

Appendix A

Lake Resident Survey and Results

Big Blake Lake Resident Survey

The following survey is a component of a grant which was received to study Big Blake Lake. The survey should take approximately 5-10 minutes to complete. Responses will remain confidential. Final results will be compiled and used to guide management decisions for Big Blake Lake. Feel free to contact the Polk County Land and Water Resources Department with any questions at 715-485-8699. Surveys should be returned by June 1st to:

LWRD
100 Polk County Plaza- Suite 120
Balsam Lake, WI 54810

Thank you again for your participation!

-
1. How many years have you owned property on Big Blake Lake? Note: If you own more than one property, please answer all questions for the property you have owned the longest.

_____ years
 2. Which of the following best describes how you use your property?
 Year-round residence
 Seasonal residence (continued occupancy for months at a time)
 Weekend, vacation, and/or holiday residence
 Rental property/resort
 Other, please specify _____
 3. How many days in a typical year is your property used by you or others? Just provide your best estimate.

_____ days per year
 4. On the average day that your property is occupied, how many people occupy the property?

_____ people
 5. Do you own shoreline property (including shared access points) on Big Blake Lake?
 No, please skip to question 7 Yes
 6. Beginning at the water's edge, how would you describe the area measuring 35 feet inland (shoreline towards the road)? If you don't own shoreline property, please skip this question. Please check all that apply.

<input type="checkbox"/> Mowed lawn	<input type="checkbox"/> Stabilizing rock/rip rap
<input type="checkbox"/> Un-mowed vegetation	<input type="checkbox"/> Pier/dock
<input type="checkbox"/> Shrubs/trees	<input type="checkbox"/> Buffer zone/shoreline restoration
<input type="checkbox"/> Undisturbed woods	<input type="checkbox"/> Rain garden

7. What activities do you enjoy on Big Blake Lake? Please check all that apply.
- | | |
|--|---|
| <input type="checkbox"/> Swimming | <input type="checkbox"/> Hunting/trapping |
| <input type="checkbox"/> Peace and tranquility | <input type="checkbox"/> Observing birds/wildlife |
| <input type="checkbox"/> Scenic view | <input type="checkbox"/> Open water fishing |
| <input type="checkbox"/> Jet skiing/wakeboarding/waterskiing | <input type="checkbox"/> Ice fishing |
| <input type="checkbox"/> Non-motorized boating (canoe/kayak) | <input type="checkbox"/> Snowmobiling |
| <input type="checkbox"/> Motorized boating | <input type="checkbox"/> Cross country skiing/snowshoeing |
| <input type="checkbox"/> Sailing or wind surfing | <input type="checkbox"/> Other, please list _____ |

8. Which of the following watercraft are kept on your property for use on Big Blake Lake? Please check all that apply.
- | | |
|--|--|
| <input type="checkbox"/> Jet skis | <input type="checkbox"/> Paddleboats/rowboats |
| <input type="checkbox"/> Motorboats/pontoons (1-20 HP) | <input type="checkbox"/> Sailboat |
| <input type="checkbox"/> Motorboats/pontoons (21-50 HP) | <input type="checkbox"/> Seaplane |
| <input type="checkbox"/> Motorboats/pontoons (more than 50 HP) | <input type="checkbox"/> No watercrafts are kept at my property, skip to question 10 |
| <input type="checkbox"/> Canoes/kayaks | |

9. Are the watercrafts that you use on Big Blake Lake used on other waterbodies?
 Yes No

10. What is your degree of concern with each issue listed below? If you believe the issue doesn't exist check the first column; if you believe the issue exists but is not a concern check the second column; and if the issue concerns you please rank your concern as low, medium, or high.

	Issue doesn't exist	Exists, but not a concern	Low concern	Medium concern	High concern
New invasive species entering the lake					
Expansion of current invasive species (curly leaf pondweed)					
Excessive aquatic plant growth					
Excessive algae blooms					
Lack of water clarity or quality					
Loss of natural scenery/beauty					
Excessive noise level on the lake					
Decreased wildlife populations					
Decreased fisheries					
Unsafe use of motorized water craft					
Disregard for slow-no-wake zones					
Decreased property values					
Increased development					
Increased nutrient pollution					
Decrease in overall lake health					

11. How would you describe the current lake level of Big Blake Lake?
 Too high Too Low
 Just right Unsure
12. How would you describe the current water quality of Big Blake Lake?
 Poor Excellent
 Fair Unsure
 Good
13. How has the water quality changed in Big Blake Lake in the time you've lived on the lake?
 Severely degraded Somewhat improved
 Somewhat degraded Greatly improved
 Remained unchanged Unsure
14. Algae growth varies through the open water season. Which month(s) of the open water season do you consider algae growth (not including plants) to be a problem on Big Blake Lake. Please check all that apply.
 May October
 June Unsure
 July Algae growth is never a problem,
 August please skip to question 16
 September

15. Please indicate which of the following uses you believe are impaired by algae (not including plants) on Big Blake Lake. If you are unsure, please check the last column.

	Yes	No	Unsure
Swimming			
Fishing			
Boating			
Navigation			
Dogs/animals using the water			
Overall enjoyment of the lake			

16. Overall, how would you describe the amount of aquatic plants (not including algae) in Big Blake Lake?
 Too few plants Healthy amount of plants Too many plants
17. Aquatic plant growth varies throughout the open water season. Which month(s) of the open water season do you consider aquatic plant growth (not including algae) to be a problem in Big Blake Lake? Please check all that apply.
 May October
 June Unsure
 July Aquatic plants are never a problem,
 August please skip to question 20
 September

18. On the map (right), please mark the areas where aquatic plants (not including algae) are a problem in Big Blake Lake. Additionally, feel free to use the space below to describe where aquatic plants are a problem in Big Blake Lake.



19. Please indicate which of the following uses you believe are limited by aquatic plants (not including algae) on Big Blake Lake. If you are unsure, please check the last column.

	Yes	No	Unsure
Swimming			
Fishing			
Boating			
Navigation			
Overall enjoyment of the lake			

20. Curly leaf pondweed is an invasive species that creates nuisance conditions in Big Blake Lake by forming dense beds of vegetation that interfere with lake uses in the spring. Do you think you would recognize curly leaf pondweed if you saw it?

- Definitely yes
- Probably yes
- Unsure
- Probably no
- Definitely no

21. Do you feel the current aquatic plant management program is effectively controlling nuisance aquatic plant growth (not including algae)? If no, please explain.

- Yes
- No, please use the space below to explain
- Unsure

22. How satisfied are you with the current aquatic plant harvesting program?

- Very satisfied
- Somewhat satisfied
- Neutral
- Somewhat dissatisfied
- Very dissatisfied
- Unsure

23. How would you describe the current amount of mowed lawn across the entire shoreline of Big Blake Lake?

- Too much
- Just right

- Not enough
- Unsure

24. How would you describe the importance of shoreline buffers, rain gardens, and native plants to the water quality of Big Blake Lake?

- Not at all important
- Not too important
- Somewhat important

- Very important
- Unsure

25. How would you describe the use of fertilizer on your property?

- I don't use any fertilizer on my property
- I use zero phosphorus fertilizer on my property
- I use fertilizer on my property but I'm unsure of its phosphorus content
- I use fertilizer on my property that contains phosphorus
- I use multiple types of fertilizers on my property that contain varying amounts of phosphorus

26. Please indicate which of the following actions should be completed by the District to manage Big Blake Lake. Most activities are eligible for grant funding.

	Yes	No	Unsure
Offering incentives for installation of shoreline buffers and rain gardens			
Offering incentives for installation of farmland conservation practices			
Lake fairs and workshops to share information			
Enforcement of slow-no-wake zones			
Practices to enhance fisheries			
Offering incentives to upgrade non-conforming septic systems			
Pursuing funding to bring the dam on Big Blake Lake up to code			
Programs to prevent and monitor invasive species			

27. Please indicate which of the following activities should be completed by the District to manage aquatic invasive species.

	Yes	No	Unsure
Harvesting curly leaf pondweed			
Herbicide control of curly leaf pondweed			
Boat landing inspections (i.e. Clean Boats, Clean Waters)			
Boat landing cameras (Big Round, Bone, Half Moon, and Church Pine are Polk County lakes that currently have cameras)			
Monitoring to detect new populations of invasive species			
Boat wash station at landings (usually a pressure wash system)			
Educational programs to provide information on invasive species			
Trainings to learn to identify and manage invasive species			

28. How would you prefer to receive information from the Big Blake Lake District? Please check all that apply.

Newsletter

Email

Website

Facebook

Annual Meeting

Prefer not to receive information

Other, please specify _____

29. How often do you visit the Big Blake Lake District Facebook page?

I wasn't aware of the Facebook page

Never

Rarely

Sometimes

Often

30. From the list below, which activities are you interested in participating in to improve Big Blake Lake? Responses will be considered as a measure of interest rather than a commitment.

Learning to identify aquatic invasive species

Learning how to monitor for aquatic invasive species

Learning how to monitor water quality

Serving on a committee to develop an action plan for improving Big Blake Lake

Installing a shoreline buffer on your property

Installing a rain garden on your property

None of the above

If you're interested in participating in any of the above activities and would like more information, please list your contact information below. This information will be kept separate from your responses to ensure confidentiality.

If you have any comments you would like to make, please use the space below.

Thank you for your time and your answers!

Big Blake Lake Resident Survey

Surveys mailed: 217

Surveys returned: 126

Response rate: 58%

1. How many years have you owned property on Big Blake Lake? Note: If you own more than one property, please answer all questions for the property you have owned the longest.

124 respondents, 98% Average years: 21

2. Which of the following best describes how you use your property?

125 respondents, 99%

<input type="checkbox"/> Year-round residence	41 respondents, 33%
<input type="checkbox"/> Seasonal residence (continued occupancy for months at a time)	13 respondents, 10%
<input type="checkbox"/> Weekend, vacation, and/or holiday residence	70 respondents, 56%
<input type="checkbox"/> Rental property/resort	1 respondent, 1%
<input type="checkbox"/> Other, please specify _____	9 respondents, 7%

- *Occasionally during the week*
- *Family owned for 74 years, personally owned for 3*
- *20-30 days occupied by family/visitors*
- *Occasional visits*
- *One of our sons lives there full time*
- *Only own land - no residence*
- *Land only*
- *Personally owned for 3 years, family owned for 60*
- *Just retired, will stay longer*

3. How many days in a typical year is your property used by you or others? Just provide your best estimate.

123 respondents, 98% Average days per year: 147.8

4. On the average day that your property is occupied, how many people occupy the property?

125 respondents, 99% Average people: 3.6

5. Do you own shoreline property (including shared access points) on Big Blake Lake?

124 respondents, 98%

<input type="checkbox"/> No, please skip to question 7	7 respondents, 6%
<input type="checkbox"/> Yes	117 respondents, 94%

6. Beginning at the water's edge, how would you describe the area measuring 35 feet inland (shoreline towards the road)? If you don't own shoreline property, please skip this question. Please check all that apply.

117 respondents, 93%

<input type="checkbox"/> Mowed lawn	106 respondents, 91%
<input type="checkbox"/> Un-mowed vegetation	44 respondents, 38%
<input type="checkbox"/> Shrubs/trees	52 respondents, 44%
<input type="checkbox"/> Undisturbed woods	17 respondents, 15%
<input type="checkbox"/> Stabilizing rock/rip rap	49 respondents, 42%
<input type="checkbox"/> Pier/dock	57 respondents, 49%
<input type="checkbox"/> Buffer zone/shoreline restoration	11 respondents, 9%
<input type="checkbox"/> Rain garden	4 respondents, 3%

7. What activities do you enjoy on Big Blake Lake? Please check all that apply.

122 respondents, 97%

<input type="checkbox"/> Swimming	85 respondents, 70%
<input type="checkbox"/> Peace and tranquility	113 respondents, 93%
<input type="checkbox"/> Scenic view	108 respondents, 89%
<input type="checkbox"/> Jet skiing/wakeboarding/waterskiing	33 respondents, 27%
<input type="checkbox"/> Non-motorized boating (canoe/kayak)	57 respondents, 47%
<input type="checkbox"/> Motorized boating	97 respondents, 80%
<input type="checkbox"/> Sailing or wind surfing	1 respondent, 1%
<input type="checkbox"/> Hunting/trapping	10 respondents, 8%
<input type="checkbox"/> Observing birds/wildlife	96 respondents, 79%
<input type="checkbox"/> Open water fishing	101 respondents, 83%
<input type="checkbox"/> Ice fishing	55 respondents, 45%
<input type="checkbox"/> Snowmobiling	20 respondents, 16%
<input type="checkbox"/> Cross country skiing/snowshoeing	21 respondents, 17%
<input type="checkbox"/> Other, please list _____	3 respondents, 2%

- *I simply live on my 12 acre backlot. I do not, at present, use the lake. I just live here. No longer use the boat, not useable.*
- *Ice Skating*
- *Tubing*

8. Which of the following watercraft are kept on your property for use on Big Blake Lake? Please check all that apply.

123 respondents, 98%

- Jet skis **15 respondents, 12%**
- Motorboats/pontoons (1-20 HP) **32 respondents, 26%**
- Motorboats/pontoons (21-50 HP) **57 respondents, 46%**
- Motorboats/pontoons (more than 50 HP) **44 respondents, 36%**
- Canoes/kayaks **56 respondents, 46%**
- Paddleboats/rowboats **54 respondents, 44%**
- Sailboat **4 respondents, 3%**
- Seaplane **0 respondents, 0%**
- No watercrafts are kept at my property, skip to question 10 **9 respondents, 7%**

9. Are the watercrafts that you use on Big Blake Lake used on other waterbodies?

116 respondents, 92%

- Yes **27 respondents, 23%**
- No **89 respondents, 77%**

10. What is your degree of concern with each issue listed below? If you believe the issue doesn't exist check the first column; if you believe the issue exists but is not a concern check the second column; and if the issue concerns you please rank your concern as low, medium, or high.

113 respondents, 90%

	Issue doesn't exist	Exists, but not a concern	Low concern	Medium concern	High concern
New invasive species entering the lake 113, 90%	2, 2%	4, 4%	13, 12%	33, 29%	61, 54%
Expansion of current invasive species (curly leaf pondweed) 120, 100%	2, 2%	5, 4%	7, 6%	32, 25%	74, 59%
Excessive aquatic plant growth 117, 93%	2, 2%	3, 3%	8, 7%	34, 29%	70, 60%
Excessive algae blooms 120, 95%	2, 2%	2, 2%	13, 11%	34, 28%	69, 58%
Lack of water clarity or quality 119, 94%	3, 3%	4, 3%	12, 10%	34, 29%	66, 55%
Loss of natural scenery/beauty 112, 89%	12, 11%	11, 10%	28, 25%	36, 32%	25, 22%
Excessive noise level on the lake 117, 93%	16, 14%	18, 15%	37, 32%	27, 23%	19, 16%
Decreased wildlife populations 115, 91%	21, 18%	11, 10%	36, 31%	23, 20%	24, 21%
Decreased fisheries 114, 90%	13, 11%	5, 4%	24, 21%	37, 32%	35, 31%
Unsafe use of motorized water craft 117, 93%	7, 6%	12, 10%	39, 33%	23, 20%	36, 31%
Disregard for slow-no-wake zones 119, 94%	10, 8%	15, 13%	40, 34%	23, 19%	31, 26%
Decreased property values 115, 91%	8, 7%	7, 6%	22, 19%	27, 23%	51, 44%
Increased development 115, 91%	13, 11%	22, 19%	29, 25%	25, 22%	26, 23%
Increased nutrient pollution 111, 88%	1, 1%	7, 6%	20, 18%	29, 26%	54, 49%
Decrease in overall lake health 116, 92%	2, 2%	5, 4%	8, 7%	37, 22%	64, 55%

11. How would you describe the current lake level of Big Blake Lake?

120 respondents, 95%

<input type="checkbox"/> Too high	1 respondent, 1%
<input type="checkbox"/> Just right	11 respondents, 9%
<input type="checkbox"/> Too Low	97 respondents, 81%
<input type="checkbox"/> Unsure	11 respondents, 9%

12. How would you describe the current water quality of Big Blake Lake?

116 respondents, 92%

<input type="checkbox"/> Poor	16 respondents, 14%
<input type="checkbox"/> Fair	63 respondents, 54%
<input type="checkbox"/> Good	30 respondents, 26%
<input type="checkbox"/> Excellent	0 respondents, 0%
<input type="checkbox"/> Unsure	7 respondents, 6%

13. How has the water quality changed in Big Blake Lake in the time you've lived on the lake?

119 respondents, 94%

<input type="checkbox"/> Severely degraded	14 respondents, 12%
<input type="checkbox"/> Somewhat degraded	36 respondents, 30%
<input type="checkbox"/> Remained unchanged	25 respondents, 21%
<input type="checkbox"/> Somewhat improved	26 respondents, 22%
<input type="checkbox"/> Greatly improved	6 respondents, 5%
<input type="checkbox"/> Unsure	12 respondents, 10%

14. Algae growth varies through the open water season. Which month(s) of the open water season do you consider algae growth (not including plants) to be a problem on Big Blake Lake. Please check all that apply.

121 respondents, 96%

<input type="checkbox"/> May	1 respondent, 1%
<input type="checkbox"/> June	17 respondents, 14%
<input type="checkbox"/> July	80 respondents, 66%
<input type="checkbox"/> August	107 respondents, 88%
<input type="checkbox"/> September	49 respondents, 40%
<input type="checkbox"/> October	4 respondents, 3%
<input type="checkbox"/> Unsure	6 respondents, 5%
<input type="checkbox"/> Algae growth is never a problem, please skip to question 16	3 respondents, 2%

15. Please indicate which of the following uses you believe are impaired by algae (not including plants) on Big Blake Lake. If you are unsure, please check the last column.

	Yes	No	Unsure
Swimming 114, 90%	105, 92%	2, 2%	7, 6%
Fishing 101, 80%	58, 57%	16, 16%	27, 27%
Boating 100, 79%	52, 52%	35, 35%	13, 13%
Navigation 94, 75%	19, 20%	53, 56%	22, 23%
Dogs/animals using the water 106, 84%	49, 46%	21, 20%	36, 34%
Overall enjoyment of the lake 108, 86%	91, 84%	5, 5%	12, 11%

16. Overall, how would you describe the amount of aquatic plants (not including algae) in Big Blake Lake?
114 respondents, 90%

- Too few plants **2 respondents, 2%**
- Healthy amount of plants **33 respondents, 29%**
- Too many plants **79 respondents, 69%**

17. Aquatic plant growth varies throughout the open water season. Which month(s) of the open water season do you consider aquatic plant growth (not including algae) to be a problem in Big Blake Lake? Please check all that apply.

- 118 respondents, 94%**
- May **11 respondents, 9%**
 - June **54 respondents, 46%**
 - July **87 respondents, 74%**
 - August **79 respondents, 67%**
 - September **40 respondents, 34%**
 - October **2 respondents, 2%**
 - Unsure **14 respondents, 12%**
 - Aquatic plants are never a problem, **1 respondent, 1%**
 please skip to question 20

18. On the map (right), please mark the areas where aquatic plants (not including algae) are a problem in Big Blake Lake. Additionally, feel free to use the space below to describe where aquatic plants are a problem in Big Blake Lake.

89 respondents, 71%

- *Shorelines and both ends of lake*
- *Northeast shoreline, north by Richardson Court, southeast corner of lake*
- *Southeast corner*
- *Center of lake – 2*
- *N and S bays – 15*
- *NW end center, NW area of center lake, center lake, SE end center*
- *NW area of center of lake towards western shore*
- *NW end center and western shore, SE end center*
- *W shore of center lake*
- *NW by N bay. E bays N of the narrows*
- *All of lake*
- *NW bay, SE bay - 2*
- *SE bay, entire W shore*

- *W shore of the S bay*
- *NW bay, NW of center of lake near W shore, SE bay*
- *E and W shores, center lake, NW bay, SE bay*
- *Lower SE bay, Blake Lake Court*
- *Near the narrows of N end of lake and both bays*
- *We see them mainly on the North end. Once you get through the narrows, it's not so bad*
- *NW bay just off shore, SE bay*
- *W shore between center lake and N bay*
- *Whole N & S bays*
- *Northern most shore of N bay, W & E shores of S bay*
- *Lower end of the North bay*
- *N and S bays. "North end of lake quick sand like sediment much where boats get stuck"*
- *Entire length of the center of the lake. "Mouth at straight river (fox creek), west end of lake"*
- *Western half of the North bay*
- *Worst areas are the N and S ends. The entire lake can have an excessive amount of aquatic plants. Mowing has been good.*
- *N and S bays, NE area of center lake*
- *E and W banks of the lower portion of North bay*
- *Western shore of S bay, SE shore of center lake*
- *Nearly entire shoreline where depth is 5 ft. of less*
- *Outlet gets plugged by cut plants*
- *Most of the lake during June and July*
- *By Bystrom Lake boat landing and W shoreline; bay just N of Baker Lane landing; Channel by and bay by inlet from L Blake*
- *All bays*
- *N shore of N bay. W shore of center lake, entire S bay*
- *NE end*
- *West shore of the north bay*
- *All along the shoreline on the west side; unsure about east side*
- *Mouth of the S bay*
- *NE area of N bay; E and W shore of S bay*
- *Whole length of western shore*
- *N and S bays trailing towards center lake*
- *N and S bays; center lake*
- *South bay -2*
- *N and S bays, "It's a lot better since harvesting."*
- *N and S bays; esp. SE shore of S bay. "I have observed water flowing across road that has flowed from a farmer's field. I have taken pictures at that time."*
- *N and S bays, "Bystrom. Richardson Ct."*
- *"The entire lake is prone to curly leaf. Without the harvester it would be a major problem"*
- *Western shore of North bay*
- *NW corner*
- *N and S bays – eastern shore of center lake*
- *"South East end of lake and the channel between Big + Little Blake Lakes. Both ends of lake get very weedy"*
- *S bay - 2*
- *Whole lake has problems. Especially the north end*
- *Eastern shore of North bay*
- *North bay, NW and SE shores of center lake*
- *Ends of lake. Richardson Bay. Beyond ledge, Blake Lake Ct.*
- *S bay extending into Little Blake Lake*
- *Northern shore of North bay, NW + SE shores of center lake. Eastern area of South bay*
- *South bay. NW center lake. "Actually the whole lake if we didn't harvest them"*
- *"Mostly on west side of lake and in the two ends – shallow areas"*
- *SE shore center lake*
- *North and NW shore of North bay extending to western shore towards center lake*
- *N and S bays. Northern center lake*
- *NW area of North bay, South bay, "Cove that empties Big into Little Blake. Area by Sherards dam site*
- *N and S bays, eastern shore center lake*
- *Least problem seems to be along East side (least developed) (least of bogus septic operations). Shallow far south is pretty bad too*
- *N and S bays, western shore b/t N bay and center lake*
- *Unsure*
- *All the areas less than 6' deep, then floating plants go where the current and wind takes it. All the lake is a problem sometimes*

19. Please indicate which of the following uses you believe are limited by aquatic plants (not including algae) on Big Blake Lake. If you are unsure, please check the last column.

