2012

EXECUTIVE SUMMARY

A comprehensive fisheries survey was conducted in Pelican Lake during spring and fall, 2011. We found good populations of gamefish including walleye (population estimate, PE = 2.4 adults per acre), northern pike (PE = 1.5 adults per acre), largemouth bass (0.53 adults per acre), smallmouth bass and muskellunge. The game species had good size and appeared to be in excellent condition. Panfish species were also abundant, with moderate to good size structure. We found high catches of bluegill, pumpkinseed and black bullhead, moderate catches of rock bass, bluegill x pumpkinseed hybrids, yellow perch and black crappie and lower numbers of yellow bullhead and white bass. Non-game species in the catch include burbot, creek chub, golden shiner, Iowa darter, troutperch and white sucker. I recommend continuing to manage Pelican Lake for quality size potential and a diverse fishery including trophy muskellunge, walleye, northern pike, largemouth bass, smallmouth bass, and panfish.

Lake and location:
Pelican Lake, south-west Oneida County, T35N R10E Sec14. Pelican Lake is in the towns of Enterprise and Schoepke, about 12 miles southeast of Rhinelander. The community of Pelican Lake (unincorporated) lies on its east shore. Pelican is part of the Upper Wisconsin River watershed. It is fed by three unnamed tributaries, and several other small or intermittent streams are not marked on topographic maps. A dam maintaining 6 feet of head and owned by Wisconsin Valley Improvement Company (WVIC) regulates the Pelican River outlet, which drains to Wisconsin River in Rhinelander. The Pelican Lake reservoir maximum elevation is 1591.98 ft MSL with a summer minimum of 1591.49 ft (April 1 to October 31) and a winter minimum of 1589.98 ft (November 1 to March 31). (Sam Morgan, WVIC, personal communication).

Physical/Chemical attributes (Andrews and Threinen 1966):
Morphometry: 3,585 acres with maximum depth of 39 feet.
Watershed: 10 square miles, including 361 acres of adjoining wetlands.
Lake type: Drainage with a low-head dam at the outlet.
Basic water chemistry: Soft – alkalinity 39 mg/l, conductance 104 μmhos.
Water clarity: Clear water of moderate transparency.
Littoral substrate: 40% sand, 30% muck, 20% gravel and some rubble.
Aquatic vegetation: moderate; dense in some areas. Eurasian watermilfoil was discovered in 2010; curly-leaf pondweed and phragmites are present.
Winterkill: none.
Boat landing: Two concrete ramps with parking for 63 vehicles with trailers and 63 additional vehicles (numbers not verified). One asphalt and two gravel ramps with roadside parking. Several resorts provide access at private ramps.
Other features: Shoreline 95% upland with bog and meadow wetlands adjoining a limited portion of the lake.

Purpose of Survey: Assess status of game and panfish species and develop management recommendations.

Dates of fieldwork: Walleye netting, April 27 – May 3 2011. Muskellunge netting May 6-17 2011 Panfish netting, June 6-10 2011. Electrofishing May 4, May 17, May 24, June 9 and September 22, 2011.

BACKGROUND

Pelican Lake has the only white bass population in the area. It was most likely initiated by transferring live fish from the Lake Winnebago system. White bass fry, fingerlings and adults were transferred to inland lakes during 13 of the years between 1891 and 1914 (Wisconsin Fish Commission 1914), but the receiving waters are not listed for 1909 and later. On May 13 1898, 500 adult white bass were stocked in Pelican Lake, "Forest County" (Commissioners of Fisheries 1899). Superintendent James Nevin summarized the white bass stocking in the 1895-96 Commissioners report:

> "WHITE BASS
>
> Each year since the commission has been provided with a [railroad] car, a quantity of full grown white bass have been distributed to the summer resort lakes of the state. During the last season of distribution, thirteen thousand five hundred of this species were planted. The fish were obtained from Lake Winnebago, and were on the eve of spawning when planted.
>
> The white bass is a very clean and handsome fish. It takes the hook readily during the summer months and is considered gamy by the angler. As a food fish it ranks little below the black bass. Its weight ranges from one to three pounds. Altogether, it is pre-eminently adapted for stocking summer resort lakes, and will afford the angler, whether lady, child or sportsman, more pleasure and amusement than any other fish that the commission can plant."
> (Commissioners of Fisheries 1897).

Kubisiak (2006) describes previous fisheries surveys. Since that time, Great Lakes Indian Fish and Wildlife Commission estimated an adult walleye population of 2.82 per acre in 2007 and fall electrofishing surveys have been conducted every year except 2009, when the survey was cancelled due to weather. In 2008, Pelican was part of a Michigan State University study of muskellunge spawning habitat (Nohner 2009). An angler creel survey conducted during the 2011-12 gamefish season is reported separately.

METHODS

The ice was mostly out when 14 standard fyke nets (¾-inch mesh, bar measure) were set on April 27, with one more set on April 29, 2011. These nets targeted walleye and northern pike. The nets were pulled on May 3, and effort totaled 88 net-nights. Six nets targeting muskellunge were set on May 6, with another 4 added on May 9. Muskellunge nets were pulled May 16 (4 nets) and May 17, for a total of 94 net-nights. Eight standard ¾-inch nets (except one ½-inch mesh was set to target smaller fish) targeting panfish were set June 6 and pulled June 9 (2 nets) and June 10 for a total of 30 net-nights.

Three electrofishing boats were used to collect gamefish on May 4, two boats on May 17 and 24, June 9 and September 8, 2011. One electrofishing boat on May 4, May 24 and September 8 was supplied by Sakaogan Chippewa Community and ran pulse direct current, while the remaining boats used WDNR-standard alternating current. The entire shoreline was electrofished on May 4 and September 8, while some shoreline was omitted during bass marking runs on the other dates.

Length or length category (nearest half-inch) was recorded for all gamefish and for panfish in June. Adult gamefish captured in spring were given a left-ventral fin clip and juveniles were given a top-tail clip for use in mark-recapture population estimates. Age structures (scales or spines) were removed from ten fish per species, per half-inch group. Age data are not available at this writing.

RESULTS AND DISCUSSION

Walleye

During walleye netting, 1,420 walleye were captured in 6 nights, including 74 recaptures, at a rate of 18.2 walleye per net night (Table 1). The electrofishing sample on May 4 yielded 186 walleye (11.3 fish per mile), including 11 juveniles. Adult walleye showed good size centered on about 15 inches (Figure 1). The mark-recapture population estimate of 8,632 adult walleye (± 1,742 SD), or 2.4 per acre, is below the predicted value of 3.2 per acre for a 3,585-acre lake supported by natural reproduction. However, it is within the 95% prediction interval of 1.0 to 9.7 per acre and is similar to past surveys on Pelican Lake (Figure 2). The consistently low proportion of adults less than 12 inches (Figure 2) suggests that walleye in Pelican Lake delay maturity until a larger size.

Fall surveys provide an index of walleye recruitment, the number of young fish moving into the population. A long-term Pelican Lake dataset of fall catch of young-of-year (yoy, born the previous spring and typically 4-8 inches in length, Figure 3) and age-1 walleye (two summers old, typically 8-11 inches) encompasses 25 of the 27 years from 1985 through 2011. These data show fairly consistent walleye recruitment, averaging 36.7 yoy (Figure 3) and 11.7 age-1 walleye per mile of shoreline. One moderate to strong yearclass every 3-4 years will sustain a fishable population (I look for at least 12 yoy or 5 age-1 per mile).

During 1997 through 2005, there was no minimum length limit for walleye on Pelican Lake, but only one fish could be larger than 14 inches. In 2006, the walleye rule reverted to the statewide 15-inch minimum length limit. The no minimum regulation is intended for high-density populations showing slow growth. In contrast, walleye surveys on Pelican show moderate adult densities and growth rates that are average or above.

Fish age and growth is important for management, but verification of age assignments requires known-age fish. During electrofishing on September 22, 2012, all 252 young-of-year walleye (defined by length) were given a complete left-ventral fin clip. This will produce a number of known-age fish that can be used to verify age assignments in future years.

