A

APPENDIX A

Public Participation Materials

Presentation Outline

- **Lake Management Planning Project Components**
  - Water Quality
  - Watershed
  - Fishery Data Integration
  - Shoreland
  - Aquatic Plants
  - User Perceptions

  } Focus of this meeting
- **"Big Picture"**

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Presentation Outline

- **Shoreland**
  - Shoreland Condition Assessment Results
  - Coarse Woody Habitat Survey Results
- **Aquatic Plants**
  - Overview of aquatic plant community
  - Aquatic plant management
  - Curly-leaf pondweed population & management
  - Eurasian watermilfoil population & management
  - Mechanical harvesting plan
- **Conclusions**

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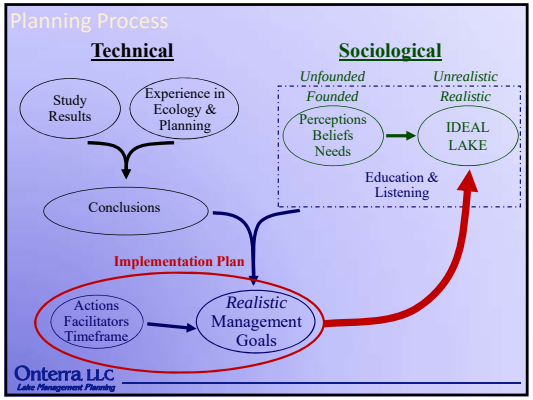
The Planning Process

…it's not as easy as you may think.



Shoreland Assessment

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

Urbanized **Natural**

Range

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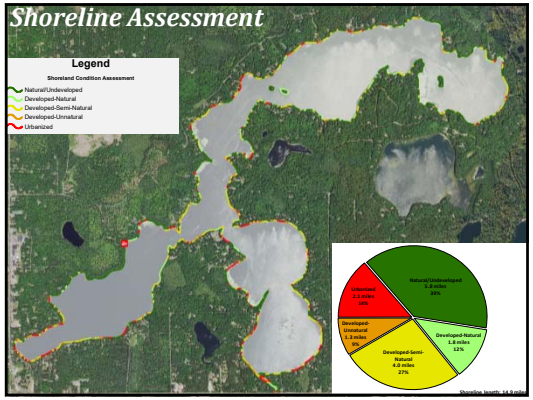

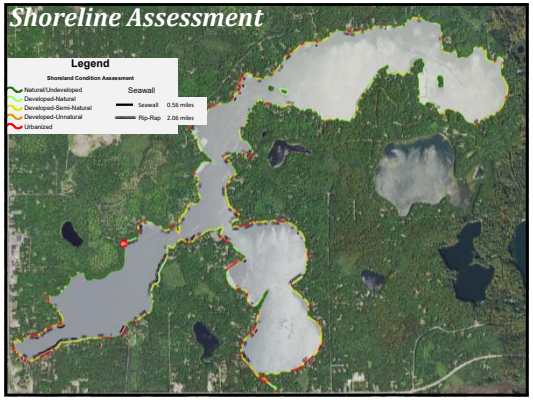

Coarse Woody Habitat

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

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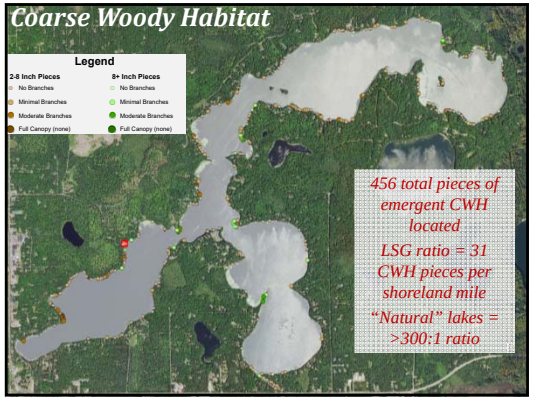

Aquatic Plant Surveys

- Concerned with both native and non-native plants
- Multiple surveys used in assessment
  - Early Season AIS Survey
  - Point-intercept Survey
  - Floating-leaf and Emergent Community Mapping Survey
  - Late-Summer EWM Survey

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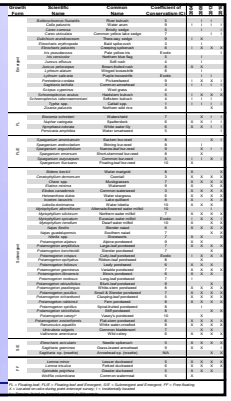
Species List

73 aquatic plant species

- 46 in 2004
- 54 in 2008
- 51 in 2013
- 46 in 2016

4 Aquatic Invasive Species

- Eurasian watermilfoil (EWM)
- Curly-leaf pondweed (CLP)
- Purple loosestrife
- Pale yellow iris



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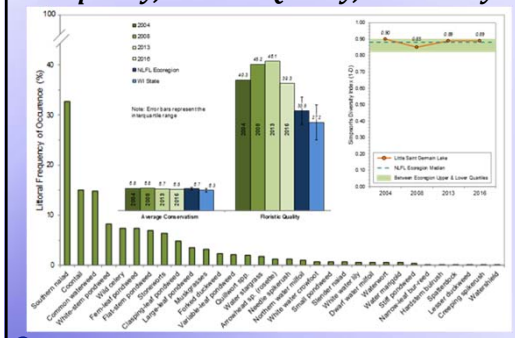
Frequency, Floristic Quality, & Diversity



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Aquatic Plant Management

Ecosystem Restoration

- Target AIS population so native ecosystem can function as it did prior to AIS
- Aimed at the entire AIS population
- Applicable to WDNR AIS Grant funding
- An ecosystem restoration plan may restore ecosystem services

Restore Ecosystem Services

- Target plants (AIS and/or natives) so they do not cause recreational, navigational, or aesthetic issues
- Aimed only at the portion of the plant population interfering with human use
- No grant funding available
- A plan to restore ecosystem services does not lead to ecosystem restoration

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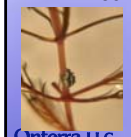
AIS Control Strategies

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





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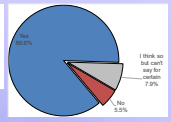
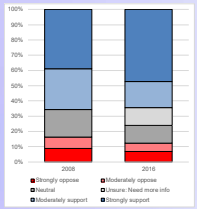
Herbicide Control Plan

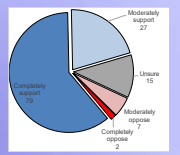
Did you know that aquatic herbicides were being applied in LSG to help control AIS?



What is your level of support or opposition for future aquatic herbicide use to target AIS in LSG?



What is your level of support for the responsible use of herbicide control in LSG?



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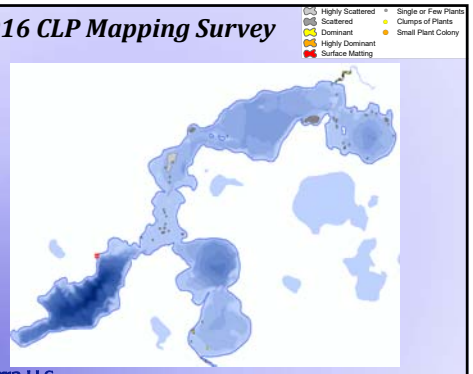
2016 CLP Mapping Survey



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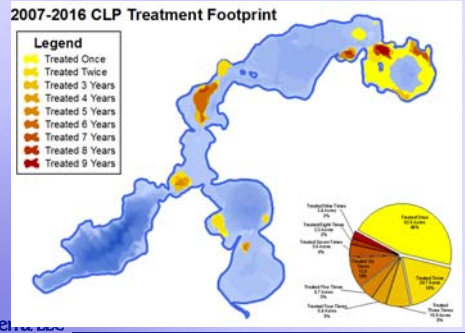
Endothall Use



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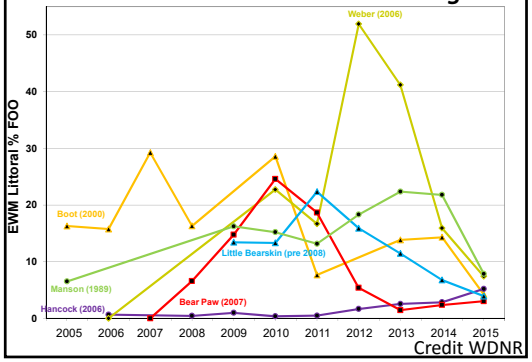
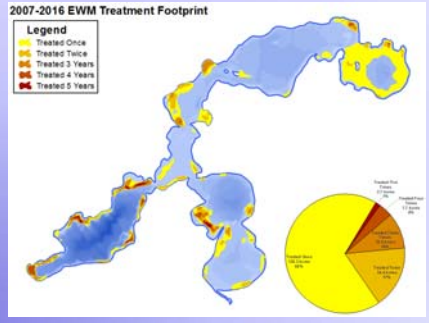
Northern Lakes & Forests - Unmanaged



2,4-D Use



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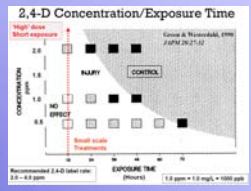
Herbicide Spot Treatment

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



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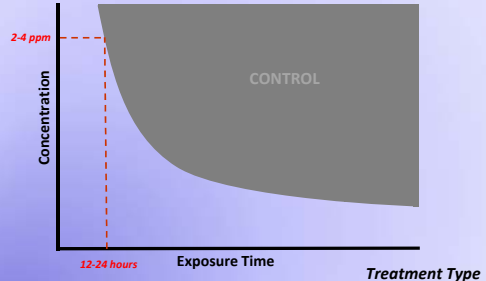
Herbicide Use Patterns



Spot Treatment Specifications

- Treatments size (>5 acres), shape (broad vs narrow), and location (protected vs exposed) are important design components
- Winds within 6hrs of treatment greatly impact outcomes
- Consider using herbicides with short CETs
  - Diquat
  - Diquat + endothall

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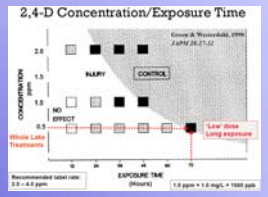
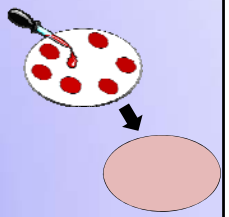
2015 Treatment on Loon Lake

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

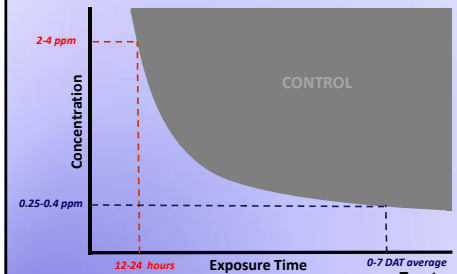
Large-Scale (Whole-lake) Treatment

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





Herbicide Use Patterns



	Treatment Type
High Concentration ▶ Short Exposure Time	*Spot*
Low Concentration ▶ Long Exposure Time	*Whole-lake*

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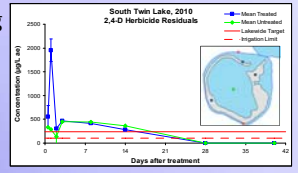
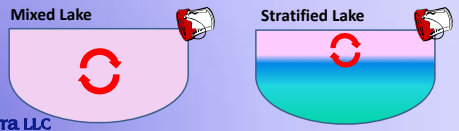
Large-Scale (Whole-lake) Treatment

- Herbicide Mixing
  - Horizontal
  - Vertical





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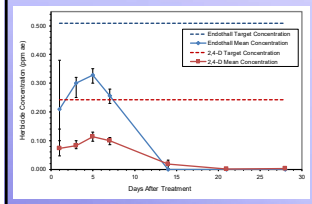
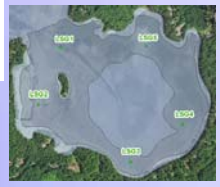
Lower East Bay Large-Scale Treatment





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Hand Removal vs. Diver-Assisted Suction Harvester (DASH)

Hand Removal

- Can be volunteer-based or contractors are available
- Used for small colonies and scattered individual plants
- Does not require a permit

DASH

- Typically used by contractors
- Used for colonies (not highly maneuverable)
- Requires mechanical harvesting permit

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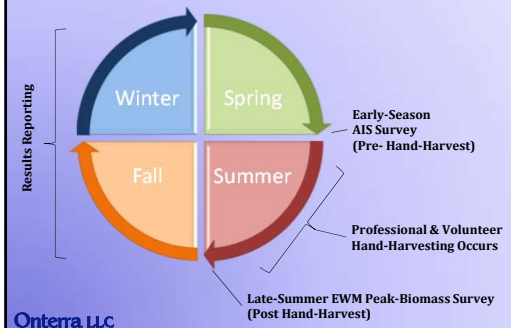
Hand-Harvest Control & Monitoring Strategy



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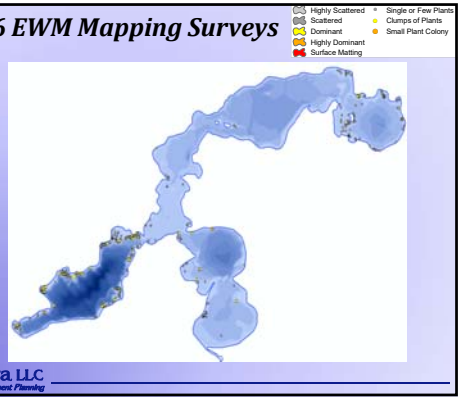
2016 EWM Mapping Surveys



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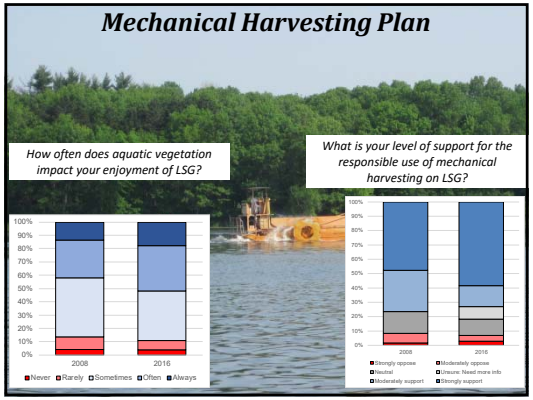
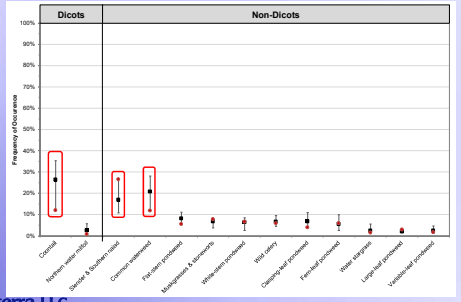
Mechanical Harvesting Plan



2004, 2008, 2013, 2016 Frequency of Occurrence



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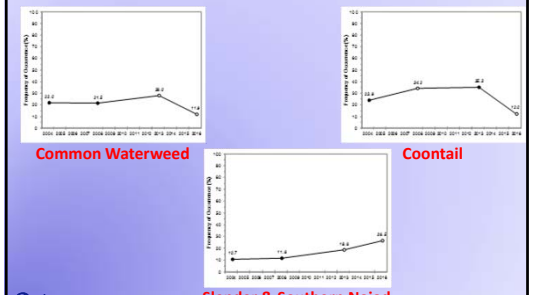
2005 – 2016 Littoral Frequency of Occurrence



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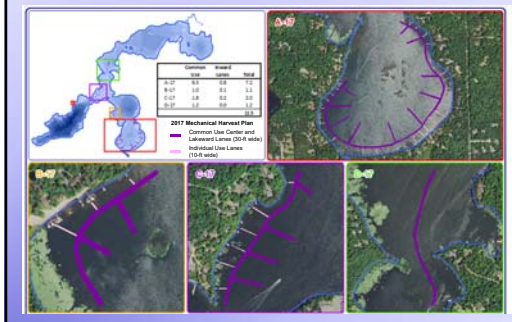
Mechanical Harvesting Plan



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Conclusions

- Shoreland condition discussed
  - Some areas could be improved – GOAL/ACTION NEEDED
  - Some areas could be preserved – GOAL/ACTION NEEDED
- Native aquatic plant community is healthy
  - Changes in populations responding to environmental conditions
  - Impact some ecosystem services – GOAL/ACTION NEEDED
- AIS populations at long-term low levels
  - Define maintenance control program – GOAL/ACTION NEEDED

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Little Saint Germain Lake Protection & Rehabilitation District

Little Saint Germain Lake
Management Planning Project
Planning Meeting II
June 21, 2017

Eddie Heath
Tim Hoyman
Onterra LLC
Lake Management Planning

Presentation Outline

- **Lake Management Planning Project Components**
  - Fishery Data Integration
  - Water Quality &Watershed — Focus of PlanMtgII
  - Shoreland
  - Aquatic Plants
  - Aquatic Plant Mgmt — Focus of PlanMtgI
- **Initial Development of Management Goals**

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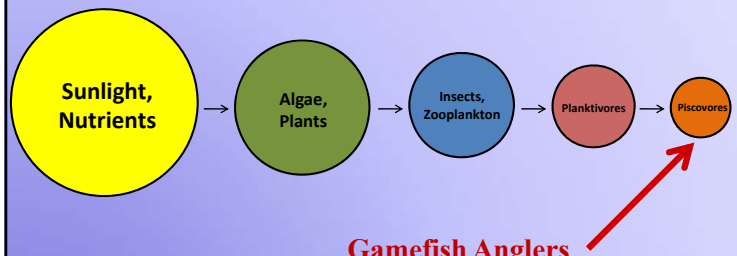
Little Saint Germain Fisheries

Energy Flow



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Little Saint Germain Fisheries

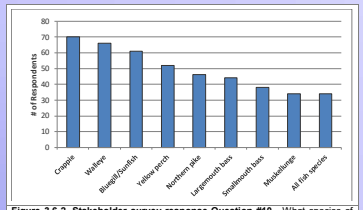

Figure 3.6-2. Stakeholder survey response Question #10. What species of fish do you like to catch on Little Saint Germain Lake?

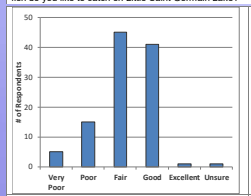

Figure 3.6-3. Stakeholder survey response Question #11. How would you describe the current quality of fishing on Little Saint Germain Lake?

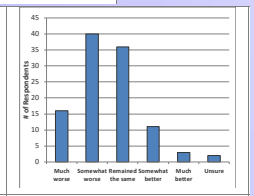

Figure 3.6-4. Stakeholder survey response Question #12. How has the quality of fishing changed on Little Saint Germain Lake since you started fishing the lake?

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Little Saint Germain Fisheries

- Walleye
  - Starting in 2013, walleye will be stocked in odd years per WI Walleye Initiative's 2nd top rate (~15K large fingerling in 2013 & 2015)
  - 2015 estimate – 2.6 fish/acre & 96% of population ≥15in
  - Population is primarily driven by stocking, but some natural reproduction occurs
  - Slot limit for walleye was proposed to protect 20-24" fish
- Muskellunge
  - Mainly in even years, large fingerlings are stocked (~1K fish)
  - 2015 estimate – 0.3 fish/acre & 26% of population ≥40in
  - No special regulations (1 over 45in)

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Little Saint Germain Fisheries

- Northern Pike
  - Considered "common" but small size (7% are ≥ 26in)
- Largemouth Bass
  - Considered "abundant" (26% are ≥ 10in)
- Smallmouth bass
  - Present but in low numbers (40% are ≥ 14in)
- Panfish
  - Bluegill: most abundant but few quality sized fish (0% are ≥ 8in)
  - Black crappie: high abundance but few quality sized fish (2% are ≥ 10in)
  - Yellow perch: moderate abundance and size (15% are ≥ 8in)

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Little Saint Germain Fisheries

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Little Saint Germain Fisheries

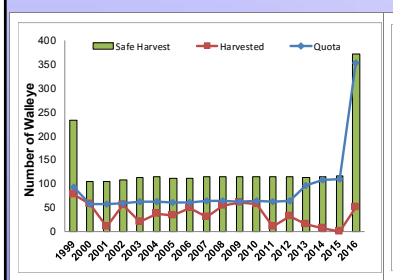

Figure 3.6-6. Little Saint Germain Lake walleye spear harvest data. (GLIFWC 1999-2016)

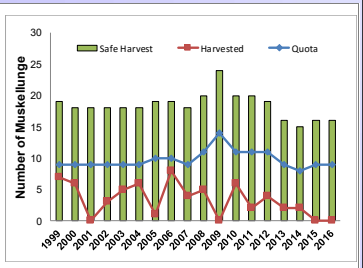

Figure 3.6-7. Little Saint Germain Lake muskellunge spear harvest data. (GLIFWC 1999-2014)

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Water Quality & Watershed Overview

Water Quality

- Phosphorus is the driving factor in algae production in all bays
- Lower East, East, and South bays have poorer than normal water quality compared to similar systems
- Much of the phosphorus that drives algal production in Lower East, East, and South bays originates from those basins
- Winter aeration likely increases growing season phosphorus levels significantly
- Water levels have little impact on water quality, while water temps have some affect

Watershed

- Much of the watershed is in good land cover types
- Maintaining beaver dam reductions is important
- Higher than typical levels of phosphorus reach the lake through ground water

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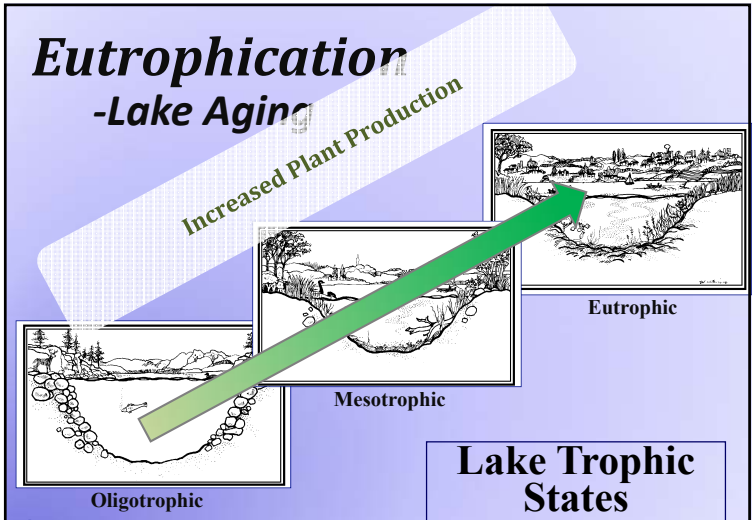
Eutrophication -Lake Aging



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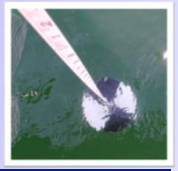
Introduction to Lake Water Quality

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

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

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



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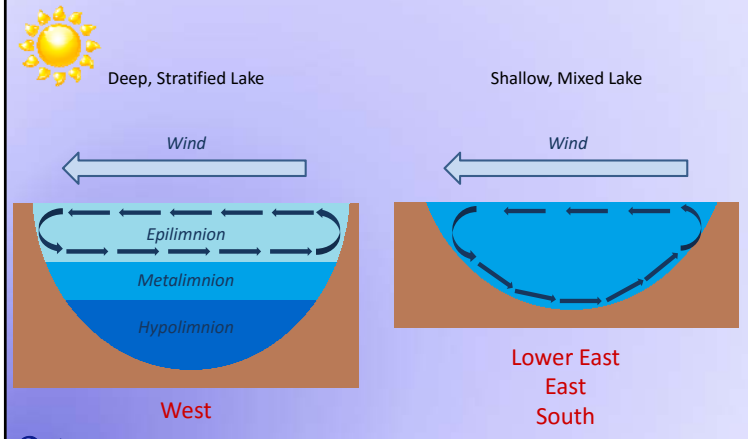
Wisconsin Lakes Classification