	Yes	No	Unsure
Swimming 109, 87%	90, 83%	8, 7%	11, 10%
Fishing 104, 83%	65, 63%	20, 19%	19, 18%
Boating 106, 84%	75, 71%	17, 16%	14, 13%
Navigation 100, 79%	43, 43%	27, 27%	30, 30%
Overall enjoyment of the lake 105, 85%	76, 72%	15, 14%	14, 13%

20. Curly leaf pondweed is an invasive species that creates nuisance conditions in Big Blake Lake by forming dense beds of vegetation that interfere with lake uses in the spring. Do you think you would recognize curly leaf pondweed if you saw it?

114 respondents, 90%

- Definitely yes **56 respondents, 49%**
- Probably yes **23 respondents, 20%**
- Unsure **15 respondents, 13%**
- Probably no **13 respondents, 11%**
- Definitely no **7 respondents, 6%**

21. Do you feel the current aquatic plant management program is effectively controlling nuisance aquatic plant growth (not including algae)? If no, please explain.

111 respondents, 88%

- Yes **44 respondents, 40%**
- No, please use the space below to explain **30 respondents, 27%**
- Unsure **37 respondents, 33%**

- *Not exactly sure what plan is currently. Would be nice if lake weed harvesting could be done by county more often by shoreline as opposed to citizens having to private pay. Taxes very high, should provide for more exclusive lake services.*
- *No significant difference.*
- *Helps, but problem still exists*
- *The harvesting cleans it up but does nothing to get rid of it or limit it's growth.*
- *Yes! Harvester made a big difference!*
- *This are better with Harvey the harvester than without, HOWEVER, way too little is done at North end along Breezy Road cabins to catch floating cut plants before they wash up on shore. TONS! Operators need to be aware of what they miss & not dawdle to catch floaters. Harvey the machine was a great purchase.*

22. How satisfied are you with the current aquatic plant harvesting program?

115 respondents, 91%

- Very satisfied **22 respondents, 19%**
- Somewhat satisfied **51 respondents, 44%**
- Neutral **19 respondents, 17%**
- Somewhat dissatisfied **12 respondents, 10%**
- Very dissatisfied **2 respondents, 2%**
- Unsure **9 respondents, 8%**

23. How would you describe the current amount of mowed lawn across the entire shoreline of Big Blake Lake?

115 respondents, 91%

___ Too much	28 respondents, 24%
___ Just right	54 respondents, 47%
___ Not enough	2 respondents, 2%
___ Unsure	31 respondents, 27%

24. How would you describe the importance of shoreline buffers, rain gardens, and native plants to the water quality of Big Blake Lake?

115 respondents, 91%

___ Not at all important	8 respondents, 7%
___ Not too important	12 respondents, 10%
___ Somewhat important	39 respondents, 34%
___ Very important	42 respondents, 37%
___ Unsure	14 respondents, 12%

25. How would you describe the use of fertilizer on your property?

114 respondents, 90%

___ I don't use any fertilizer on my property	68 respondents, 60%
___ I use zero phosphorus fertilizer on my property	43 respondents, 38%
___ I use fertilizer on my property but I'm unsure of its phosphorus content	2 respondents, 2%
___ I use fertilizer on my property that contains phosphorus	0 respondents, 0%
___ I use multiple types of fertilizers on my property that contain varying amounts of phosphorus	1 respondent, 1%

26. Please indicate which of the following actions should be completed by the District to manage Big Blake Lake. Most activities are eligible for grant funding.

	Yes	No	Unsure
Offering incentives for installation of shoreline buffers and rain gardens 109, 87%	66, 61%	19, 17%	24, 22%
Offering incentives for installation of farmland conservation practices 109, 87%	59, 54%	13, 12%	37, 34%
Lake fairs and workshops to share information 106, 84%	47, 44%	20, 19%	39, 37%
Enforcement of slow-no-wake zones 109, 87%	48, 44%	31, 28%	30, 28%
Practices to enhance fisheries 109, 87%	85, 78%	4, 4%	20, 18%
Offering incentives to upgrade non-conforming septic systems 112, 89%	79, 71%	10, 9%	23, 21%
Pursuing funding to bring the dam on Big Blake Lake up to code 115, 91%	105, 91%	1, 1%	9, 8%
Programs to prevent and monitor invasive species 113, 1%	101, 89%	1, 1%	11, 10%

27. Please indicate which of the following activities should be completed by the District to manage aquatic invasive species.

	Yes	No	Unsure
Harvesting curly leaf pondweed 115, 91%	104, 90%	1, 1%	10, 9%
Herbicide control of curly leaf pondweed 111, 88%	60, 54%	25, 23%	26, 23%
Boat landing inspections (i.e. Clean Boats, Clean Waters) 114, 90%	98, 86%	3, 3%	13, 11%
Boat landing cameras (Big Round, Bone, Half Moon, and Church Pine are Polk County lakes that currently have cameras) 107, 85%	40, 37%	29, 27%	38, 36%
Monitoring to detect new populations of invasive species 114, 90%	102, 89%	2, 2%	10, 9%
Boat wash station at landings (usually a pressure wash system) 113, 90%	39, 35%	31, 27%	43, 38%
Educational programs to provide information on invasive species 114, 90%	82, 72%	10, 9%	22, 19%
Trainings to learn to identify and manage invasive species 114, 90%	79, 69%	9, 8%	26, 23%

28. How would you prefer to receive information from the Big Blake Lake District? Please check all that apply.

122 respondents, 97%

<input type="checkbox"/> Newsletter	104 respondents, 85%
<input type="checkbox"/> Email	62 respondents, 51%
<input type="checkbox"/> Website	29 respondents, 24%
<input type="checkbox"/> Facebook	7 respondents, 6%
<input type="checkbox"/> Annual Meeting	49 respondents, 40%
<input type="checkbox"/> Prefer not to receive information	1 respondent, 1%
<input type="checkbox"/> Other, please specify _____	0 respondents, 0%

29. How often do you visit the Big Blake Lake District Facebook page?

120 respondents, 95%

<input type="checkbox"/> I wasn't aware of the Facebook page	66 respondents, 55%
<input type="checkbox"/> Never	38 respondents, 32%
<input type="checkbox"/> Rarely	11 respondents, 9%
<input type="checkbox"/> Sometimes	5 respondents, 4%
<input type="checkbox"/> Often	0 respondents, 0%

30. From the list below, which activities are you interested in participating in to improve Big Blake Lake? Responses will be considered as a measure of interest rather than a commitment.

109 respondents, 87%

<input type="checkbox"/> Learning to identify aquatic invasive species	39 respondents, 36%
<input type="checkbox"/> Learning how to monitor for aquatic invasive species	32 respondents, 29%
<input type="checkbox"/> Learning how to monitor water quality	30 respondents, 28%
<input type="checkbox"/> Serving on a committee to develop an action plan for improving Big Blake Lake	13, 12%
<input type="checkbox"/> Installing a shoreline buffer on your property	35 respondents, 32%
<input type="checkbox"/> Installing a rain garden on your property	30 respondents, 28%
<input type="checkbox"/> None of the above	38 respondents, 35%

If you have any comments you would like to make, please use the space below.

Thank you for your time and your answers!

- *Most important issue is rebuilding the dam*
- *As a lake resident, the lake is most important. All actions to help lake Me good! We support it even if tax increase or Lake Association dues*
- *I'd like to do the pontoon classroom and the class at the government center*
- *Anyone looking to buy I'm selling!*
- *Take culvert out that feeds run off from the field on 78th St.*
- *Better inspection of boats coming from other waters. Closer monitoring of boat speed, jet ski operations, young people operating boats/jet skis.*
- *Do not understand why the DNR thinks it's such a big deal to throw a few rocks on the dam for a temporary fix to hold the water level until a new dam can be put in place. It has only been done this way for 100 years. A safety issue. REALLY!! What a bunch of bullshit.*
- *Fix the dam, if not let the people fix it!*
- *I am very concerned about the dam washout at Fox Creek. We need to make sure this gets rebuilt or we will have nothing but a mud puddle.*
- *I believe the lake has too much traffic for its size compared to other lakes in the area. Jet skis are changing the shore line by too much use.*
- *Is there a list somewhere of who lives where around the lake?*
- *Limit jet ski hours. We do not need a no wake zone.*
- *Live too far away to participate*
- *We are 1000 ft. back from Blake Lake! None of these questions apply to us!*
- *Re: #7 Jet skiing - forbid #22 Just before holidays don't come up to shoreline to cut & harvest weeds! #30 Get rid of harvester. Use spray. Ones that want swimming and fishing negotiate treatment to their property on the subject. It's hard to do manually for older residents. Get a contact person to run Harvester all summer/year*
- *Re: #25 My neighbors do and I'm not sure if it's the right product #26 re: Dam funding - if water keeps flowing where dam use to be we will have a dry lake bed. #30 I'm selling my cabin because of all the problems with the Lake Association.*
- *Lake is "way too low". Poor condition all summer, good condition in spring and winter. The lake "smells really bad"*
- *Re #10: No one adheres to [the no wake zones] re #25: Never use fertilizers. Would rather have good water conditions than green grass. re #30: I have this [buffer] now for the last 25 years*
- *Re #12: water quality poor in summer, good spring to July re #23: [Mown lawn] is too much, but is less concern than failed/ failing / borderline septics. re#26: [Offering incentives to upgrade septic systems] is the most important question on entire survey. [Pursuing funding to repair dam] 2nd most important although most urgent re#27: Not persuaded herbicide is safe.*
- *Re:#12: Natural, same as in the 50's, 60's, 70's, 80's, 90's. re #14: It happens every year, it's normal. re #30: Keep cutting the weeds and leave the lake alone. It's been fine for the 70 years I've been there.*
- *Re: #1: Develop stewardship group that includes 2 generations. Favor involvement of area student groups paired with adults. Engagement program.*
- *Emphatic #11 & #26 (Funding)*
- *Re: #30 "Too old!"*

Appendix B

Lake Level and Precipitation Monitoring

Date	Lake Level (ft)	Precipitation (in)	Comments
5/23/14	138	0	
5/24/14	136	0	
5/25/14	134	0	
5/26/14	130	0	
5/27/14	138	1.5	
5/28/14	139	0	
5/29/14	136	0	
5/30/14	134	0	
5/31/14	132	0	
6/1/14	144	1.75	
6/2/14	148	0.5	
6/3/14	148	0	
6/4/14	146	0	
6/5/14	146	0	
6/6/14	146	0	
6/7/14	146	0.06	
6/8/14	148	0	
6/9/14	144	0	
6/10/14	142	0	
6/11/14	140	0	
6/12/14	136	0.25	
6/13/14	136	0	
6/14/14	136	0	
6/15/14	146	1.25	
6/16/14	146	0	
6/17/14	144	0.02	
6/18/14	146	0.02	
6/19/14	154	0.08	
6/20/14	154	0	
6/21/14	156	0	
6/22/14	156	0	
6/23/14	152	0	
6/24/14	150	0	
6/25/14	150	0	
6/26/14	148	0	
6/27/14	140	0	
6/28/14	140	0.5	
6/29/14	150	1.5	
6/30/14	146	0	
7/1/14	142	0	
7/2/14	140	0	
7/3/14	136	0	
7/4/14	134	0	

7/5/14	132	0	
7/6/14	128	0.01	
7/7/14	126	0	
7/8/14	124	0.25	
7/9/14	120	0	
7/10/14	116	0	
7/11/14	118	0.03	
7/12/14	112	0	
7/13/14	112	0	
7/14/14	110	0	
7/15/14	108	0.02	
7/16/14	106	0	
7/17/14	102	0	
7/18/14	100	0	
7/19/14	100	0	
7/20/14	98	0	
7/21/14	96	0	
7/22/14	94	0	
7/23/14	94	0	
7/24/14	92	0	
7/25/14	92	0	
7/26/14	90	0	
7/27/14	88	0	
7/28/14	86	0	
7/29/14	96	0	
7/30/14	104	0	
7/31/14	110	0	rocks placed
8/1/14	114	0	
8/2/14	118	0	
8/3/14	120	0	
8/4/14	132	1.03	
8/5/14	134	0	
8/6/14	132	0	
8/7/14	132	0	
8/8/14	132	0	
8/9/14	132	0	
8/10/14	130	0	
8/11/14	138	0.5	
8/12/14	138	0.25	
8/13/14	138	0	
8/14/14	136	0	
8/15/14	136	0	
8/16/14	134	0	
8/17/14	134	0	
8/18/14	138	0.5	

8/19/14	136	0.02	
8/20/14	140	0.06	
8/21/14	146	0.75	
8/22/14	146	0	
8/23/14	142	0	
8/24/14	142	0	
8/25/14	142	0	
8/26/14	140	0	
8/27/14	138	0.01	
8/28/14	138	0	
8/29/14	136	0	
8/30/14	158	2.5	
8/31/14	156	0	
9/1/14	160	1	
9/2/14	158	0	
9/3/14	154	0	
9/4/14	164	1.04	
9/5/14	160	0	
9/6/14	158	0	
9/7/14	156	0	
9/8/14	152	0	
9/9/14	148	0	
9/10/14	154	0.06	
9/11/14	150	0	
9/12/14	140	0	
9/13/14	138	0	
9/14/14	136	0	
9/15/14	134	0	
9/16/14	132	0	
9/17/14	132	0	
9/18/14	132	0	
9/19/14	134	0	
9/20/14	134	0	
9/21/14	138	0.25	
9/22/14	138	0	
9/23/14	138	0	
9/24/14	138	0	
9/25/14	138	0	
9/26/14	138	0	
9/27/14	138	0	
9/28/14	138	0	
9/29/14	140	0.25	
9/30/14	140	0	
10/1/14	140	0	
10/2/14	146	0.75	

10/3/14	146	0.25	
10/4/14	150	0.75	
10/5/14	152	0	
10/6/14	150	0	
10/7/14	150	0	
10/8/14	150	0	
10/9/14	148	0	
10/10/14	146	0	

Appendix C

Deep Hole Chemical and Physical Data

Big Blake Lake Surface, all units mg/L unless otherwise noted								
Date	Phosphate Ortho Diss	Total Phosphorus	Nitrogen NO3+NO2 Diss	Nitrogen Kjeldahl Total	Nitrogen NH3-N Diss	Total Suspended Solids	Total Sulfate	Chlorophyll a (ug/L)
5/20/13	ND	0.0464	ND	ND	ND	5.00	ND	
5/28/13	ND	0.0378	ND	0.661	ND	5.00	ND	12.1
6/26/13	0.00460	0.0214	ND	0.675	ND	ND	ND	5.81
7/24/13	ND	0.0849	ND	1.63	ND	12.5	ND	118
8/19/13	0.0039	0.135	ND	2.55	0.0236	30.00	ND	235
9/10/13	ND	0.135	ND	1.71	0.203	30.70	ND	98.6
11/12/13	0.0036	0.027	0.182	0.683	0.132	ND		
5/12/14	ND	0.0387	ND	0.676	ND	ND	ND	
5/28/14	ND	0.0308	ND	0.425	0.0377	ND	ND	2.93
6/24/14	ND	0.0212	ND	0.457	ND	2.60	ND	6.71
7/21/14	ND	0.0377	ND	0.717	ND	4.40	ND	8.19
8/19/14	ND	0.0622	ND	1.44	ND	10.00	ND	76.8
9/17/14	ND	0.051	ND	1.03	0.023	7.75	ND	38.1
11/3/14	0.0022	0.0247	0.103	0.42	0.0182	2.20	ND	
4/14/15	ND	0.0252	0.0644	0.374	0.0157	2.50	4.84	
5/27/15	0.0026	0.0248	ND	0.352	0.0316	ND	5.28	3.35
6/25/15	0.0021	0.0228	ND	0.466	ND	2.40	ND	
7/20/15	ND	0.0437	ND	0.812	ND	7.8	ND	27
8/17/15	0.0052	0.077	ND	1.81	0.0262	13.00	4.72	123
9/14/15	0.0119	0.0691	ND	1.02	0.0265	8.00	ND	33.8
11/17/15	0.0046	0.0305	0.051	0.431	0.0191	ND	5.33	

Big Blake Lake Bottom, units mg/L		
Date	Phosphate Ortho Diss	Phosphorus Total
5/28/13	ND	0.0484
6/26/13	0.00360	0.0389
7/24/13	ND	0.0623
8/19/13	ND	0.14
9/10/13	0.012	0.0788
5/28/14	ND	0.0388
6/24/14	ND	0.0255
7/21/14	0.0021	0.0464
8/19/14	ND	0.0558
9/17/14	ND	0.0576
5/27/15	0.0035	0.0256
6/25/15	ND	0.0307
7/20/15	0.002	0.0781
8/17/15	0.00800	0.076
9/14/15	0.0112	0.0736

Big Blake Lake, deep hole

Date	Depth (m)	DO (mg/l)	SpCond (ms/s)	Conduct (ms/s)	Temp (oC)	Salinity (ppt)	pH	ORP	TDS	Secchi (ft)	Comments
5/20/13	0	7.46	206	173	16.76	0.10	8.36	-44.1		4.5	Turnover, 11:44 am
	1	7.89	206	173	16.74	0.10	8.33	-43.2			cloudy, breezy, humid
	2	8.18	206	173	16.73	0.10	8.32	-43.7			storms over weekend
	3	8.19	210	177	16.53	0.10	8.30	-44.3			CLP immature, loon
	4	5.54	218	179	15.59	0.10	7.76	-43.7			depth 16 feet
5/28/13	0	3.35	194	159	15.28	0.09	7.92	-72.8		5	overcast, calm
	1	4.13	202	164	15.27	0.10	7.86	-71.0			low/mid 60's, slight breeze
	2	5.06	204	167	15.26	0.10	7.83	-70.7			bottom: 13 ft, top: 1 ft
	3	5.90	203	165	15.23	0.10	7.82	-70.8			zooplankton: 13 ft
	4	5.97	202	164	15.23	0.10	7.81	-70.9			algae: 2 meter composite
6/19/13	0	2.96	200	191	22.39	0.09	8.48	-97.9		8	clear, calm breeze, 70's
	1	4.12	204	193	22.19	0.10	8.37	-93.1			
	2	5.28	205	193	21.99	0.10	8.31	-92.3			
	3	3.10	212	191	19.99	0.10	7.70	-92.8			
	4	1.29	224	199	18.94	0.11	7.40	-94.9			
6/26/13	0	7.35	201	204	25.71	0.09	8.26	-78.9		7	calm, humid, then storm arrived
	1	6.62	206	208	25.51	0.10	8.28	-78.9			top at 2 PM bottom at 2:07 PM
	2	6.93	207	209	25.34	0.10	8.17	-75.2			
	3	5.98	208	207	24.68	0.10	7.91	-75.7			
	4	1.61	231	216	21.64	0.11	7.37	-83.1			
7/18/13	0	2.91	190	201	28.52	0.09	9.24	-95.7		4	90's, sunny, light breeze 11:55 AM
	1	5.81	186	201	29.15	0.09	9.25	-95.1			
	2	5.83	207	214	26.74	0.10	8.61	-88.8			
	3	0.03	238	234	24.26	0.11	7.52	-105.9			
	4	0.00	246	240	23.85	0.12	7.36	-115.6			
7/24/13	0	5.67	191	188	24.19	0.09	8.77	-88.4		1.5	blue-green alage bloom

	1	7.37	188	185	24.23	0.09	8.68	-86.7		overcast, calm, high 60's
	2	4.85	190	187	24.11	0.09	8.51	-89.0		10:10AM
	3	5.50	190	187	24.04	0.09	8.56	-88.7		
	4	3.93	194	190	23.87	0.09	8.35	-89.6		
8/9/13	0	7.86	187	181	23.09	0.09	9.12	-81.0	2	sunny, partly cloudy, light breeze
	1	10.83	187	181	23.19	0.09	9.12	-78.0		low 70's, 1:40 PM
	2	5.77	193	182	22.12	0.09	8.51	-73.9		
	3	2.04	199	185	21.39	0.09	7.87	-75.7		
	4	0.86	202	188	21.31	0.10	7.53	-83.3		
8/19/13	0	3.40	168	163	23.65	0.08	9.43	-66.0	1	overcast, calm, slight breeze
	1	8.57	168	163	23.46	0.08	9.30	-64.6		10:16 AM
	2	7.00	182	176	23.14	0.09	8.89	-62.7		
	3	1.71	191	182	22.53	0.09	8.14	-64.0		
	4	0.00	203	191	21.79	0.10	7.75	-65.0		
9/10/13	0	2.86	178	170	22.87	0.09	8.38	-43.2	2	raining, calm, 12:05 PM
	1	3.40	187	180	22.84	0.09	8.46	-44.1		
	2	1.46	190	181	22.38	0.09	8.03	-44.7		
	3	1.42	191	181	22.24	0.09	7.91	-45.1		
	4	0.00	206	194	21.88	0.10	7.29	-50.7		
9/26/13	0	7.37	184	159	17.81	0.09	9.12	-14.9	2	very windy, sunny, high 70's
	1	10.63	185	159	17.74	0.09	9.08	-14.5		12:20 PM
	2	8.47	185	160	17.74	0.09	9.07	-15.1		
	3	9.05	186	160	17.64	0.09	9.04	-15.0		
	4	8.84	187	160	17.43	0.09	8.98	-15.2		
10/24/13	0	5.70	187	124	7.25	0.09	7.58	-2.5	8	crisp breeze, overcast
	1	3.61	193	128	7.23	0.09	7.78	-2.5		flurries earlier in day
	2	3.67	196	129	7.13	0.09	7.77	-3.3		
	3	4.26	200	132	7.03	0.10	7.75	-5.4		
	4	4.77	202	133	6.98	0.10	7.73	-6.2		