Table 1. Catch per unit effort during a 2011 survey of Pelican Lake, Oneida County WI. Netting catch rates are reported as number of fish per net night, while electrofishing catch rates are number of fish per mile of shoreline. Blank cells during shocking runs indicate a species was not targeted.

species	walleye netting	muskie netting	May 4 shocking	May 17 shocking	May 24 shocking	June 9 shocking	panfish netting
walleye	18.2	1.3	11.3				2.5
largemouth bass	0.13	0.56	5.3	8.9	14.9	3.5	0.32
smallmouth bass	0.14	0.28	0.18	1.5	2.9	0.09	0.79
white bass	0	0.13	0.18	0	0.26		0.54
muskellunge	0.30	0.86	1.1	0.80	0.40		0.21
northern pike	8.1	1.5	3.3				0.48
hybrid pike x muskellunge	0	0	0	0	0.13		0
black bullhead	0.33	3.2					18.9
black crappie	0.22	1.6					5.1
bluegill	2.1	21.8					149.1
hybrid bluegill x pumpkinseed	0	1.6					9.3
burbot	0.82	0.29					0
creek chub	0	0.2					0
golden shiner	0	0.17					0.60
Iowa darter	0.17	0					0
pumpkinseed	0.49	10.2					75.3
rock bass	0.35	2.8					9.3
troutperch	0.375	0.10					0
white sucker	1.3	8.5					0.32
yellow bullhead	0.22	1.0					3.4
yellow perch	3.3	9.6					8.3

Table 2. Fish stocking record during 1975 through 2011 in Pelican Lake, Oneida County Wisconsin.

Year	Species	Size	Number	Comments
1975	walleye	lg fingerling	20,000	
1976	walleye	lg fingerling	20,000	
1976	muskellunge	lg fingerling (10 inch)	1,390	
1977	muskellunge	lg fingerling (11 inch)	2,369	
1980	muskellunge	lg fingerling (8 inch)	2,500	
1981	muskellunge	lg fingerling (12 inch)	890	
1982	muskellunge	lg fingerling (11 inch)	2,500	
1984	walleye	fry	3,000,000	
1984	muskellunge	lg fingerling (9 inch)	1,186	
1985	muskellunge	lg fingerling (11 inch)	2,500	
1986	muskellunge	lg fingerling	1,176	
1988	muskellunge	lg fingerling (11 inch)	2,500	
1988	muskellunge	lg fingerling	1,000	Permit to Dave's Musky Club
1989	muskellunge	lg fingerling	750	Permit to Dave's Musky Club
1989	muskellunge	lg fingerling (9-11 inch)	2,210	
1991	muskellunge	lg fingerling	910	
1991	muskellunge	lg fingerling (10.4 inch)	1,750	
1991	walleye	fry	400,000	Mole Lake
1993	muskellunge	lg fingerling	2,500	
1996	muskellunge	fry (0.5 inch)	100,000	
1996	muskellunge	lg fingerling (10.8 inch)	2,500	
1998	muskellunge	lg fingerling (12 inch)	2,500	
1999	walleye	fry	440,000	Mole Lake
2000	walleye	fry	460,000	Mole Lake
2000	smallmouth bass	lg fingerling	250	Pelican L. Prop. Owners Assoc.
2000	largemouth bass	lg fingerling	250	PLPOA
2001	yellow perch	adult	12,000	PLPOA
2002	yellow perch	adult	20,000	PLPOA
2003	yellow perch	adult (5.5 inch)	22,250	PLPOA
2004	bluegill	adult (4.2 inch)	34,670	PLPOA; LV clip on 26,431

Figure 1. Length-frequency of adult walleye during 2011 in Pelican Lake, Oneida County WI.

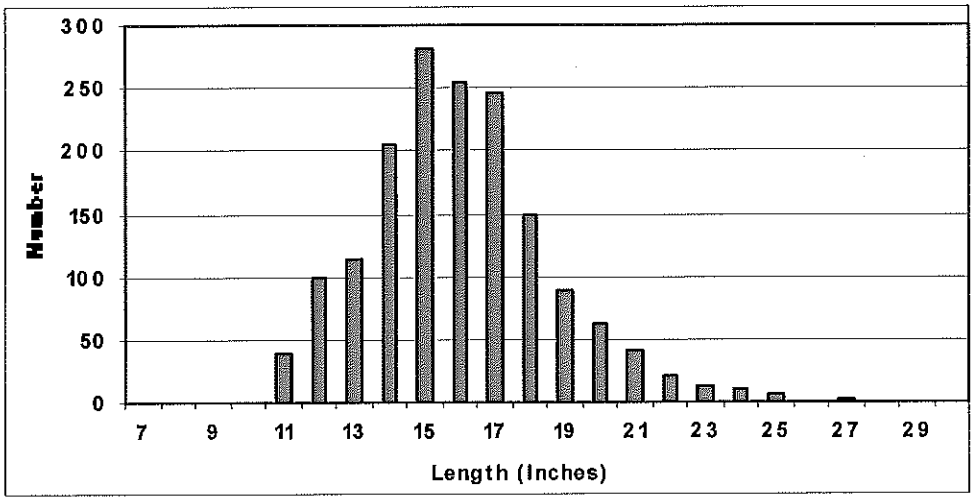


Figure 2. Adult walleye population estimates by length category during 1990 through 2011 on Pelican Lake, Oneida County WI.

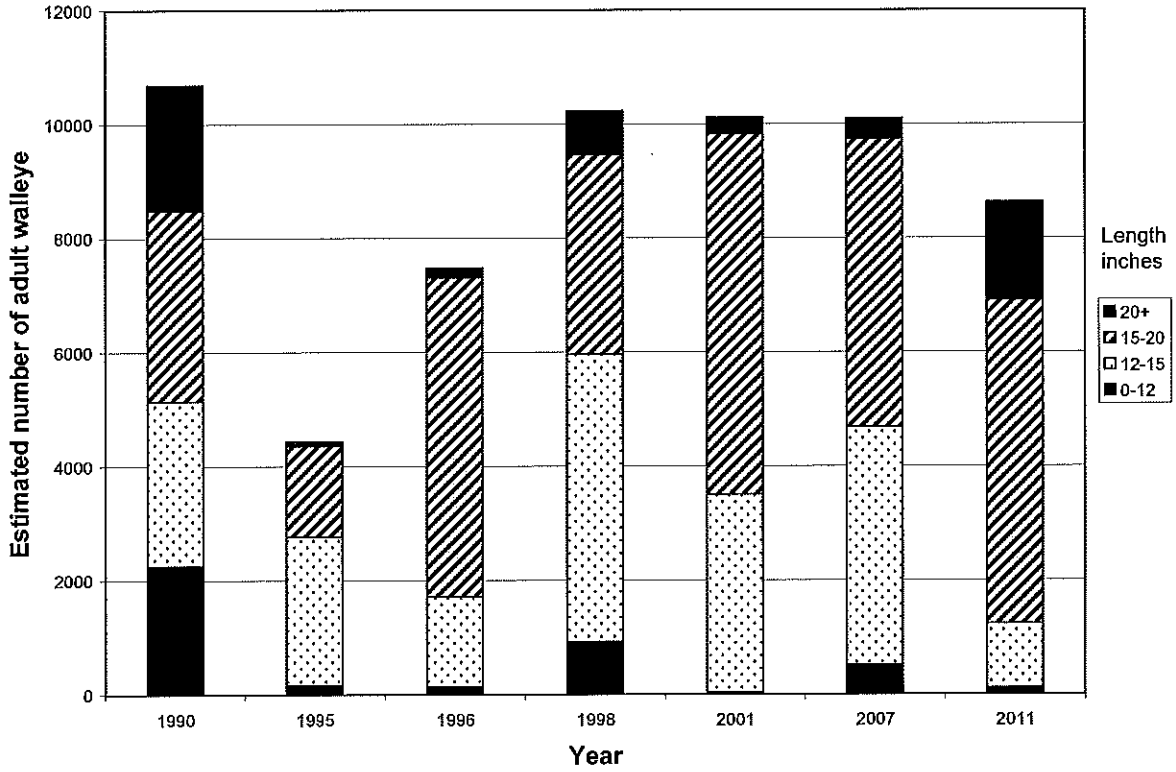
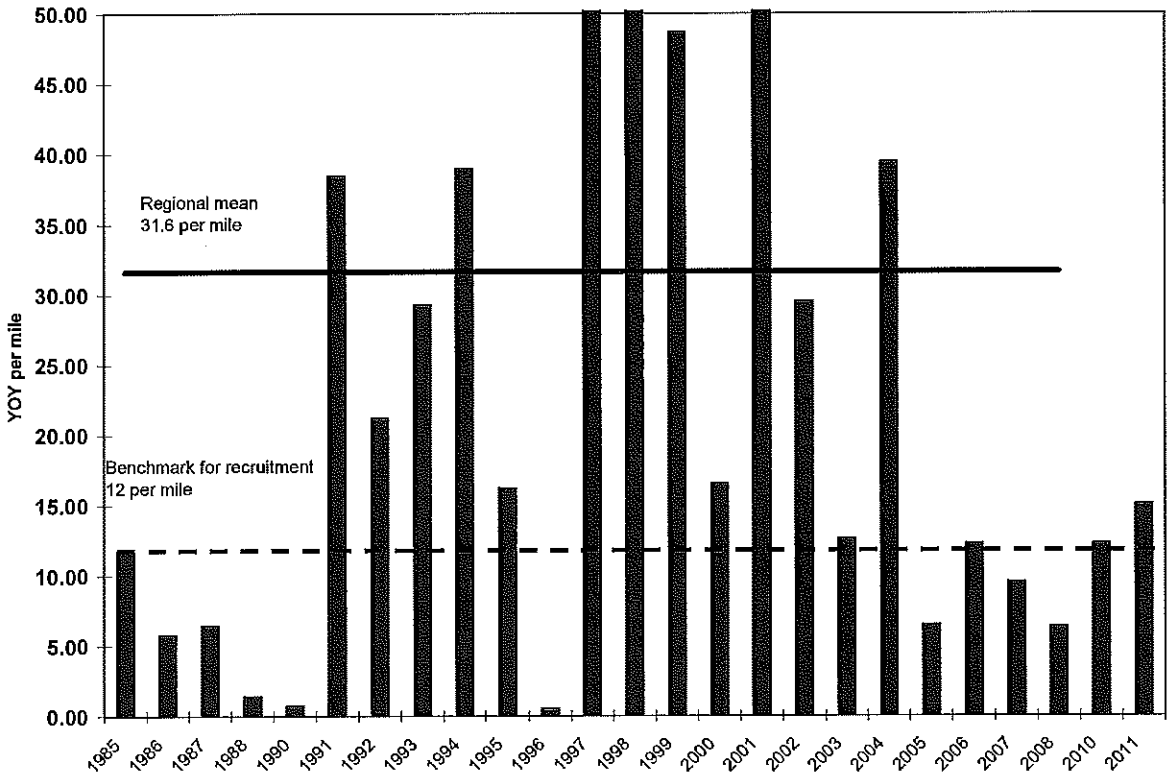