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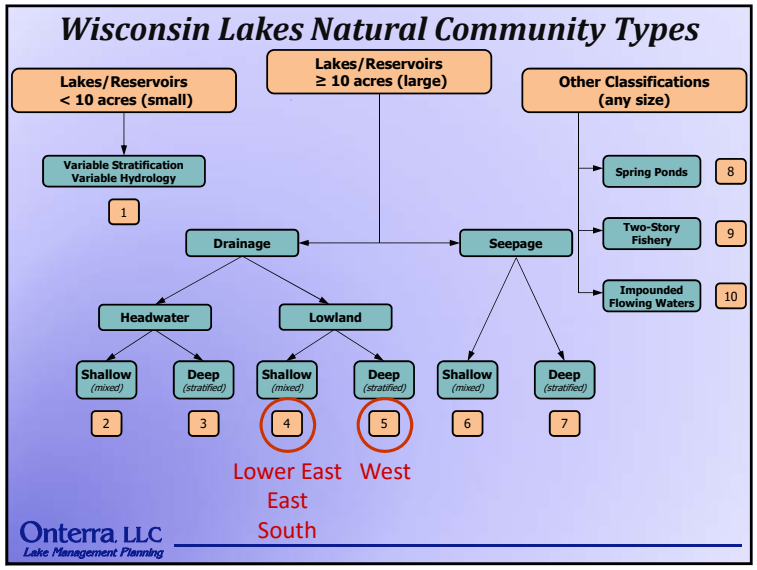
Wisconsin Lakes Natural Community Types
Lakes/Reservoirs < 10 acres (small)
Lakes/Reservoirs ≥ 10 acres (large)
Other Classifications (any size)
Variable Stratification Variable Hydrology
1
Drainage
Seepage
Spring Ponds
8
Two-Story Fishery
9
Impounded Flowing Waters
10
Headwater
Lowland
Shallow (mixed)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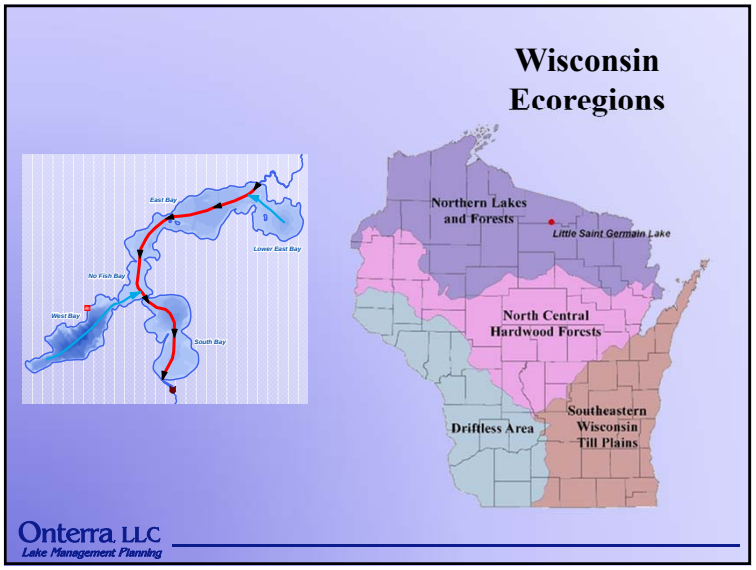
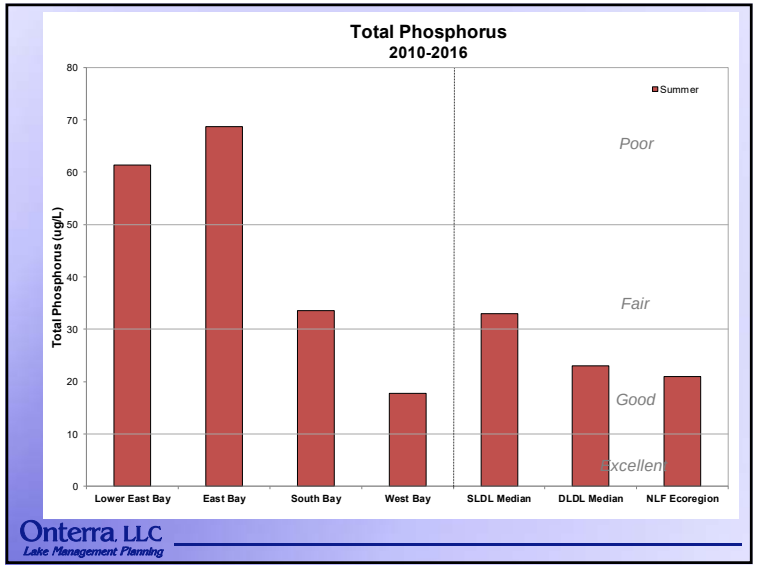
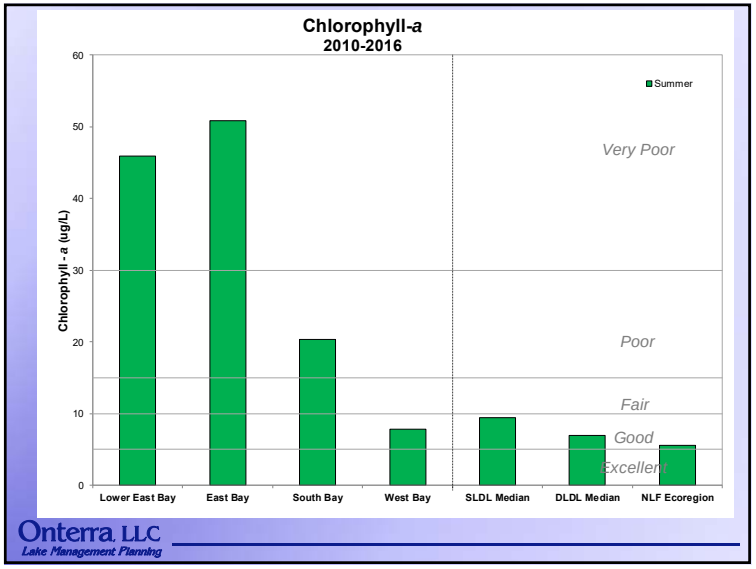
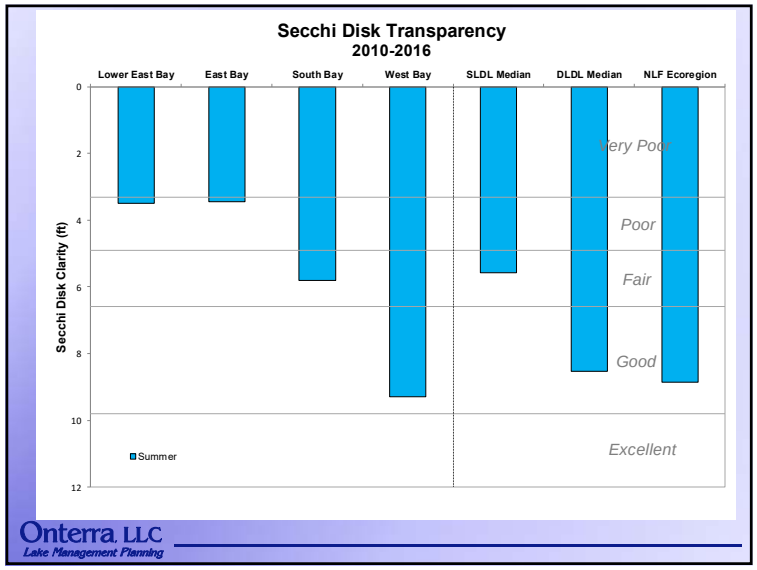
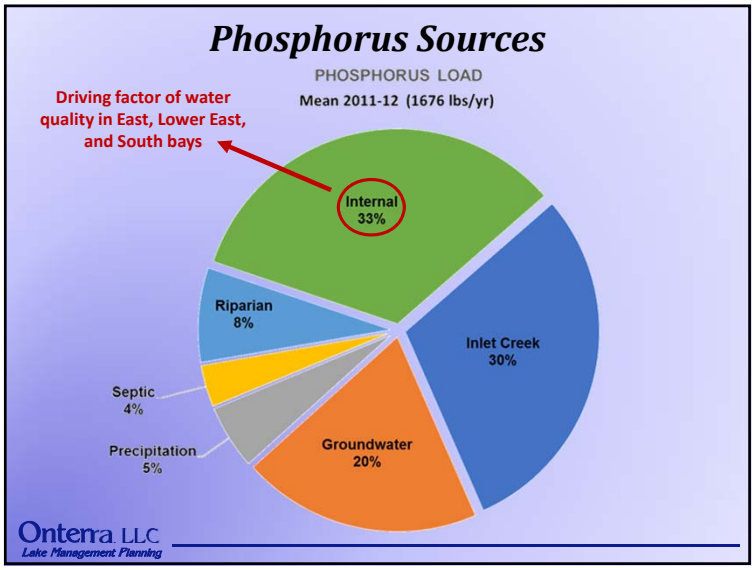
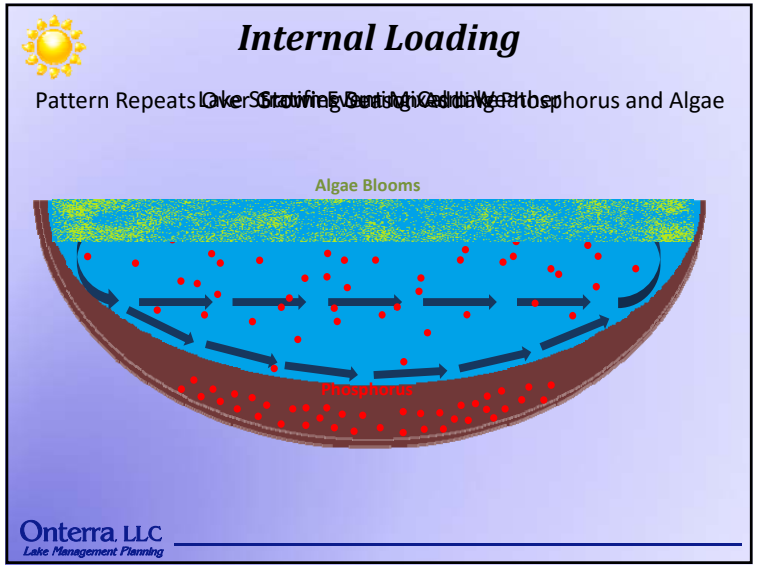

Wisconsin Ecoregions
East Bay
Lower East Bay
No Fish Bay
West Bay
South Bay
Northern Lakes and Forests
Little Saint Germain Lake
North Central Hardwood Forests
Driftless Area
Southeastern Wisconsin Till Plains
Onterra LLC
Lake Management Planning

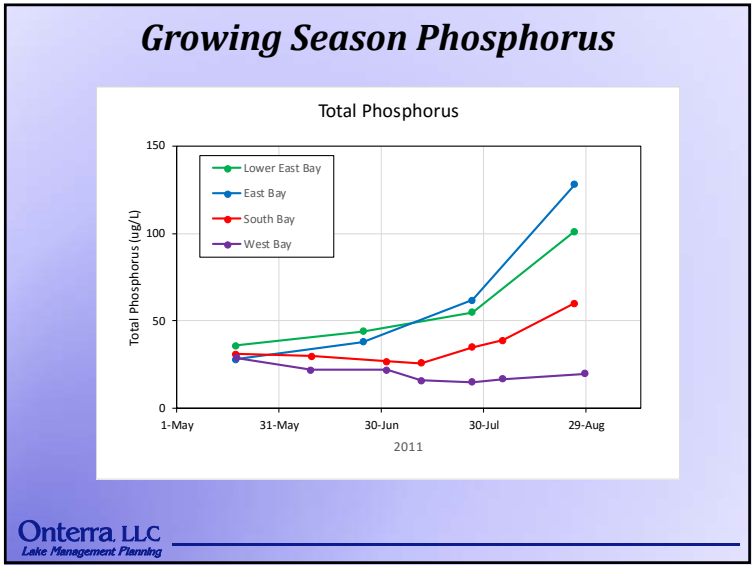

Total Phosphorus
2010-2016
Summer
Total Phosphorus (ug/L)
0
10
20
30
40
50
60
70
80
Poor
Fair
Good
Excellent
Lower East Bay
East Bay
South Bay
West Bay
SLDL Median
DLDL Median
NLF Ecoregion
Onterra LLC
Lake Management Planning


Chlorophyll-a
2010-2016
Summer
Chlorophyll - a (ug/L)
0
10
20
30
40
50
60
Very Poor
Poor
Fair
Good
Excellent
Lower East Bay
East Bay
South Bay
West Bay
SLDL Median
DLDL Median
NLF Ecoregion
Onterra LLC
Lake Management Planning

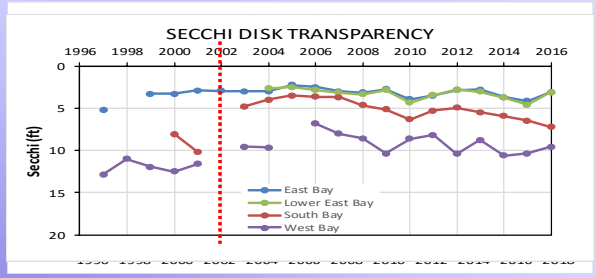

Secchi Disk Transparency
2010-2016
Lower East Bay
East Bay
South Bay
West Bay
SLDL Median
DLDL Median
NLF Ecoregion
Secchi Disk Clarity (ft)
0
2
4
6
8
10
12
Very Poor
Poor
Fair
Good
Excellent
Summer
Onterra LLC
Lake Management Planning


Phosphorus Sources
PHOSPHORUS LOAD
Mean 2011-12 (1676 lbs/yr)
Driving factor of water quality in East, Lower East, and South bays
Internal 33%
Riparian 8%
Inlet Creek 30%
Septic 4%
Precipitation 5%
Groundwater 20%
Onterra LLC
Lake Management Planning


Internal Loading
Pattern Repeats Lake Stratifies Bacteria Consume Oxygen Phosphorus and Algae
Algae Blooms
Phosphorus
Onterra LLC
Lake Management Planning


Growing Season Phosphorus
Total Phosphorus
Lower East Bay
East Bay
South Bay
West Bay
Total Phosphorus (ug/L)
150
100
50
0
1-May
31-May
30-Jun
30-Jul
29-Aug
2011
Onterra LLC
Lake Management Planning

Long-Term Trends



Aeration Begins

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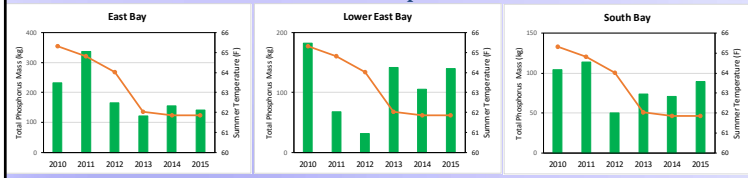
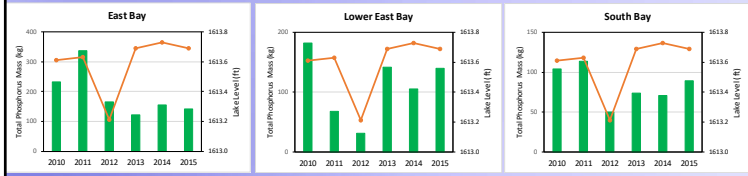
Lake Management Planning

Long-Term Trends

Summer Temperature



Summer Lake Levels



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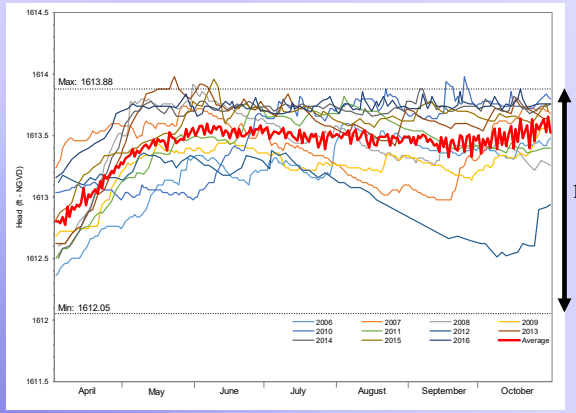
Lake Management Planning

Water Levels



1.83 ft

1996-2026 FERC Operating order – maintain 5.6 cfs year round

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Lake Management Planning

Alum Treatment

- **What is it?**
  - Phosphorus inactivation
    - Aluminum Sulfate Addition
      - Forms aluminum hydroxide floc
      - Floc settles to the bottom of lake "dragging" phosphorus with it.
      - Floc forms barrier to sediment phosphorus release
        - Binds sediment phosphorus

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Lake Management Planning

Alum Treatment

Anticipated Results

Table Ex-1. Expected Improvement in Total Phosphorus, Chlorophyll *a*, and Secchi Disc Depth (June through August) with Alum Treatment of the East/Upper East Bay and the South Bay.

Alum Treated Area	East Bay/Upper East Bay			South Bay[2]		
	Total Phosphorus (mg/L)	Chlorophyll a (µg/L)	Secchi disc depth (ft)	Total Phosphorus (µg/L)	Chlorophyll a (µg/L)	Secchi disc depth (ft)
No Treatment	0.062	38	2.8	0.046	19	4.4
East/Upper East Bay Only[1]	0.033	15	4.2	0.028	10	6.0
South Bay Only	0.062	38	2.8	0.035	13	5.3
South Bay and East/Upper East	0.033	15	4.2	0.019	6	7.6

(1)Average of modeling results for 2001, 2002, and 2007. Average for June through August period.
(2)Average of modeling results for the year 2002.

Barr December 2007

Onterra LLC Lake Management Planning

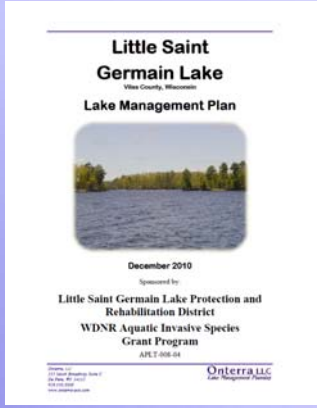
Alum Treatment

Updated Costs

Bay	Treatment Area (ac)	Total Gallons Applied	Gallons of Alum Applied per Acre	Estimated Cost (2007)	Estimated Cost (2017)
Upper East and East	325	365,565	1,125	$365,565	$658,017
South	162	443,202	2,736	$443,202	$797,764
Total	487	808,767	---	**$808,767**	**$1,455,781**

Onterra LLC Lake Management Planning

Implementation Plan



Onterra LLC Lake Management Planning

2010 Plan Goal 1: Maintain recreational access for shoreland property owners and other lake users

Management Actions

1. Contracted Mechanical Harvesting
   a. Trigger: *when submergent plants in a given area reach the surface and either disrupt navigability themselves or aggregate masses of non-rooted plant species*
   b. Conditions: *no more than 1/8 the lake in any year (75 acres). No AIS as contingent upon ESAIS Survey*

Onterra LLC Lake Management Planning

2010 Plan ***Current Working Plan***

Onterra LLC
Lake Management Planning

2010 Plan Goal 2: Maintain Current Water Quality Conditions

Management Actions

1. Monitor water quality through WDNR Citizens Lake Monitoring Network.
2. Investigate alum treatment in East Bay & Lower East Bay
3. Complete Shoreland Condition Assessment as part of next planning project

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Lake Management Planning

2010 Plan Goal 3: Control AIS within LSG

Management Actions

1. Continue CBCW – Goal 200 hours annually
2. Coordinate annual volunteer-based monitoring
3. Professional monitor AIS populations
4. Control EWM & CLP using herbicides
   a) Trigger: *dominant or greater EWM colonies*
   b) Trigger: *all previous year's treatment areas as well as colonized CLP from ESAIS*
5. Monitor herbicide concentrations

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Potential Goal: Increase LSGPRD's communication capacity

Potential Goal: Enhance resource by protection & restoring shoreland/nearshore habitat

Potential Goal: Maintain cultural ecosystem services

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B

APPENDIX B

Stakeholder Survey Response Charts and Comments

Little Saint Germain Lake - Anonymous Stakeholder Survey

Surveys Distributed: 399
Surveys Returned: 131
Response Rate: 33%

Little Saint Germain Lake Property

1. Do you rent or own your property on or near Little Saint Germain Lake? Please select one choice.

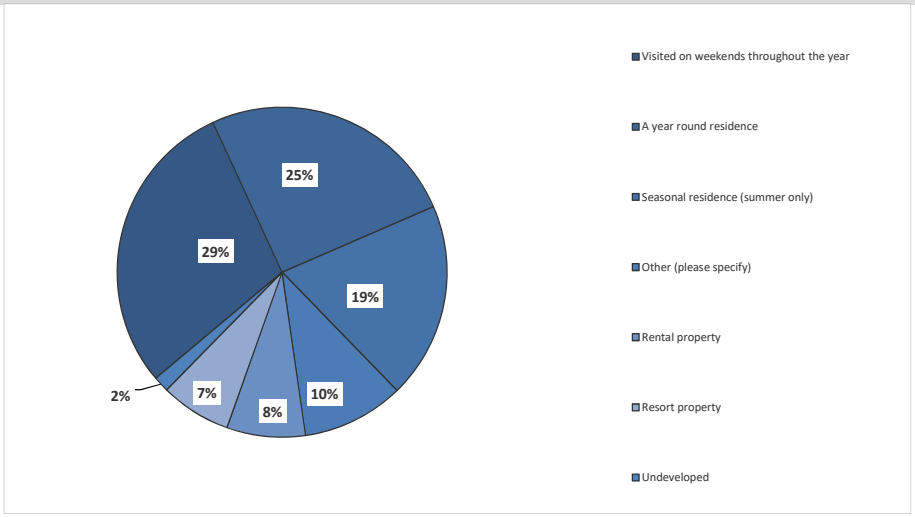
Answer Options	Response Percent	Response Count
Own	99.2%	130
Rent	0.8%	1
answered question		**131**
skipped question		**0**

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

Answer Options	Response Percent	Response Count
On the lake	97.7%	128
Off the lake	2.3%	3
answered question		**131**
skipped question		**0**

3. How is your property on Little Saint Germain Lake utilized?

Answer Options	Response Percent	Response Count
Visited on weekends throughout the year	29.2%	38
A year round residence	25.4%	33
Seasonal residence (summer only)	19.2%	25
Other (please specify)	10.0%	13
Rental property	7.7%	10
Resort property	6.9%	9
Undeveloped	1.5%	2
answered question		130
skipped question		1

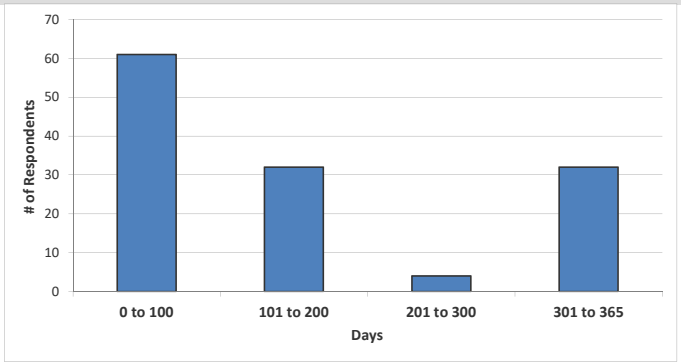


Number	Other (please specify)
1	We spend approximately half of our time at the property.
2	Visited periodically throughout the summer
3	Rental property and personal use throughout the year
4	Several weeks throughout the year
5	We come up off an on all year long
6	Rent and use at least 4-5 months per year
7	condo association- varied residences
8	one week each month
9	RENTAL/OWNER USED IN SUMMER
10	May-November with occasional winter visits.
11	Rent and use through out the year
12	visited year round with no specfic timetable
13	4 season property (visit all year)

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

Answer Options	Response Count
	129
answered question	129
skipped question	2

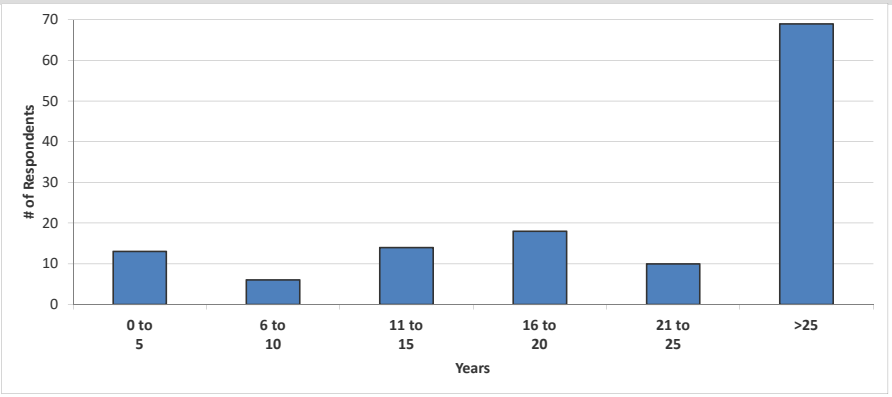
Category (# of days)	Responses	
0 to 100	61	47%
101 to 200	32	25%
201 to 300	4	3%
301 to 365	32	25%



5. How long have you owned your property on Little Saint Germain Lake?

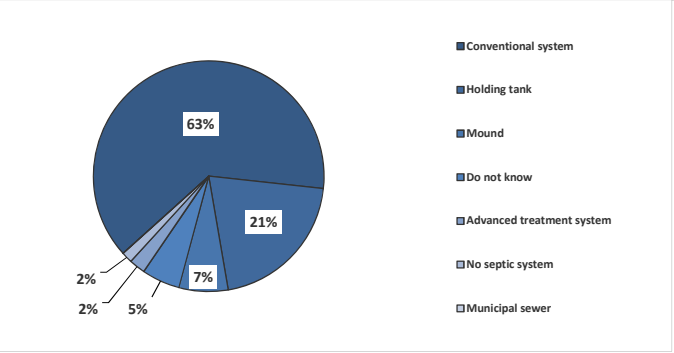
Answer Options	Response Count
	130
answered question	130
skipped question	1

Category (# of years)	Responses	% Response
0 to 5	13	10%
6 to 10	6	5%
11 to 15	14	11%
16 to 20	18	14%
21 to 25	10	8%
>25	69	53%



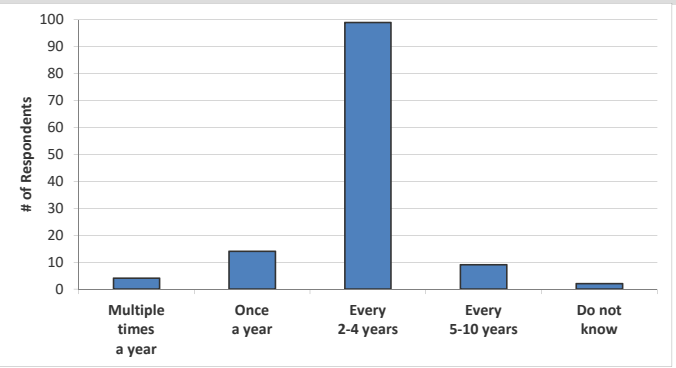
6. What type of septic system does your property utilize?

Answer Options	Response Percent	Response Count
Conventional system	63.4%	83
Holding tank	20.6%	27
Mound	6.9%	9
Do not know	5.3%	7
Advanced treatment system	2.3%	3
No septic system	1.5%	2
Municipal sewer	0.0%	0
answered question		131
skipped question		0



7. How often is the septic system on your property pumped?

Answer Options	Response Percent	Response Count
Multiple times a year	3.1%	4
Once a year	10.9%	14
Every 2-4 years	77.3%	99
Every 5-10 years	7.0%	9
Do not know	1.6%	2
answered question		128
skipped question		3



Recreational Activity on Little Saint Germain Lake

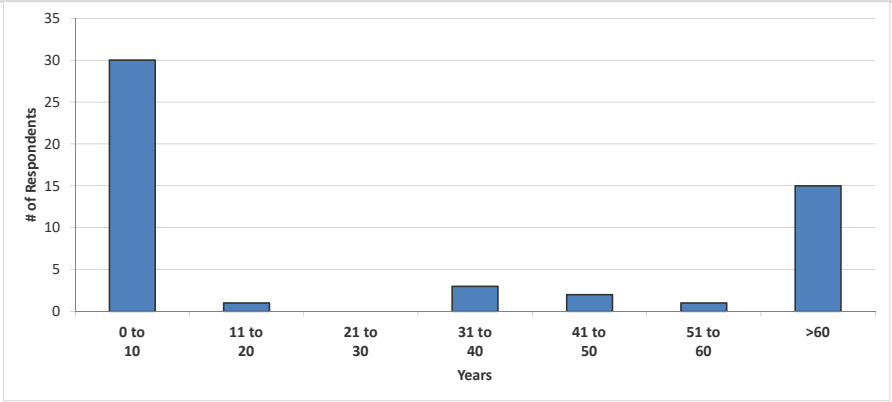
8. Have you personally fished on Little Saint Germain Lake in the past three years?