11/4/13	0	23.56	206	131	5.76	0.10	7.99	-46.9	10	drizzle, gusty, overcast	
	1	22.47	208	132	5.74	0.10	7.94	-45.1			
	2	20.76	210	133	5.73	0.10	7.89	-43.1			
	3	19.63	212	134	5.73	0.10	7.85	-41.2			
	4	12.49	214	136	5.72	0.10	7.81	-39.4			
11/6/13	0	8.65	207	130	5.39	0.10	9.10	-23.1	11.5	lake fairly calm, chill breeze sunny, snow last night	
	1	7.84	208	130	5.37	0.10	8.70	-22.9			
	2	7.15	211	132	5.38	0.10	8.44	-22.8			
	3	6.85	215	135	5.29	0.10	8.28	-23.1			
	4	6.81	218	136	5.18	0.10	8.18	-23.0			
11/12/13	0	24.76	208	119	2.71	0.10	9.32	-50.8	14	sunny, calm secchi touched bottom Turnover chemistry	
	1	26.06	210	120	2.54	0.10	8.99	-50.3			
	2	22.28	212	122	2.54	0.10	8.60	-47.4			
	3	15.99	213	122	2.57	0.10	8.47	-46.8			
	4	14.65	216	128	3.39	0.10	8.13	-51.2			
5/12/14	0	11.85	214	170	14.07	0.10	8.69	20.5	3.5	Turnover Slight breeze, overcast Storm previous night Dam blew in spring	
	1	11.94	210	165	13.9	0.10	8.65	21.0			
	2	11.82	208	162	13.3	0.10	8.61	21.4			
	3	9.63	210	161	12.89	0.10	8.32	21.9			
	4	3.80	217	164	12.22	0.10	7.86	21.6			
5/22/14	0	8.56	195	159	15.51	0.09	8.14	28.9	97	6	Sunny, calm, beautiful day Installed staff gauge at Denny's
	1	8.22	201	164	15.34	0.10	8.11	29.0			
	2	7.84	203	161	14.13	0.10	8.04	29.6			
	3	9.51	204	161	13.95	0.10	7.97	29.7			
	4	6.96	207	163	13.9	0.10	7.86	29.1			
5/28/14	0	5.58	202	185	20.39	0.10	8.02	-23.7	101	9	Large rain on 5/27/14 Sunny, calm, beautiful day Chemistry 11AM
	1	5.25	202	183	20.04	0.10	8.03	-23.4			
	2	4.88	203	178	18.68	0.10	7.98	-23.0			
	3	2.80	214	185	17.84	0.10	7.65	-21.8			

	4	0.70	237	196	15.8	0.11	7.43	-20.0	119	
6/9/14	0	5.70	205	191	21.41	0.10	8.20	-25.8	102	6 overcast, calm
	1	5.43	202	189	21.39	0.10	8.28	-24.7	101	
	2	5.42	202	187	21.13	0.10	8.23	-23.4	101	
	3	3.10	209	190	20.18	0.10	7.75	-23.4	105	
	4	1.06	230	207	19.53	0.11	7.42	-24.8	105	
6/24/14	0	5.16	198	197	24.62	0.09	8.46	-18.5	99	8 Beautiful day, calm, sunny
	1	5.19	197	194	24.04	0.09	8.48	-18.5	99	Harvesting
	2	4.82	198	193	23.64	0.09	8.32	-18.5	99	Chemistry, algae, zooplankton
	3	2.82	209	196	21.63	0.10	7.77	-19.1	105	
	4	1.16	220	203	20.87	0.10	7.43	-21.8	110	
7/9/14	0	3.77	196	191	23.61	0.09	7.66	-18.2	99	4 Sunny, calm, 70's, perfect day
	1	3.62	197	191	23.24	0.09	7.84	-17.3	99	10:46AM
	2	3.56	197	189	22.87	0.09	7.94	-17.0	99	
	3	3.34	198	189	22.78	0.09	7.89	-15.1	99	
	4	0.63	203	194	22.62	0.10	7.33	-25.0	102	
7/21/14	0	4.13	199	195	24.04	0.09	8.32	-54.1	99	4 Sunny, light breeze
	1	4.01	199	195	23.98	0.09	8.33	-53.1	99	Heat advisory
	2	3.80	199	195	23.77	0.09	8.28	-52.1	100	10:33AM
	3	3.52	202	196	23.58	0.09	8.15	-50.8	101	Chemistry, algae, zooplankton
	4	0.95	219	208	22.46	0.10	7.49	-63.0	110	
8/5/14	0	8.45	196	197	25.17	0.09	8.63	-32.6	98	4 Partly cloudy, mostly calm
	1	9.36	195	194	24.76	0.09	8.71	-32.7	97	
	2	7.05	200	198	24.24	0.09	8.38	-31.3	100	
	3	0.00	213	208	23.73	0.10	7.53	-33.0	107	
	4	0.00	232	219	23.4	0.11	7.27	-44.4	112	
8/19/14	0	4.87	217	206	23.61	0.10	9.49	8.2	102	2 Overcast, slight breeze
	1	4.53	196	190	23.43	0.09	9.14	6.4	98	
	2	4.09	198	192	23.39	0.09	8.99	5.3	99	

	3	3.29	200	194	23.34	0.09	8.74	5.8	100		
	4	0.93	207	200	23.07	0.10	7.89	-6.8	106		
9/6/14	0	2.61	192	177	20.92	0.09	8.28	-55.8	96	3.5	Overcast, windy, cold
	1	2.52	192	177	20.94	0.09	8.28	-57.7	96		
	2	2.52	191	177	20.94	0.09	8.27	-57.9	96		
	3	2.52	191	176	20.94	0.09	8.26	-58.9	96		
	4	1.86	200	185	20.93	0.09	7.83	-73.2	99		
9/17/14	0	10.06	189	164	18.13	0.09	9.63	-63.2	94	3	Mostly sunny, calm, beautiful
	1	10.37	186	156	16.69	0.09	9.49	-64.0	93		
	2	9.20	175	145	15.94	0.09	9.50	-64.1	91		
	3	5.78	188	154	15.68	0.09	8.86	-63.6	94		
	4	5.60	189	155	15.49	0.09	8.60	-64.2	94		
	4.5	1.43	196	160	15.33	0.09	8.34	-65.3	98		
11/3/14	0	3.25	200	128	6.13	0.10	10.27	-57.0	100	9	Turnover, slight breeze
	1	3.21	200	128	6.14	0.10	10.10	-58.0	100		Overcast, cold
	2	3.32	200	129	6.13	0.10	10.01	-59.1	100		
	3	3.46	200	128	6.12	0.10	9.88	-58.3	100		
	4	3.49	200	128	6.12	0.10	9.80	-59.3	100		
4/14/15	0	3.33	173	124	10.14	0.08	8.18	52.0	86	7	Clear, calm breeze, sunny
	1	3.49	173	124	10.08	0.08	8.19	53.1	86		Turnover
	2	3.66	175	125	9.73	0.08	8.14	54.4	88		
	3	3.81	175	124	9.66	0.08	8.13	55.7	87		
	4	3.60	174	123	9.61	0.08	8.02	56.3	87		
5/27/15	0	5.83	174	151	17.95	0.08	8.53	10.0	87	11	
	1	5.66	173	149	17.51	0.08	8.34	13.3	87		
	2	5.44	173	147	17.09	0.08	8.29	16.9	87		
	3	5.57	173	147	16.96	0.08	8.24	19.5	87		
	4	2.66	174	146	16.69	0.08	7.81	16.5	87		
	4 1/4	2.22	174	146	16.66	0.08	7.57	15.0	87		

6/9/15	0	5.06	160	159	24.65	0.07	8.75	15.0	80	8	harvesting
	1	5.12	158	151	22.56	0.07	8.74	17.6	78		
	2	5.09	156	146	21.64	0.07	8.74	19.6	78		
	3	4.54	156	145	21.27	0.07	8.53	21.4	78		
	4	2.40	164	150	20.46	0.08	8.06	18.9	82		
	4 1/4	0.89	168	153	20.32	0.08	7.45	11.4	84		
6/25/15	0	4.15	140	139	24.51	0.07	8.74	21.4	70	8.5	breezy, cloudy, warm
	1	4.12	141	139	24.23	0.07	8.68	23.3	70		
	2	4.08	140	136	23.41	0.07	8.62	27.5	70		
	3	1.86	145	138	22.34	0.07	7.82	22.9	73		
	4	0.14	148	139	21.84	0.07	7.44	14.7	74		
	4 1/4	0.00	151	142	21.71	0.07	7.28	12.3	75		
7/7/15	0	1.38	148	144	23.56	0.07	8.21	29.2	74	6	breezy, partly cloudy Close to 3" rain Sunday night to Monday
	1	1.42	149	145	23.57	0.07	8.24	30.6	75		
	2	1.45	151	147	23.43	0.07	8.22	32.0	76		
	3	1.45	153	148	23.33	0.07	8.14	35.2	77		
	4	1.47	155	149	22.98	0.07	7.99	36.1	78		
	4.5	0.00	179	172	22.92	0.08	7.31	9.1	80		
7/20/15	0	3.82	139	141	25.68	0.06	9.24	22.7	70	3.5	windy, partly cloudy
	1	3.87	141	143	25.67	0.07	9.19	25.6	70		
	2	3.90	142	143	25.59	0.07	9.11	28.7	70		
	3	1.69	149	148	24.43	0.07	8.10	22.4	74		
	4	0.99	151	149	24.13	0.07	7.70	17.0	76		
	4.5	0.00	168	165	23.86	0.08	7.27	29.5	83		
8/6/15	0	7.99	127	126	24.44	0.06	9.85	49.5	63	1.5	breezy, overcast, water - green - bloom
	1	8.26	128	127	24.43	0.06	9.79	49.4	64		
	2	7.95	130	129	24.37	0.06	9.70	52.4	65		
	3	6.00	134	131	23.92	0.06	9.31	56.9	67		
	4	2.22	138	132	22.83	0.06	8.42	60.9	69		

	4.5	0.00	154	148	22.77	0.07	7.46	51.5	77		
8/17/15	0	5.65	130	132	25.67	0.06	9.75	-25.7	65	1.5	mostly cloudy, slight breeze
	1	6.05	132	133	25.68	0.06	9.70	-29.2	66		
	2	0.31	149	148	24.68	0.07	8.44	-43.5	74		
	3	0.00	150	146	23.61	0.07	8.15	-54.9	75		
	4	0.00	155	149	23.01	0.07	7.96	-96.8	77		
	4.5	0.00	184	176	22.83	0.09	7.58	-113.9	92		
8/31/15	0	9.21	142	133	21.82	0.07	9.48	-49.6	71	2	windy, breezy, cloudy, partly sunny
	1	11.04	142	133	21.74	0.07	9.49	-42.3	71		
	2	11.43	145	135	21.43	0.07	9.43	-37.8	72		
	3	9.43	144	134	21.17	0.07	9.22	-36.6	72		
	4	2.77	150	138	20.67	0.07	8.22	-45.9	75		
	4.5	0.00	172	156	19.84	0.08	7.76	-92.5	86		
9/14/15	0	6.93	138	125	20.3	0.06	9.20	-74.1	69	3	breezy, sunny
	1	8.70	141	129	20.19	0.07	9.13	-64.6	71		
	2	8.09	142	129	20.07	0.07	9.05	-60.8	71		
	3	7.66	144	129	19.83	0.07	8.90	-59.7	72		
	4	6.80	144	129	19.71	0.07	8.76	-58.9	72		
	4.5	0.00	152	137	19.72	0.07	7.59	-192.7	76		
11/17/15	0	4.73	142	94	7.19	0.07	9.02	-13.4	71	10	
	1	4.94	143	95	7.18	0.07	8.91	-9.9	72		
	2	5.21	147	97	7.17	0.07	8.83	-5.8	73		
	3	5.42	147	97	7.16	0.07	8.76	-2.8	74		
	4	5.54	151	100	7.12	0.07	8.72	0.1	75		
	4.5	4.64	154	102	7.17	0.07	8.42	3.3	77		

Appendix D

Tributary and Outlet Chemical and Physical Data

Fox Creek, all units mg/L unless otherwise noted

Date	Phosphate Ortho Diss	Total Phosphorus	Nitrogen NO3+NO2 Diss	Nitrogen Kjeldahl Total	Nitrogen NH3-N Diss	Total Suspended Solids	Chlorophyll a (ug/L)
5/28/13	ND	0.0510	ND	0.266	ND	4.80	
6/26/13	0.00420	0.0247	ND	0.449	0.0250	3.00	
7/24/13	ND	0.0794	ND	1.52	0.0470	12.0	91.9
8/19/13	ND	0.101	ND	2.21	0.039	20.50	
9/10/13	0.0047	0.104	ND	1.49	0.308	7.20	
5/28/14	0.0022	0.0274	ND	0.412	0.0311	2.20	
6/24/14	ND	0.0257	ND	0.564	ND	3.20	
7/21/14	ND	0.047	ND	0.742	0.0251	6.20	
8/19/14	ND	0.0611	ND	1.12	0.0674	9.0	
9/17/14	ND	0.0498	ND	1.05	0.0372	6.00	
5/27/15	0.0053	0.0241	ND	0.385	0.0257	ND	
6/25/15	ND	0.0242	ND	0.518	0.0186	ND	
7/20/15	0.0017	0.0496	ND	0.903	0.0187	6.00	
8/17/15	0.0242	0.0723	ND	1.52	0.0532	9.60	
9/14/15	0.0056	0.0685	ND	0.872	0.0442	7.00	

Lost Creek, all units mg/L unless otherwise noted

Date	Phosphate Ortho Diss	Total Phosphorus	Nitrogen NO3+NO2 Diss	Nitrogen Kjeldahl Total	Nitrogen NH3-N Diss	Total Suspended Solids	Chlorophyll a (ug/L)
5/28/13	ND	0.0227	ND	0.545	ND	4.4	
6/26/13	0.0336	0.125	ND	2.44	0.0682	15.7	
7/24/13	0.0261	0.173	ND	1.55	0.118	30.0	29.1
8/19/13	0.0038	0.132	ND	1.42	0.0576	92.0	
9/10/13	0.0022	0.0799	ND	0.989	0.0217	22.0	
5/28/14	0.0031	0.0467	ND	1.12	0.0237	3.4	
6/24/14	0.0145	0.0738	ND	1.38	0.0487	ND	
7/21/14	0.0284	0.121	ND	1.76	0.0539	17.0	
8/19/14	0.0101	0.105	ND	1.64	0.0532	14.3	
9/17/14	0.0085	0.103	ND	1.71	0.0849	41.0	
5/27/15	0.0105	0.0349	ND	0.886	0.0245	5.5	
6/25/15	0.0268	0.152	ND	1.67	0.0726	49.0	
7/20/15	0.0101	0.0855	ND	1.49	0.0479	18.0	
8/17/15	0.0382	0.299	ND	2.05	0.192	28.0	
9/14/15	0.0266	0.14	ND	1.81	0.11	38.5	

Little Blake Inlet, all units mg/L unless otherwise noted

Date	Phosphate Ortho Diss	Total Phosphorus	Nitrogen NO3+NO2 Diss	Nitrogen Kjeldahl Total	Nitrogen NH3-N Diss	Total Suspended Solids	Chlorophyll a (ug/L)
5/28/13	ND	0.0652	ND	0.595	ND	5.00	
6/26/13	0.00700	0.0370	ND	0.516	0.0214	ND	
7/24/13	ND	0.0415	ND	0.992	0.0345	ND	17.6
8/19/13	ND	0.0240	ND	0.698	0.0309	ND	
9/10/13	ND	0.0441	ND	0.53	0.0225	ND	
5/28/14	ND	0.0436	ND	0.469	0.0325	2.60	
6/24/14	ND	0.0319	ND	0.537	ND	2.40	
7/21/14	ND	0.0343	ND	0.507	0.018	2.60	
8/19/14	ND	0.0481	ND	1.08	0.0254	5.00	
9/17/14	ND	0.0494	0.0383	0.822	0.0464	3.00	
5/27/15	0.00510	0.0345	ND	0.337	0.0176	ND	
6/25/15	0.00300	0.0340	ND	0.668	0.0182	ND	
7/20/15	ND	0.0419	ND	0.764	0.015	4.20	
8/17/15	0.00280	0.0560	ND	1.14	0.0288	3.67	
9/14/15	0.00930	0.0559	ND	0.859	0.0714	3.80	

Little Blake Inlet											
Date	Foot	Depth (ft)	Flow (m/s)								
5/28/13	0	0.7	0.02	18	1.7	0.23		16	1.9	0.23	
	1	1.0	0.05	19	1.6	0.05		17	1.7	0.20	
	2	1.1	0.07	20	1.4	0.01		18	1.7	0.09	
	3	1.1	0.11	21	1.2	0.01		19	1.6	0.09	
	4	1.5	0.20	22	0.5	0.00		20	1.4	0.01	
	5	1.7	0.25	23	0.2	0.00		21	1.3	0.00	
	6	2.4	0.23	6/26/13	0	0.8	0.00		22	0.9	0.00
	7	2.5	0.19	1	0.7	0.03		23	0.3	0.00	
	8	2.6	0.24	2	0.8	0.10		24	0.1	0.00	
	9	2.5	0.27	3	0.9	0.16	7/24/13	0	0.3	0.00	
	10	2.7	0.26	4	1.6	0.44		1	0.5	0.00	
	11	2.7	0.21	5	2.1	0.61		2	0.6	0.02	
	12	2.5	0.21	6	2.3	0.75		3	1.4	0.04	
	13	2.6	0.27	7	2.4	1.05		4	1.1	0.19	
	14	2.5	0.24	8	2.5	1.05		5	1.3	0.32	
	15	2.3	0.18	9	2.3	0.92		6	1.9	0.34	
	16	2.2	0.17	10	2.5	0.77		7	2.1	0.42	
	17	2.0	0.15	11	2.5	0.83		8	2.2	0.33	
	18	2.1	0.12	12	2.5	0.86		9	2.0	0.48	
	19	1.9	0.08	13	2.4	0.89		10	2.2	0.36	
	20	1.7	0.01	14	2.3	0.80		11	2.2	0.37	
	21	1.4	0.00	15	2.2	0.69		12	2.1	0.35	
	22	1.4	0.00	16	2.0	0.52		13	2.1	0.38	
	23	0.7	0.00	17	2.0	0.43		14	2.0	0.37	
24	0.4	0.00	18	2.0	0.24		15	2.0	0.35		
6/19/13	0	0.8	0.00	19	1.7	0.10		16	1.8	0.20	
	1	1.0	0.00	20	1.5	0.03		17	1.7	0.09	
	2	1.0	0.13	21	1.3	0.01		18	1.5	0.14	
	3	0.8	0.22	22	1.0	0.01		19	1.4	0.04	
	4	1.6	0.41	23	0.5	0.02		20	1.4	0.00	
	5	2.3	0.69	7/18/13	0	0.5	0.06		21	1.2	0.03
	6	2.1	1.03	1	0.4	0.02		22	0.8	0.00	
	7	2.5	1.02	2	0.6	0.04		23	0.2	0.00	
	8	2.6	1.14	3	1.1	0.06	8/9/13	0	0.2	0.98	
	9	2.6	1.20	4	1.1	0.18		1	0.3	0.81	
	10	2.6	1.13	5	0.9	0.21		2	0.3	0.80	
	11	2.5	1.18	6	2.0	0.40		3	0.2	1.34	
	12	2.4	1.13	7	2.1	0.49		4	0.2	1.16	
	13	2.4	0.99	8	2.2	0.49		5	0.2	0.75	
	14	2.2	0.81	9	2.2	0.64		6	0.2	1.24	
	15	2.1	0.62	10	2.4	0.42		7	0.2	1.13	
	16	2.0	0.58	11	2.2	0.41		8	0.1	0.00	
17	2.0	0.55	12	2.1	0.47		9	0.0	0.00		
			13	1.6	0.60		10	0.1	0.01		
			14	2.1	0.46		11	0.3	0.57		
			15	2.0	0.39		12	0.3	0.88		

13	0.3	1.12	7	2.1	0.57	4	1.2	0.19			
14	0.3	1.85	8	1.2	0.28	5	1.3	0.66			
15	0.4	1.45	9	2.0	0.50	6	1.5	1.18			
16	0.4	2.54	10	2.2	0.37	7	1.5	2.15			
17	0.5	2.17	11	2.2	0.44	8	1.6	2.70			
18	0.3	2.44	12	2.0	0.36	9	1.6	2.95			
19	0.4	0.88	13	2.0	0.40	10	1.5	2.85			
20	0.5	1.65	14	2.0	0.46	11	1.9	2.77			
21	0.5	1.60	15	1.9	0.38	12	2.0	1.01			
22	0.4	1.00	16	1.7	0.32	13	1.9	2.83			
23	0.5	1.22	17	1.6	0.30	14	1.9	2.88			
24	0.5	2.95	18	1.6	0.36	15	1.8	2.10			
25	0.5	3.10	19	1.3	0.18	16	1.5	1.04			
26	0.4	1.88	20	1.0	0.11	17	0.4	0.54			
8/19/13	0	0.4	0.07	21	1.0	0.07	18	0.6	0.20		
	1	0.2	0.04	22	0.2	0.00	19	0.4	0.15		
	2	0.6	0.09	23	0.1	0.00	20	0.3	0.01		
	3	0.6	0.07	9/26/13	0	0.2	0.04	5/28/14	0	0.1	0.04
	4	1.2	0.24		1	0.4	0.05		1	0.1	0.00
	5	1.2	0.41		2	0.6	0.11		2	0.3	0.05
	6	2.0	0.44		3	0.5	0.17		3	0.2	0.31
	7	1.8	0.44		4	1.1	0.36		4	0.8	0.11
	8	2.3	0.80		5	1.1	0.45		5	0.9	0.78
	9	2.3	0.54		6	1.9	0.46		6	1.5	0.84
	10	2.4	0.56		7	2.1	0.62		7	1.7	2.35
	11	2.4	0.68		8	1.9	0.86		8	1.9	2.27
	12	2.1	0.76		9	2.1	0.82		9	1.9	2.86
	13	2.2	0.71		10	2.0	0.65		10	1.9	2.87
	14	2.2	0.72		11	2.1	0.82		11	1.8	3.01
	15	2.1	0.63		12	2.1	0.63		12	1.5	2.96
	16	1.9	0.45		13	2.1	0.63		13	1.7	2.40
	17	1.7	0.54		14	2.1	0.57		14	1.6	1.10
	18	1.7	0.36		15	1.9	0.41		15	1.4	0.59
	19	1.7	0.26		16	1.8	0.32		16	1.2	0.32
	20	1.4	0.14		17	1.8	0.26		17	1.1	0.04
	21	1.0	0.06		18	1.7	0.18		18	1.0	0.02
	22	1.0	0.05		19	1.3	0.19		19	0.5	0.07
	23	0.4	0.04		20	1.4	0.16		20	0.4	0.09
	24	0.1	0.00		21	1.0	0.14	6/9/14	0	0.2	0.11
9/10/13	0	0.4	0.02		22	0.3	0.07		1	0.2	0.03
	1	0.3	0.00		23	0.2	0.00		2	0.4	0.20
	2	1.2	0.10		24	0.1	0.00		3	0.5	0.35
	3	1.3	0.11	5/22/14	0	0.5	0.11		4	0.7	0.79
	4	1.0	0.20		1	0.5	0.12		5	1.2	1.18
	5	1.1	0.25		2	1.0	0.09		6	1.8	1.87
	6	1.8	0.29		3	1.2	0.15		7	1.8	2.43