Figure 3. Catch of young-of-year (yoy) walleye per mile of shoreline in fall electrofishing surveys during 1985 to 2011 in Pelican Lake, Oneida County WI. Catch was 144 per mile in 1997, 136 per mile in 1998 and 136 per mile in 2001.



Largemouth and Smallmouth Bass

The minimum length limit for largemouth and smallmouth bass in Pelican is 18 inches, with a daily bag limit of 1 fish. The goal of this regulation is to increase bass predation on the invasive rusty crayfish, but it has also resulted in a high proportion of larger fish.

We captured 361 largemouth bass during spring sampling, including 25 recaptures of previously-marked fish. The largemouth population (including all fish over 8 inches) was estimated at 1,915 (± 383 SD), or 0.53 per acre, using the Schnabel multiple-capture method (Ricker 1975). This is low density for largemouth bass. Largemouth bass size structure was dominated by a broad range of 12 to 20 inch fish with average length of 15.2 inches (Figure 4). The longest largemouth was 20.2 inches; 79% were 14 inches and larger, while 7.2% were 18 inches and larger.

Seventy-six smallmouth bass (including 7 recaptures and 3 fish smaller than 8 inches) were captured during the survey. Average length was 15.6 inches, with good numbers of fish out to 20 inches. The largest smallmouth was 20.2 inches; 71% were 14 inches and larger, while 23% were at least 18 inches (Figure 5). Too few smallmouth were handled to attempt a population estimate.

Figure 4. Length-frequency of adult largemouth bass during 2011 in Pelican Lake, Oneida County Wisconsin.

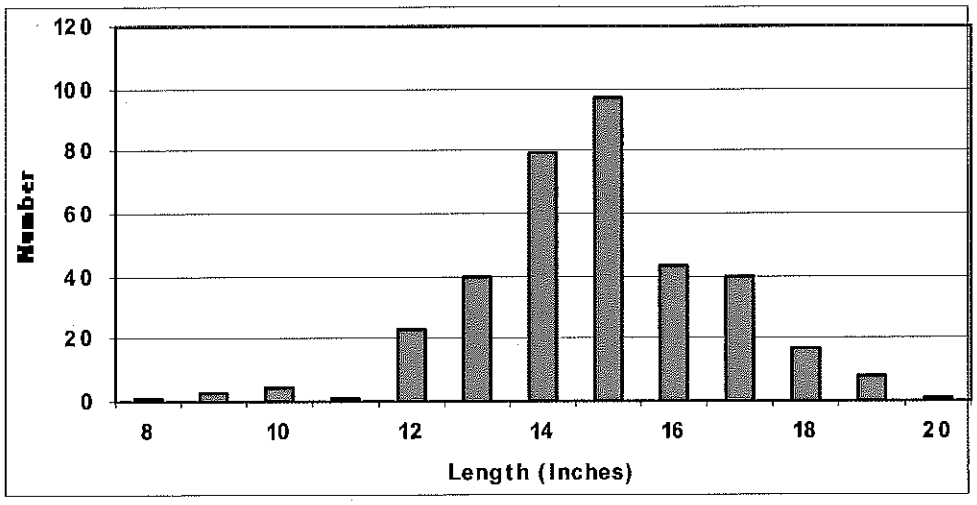
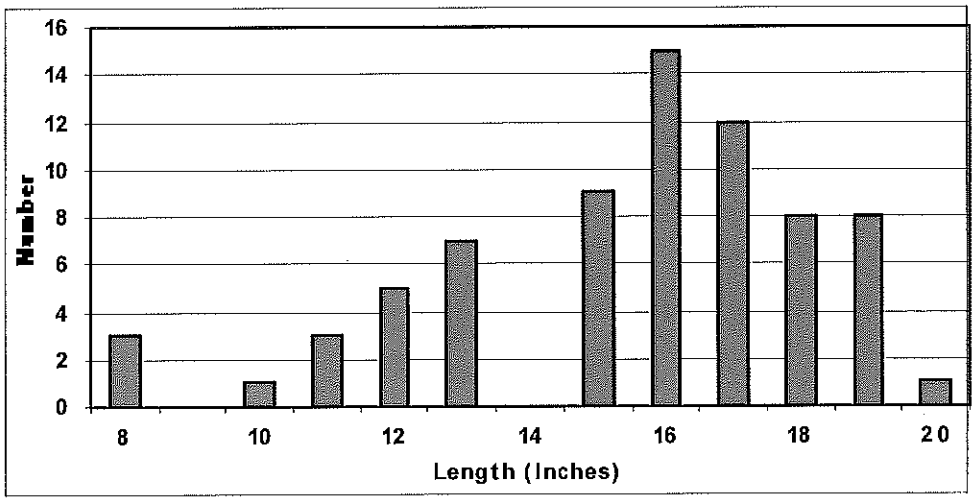


Figure 5. Length-frequency of adult smallmouth bass during 2011 in Pelican Lake, Oneida County Wisconsin.



White Bass

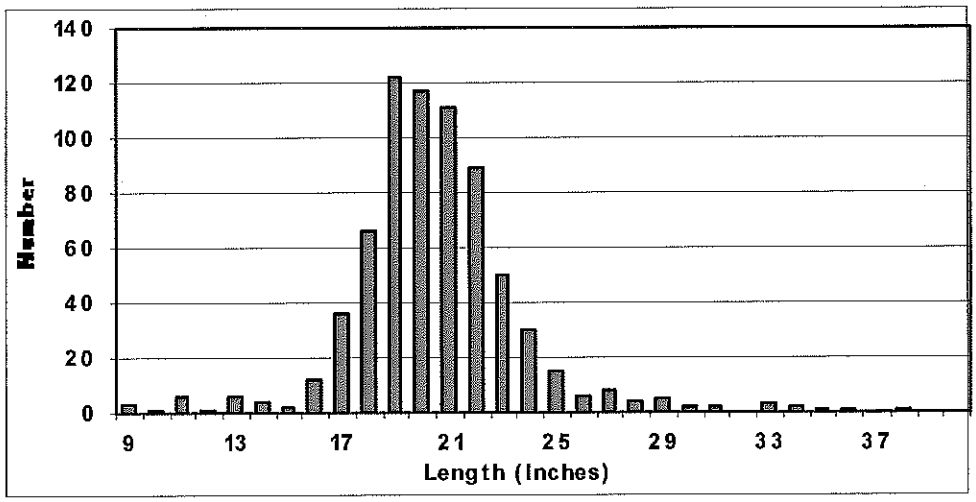
We captured 19 white bass during the survey. White bass lengths spanned a narrow range of 13.4 to 15.7 inches and average length was 14.6 inches. An abundant yearclass of approximately 4-inch fish, along with a handful of larger white bass up to 16 inches was noted during fall, 2010 electrofishing, It is unlikely that the 4-inch fish grew much over the winter, but it is puzzling that only larger fish were captured in 2011.