Answer Options	Response Percent	Response Count
Yes	83.1%	108
No	16.9%	22
answered question		**130**
skipped question		**1**

9. For how many years have you fished Little Saint Germain Lake?

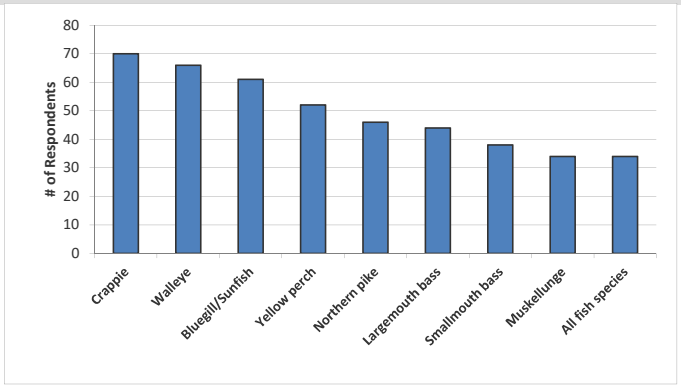
Answer Options	Response Count
	108
answered question	**108**
skipped question	**23**

Category (# of years)	Responses	% Response
0 to 10	**30**	**58%**
11 to 20	**1**	**2%**
21 to 30	**0**	**0%**
31 to 40	**3**	**6%**
41 to 50	**2**	**4%**
51 to 60	**1**	**2%**
>60	**15**	**29%**



10. What species of fish do you like to catch on Little Saint Germain Lake?

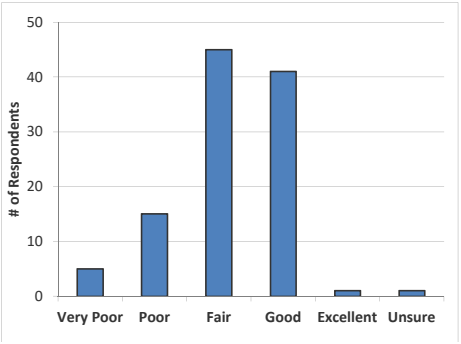
Answer Options	Response Percent	Response Count
Crappie	64.8%	70
Walleye	61.1%	66
Bluegill/Sunfish	56.5%	61
Yellow perch	48.1%	52
Northern pike	42.6%	46
Largemouth bass	40.7%	44
Smallmouth bass	35.2%	38
Muskellunge	31.5%	34
All fish species	31.5%	34
Other (please specify)	2.8%	3
answered question		108
skipped question		23



Number	Other (please specify)
1	What ever bites my hook
2	BULLHEAD
3	What fish? There are none

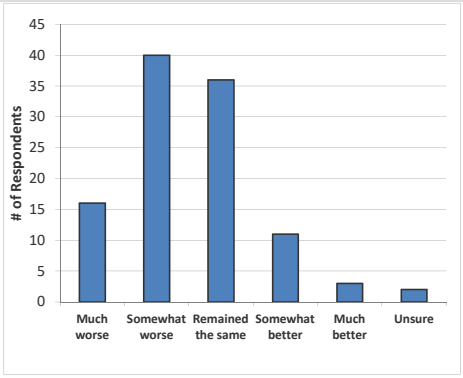
11. How would you describe the current quality of fishing on Little Saint Germain Lake?

Answer Options	Very Poor	Poor	Fair	Good	Excellent	Unsure	Response Count
	5	15	45	41	1	1	108
answered question							108
skipped question							23



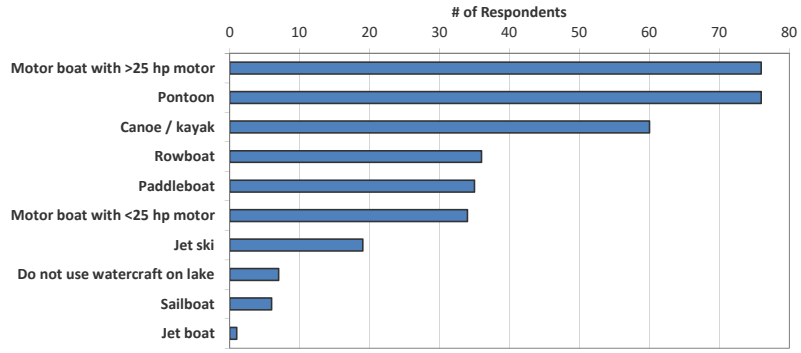
12. How has the quality of fishing changed on Little Saint Germain Lake since you have started fishing the lake?

Answer Options	Much worse	Somewhat worse	Remained the same	Somewhat better	Much better	Unsure	Response Count
	16	40	36	11	3	2	108
						answered question	**108**
						skipped question	**23**



13. What types of watercraft do you currently use on Little Saint Germain Lake?

Answer Options	Response Percent	Response Count
Motor boat with greater than 25 hp motor	58.5%	76
Pontoon	58.5%	76
Canoe / kayak	46.2%	60
Rowboat	27.7%	36
Paddleboat	26.9%	35
Motor boat with 25 hp or less motor	26.2%	34
Jet ski (personal water craft)	14.6%	19
Do not use watercraft on Little Saint Germain Lake	5.4%	7
Sailboat	4.6%	6
Jet boat	0.8%	1
	answered question	**130**
	skipped question	**1**



14. Do you use your watercraft on waters other than Little Saint Germain Lake?

Answer Options	Response Percent	Response Count
Yes	29.2%	38
No	70.8%	92
answered question		**130**
skipped question		**1**

15. What is your typical cleaning routine after using your watercraft on waters other than Little Saint Germain Lake?

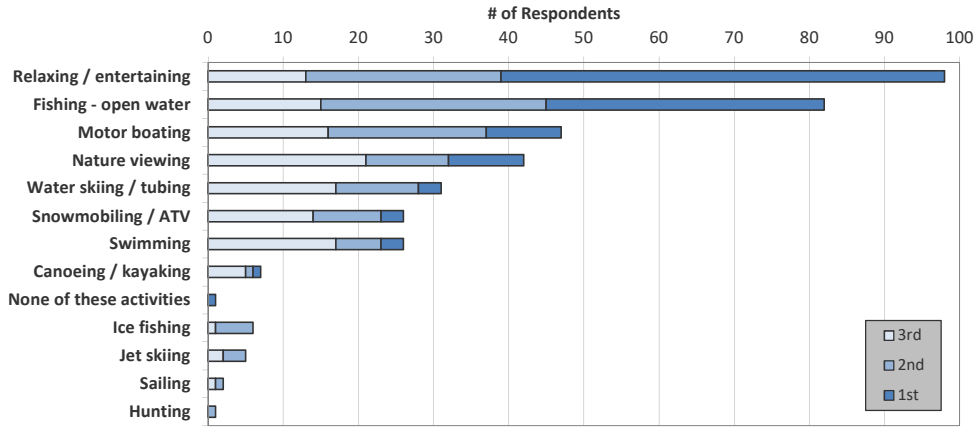
Answer Options	Response Percent	Response Count
Remove aquatic hitch-hikers (ex. - plant material, clams, mussels)	100.0%	36
Drain bilge	83.3%	30
Rinse boat	38.9%	14
Power wash boat	8.3%	3
Apply bleach	8.3%	3
Do not clean boat	0.0%	0
Other (please specify)		4
answered question		**36**
skipped question		**95**

Number	Other (please specify)
1	Kayaks, Canoes and SUP boards go to other waterways and get rinsed upon return. Rarely a pontoon will go to BSGL, same process
2	drain and clean live well
3	Renters bring and rent boats.I do not know how they are cleaned.We do not use the lake.
4	Only take kayaks to other lakes. We remove any hitch hikers from the kayaks.

16. For the list below, rank up to three activities that are important reasons for owning your property on Little Saint Germain Lake, with 1 being the most important.

Answer Options	1st	2nd	3rd	Rating Average	Response Count
Relaxing / entertaining	59	26	13	1.53	98
Fishing - open water	37	30	15	1.73	82
Motor boating	10	21	16	2.13	47
Nature viewing	10	11	21	2.26	42
Water skiing / tubing	3	11	17	2.45	31
Snowmobiling / ATV	3	9	14	2.42	26
Swimming	3	6	17	2.54	26
Canoeing / kayaking	1	1	5	2.57	7
None of these activities are important to me	1	0	0	1	1
Ice fishing	0	5	1	2.17	6
Jet skiing	0	3	2	2.4	5
Sailing	0	1	1	2.5	2
Hunting	0	1	0	2	1
Other (please specify below)	3	1	2	1.83	6
Please specify "Other" response here					8
				answered question	**130**
				skipped question	**1**

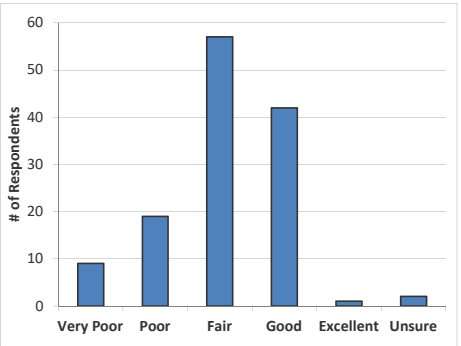
Number	"Other" responses
1	All of them are equally important, we are a resort and rent to guests with all sorts of preferences.
2	Bicycling, hiking, water skiing
3	Rental property management
4	Biking
5	Boating, Pontoon
6	rental business
7	I purchase this home for location and the beauty our home affords of surrounding area of house...Lake not what we had expected and is worst Lake I have ever visited in north woods so therefore we do NOT use the lake
8	solitude



Little Saint Germain Lake Current and Historic Condition, Health and Management

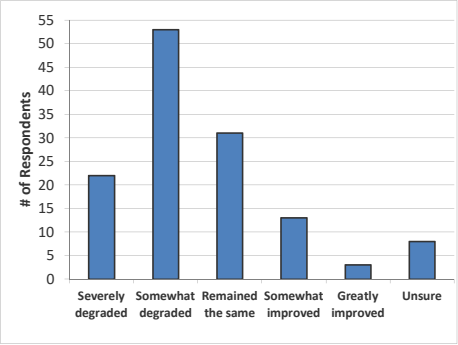
17. How would you describe the current water quality of Little Saint Germain Lake?

Answer Options	Very Poor	Poor	Fair	Good	Excellent	Unsure	Response Count
	9	19	57	42	1	2	130
						answered question	**130**
						skipped question	**1**



18. How has the current water quality changed in Little Saint Germain Lake since you first visited the lake?

Answer Options	Severely degraded	Somewhat degraded	Remained the same	Somewhat improved	Greatly improved	Unsure	Response Count
	22	53	31	13	3	8	130
						answered question	**130**
						skipped question	**1**



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

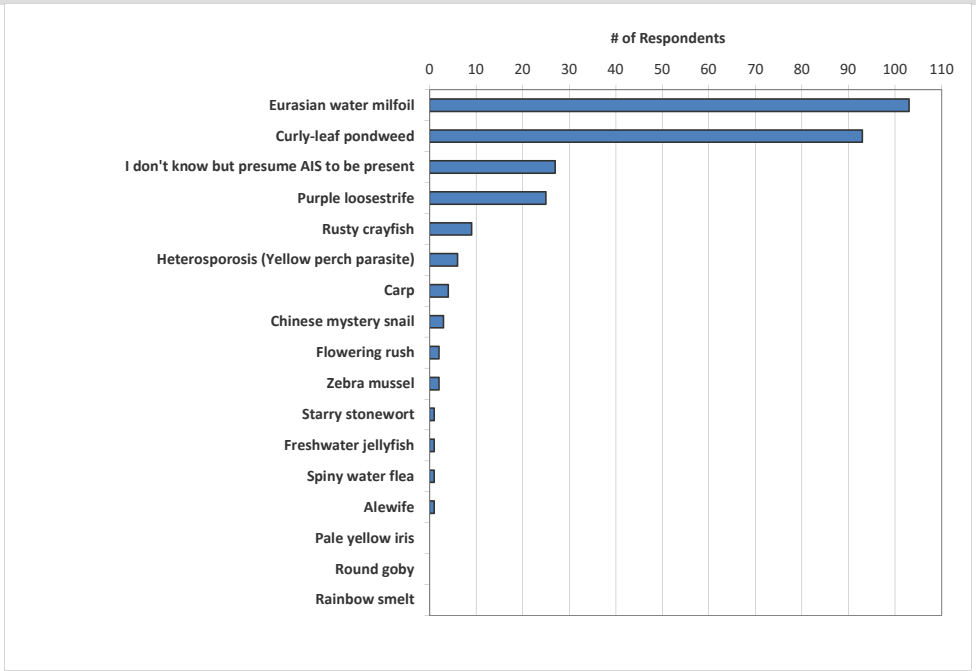
Answer Options	Response Percent	Response Count
Yes	99.2%	129
No	0.8%	1
answered question		130
skipped question		1

20. Do you believe aquatic invasive species are present within Little Saint Germain Lake?

Answer Options	Response Percent	Response Count
Yes	81.4%	105
I think so but am not certain	17.8%	23
No	0.8%	1
answered question		129
skipped question		2

21. Which aquatic invasive species do you believe are in Little Saint Germain Lake?

Answer Options	Response Percent	Response Count
Eurasian water milfoil	80.5%	103
Curly-leaf pondweed	72.7%	93
I don't know but presume AIS to be present	21.1%	27
Purple loosestrife	19.5%	25
Rusty crayfish	7.0%	9
Heterosporosis (Yellow perch parasite)	4.7%	6
Carp	3.1%	4
Chinese mystery snail	2.3%	3
Flowering rush	1.6%	2
Zebra mussel	1.6%	2
Starry stonewort	0.8%	1
Freshwater jellyfish	0.8%	1
Spiny water flea	0.8%	1
Alewife	0.8%	1
Pale yellow iris	0.0%	0
Round goby	0.0%	0
Rainbow smelt	0.0%	0
Other (please specify)	3.1%	4
answered question		128
skipped question		3

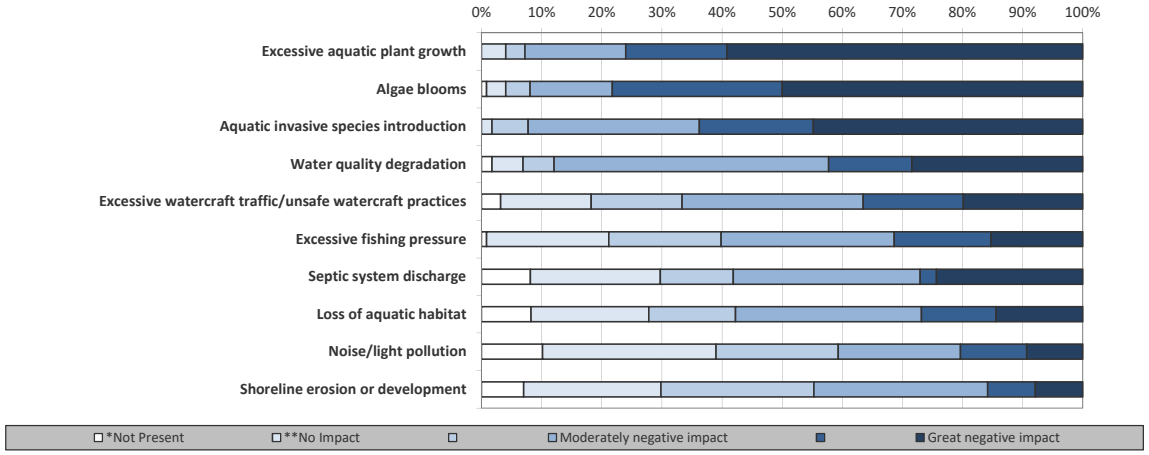


Number	"Other" responses
1	Terrible thick floating weeds in South Bay
2	Not knowledgeable to the names associated with many listed
3	BIRDSFOOT TREFOIL
4	It might not be invasive but the increase of other weeds in South Bay

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

Answer Options	*Not Present	**No Impact		Moderately negative impact		Great negative impact	Unsure: Need more information	Rating Average	Response Count
Excessive aquatic plant growth (excluding algae)	0	5	4	21	21	74	2	4.17	127
Algae blooms	1	4	5	17	35	62	5	3.99	129
Aquatic invasive species introduction	0	2	7	33	22	52	9	3.7	125
Water quality degradation	2	6	6	53	16	33	11	3.2	127
Excessive watercraft traffic or unsafe watercraft practices	4	19	19	38	21	25	2	2.97	128
Excessive fishing pressure	1	24	22	34	19	18	8	2.67	126
Septic system discharge	6	16	9	23	2	18	52	1.6	126
Loss of aquatic habitat	8	19	14	30	12	14	26	2.07	123
Noise/light pollution	12	34	24	24	13	11	6	2.1	124
Shoreline erosion or development	8	26	29	33	9	9	13	2.08	127
Other (please specify)									8
								answered question	**130**
								skipped question	**1**

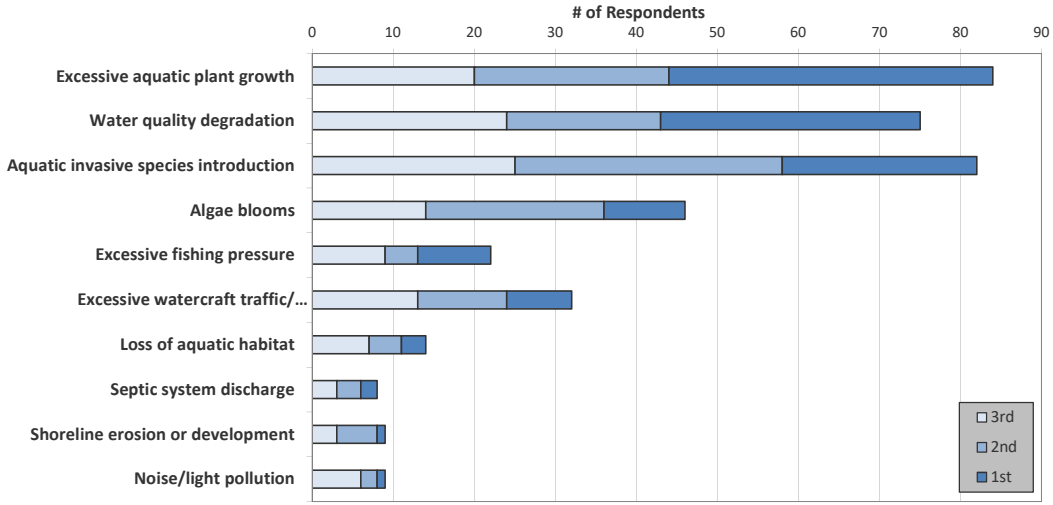
Number	Other (please specify)
1	Just amatory weed problem limiting any fishing or swimming in front of,property.
2	Late last summer, terrible floating weed invasion in South Bay.
3	Do we have septic discharge into the lake? If so why?
4	weed growth in South Bay
5	Too many jet skiers
6	Watercraft size and type used more often are too big for this lake
7	why is there a slot limit on walleye when the DNR say walleye do not reproduce on Little St Germain ?
8	BIG MOTORS AND JET SKIS TOO CLOSE TO SHORE CAUSING LARGE WAKES GREAT SHORE EROSION



23. From the list below, please rank your top three concerns regarding Little Saint Germain Lake, with 1 being your greatest concern.

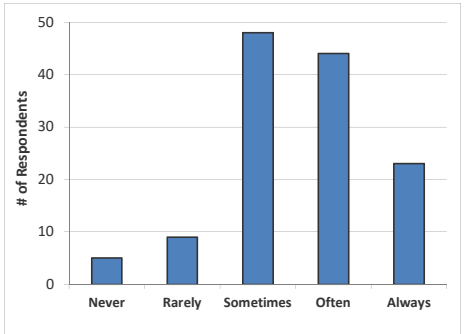
Answer Options	1st	2nd	3rd	Response Count
Excessive aquatic plant growth (excluding algae)	40	24	20	84
Water quality degradation	32	19	24	75
Aquatic invasive species introduction	24	33	25	82
Algae blooms	10	22	14	46
Excessive fishing pressure	9	4	9	22
Excessive watercraft traffic or unsafe watercraft practices	8	11	13	32
Loss of aquatic habitat	3	4	7	14
Septic system discharge	2	3	3	8
Shoreline erosion or development	1	5	3	9
Noise/light pollution	1	2	6	9
Other (please specify)	0	0	1	1
Please specify "Other" response here				2
			answered question	**130**
			skipped question	**1**

Number	"Other" responses
1	weed growth in South Bay
2	Lake dept. We need to increase depth in certain areas



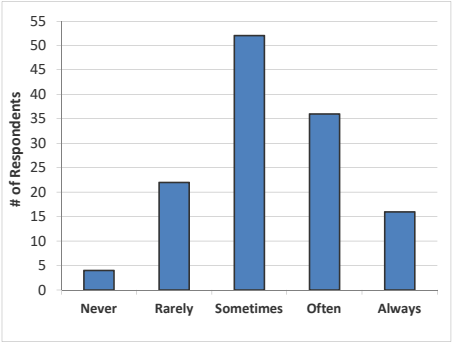
24. During open water season how often does unrooted aquatic vegetation, excluding algae, negatively impact your enjoyment of Little Saint Germain Lake?

Answer Options	Never	Rarely	Sometimes	Often	Always	Response Count
	5	9	48	44	23	129
					answered question	*129*
					skipped question	**2**



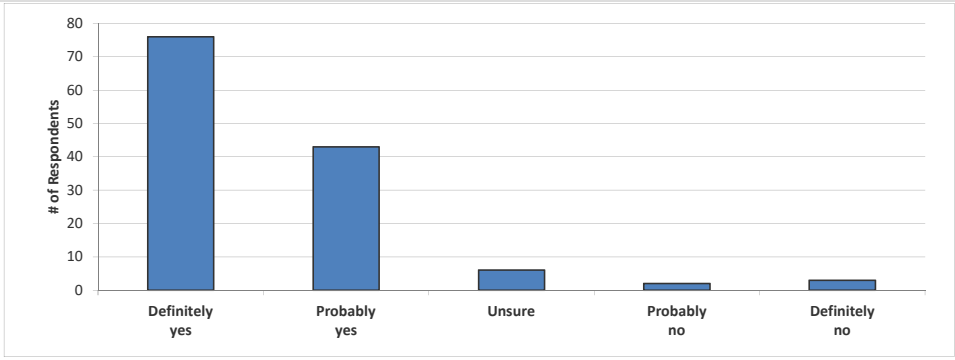
25. During open water season how often does free-floating algae or algae blooms negatively impact your enjoyment of Little Saint Germain Lake?

Answer Options	Never	Rarely	Sometimes	Often	Always	Response Count
	4	22	52	36	16	130
					answered question	**130**
					skipped question	**1**



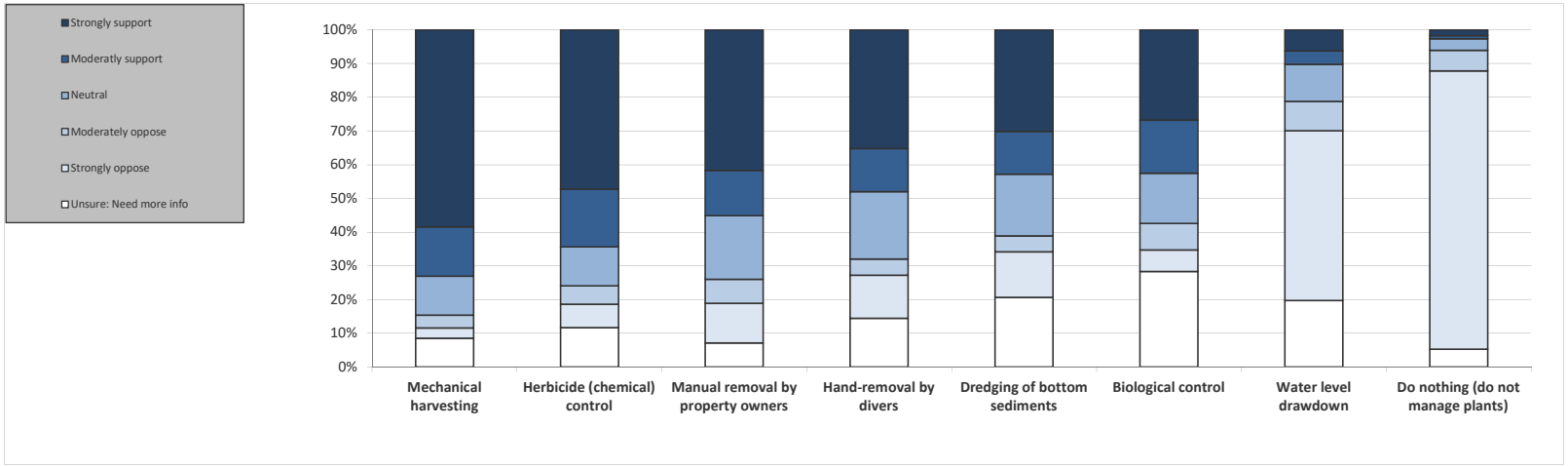
26. Considering your answer to the questions above, do you believe aquatic plant control is needed on Little Saint Germain Lake?