	8	1.9	2.83		5	1.4	0.17		5	1.0	0.36
	9	2.1	2.41		6	1.1	0.63		6	1.6	0.38
	10	2.1	2.52		7	1.6	1.15		7	1.8	0.62
	11	2.1	3.02		8	1.8	1.81		8	1.8	0.70
	12	1.7	3.59		9	2.0	2.12		9	1.9	1.11
	13	2.0	2.28		10	2.0	1.60		10	2.0	1.18
	14	1.8	3.05		11	1.9	1.85		11	1.9	1.32
	15	1.8	2.28		12	1.9	2.03		12	1.5	1.41
	16	1.6	1.97		13	1.8	2.35		13	1.9	1.12
	17	1.4	0.99		14	1.9	2.04		14	1.8	1.11
	18	1.4	0.67		15	1.6	1.81		15	1.6	0.95
	19	1.0	0.18		16	1.5	1.47		16	1.7	0.83
	20	1.0	0.03		17	1.2	1.27		17	1.3	0.54
	21	0.9	0.10		18	1.2	0.97		18	1.3	0.47
	22	0.5	0.11		19	0.9	0.50		19	0.9	0.26
	23	0.1	0.00		20	1.0	0.22		20	1.0	0.09
6/24/14	0	0.3	0.09		21	1.0	0.02		21	0.6	0.10
	1	0.4	0.05		22	0.5	0.11		22	0.4	0.04
	2	0.6	0.09		23	0.0	0.00		23	0.1	0.00
	3	0.5	0.18	7/21/14	0	0.2	0.07	8/19/14	0	0.2	0.12
	4	0.0	0.00		1	0.8	0.92		1	0.05	0.00
	5	1.6	0.40		2	0.6	0.22		2	0.5	0.08
	6	1.8	0.43		3	1.0	0.24		3	0.5	0.24
	7	1.8	1.52		4	1.4	0.75		4	0.0	0.00
	8	1.9	2.59		5	1.5	1.07		5	1.5	0.46
	9	2.0	2.06		6	1.7	1.36		6	1.2	0.50
	10	2.1	2.12		7	1.7	1.73		7	1.7	0.70
	11	2.1	2.42		8	1.7	1.35		8	1.9	1.16
	12	2.1	2.38		9	1.7	1.81		9	2.0	0.99
	13	2.1	1.96		10	1.6	2.05		10	2.0	0.96
	14	2.1	2.53		11	1.5	1.87		11	2.0	1.04
	15	2.0	2.12		12	1.5	1.69		12	2.1	1.19
	16	1.5	2.29		13	1.4	1.23		13	1.6	1.15
	17	1.5	1.68		14	1.3	0.90		14	1.7	1.12
	18	1.5	1.22		15	1.2	0.63		15	1.8	1.02
	19	1.2	0.80		16	1.2	0.37		16	1.7	0.69
	20	1.2	0.43		17	1.0	0.14		17	1.4	0.46
	21	1.2	0.18		18	0.9	0.06		18	1.4	0.26
	22	0.7	0.05		19	0.5	0.13		19	1.3	0.25
	23	0.4	0.10		20	0.4	0.06		20	1.1	0.08
	24	0.1	0.00		21	0.2	0.03		21	1.1	0.06
7/9/14	0	0.1	0.00	8/5/14	0	0.1	0.00		22	0.4	0.07
	1	0.1	0.00		1	0.1	0.00		23	0.05	0.00
	2	0.2	0.01		2	0.4	0.11	9/6/14	0	0.4	0.03
	3	0.2	0.10		3	0.5	0.15		1	0.2	0.01
	4	0.6	0.12		4	0.6	0.14		2	0.8	0.10

2	0.7	0.07
3	1.0	0.19
4	1.4	0.42
5	1.3	0.62
6	1.4	0.95
7	1.6	1.22
8	1.7	1.47
9	1.9	1.74
10	1.9	1.96
11	1.9	1.66
12	2.0	1.87
13	1.8	1.61
14	2.1	1.40
15	1.8	1.28
16	1.8	1.49
17	1.7	1.75
18	1.4	0.21
19	0.8	0.11
20	0.9	0.06
21	0.1	0.00
22	0.2	0.00
23	0.1	0.00
<hr/>		
8/6/15	0	0.3 0.03
	1	0.1 0.00
	2	0.0 0.00
	3	0.2 0.00
	4	0.7 0.05
	5	0.9 0.32
	6	1.5 0.59
	7	1.5 1.08
	8	1.5 0.96
	9	1.5 0.95
	10	1.8 1.16
	11	1.7 1.13
	12	1.6 1.25
	13	1.6 1.15
	14	1.6 0.86
	15	1.5 0.81
	16	1.2 0.47
	17	1.1 0.40
	18	1.1 0.22
	19	1.1 0.08
	20	0.9 0.08
	21	0.6 0.05
	22	0.4 0.06
<hr/>		
8/17/15	0	0.5 0.08

1	3.0	0.02
2	0.0	0.00
3	0.1	0.00
4	0.7	0.24
5	1.0	0.26
6	1.7	0.55
7	1.7	0.90
8	1.7	0.74
9	1.7	1.15
10	1.9	1.01
11	1.8	1.06
12	1.7	1.04
13	1.7	1.06
14	1.7	0.90
15	1.6	0.48
16	1.4	0.58
17	1.3	0.30
18	1.2	0.15
19	1.2	0.11
20	0.7	0.14
21	0.2	0.00
22	0.2	0.02
23	0.1	0.00
<hr/>		
8/31/15	0	0.1 0.00
	1	0.4 0.05
	2	0.3 0.00
	3	0.3 0.01
	4	0.8 0.10
	5	1.4 0.32
	6	1.7 0.66
	7	1.8 1.04
	8	1.9 1.64
	9	1.9 1.31
	10	2.1 1.34
	11	2.0 1.64
	12	1.9 1.36
	13	1.8 1.73
	14	1.8 1.44
	15	1.7 1.29
	16	1.5 0.71
	17	1.4 0.60
	18	1.3 0.61
	19	1.4 0.26
	20	1.3 0.15
	21	0.7 0.08
	22	0.5 0.00

<hr/>		
9/14/15	23	0.1 0.00
	0	0.1 0.00
	1	0.3 0.04
	2	0.0 0.00
	3	0.2 0.07
	4	0.2 0.00
	5	1.3 0.12
	6	1.4 0.57
	7	1.6 0.90
	8	1.8 1.09
	9	1.7 0.96
	10	1.9 1.11
	11	1.8 1.29
	12	1.8 1.32
	13	1.6 1.60
	14	1.7 1.36
	15	1.6 1.08
	16	1.5 1.03
	17	1.3 0.68
	18	1.3 0.34
	19	1.2 0.12
	20	1.2 0.04
	21	0.5 0.02
	22	0.3 0.00
	23	0.1 0.00

Lost Creek

Date	Foot	Depth (ft)	Flow (m/s)
5/28/13	0	2.0	0.03
	1	2.5	0.00
	2	3.0	0.03
	3	2.9	0.03
	4	3.4	0.01
	5	3.5	0.03
	6	3.0	0.03
	7	3.0	0.02
	8	2.8	0.03
	9	2.5	0.01
	10	2.4	0.03
	11	2.2	0.01
	12	2.2	0.01
	13	2.2	0.01
	14	2.1	0.01
	15	2.5	0.01
	16	2.7	0.01

	17	2.2	0.01
6/19/13	0	2.2	0.04
	1	1.3	0.06
	2	1.0	0.06
	3	0.7	0.02
	4	0.8	0.10
	5	0.9	0.04
	6	1.0	0.05
	7	1.2	0.06
	8	1.5	0.08
	9	1.3	0.06
	10	1.2	0.02
	11	1.2	0.08
6/26/13	0	2.9	0.02
	1	1.6	0.03
	2	1.0	0.07
	3	0.6	0.03
	4	0.7	0.04
	5	0.7	0.03
	6	0.9	0.04
	7	1.0	0.04
	8	1.7	0.03
	9	1.7	0.04
	10	2.9	0.01
	11	1.4	0.02
	12	1.0	0.02
	13	0.8	0.02
7/18/13	0	1.5	0.02
	1	1.0	0.04
	2	0.7	0.03
	3	0.5	0.01
	4	0.6	0.01
	5	1.0	0.00
	6	0.9	0.02
	7	1.2	0.02
	8	1.3	0.03
	9	1.9	0.02
	10	1.2	0.03
	11	1.3	0.03
	12	1.0	0.02
7/24/13	0	2.7	0.06
	1	1.5	0.06
	2	1.1	0.06
	3	0.9	0.03
	4	0.8	0.03
	5	0.6	0.04

	6	0.6	0.00
	7	0.7	0.03
	8	0.9	0.02
	9	1.5	0.04
	10	1.5	0.03
	11	2.0	0.02
	12	1.4	0.06
	13	0.6	0.03
	14	2.1	0.06
8/9/13	0	3.3	0.09
	1	1.1	0.07
	2	0.9	0.07
	3	0.7	0.06
	4	0.9	0.06
	5	0.7	0.05
	6	0.9	0.07
	7	0.8	0.12
	8	1.1	0.08
	9	1.1	0.10
	10	1.0	0.10
	11	1.2	0.09
	12	1.2	0.09
	13	3.5	0.10
	14	1.0	0.09
8/19/13	0	2.8	0.07
	1	2.6	0.12
	2	1.2	0.09
	3	0.7	0.11
	4	0.6	0.11
	5	0.8	0.09
	6	1.1	0.10
	7	1.0	0.11
	8	1.2	0.11
	9	1.8	0.09
	10	1.8	0.09
	11	1.5	0.09
	12	1.0	0.11
	13	1.4	0.09
	14	2.0	0.10
9/10/13	0	2.8	0.07
	1	1.7	0.08
	2	1.0	0.10
	3	0.6	0.08
	4	0.6	0.07
	5	0.7	0.09
	6	1.0	0.09

	7	1.2	0.10
	8	1.3	0.10
	9	1.5	0.07
	10	1.3	0.11
	11	1.3	0.09
	12	1.0	0.10
	13	1.0	0.12
9/26/13	0	2.6	0.14
	1	1.2	0.12
	2	0.7	0.11
	3	0.8	0.12
	4	1.0	0.13
	5	0.8	0.12
	6	0.9	0.13
	7	1.0	0.11
	8	1.3	0.14
	9	1.3	0.11
	10	1.2	0.13
	11	1.4	0.14
	12	0.7	0.12
	13	1.0	0.10
5/22/14	0	0.5	0.05
	1	0.9	0.24
	2	1.1	0.60
	3	1.2	0.65
	4	1.3	0.47
	5	1.3	0.74
	6	1.4	0.75
	7	1.5	0.56
	8	1.2	0.41
	9	1.1	0.33
	10	1.1	0.27
	11	0.8	0.22
	12	0.3	0.11
	13	0.3	0.14
	14	0.3	0.01
5/28/14	0	1.4	0.21
	1	1.6	0.22
	2	2.0	0.26
	3	2.0	0.34
	4	2.1	0.31
	5	2.6	0.35
	6	2.2	0.13
	7	2.3	0.22
	8	2.5	0.44
	9	2.7	0.75

	10	2.7	0.52
	11	2.2	0.16
	12	2.2	0.24
	13	0.9	0.18
	14	0.5	0.09
6/9/14	0	2.5	0.12
	1	2.6	0.13
	2	2.6	0.10
	3	2.2	0.14
	4	2.2	0.12
	5	1.5	0.11
	6	1.5	0.14
	7	1.5	0.14
	8	1.9	0.19
	9	2.0	0.17
	10	1.7	0.19
	11	1.5	0.17
	12	1.0	0.14
	13	0.8	0.13
	14	1.0	0.15
	15	1.0	0.13
6/24/14	0	1.4	1.03
	1	1.2	0.20
	2	1.7	0.16
	3	1.7	0.13
	4	2.0	0.12
	5	2.3	0.19
	6	2.3	0.16
	7	2.3	0.13
	8	2.3	0.18
	9	2.4	0.35
	10	2.1	0.19
	11	1.9	0.13
	12	1.0	0.28
	13	1.9	0.10
	14	0.7	0.09
	15	1.2	0.07
7/9/14	0	1.5	0.12
	1	2.5	0.12
	2	2.2	0.13
	3	2.2	0.13
	4	2.2	0.10
	5	2.1	0.12
	6	2.4	0.12
	7	2.3	0.18
	8	2.2	0.13

	9	1.9	0.17
	10	1.3	0.12
	11	0.7	0.13
	12	0.5	0.15
	13	0.4	0.11
	14	0.2	0.00
7/21/14	0	1.2	0.13
	1	1.4	0.11
	2	1.3	0.16
	3	1.2	0.18
	4	1.3	0.12
	5	1.2	0.12
	6	1.5	0.29
	7	1.3	0.13
	8	1.7	0.14
	9	2.0	0.14
	10	1.8	0.13
	11	1.8	0.14
	12	1.3	0.11
	13	0.5	0.10
8/5/14	0	1.6	0.13
	1	1.3	0.11
	2	1.5	0.09
	3	1.3	0.11
	4	1.7	0.15
	5	1.9	0.12
	6	2.0	0.12
	7	2.3	0.12
	8	2.4	0.11
	9	2.3	0.13
	10	2.0	0.10
	11	1.7	0.12
	12	0.5	0.13
	13	0.7	0.12
	14	0.9	0.11
	15	0.1	0.00
8/19/14	0	1.9	0.11
	1	2.0	0.11
	2	1.8	0.10
	3	1.9	0.14
	4	1.7	0.13
	5	2.0	0.13
	6	2.8	0.11
	7	2.5	0.11
	8	2.8	0.12
	9	2.9	0.10

	10	2.5	0.11
	11	1.9	0.12
	12	0.8	0.11
	13	0.8	0.08
	14	0.8	0.09
	15	0.8	0.07
9/6/14	0	2.3	0.12
	1	1.3	0.07
	2	1.5	0.09
	3	2.1	0.10
	4	2.2	0.10
	5	2.5	0.08
	6	2.6	0.15
	7	2.6	0.13
	8	2.9	0.12
	9	2.5	0.12
	10	2.4	0.12
	11	1.1	0.08
	12	1.0	0.09
	13	0.9	0.05
	14	1.2	0.12
	15	0.2	0.00
9/17/14	0	3.0	0.10
	1	1.0	0.11
	2	1.4	0.10
	3	1.6	0.08
	4	1.8	0.09
	5	1.8	0.08
	6	1.7	0.11
	7	2.2	0.12
	8	2.5	0.11
	9	2.0	0.13
	10	2.0	0.16
	11	1.6	0.12
	12	1.0	0.10
	13	0.6	0.10
	14	0.8	0.11
5/27/15	0	1.8	0.12
	1	1.6	0.12
	2	1.6	0.08
	3	1.4	0.12
	4	1.2	0.10
	5	1.3	0.12
	6	1.3	0.11
	7	0.2	0.04
	8	1.0	0.04

	9	1.3	0.10		5	2.4	0.11		13	0.8	0.08
	10	1.1	0.09		6	2.4	0.12		14	0.8	0.08
	11	1.6	0.11		7	2.4	0.15		15	0.8	0.10
	12	1.6	0.09		8	2.7	0.08	8/17/15	0	2.8	0.06
	13	1.3	0.04		9	2.4	0.09		1	0.6	0.14
	14	1.0	0.11		10	2.4	0.06		2	1.7	0.06
6/9/15	0	1.9	0.14		11	2.3	0.11		3	1.8	0.08
	1	2.5	0.17		12	1.9	0.10		4	1.8	0.08
	2	1.3	0.15		13	1.1	0.09		5	2.0	0.04
	3	1.3	0.04		14	0.8	0.11		6	2.0	0.07
	4	2.0	0.06		15	0.9	0.11		7	2.2	0.08
	5	2.2	0.11		16	0.8	0.12		8	2.2	0.07
	6	2.4	0.10		17	0.9	0.09		9	2.0	0.03
	7	2.4	0.12		18	0.9	0.02		10	2.0	0.09
	8	2.5	0.10		19	0.5	0.08		11	2.0	0.10
	9	2.8	0.10	7/20/15	0	2.5	0.08		12	1.0	0.08
	10	2.1	0.08		1	1.0	0.09		13	1.0	0.09
	11	1.3	0.13		2	1.6	0.10		14	1.3	0.09
	12	1.1	0.13		3	1.3	0.08		15	1.0	0.08
	13	1.0	0.11		4	1.6	0.09	8/31/15	0	0.8	0.10
	14	1.0	0.11		5	2.0	0.09		1	1.9	0.08
	15	1.0	0.10		6	2.1	0.09		2	1.8	0.11
6/25/15	0	2.4	0.13		7	2.4	0.09		3	2.0	0.07
	1	2.2	0.13		8	2.1	0.10		4	2.0	0.09
	2	1.2	0.10		9	1.9	0.08		5	2.4	0.09
	3	1.5	0.12		10	1.9	0.10		6	2.4	0.09
	4	1.6	0.09		11	1.0	0.07		7	2.5	0.10
	5	2.2	0.11		12	0.7	0.08		8	2.4	0.08
	6	2.4	0.11		13	0.6	0.10		9	2.4	0.07
	7	2.4	0.13		14	0.8	0.10		10	2.2	0.09
	8	2.5	0.11		15	1.0	0.07		11	2.0	0.07
	9	2.4	0.13		16	0.1	0.09		12	1.7	0.06
	10	2.4	0.12		17	0.6	0.08		13	1.7	0.11
	11	2.4	0.12	8/6/15	0	3.0	0.10		14	2.5	0.10
	12	2.0	0.19		1	2.3	0.11	9/14/15	0	1.8	0.07
	13	1.2	0.13		2	2.0	0.07		1	1.8	0.09
	14	0.8	0.10		3	2.3	0.08		2	1.9	0.06
	15	0.8	0.13		4	1.8	0.06		3	1.8	0.07
	16	1.0	0.14		5	1.9	0.10		4	1.8	0.06
	17	1.1	0.13		6	2.2	0.07		5	2.2	0.04
	18	1.1	0.13		7	2.3	0.08		6	2.3	0.09
7/7/15	0	3.0	0.08		8	2.1	0.03		7	2.3	0.07
	1	1.5	0.09		9	1.9	0.09		8	2.4	0.04
	2	1.5	0.13		10	1.9	0.09		9	2.0	0.06
	3	1.7	0.10		11	1.9	0.08		10	2.0	0.05
	4	1.7	0.08		12	1.6	0.09		11	1.4	0.05

12	1.7	0.06
13	1.7	0.03
14	1.7	0.07

Fox Creek

Date	Foot	Depth (ft)	Flow (m/s)
5/28/13	0	0.2	0.04
	1	0.4	0.06
	2	0.5	0.10
	3	0.4	0.15
	4	0.3	0.46
	5	0.3	0.56
	6	0.4	0.87
	7	0.3	0.77
	8	0.3	0.57
	9	0.3	0.80
	10	0.3	0.70
	11	0.3	0.56
	12	0.3	0.45
	13	0.6	0.69
	14	0.6	0.48
	15	0.6	0.63
	16	0.6	0.73
	17	0.7	0.85
	18	0.8	0.84
	19	0.8	0.80
	20	0.9	0.86
	21	0.8	0.74
	22	0.9	0.63
	23	0.9	0.54
	24	0.6	0.39
	25	0.8	0.48
	26	0.8	0.74
	27	0.7	0.65
	28	0.7	0.49
6/19/13	0	0.7	2.13
	1	0.8	2.30
	2	0.9	2.59
	3	0.6	1.97
	4	0.7	1.25
	5	0.8	1.99
	6	0.9	2.16
	7	0.9	1.82
	8	0.9	2.83
	9	0.8	2.91

10	0.6	3.06
11	0.8	2.68
12	0.7	2.13
13	0.6	1.49
14	0.6	2.54
15	0.5	1.42
16	0.4	2.23
17	0.3	2.70
18	0.3	2.57
19	0.5	2.45
20	0.5	2.55
21	0.4	2.25
22	0.4	2.50
23	0.5	1.62
24	0.5	1.25
25	0.5	0.88
26	0.4	0.22

6/26/13	0	0.3	0.45
	1	0.5	0.44
	2	0.5	0.83
	3	0.5	2.01
	4	0.5	2.15
	5	0.5	2.04
	6	0.4	1.75
	7	0.4	2.29
	8	0.3	2.00
	9	0.3	1.29
	10	0.3	0.95
	11	0.5	1.80
	12	0.6	2.39
	13	0.6	1.59
	14	0.6	2.36
	15	0.7	2.29
	16	0.7	3.01
	17	0.7	3.00
	18	0.6	3.32
	19	0.7	2.76
	20	0.8	2.51
	21	0.8	1.29
	22	0.7	1.47
	23	0.8	2.05
	24	0.9	3.05
	25	0.7	2.48
	26	0.6	0.52

7/18/13	0	0.4	1.48
	1	0.4	2.43

2	0.6	1.57
3	0.3	1.39
4	0.4	1.35
5	0.4	1.43
6	0.6	1.32
7	0.5	2.53
8	0.5	2.43
9	0.4	1.32
10	0.4	2.07
11	0.3	1.88
12	0.2	1.22
13	0.2	0.53
14	0.2	0.17
15	0.2	0.05
16	0	0.00
17	0	0.00
18	0.2	0.90
19	0.2	1.52
20	0.2	0.91
21	0.3	0.78
22	0.2	0.32
23	0.3	0.89
24	0.2	0.95
25	0.3	0.91
26	0.2	0.79

7/24/13	0	0.3	0.97
	1	0.4	0.87
	2	0.4	2.15
	3	0.4	0.65
	4	0.3	0.85
	5	0.4	1.73
	6	0.4	1.52
	7	0.3	1.48
	8	0.3	1.45
	9	0.4	1.55
	10	0.3	1.52
	11	0.3	0.12
	12	0.2	1.30
	13	0.2	1.06
	14	0.2	0.54
	15	0.2	0.40
	16	0.0	0.00
	17	0.0	0.00
	18	0.0	0.00
	19	0.2	1.03
	20	0.2	1.07