Northern Pike

We captured 813 northern pike (including 31 recaptures of previously-marked fish and 8 immature fish less than 12 inches in length). The northern pike population (including sexually mature fish and all fish over 12 inches) was estimated at 5,240 (± 941 SD), or 1.5 per acre, using the Schnabel multiple-capture method (Ricker 1975). This is considered low to moderate density for a northern pike population. The male population was estimated at 1.3 (± 0.26) and the females at 0.20 (± 0.07) per acre. Average size of northern pike was 21.0 inches; 5% of pike were 26 inches or larger and only 1.7% exceeded 30 inches (Figure 6). The largest northern pike was a 38.3 inch female.

Lymphosarcoma is a disease of northern pike and muskellunge, evidenced by skin sores or lesions. It is sometimes fatal, and may limit the abundance of these species. Lymphosarcoma has a fairly wide-spread distribution, but it is not evident in every lake in this region. Skin lesions consistent with Lymphosarcoma were reported by anglers in Pelican Lake fish in recent years, and we confirmed the presence of Lymphosarcoma in several Pelican Lake northern pike last spring.

Figure 6. Length-frequency of northern pike during 2011 in Pelican Lake, Oneida County Wisconsin.



Muskellunge

We captured 123 muskellunge during the survey, including 14 recaptures of previously-marked fish and 5 immature fish. Adult muskellunge ranged from 23.5 to 49.1 inches in length (Figure 7). The recapture portion of a mark-recapture population estimate is planned from spring, 2012. Pelican Lake has been identified as a potential source of muskellunge eggs for DNR hatcheries. We collected muskellunge tissue samples from fin clips to allow characterization of the genetic stock. Broodstock collections are rotated among 3-5 lakes, with first egg collection from Pelican scheduled during the spring, 2012 recapture netting.

Muskellunge were last stocked in Pelican Lake 13 years ago, in 1998 (Table 2). In Northern Wisconsin, average length of a 13-year-old male muskellunge is about 39 inches in length, while age-13 females average over 44 inches. Smaller fish in Pelican likely originate from natural reproduction. We captured five immature fish 10.5 to 13.3 inches in length during spring sampling, indicating a natural yearclass in 2010 (Figure 8). A single 11.0-11.4 inch muskellunge captured on September 22, 2011 provides evidence of a yearclass in 2011.

Many muskellunge anglers define a trophy muskellunge as 50 inches or greater in length. A 50-inch minimum length limit was implemented on Pelican Lake in 2007. Across northern Wisconsin, female muskellunge average about 18 years to reach 50 inches, while male muskellunge rarely exceed low 40's. Six Pelican Lake muskellunge aged using cleithral bones showed variable growth rates. The fish were 52.0 and 44.1 inches at age 18; 48.4 and 45.3 inches at age 14, 43.7 inches at age 13 and 44.0 inches at age 12. Ultimate length (i.e., maximum length predicted from growth trajectory by a numerical model, e.g., Casselman 1999) was estimated individually for five of the fish and ranged from 44.0 to 59.2 and averaged 51.0 inches (Matthew Faust, University of Wisconsin, Stevens Point, personal communication). All six can be presumed females although gender is listed as unknown for the 52, 48.4 and 45.3-inch fish.

Figure 7. Length-frequency of adult muskellunge during 2011 in Pelican Lake, Oneida County WI.

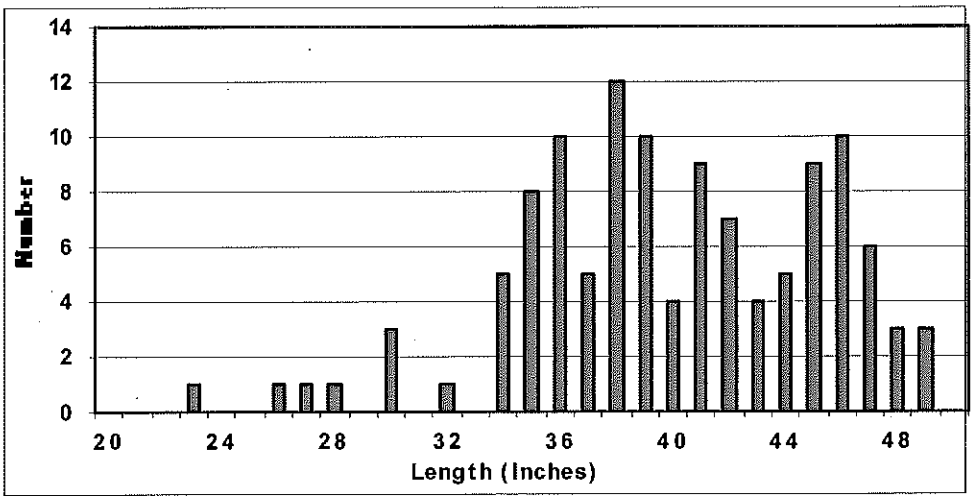


Figure 8. A naturally reproduced 11.9-inch muskellunge captured in a fyke net May 15, 2011 on Pelican Lake, Oneida County WI.

Panfish

Pelican is a lake with moderate depth and fertility and extensive beds of aquatic vegetation, despite the presence of invasive rusty crayfish. These conditions result in fairly high panfish abundance. We found very high June catches of bluegill, pumpkinseed and black bullhead, and moderate numbers of yellow perch and black crappies, which spawn earlier and tend to have higher catches in the earlier netting periods (Table 1). Moderate numbers of bluegill x pumpkinseed hybrids, rock bass and yellow bullhead were also encountered.

June bluegill catch increased dramatically from 60 per net night in a 2005 survey (Kubisiak 2006) to 149 per net night in 2011 and pumpkinseed increased from 7 per net night in 2005 to 75 per net night in 2011. The high 2011 catch may be at least partly due to fish movement due to a warming trend during the 2011 netting, but it also reflects a high panfish population. Bluegill size structure also increased between the two surveys. Average bluegill length increased about ¾-inch, from 5.8 inches in 2005 to 6.5 inches in 2011. The fraction of 7-inch and larger fish doubled from 11% to 24% of the population. The proportion of 8-inch and larger bluegill was low in both surveys, but decreased from 5.7% in 2005 to 0.67% (only 2 of 299 bluegill measured in 2011 were 8 inches or larger, Figure 9).

Yellow perch showed a spike of 4-5 inch fish (Figure 12), likely 2-year-old fish hatched in 2008. The remaining perch were broadly distributed from 5.5 to 9.4 inches, with lower numbers out to 12.4 inches. Black crappie showed an upper size of 13.4 inches, with a strong peak at 8.5 to 9.5 inches likely reflecting a very strong 2007 yearclass (Figure 13). Rock bass size was skewed towards smaller fish, with low numbers over 8 inches (Figure 14). Black bullhead catch was very strong in June panfish nets at 18.9 per net night (Table 1). Size of black bullhead was a broad peak from 8 to 12 inches, with a few larger fish including one that exceeded 14.5 inches (Figure 15).

Figure 9. Length-frequency of bluegill during 2011 in Pelican Lake, Oneida County Wisconsin.

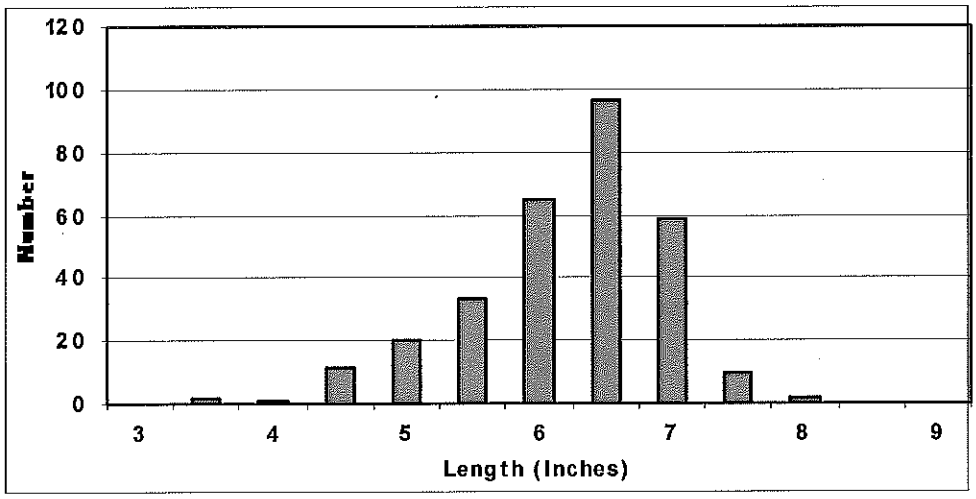


Figure 10. Length-frequency of pumpkinseed during 2011 in Pelican Lake, Oneida County WI.