Answer Options	Definitely yes	Probably yes	Unsure	Probably no	Definitely no	Response Count
	76	43	6	2	3	130
					answered question	**130**
					skipped question	**1**



27. Aquatic plants can be managed using many techniques. What is your level of support for the responsible use of the following techniques on Little Saint Germain Lake?

Answer Options	Strongly oppose	Moderately oppose	Neutral	Moderatly support	Strongly support	Unsure: Need more info	Rating Average	Response Count
Mechanical harvesting	4	5	15	19	76	11	3.96	130
Herbicide (chemical) control	9	7	15	22	61	15	3.57	129
Manual removal by property owners	15	9	24	17	53	9	3.45	127
Hand-removal by divers	16	6	25	16	44	18	3.1	125
Dredging of bottom sediments	17	6	23	16	38	26	2.79	126
Biological control (milfoil weevil, loosestrife beetle, etc	8	10	19	20	34	36	2.64	127
Water level drawdown	64	11	14	5	8	25	1.48	127
Do nothing (do not manage plants)	95	7	4	1	2	6	1.17	115
							answered question	**130**
							skipped question	**1**



28. Did you know that aquatic herbicides were being applied in Little Saint Germain Lake to help control AIS?

Answer Options	Response Percet	Response Count
Yes	86.6%	110
I think so but can't say for certain	7.9%	10
No	5.5%	7
answered question		**127**
skipped question		**4**

29. How do you feel about the past use of herbicides to treat AIS in previous years?

Answer Options	Completely support	Moderately support	Unsure	Moderately oppose	Completely oppose	Rating Average	Response Count
	73	22	25	4	2	4.27	126
						answered question	**126**
						skipped question	**5**

30. What is your level of support or opposition for future aquatic herbicide use to target AIS in Little Saint Germain Lake?

Answer Options	Completely support	Moderately support	Unsure	Moderately oppose	Completely oppose	Rating Average	Response Count
	79	27	15	7	2	4.34	130
						answered question	**130**
						skipped question	**1**

31. What is the reason(s) you oppose the future use of aquatic herbicides to target AIS in Little Saint Germain Lake?

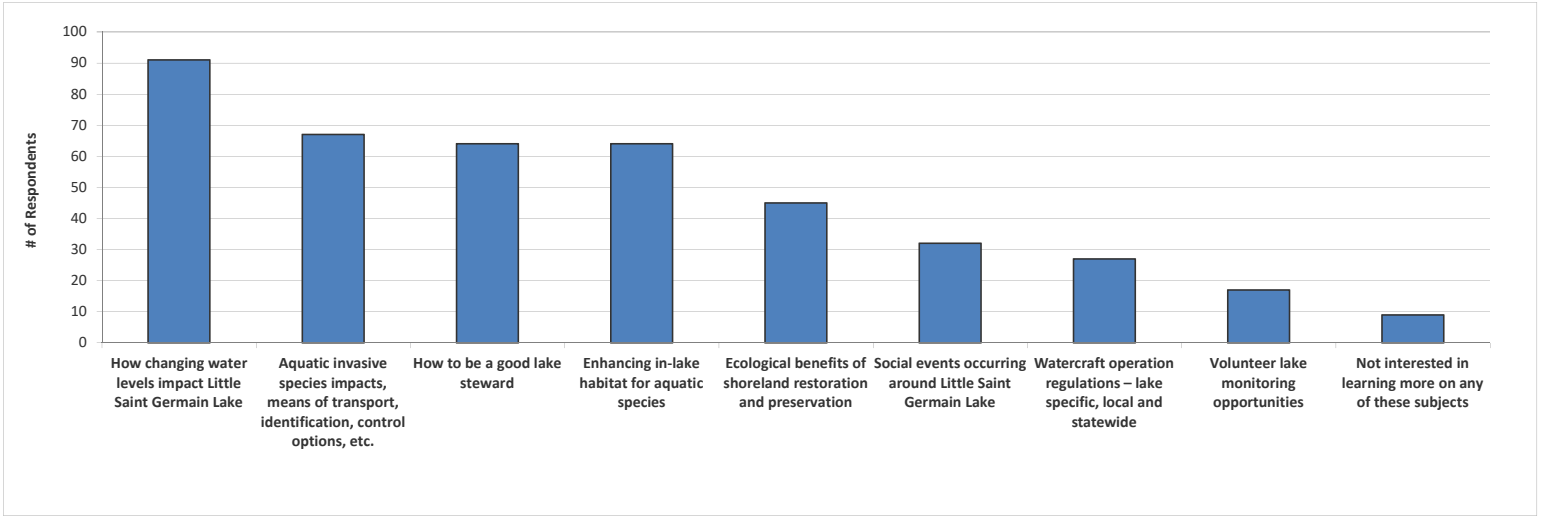
Answer Options	Response Percet	Response Count
Potential cost of treatment is too high	22.2%	2
Potential impacts to native aquatic plant species	44.4%	4
Potential impacts to native (non-plant) species such as fish, insects, etc	88.9%	8
Potential impacts to human health	66.7%	6
Future impacts are unknown	44.4%	4
Another reason (please specify below):	33.3%	3
	answered question	**9**
	skipped question	**122**

Number	"Other" responses
1	I don't know the full impact or danger of it.
2	effectiveness has not been totally proven
3	Whenever the lake is treated we see a much higher number of fish kill in the sprayed area. Every year we can tell when the treatment occurs based on number of dead fish. We also question the transfer of chemicals to humans eating the fish.

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

Answer Options	Response Percent	Response Count
How changing water levels impact Little Saint Germain Lake	70.5%	91
Aquatic invasive species impacts, means of transport, identification, control options, etc	51.9%	67
How to be a good lake steward	49.6%	64
Enhancing in-lake habitat (not shoreland or adjacent wetlands) for aquatic species	49.6%	64
Ecological benefits of shoreland restoration and preservation	34.9%	45
Social events occurring around Little Saint Germain Lake	24.8%	32
Watercraft operation regulations – lake specific, local and statewide	20.9%	27
Volunteer lake monitoring opportunities (Clean Boats Clean Waters, Citizen Lake Monitoring Network, Loon Watch, LSGLPRD programs, etc.	13.2%	17
Not interested in learning more on any of these subjects	7.0%	9
Some other topic (please specify):	3.9%	5
	answered question	**129**
	skipped question	**2**

Number	Other (please specify)
1	More education on herbicides and weeds
2	We're too old.
3	Why we always have algae bloom
4	Long term impact of water quality due to boating/recreational pressure
5	Changing watercraft regulations to avoid pattern destruction of wildlife and shore erosion



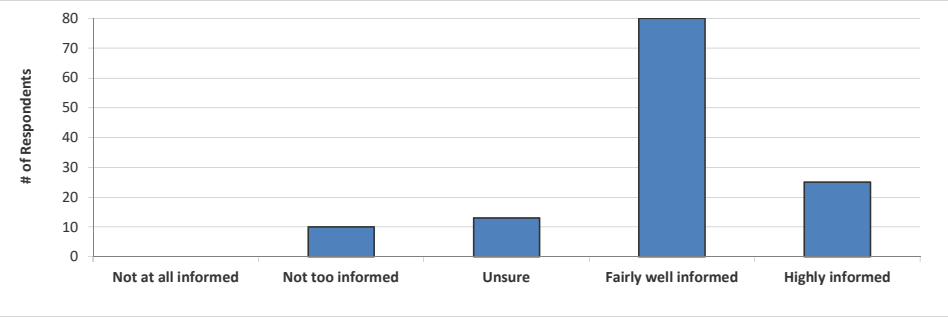
33. Would you be interested in participating in a grant funded shoreland restoration project?

Answer Options	Response Percent	Response Count
Yes	58.4%	73
No	40.0%	50
Do not own shoreland property	1.6%	2
answered question		**125**
skipped question		**6**

Little Saint Germain Lake Protection & Rehabilitation District (LSGLPRD)

34. How informed has the LSGLPRD kept you regarding issues with Little Saint Germain Lake and its management?

Answer Options	Not at all informed	Not too informed	Unsure	Fairly well informed	Highly informed	Response Count
	0	10	13	80	25	128
					answered question	128
					skipped question	3



35. Please feel free to provide written comments concerning Little Saint Germain Lake, its current and/or historic condition and its management.

Answer Options	Response Count
	67
answered question	**67**
skipped question	**64**

Number	Response Text

1	Little Saint Germain is at a point in it's evolution where our actions are critical to use by future generations, let's be very careful with our decisions.
2	The quality of the water has deteriorated greatly over the years. Very unfortunate. Thanks for addressing the issues!
3	None at this time
4	The weeds in both South Bay and No Fish Bay seem to be getting worse. Even after last year's cutting, it still seemed to be worse than previous years. It did not seem that the weed cutting was very effective for the cost. We also encourage fish stocking.
5	We purchased our property in 1999 - built in 2000. It is very disheartening to see the quality of Little St. Germain Lake regress from summer to summer. When we purchased the land, we actually had sand along the shoreline and no weeds. Now the weeds have taken over within ten feet of our shoreline. Last summer, our shoreline was all green slime, weeds, and fisherman's trash. Definitely not conducive to swimming or any water activity. We work hard to maintain our property, but obviously the lake is out of our control, but in the hands of the association.
6	The weeds in South Bay are unmanageable. If the property owners were given acceptable practices to be part of the solution it could be beneficial to the whole lake. Good quality lake water is important to our rental income opportunities.
7	Annual meeting on Sunday morning - why compete with church services?
8	thank you for asking
9	love the lake some years has a lot of weeds and some very low
10	Notify me of the meetings. In need more education and knowledge. Frank Tomasovich 970-396-7337 1400 Hemlock Rd St Germain 54558 Thank you
11	Lilly pads have taken over much of the shoreline in lower east bay.
12	district has done, and is doing a great job monitoring and managing our lake - it is a great asset to our community and State so please continue !
13	We need to address out of control native species in South Bay. We will lose our lake without control asap.. Get the DNR to understand how much our lake has deteriorated and how it affects tourism and property values. A major concern: people treating lake weeds with chemicals available from various sources - it is happening all over the lake.
14	We appreciate all the work done to maintain our lake. We were very shocked at the loose weed invasion of South Bay last year.
15	How do we get the Walleye population back to a level that supports decent fishing?
16	Our beautiful lake is being overtaken by weeds and suffers from horrible algae bloom. Unfortunately the solutions and funding that has been spent has not worked. The quality of the lake looks beautiful in May and is weedy pea soup in summer and fall. There is sand under there, let's do something that finds it and shows everyone what a beautiful lake Little St. Use whatever you have to to invest once and get it solved. We are desperate owners who want to enjoy the clear lake we see in May all throughout the summer.
17	Not sure shoreland restoration is the main solution. Inlet to the lake a major problem. Invasive aquatic weeds the primary issue that appears to be a losing battle. How do we eliminate this problem? What is the number 1 contributor to the poor water quality?
18	We are new property owners on Little Saint Germain Lake (April 2015) and are not full times residents but hope to be in the next few years. The quality of the lake and the entire area is very important to us and would like to continue to learn as much as possible about has been done, what can be done, what needs to be done, and what we can do to ensure the condition of the lake and surrounding areas. We hope to become more active when we are able to spend more time in Saint Germain and want to continue to be educated about the lake and its issues so that we might be better prepared to help in any way possible now and in the future.
19	Survey feedback: Questions 29 needs a maybe answer or need more information. Question 23 was leading and will result in the outcome the author of this survey wanted. Open water season is from May-October/Novemer. Ask this question about July and August only and the answer is ALWAYS.

20	The existing problem of weeds in South Bay is really bad. Anyone boating with a motor is having real issues because of the dense weeds. It is a safety hazard for skiers, tubers, etc. It is also hurting the businesses in South Bay with rentals and engine problems.Please take care of the weeds in South Bay. The weed cutting done in 2016 was done very poorly. Hire someone who will do the job right.
21	We have attempted to be good stewards of the lake, not making any changes in or near our shoreline, but the increase in weed growth near our shore over the past 15 years has definitely reduced our enjoyment, and we believe also reduced our property value. It is a great fishery, with its yearly ups and downs, but thoroughly enjoy the variety if fish species found in the lake. This is an extremely unique lake/fishery that truly deserves attention to maintain it long term.
22	I have owned property on the lake for 26 years. The condition of the lake has improved. I believe the management of the lake district has been outstanding.
23	I feel as if I should have a stronger opinion on these issues, but need to be more informed to that end. I feel for the most part your efforts have been excellent, appreciated and very thoughtful for the good of the lake community.
24	Fish stocking resources have been tilted heavily away from muskie stocking towards walleye stocking in recent years. This is a mistake as walleye struggle to maintain a decent population on their own. The lake doesn't seem to support walleye as it once did. The drop in resources towards muskie has taken a toll as several years of poor year classes from 2002 to 2011 resulted from lack of stocked fish. The tilt is more towards a bass/muskie fishery. Stronger restrictions on panfish harvest would result in better quality of catch. This is for crappie specifically. The muskie fishing is the main concern as the catch rates from 2000 to 2007 are a distant memory. The stocking from the early to mid 1990's resulted in great catch rates for several years, but those fish are now at the end of their life cycle. Not many muskies caught now between 35 to 43 inches and not enough bigger than 44 left to keep people coming back.
25	please fix the weed issues that have become a problem the past couple of years, soothsay is unbearable when the weeds take over.
26	We have algae bloom all summer.People rent to boat and fish,but not swim.That is our main problem with the lake.
27	I believe there should be some boating/wake restrictions. Limit max HP allowed. Also noise ordinance applied to ATV usage on Birchwood drive.
28	Thank you for your concern and action to support our lake!!!
29	Our unit is a condo and part of a resort, so we own the shoreline with others.
30	I am not a biologist, but we have a weed problem in No Fish Bay I have been having difficulty getting may boat out due to the thick weeds.
31	Native weed growth has intensified over the past 3 years, especially in No Fish Bay, and other nearby areas in East & South Bays. The proliferation of (rental) personal watercraft, and their operator's disrespect for boating regulations, including speed & dangerously close proximity to other boaters, is very disturbing. These watercraft renters are not residents and couldn't care less about these waters - They are interested only in their own personal enjoyment - even at the expense of others. Those that rent these devices are interested in making a buck more than anything else.
32	I'm highly concerned with the plant growth in South Bay and in other concentrated areas of the lake. A large amount of weeds cut by boat traffic must be cleaned up on a regular basis and are a general nuisance.
33	I believe the harvesting of the underwater plant life has disrupted the fish habitat and as a result has affected the fish population. It appears that the resort owners have gotten their way for the boaters, skiers. and jet craft
34	Lake District reps are trying to provide updated information; if only more property owners would attend meetings or become involved.
35	Have not seen a DNR Warden for years on our lake. Use to see annually. Realize this is a state funding issue. Would be nice to see local enforcement of boating/fishing regulations if possible. Tourism is critical for the area but they are the biggest violators. Some display an attitude that because they have paid to stay at a resort or condo they can do as they please. Have personally heard this comment. Respect for our resource is priority #1 for me. As more and more people use our lake more enforcement will be necessary, unfortunately.
36	REALLY need to get rid of these weeds!!

37	No comments made.
38	Since moving here in 1978, the fishing has greatly deteriorated. Many more weeds in lake.
39	The vegetation in the lake is out of control, I spend $200 a year to keep my swimming area open on Aquacide tablets. The vegetation has got so out of hand it is not breaking down and the lake is filling up with muck from the vegetation. I am in full support to help financially if required by lake property owners.
40	Thanks for all that you do. We love Little Saint Germain Lake. It is a treasure.
41	Please consider returning some of the tax dollars collected in the past from us for the ill-fated and ill-advised alum treatment project. The District balance sheet is very flush and I for one would appreciate a hiatus on the taxation while you whittle down this balance over time. You've collected enough money to operate for a while.
42	Thank you to all of the individuals who serve in a capacity to help improve the quality of LSG Lake! Your efforts are greatly appreciated!
43	No comments
44	Seems to be getting weedier in South Bay. Not very appealing to vacationers to go swimming. This is our #1 concern
45	I would like to swim in the lake but the water quality is often green or generally poor and weedy.
46	No comments
47	Would like to see more fish stocking, primarily walleyes and perch (something other than bass). Haven't heard much about alum treatment??
48	We love the lake. Would like to see channels dredged and more control over stupid boaters.
49	Kudos to the Lake Assn for all they have done and to Ted Ritter especially. Nonetheless, more is needed, including some control over boat size and types allowed on this lake.
50	Too many studies with little or no action taken.
51	I feel we need more done with weeds floating on surface at the west end of west bay. Has become a big problem.
52	I believe the board is trying to do the best job they can, but native weeds have been out of control the last couple years. Weed cutting does not help much because they don't cut where the weeds are. Boats cut the weeds in the boat traffic. Some of the frontages are overwhelmed with native weeds.
53	No comments
54	I'm on West bay. We see huge motors with wake skiers and jet skis constantly. They are tearing up plants and ruining spawning grounds. Repetitive action of jet skis just going in circles cause large waves and shore erosion. We propose limiting the motor size, speed and time of use. We have sking from sun up to sunset. Some of these waves have caused my dock to be lifted and damaged due to careless boaters. It is nearly impossible to fish from shore.These are very large waves. Over fishing of spawning grounds has resulted in more small fish. We see many boating violations especially at night. Perhaps more DNR enforcement is necessary. 30 years ago a family could enjoy the lake. Now it is rodding around, the faster the better. We have seen fishermen and wildlife get harassed by high speed power craft. Safety is a major concern. We want to have everyone enjoy the lake. The lake has changed from a family environment (35 years ago) to a do whatever you want type of lake. From June to September, I fear to take my family on the lake because of so much traffic and harassment. NO LONGER ENJOYABLE.
55	In my opinion the current Lake District board does a poor job communicating with the members. There is no use of e-mail and the website is not maintained. We receive material once a year in advance of the yearly meeting. This includes the minutes of the prior year's meeting which should be mailed sooner. The meeting is way too long and feels like most of the time is spent asking for volunteers to serve as a board member. Also the annual meeting is poorly attended so is not a true representation of the lake property owners. The board could/should do more to promote attendance.
56	I strongly support LSGLPRD

57	Invasive weeds in 2016 on South Bay were the worst we've seen in 14 years that we've been on the lake. We are concerned that the control actions are not effective. Long run concerns about impact on lake property values. Problem is urgent in our view.
58	Appreciate the associations board members hard work and diligence in attending to the well being of the lake and surrounding area! While there is little recognition and much criticism, I hope knowing you are truely making a difference in the local environment is rewarding and hope to someday have the time and energy to join your quest. Thank You all for what you do!
59	Need to limit hours of water skiing,etc. Perhaps an early morning and evening speed limit.
60	Since purchasing our cottage 27years ago, the quality of the lake continues to go down even though efforts to improve it goes on.
61	west end of west bay is having a problem with weeds floating on surface, along north shore. rake every day.
62	I am one of the homeowners with property along the north shore of East Bay. We were severely affected by the invasive growths at the beginning of the problem. I would like to see this program continued as it has helped considerably with the problem. I would like to see more attention paid to the algae problem in East Bay to hopefully be able to control this better.
63	Algae blooms in East Bay appear to have improved the last couple years, but further improvement is needed.
64	Thank you for asking about light pollution. We are across the bay from the Black Bear and have always felt that the lighting is extreme and negatively effects our enjoyment of the night sky.
65	Please lets keep it as clean as possible
66	Because of travel involved, it is difficult to attend meetings or participate in projects. Your efforts are very much appreciated.
67	we need more people at our annual meeting

C

APPENDIX C

WDNR Aquatic Herbicide Regulations FAQ
WDNR 2,4-D Chemical Fact Sheet (2,4-D & Endothall)

Frequently Asked Questions about Aquatic Herbicide Use in Wisconsin

Prepared by Wisconsin Dept. of Natural Resources, Dept. of Health Services and Dept. of Agriculture, Trade, and Consumer Protection

June 23, 2011

Why are herbicides used in Wisconsin lakes and rivers?

Aquatic herbicides are used to reduce the abundance of invasive species to reduce spread to new water bodies, to help maintain a healthy native plant community that is beneficial for fish and other aquatic organisms, to improve navigational access to lakes and rivers and make boat navigation safer, and to control nuisance plant and algae growth that can pose a hazard to swimmers.

How is aquatic herbicide use regulated in Wisconsin?

In order to be used in Wisconsin, an aquatic herbicide must be all of the following:

1) Labeled and registered with U.S. EPA's office of Pesticide Programs;
2) Registered for sale and use by the Department of Agriculture, Trade, and Consumer Protection (DATCP);
3) Permitted by the Department of Natural Resources (DNR); and
4) Applied by a DATCP-certified and licensed applicator, with few exceptions.

Step 1) U.S. EPA's office of Pesticide Programs reviews the chemical and label.

Federal law requires herbicides to be registered with the Environmental Protection Agency (EPA) before they can be sold or used. The registration process determines potential risk to human health and the environment. The human health assessment includes sensitive groups such as infants, and risk is evaluated for both short-term and chronic effects. Ultimately, the EPA registers the herbicide if it determines that use of the pesticide will result in "no unreasonable adverse effects" as defined in federal law. This means that the benefits of using the pesticide according to the label outweigh the risks. Once an herbicide is registered, it is re-assessed by EPA every fifteen years.

Step 2) Herbicides must be registered by DATCP prior to sale or use in Wisconsin.

Most EPA-registered herbicide products are eligible to be registered for sale and use in Wisconsin by DATCP-licensed manufacturers and labelers. DATCP will not register an herbicide for use if it is prohibited for sale, use or distribution in Wisconsin, even if it is registered by EPA.

Step 3) DNR evaluates requests for use of chemicals in public waters when a permit application is submitted.

> When making a decision whether or not to issue a permit, the Department considers the appropriateness of the herbicide selected at the site, the likely non-target organism effects, the potential for adverse effects on the water body, as well as the potential hazard to humans. DNR may then issue the permit, issue the permit with conditions, or deny the permit. Permit conditions are frequently used to make sure that the herbicide is used responsibly and in accordance with best management practices for the plant being managed.

Step 4) Applied by a certified applicator.

> Most herbicide applications to water bodies in Wisconsin must be done by certified applicators. To become certified, an individual must complete a training course and pass a written exam. Businesses that provide herbicide application services must also be licensed by DATCP. A certified applicator is not needed only if the treatment area is less than ¼ acre in size and the product being applied is a granular herbicide.

Are herbicides safe?

The distinction between "EPA registered" and the terms "approved" or "safe" is important. Registration by the EPA does not mean that the use of the herbicide poses no risk to humans or the environment, only that for use in the U.S., the benefits have been determined to outweigh the risks. Because product use is not without risk, the EPA does not define any herbicide as "safe". It is prudent to minimize herbicide exposure whenever possible.

When an herbicide is registered, the EPA sets use requirements to minimize risk that are given on the herbicide label. When using herbicides it is important to follow the label instructions exactly, and never use an herbicide for a use not specified on the label.

What does the DNR do to minimize herbicide use and ensure that herbicides are used responsibly?

The Department of Natural Resources evaluates the benefits of using a particular chemical at a specific site vs. the risk to non-target organisms, including threatened or endangered species, and may stop or limit treatments to protect them. The Department frequently places conditions on a permit to require that a minimal amount of herbicide is needed and to reduce potential non-target effects, in accordance with best management practices for the species being controlled. For example, certain herbicide treatments are required by permit conditions to be in spring because they are more effective, require less herbicide and reduce harm to native plant species. Spring treatments also means that, in most cases, the herbicide will be degraded by the time peak recreation on the water starts.

The DNR encourages minimal herbicide use by requiring a strategic Aquatic Plant Management (APM) Plan for management projects over 10 acres or 10% of the water body or any projects

receiving state grants. DNR also requires consideration of alternative management strategies and integrated management strategies on permit applications and in developing an APM plan, when funding invasive species prevention efforts, and by encouraging the use of best management practices when issuing a permit.

The Department also supervises treatments, requires that adjacent landowners are notified of a treatment and have an opportunity to request a public meeting, requires that the water body is posted to notify the public of treatment and usage restrictions, and requires reporting after treatment occurs.

How long do the chemicals stay in the water?

The amount of time an herbicide will stay in the water varies greatly based on a number of different factors, including the type of herbicide used. Residues may only be present in the water for a few hours, or for as long as a few months. Each herbicide has different characteristics that affect where the chemical moves (e.g. if it stays in the water column or settles into the sediment), how it is broken down, and how long it can be detected in water, sediments, and aquatic organisms. For more information on the environmental fate of a particular herbicide, please see the individual chemical fact sheets, available by request from your local lake coordinator (http://dnr.wi.gov/lakes/contacts/Contacts.aspx?role=LAKE_COORDINATOR). These are currently being updated and will be available online soon, as well.

Should I let my kids swim in the water?

None of the aquatic herbicides licensed for use in Wisconsin have swimming restrictions. Dilute amounts of herbicide may be present in the water, but EPA has determined that minimal exposure would result from adults or children swimming in treated waters.

Use restrictions for treated water vary by herbicide, but will always be listed on the herbicide label. To find out how to read an herbicide label, see http://www.epa.gov/pesticides/label/. Restrictions must be posted at public access points to the water body for at least one day near an herbicide treatment and sent to shoreline landowners in advance of the treatment. To minimize your risk of direct exposure, it is wise to stay a safe distance from the area being treated while herbicide applications are being made.

What if I accidently ingest some of the water while swimming or my pet drinks the water?

When assessing the risk posed by swimming in treated water, the EPA considers exposure from accidental swallowing of water, as well as from other routes such as through the skin. Any exposure to herbicide in the water while swimming or through accidental ingestion would be small and would not have toxic effects. Similarly, your pet should not have any side effects from swimming in or drinking treated water, so long as any applicable use restriction period is over.

Are there risks to drinking water?

In Wisconsin, most drinking water supplies come from groundwater, not surface water. For water bodies that are used for drinking water, treatments are required to be a minimum distance from any existing intakes (usually ¼ of a mile). Wells are not considered to be intakes, and therefore the setback distance does not apply. Some aquatic herbicides can move through the sediment into the groundwater, but even those that do move through soil have not been detected above drinking water thresholds in wells.