	21	0.3	0.51
	22	0.3	0.99
	23	0.2	1.21
	24	0.3	0.70
	25	0.3	0.96
	26	0.2	0.81
8/9/13	0	0.5	0.08
	1	0.4	0.05
	2	0.6	0.10
	3	0.5	0.24
	4	1.2	0.27
	5	1.2	0.28
	6	2.0	0.36
	7	2.1	0.53
	8	2.2	0.56
	9	2.3	0.45
	10	2.4	0.53
	11	2.2	0.60
	12	2.1	0.55
	13	1.6	0.54
	14	2.1	0.33
	15	2.0	0.47
	16	1.9	0.41
	17	1.7	0.37
	18	1.7	0.22
	19	1.6	0.23
	20	1.4	0.22
	21	1.2	0.15
	22	0.9	0.06
	23	0.3	0.08
	24	0.1	0.00
8/19/13	0	0.2	0.83
	1	0.3	0.76
	2	0.3	1.05
	3	0.3	1.02
	4	0.3	1.07
	5	0.2	1.22
	6	0.2	1.42
	7	0.0	0.00
	8	0.1	0.12
	9	0.2	0.28
	10	0.2	0.82
	11	0.3	0.70
	12	0.4	1.78
	13	0.4	2.45
	14	0.4	1.84

	15	0.5	2.77
	16	0.5	1.98
	17	0.5	2.71
	18	0.5	1.73
	19	0.5	1.86
	20	0.6	1.91
	21	0.5	0.80
	22	0.6	1.11
	23	0.6	2.43
	24	0.5	1.51
	25	0.3	1.21
9/10/13	0	0.2	0.92
	1	0.3	1.17
	2	0.2	1.02
	3	0.2	0.45
	4	0.2	0.40
	5	0.2	1.10
	6	0.1	0.92
	7	0.0	0.00
	8	0.2	0.22
	9	0.1	0.22
	10	0.2	0.46
	11	0.2	0.71
	12	0.3	0.64
	13	0.3	1.53
	14	0.3	1.89
	15	0.4	2.15
	16	0.3	2.79
	17	0.3	1.89
	18	0.4	1.36
	19	0.5	1.62
	20	0.5	1.85
	21	0.4	0.66
	22	0.5	1.31
	23	0.5	2.47
	24	0.4	1.93
	25	0.3	1.68
9/26/13	0	0.2	0.58
	1	0.3	0.76
	2	0.3	0.80
	3	0.3	0.50
	4	0.2	0.66
	5	0.2	0.76
	6	0.2	1.42
	7	0.2	0.95
	8	0.1	0.00

	9	0.2	0.92
	10	0.2	0.04
	11	0.3	0.70
	12	0.3	1.15
	13	0.3	1.06
	14	0.4	2.24
	15	0.4	0.61
	16	0.4	1.83
	17	0.4	3.30
	18	0.4	2.00
	19	0.5	1.96
	20	0.6	1.71
	21	0.5	1.39
	22	0.5	0.65
	23	0.6	1.96
	24	0.6	2.35
	25	0.5	1.64
	26	0.4	1.66
5/22/14	0	1.4	2.65
	1	1.3	3.27
	2	1.4	3.27
	3	1.2	2.70
	4	1.1	1.68
	5	1.0	2.36
	6	1.1	1.95
	7	1.1	2.81
	8	1.1	3.20
	9	1.0	3.02
	10	1.0	3.77
	11	0.9	3.16
	12	0.8	3.42
	13	0.6	2.58
	14	0.8	2.97
	15	0.8	1.82
	16	0.8	2.26
	17	0.6	2.54
	18	0.6	2.38
	19	0.6	1.94
	20	0.6	2.38
	21	0.5	2.00
	22	0.5	1.82
	23	0.5	1.98
	24	0.6	2.19
	25	0.5	2.15
	26	0.2	1.80
	27	0.4	1.30

	28	0.4	1.16		14	0.7	2.74		2	1.2	2.24
	29	0.3	0.42		15	0.5	2.39		3	1.2	2.35
5/28/14	0	0.3	0.20		16	0.5	2.28		4	1.1	1.45
	1	0.3	0.52		17	0.6	2.18		5	1.1	2.08
	2	0.5	0.73		18	0.5	2.25		6	1.0	0.81
	3	0.6	1.29		19	0.6	2.85		7	1.0	2.31
	4	0.5	2.00		20	0.5	2.36		8	1.0	2.85
	5	0.6	1.95		21	0.5	2.29		9	1.0	2.93
	6	0.5	2.14		22	0.6	2.24		10	0.8	3.06
	7	0.5	1.71		23	0.5	2.23		11	0.8	2.31
	8	0.5	2.03		24	0.5	2.60		12	0.8	2.20
	9	0.5	2.78		25	0.5	0.86		13	0.7	1.91
	10	0.6	2.10		26	0.4	1.02		14	0.7	2.08
	11	0.6	1.94		27	0.3	0.82		15	0.7	1.98
	12	0.5	2.47	6/24/14	0	1.3	1.33		16	0.7	1.74
	13	0.3	2.66		1	1.3	2.66		17	0.6	0.79
	14	0.8	2.02		2	1.4	3.59		18	0.6	1.66
	15	0.5	2.37		3	1.1	2.08		19	0.5	1.54
	16	0.5	3.17		4	1.2	2.56		20	0.5	1.54
	17	0.7	3.09		5	1.1	2.56		21	0.5	1.33
	18	1.0	2.60		6	1.1	2.34		22	0.4	1.28
	19	1.0	2.36		7	1.0	3.59		23	0.5	1.23
	20	1.0	3.12		8	1.1	3.56		24	0.5	1.41
	21	1.0	3.41		9	1.1	3.31		25	0.5	1.30
	22	1.0	2.85		10	1.0	2.92		26	0.5	1.50
	23	1.0	2.76		11	1.0	3.41		27	0.5	0.97
	24	0.6	4.07		12	0.9	2.77		28	0.4	1.03
	25	1.1	2.92		13	0.8	2.67		29	0.3	0.64
	26	1.2	0.87		14	0.8	2.69		30	0.3	0.32
	27	1.3	2.46		15	0.6	2.72	7/21/14	0	1.0	1.20
	28	1.4	2.89		16	0.8	2.49		1	1.0	1.95
	29	1.4	2.45		17	0.7	1.91		2	0.8	2.29
6/9/14	0	1.4	2.68		18	0.7	2.34		3	1.0	2.15
	1	1.4	2.66		19	0.6	1.78		4	0.8	1.02
	2	1.4	2.97		20	0.6	1.72		5	0.8	2.63
	3	1.2	2.35		21	0.6	1.74		6	0.8	0.47
	4	1.1	2.32		22	0.7	1.76		7	0.8	2.25
	5	1.1	1.73		23	0.7	1.53		8	0.6	2.44
	6	1.1	2.33		24	0.7	1.56		9	0.5	3.13
	7	1.0	2.71		25	0.6	1.76		10	0.8	2.64
	8	1.0	3.07		26	0.6	0.81		11	0.7	2.22
	9	1.0	3.51		27	0.6	0.87		12	0.6	1.78
	10	0.9	2.74		28	0.4	0.48		13	0.5	2.05
	11	0.6	2.63		29	0.2	0.31		14	0.4	1.22
	12	0.9	3.51	7/9/14	0	1.1	1.13		15	0.5	1.05
	13	0.7	2.98		1	1.2	1.66		16	0.5	0.80

17	0.4	0.06		2	1.0	2.14		18	0.5	2.07	
18	0.3	1.87		3	0.9	1.87		19	0.5	1.98	
19	0.3	1.45		4	0.8	0.84		20	0.5	1.24	
20	0.3	1.45		5	0.7	1.86		21	0.5	1.31	
21	0.3	1.04		6	0.7	0.02		22	0.5	1.49	
22	0.2	0.74		7	0.7	2.02		23	0.5	1.78	
23	0.3	0.92		8	0.5	2.34		24	0.5	1.77	
24	0.3	1.00		9	0.4	2.74		25	0.5	1.72	
25	0.2	1.04		10	0.6	2.18		26	0.5	1.50	
26	0.3	1.27		11	0.6	2.43		27	0.5	1.10	
27	0.2	1.07		12	0.5	2.19		28	0.3	0.60	
28	0.2	0.61		13	0.4	2.11		29	0.3	0.70	
29	0.1	0.51		14	0.4	1.75	9/17/14	0	0.9	1.17	
30	0.1	0.12		15	0.4	1.51		1	0.7	2.14	
8/5/14	0	0.9	1.35	16	0.4	1.01		2	1.0	1.68	
	1	1.0	1.53	17	0.1	0.23		3	0.7	1.90	
	2	0.9	1.81	18	0.3	2.07		4	0.8	1.29	
	3	0.9	1.91	19	0.2	1.20		5	0.7	1.67	
	4	0.8	1.34	20	0.2	1.13		6	0.6	0.74	
	5	0.7	1.64	21	0.2	0.90		7	0.7	2.28	
	6	0.7	0.14	22	0.2	0.87		8	0.7	2.70	
	7	0.5	2.15	23	0.3	0.81		9	0.5	2.93	
	8	0.6	2.52	24	0.3	1.09		10	0.6	2.11	
	9	0.4	2.52	25	0.3	1.32		11	0.5	1.94	
	10	0.5	2.25	26	0.3	1.26		12	0.4	1.86	
	11	0.5	2.04	27	0.2	0.29		13	0.4	1.40	
	12	0.5	2.01	28	0.1	0.51		14	0.4	1.33	
	13	0.4	1.63	29	0.05	0.00		15	0.3	1.27	
	14	0.4	1.35	9/6/14	0	1.3	2.12	16	0.4	1.19	
	15	0.4	1.15		1	1.3	2.68	17	0.2	0.89	
	16	0.4	0.91		2	1.3	3.05	18	0.2	0.89	
	17	0.3	1.27		3	1.2	2.75	19	0.2	1.84	
	18	0.2	1.49		4	1.1	3.48	20	0.2	0.72	
	19	0.2	1.21		5	0.9	3.39	21	0.1	0.84	
	20	0.2	1.14		6	1.0	3.54	22	0.2	0.69	
	21	0.2	0.94		7	1.0	2.77	23	0.2	0.59	
	22	0.2	0.97		8	0.9	2.94	24	0.3	0.99	
	23	0.3	0.87		9	0.8	4.03	25	0.2	1.03	
	24	0.3	0.87		10	0.9	2.40	26	0.2	0.88	
	25	0.3	1.09		11	0.9	3.32	27	0.2	0.56	
	26	0.3	0.86		12	0.7	2.48	28	0.1	0.19	
	27	0.2	0.42		13	0.6	3.53	5/27/15	0	0.7	1.40
	28	0.1	0.47		14	0.5	2.62		1	0.8	1.19
	29	0.05	0.00		15	0.7	2.69		2	0.9	3.30
8/19/14	0	1.0	1.54		16	0.7	2.36		3	0.9	2.93
	1	1.0	2.02		17	0.5	1.80		4	0.8	1.44

5	0.8	3.04		22	0.3	1.11		10	0.7	2.97
6	0.8	1.13		23	0.3	1.39		11	0.7	3.03
7	0.7	2.76		24	0.3	1.23		12	0.7	2.35
8	0.6	3.02		25	0.3	1.29		13	0.6	2.58
9	0.6	3.31		26	0.3	1.67		14	0.5	2.41
10	0.8	3.00		27	0.3	1.12		15	0.6	2.53
11	0.6	2.34		28	0.2	0.44		16	0.5	2.65
12	0.6	1.96						17	0.5	1.89
13	0.4	1.54	6/25/15	0	0.8	1.18		18	0.5	2.10
14	0.4	0.87		1	0.9	2.54		19	0.4	1.67
15	0.4	0.87		2	0.9	2.69		20	0.4	1.53
16	0.3	0.53		3	0.9	2.68		21	0.4	1.52
17	0.1	2.23		4	0.6	1.55		22	0.4	1.84
18	0.3	1.13		5	0.6	3.05		23	0.4	1.79
19	0.3	1.37		6	0.6	1.68		24	0.4	1.92
20	0.2	1.02		7	0.7	2.58		25	0.4	1.81
21	0.2	0.94		8	0.7	3.82		26	0.4	1.80
22	0.2	0.06		9	0.5	3.67		27	0.3	1.09
23	0.3	0.99		10	0.6	3.43		28	0.2	0.12
24	0.3	1.12		11	0.5	2.48		29	0.1	0.08
25	0.2	1.06		12	0.6	2.03				
26	0.2	0.78		13	0.4	1.91				
27	0.2	0.99		14	0.4	1.69	7/20/15	0	0.9	0.42
28	0.2	0.28		15	0.3	1.38		1	1.0	2.51
6/9/15	0	0.8	0.92	16	0.3	1.54		2	1.0	2.90
	1	1.0	3.12	17	0.3	0.59		3	0.9	2.84
	2	1.0	3.06	18	0.3	1.90		4	0.7	0.35
	3	1.0	2.72	19	0.2	0.75		5	0.8	2.35
	4	0.9	2.94	20	0.3	0.93		6	0.7	2.32
	5	0.8	3.14	21	0.2	1.11		7	0.6	4.11
	6	0.8	2.66	22	0.2	0.90		8	0.7	3.93
	7	0.6	3.67	23	0.2	0.66		9	0.7	2.50
	8	0.8	4.25	24	0.3	1.18		10	0.7	2.80
	9	0.7	2.25	25	0.3	1.45		11	0.7	2.49
	10	0.7	3.30	26	0.3	1.21		12	0.7	2.48
	11	0.8	2.84	27	0.3	1.06		13	0.6	2.06
	12	0.7	2.54	28	0.2	0.30		14	0.5	3.22
	13	0.5	2.62	7/7/15	0	0.9	1.85	15	0.5	2.58
	14	0.5	1.52		1	0.9	2.55	16	0.4	1.74
	15	0.4	1.12		2	1.0	2.50	17	0.4	1.50
	16	0.4	1.69		3	0.9	1.49	18	0.3	0.02
	17	0.3	0.90		4	0.9	2.51	19	0.4	1.41
	18	0.3	1.34		5	0.9	0.85	20	0.3	0.58
	19	0.3	1.04		6	0.8	3.11	21	0.3	0.91
	20	0.3	1.14		7	0.8	3.48	22	0.4	2.02
	21	0.3	1.14		8	0.8	3.71	23	0.4	1.60
					9	0.8	3.51	24	0.4	1.77
								25	0.4	1.94

	26	0.4	2.12
	27	0.3	0.85
	28	0.1	0.03
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8/6/15	0	0.6	0.62
	1	0.8	2.39
	2	0.9	2.63
	3	0.5	1.76
	4	0.6	2.23
	5	0.6	0.06
	6	0.5	2.31
	7	0.5	2.16
	8	0.5	3.52
	9	0.5	2.99
	10	0.4	2.38
	11	0.5	1.72
	12	0.4	1.99
	13	0.3	1.18
	14	0.1	1.07
	15	0.3	0.24
	16	0.2	1.27
	17	0.1	1.70
	18	0.1	0.58
	19	0.2	0.67
	20	0.1	0.61
	21	0.1	0.02
	22	0.2	0.44
	23	0.2	0.90
	24	0.2	0.74
	25	0.1	0.72
	26	0.1	0.96
	27	0.1	0.27
	28	0.1	0.13
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8/17/15	0	0.6	0.24
	1	0.6	2.63
	2	0.8	2.73
	3	0.6	1.92
	4	0.6	1.98
	5	0.6	0.68
	6	0.5	0.10
	7	0.3	2.77
	8	0.5	3.23
	9	0.3	3.20
	10	0.5	2.29
	11	0.5	2.32
	12	0.4	2.07
	13	0.4	1.44

	14	0.2	0.91
	15	0.3	0.96
	16	0.2	1.39
	17	0.2	0.55
	18	0.2	0.18
	19	0.2	0.69
	20	0.1	0.61
	21	0.1	0.00
	22	0.1	0.53
	23	0.2	0.97
	24	0.1	0.76
	25	0.2	0.24
	26	0.2	1.21
	27	0.1	0.59
	28	0.1	0.22
<hr/>			
8/31/15	0	1.1	1.48
	1	1.0	2.31
	2	1.0	2.34
	3	0.7	1.06
	4	0.7	2.04
	5	0.6	2.34
	6	0.7	2.20
	7	0.6	3.36
	8	0.6	3.17
	9	0.7	2.57
	10	0.7	2.25
	11	0.6	2.33
	12	0.5	2.59
	13	0.5	1.94
	14	0.5	1.05
	15	0.5	2.68
	16	0.2	0.50
	17	0.3	1.81
	18	0.3	1.55
	19	0.3	2.02
	20	0.3	1.84
	21	0.3	1.61
	22	0.3	1.26
	23	0.3	1.31
	24	0.3	1.11
	25	0.3	1.56
	26	0.3	1.87
	27	0.2	1.74
<hr/>			
9/14/15	0	0.8	0.29
	1	0.8	2.47
	2	1.0	2.81

	3	0.7	0.32
	4	0.7	2.94
	5	0.6	0.14
	6	0.6	2.73
	7	0.6	2.97
	8	0.6	3.28
	9	0.7	2.70
	10	0.6	2.11
	11	0.7	2.15
	12	0.6	2.60
	13	0.5	1.52
	14	0.3	1.23
	15	0.3	1.86
	16	0.4	1.39
	17	0.3	1.08
	18	0.2	1.88
	19	0.2	1.32
	20	0.2	1.06
	21	0.1	1.00
	22	0.3	1.22
	23	0.2	1.15
	24	0.2	0.67
	25	0.3	1.55
	26	0.2	1.02
	27	0.2	0.83
	28	0.1	0.38

Appendix E

Algae Data and Report



Wisconsin State Laboratory of Hygiene
 2601 Agriculture Drive, PO Box 7996
 Madison, WI 53707-7996
 (800)442-4618 • FAX (608)224-6213
 http://www.slh.wisc.edu

Laboratory Report

D.F. Kurtycz, M.D., Medical Director • Charles D. Brokopp, Dr.P.H., Director

Environmental Health Division

Environmental Toxicology

WDNR LAB ID: 113133790

NELAP LAB ID: E37658

EPA LAB WI00007

WI DATCP ID: 105-415

WSLH Sample: FY000225

POLK COUNTY LAND & WATER RESOU

Bill To

100 POLK CO. PLAZA, STE 120

BALSAM LAKE WI 54810

Customer ID: 336949

POLK COUNTY LAND & WATER RESOURCES

DEPARTMENT
 100 POLK CO. PLAZA, STE 120

BALSAM LAKE WI 54810

ID#: 493144

Waterbody/Outfall ID: 2627000

Point/Well:

Account #: PP001

Project No:

Date Received: 02/19/2014 08:28:00

Date Reported: 03/10/2014

Sample Reason:

Field #:

Collection Start: 05/28/2013

Collection End:

Collected By: JEREMY WILLIAMSON

County:

Sample Source: SURFACE WATER

Sample Depth: 2 Meters

Sample Information: ; COMPOSITE SAMPLER

Sample Location: BIG BLAKE LAKE

Sample Description: MID LAKE

Analyses and Results:

Taxa	Division	Result	Unit	Percentage
ASTERIONELLA FORMOSA	BACILLARIOPHYTA	131.	CELLS/ML	1.4 %
AULACOSEIRA SP.	BACILLARIOPHYTA	341.	CELLS/ML	3.7 %
FRAGILARIA CROTONENSIS	BACILLARIOPHYTA	2804.	CELLS/ML	30.6 %
DYSMORPHOCOCCUS SP.	CHLOROPHYTA	26.	CELLS/ML	0.3 %
STAUSTRUM SP.	CHLOROPHYTA	26.	CELLS/ML	0.3 %
DINOBRYON SP.	CHRYSOPTHYTA	1598.	CELLS/ML	17.4 %
CRYPTOMONAS SP.	CRYPTOPHYTA	970.	CELLS/ML	10.6 %
KOMMA CAUDATA	CRYPTOPHYTA	3275.	CELLS/ML	35.7 %



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Environmental Health Division

Environmental Toxicology

WDNR LAB ID: 113133790

NELAP LAB ID: E37658 EPA LAB WI00007

WI DATCP ID: 105-415

WSLH Sample: FY000225

Test results for NELAP accredited tests are certified to meet the requirements of the NELAC standards. For a list of accredited analytes see <http://www.slh.wisc.edu/nelap/>

List of Abbreviations:

Natural Unit = Unicell, Colony or Filament Equals 1 Unit

LOD = Level of detection

LOQ = Level of quantification

ND = None detected. Results are less than the LOD

Responsible Party: Steve Geis Steve Geis, Chemist Supervisor

If there are questions about this report, please contact Dawn Perkins at 608-224-6230.