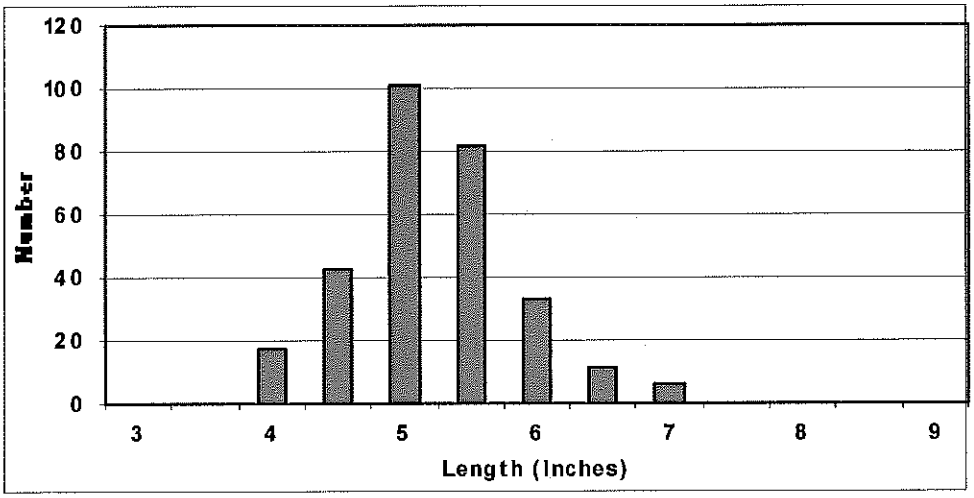


Figure 11. Length-frequency of bluegill x pumpkinseed hybrids during 2011 in Pelican Lake, Oneida County WI.

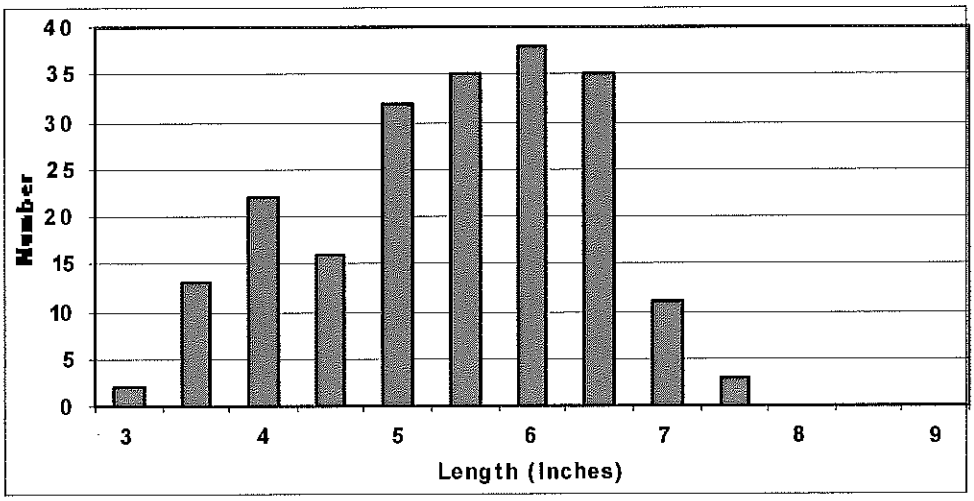


Figure 12. Length-frequency of yellow perch during 2011 in Pelican Lake, Oneida County WI.

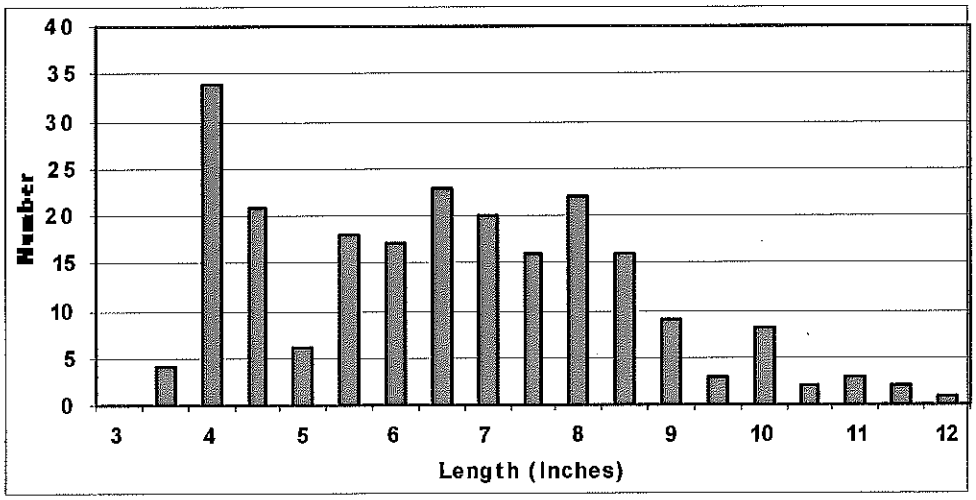


Figure 13. Length-frequency of black crappie during 2011 in Pelican Lake, Oneida County WI.

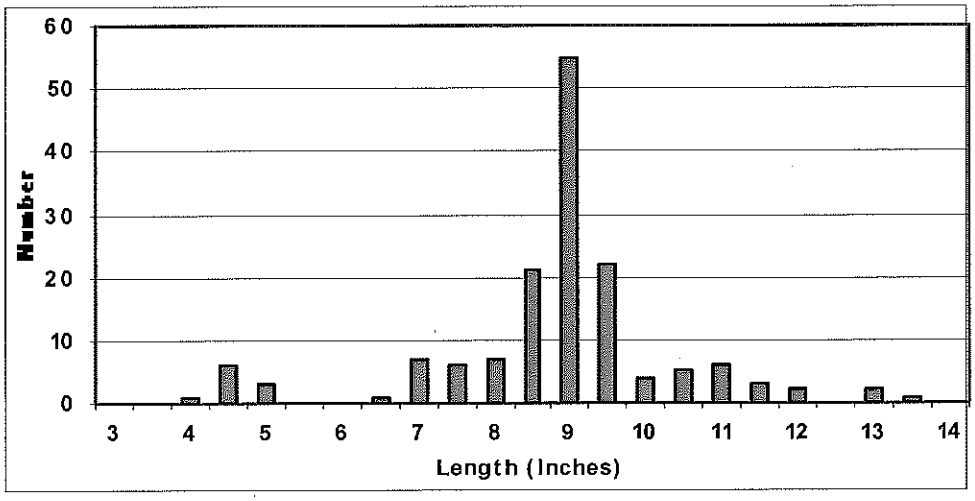


Figure 14. Length-frequency of rock bass during 2011 in Pelican Lake, Oneida County WI.

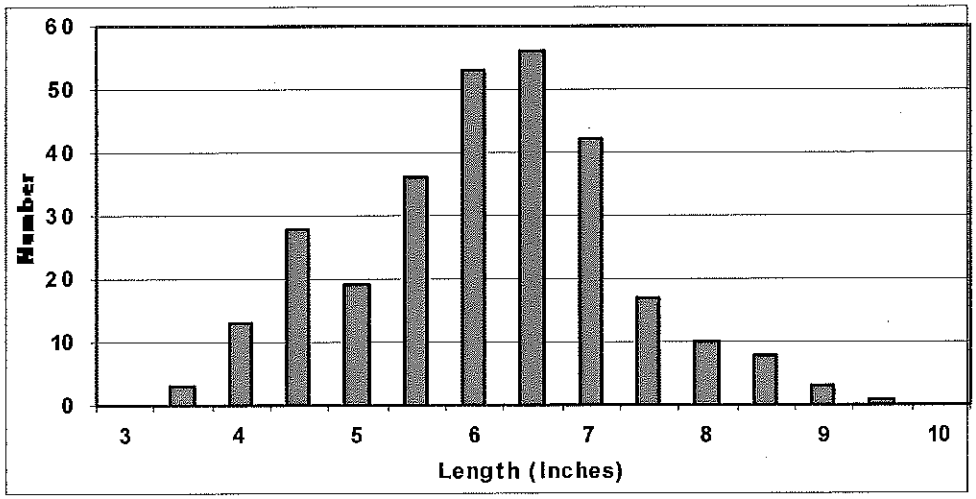
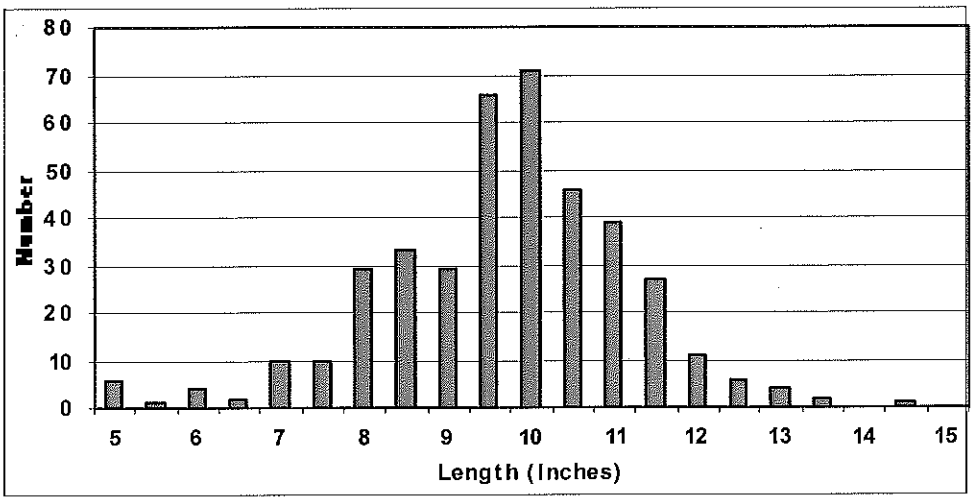


Figure 15. Length-frequency of black bullhead during 2011 in Pelican Lake, Oneida County WI.