Campers that are treating surface water for drinking should obtain water from an alternate location until after any posted drinking water restrictions have passed.

Can I eat the fish?

There are no restrictions on eating fish for any currently registered aquatic herbicides following application to water. That does not mean you would not be exposed to the herbicide, just that the amount of herbicide that you might be exposed to is not toxic. A common concern with eating fish from treated water is that the herbicide concentration may be higher in fish tissues than in the water, and therefore exposure may be greater from fish than from exposure to lake water. The potential for bioaccumulation in fish varies by herbicide, and is evaluated by the EPA during the registration process.

Can I water my lawn/garden with lake water?

Many of the herbicides used in lakes and ponds are broadleaf herbicides which will damage garden plants including fruits and vegetables. Some aquatic herbicides will also affect grass. Whether you are watering your lawn or your garden, follow water usage restrictions to avoid any unintended damage. These restrictions on watering will be listed on the herbicide label and posted at boat landings and beaches. The limits vary widely, from no restriction to 120 days. If you are unsure about the herbicide used on the lake near your home, the safest option is to use water from your municipal supply or private well to water plants.

How can I find out if an aquatic herbicide treatment is scheduled for my lake, or has occurred recently?

Notices of herbicide applications and the use restrictions of the herbicides used are required to be posted along shore adjacent to a treatment area, as well as at public access points for the day of treatment through the end of the restricted use period. Additionally, landowners adjacent to a treatment area should be sent advance notification of the treatment by mail, email or newsletter. For a large-scale treatment (over 10 acres or over 10% of the area of the lake) all landowners around the lake would receive advance notification.

How can I be notified in advance of when and where an application will occur, even if I am not adjacent to the treatment area?

The DNR will notify any interested person of upcoming applications if they request to be notified in writing each year. To request notification, contact your local DNR aquatic plant management coordinator (http://dnr.wi.gov/lakes/contacts/Contacts.aspx?role=AP_MNGT).

Why can one person or group of people receive a permit to treat my lake if I don't want the treatment?

Any individual or group can request a permit from the DNR for a treatment since water bodies in the state are public property. The DNR is charged with evaluating any proposed treatments to consider the impact on the environment, and permits can be denied.

The permitting process requires that all landowners adjacent to the treated area be notified of the treatment. If you receive the notice and don't want the treatment to occur, you can send a written request to the applicant and the DNR requesting a public informational meeting on topics of concern to you regarding the treatment and alternatives. If 5 or more such requests are received within 5 days of the notice, the applicant is required to conduct such a meeting in a location near the water body.

What can I do to reduce the need for aquatic herbicide use?

Individuals can help reduce requests for herbicide use to control aquatic plants and algae by implementing best management practices on their property to prevent nutrients from running into the water and by preventing the spread of invasive species. To reduce runoff eliminate the use of fertilizers adjacent to a water body, rake leaves out of the street and off the lawn, plant a buffer strip of native vegetation on shore to reduce erosion and filter water coming off lawns, create a rain garden to filter and slow down water from driveways or rooftops, use a rain barrel to collect water from rooftops to use to water plants, or use a pervious option to pave driveways and sidewalks. To prevent the introduction of new invasive species and stop the spread of existing invasives, when boating remove plants, animals, and mud from your boat when leaving a boat launch, drain all water from your boat, and rinse your boat and equipment with hot or high pressure water or allow to dry for at least five days before moving to another water body.

Where can I find more information about a specific herbicide?

The DNR keeps a fact sheet on file for each herbicide used in aquatic systems. These fact sheets can be requested from your local DNR lake coordinator (http://dnr.wi.gov/lakes/contacts/Contacts.aspx?role=LAKE_COORDINATOR), and will be updated and available online soon, as well.

The EPA's risk assessments are available at http://www.epa.gov/pesticides/reregistration/status.htm.

Additional information can be found with these resources:

http://www.co.thurston.wa.us/health/ehipm/ehipm_aquaticreview.html
Health assessment of aquatic herbicides by Thurston County, Washington, Public Health and Social Services

http://extoxnet.orst.edu/pips/ghindex.html
Specific information on pesticides as well as toxicology

http://npic.orst.edu/
Information about pesticides, supported by EPA and Oregon State University

http://www.datcp.wi.gov/Plants/Pesticides/
WI Department of Agriculture, Trade, and Consumer Protection

2,4-D Chemical Fact Sheet

Formulations

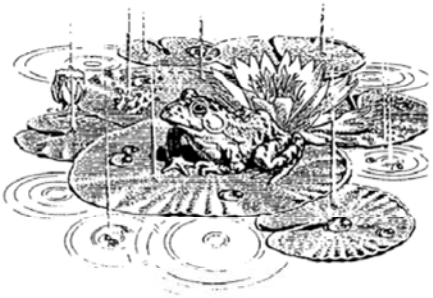
2,4-D is an herbicide that is widely used as a household weed-killer, agricultural herbicide, and aquatic herbicide. It has been in use since 1946, and was registered with the EPA in 1986 and re-reviewed in 2005. The active ingredient is 2,4-dichloro-phenoxyacetic acid. There are two types of 2,4-D used as aquatic herbicides: dimethyl amine salt and butoxyethyl ester. Both liquid and slow-release granular formulations are available. 2,4-D is sold under the trade names Aqua-Kleen, Weedar 64 and Navigate (product names are provided solely for your reference and should not be considered endorsements nor exhaustive).

Aquatic Use and Considerations

2,4-D is a widely-used herbicide that affects plant cell growth and division. It affects primarily broad-leaf plants. When the treatment occurs, the 2,4-D is absorbed into the plant and moved to the roots, stems, and leaves. Plants begin to die in a few days to a week following treatment, but can take several weeks to decompose. Treatments should be made when plants are growing.

For many years, 2,4-D has been used primarily in small-scale spot treatments. Recently, some studies have found that 2,4-D moves quickly through the water and mixes throughout the waterbody, regardless of where it is applied. Accordingly, 2,4-D has been used in Wisconsin experimentally for whole-lake treatments.

2,4-D is effective at treating the invasive Eurasian watermilfoil (*Myriophyllum spicatum*). Desirable native species that may be affected include native milfoils, coontail (*Ceratophyllum demersum*), naiads (*Najas* spp.), elodea (*Elodea canadensis*) and duckweeds (*Lemna* spp.). Lilies (*Nymphaea* spp. and *Nuphar* spp.) and bladderworts (Utricularia spp.) also can be affected.



Post-Treatment Water Use Restrictions

There are no restrictions on eating fish from treated water bodies, human drinking water or pet/livestock drinking water. Following the last registration review in 2005, the ester products require a 24-hour waiting period for swimming. Depending on the type of waterbody treated and the type of plant being watered, irrigation restrictions may apply for up to 30 days. Certain plants, such as tomatoes and peppers and newly seeded lawn, should not be watered with treated water until the concentration is less than 5 parts per billion (ppb).

Herbicide Degradation, Persistence and Trace Contaminants

The half-life of 2,4-D (the time it takes for half of the active ingredient to degrade) ranges from 12.9 to 40 days depending on water conditions. In anaerobic lab conditions, the half-life has been measured up to 333 days. After treatment, the 2,4-D concentration in the water is reduced primarily through microbial activity, off-site movement by water, or adsorption to small particles in silty water. It is slower to degrade in cold or acidic water, and appears to be slower to degrade in lakes that have not been treated with 2,4-D previously.

There are several degradation products from 2,4-D: 1,2,4-benzenetriol, 2,4-dichlorophenol, 2,4-dichloroanisole, chlorohydroquinone (CHQ), 4-chlorophenol and volatile organics.

Impacts on Fish and Other Aquatic Organisms

Toxicity of aquatic 2,4-D products vary depending on whether the formulation is an amine or an ester 2,4-D. The ester formulations are toxic to fish and some important invertebrates such as water fleas (*Daphnia*) and midges at application rates; the amine formulations are not toxic to fish or invertebrates at application rates. Loss of habitat following treatment may cause reductions in populations of invertebrates with either formulation, as with any herbicide treatment. These organisms only recolonize the treated areas as vegetation becomes re-established.

Available data indicate 2,4-D does not accumulate at significant levels in the bodies of fish that have been tested. Although fish that are exposed to 2,4-D will take up some of the chemical, the small amounts that accumulate are eliminated after exposure to 2,4-D ceases.

On an acute basis, 2,4-D is considered moderately to practically nontoxic to birds. 2,4-D is not toxic to amphibians at application rates; effects on reptiles are unknown. Studies have shown some endocrine disruption in amphibians at rates used in lake applications, and DNR is currently funding a study to investigate endocrine disruption in fish at application rates.

As with all chemical herbicide applications it is very important to read and follow all label instructions to prevent adverse environmental impacts.

Human Health

Adverse health effects can be produced by acute and chronic exposure to 2,4-D. Those who mix or apply 2,4-D need to protect their skin and eyes from contact with 2,4-D products to minimize irritation, and avoid inhaling the spray. In its consideration of exposure risks, the EPA believes no significant risks will occur to recreational users of water treated with 2,4-D.

Concerns have been raised about exposure to 2,4-D and elevated cancer risk. Some (but not all) epidemiological studies have found 2,4-D associated with a slight increase in risk of non-Hodgkin's lymphoma in high exposure populations (farmers and herbicide applicators). The studies show only a possible association that may be caused by other factors, and do not show that 2,4-D causes cancer. The EPA determined in 2005 that there is not sufficient evidence to classify 2,4-D as a human carcinogen.

The other chronic health concern with 2,4-D is the potential for endocrine disruption. There is some evidence that 2,4-D may have estrogenic activities, and that two of the break-down products of 2,4-D (4-chlorophenol and 2,4-dichloroanisole) may affect male reproductive development. The extent and implications of this are not clear and it is an area of ongoing research.

For Additional Information

Environmental Protection Agency
Office of Pesticide Programs
www.epa.gov/pesticides

Wisconsin Department of Agriculture, Trade, and Consumer Protection
http://datcp.wi.gov/Plants/Pesticides/

Wisconsin Department of Natural Resources
608-266-2621
http://dnr.wi.gov/lakes/plants/

Wisconsin Department of Health Services
http://www.dhs.wisconsin.gov/

National Pesticide Information Center
1-800-858-7378
http://npic.orst.edu/

Wisconsin Department of Natural Resources
Box 7921
Madison, WI 53707-7921

DNR PUB-WT-964 2012

Endothall Chemical Fact Sheet

Formulations

Endothall is the common name of the active ingredient endothal acid (7-oxabicyclo[2,2,1] heptane-2,3-dicarboxylic acid). Endothall products are used to control a wide range of terrestrial and aquatic plants. Both granular and liquid formulations of endothall are available for aquatic use in Wisconsin. Two types of endothall are available: dipotassium salt (such as Aquathol®) and monoamine salts (such as Hydrothol 191). Trade names are provided for your reference only and are neither exhaustive nor endorsements of one product over another.

Aquatic Use and Considerations

Endothall is a contact herbicide that prevents certain plants from making the proteins they need. Factors such as density and size of the plants present, water movement, and water temperature determine how quickly endothall works. Under favorable conditions, plants begin to weaken and die within a few days after application.

Endothall products vary somewhat in the target species they control, so it is important to always check the product label for the list of species that may be affected. Endothall products are effective on Eurasian watermilfoil (*Myriophyllum spicatum*) and also kill desirable native species such as pondweeds (*Potamogeton* spp.) and coontail (*Ceratophyllum* spp.). In addition, Hydrothol 191 formulations can also kill wild celery (*Vallisneria americana*) and some species of algae (*Chara, Cladophora, Spirogyra, and Pithophora*).

Endothall will kill several high value species of aquatic plants (especially *Potamogeton* spp.) in addition to nuisance species. The plants that offer important values to aquatic ecosystems often resemble, and may be growing with those plants targeted for treatment. Careful identification of plants and application of endothall products is necessary to avoid unintended harm to valuable native species.

For effective control, endothall should be applied when plants are actively growing. Most submersed weeds are susceptible to Aquathol formulations. The choice of liquid or granular formulations depends on the size of the area requiring treatment. Granular is more suited to small areas or spot treatments, while liquid is more suitable for large areas.

If endothall is applied to a pond or enclosed bay with abundant vegetation, no more than 1/3 to ½ of the surface should be treated at one time because excessive decaying vegetation may deplete the oxygen content of the water and kill fish. Untreated areas should not be treated until the vegetation exposed to the initial application decomposes.

Post-Treatment Water Use Restrictions

Due to the many formulations of this chemical the post-treatment water use restrictions vary. Each product label must be followed. For all products there is a drinking water standard of 0.1 ppm and can not be applied within 600 feet of a potable water intake. Use restrictions for Hyrdtohol products have irrigation and animal water restrictions.

Herbicide Degradation, Persistence and Trace Contaminants

Endothall disperses with water movement and is broken down by microorganisms into carbon, hydrogen, and oxygen. Field studies show that low concentrations of endothall persist in water for several days to several weeks depending on environmental conditions. The half-life (the time it takes for half of the active ingredient to degrade) averages five to ten days. Complete degradation by microbial action is 30-60 days. The initial breakdown product of endothall is an amino acid, glutamic acid, which is rapidly consumed by bacteria.

Impacts on Fish and Other Aquatic Organisms

At recommended rates, the dipotassium salts (Aquathol and Aquathol K) do not have any apparent short-term effects on the fish species that have been tested. In addition, numerous studies have shown the dipotassium salts induce no significant adverse effects in aquatic invertebrates (such as snails, aquatic insects, and crayfish) when used at label application rates. However, as with other herbicide use, some plant-dwelling populations of aquatic organisms may be adversely affected by application of endothall formulations due to habitat loss.

In contrast to the low toxicity of the dipotassium salt formulations, laboratory studies have shown the monoamine salts (Hydrothol 191 formulations) are toxic to fish at dosages above 0.3 parts per million (ppm). In particular, the liquid formulation will readily kill fish present in a treatment site. By comparison, EPA approved label rates for plant control range from 0.05 to 2.5 ppm. In recognition of the extreme toxicity of the monoamine salt, product labels recommend no treatment with Hydrothol 191 where fish are an important resource.

Other aquatic organisms can also be adversely affected by Hydrothol 191 formulations depending upon the concentration used and duration of exposure. Tadpoles and freshwater scuds have demonstrated sensitivity to Hydrothol 191 at levels ranging from 0.5 to 1.8 ppm.

Findings from field and laboratory studies with bluegills suggest that bioaccumulation of dipotassium salt formulations by fish from water treated with the herbicide is unlikely. Tissue sampling has shown residue levels become undetectable a few days after treatment.

Human Health

Most concerns about adverse health effects revolve around applicator exposure. Liquid endothall formulations in concentrated form are highly toxic. Because endothall can cause eye damage and skin irritation, users should minimize exposure by wearing suitable eye and skin protection.

At this time, the EPA believes endothall poses no unacceptable risks to water users if water use restrictions are followed. EPA has determined that endothall is not a neurotoxicant or mutagen, nor is it likely to be a human carcinogen.

For Additional Information

Environmental Protection Agency
Office of Pesticide Programs
www.epa.gov/pesticides

Wisconsin Department of Agriculture, Trade, and Consumer Protection
http://datcp.wi.gov/Plants/Pesticides/

Wisconsin Department of Natural Resources
608-266-2621
http://dnr.wi.gov/lakes/plants/

Wisconsin Department of Health Services
http://www.dhs.wisconsin.gov/

National Pesticide Information Center
1-800-858-7378
http://npic.orst.edu/

Wisconsin Department of Natural Resources
Box 7921
Madison, WI 53707-7921

DNR PUB-WT-970 2012

D

APPENDIX D

WDNR Fisheries Reports:

WDNR Fisheries Information Sheet (2015). Steve Gilbert
Creel Survey Report (2015-2016). Jason Halverson and Jeff Blonski

WISCONSIN DNR
FISHERIES INFORMATION SHEET

LAKE: Little Saint Germain **COUNTY:** Vilas **YEAR:** 2015

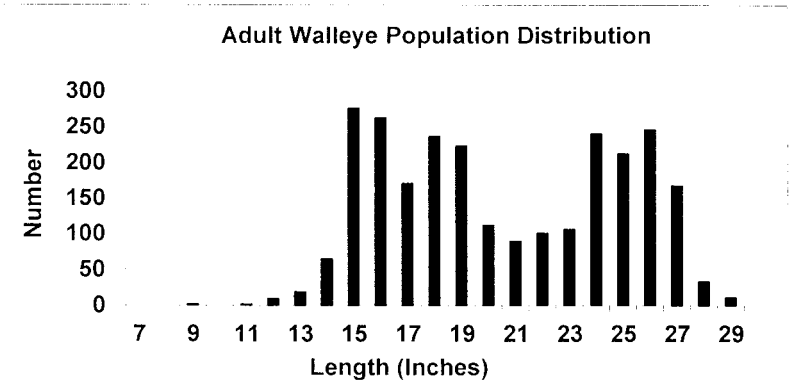
A comprehensive fishery survey was conducted of Little Saint Germain Lake, Vilas County, from April 15 through June 5, 2015 to determine the health of this fishery. Little Saint Germain is a moderately fertile drainage lake with predominantly sand, gravel and muck substrates. It has a surface area of 980 acres, 14.7 miles of shoreline and a maximum depth of 53 feet. The walleye and muskellunge fisheries are currently maintained by stocking.

Walleye

A mark-recapture survey of Little Saint Germain Lake was conducted to estimate the number of adult walleye present. 357 adult walleye were captured and marked (fin clipped) in 5 days of netting and 74 during one night of electrofishing.

Based on these results, Little Saint Germain Lake was estimated to contain 2,586 adult walleye (2.6/acre). Approximately 96% of the adult walleye were 15 inches long or larger. These numbers do not reflect the entire walleye population present in Little Saint Germain Lake. Smaller juvenile walleye are not part of this estimate. The largest walleye captured was a 29.2 inch long female.

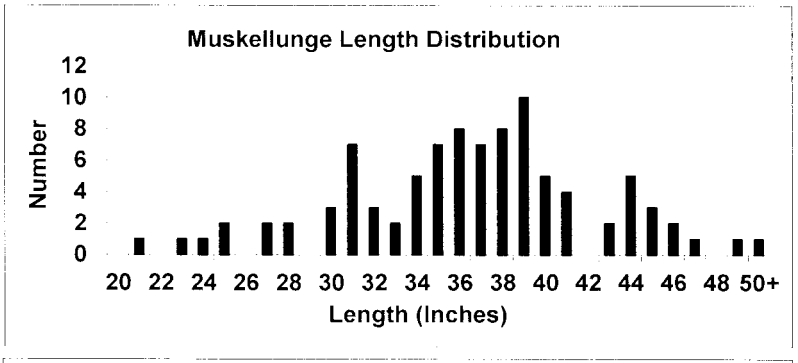
* Note: Adult walleye are defined as all sexable walleye (regardless of length) and those of unknown sex ≥ 15 inches in length.



Muskellunge

During the survey 91 adult muskellunge were captured and marked (fin clipped). Approximately 26% of the adult muskellunge were greater than 40 inches long or larger. The largest muskellunge captured was a 50.9 inch long female.

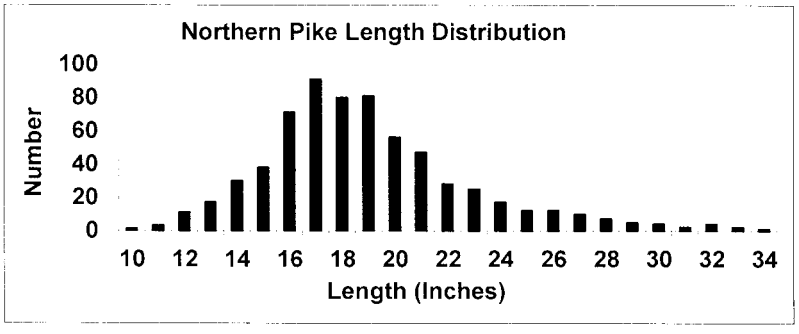
Netting will again take place in the spring of 2016 to recapture muskellunge marked this year in order to make a population estimate.



Northern Pike

Northern pike are common in Little Saint Germain Lake. A total of 655 were captured during this survey. There was no attempt to make a population estimate of this species.

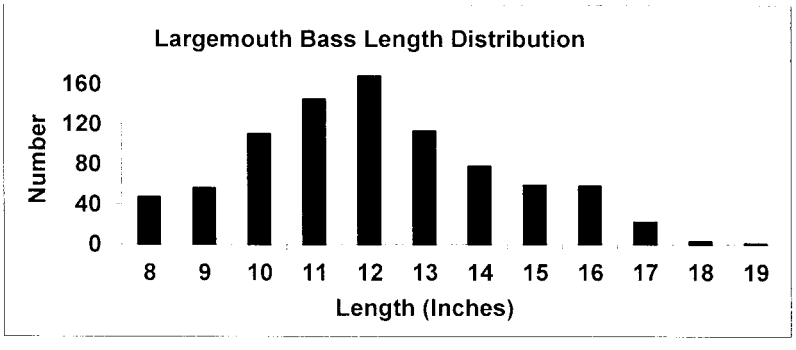
The average length of the northern pike captured was poor. Only 7% were greater than 26 inches in length. The largest pike captured was a 34.2 inch long female.



Largemouth Bass

Largemouth bass are abundant Little Saint Germain Lake. Survey crews captured 860 fish eight inches or greater in length. Sufficient numbers of largemouth bass were captured to calculate a population estimate. The largemouth bass population in Little Saint Germain Lake (eight inches or larger) was estimated to be 7,812 fish (8.0/acre).

Only 26 % of the largemouth bass in this estimate were 14 inches or greater in length. The largest largemouth bass captured was 19.7 inches long.



Drafted: August 5, 2015
By: Steve Gilbert

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Smallmouth Bass
Smallmouth bass are present in Little Saint Germain Lake but in low numbers. There was no attempt to calculate a population estimate for this species.

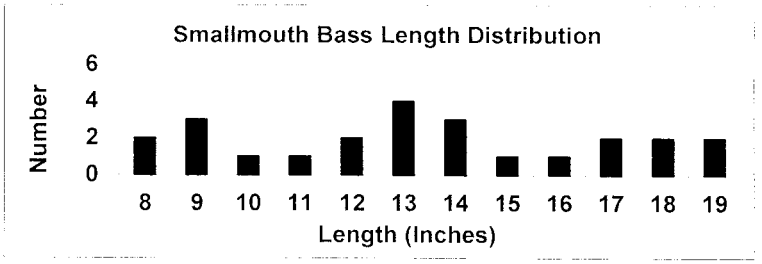
Survey crews captured 24 smallmouth bass during sampling greater than eight inches in length. Forty six percent of the smallmouth bass were 14 inches or greater in length. The largest smallmouth bass captured was 19.7 inches long.

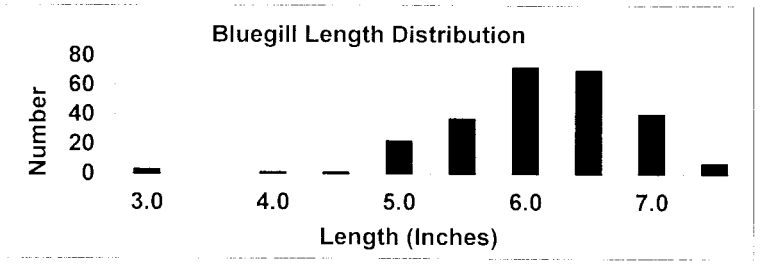
PANFISH
Panfish information presented here was collected from fyke nets set at various times during the spring survey. Overall, Little Saint Germain lake has an abundant panfish population that lacks numbers of quality sized fish.

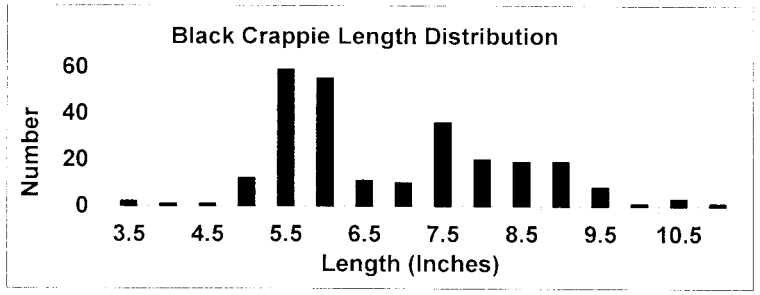
Bluegill
Bluegill are the most abundant panfish species present in Little Saint Germain Lake. Few quality sized bluegill were captured in this survey. None of the fish from a random sample of 253 measured was greater than eight inches in length. The largest bluegill captured during the survey measured 7.7 inches long.

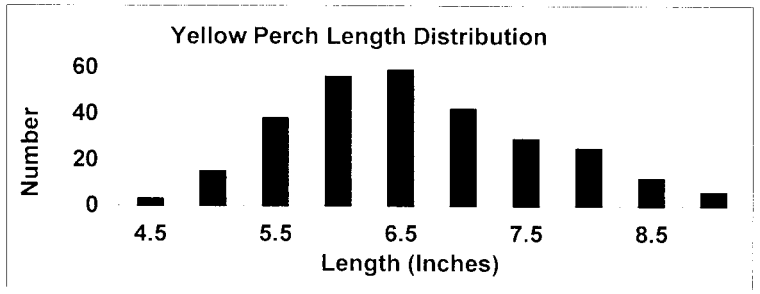
Black Crappie
Black Crappies are also very abundant in Little Saint Germain Lake. From a random sample of 258 crappies measured, only 2% were 10.0 inches long or longer. The largest crappie captured during the survey was 11.0 inches long.

Yellow Perch
Yellow perch are moderately abundant in Little Saint Germain Lake. From a random sample of 285 fish measured, only 15% were 8.0 inches long or longer. The largest yellow perch captured during the survey was 9.4 inches long.









Other Fish Species

Other fish species captured during this survey but in lower numbers were: pumpkinseed, rock bass, white sucker, yellow bullhead, black bullhead, central mudminnow and golden shiner.