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Laboratory Report

D.F. Kurtycz, M.D., Medical Director • Charles D. Brokopp, Dr.P.H., Director

Environmental Health Division

Environmental Toxicology

WDNR LAB ID: 113133790

NELAP LAB ID: E37658

EPA LAB WI00007

WI DATCP ID: 105-415

WSLH Sample: FY000226

POLK COUNTY LAND & WATER RESOU

Bill To

100 POLK CO. PLAZA, STE 120

BALSAM LAKE WI 54810

Customer ID: 336949

POLK COUNTY LAND & WATER RESOURCES

DEPARTMENT
 100 POLK CO. PLAZA, STE 120

BALSAM LAKE WI 54810

ID#: 493144

Waterbody/Outfall ID: 2627000

Point/Well:

Account #: PP001

Project No:

Date Received: 02/19/2014 08:28:00

Date Reported: 03/10/2014

Sample Reason:

Field #:

Collection Start: 06/26/2013

Collection End:

Collected By: JEREMY WILLIAMSON

County:

Sample Source: SURFACE WATER

Sample Depth: 2 Meters

Sample Information: ; COMPOSITE SAMPLER

Sample Location: BIG BLAKE LAKE

Sample Description: MID LAKE

Analyses and Results:

Taxa	Division	Result	Unit	Percentage
AULACOSEIRA SP.	BACILLARIOPHYTA	454.	CELLS/ML	9.6 %
CAVINULA SP.	BACILLARIOPHYTA	14.	CELLS/ML	0.3 %
FRAGILARIA CROTONENSIS	BACILLARIOPHYTA	1306.	CELLS/ML	27.7 %
SCHROEDERIA SP.	CHLOROPHYTA	695.	CELLS/ML	14.7 %
DINOBRYON SP.	CHRYSOPHYTA	284.	CELLS/ML	6.0 %
CRYPTOMONAS SP.	CRYPTOPHYTA	199.	CELLS/ML	4.2 %
KOMMA CAUDATA	CRYPTOPHYTA	1717.	CELLS/ML	36.4 %
CERATIUM HIRUNDINELLA	PYRRHOPHYTA	43.	CELLS/ML	0.9 %



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Laboratory Report

D.F. Kurtycz, M.D., Medical Director • Charles D. Brokopp, Dr.P.H., Director

Environmental Health Division

Environmental Toxicology

WDNR LAB ID: 113133790

NELAP LAB ID: E37658 EPA LAB WI00007

WI DATCP ID: 105-415

WSLH Sample: FY000226

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LOQ = Level of quantification

ND = None detected. Results are less than the LOD

Responsible Party: Steve Geis Steve Geis, Chemist Supervisor

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Laboratory Report

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Environmental Health Division

Environmental Toxicology

WDNR LAB ID: 113133790

NELAP LAB ID: E37658

EPA LAB WI00007

WI DATCP ID: 105-415

WSLH Sample: FY000227

POLK COUNTY LAND & WATER RESOU

100 POLK CO. PLAZA, STE 120

BALSAM LAKE WI 54810

Bill To

Customer ID: 336949

POLK COUNTY LAND & WATER RESOURCES

DEPARTMENT
 100 POLK CO. PLAZA, STE 120

BALSAM LAKE WI 54810

ID#: 493144

Waterbody/Outfall ID: 2627000

Point/Well:

Account #: PP001

Project No:

Date Received: 02/19/2014 08:28:00

Date Reported: 03/10/2014

Sample Reason:

Field #:

Collection Start: 07/24/2013

Collection End:

Collected By: JEREMY WILLIAMSON

County:

Sample Source: SURFACE WATER

Sample Depth: 2 Meters

Sample Information: ; COMPOSITE SAMPLER

Sample Location: BIG BLAKE LAKE

Sample Description: MID LAKE

Analyses and Results:



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Laboratory Report

D.F. Kurtycz, M.D., Medical Director • Charles D. Brokopp, Dr.P.H., Director

Environmental Health Division

Environmental Toxicology

WDNR LAB ID: 113133790

NELAP LAB ID: E37658 EPA LAB WI00007

WI DATCP ID: 105-415

WSLH Sample: FY000227

Taxa	Division	Result	Unit	Percentage
AULACOSEIRA SP.	BACILLARIOPHYTA	30.	CELLS/ML	0.7 %
CAVINULA SP.	BACILLARIOPHYTA	30.	CELLS/ML	0.7 %
FRAGILARIA CROTONENSIS	BACILLARIOPHYTA	180.	CELLS/ML	4.3 %
SYNEDRA SP.	BACILLARIOPHYTA	20.	CELLS/ML	0.5 %
DICTYOSPHAERIUM SP.	CHLOROPHYTA	220.	CELLS/ML	5.2 %
DYSMORPHOCOCCUS SP.	CHLOROPHYTA	30.	CELLS/ML	0.7 %
MICRACTINIUM SP.	CHLOROPHYTA	220.	CELLS/ML	5.2 %
OOCYSTIS SP.	CHLOROPHYTA	40.	CELLS/ML	1.0 %
PEDIASTRUM SP.	CHLOROPHYTA	10.	CELLS/ML	0.2 %
SCENEDESMUS SP.	CHLOROPHYTA	40.	CELLS/ML	1.0 %
SCHROEDERIA SP.	CHLOROPHYTA	80.	CELLS/ML	1.9 %
SPHAEROCYSTIS SP.	CHLOROPHYTA	210.	CELLS/ML	5.0 %
STAUSTRUM SP.	CHLOROPHYTA	20.	CELLS/ML	0.5 %
TETRAEDRON SP.	CHLOROPHYTA	20.	CELLS/ML	0.5 %
TETRASELMIS SP.	CHLOROPHYTA	40.	CELLS/ML	1.0 %
CRYPTOMONAS SP.	CRYPTOPHYTA	391.	CELLS/ML	9.3 %
KOMMA CAUDATA	CRYPTOPHYTA	1723.	CELLS/ML	41.1 %
ANABAENA SP.	CYANOPHYTA	491.	CELLS/ML	11.7 %
TRACHELOMONAS SP.	EUGLENOPHYTA	100.	CELLS/ML	2.4 %
CERATIUM HIRUNDINELLA	PYRRHOPHYTA	281.	CELLS/ML	6.7 %
PERIDINIUM SP.	PYRRHOPHYTA	20.	CELLS/ML	0.5 %

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List of Abbreviations:

Natural Unit = Unicell, Colony or Filament Equals 1 Unit
 LOD = Level of detection
 LOQ = Level of quantification
 ND = None detected. Results are less than the LOD

Responsible Party: Steve Geis Steve Geis, Chemist Supervisor

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Laboratory Report

D.F. Kurtycz, M.D., Medical Director • Charles D. Brokopp, Dr.P.H., Director

Environmental Health Division

Environmental Toxicology

WDNR LAB ID: 113133790

NELAP LAB ID: E37658

EPA LAB WI00007

WI DATCP ID: 105-415

WSLH Sample: FY000228

POLK COUNTY LAND & WATER RESOU

100 POLK CO. PLAZA, STE 120

BALSAM LAKE WI 54810

Bill To

Customer ID: 336949

POLK COUNTY LAND & WATER RESOURCES

DEPARTMENT
 100 POLK CO. PLAZA, STE 120

BALSAM LAKE WI 54810

ID#: 493144

Waterbody/Outfall ID: 2627000

Point/Well:

Account #: PP001

Project No:

Date Received: 02/19/2014 08:28:00

Date Reported: 03/10/2014

Sample Reason:

Field #:

Collection Start: 08/19/2013

Collection End:

Collected By: JEREMY WILLIAMSON

County:

Sample Source: SURFACE WATER

Sample Depth: 2 Meters

Sample Information: ; COMPOSITE SAMPLER

Sample Location: BIG BLAKE LAKE

Sample Description: MID LAKE

Analyses and Results:



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Environmental Toxicology

WDNR LAB ID: 113133790

NELAP LAB ID: E37658 EPA LAB WI00007

WI DATCP ID: 105-415

WSLH Sample: FY000228

Taxa	Division	Result	Unit	Percentage
AULACOSEIRA SP.	BACILLARIOPHYTA	136.	CELLS/ML	0.9 %
CAVINULA SP.	BACILLARIOPHYTA	27.	CELLS/ML	0.2 %
CHODATELLA SP.	CHLOROPHYTA	82.	CELLS/ML	0.5 %
DYSMORPHOCOCCUS SP.	CHLOROPHYTA	164.	CELLS/ML	1.1 %
EUDORINA SP.	CHLOROPHYTA	409.	CELLS/ML	2.7 %
OOCYSTIS SP.	CHLOROPHYTA	164.	CELLS/ML	1.1 %
PEDIASTRUM SP.	CHLOROPHYTA	27.	CELLS/ML	0.2 %
SCHROEDERIA SP.	CHLOROPHYTA	27.	CELLS/ML	0.2 %
TETRASELMIS SP.	CHLOROPHYTA	27.	CELLS/ML	0.2 %
CRYPTOMONAS SP.	CRYPTOPHYTA	2889.	CELLS/ML	18.9 %
KOMMA CAUDATA	CRYPTOPHYTA	4006.	CELLS/ML	26.2 %
ANABAENA SP.	CYANOPHYTA	1744.	CELLS/ML	11.4 %
APHANIZOMENON FLOS-AQUAE	CYANOPHYTA	2861.	CELLS/ML	18.7 %
COELOSPHAERIUM SP.	CYANOPHYTA	1690.	CELLS/ML	11.1 %
MICROCYSTIS AERUGINOSA	CYANOPHYTA	491.	CELLS/ML	3.2 %
CERATIUM HIRUNDINELLA	PYRRHOPHYTA	545.	CELLS/ML	3.6 %

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List of Abbreviations:

Natural Unit = Unicell, Colony or Filament Equals 1 Unit
 LOD = Level of detection
 LOQ = Level of quantification
 ND = None detected. Results are less than the LOD

Responsible Party: Steve Geis Steve Geis, Chemist Supervisor

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Environmental Toxicology

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WI DATCP ID: 105-415

WSLH Sample: FY000229

POLK COUNTY LAND & WATER RESOU

100 POLK CO. PLAZA, STE 120

BALSAM LAKE WI 54810

Bill To

Customer ID: 336949

POLK COUNTY LAND & WATER RESOURCES

DEPARTMENT
 100 POLK CO. PLAZA, STE 120

BALSAM LAKE WI 54810

ID#: 493144

Waterbody/Outfall ID: 2627000

Point/Well:

Account #: PP001

Project No:

Date Received: 02/19/2014 08:28:00

Date Reported: 03/10/2014

Sample Reason:

Field #:

Collection Start: 09/26/2013

Collection End:

Collected By: JEREMY WILLIAMSON

County:

Sample Source: SURFACE WATER

Sample Depth: 2 Meters

Sample Information: ; COMPOSITE SAMPLER

Sample Location: BIG BLAKE LAKE

Sample Description: MID LAKE

Analyses and Results:



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WDNR LAB ID: 113133790

NELAP LAB ID: E37658

EPA LAB WI00007

WI DATCP ID: 105-415

WSLH Sample: FY000229

Taxa	Division	Result	Unit	Percentage
AULACOSEIRA SP.	BACILLARIOPHYTA	40.	CELLS/ML	0.2 %
CAVINULA SP.	BACILLARIOPHYTA	140.	CELLS/ML	0.6 %
CLOSTERIUM SP.	CHLOROPHYTA	20.	CELLS/ML	0.1 %
DYSMORPHOCOCCUS SP.	CHLOROPHYTA	60.	CELLS/ML	0.3 %
OOCYSTIS SP.	CHLOROPHYTA	301.	CELLS/ML	1.3 %
SCENEDESMUS SP.	CHLOROPHYTA	160.	CELLS/ML	0.7 %
SCHROEDERIA SP.	CHLOROPHYTA	341.	CELLS/ML	1.5 %
SPHAEROCYSTIS SP.	CHLOROPHYTA	1242.	CELLS/ML	5.5 %
STAUSTRUM SP.	CHLOROPHYTA	20.	CELLS/ML	0.1 %
TETRAEDRON SP.	CHLOROPHYTA	40.	CELLS/ML	0.2 %
TETRASELMIS SP.	CHLOROPHYTA	40.	CELLS/ML	0.2 %
CRYPTOMONAS SP.	CRYPTOPHYTA	2645.	CELLS/ML	11.8 %
KOMMA CAUDATA	CRYPTOPHYTA	1643.	CELLS/ML	7.3 %
ANABAENA SP.	CYANOPHYTA	260.	CELLS/ML	1.2 %
APHANIZOMENON FLOS-AQUAE	CYANOPHYTA	561.	CELLS/ML	2.5 %
COELOSPHAERIUM SP.	CYANOPHYTA	9518.	CELLS/ML	42.4 %
MICROCYSTIS AERUGINOSA	CYANOPHYTA	1703.	CELLS/ML	7.6 %
PSEUDANABAENA SP.	CYANOPHYTA	3707.	CELLS/ML	16.5 %

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LOQ = Level of quantification

ND = None detected. Results are less than the LOD

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Lake		Big Blake	Big Blake	Big Blake
Date		6/24/14	7/21/14	8/19/14
Division	Taxa	cells/ml	cells/ml	cells/ml
Bacillariophyta	Aulacoseira	186.39	0.00	0.00
Bacillariophyta	centric sm	0.00	0.00	0.00
Bacillariophyta	Cocconeis	11.65	22.02	0.00
Bacillariophyta	Fragilaria crotonensis	2912.39	352.24	1033.26
Bacillariophyta	Gomphonema	23.30	0.00	0.00
Bacillariophyta	Naviculoid	11.65	0.00	0.00
Bacillariophyta	Stephanodiscus	0.00	88.06	32.29
Bacillariophyta	Synedra	34.95	22.02	0.00
Chlorophyta	Ankistrodesmus	11.65	44.03	0.00
Chlorophyta	Chlamydomonas	104.85	44.03	0.00
Chlorophyta	Cocoid greens	139.79	110.08	581.21
Chlorophyta	Cosmarion	0.00	0.00	0.00
Chlorophyta	Dictyosphaerium	1071.76	3148.18	161.45
Chlorophyta	Eudorina	0.00	154.11	0.00
Chlorophyta	Franceia	0.00	0.00	0.00
Chlorophyta	Gloeocystis	0.00	88.06	129.16
Chlorophyta	Lagerheimia	0.00	0.00	32.29
Chlorophyta	Mougeotia	0.00	0.00	32.29
Chlorophyta	Nephrocytium	93.20	0.00	0.00
Chlorophyta	Oedogonium	0.00	0.00	193.74
Chlorophyta	Oocystis	46.60	66.05	742.65
Chlorophyta	Pandorina	93.20	0.00	0.00
Chlorophyta	Pediastrum	0.00	88.06	32.29
Chlorophyta	Scenedesmus	0.00	352.24	0.00
Chlorophyta	Schroederia	0.00	0.00	0.00
Chlorophyta	Staurastrum	0.00	44.03	32.29
Chlorophyta	Tetraedron	0.00	0.00	0.00
Chrysophyta	Dinobryon	34.95	0.00	0.00
Chrysophyta	Komma Caudata	34.95	132.09	0.00
Chrysophyta	Mallomonas	0.00	286.20	0.00
Chrysophyta	Synura	0.00	5569.87	32.29
Cryptophyta	Cryptomonas	0.00	132.09	64.58
Cyanophyta	Anabaena	349.49	1871.30	5650.63
Cyanophyta	Aphanizomenon flos-aquae	0.00	0.00	30416.53
Cyanophyta	Aphanocapsa	0.00	0.00	0.00
Cyanophyta	Aphanothece	0.00	0.00	0.00
Cyanophyta	Chroococcus	69.90	0.00	1162.42
Cyanophyta	Coelospharium	151.44	0.00	0.00
Cyanophyta	Gloeocystis	0.00	0.00	0.00

Cyanophyta	Gomphosphaeria	151.44	0.00	2098.81
Cyanophyta	Microcystis	0.00	0.00	10849.21
Cyanophyta	Planktolyngbya	0.00	0.00	0.00
Cyanophyta	Schizothrix	0.00	0.00	0.00
Euglenophyta	Euglena	0.00	44.03	0.00
Euglenophyta	Trachelomonas	11.65	0.00	0.00
Pyrrhophyta	Ceritum	0.00	0.00	0.00
Pyrrhophyta	Peridinium	0.00	0.00	0.00

From:

Dr Robert Pillsbury
Biology Department
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Date: Dec 10, 2015**To:**

Jeremy Williamson
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Project Overview

Wisconsin Lakes Report: Analysis of phytoplankton samples from Big Blake Lake and Lotus Lake during June-August 2014.

Methods

This set of lake samples was received in the spring of 2015. Lake samples were concentrated when necessary in glass funnels. Samples were then enumerated using a Palmer-Maloney nanoplankton counting chamber and a Olympus BX40 research microscope at 400x magnification. This allows for the calculations of cell densities (cells/ml) At least 400 cells were counted and identified to genus using Prescott (1952), Taft and Taft (1971) Wehr and Sheath (2003) as the main taxonomic guides. All samples were counted within 5 weeks of receiving them.

Results

Cell densities for each sample are reported in Table 1. The data is grouped by lake and algal division. An electronic version will be included.

-The taxa labeled “centric sm” refers to small (<8 um) centric diatoms which most likely belong to the genus *Cyclotella* but distinguishing details important to taxonomic resolution could not be resolved.

-The Taxa labeled “Naviculoid” represents diatoms that resembled the genus *Navicula* but lack any taxonomic features resolvable at 400x with uncleaned samples.

-The taxa labeled “Cocoid greens” represent small (3-6um), cocoid, green algae (phylum Chlorophyta) cells that lack characteristics to distinguish among several genera from the order Chlorococcales.

Discussion

In both Big Blake and Lotus lakes, there is a general increase in blue-green taxa (Cyanobacteria) from June to August which is typical of many mesotrophic and eutrophic lakes. For each month, Big Blake Lake has high cell densities compared to Lotus Lake.

In general there seems to be a good agreement with both the cell densities and taxonomic composition when these samples are compared with past analyses conducted by the Wisconsin State laboratory of Hygiene from these same lakes. Those reports noted the presence of the diatom genus *Cavinula* was recently split off from the genus *Navicula*. In the cells counts presented in this report those cells would have been labeled as “Naviculoid”. At the magnification used for this report, I did not believe that I could consistently and accurately keep that two taxa separate.

References:

Prescott, G.W. 1952. Algae of the western great lakes area. Otto Koeltz Science Publishers. Koenigstein. Germany.

Taft, C.E., and Taft, C.W. 1971. The algae of western Lake Erie. Bulletin of Ohio Biological survey. 4(1). College of Biological sciences, Ohio State University. Columbus, OH.

Wehr, J.E., and Sheath, R.G. (eds) 2003. Freshwater algae of North America. Ecology and Classification. Academic Press. New York, NY.

Lake	Big Blake	Big Blake	Big Blake
Date	6/25/15	7/20/15	8/17/15
units	cells/ml	cells/ml	cells/ml
Taxa			
Amphora	6	0	0
Asterionella	0	442	0
Aulacoseira granulata	0	1567	0
centric sm	11	241	136
Cocconeis	0	0	0
Cymbella	0	40	34
Fragilaria crotonensis	841	4621	0
Gomphonema	0	0	0
Naviculoid	0	40	102
Nitzschia	0	0	0
Stephanodiscus	0	0	0
Synedra	17	161	136
Tabellaria	0	0	0
Actinastrum	0	0	816
Ankistrodesmus	0	40	0
Arthrodesmus	0	0	0
Characium	0	0	0
Chlamydomonas	105	80	714
Closterium	0	0	0
Cocoid greens	0	0	0
Coelastrum	44	0	0
Cosmarion	0	0	0
Crucigenia	0	0	0
Cylindrocapsa	0	0	0
Dictyosphaerium	144	2049	68
Elactothrix	11	0	0
Euastrum	0	0	0
Eudorina	160	0	0
Franceia	0	80	0
Gloeocystis	33	241	0
Kirchneriella	0	0	0
Lagerheimia	0	40	0
Mougeotia	0	0	0
Nephrocytium	0	0	0
Oedogonium	0	0	0
Oocystis	183	643	136
Pandorina	44	0	0
Pediastrum	0	0	34
Quadrigula	0	0	0

Scenedesmus	0	321	136
Schroederia	17	0	34
Sphaerocystis	0	0	0
Spondylosium	0	0	0
Staurastrum	0	40	0
Tetraedron	0	0	0
Dinobryon	6	0	0
Mallomonas	55	0	136
Synura	0	0	0
Uroglenopsis	0	0	0
Cryptomonas	71	362	714
Komma Caudata	94	241	238
Anabaena	0	6028	40311
Aphanizomenon flos-aquae	0	5063	7348
Aphanocapsa	1681	3215	0
Aphanothece	0	0	0
Chroococcus	44	723	0
Coelospharium	0	0	0
Gloeocystis	0	0	102
Gomphosphaeria	72	1567	0
Merismopedia	0	0	0
Microcystis	0	0	442
Planktolyngbya	548	362	4899
Planktothrix	354	0	2721
Schizothrix	0	0	0
Euglena	0	0	0
Trachelomonas	6	80	0
Ceratium	0	0	0
Euglena	0	0	0
Peridinium	0	0	34
total	4546	28290	59293

From:

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Date: Oct 10, 2016**To:**

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Project Overview

Wisconsin Lakes Report: Analysis of phytoplankton samples from:
Big Blake Lake – June to August 2015 (3 samples)
Bone Lake –April to September 2015 (5 samples)
Lotus Lake - June to August 2015 (3 samples)
North Pipe Lake- June to August 2015 (4 samples)
Pipe Lake- June to September 2015 (5 samples)

Methods

This set of lake samples was received in the spring of 2016. Lake samples were concentrated when necessary in glass funnels to increase cell densities. Samples were then enumerated using a Palmer-Maloney nanoplankton counting chamber and a Olympus BX40 research microscope at 400x magnification. This allows for the calculations of cell densities (cells/ml, back-calculating to the original cell densities). At least 400 cells were counted and identified to genus using Prescott (1952), Taft and Taft (1971), Wehr et al. (2015) as the main taxonomic guides. All samples were counted within 5 weeks of receiving them.

Results

Cell densities for each sample are reported in Table 1. The data is grouped by lake and algal division and presented both as cells/ml and % of total cells counted. An electronic version will be included.

-The taxa labeled “centric sm” refers to small (<8 um) centric diatoms which most likely belong to the genus *Cyclotella* but distinguishing details important to taxonomic resolution could not be resolved. Larger centric diatoms, where it was possible to note genus distinctions, were identified to genera.

-The Taxa labeled “Naviculoid” represents diatoms that resembled the genus *Navicula* but lack any taxonomic features resolvable at 400x with uncleaned samples.

-The taxa labeled “Coccol green” represent small (3-6um), coccol, green algae (phylum Chlorophyta) cells that lack characteristics to distinguish among several genera from the order Chlorococcales.

Discussion

Since I also counted the 2014 for both Big Blake Lake and Lotus Lake, we can compare the phytoplankton samples from these lakes from 2014 and 2015. The cell densities, largely driven by Cyanobacteria, are comparable between 2014 and 2015 with Lotus lake, at any given time, having a higher densities. In 2014, both lakes had their highest sampled densities in August. But in 2015, while Big Blake Lake still peaked in August, Lotus had peak cell densities in July which was also the highest cell densities of the 2015 sampled (over 272,000 cells/ml). This high density sample consisted mostly (71%) of *Planktolyngbia*. This genus is a Cyanobacteria that grows in filaments composed of very small cells. Therefore, even with high cell densities, other lakes may have had more turbid conditions. The second most common taxa (9%) from this sample as *Planktothrix*, a slightly larger filamentous Cyanobacteria. It is interesting to note that while *Planktothrix* is fairly distinct and was present in all sampled lakes in 2015, it was absent from the 2014 samples.

Bone Lake was sampled across the largest range of months (April to September) and seems to show a spring algal bloom in April which is gone by June. This vernal peak was mostly driven by small-celled Cyanobacteria (*Planktolyngbia* and *Aphanocapsa*). A late summer/fall peak was also observed (mainly caused by a bloom of *Aphanizomenon*) which significantly diminished by late September.