MANAGEMENT RECOMMENDATIONS

Pelican Lake supports a diverse fishery. Walleye, northern pike, largemouth bass, smallmouth bass and muskellunge are all important parts of the gamefish community, with no one species dominating. Size structure of game species was excellent and individual fish were robust. Bluegill and pumpkinseed dominated the panfish catch, while black bullhead, yellow perch, rock bass, hybrid bluegill x pumpkinseed, black crappie and yellow bullhead were moderately abundant, with low numbers of white bass. We found 24% of bluegill were at least 7 inches, 29% of perch were at least 8 inches and 52% of black bullhead were 10 inches or larger. Forage and non-game species include burbot, creek chub, golden shiner, Iowa darter, troutperch and white sucker. Pelican is managed as a mixed fishery with trophy muskellunge and quality size potential of most other species.

ACKNOWLEDGEMENTS

Dennis Scholl supervised the field work for this survey using field crews from Antigo, Woodruff and Sokaogon Chippewa Community. Jeff Blonski, Nick Giannola, Steve Gilbert, David Gunderson, Fred Hagstrom, Gilbert Hammer, Jonathon Hansen, Zach Lawson, Kyle McLaughlin, Tanya Meives, Aaron Nelson, Ron Plank, Scott Poler, Mike Preul, Jeff Reissmann, Ben Rolling, Mike Rynski, Dave Seibel, Clint Soulier, Steve Timler, Tim Tobias, Joelle Underwood, Roger Weber and I assisted in the field work. Lake Association volunteers Ed Ericson, Larry Hahn and Bob Mott helped with the fall survey. Mike Coshun calculated the walleye population estimate.

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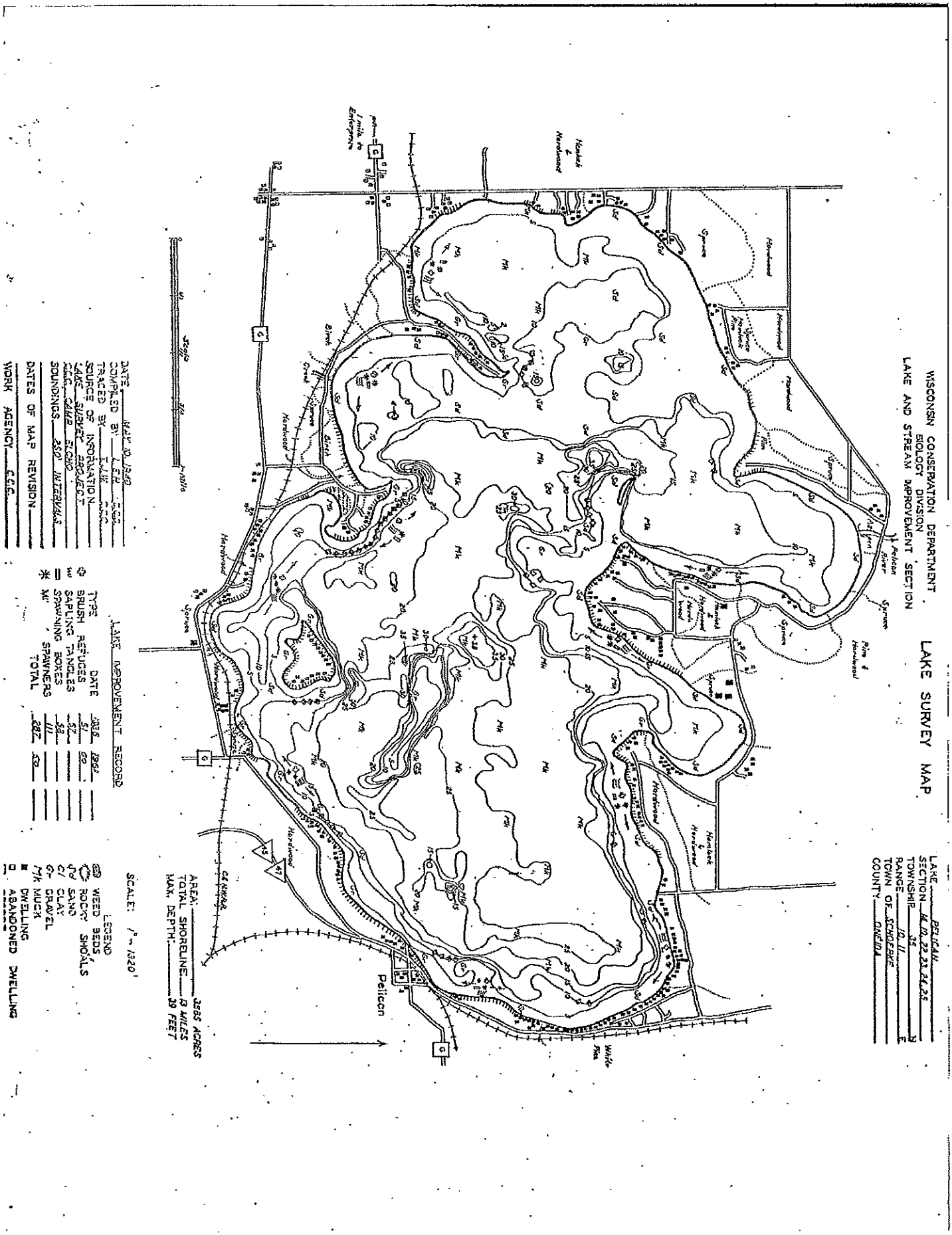
Cover image courtesy of Oneida County website. www.co.oneida.wi.gov


WISCONSIN CONSERVATION DEPARTMENT
BIOLOGY DIVISION
LAKE AND STREAM IMPROVEMENT SECTION
LAKE SURVEY MAP
LAKE PELICAN
SECTION 16, 19, 22, 23, 24, 25
TOWNSHIP 35
RANGE 10 W
TOWN OF SCHOLEKE
COUNTY ONEIDA
Pelican River
Pelican
White Pine
Hardwood
Spruce
Birch
Pine & Hardwood
Hemlock & Hardwood
Tamarack
Swamp
Marsh
Muck
Sand
Gravel
Clay
Rocky Shoals
Weed Beds
Dwelling
Abandoned Dwelling
Scale 1" = 1320'
SCALE: 1" = 1320'
AREA: 2685 ACRES
TOTAL SHORELINE 13 MILES
MAX. DEPTH 39 FEET
LAKE IMPROVEMENT RECORD
TYPE DATE 1936 1964
BRUSH REFUGES 51 69
SAPLING TANGLES 67
SPAWNING BOXES 58
SPAWNERS 111
TOTAL 287 42
DATE MAY 30, 1940
COMPILED BY E.J.H. S.C.C.
TRACED BY E.J.H. S.C.C.
SOURCE OF INFORMATION
LAKE SURVEY PROJECT
AERIAL CAMP ECHO
SOUNDINGS 250' INTERVALS
DATES OF MAP REVISION
WORK AGENCY C.C.C.

G

APPENDIX G

Pelican Lake 2013 EWM Letter Report

Introduction

Eurasian water milfoil (EWM) was first discovered by Onterra ecologists during a June 15, 2011 Early Season (ES) Aquatic Invasive Species (AIS) Survey. An additional survey was completed during August 2011, resulting in numerous *Single or Few Plants*, several *Clumps of Plants*, and a *Highly Dominant* EWM colony being mapped near the CTH Q boat landing (Figure 1). With Onterra's assistance, the Pelican Lake Property Owners Association (PLPOA) successfully secured a Wisconsin Department of Natural Resources (WDNR) AIS-Early Detection and Response (EDR) Grant to fund the monitoring and implementation of the control strategy.