General Fishing Regulations for Little Saint Germain Lake, Vilas County, 2015

FISH SPECIES	OPEN SEASON	DAILY LIMIT	MINIMUM LENGTH
Walleye	May 2 - March 6	3	15"min. length, 20-24" no harvest slot 1 fish over 24" allowed
Smallmouth Bass	May 3 - June 20 June 21 - March 6	0 5 in total w/ LMB	Catch and Release 14 inches
Largemouth Bass	May 3 - March 6	5 in total w/ SMB	14 inches
Muskellunge	May 24 - Nov. 30	1	45 inches
Northern Pike	May 3 - March 6	5	No minimum length

The regulatory information provided was current at the time the surveys were conducted. You may obtain a copy of current fishing regulations when you purchase your fishing license, or download a copy from our web site at:
http://dnr.wi.gov/topic/fishing/regulations/

This report is interim only; Watch for finalized summaries at: http://dnr.wi.gov/topic/fishing/north/trtysprngsrvys.html. Creel survey results should be available by June 2016 at: http://dnr.wi.gov/topic/fishing/north/trtycrlsrvys.html. For questions, contact:

Lawrence Eslinger, Treaty Fisheries Biologist
Wisconsin Department of Natural Resources
8770 Highway J
Woodruff, WI 54568
(715) 356-5211 Ext. 209

For answers to questions about fisheries management activities and plans for Little Saint Germain Lake, Vilas County, contact:

Steve Gilbert, Fisheries Biologist
Wisconsin Department of Natural Resources
8770 Highway J
Woodruff, WI 54568
Phone: (715) 356-5211 Ext 229
Email: Stephen.Gilbert@Wisconsin.gov

Drafted: August 5, 2015
By: Steve Gilbert

File: Little Saint Germain_Summary_2015 Excel

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
CREEL SURVEY REPORT

LITTLE SAINT GERMAIN LAKE

VILAS COUNTY

2015-16

Treaty Fisheries Publication

Compiled by Jason Halverson &
Jeff Blonski
Treaty Fisheries Technicians

CONTENTS

SUMMARY TABLES

Cover Art: Steve Hilt, Portland, OR
Fish Graphics: Virgil Beck, Stevens Point, WI

INTRODUCTION

Fish populations can fluctuate due to natural forces (weather, predation, competition), management actions (stocking, regulations, habitat improvement), inappropriate development (habitat degradation), and harvest impacts. Wisconsin Department of Natural Resources fisheries crews regularly conduct fishery surveys on area lakes and reservoirs to gather the information needed to monitor changes, identify concerns, evaluate past management actions, and to prescribe fishery management strategies. Netting and electrofishing surveys are used to gather data on the status of fish populations and communities (species composition, population size, reproductive success, size/age distribution, and growth rates). The other key component of the fishery that we often need to measure is the harvest.

On many lakes in the Ceded Territory of northern Wisconsin, harvest of fish is divided between sport anglers and the six Chippewa tribes who harvest fish under rights granted by federal treaties. The tribes harvest fish mostly using a highly efficient method, spearing, during a relatively short time period in the spring. Every fish in the spear harvest is counted – a complete "census" of the harvest.

We measure the sport harvest to assess its impact on the fishery. However, it would be highly impractical and very costly to conduct a complete census of every angler who fishes on a lake. Therefore, we conduct creel surveys.

A creel survey is an assessment tool used to sample the fishing activities of anglers on a body of water and make projections, or estimates, of harvest and other fishery parameters. Creel survey clerks work on randomly-selected days and shifts, forty hours per week during the open season for gamefish from the first Saturday in May through the first Sunday in March. Creel surveys are not conducted in November when fishing effort is low and ice conditions are often unsafe. The survey is run during daylight hours, and shift times change from month to month as day length changes.

Creel survey clerks travel their lakes using a boat or snowmobile to count the number of anglers at predetermined times, and to interview anglers who have completed their fishing trip. Data is collected on what species they fished for, catch, harvest, lengths of fish harvested, marks (fin clips or tags), and hours of fishing effort. Collecting completed-trip data provides the most accurate assessment of angling activities, and it avoids the need to disturb anglers while they are fishing.

A computer program is used to make estimates of total catch and harvest of each species, catch and harvest rates, and total fishing effort by month, as well as for the year in total. Keep in mind that these are only estimates based on the best information available, and not a complete accounting of effort, catch, and harvest. Accurate estimates require that we sample a sufficient and representative portion of the angling activity on a lake. The accuracy of creel survey results, therefore, depends on good cooperation and truthful responses by anglers when a creel clerk interviews them.

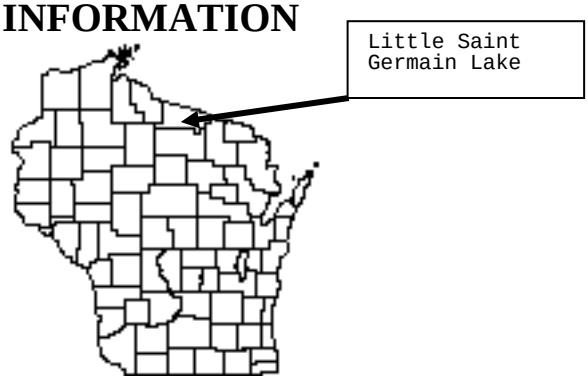
You may have encountered a DNR creel survey clerk on a recent fishing trip. We appreciate your cooperation during an interview. The survey only takes a moment of your time and it gives the Department valuable information needed for management of the fishery.

This report provides estimates of:

1. Overall fishing effort (pressure)
2. Fishing effort directed at each species
3. Catch and harvest rates
4. Numbers of fish caught and harvested

Also included are a physical description of Little Saint Germain Lake; discussion of results of the survey; and detailed summaries, by species, of fishing effort, catch and harvest.

GENERAL LAKE INFORMATION



Location

Little Saint Germain Lake is located in Vilas County in the Town of Saint Germain.

Physical Characteristics

Little Saint Germain Lake is a 980 acre drainage lake with a maximum depth of 53 feet. Littoral substrate consists primarily of sand, with lesser amounts of muck and gravel. Little Saint Germain Lake contains soft, slightly alkaline, clear water of moderate transparency.

Seasons Surveyed

The period referred to in this report as the 2015-16 fishing season ran from May 2, 2015 through March 6, 2016. The open water creel survey ran from May 2 through October 31, 2015, and the ice fishing creel survey ran from December 1, 2015 through March 6, 2016.

Weather

Ice-out on Little Saint Germain Lake was around April 14, 2016. Fishable-ice formed on Little Saint Germain Lake in late December.

Fishing Regulations

The following seasons, daily bag limits, and length limits were in place on Little Saint Germain Lake during the 2015-16 fishing season:

Species	Season	Bag Limit	Min. Size
Largemouth Bass	5/2-3/6	5	14"
Smallmouth Bass	5/2-6/19	Catch&Release	
	6/20-3/6	5	14"
Musky	5/23-11/30	1	45"
Northern Pike	5/2-3/6	5	none
Walleye	5/2-3/6	3	15"
20"-24" Protected Slot, 1>24"			
Panfish	year round	25	
No More Then 10 of Any Species			
Rock Bass	year round	none	none

SPECIES CATCH AND HARVEST INFORMATION

Angling effort, catch, and harvest information is summarized for each species in Table 2 and Figures 1-10. Table 2 also includes a comparison of these statistics with the previous creel survey. Information presented about species whose fishing season extends beyond March 6 should be considered minimum estimates. Each species page has up to five graphs depicting the following:

1. **ESTIMATED FISHING EFFORT**
   Total calculated number of hours during each month that anglers spent fishing for a species.

2. **ESTIMATED SPECIFIC CATCH AND HARVEST RATES**
   Calculated number of hours it takes an angler to catch or harvest a fish of the indicated species. Only information from anglers who were

specifically targeting that species is reported.

3. **ESTIMATED CATCH AND HARVEST**
   Calculated number of fish of the indicated species caught or harvested by all anglers, regardless of targeted species.

4. **LENGTH DISTRIBUTION OF HARVESTED FISH**
   All fish of a species that were measured by the clerk during the entire creel survey season.

5. **LARGEST AND AVERAGE LENGTH OF HARVESTED FISH**
   Monthly largest and average length of harvested fish of a species. Only those fish measured by the creel survey clerk are reported.

CREEL SURVEY RESULTS AND DISCUSSION

Survey Logistics

The creel survey went well. We encountered no unusual problems conducting the survey or calculating the estimates contained in the report. This was the third time the department conducted a creel survey on Little Saint Germain Lake. The last creel survey took place in 1997-98.

General Angler Information

Anglers spent 99,326 hours, or 101.4 hours per acre, fishing Little Saint Germain Lake during the 2015-16 season (Table 1). That was more than the Vilas County average of 35.5 hours per acre. June was the most heavily fished month (23,417 hours). Fishing effort was lightest in December (615 hours) for those months when the entire month was creeled. Anglers spent slightly more time (106.4 hours per acre) fishing during the 1997-98 creel survey. The creel clerks were able to conduct 608 interviews throughout the survey.

RESULTS BY SPECIES

Walleye (Table 2, Figure 1)

Anglers spent 17,811 hours targeting walleyes during the 2015-16 season. The greatest fishing effort for walleyes was in June (3,154 hours). October had the least amount of walleye fishing effort (138 hours).

Total catch of walleyes was 2,187 fish with a harvest of 310 fish. Highest catch (1,253 fish) and harvest (205 fish) occurred in June. Anglers fished 12.9 hours to catch, and 85.5 hours to harvest, a walleye during the survey. The mean length of harvested walleyes was 18.8 inches, and the largest walleye measured was a 26.3-inch fish.

Northern Pike (Table 2, Figure 2)

Fishing effort directed at northern pike was 18,168 hours during the 2015-16 season. Northern pike fishing effort was greatest in July (3,808 hours). Total catch of northern pike was 6,513 fish with a harvest of 728 fish. The mean length of harvested northern pike was 23.1 inches, and the largest northern pike measured was a 30.5-inch fish.

Muskellunge (Table 2, Figure 3)

Anglers spent 12,826 hours targeting muskellunge during the 2015-16 season. Muskellunge fishing effort was greatest in June (4,282 hours). Total catch of muskellunge was 295 fish, and the highest catch (125 fish) occurred in June. Anglers fished 69.0 hours to catch a muskellunge, and there was no documented harvest during the survey.

Smallmouth Bass (Table 2, Figure 4)

Fishing effort targeted at smallmouth bass was 26,035 hours during the 2015-16 season. Smallmouth bass fishing effort was greatest in July (6,949 hours). Total catch of smallmouth bass was 1,266 fish, and there was no documented harvest during the survey. Highest catch (404 fish) occurred in May. Anglers fished 39.5 hours to catch a smallmouth bass during the survey.

Largemouth Bass (Table 2, Figure 5)

Largemouth bass received the most fishing effort for any gamefish species during 2015-16 season. Fishing effort directed at largemouth bass was 29,699 hours. Largemouth bass fishing effort was greatest in July (8,547 hours). Total catch of largemouth bass was 21,082 fish, with a harvest of 561 fish. Highest catch (5,964 fish) occurred in June. Anglers fished 1.9 hours to catch a largemouth bass during the survey.

Panfish (Table 2, Figures 6-10)

Yellow perch received 18,985 hours of directed fishing effort. Total catch of yellow perch was 10,196 fish, with a harvest of 2,773. The mean length of yellow perch harvested was 8.5 inches.

Bluegills received 33,196 hours of directed fishing effort. Total catch of bluegills was 109,658 fish, with 25,351 being harvested. The mean length of bluegills harvested was 7.0 inches.

Black crappies were the most sought after panfish species during the survey. Fishing effort directed at black crappies was 46,641 hours. Anglers caught 71,062 black crappies, with a harvest of 24,933 fish. The mean length of black crappies harvested was 9.0 inches.

Pumpkinseeds received 7,190 hours of directed fishing effort. Total catch of pumpkinseed was 10,777 fish, with 3,842 being harvested. The mean length of pumpkinseed harvested was 7.0 inches.

Rock bass were also caught and harvested during the 2015-16 season in low numbers.

ACKNOWLEDGMENTS

Completion of this survey was possible because of the efforts of the following fisheries management and treaty fisheries staff: Lawrence Eslinger, Jeff Blonski, Joelle Underwood, Jason Halverson, Tim Tobias, Steve Gilbert, Steve Timler, Dave Farrow, and Eric Brown. Andrew Disch and Dave Farrow were the creel clerks on Little Saint Germain Lake during the survey period.

We thank all the anglers who took the time to offer information about their fishing trip to the survey clerk. Without their cooperation the survey would not have been possible.

The department thanks our cooperators, Ken and Tom Jackson of Jackson Lakeside Cottages, who generously allowed the department to keep a boat and snowmobile on their property during this survey.

This creel report was reviewed by Steve Gilbert and Lawrence Eslinger of the Wisconsin Department of Natural Resources, Woodruff, Wisconsin.

Additional copies of this report, and those covering other local lakes, can be obtained from the Woodruff DNR or online at:
http://dnr.wi.gov/topic/Fishing/north/trtycrlsrvys.html

Table 1. Sportfishing effort summary, Little Saint Germain Lake, 2015-16 season.

Month	Number of Angler Party Interviews	Total Angler Hours	Total Angler Hours/Acre	1997-98 Total Angler Hours/Acre	Vilas County Average Hours/Acre	Ceded Territory Average Hours/Acre
May	106	14144	14.4	11.2	5.4	5.0
June	92	23417	23.9	31.6	7.1	6.4
July	74	23241	23.7	23.0	7.5	6.8
August	66	16229	16.6	20.2	6.6	5.5
September	51	11323	11.6	8.5	4.3	3.3
October	59	3236	3.3	5.4	2.0	1.5
December	10	615	0.6	3.3	0.6	1.1
January	84	3195	3.3	1.2	0.8	1.7
February	54	3656	3.7	1.8	1.0	1.6
March	12	270	0.3	0.1	0.2	0.2
*Summer Total	448	91589	93.5	100.0	32.9	28.5
*Winter Total	160	7737	7.9	6.4	2.6	4.6
Grand Total	608	99326	101.4	106.4	35.5	33.1

*"Summer" is May-October; "Winter" is December-March

Number of Angler Party Interviews is the number of groups of anglers interviewed by the creel clerk. A party is considered the members of a group who fish together in the same boat, ice shanty, or from shore. The clerk fills out one interview form for each group of anglers. The number of individual anglers actually contacted by the clerk is usually much greater than the number of groups listed in this table since most groups consist of more than one angler.

Total Angler Hours is the estimated total number of hours that anglers spent fishing on Little Saint Germain Lake during each month surveyed.

Total Angler Hours/Acre is the total angler hours divided by the area of the lake in acres. This is useful in order to compare effort on Little Saint Germain Lake to other lakes.

1997-98 Total Angler Hours/Acre is the total angler hours divided by the area of the lake in acres. This is from the previous creel survey that took place on Little Saint Germain Lake.

County Average Hours/Acre is the average angler effort in hours per acre for county lakes that have been surveyed since 1990. This value is useful for fishing pressure comparisons with other waters.

Ceded Territory Average Hours/Acre is the average angler effort in hours per acre for inland lakes in the ceded territory that have been surveyed since 1990. This value can be used to compare Little Saint Germain Lake to other lakes in northern Wisconsin.

Table 2. Comparison of creel survey synopses, Little Saint Germain Lake, 2015-16 and 1997-98 fishing seasons.

CREEL YEAR: 2015-16

SPECIES	DIRECTED EFFORT (Hours)	PERCENT OF TOTAL	TOTAL CATCH	SPECIFIC CATCH RATE (Hrs/Fish) *	TOTAL HARVEST	SPECIFIC HARVEST RATE (Hrs/Fish) **	MEAN LENGTH OF HARVESTED FISH
Walleye	17811	8.5%	2187	12.9	310	85.5	18.8
Northern Pike	18168	8.6%	6513	4.1	728	25.9	23.1
Muskellunge	12825	6.1%	295	69.0	0		
Smallmouth Bass	26035	12.4%	1266	39.5	0		
Largemouth Bass	29699	14.1%	21082	1.9	561	119.0	15.5
Yellow Perch	18985	9.0%	10196	4.3	2773	15.1	8.5
Bluegill	33196	15.8%	109658	0.4	25351	1.4	7.0
Black Crappie	46641	22.2%	71062	0.7	24933	1.9	9.0
Pumpkinseed	7190	3.4%	10777	0.8	3842	2.2	7.0
Rock Bass	0	0.0%	1253		52		7.0

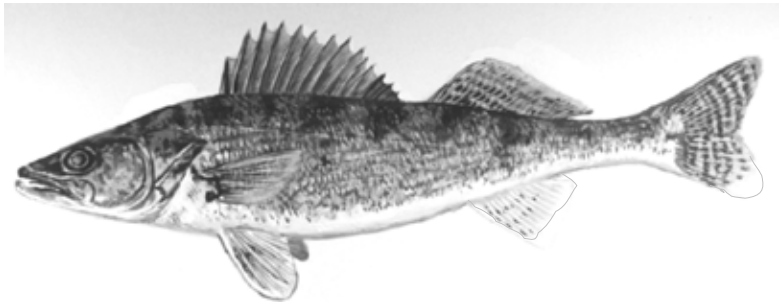
* A blank cell in this column indicates that no fish of a given species were caught by anglers who specifically targeted that species.

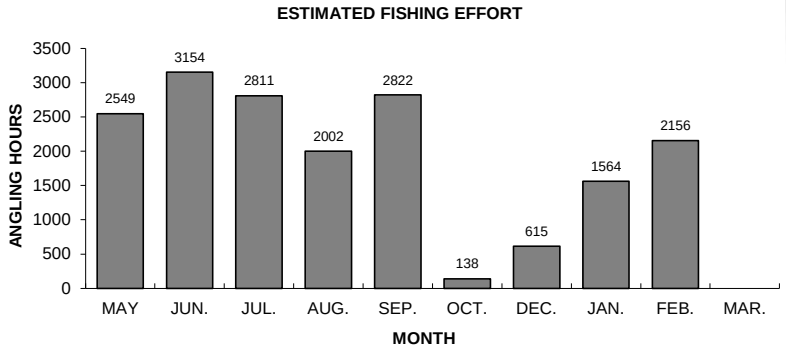
** A blank cell in this column indicates that no fish of a given species were harvested by anglers who specifically targeted that species.

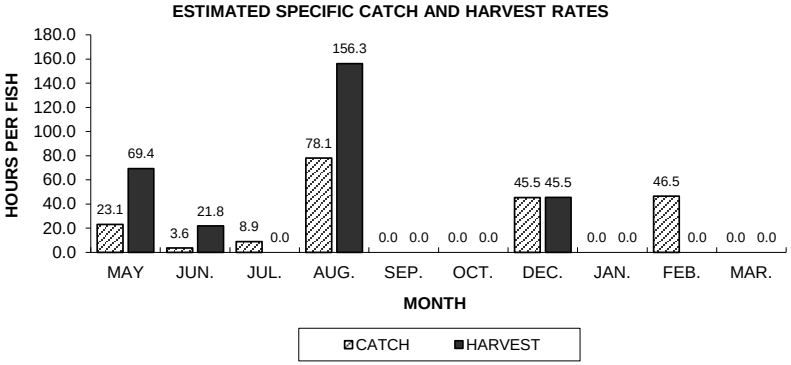
CREEL YEAR: 1997-98

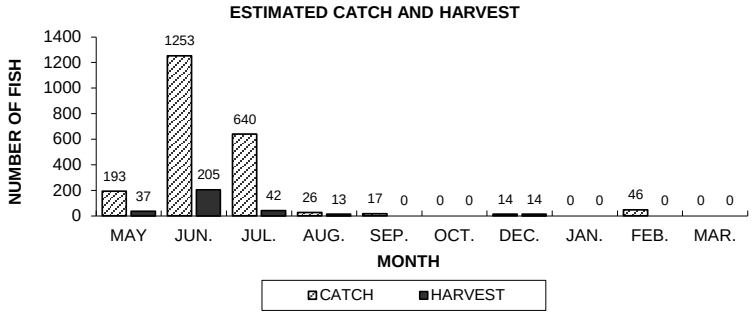
SPECIES	DIRECTED EFFORT (Hours)	PERCENT OF TOTAL	TOTAL CATCH	SPECIFIC CATCH RATE (Hrs/Fish)	TOTAL HARVEST	SPECIFIC HARVEST RATE (Hrs/Fish)	MEAN LENGTH OF HARVESTED FISH
Walleye	15406	8.1%	1973	11.4	213	92.6	17.7
Northern Pike	29696	15.7%	21152	2.7	2220	16.6	20.8
Muskellunge	23405	12.4%	658	69.0	39	588.2	36.3
Smallmouth Bass	10375	5.5%	1225	14.2	23	909.1	11.7
Largemouth Bass	9939	5.2%	2035	17.1	60	204.1	14.3
Yellow Perch	25264	13.3%	27279	1.2	7760	3.8	7.7
Bluegill	26915	14.2%	42525	0.7	12125	2.4	6.9
Black Crappie	36545	19.3%	45010	0.8	19245	1.9	8.9
Pumpkinseed	11309	6.0%	17477	0.7	6694	1.8	6.7
Rock Bass	600	0.3%	1152	1.3	94	31.3	6.7

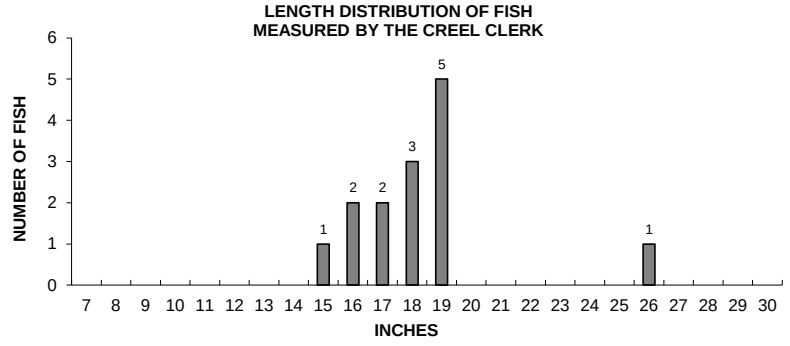
WALLEYE











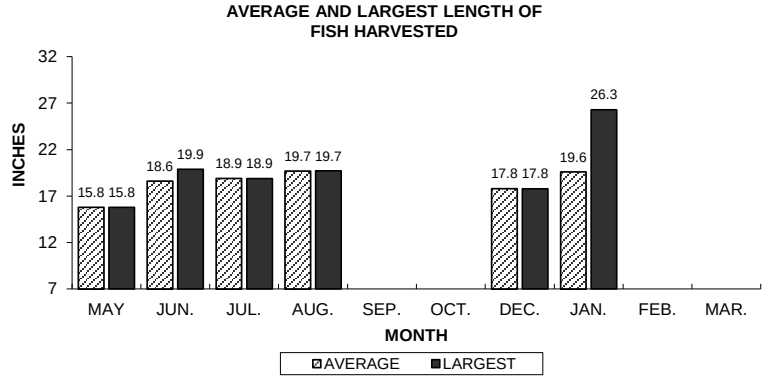
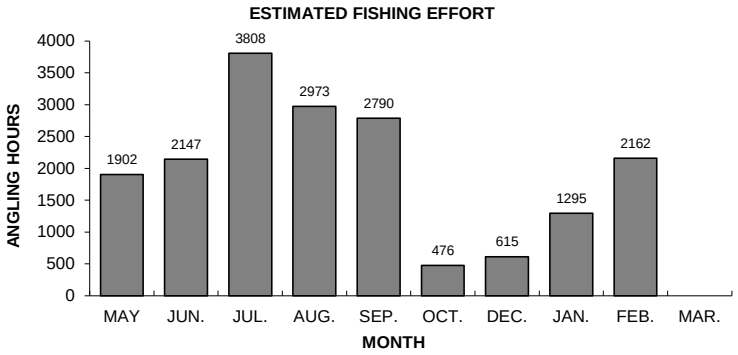
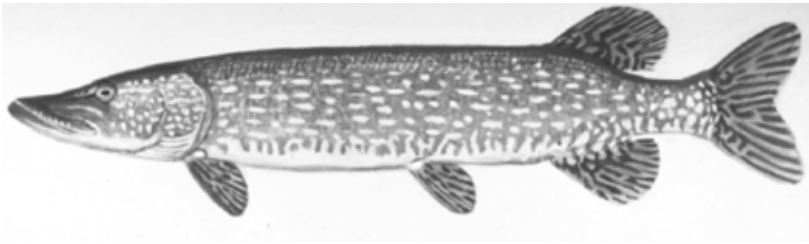
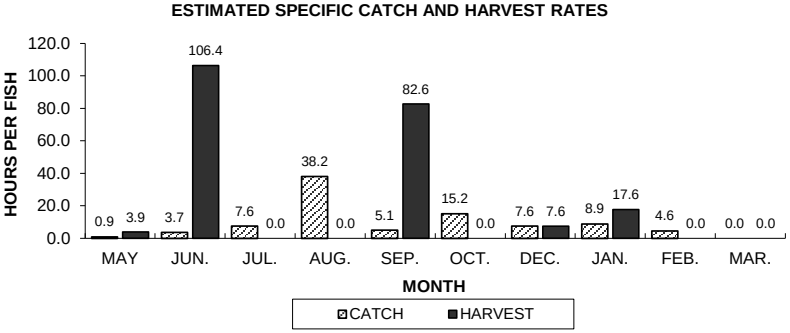


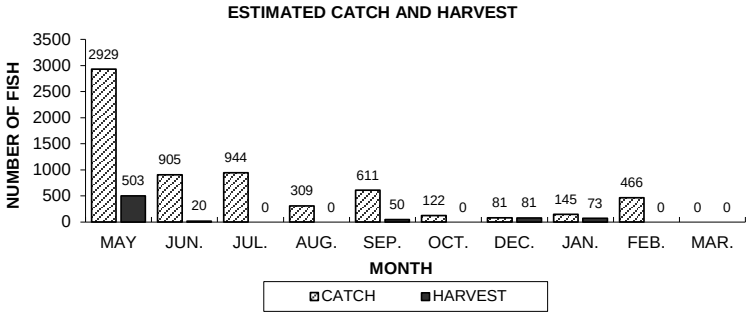
Figure 1. Walleye sportfishing effort, catch, harvest, and length distribution, Little Saint Germain Lake, during 2015-16.