North Pipe Lake exhibited high densities of blue-green algae (*Anabaena* and *Aphanizomenon*) in August. Both of these taxa are “nitrogen fixers” so their dominance might indicate the system was Nitrogen limited during this time. Pipe Lake, however, had relatively low algal densities throughout the sampling season (June to September). This lack of a summer plankton bloom suggests that Pipe Lake might be considered oligotrophic compared to the other sampled lakes which seemed more typical of mesotrophic to eutrophic conditions. Pipe Lake exhibited a spring (June) flora consisting of the diatom *Asterionella*, the green alga *Gloeosystis*, and the flagellated chrysophyte Dinobryon. For the rest of the sampling period (July to September) the algal community was dominated by *Aphanizomenon* and *Anabaena*, which may indicate that the system is also limited by Nitrogen.

References:

Prescott, G.W. 1952. Algae of the western great lakes area. Otto Koeltz Science Publishers. Koenigstein. Germany.

Taft, C.E., and Taft, C.W. 1971. The algae of western Lake Erie. Bulletin of Ohio Biological survey. 4(1). College of Biological sciences, Ohio State University. Columbus, OH.

Wehr, J.E., Sheath, R.G. and Kociolek, J.P. (eds) 2015. Freshwater algae of North America. Ecology and Classification (Second Edition). Academic Press. New York, NY.

Appendix F

Zooplankton Data and Report

Big Blake Lake Zooplankton (number per liter)

Month	Year	Rotifera	Copepoda	Cladocera	testate protista	<i>Chaoborus sp.</i>
June	2013	11.0	4.7	1.3	0.0	0.0
July	2013	14.7	15.9	5.4	0.0	0.0
Aug	2013	4.2	3.3	3.8	0.8	0.4
June	2014	13.4	3.8	0.4	0.0	0.0
July	2014	4.7	5.7	1.3	0.0	0.0
Aug	2014	16.3	9.2	2.5	0.4	0.0
June	2015	26.1	8.2	4.4	0.0	0.0
July	2015	21.8	16.7	1.7	1.3	0.0
Aug	2015	11.0	22.0	0.6	0.0	0.0

Cyclops sp.	0	0	0	0	0	0	0	0	0
Diacyclops spp.	0.314051	0.837468	0	0	1.570253	0	0	1.256202	1.570253
Megacyclops viridis	0	0	0	0	0	0.418734	0	0	0.314051
Mesocyclops sp.	0.314051	0	0	0	0	0	0	0	0.314051
(Metacyclops sp.)	0	0	0	0	0	0	0	0	0
Microcyclops sp.	0	0	0	0	0	0	0	0	0
Paracyclops chiltoni	0	0	0	0	0	0	0	0	0
[Thermocyclops crassus]	0	0	0	0	0	0	0	0	0
Diaptomidae	0	0	0	0	0	0	0	0	0.628101
(Arctodiaptomus arapahoensis)	0	0	0	0	0	0	0	0	0
Heterocope septentrionalis	0	0	0	0	0	0	0	0	0
(Limnocalanus sp.)	0	0	0	0	0	0	0	0	0
(Osphrantium sp.)	0	0	0	0	0	0	0	0	0
Skistodiaptomus oregonensis	0	0	0	0	0	0.837468	0.628101	0.837468	0
(Senecella calanoides)	0	0	0	0	0	0	0	0	0
Bosmina coregoni	0	0	0	0	0	0	0.314051	0	0
Bosmina leideri	0	0	0	0	0	0	0	0	0
Bosmina longirostris	0	0	0	0	0	0	1.570253	0	0
Bosmina longispina	0	0	0	0	0	0	0	0	0
Ceriodaphnia sp.	0	0	0	0.418734	0	0	0	0	0
Ceriodaphnia lacustris	0	0	0	0	0	0	0	0	0
Ceriodaphnia laticaudata	0	0	0	0	0	0	0	0	0
Ceriodaphnia pulchella	0	0	0	0	0	0	0	0	0
Ceriodaphnia quadrangula	0	0	0	0	0	0	0.628101	0	0
Chydorus sp.	0	0.418734	0	0	0	0.418734	0	0	0
Chydorus faviformis	0	0	0	0	0	0	0	0	0
Chydorus sphaericus	0	0	0	0	0	0	0	0	0
Diaphanosoma sp.	0	0.837468	0	0	0.314051	0	1.256202	1.674937	0.314051
Daphnia ambigua	0	0.837468	0	0	0	0	0.314051	0	0
Daphnia mendotae	1.256202	2.931139	1.256202	0	0.942152	2.093671	0.314051	0	0.314051

Zooplankton of Big Blake and Lotus Lakes, Polk County (WI) 2013-2016.

Toben Lafrançois, PhD
November 2016



Figure 1. *Bosmina coregoni* from Big Blake Lake, Polk Co., WI, 2015. Field of view = 0.65 mm. Photo T. Lafrançois.

Suggested citation: Lafrançois, T. 2016. Zooplankton of Big Blake and Lotus Lakes, Polk County (WI) 2013-2016. Final report to Polk County Land & Water Resources Department, Polk Co. WI.

Eighteen samples from Big Blake and Lotus Lakes in Polk County were examined for zooplankton species abundances. Final data and basic community analyses have been sent with this report as an attachment in Microsoft Excel.

Methods

Zooplankton samples were collected by Polk Co. with WI plankton nets using known depths for volumetric calculation and preserved in ETOH. Laboratory methods used a dual counting technique for different size fractions modified from Chick et al. 2006 and Chick et al. 2010. This process has been found to be cost-effective and statistically robust in nearby systems (Lafrancois 2009, Lafrancois 2013, Lafrancois *et al.* 2016). Samples were condensed on a 20 µm filter, transferred to 40 mL centrifuge tubes and diluted to between 20 and 40 ml depending on sample density. This volume was rigorously agitated, sub-sampled with a 1mL Hensen-Stempel pipette, and transferred to a 1mL Sedgwick Rafter counting slide. Organisms of all size fractions were counted on a compound microscope at magnifications of 40x to 100x using an Olympus CX41 compound microscope. Counts of rotifers and protists were tallied row by row (1/20 ml increments) on the Sedgwick Rafter cell until stable variance in taxa diversity was achieved (Colwell & Coddington 1994). Stable variance in taxonomic diversity and total number for these samples was achieved when at least 50 individuals of smaller species were counted (with volume counted between 0.6 and 2 ml out of 20-40 ml). The larger organisms (copepods and cladocerans) were then counted for the entire cell and checked against the entire sample. Insecta were counted from the entire sample, but in this case only one *Chaoborus* sp. was found in one sample. At least two aliquots were counted in this manner for each sample. Standard identification keys were used from Thorp & Covich (2010) to allow cross study comparison. Zooplankton counts were converted from numbers per subsample to number per liter (n/l).

Results and Summary

Thirty-eight species / lowest practically identifiable taxa from Big Blake Lake and thirty seven from Lotus Lake were identified from samples reported here (2013 to 2016), Tables 1 and 2 respectively. Basic diversity measures are presented in Table 3.

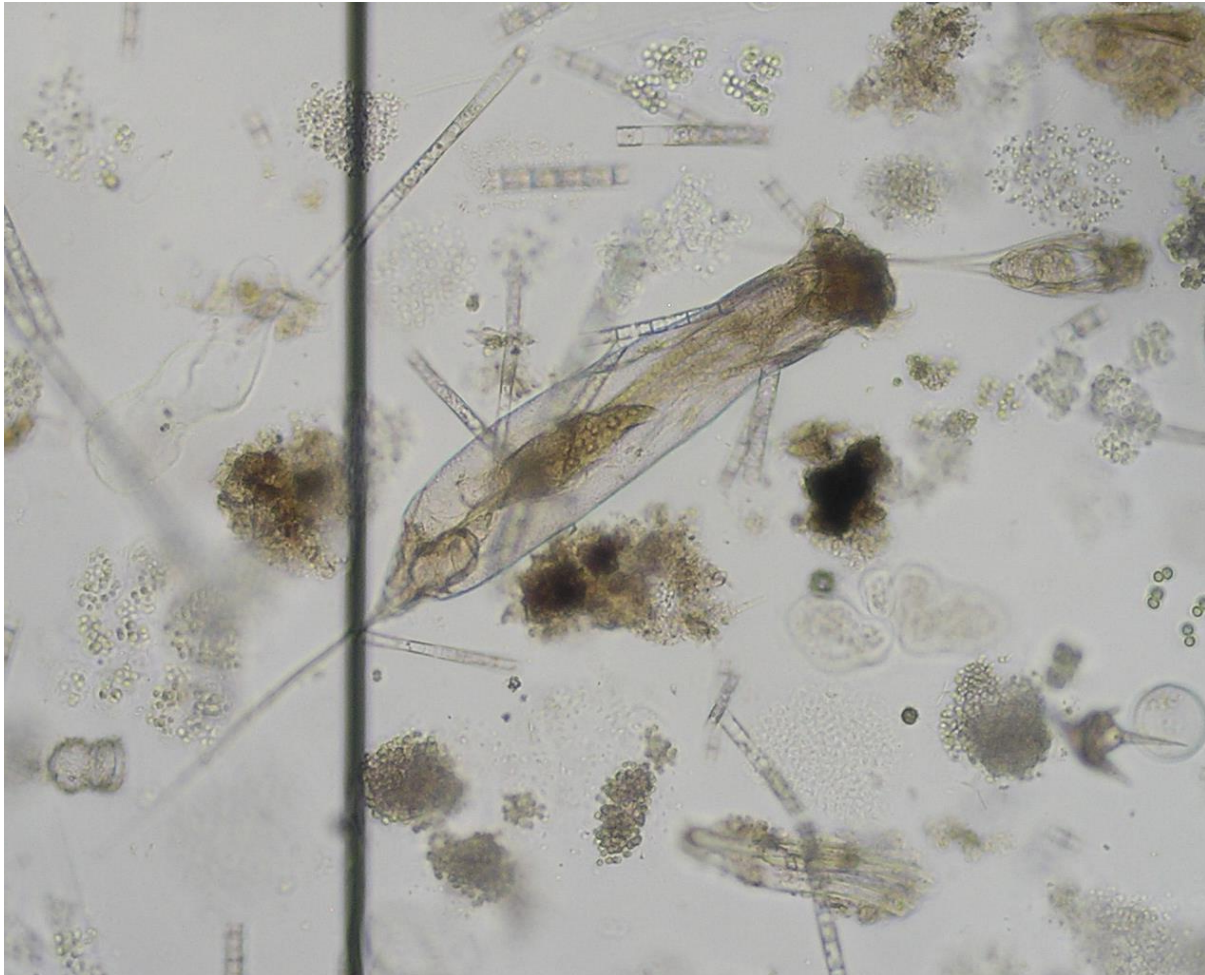


Figure 2. *Trichocerca elongata* and *Filinia longiseta* from Lotus Lake, Polk Co., WI (field of view 1mm across).

Community composition baselines are shown in Figures 3 and 4, with numbers per liter of four primary taxonomic groups. Rotifera are small multicellular organisms that generally feed on bacteria and algae. Cladocerans are crustacean plankton that are typically grazers, and copepods are crustacean often size selective omnivores or predators. Testate protozoa are single celled organisms that leave behind a shell used for identification and counting. It is unclear whether testate protozoa correlate to the total protozoan community, or perhaps are inverse (increasing at the expense of other soft protozoa that leave no trace in preserved samples). They are included because they may indicate run-off events and could be important to long term monitoring as knowledge of this group's ecology develops.

Zooplankton occupy an ecologically critical position between top-down (e.g., fish predation) and bottom-up (e.g., eutrophication) processes. Typically zooplankton will increase in abundance over the summer, and peak in August or September, tracking overall productivity. However, patterns can change

as the community responds to fish stocking and growth, temperature, algal growth and community change – particularly due to nutrients and eutrophication, and other factors. Looking *just* at the community patterns over time gives some insight into these processes but is most meaningful when coupled with environmental and fish stocking data. That said, some general patterns stick out.

Big Blake Lake shows some interesting patterns in 2013, where a typical phenological pattern appears in June and July with a crash in August (Fig. 3). This crash is someone unexpected since August tends to be a very productive year. Environmental factors need to be analyzed to explain this change, which would typically occur later in October or November. The 2014 trends show a more typical response with an unexpected drop in rotifers in July but otherwise a slow increase into the most productive months. In 2015 there was a major increase in copepods over the summer, with a decline in rotifers that could be associated with copepod predation, and a decrease in cladocerans. The cladoceran decrease could be due to either fish pressure or a change in algal community structure. The concurrent increase in copepods suggests that a bottom-up mechanism is more likely, since planktivorous fish tend to favor cladocerans but also enjoy copepods, being mostly size selective.

Lotus Lake produced an order of magnitude greater density of zooplankton than Big Blake in 2014 and 2015 with a curious crash in 2016 for all groups except rotifers in June (Fig. 4). In 2014 and 2015 there was a bump in zooplankton populations, all groups, in July. One particularly notable spike of rotifers in June 2016, Lotus Lake, is primarily due to *B. angularis*, *F. longiseta*, and *Collotheca* sp. (probably *C. mutabilis*). The first two rotifer specie are indicators of eutrophic conditions, combined with *Collotheca* sp. in this spike it would appear to relate to a bacterial bloom related to high nutrients and/or high temperatures (Pejler 1983, Walz 1993, Mola 2011).

A simple principle components ordination based on Bray-Curtis similarities helps sort out the complex of species level community composition. Environmental factors were not tested at this time. The ordination shows community similarity between lakes and sample periods, both month and year (Figure 5). This ordination confirms that there are differences between the zooplankton communities in Big Blake and Lotus Lake across the x-axis, which explains 66.2% of variation in community similarity. Samples from Lotus Lake also spread out a bit more, showing what look to be important groups of different community patters. All of the patterns pointed out here between and within Big Blake and Lotus Lake will be best explained when these results are compared to the larger data set of all factors from these lakes.

Table 1. Lowest identified taxa from Big Blake Lake, Polk County (WI) 2013-2015 with total percent occurrence.

Rotifera		Cladocera	
<i>Adineta</i> sp.	0.77%	<i>Bosmina coregoni</i>	0.15%
<i>Ascomorpha</i> sp.	0.46%	<i>Bosmina longirostris</i>	0.77%
<i>Collotheca</i> sp.	0.15%	<i>Ceriodaphnia</i> sp.	0.15%
<i>Conochilus unicornis</i>	5.11%	<i>Ceriodaphnia quadrangula</i>	0.31%
<i>Filinia longiseta</i>	2.01%	<i>Chydorus</i> sp.	0.31%
<i>Filinia terminalis</i>	0.31%	<i>Diaphanosoma</i> sp.	1.86%
<i>Gastropus</i> sp.	0.62%	<i>Daphnia ambigua</i>	0.46%
<i>Keratella cochlearis</i>	20.59%	<i>Daphnia mendotae</i>	3.72%
<i>Keratella cochlearis robusta</i>	4.49%	<i>Daphnia retrocurva</i>	0.93%
<i>Monostyla bulla</i>	0.15%	<i>Holopedium gibberum</i>	0.15%
<i>Polyarthra</i> sp.	0.31%		
<i>Polyarthra dolichoptera</i>	1.08%	Copepoda	
<i>Polyarthra euryptera</i>	2.17%	cyclopoid nauplius	16.25%
<i>Polyarthra remata</i>	8.98%	cyclopoid copepodid	14.24%
<i>Pompholyx sulcata</i>	0.31%	calanoid nauplius	1.08%
<i>Synchaeta</i> sp.	1.55%	calanoid copepodid	2.17%
<i>Trichocerca cylindrica</i>	0.62%	<i>Diacyclops</i> spp.	2.48%
<i>Trichocerca pusilla</i>	1.55%	<i>Megacyclops viridis</i>	0.31%
<i>Trichocerca longiseta</i>	0.15%	<i>Mesocyclops</i> sp.	0.31%
unidentified rotifer	0.62%	Diaptomidae	0.31%
		<i>Skistodiaptomus oregonensis</i>	0.93%
testate Protista			
<i>Diffflugia globosa</i>	0.31%		
<i>Diffflugia lobostoma</i>	0.62%		
Insecta			
<i>Chaoborus</i> sp.	0.15%		

Table 2. Lowest identified taxa from Lotus Lake, Polk County (WI) 2013-2016 with total percent occurrence.

Rotifera		Copepoda	
<i>Anuraeopsis fissa</i>	4.58%	cyclopoid nauplius	4.84%
<i>Aplanchna priodonta</i>	0.52%	cyclopoid copepodid	3.79%
<i>Brachionus angularis</i>	6.15%	calanoid nauplius	0.52%
<i>Collotheca</i> sp.	3.01%	calanoid copepodid	0.16%
<i>Conochilus unicornis</i>	0.13%	<i>Diacyclops</i> spp.	1.44%
<i>Filinia longiseta</i>	8.50%	<i>Paracyclops chiltoni</i>	1.18%
<i>Kellicottia longispina</i>	0.78%	Diaptomidae	0.02%
<i>Keratella cochlearis cochlearis</i>	30.09%	<i>Skistodiaptomus oregonensis</i>	0.03%
<i>Keratella cochlearis hispida</i>	0.13%		
<i>Keratella cochlearis robusta</i>	0.26%	Cladocera	
<i>Polyarthra euryptera</i>	0.13%	<i>Bosmina coregoni</i>	0.78%
<i>Polyarthra remata</i>	0.92%	<i>Bosmina leideri</i>	0.52%
<i>Pompholyx sulcata</i>	8.37%	<i>Chydorus sphaericus</i>	1.45%
<i>Trichocerca (bicristata)</i>	0.92%	<i>Daphnia ambigua</i>	0.92%
<i>Trichocerca cylindrica</i>	0.65%	<i>Daphnia mendotae</i>	3.01%
<i>Trichocerca elongata</i>	0.13%	<i>Daphnia retrocurva</i>	1.80%
<i>Trichocerca pusilla</i>	0.26%	<i>Sida</i> sp.	0.01%
<i>Trichocerca multicornis</i>	0.13%		
<i>Trichocerca similis</i>	0.26%		
unidentified rotifer	0.52%		
testate protista			
<i>Arcella gibbosa</i>	0.65%		
<i>Centropyxis aerophila</i>	0.26%		
<i>Codonella</i> sp.	1.57%		
<i>Diffflugia oblonga</i>	0.13%		
<i>Diffflugia lobostoma</i>	10.33%		
unidentified protist	0.13%		

Table 3. Diversity indices for Big Blake and Lotus Lakes, 2013 to 2016, Polk Co., WI including S (raw number of species or lowest identified taxa), d (Margaleff Diversity), J' (Pielou's index), Brillouin and Fisher indices, H' (Shannon index, natural log) and in the last column the inverse Simpson index.

Sample	S	d	J'	Brillouin	Fisher	H'(loge)	1-Lambda'
BBlakeJune2013	13	4.24	0.73	1.20	25.49	1.86	0.79
BBlakeJuly2013	16	4.19	0.82	1.84	11.03	2.27	0.88
BBlakeAug2013	9	3.20	0.95	1.40	15.74	2.09	0.94
BBlakeJune2014	9	2.79	0.91	1.48	7.39	1.99	0.89
BBlakeJuly2014	12	4.49	0.87	1.40	****	2.16	0.93
BBlakeAug2014	14	3.88	0.83	1.70	10.90	2.20	0.89
BBlakeJune2015	18	4.65	0.77	1.84	13.11	2.24	0.86
BBlakeJuly2015	14	3.49	0.79	1.72	7.43	2.09	0.84
BBlakeAug2015	15	3.98	0.72	1.57	10.40	1.95	0.82
LotusJune2014	10	1.77	0.67	1.43	2.36	1.54	0.66
LotusJuly2014	19	2.70	0.75	2.19	3.51	2.22	0.86
LotusAug2014	14	2.50	0.85	2.11	3.53	2.23	0.86
LotusJune2015	21	3.94	0.83	2.35	6.47	2.53	0.90
LotusJuly2015	14	2.44	0.88	2.22	3.40	2.32	0.88
LotusAug2015	14	3.08	0.88	2.00	5.35	2.32	0.88
LotusJune2016	11	1.48	0.57	1.34	1.78	1.36	0.59
LotusJuly2016	12	2.91	0.90	1.92	5.45	2.23	0.89
LotusAug2016	11	2.81	0.78	1.59	5.50	1.86	0.77

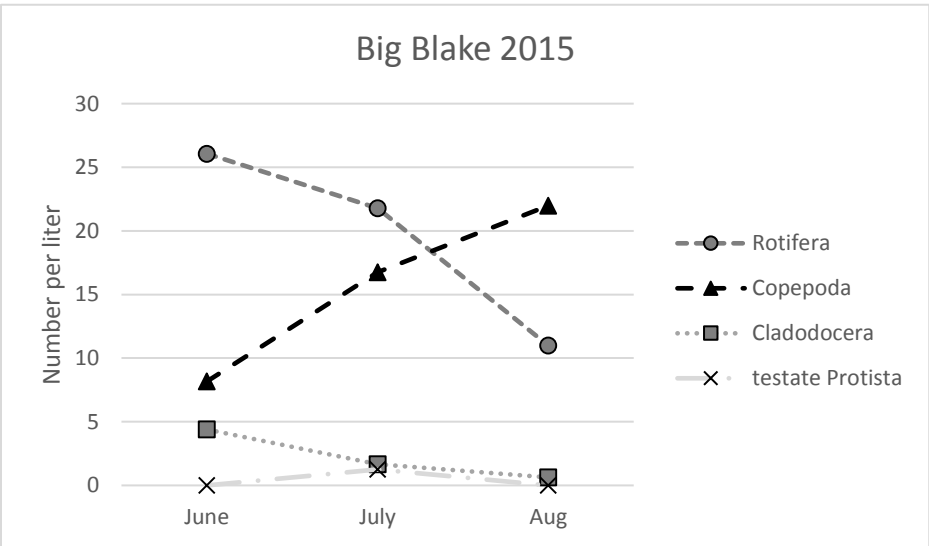
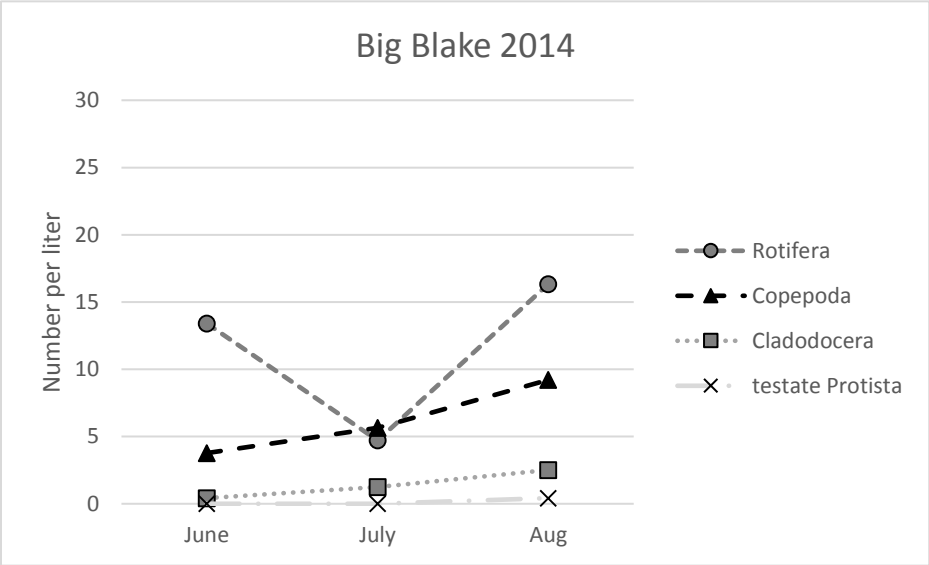
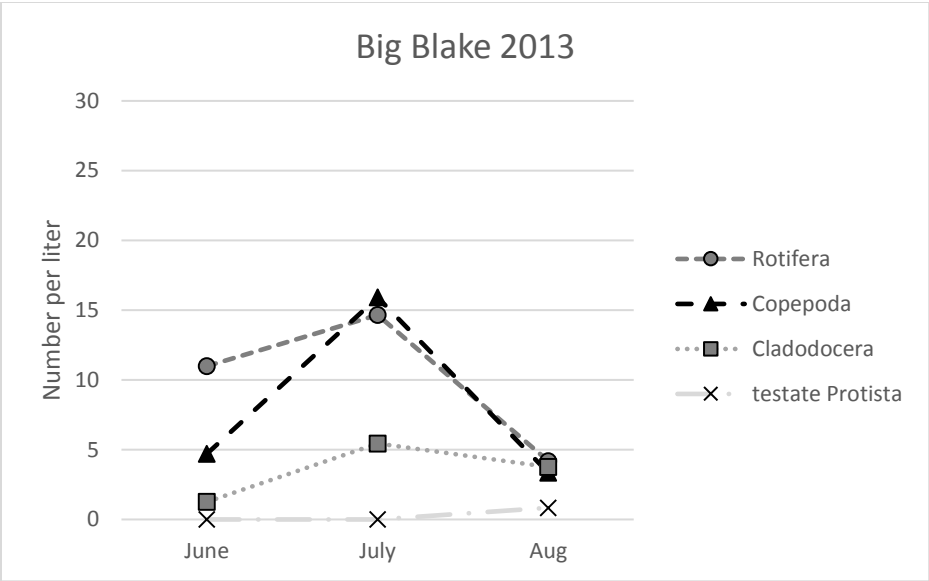


Figure 3. Zooplankton community composition (as total numbers per liter of four primary taxonomic groups) of samples from Big Blake Lake, Polk Co. (WI), 2013 to 2015.