In order to target the EWM located during August 2011, 14.6 acres of Pelican Lake were treated with granular 2,4-D at 3.0 ppm ae by Stantec on May 16, 2012. Post-treatment surveys were conducted by Onterra on September 17, 2012 to determine the treatments efficacy. Only a small number of EWM plants were observed during this survey (Figure 1), indicating that the 2012 treatment had been successful. While a spring 2013 treatment was not proposed, the Pelican Lake Property Owners were prepared mentally and sociologically if a spring survey revealed that the 2012 treatment was not as effective as originally thought and rebounded EWM plants required treatment.

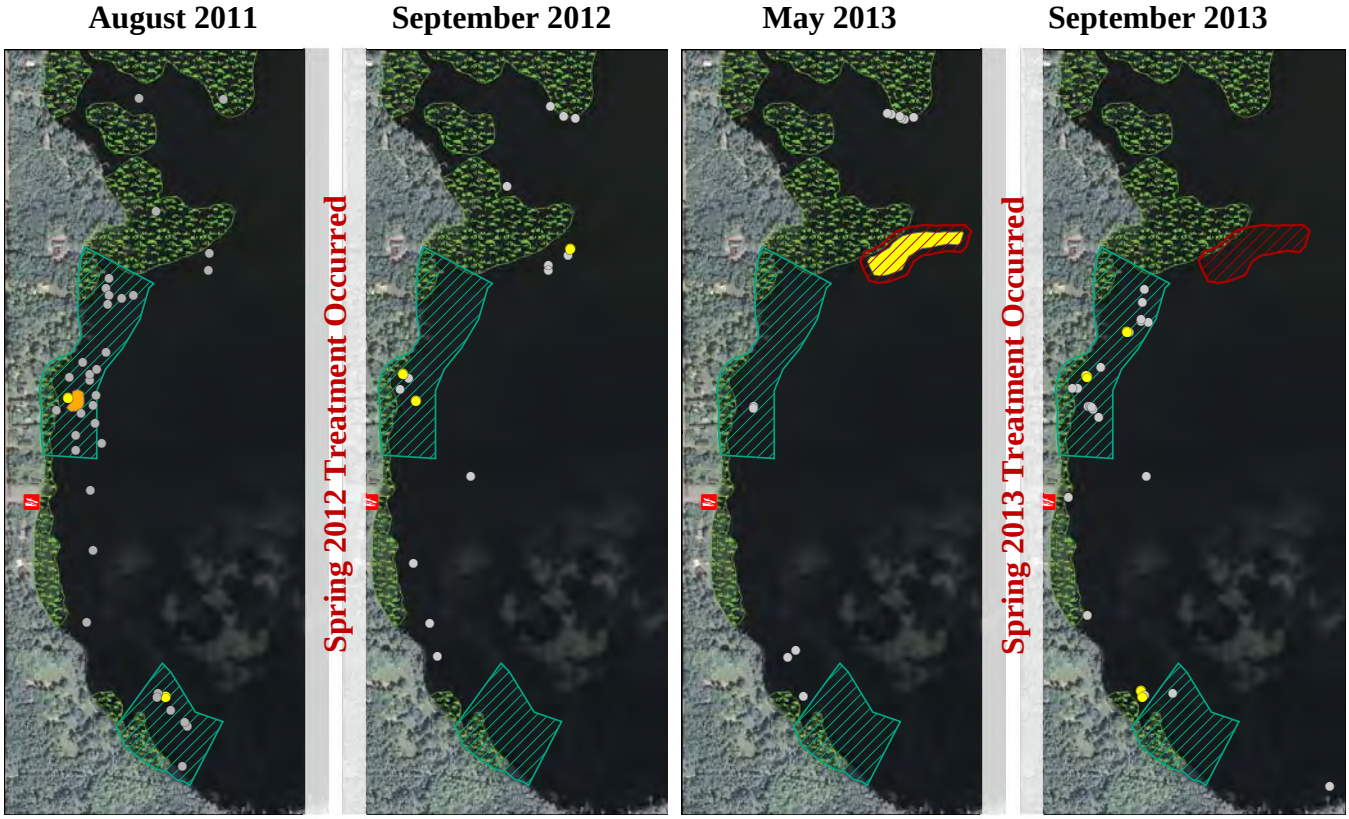


Figure 1. EWM locations from August 2011, September 2012, May 2013, and September 2013 surveys. Gray Point = Single or Few Plants; Yellow Point = Clumps of Plants; Yellow polygon = Dominant Colony. Green Hashed Area = May 2012 Treatment Area, Red Hashed Area = June 2013 Treatment Area

Pretreatment Confirmation and Refinement Survey

On May 16, 2013, Onterra conducted the EWM Pretreatment Confirmation and Refinement Survey on Pelican Lake. To keep survey costs to a minimum, the Pretreatment Confirmation and Refinement Survey only focused on the bay where the 2012 herbicide treatment took place. Large colonies over 40 feet in diameter were mapped using polygons (areas), while small colonies, clumps of plants, and single plants were mapped using points. EWM occurrences mapped using point-based methodologies where designated as *Single or Few Plants*, *Clumps of Plants*, or *Small Plant Colonies*. Colonies marked with polygons were designated using a 5- tiered density scale from *Highly Scattered* to *Surface Matting*.

The Pretreatment Confirmation and Refinement Survey located minimal EWM within the 2012 treatment area (Map 1, Figure 1). However, a *Dominant* EWM colony was located to the northeast of the treatment areas, mostly through the aid of a submersed camera. After discussions between the PLPOA, WDNR, and Onterra, a control strategy targeting the densest area of EWM in front of the public access location was permitted. The final treatment strategy included a 40-foot buffer around the colony and targeted the EWM with granular 2,4-D at its maximum application rate (4.0 ppm ae). The treatment was conducted by Stantec, Inc. during the afternoon of May 20, 2013. The applicator reported southern winds at 5-15 mph during the application.

Late-Season EWM Peak-biomass Survey

EWM continues to grow and spread throughout the summer. For this reason, a late-summer EWM survey was conducted to understand the peak growth (peak-biomass) of the EWM population during 2013. On September 13, 2013 Onterra ecologists meandered a few of the more plant-rich parts of Pelican Lake in search of EWM.

During the meander survey, no colonized EWM plants were located within Pelican Lake (Map 2, Figure 1). Within the 2013 herbicide treatment area, no EWM was observed during this post treatment assessment. This indicates that the 2013 herbicide treatment was highly effective at controlling EWM.

The few more EWM occurrences were located in the northern 2012 treatment area than in past surveys, indicated that some amount of regrowth or re-colonization is occurring in this location. Almost no EWM was located within the southern 2012 treatment area; however a few EWM *Clumps of Plants* were located just to the west of this location. The survey also located a several EWM *Single or Few Plants* within Outlet Bay (Map 2).