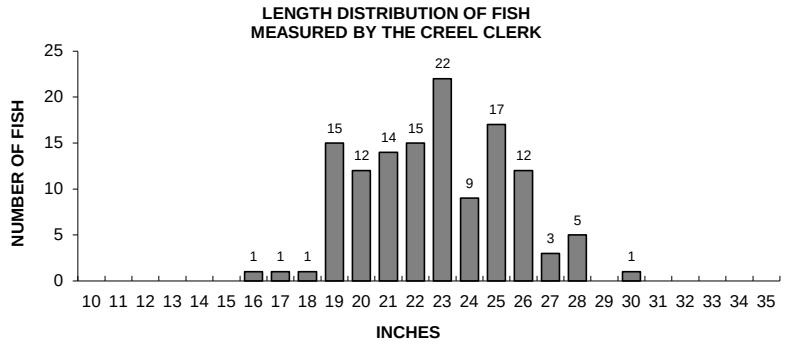


NORTHERN PIKE









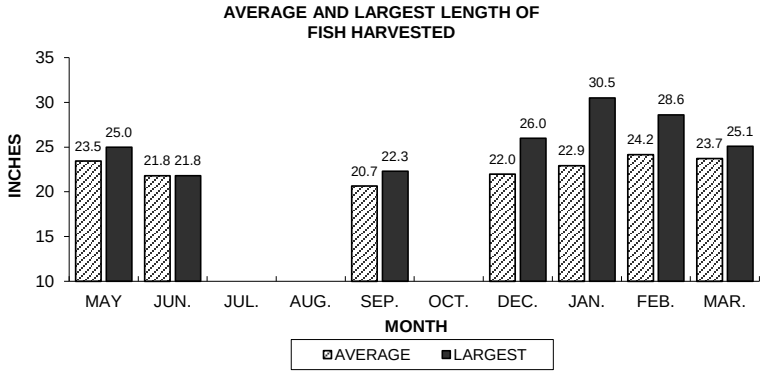
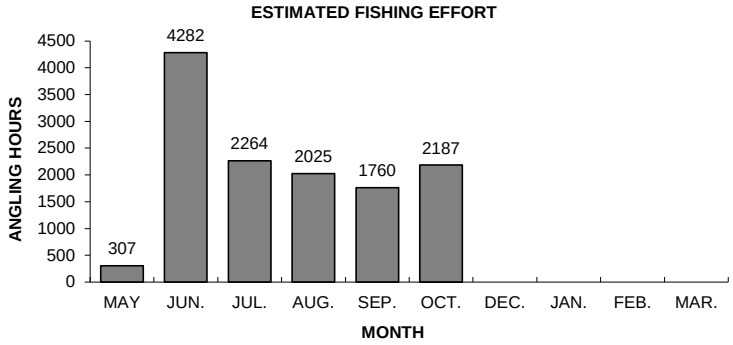
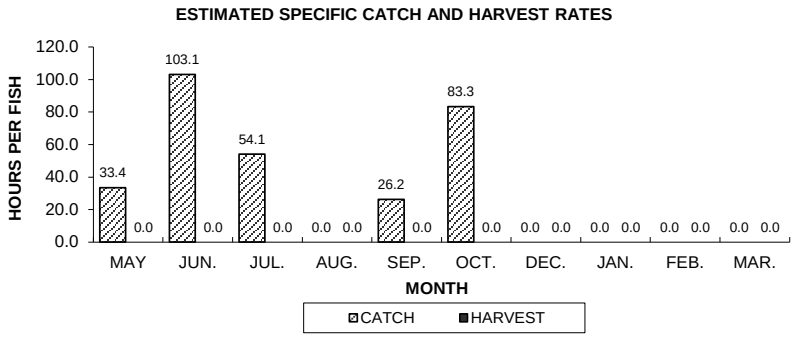


Figure 2. Northern pike sportfishing effort, catch, harvest, and length distribution, Little Saint Germain Lake, during 2015-16.

MUSKELLUNGE





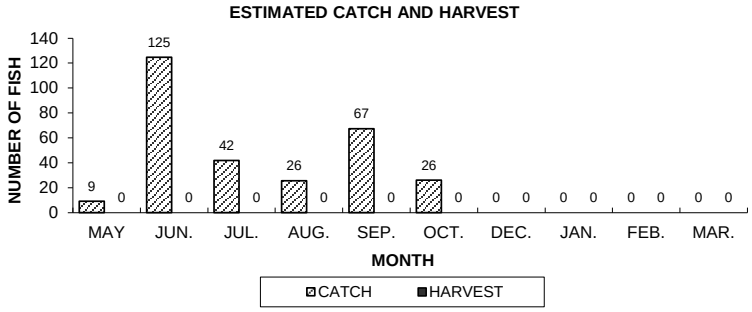
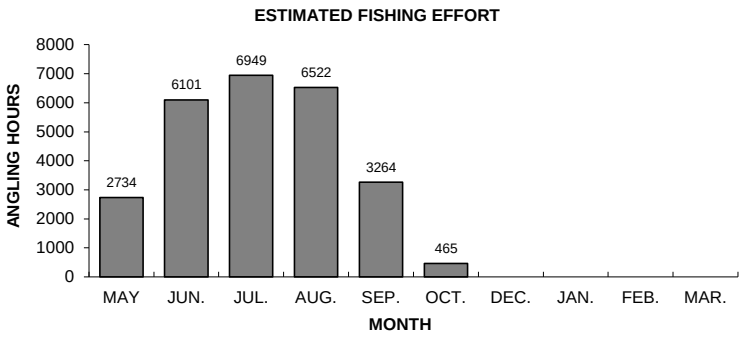
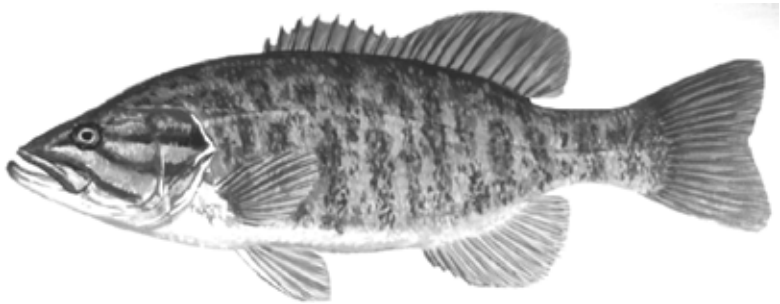
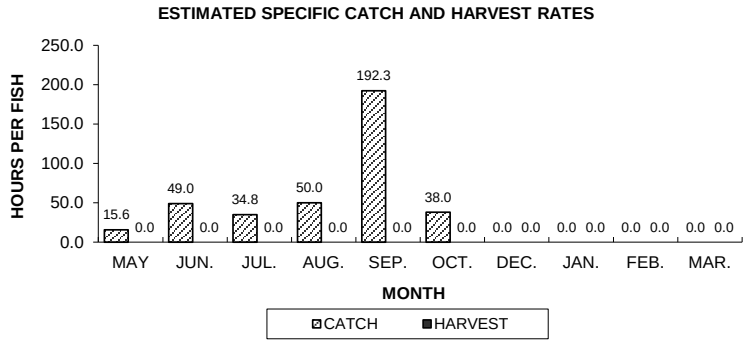


Figure 3. Muskellunge sportfishing effort, catch, harvest, and length distribution, Little Saint Germain Lake, during 2015-16.

SMALLMOUTH BASS







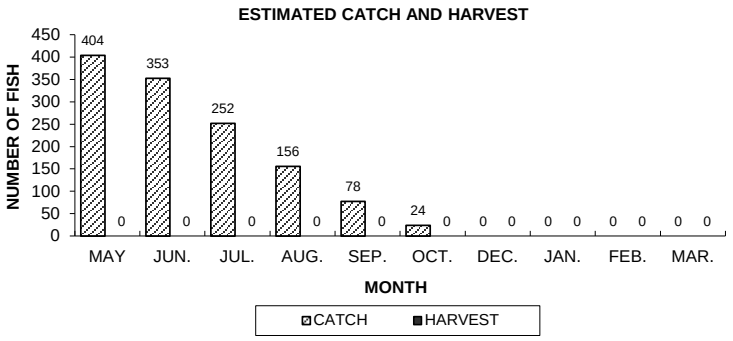
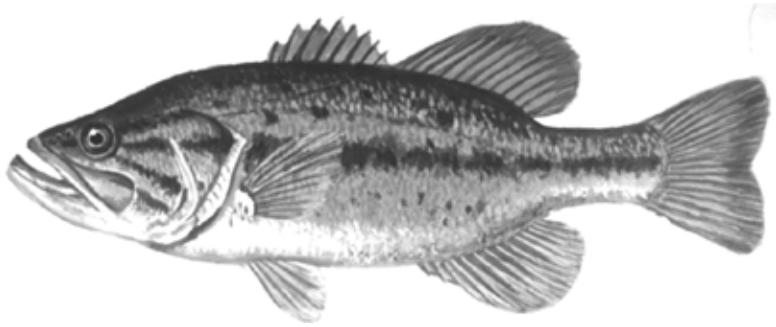
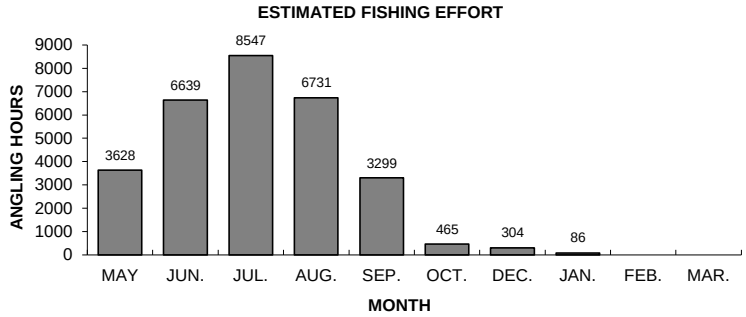
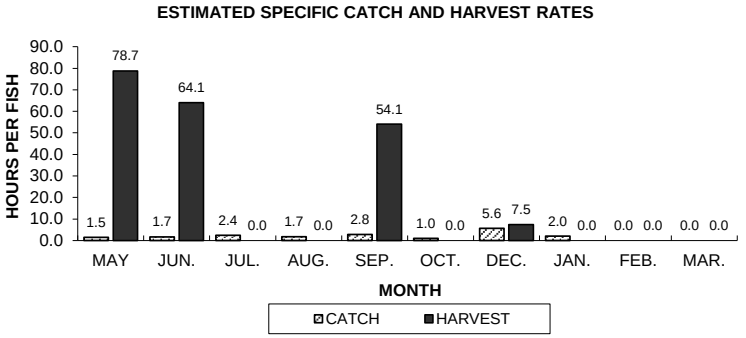


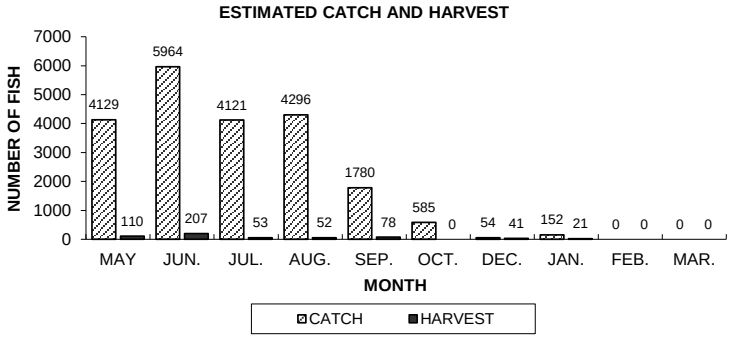
Figure 4. Smallmouth bass sportfishing effort, catch, harvest, and length distribution, Little Saint Germain Lake, during 2015-16.

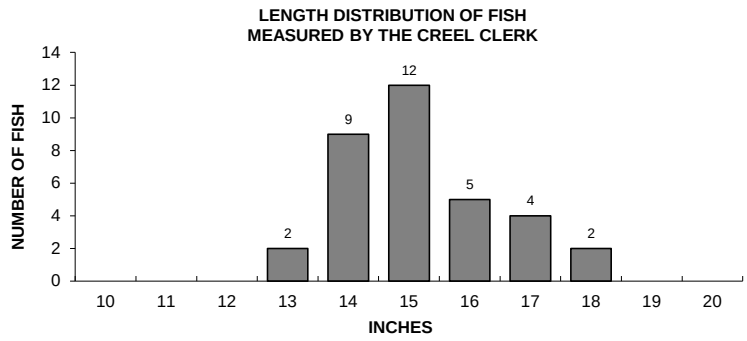
LARGEMOUTH BASS











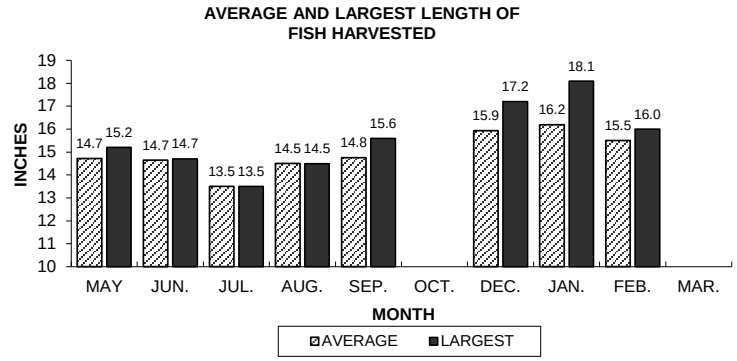
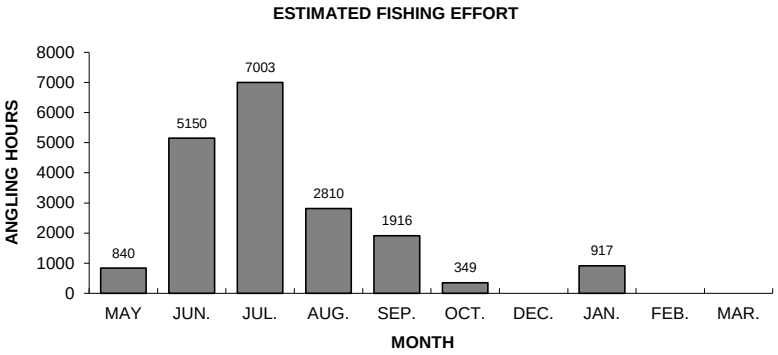
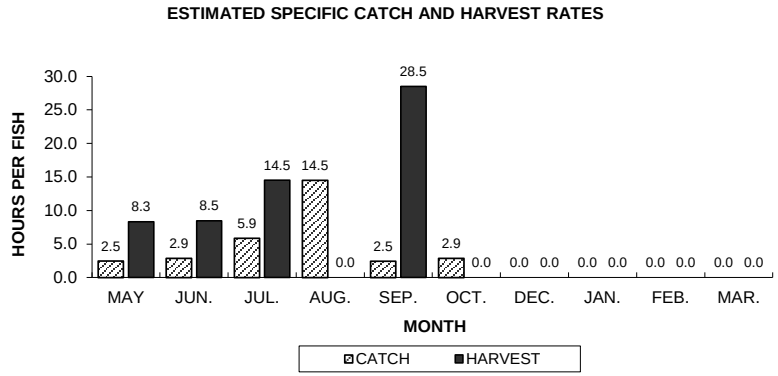
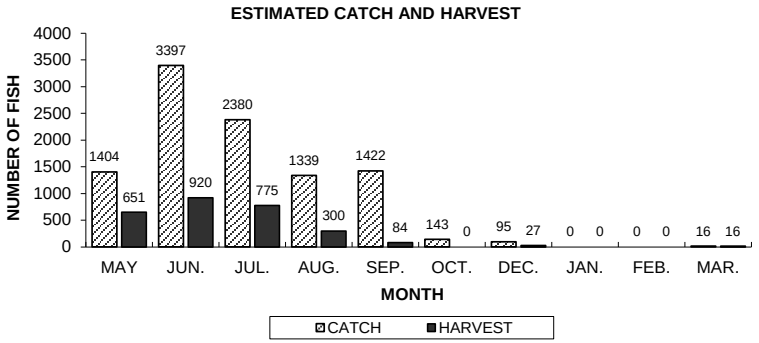


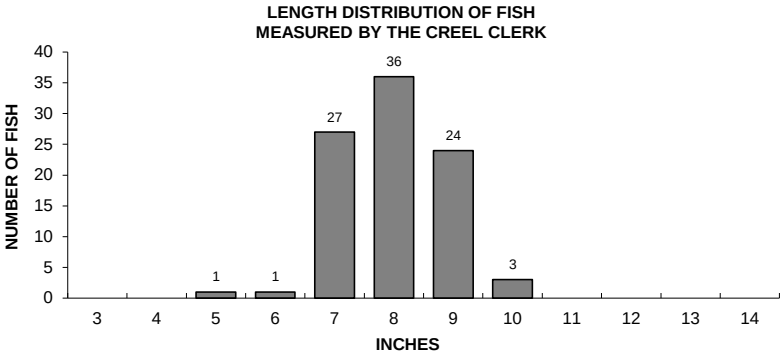
Figure 5. Largemouth bass sportfishing effort, catch, harvest, and length distribution, Little Saint Germain Lake, during 2015-16.

YELLOW PERCH









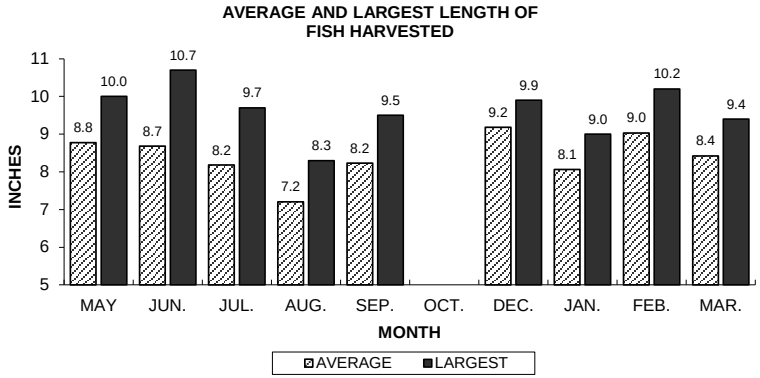
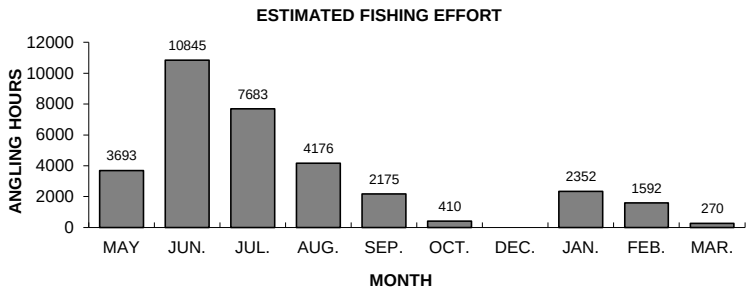
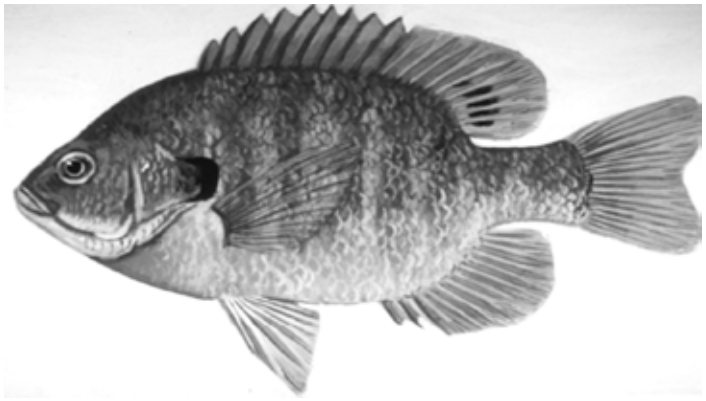
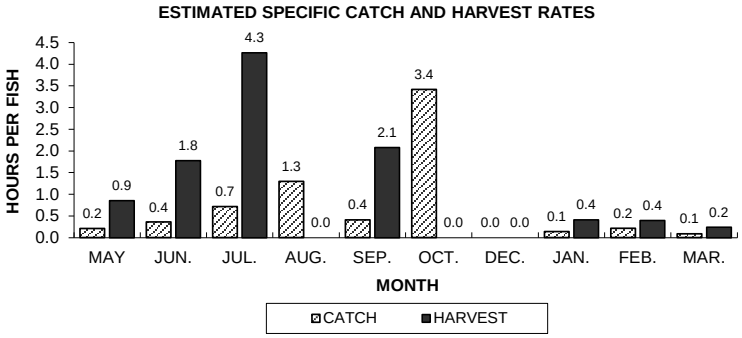


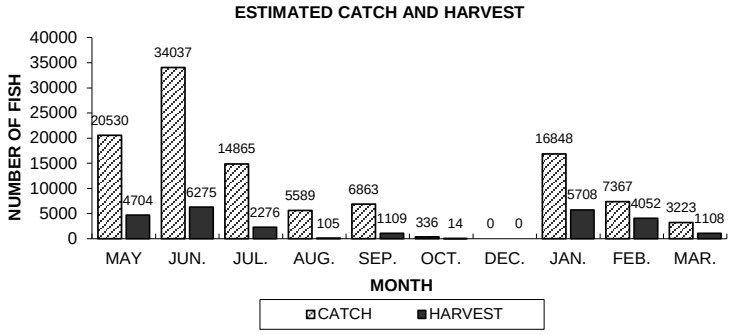
Figure 6. Yellow perch sportfishing effort, catch, harvest, and length distribution, Little Saint Germain Lake, during 2015-16.

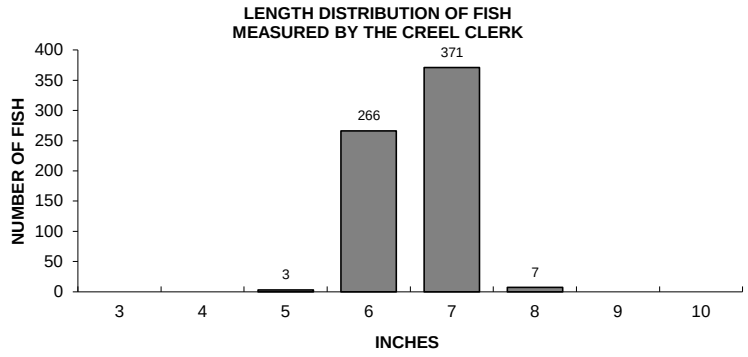
BLUEGILL











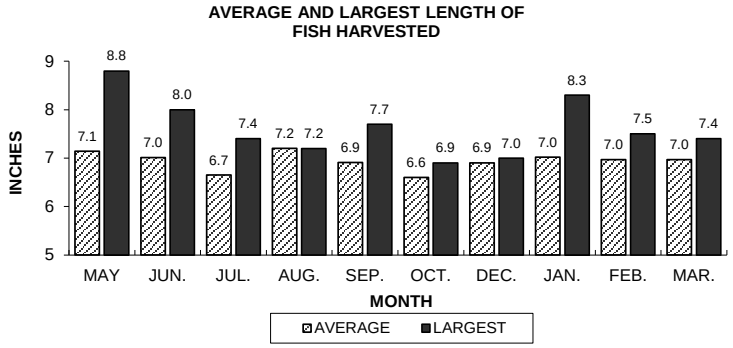
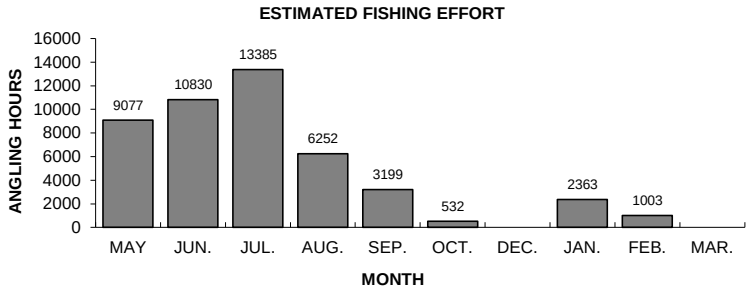
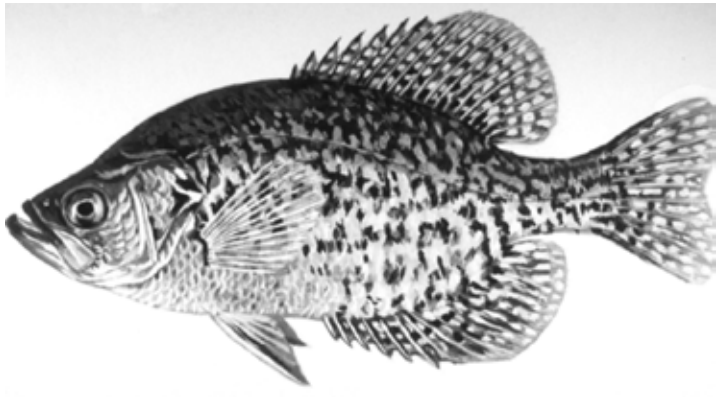
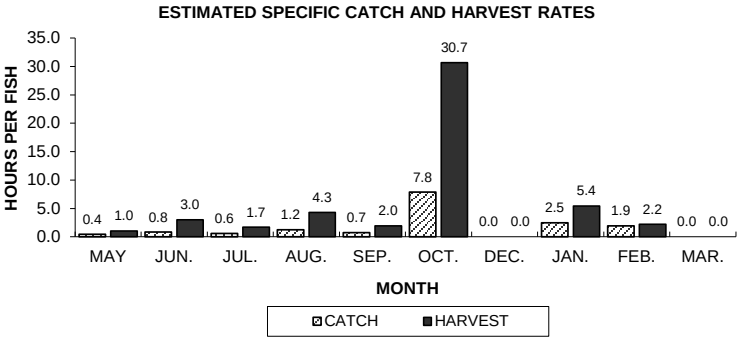


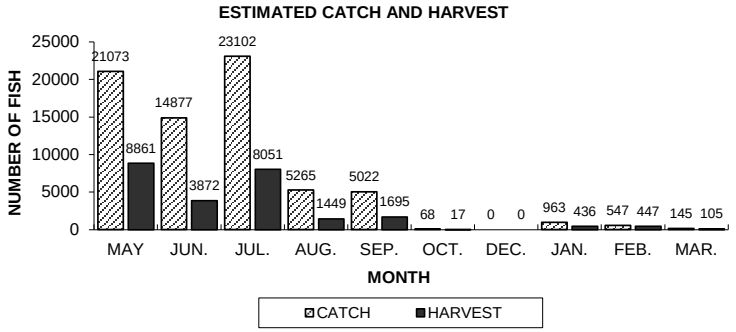
Figure 7. Bluegill sportfishing effort, catch, harvest, and length distribution, Little Saint Germain Lake, during 2015-16 season.

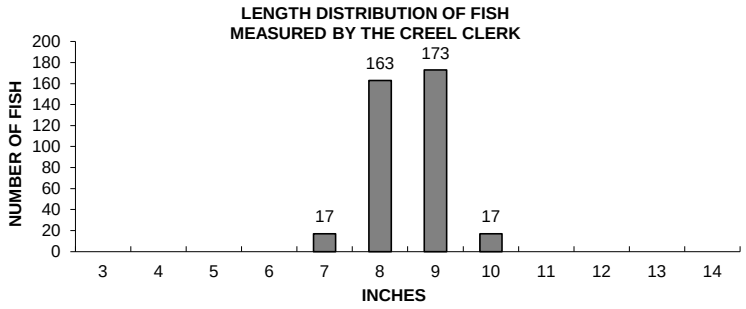
BLACK CRAPPIE











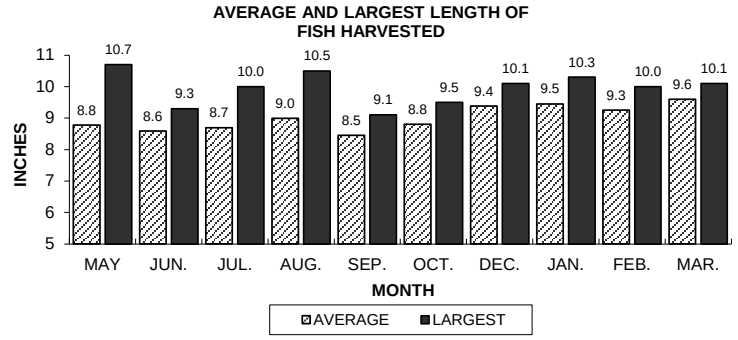
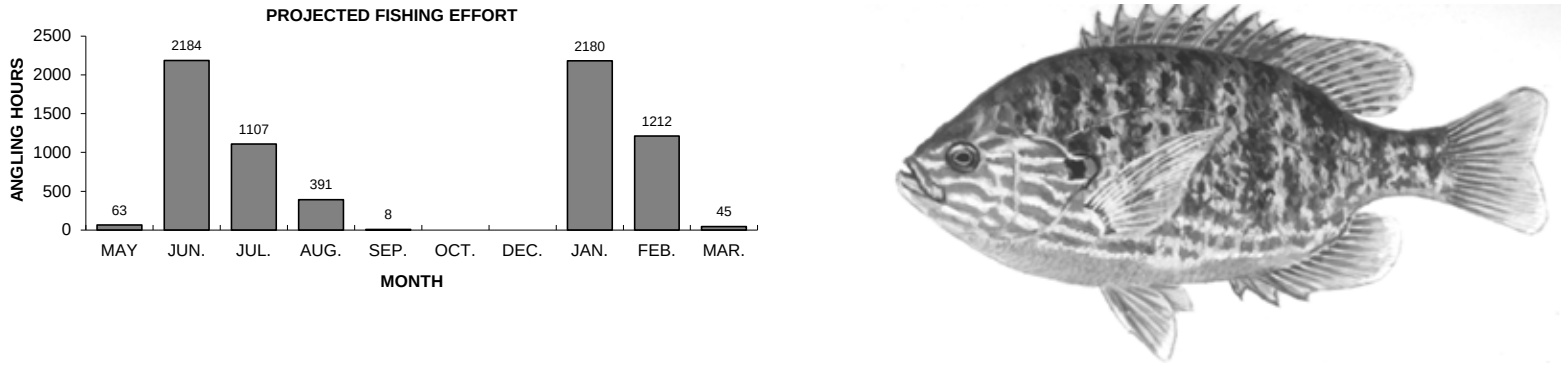
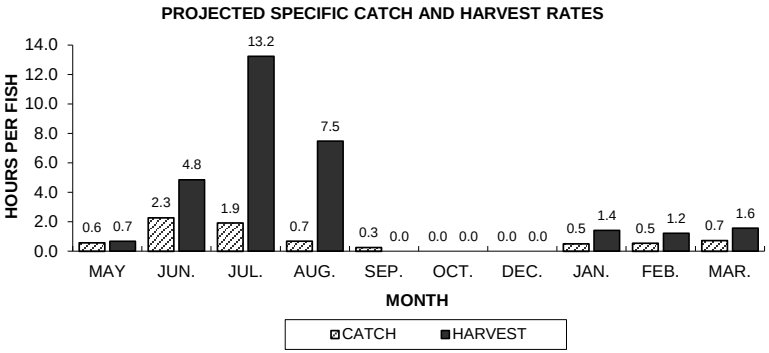
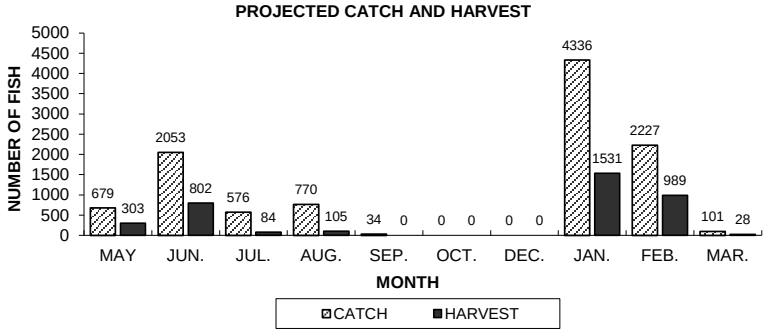


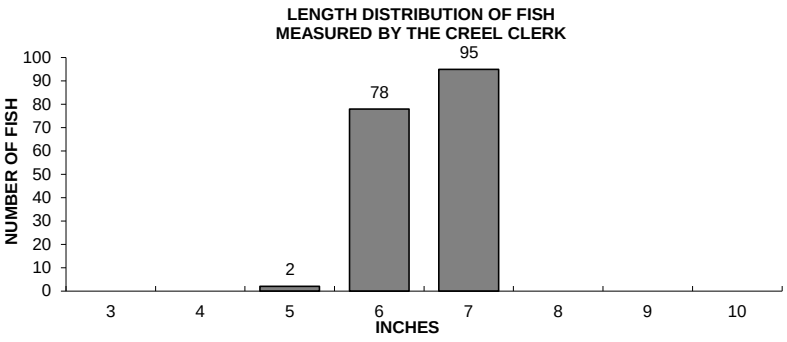
Figure 8. Black crappie sportfishing effort, catch, harvest, and length distribution, Little Saint Germain Lake, during 2015-16.

PUMPKINSEED









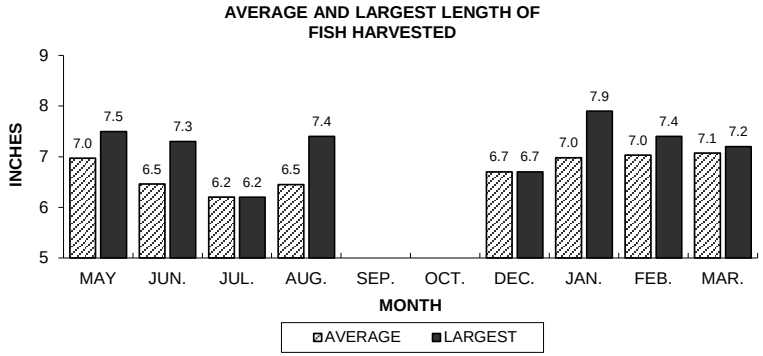
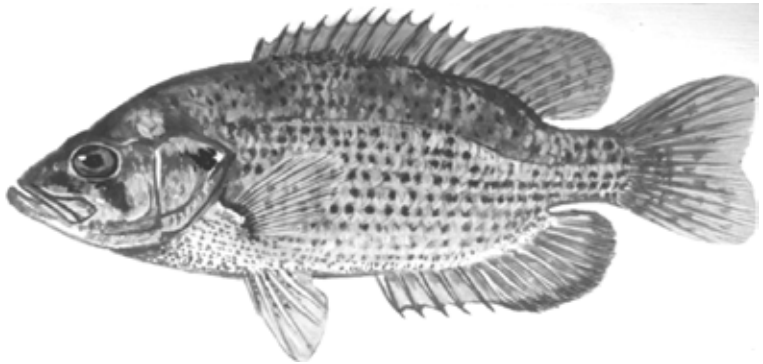
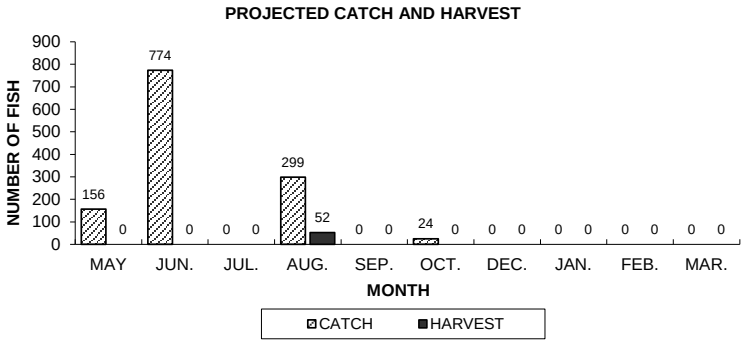
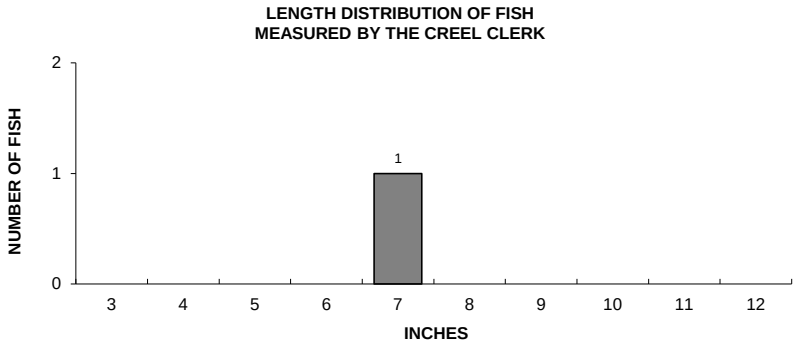


Figure 9. Pumpkinseed sportfishing effort, catch, harvest, and length distribution, Little Saint Germain Lake, during 2015-16.

ROCK BASS







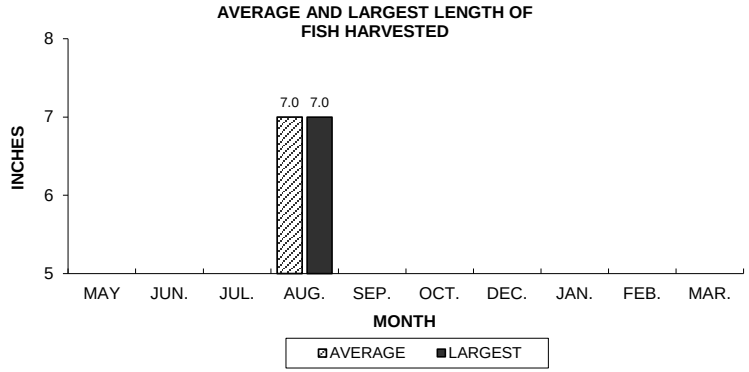


Figure 10. Rock bass sportfishing effort, catch, harvest, and length distribution, Little Saint Germain Lake, during 2015-16.

E

APPENDIX E

Agency Comments on Draft Documents

Comments to Little Saint Germain Lake Draft Comprehensive Management Plan (2/14/18) – Comments Received 7/24/2018

Response Comment by Jessica Wittman-Mass
Response Comment by Eddie Heath
Response Comment by Josephine Barlament

- General comments from Aquatic Plant section. Reviewers were confused in several sections of this part of the plan that seemed to switch back and forth between displaying littoral %FOO and lakewide %FOO (and also relative %FOO). In some instances a graph was labeled as "littoral %FOO" when in actuality it was displaying lakewide %FOO; in other instances it was just labeled as "%FOO" and it was not clear if the plan was talking about littoral or lakewide (or relative or vegetated, for that matter). We recommend QAQC the figure legends, axis labels, and associated text to be sure this data is all accurately represented and very clearly stated in the report, and also that the proper figure #s are referred to throughout the text. Although each individual error may be seen as relatively 'minor' or 'nitpicky' on its own, due to the large number of these 'minor' errors scattered throughout this section of the document, it made a lot of the aquatic plant data figures and associated discussion difficult to follow, which makes the overall 'big picture' review process more challenging. Change has been made. 2004 data was not used as a frequency of occurrence comparable and everything was updated to be LFOO, not FOO.

- **Pg. 65 in PDF, AIS Peak-Biomass Surveys:** Based on Maps 5 & 6 provided in the Appendices, it that seems CLP & EWM peak biomass surveys were also conducted in 2017 (June & Sept, respectively). If so, update the years listed in this text to 2017 (currently listed as 2016 biomass surveys). Change has been made.

- **Pg. 68 in PDF, Figure 3.3-2**: Very minor suggestion – in case you want to update the EWM spread by county map, EWM was recently verified in a Jackson Co. Lake in 2015 (but still no verified EWM records from Clark Co. or Lafayette Co). Change has been made.

- **Pg. 69 in PDF, last paragraph**: Based upon our statewide aquatic plant database, it seems that this should state: "*Of the points that fell within the littoral zone in 2016 (littoral frequency), 47% contained aquatic vegetation, compared to 56% in 2013.*" (not 2008 as currently written; 2008 had a lower max rooting depth of only 12 ft, and a littoral veg %FOO of 71.5% based upon the raw PI data). Change has been made.

- **Pg. 70, in PDF**, **Table 3.3-1:** This table indicates that there were 29 species found on the rake during 2016. Yet on pg. 72 in PDF, 1st paragraph: "*Of the 43 native aquatic plant species….32 were physically encountered on the rake….*". A few species marked as incidentals ("I") in this table during the 2016 PI seem to have been actually found on the rake at one location (and should be an "X") – specifically: BraSc, NupVar, & SpargAng. Change has been made. BRASC, NUPVA, NYMOD, & SPAANG were not marked as encountered on the rake when they were, CLP was marked as encountered on the rake

when it was an incidental species. Also, we encountered 46 species in total during the PI & CM, not 43 species – updated.

- **Pg. 71.** *Najas guadalupensis* was not necessarily misidentified as N. *flexilis*. 2008-2009 was the time span when *Najas guadalupensis* became abundant on many area lakes. Possibly all *Najas* were misidentified, but more likely not. Included an expanded figure, but Onterra is not sure if our surveys properly distinguished between these two species.

- **Pg. 73-75 in PDF, Figures 3.3-7 through 3.3-10**: The individual species littoral %FOO values in Figure 3.3.-7 seems to agree with the raw August 2016 PI data in our database. However, these 2016 % frequencies seem to be reported slightly different in the individual species long-term trend graphs displayed in Figure 3.3-8 (N. guad + N. flex), Figure 3.3-9 (coontail), and Figure 3.3-10 (elodea). For example, Figure 3.3-7 has the coontail littoral %FOO in 2016 reported at 15%, but in Figure 3.3-9 the 2016 value it is reported as 12%. Are these individual species long-term trends graphs displaying something other than littoral %FOO (i.e. relative, vegetated, or lakewide % frequency)? [FOLLOW-UP NOTE: Upon reading down a few paragraphs further, the difference in analysis approach is briefly explained at the end of this section on the bottom of pg. 75 in the PDF, and is related to the different PI sampling methodology employed in 2004. This section explaining the alternative analysis approach should really come first prior to these graphs being displayed or long-term trends discussed in order to avoid confusion. It was unclear what %s were being displayed in these figures until the very end of the discussion. It should be clear in both the figure legends and y-axis labels that these long-term graphs are looking at *lakewide* % FOO and not littoral %FOO. Even though the methodology (spacing between sample points) was slightly different in 2004 vs. the other years, you could still display the littoral %FOO values over time, and just clearly indicate that the intensively of sampling (i.e. # of points sampled) increased between the original 2004 survey and all subsequent surveys. Also note that pg. 64 in the PDF states that the 2004 PI survey had 364 total sample points, while on pg. 75 in the PDF it states that this 2004 survey had 394 sample points.] Change has been made.

- **Pg. 75 Figure 3.3-12.** The FQA, as developed by Nichols, included many species that could potentially be present in the lake. Are the species tallied in the species richness graph for LSG drawn from the same potential list of species as the NLFL Ecoregion or the State? There are many limitations to literally applying the FQA method developed by Nichols, as this metric was developed before the point-intercept sampling method. As outlined in the Primer Section (66), we use the C-value for every plant species that is located during the point-intercept survey.

- **Pg. 76 in PDF, 1st sentence**: "*Figure 3.3-8 and 3.3-9 displays the….that had an occurrence of at least 4% in one of the four surveys.*" Is the criteria >4% *littoral* FOO or >4% *lakewide* FOO? I see individual figures for Najas, coontail, and elodea, but there seem to be other species which also meet this >4% criteria, at least in terms of their 2016 reported littoral %FOO (i.e. white-stem pondweed, wild celery, fern leaf pondweed, flat-stem pondweed, & stoneworts). Or maybe this statement is actually referring to Figure 3.3-11 (and not Figure 3.3-8 or 3.3-9, as currently stated) which displays the range of

dominant species %FOO observed over time?? This statement is referring to 3.3-11, updated.

- **Pg. 76 in PDF, Figure 3.3.-11:** It seems that this is showing the range in *lakewide* %FOO, not littoral %FOO as the figure legend states. As mentioned above, it is really confusing that this section seems to switch back and forth between littoral and lakewide %FOO values. It is suggested that the report just sticks with reporting the littoral %FOOs (which is the standard assessment metric used across the state) rather than trying to switch back and forth between littoral and lakewide. Just make a comment that the 2004 method was slightly different and needs to be taken into consideration if trying to make direct comparisons of littoral %FOO over time. Figure reflects LFOO.

- **Pg. 76** "As explained earlier…" Probably not true, see in press article https://www.maisrc.umn.edu/sites/maisrc.umn.edu/files/muthukrishnan_et_al-2018-journal_of_ecology.pdf?platform=hootsuite This discussion is included in the Primer Section (pg 67)

- **Pg. 77 in PDF, Figure 3.3-12:** The text on this page (and earlier in the document) states that: "*These 32 native species and their conservatism values were used to calculate the FQI*…". However, the associated graph displays 36 native species being found in 2016. Does this species # in the graph also include visuals or incidental native species found, or is it just a typo? These numbers were including lumped species (i.e. counting CHARA, NITELLA, & CHARA+NITELLA as 3 species instead of just counting 2 species for CHARA and NITELLA). This was occurring for all years, so all year's native species richness (encountered on the rake) was updated to remove counting the "lumped" species as an extra native species encountered.

- **Pg. 77 in PDF, last paragraph:** "*The average conservatism values for LSG….6.6 in 2013 and 6.5 in 2016 (Figure 3.3-10*)". This should be directing the readers to Figure 3.3-12, not 3.3-10. Also, Figure 3.3-12 has the 2013 average C-value listed as 6.7, while its listed as 6.6 in the text below the figure (probably just a minor rounding difference). Change has been made.

- **Pg. 79 in PDF, Fig. 3.3-14:** It does not seem that this is actually showing the August 2016 *littoral* %FOO as the figure legend states (these %s are different than what is displayed in Figure 3.3-7). Because the data is displayed in a pie chart which adds up to 100%, and due to the text preceding this figure, it is assumed that this is actually displaying the *relative* %FOO? This is the relative LFOO, change has been made.

- **Pg. 80 in PDF, CLP, 2nd paragraph: "***Johnson et al. 2012 investigated 9 midwestern lakes…..all five years of the project*." Consider **c**larifying that the 'continued reductions' were less substantial in the subsequent years of treatment. Also, a very important finding from this study which should be added to this section is that: "*Despite these reductions, viable turions remained in the sediments of treated lakes after up to 5 consecutive years of treatment*." Additional statement included

- **Pg. 83 in PDF, 1st paragraph:** The Nault et al. 2015 LakeLine article examined the rapid dissipation of herbicide (2,4-D) off of small-scale treatments, which were defined in this study as those treatments between 0.1-10 acres. This particular study did not explicitly show that "*…herbicide concentrations and exposure times of large (>5 acres each) treatment sites are higher and longer than for small sites*" as is stated in this report. This should be rephrased to accurately capture the findings of this particular study, or another source other than Nault et al. 2015 should be cited for this statement. Reviewers comment is understood and citation was revised.

- **Pg. 85 in PDF, Efficacy, 1st paragraph:** *"Properly implemented large-scale….being detected for a year or two following the treatment (Figure 3.4-17)"*. This should be directing the readers to Figure 3.3-20, not 3.4-17. Change has been made.

- **Pg. 88 in PDF, Figure 3.3-21:** Change the figure legend to indicate "2008-2017" (instead of 2008-2016). It would also be very beneficial to include a figure which displays the littoral %FOO for EWM over time based upon the numerous PI surveys done over the past decade (in addition to this EWM bed mapping data). The EWM littoral %FOO over time PI data was not seen anywhere in this report. Change has been made.

- **Pg. 88 in PDF, 1st paragraph:** "*The EWM increased in 2017 in the absence of management (Map 6), but continues to be relative low…*". Directly preceding this statement, it says that professional hand-harvesting was implemented on a few select areas in 2017. Professional hand-harvesting is certainly considered a form of active management, and so this statement is not accurate. If it is meant to indicate that there was an observed increase in the absence of chemical management, explicitly state such. Removed the reference to management.

- **Pg. 92 in PDF, 2nd paragraph**: This section should be referring to Figure 3.**3**-25, not 3.4-25 as stated twice. Change has been made.

- **Pg. 93 in PDF, Figure 3.3-25:** The Weber Lake dated is slightly 'shifted' over time – the EWM data point in this figure for 2009 is actually the data from 2006. There was then a gap of no surveys for several years, and then annual surveys from 2010-2017. So in the bottom panel, the Weber data should start at year 0 (since EWM was first detected in 2006) and not at year 3. Hancock Lake also has PI data from 2006 which is not currently included in this figure (EWM litt FOO = 0.65%). So if this data is included, in the bottom panel the Hancock data should start at year 0 (since EWM was first detected in 2006) and not at year 2. [NOTE: This comment was made in another recent plan review, but just copying it down again so that future reports which use this DNR EWM LTT data graph can be corrected]. Change has been made.

- **Pg. 94 in PDF, Figure 3.3-26:** As mentioned in previous plan reviews, the Sandbar Lake treatment in spring 2013 was a large-scale treatment (same approach as spring 2011) and the line in this figure should be changed from yellow to red. Change has been made.

- **Pg. 95 in PDF, 1st paragraph:** This section should be referring to Figure 3.3-27, not 3.4-27 as stated. Also I believe this paragraph is trying to compare support/lack of support differences observed between the 2008 and 2016 social surveys, but this is not very clear. I think that the last sentence in the first paragraph should read, "*This compares to the 2008 survey with 66% of stakeholder respondents…*"? Change has been made.

- **Pg. 95 in PDF, Figure 3.3-27, left "2008" panel**: There seem to be labels missing for the 27% and 7% pie chart slices, and it is unclear what 'level of support' categories these slices are representing. Also, it seems like dark gray slice in 2008 indicated "moderate support", while dark gray in 2016 indicated "neutral". If the categories changed over time, the same colors should not be used in between the graphs as this may be visually misleading. Change has been made and comparison limitation has been addressed.

- **Pg. 95 in PDF, last paragraph:** This section should be referring to Figure 3.3-28, not 3.4-28 as stated. Change has been made.

- Comments from the fisheries section: - the introduction makes it sound like the energy flow summary that were put into all of these plans was provided by DNR and GLIFWC. It would be more accurate to say the survey work summarized was conducted by DNR and GLIFWC. The netting survey summary is good, with the exception that all fishery staff net. Electrofishing, not electroshocking. Fish are only attracted to DC current (GLIFWC uses DC, we use AC). Technically, fish don't voluntarily swim toward droppers. Everybody nets, not just technicians, and fish aren't always easy to net. DNR no longer stocks fry. Change has been made

- General comment – Concerned about hard triggers/thresholds that might automatically be used to determine an AIS (EWM/CLP) management action. If a developed trigger/threshold invokes data collection and discussion that might lead to management, that would seem reasonable. This would allow each individual year to be compared with previous actions and successes or failures, look at emerging science, the rest of lake biota as a whole picture in considering further management, and perhaps other issues that may arise during a project. Would be glad to discuss. The revised trigger indicates: "Once the trigger has been met and the pretreatment data is collected, the LSGLPRD will review the information in the context the most current science as it relates to improving the efficacy and minimizing collateral impacts of the control actions."

- General comment – glad to see that folks might be interested in shoreland and stormwater improvement projects, either via healthy lakes and/or a lake protection grant. Look forward to possibly working with the district in this endeavor. **No change required.**