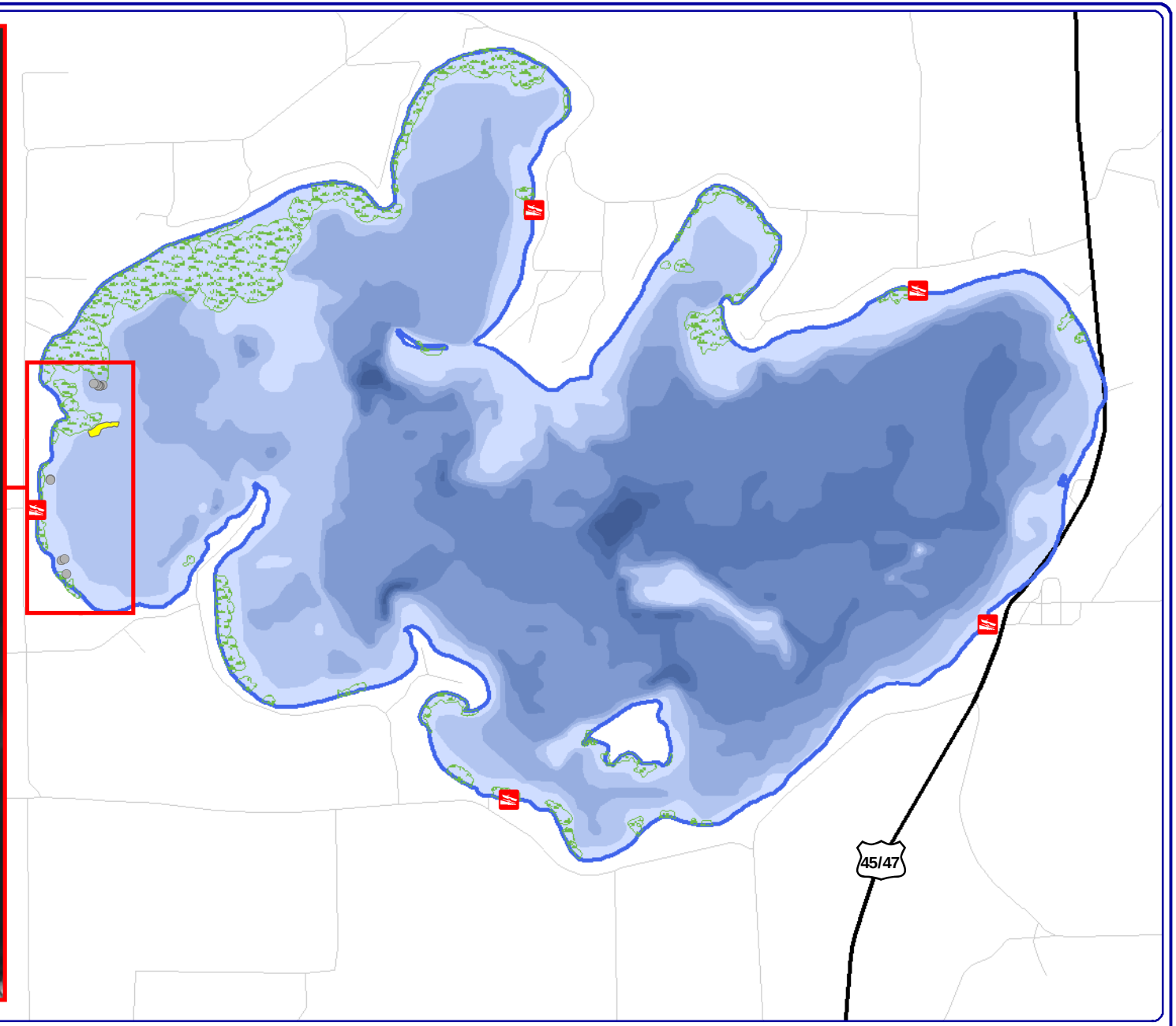
2013 Conclusions & Discussion

Overall, the 2013 EWM control program on Pelican Lake was met with encouraging results. The 2013 treatment was effective at controlling EWM with no regrowth observed within this area. But as noted above, an increasing amount of low-density EWM has been located within the northern 2012 treatment area.

With the low level of EWM currently existing in Pelican Lake, the proposed 2014 control strategy does not include an herbicide treatment. Volunteer-based hand-harvesting efforts would be extremely beneficial, especially within the shallow bay that was targeted with herbicides in 2013. If EWM

rebounds within 2013 treatment area, the low-density levels may be suitable for hand-removal by volunteers with advanced snorkeling or scuba abilities.

Due to the plethora of native plants within part of the lake displayed in Figure 1, PLPOA volunteers have had difficult locating EWM to conduct hand-harvesting control strategies on. It is proposed that a slightly modified approach be take in 2014 to help guide the volunteer-based activities. The PLPOA would purchase a Garmin GPSMAP 78, capable of being supplied with basemaps created by Onterra. Onterra would conduct an EWM mapping survey during June 2014 and provide the PLPOA with a basemap containing the survey findings. The GPS would guide the volunteer-based hand-harvesting efforts. A late- season EWM survey would be conducted towards the end of the growing season to evaluate the 2014 volunteer-based hand-harvesting efforts, as well as to propose a control strategy (hand-removal and/or herbicide treatment) for 2015.



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www.onterra-eco.com

Sources:
Roads and Hydro: WDNR
Orthophotography: NAIP, 2010
Aquatic Plants: Onterra, 2012-13
Map Date: September 30, 2013
Filename: Map1_Pelican_EWM_Spring2013.mxd

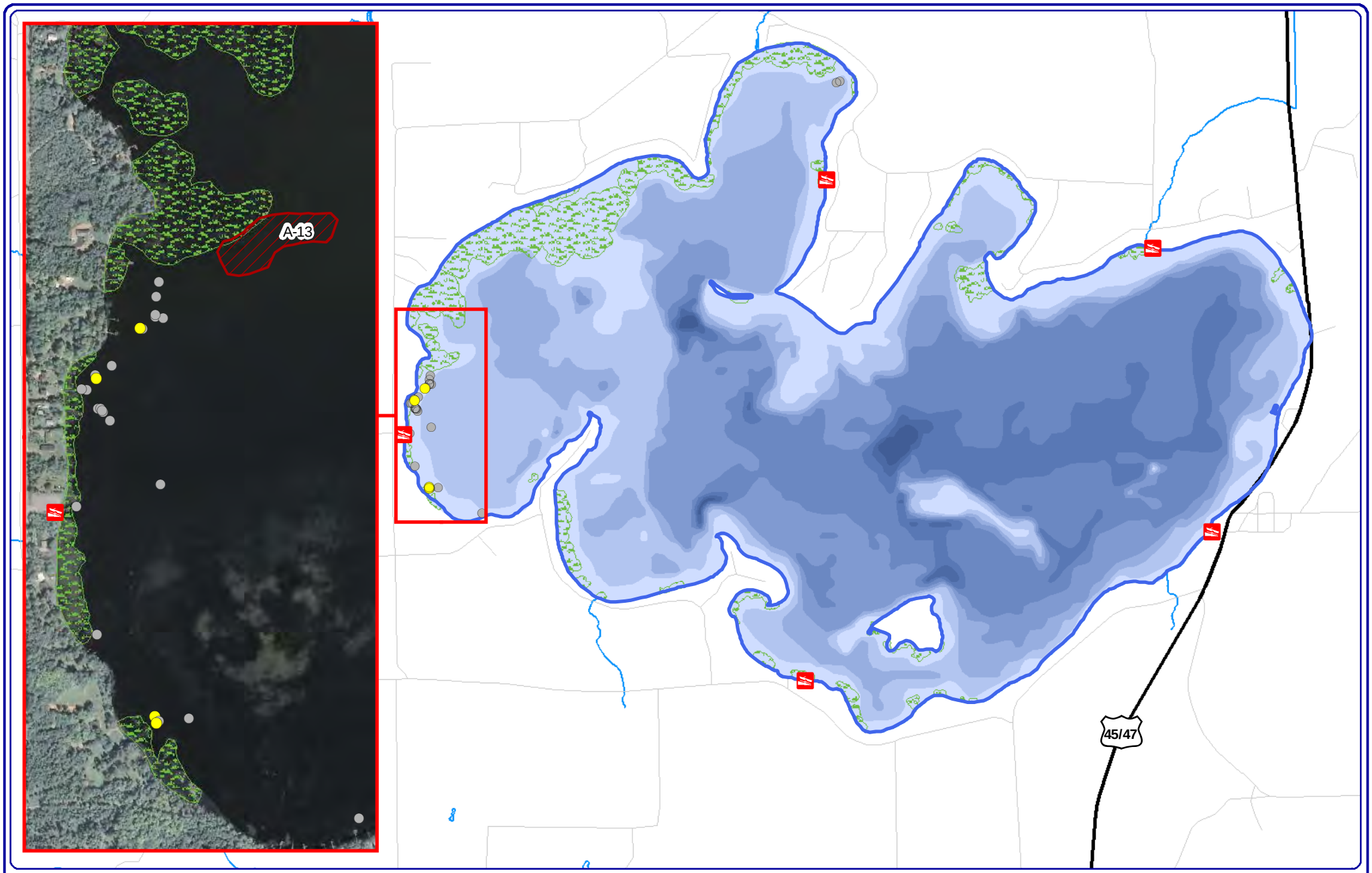
Project Location in Wisconsin

Legend

- Highly Scattered *(none found)*
- Scattered *(none found)*
- Dominant
- Highly Dominant *(none found)*
- Surface Matting *(none found)*
- Single or Few Plants
- Clump of Plants *(none found)*
- Small Plant Colony *(none found)*
- Floating-leaf and/or Emergent Plant Colony
- 2013 Final Treatment Area

Map 1
Pelican Lake
Oneida County, Wisconsin

Spring 2013
EWM Survey Results



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Sources:
Roads and Hydro: WDNR
Orthophotography: NAIP, 2010
Aquatic Plants: Onterra, 2012-13
Map Date: September 30, 2013
Filename: Map2_Pelican_EWMPB_Sept2013.mxd

Project Location in Wisconsin

Legend

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- Surface Matting *(none found)*
- Single or Few Plants
- Clump of Plants
- Small Plant Colony *(none found)*
- Floating-leaf and/or Emergent Plant Colony
- 2013 Final Treatment Area

Map 2
Pelican Lake
Oneida County, Wisconsin

September 2013
EWM Survey Results