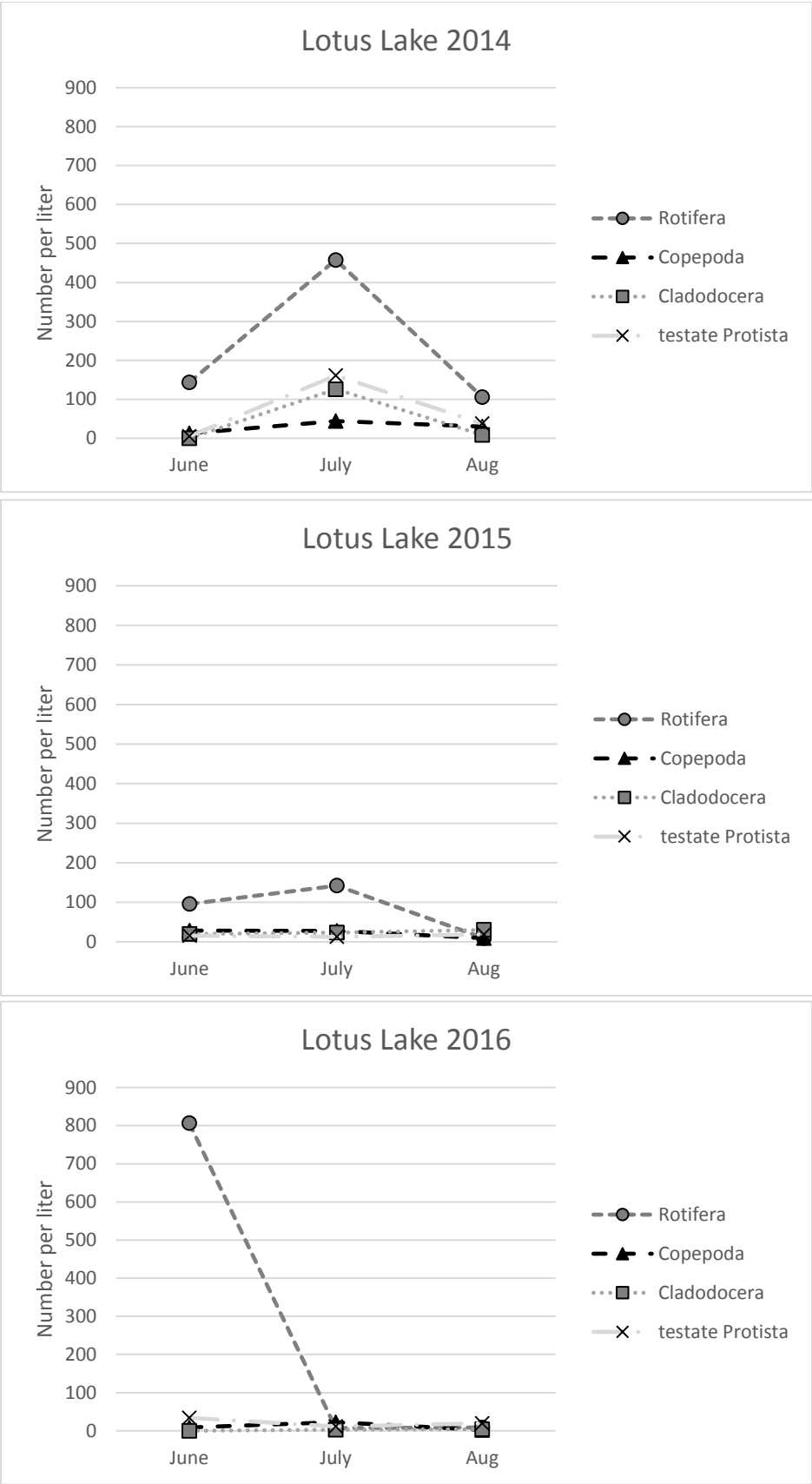


Figure 4. Zooplankton community composition (as total numbers per liter of four primary taxonomic groups) from Lotus Lake, Polk Co. (WI), 2014-2016.

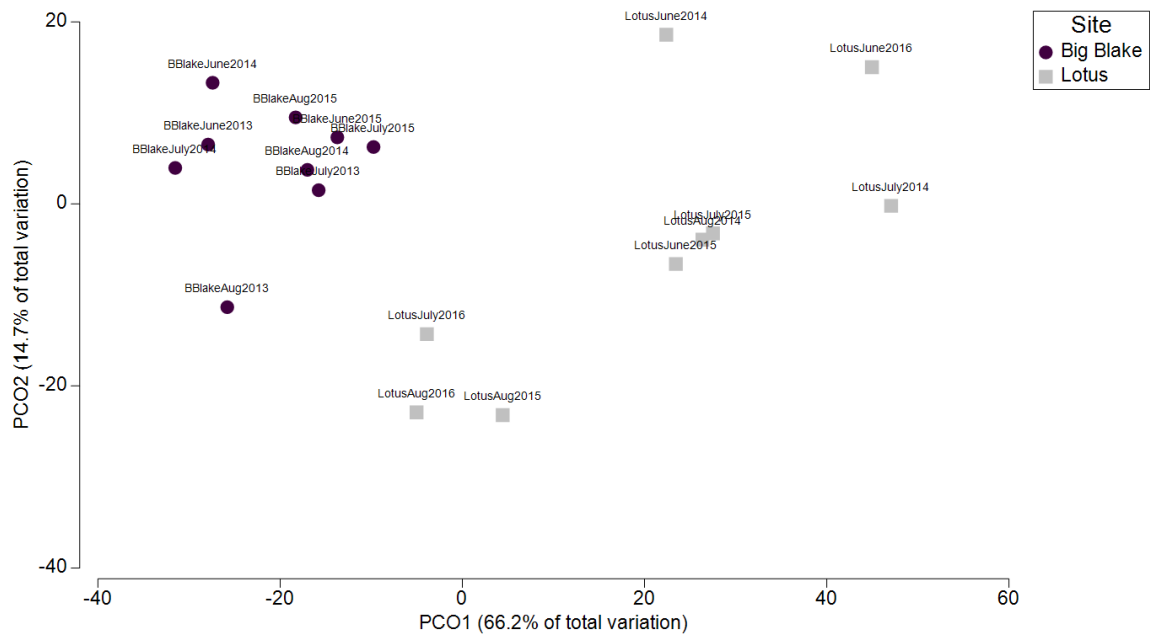


Figure 5. Principal components analysis of zooplankton community composition. Abundances (numbers per liter) were square root transformed before calculating Bray-Curtis resemblance for the ordination. This plot lumped species into major groups to weight the differences between the lakes to show major composition shifts over the more local variations in species. Plot was run in Primer 7 software.

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Appendix G

Curly-leaf Pondweed Biomass and Turion Data

Date	Site	Dredge turion (#)	Turions/m ²	Biomass (grams)	Turion # attached to biomass
6/19/13	4	2	86.95652174	0	0
	8	1	43.47826087	0.5	0
	6	3	130.4347826	0.6	0
	12	4	173.9130435	0.7	0
	44	0	0	0.3	0
	46	6	260.8695652	0.1	0
	48	1	43.47826087	0.1	0
	51	1	43.47826087	2.8	0
6/20/13	69	0	0	0	0
	72	4	173.9130435	9	0
	82	4	173.9130435	12.3	0
	84	0	0	0	0
	79	10	434.7826087	4.2	0
	87	3	130.4347826	0.1	0
	97	9	391.3043478	0	0
	93	0	0	0	0
	92	0	0	0	0
	91	0	0	0	0
	120	0	0	0	0
	121	1	43.47826087	0	0
	125	0	0	0.3	0
	141	0	0	0	0
	140	0	0	0	0
	138	0	0	0	0
	160	0	0	0	0
	154	1	43.47826087	0	0
	165	0	0	0	0
	166	0	0	0	0
	168	0	0	0	0
	169	0	0	0	0
	173	0	0	0	0
9/25/13	181	1	43.47826087	0	0
	188	0	0	0.1	0
	189	2	86.95652174	0	0
	209	5	217.3913043	0	0
	203	5	217.3913043	0	0
	198	0	0	0	0
	193	0	0	0	0
	219	2	86.95652174	0	0
	220	1	43.47826087	0.2	0
	228	3	130.4347826	0	0
	232	15	652.173913	0.1	1
	238	9	391.3043478	0.3	0
	241	2	86.95652174	0	0

	255	1	43.47826087	0	0
	256	1	43.47826087	0.1	0
	260	0	0	0.1	0
	268	12	521.7391304	0.9	0
	267	26	1130.434783	0	0
	276	0	0	0	0

Date	Site	Dredge turion (#)	Turions/m ²	Biomass (grams)	Turion # attached to biomass
6/2/14-6/4/14	4	1	43.47826087	0	0
	10	0	0	0	0
	11	3	130.4347826	0.9	0
	14	4	173.9130435	8.1	1
	37	4	173.9130435	2.4	3
	30	5	217.3913043	0	0
	19	0	0	0	0
	31	2	86.95652174	0.3	0
	49	5	217.3913043	7.3	12
	23	0	0	0.1	0
	56	0	0	1.7	0
	65	7	304.3478261	0.9	1
	67	1	43.47826087	0	0
	73	0	0	0	0
	77	0	0	0.1	0
	82	0	0	6.6	2
	85	0	0	0	0
	94	0	0	0	0
	96	0	0	0	0
	105	0	0	0	0
	111	1	43.47826087	0	0
	124	0	0	0	0
	133	0	0	0	0
	136	0	0	0	0
	139	1	43.47826087	0	0
	147	0	0	0	0
	159	0	0	0	0
	167	0	0	0	0
	170	1	43.47826087	0	0
	171	0	0	0	0
	185	1	43.47826087	0	0
	188	1	43.47826087	0	0
	195	0	0	0	0
	202	2	86.95652174	0	0
	210	3	130.4347826	4.8	2
	217	0	0	3.3	0

	222	1	43.47826087	0	0
	224	4	173.9130435	0	0
	228	5	217.3913043	0	0
	234	4	173.9130435	1.2	1
	237	7	304.3478261	0	0
	239	1	43.47826087	0	0
	241	2	86.95652174	0	0
	244	0	0	0.5	1
	250	1	43.47826087	0	0
	255	1	43.47826087	0	0
	264	10	434.7826087	0.2	0
	269	7	304.3478261	0	0
	271	10	434.7826087	0	0
	273	0	0	0	0

Date	Site	Dredge turion (#)	Turions/m ²	Biomass (grams)	Turion # attached to biomass
6/16/15	10	0	0	2.7	0
	15	0	0	0	0
	18	0	0	2.3	0
	24	3	130.4347826	2.2	1
	30	1	43.47826087	3.3	0
	31	1	43.47826087	12.5	0
	34	0	0	0.2	0
	44	0	0	0.2	0
	57	2	86.95652174	21.8	0
	66	1	43.47826087	35.2	0
	70	0	0	0	0
	89	1	43.47826087	2.2	1
	94	0	0	0	0
	97	0	0	0.5	0
	103	0	0	0.2	0
	105	0	0	0	0
	111	0	0	0	0
	120	0	0	0	0
	122	0	0	0	0
	128	0	0	0	0
	130	0	0	0	0
	139	0	0	0	0
	142	0	0	0	0
	147	0	0	0	0
	149	0	0	0	0
	154	0	0	0	0
	161	0	0	0	0
	165	0	0	0	0

	169	0	0	0	0
	174	0	0	0	0
	185	0	0	0	0
	189	1	43.47826087	0	0
	194	0	0	0	0
	197	0	0	0	0
	199	1	43.47826087	0	0
	205	0	0	0	0
	208	2	86.95652174	0.6	0
	213	0	0	1.1	0
	219	3	130.4347826	0.1	0
	224	0	0	0.4	1
	231	4	173.9130435	1.9	0
	234	2	86.95652174	4.2	0
	240	15	652.173913	4.2	0
	243	0	0	1.1	0
	249	1	43.47826087	0.6	0
	255	2	86.95652174	0.1	0
	264	2	86.95652174	0.7	0
	270	8	347.826087	15	0
	271	14	608.6956522	0.3	1
	273	0	0	0	0

Appendix H

Point Intercept Aquatic Macrophyte Survey Data

cool spring, record lake ice

9:00 AM - 11:30 EW, JW, KH

Field Sheet 1 of 2 pages

Site #	Depth (ft)	Dominant sediment type	Muck (M), sand (S), Rock (R)	Rake pole (P) or rake rope (R)	Comments	EWM	CLP	POTCR	1 POTRU	2 CERDC	3 POT20	4 POTL	5 POTPK	6 212A9	7 LEMTR	8 YK MTR	9 Wolfia	10 Lem Mt	11	12	13	14	15	
1	8.5	W																						
2	10	W																						
3	9.5	W																						
4	9	W																						
5	9	W																						
6	8	S																						
7	10	M																						
8	11	W																						
9	10.5	W																						
10	10	M																						
11	9.5	M																						
12	9	M																						
13	8	M																						
14	5	W																						
15	3	M																						
16	7	S																						
17	8	M																						
18	10	M																						
19	10.5	W																						
20	11	W																						
21	11	W																						
22	11	W																						
23	10	M																						
24	10	W																						
25	10	W																						
26	9.5	W																						
27	8	W																						
28	7	S																						
29	7	W																						
30	6.5	W																						

Observers for this page: names and hours worked by each:

Lake: Big Lake

WBIC

County Polk

Date: 6/11/13

Tuesday 191

Observers for this page: names and hours worked by each:		County	Date:
Lake:	WBIC		
Site #	Depth (ft)	Dominant sediment type	Muck (M), sand (S), Rock (R)
		Rake pole (P) or rake rope (R)	comments
		EWM	
		CLP	
151	12.5		
152	12.5		
153	12.5		
154	12	M	
155	11.5	M	
156	10.9	R	
157	8.5	M/S	
158	16		
159	15		
160	14		
161	13		
162	14		
163	12.5		
164	12.5		
165	13.5		
166	14		
167	13		
168	13		
169	13		
170	13		
171	13		
172	12.5		
173	11.5	M	
174	13.5		
175	14.5		
176	14		
177	13.5		
178	13.5		
179	13.5		
180	14		

15 Mr S. M
 14 Mr S. M
 13 Mr S. M
 12 Mr S. M
 11 Mr S. M
 10 Mr S. M
 9 Mr S. M
 8 Mr S. M
 7 Mr S. M
 6 Mr S. M
 5 Mr S. M
 4 Mr S. M
 3 Mr S. M
 2 Mr S. M
 1 Mr S. M

Observers for this page: names and hours worked by each:		WBIC	County	Date:																			
Site #	Depth (ft)	Dominant sediment type	Muck (M), sand (S), Rock (R)	Rake pole (P) or rake rope (R)	comments	EWM	CLP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
181	131																						
182	13																						
183	19																						
184	11.5																						
185	13																						
186	12.5																						
187	12.5																						
188	12.5																						
189	12																						
190	11																						
191	11																						
192	12.5																						
193	13.5																						
194	13.5																						
195	15																						
196	13																						
197	12.5																						
198	12																						
199	12.5																						
200	13																						
201	12.5																						
202	12																						
203	11.5																						
204	12.5																						
205	12																						
206	11																						
207	10.5																						
208	10.5																						
209	10																						
210	10																						

Handwritten marks at the bottom right of the page.

Site #	Depth (ft)	Dominant sediment type	Muck (M), sand (S), Rock (R)	Rake pole (P) or rake rope (R)	Comments	EWM	GLP	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Observers for this page: names and hours worked by each:																						
Lake:										WBIC					County					Date:		
191	10	P					2'															
212	12	W																				
213	11	W																				
214	12	W																				
215	13	W																				
216	8.5	W					2'	1'														
217	9.5	W					1'															
218	10.5	W					1'															
219	11.5	W					1'															
220	11	W																				
221	10	W					1'															
222	10	W					1'															
223	10	W					1'															
224	9	W							1'													
225	5.5	W					2'															
226	5	W					2'															
227	10.5	W																				
228	10.5	W							1'													
229	10	W					1'															
230	10	W																				
231	10	W																				
232	9	W																				
233	4	W					1'	1'	1'													
234	4	W					2'	1'	1'	1'												
235	10.5	W					1'															
236	9.5	W					1'															
237	9	W					1'															
238	9.5	W					1'															
239	9.5	W					1'															
240	9	W					1'															

~~191~~
191

4

Observers for this page: names and hours worked by each:	County	Date:
Site #		
Depth (ft)		
Dominant sediment type		
Muck (M), Sand (S), Rock (R)		
Rake pole (P) or rake rope (R)		
Comments		
EWM		
GLP		
1 POT-PU		
2 CER-DE		
3 POT-20		
4 POT-1L		
5 POT-PR		
6 POT-PR		
7 LA-MIO-T1		
8 LA-MIO-T1		
9 LA-MIO-T1		
10 WOLFBA MI		
11 LANGA MI		
12 HGT-TR		
13 HGT-TR		
14 HGT-TR		
15 NVR-5		
16 NVR-1		
17 NVR-2		
18 NVR-3		
19 NVR-4		
20 NVR-5		
21 NVR-6		
22 NVR-7		
23 NVR-8		
24 NVR-9		
25 NVR-10		
26 NVR-11		
27 NVR-12		
28 NVR-13		
29 NVR-14		
30 NVR-15		
31 NVR-16		
32 NVR-17		
33 NVR-18		
34 NVR-19		
35 NVR-20		
36 NVR-21		
37 NVR-22		
38 NVR-23		
39 NVR-24		
40 NVR-25		
41 NVR-26		
42 NVR-27		
43 NVR-28		
44 NVR-29		
45 NVR-30		

Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?	Total Rake Fullness	Observer 1: name and hours: KH	Observer 2: name and hours: EW	Observer 3: name and hours: JW	Total hours worked:
1	8.5		1					
2	9							
3	9							
4	8.5							
5	8		1					
6	8		1					
7	9							
8	9.5							
9	9.5							
10	9							
11	9							
12	8.5		1					
13	7.5							
14	6.5		1					
15	3		2					
16	5		2					
17	8		1					
18	9							
19	9.5							
20	9.5							
21	9.5							
22	9.5							
23	9		3					
24	9		V					
25	9		1					
26	8.5							
27	rice							
28	T		1					
29	9		1					

Observer 1: name and hours: KH
 Observer 2: name and hours: EW
 Observer 3: name and hours: JW
 Total hours worked:

1 CLP 1,2,3
 2 Cer-De
 3 NYMcd
 4 Pot-2a
 5 Lem-TR
 6 Lem-TR
 7 Wot-TR
 8 SP-TR
 9 SP-TR
 10 filamentous algae
 11 Nappa
 12 Nappa
 13 SP-TR
 14 HET-TR
 15 Valt-TR
 16 Pot-TR
 17 Pot-TR
 18 NYMcd
 19 Pot-TR
 20 NYMcd
 21
 22
 23

Observer 1: name and hours:	Observer 2: name and hours:	Observer 3: name and hours:	Total hours worked:
Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?
GLP 1,2,3	EEM 1,2,3	Total Rake Fullness	
1 CerDe	2 PotPa	3 Nymod	4 PotPa
5 LemTR	6 LemMI	7 WotrA	8 SprPo
9 f1 a19	10 BrAq	11 NuPVA	12 SCNTA
13 TetPb	14 ValTM	15 PotFe	16 PanAq
17 MKS	18 NaJH	19	20
21	22	23	
30 9.5			
31 9.5			
32 9.5			
33 9.5			
34 9.5			
35 9.5			
36 9			
37 9.5			
38 shore			
39 9 S			
40 10			
41 10			
42 10			
43 10			
44 10			
45 9.5			
46 9			
47 6.5			
48 4			
49 9			
50 10			
51 10			
52 10			
53 10			
54 10			
55 10			
56 7 R			
57 3			
58 2			

Observer 1: name and hours:	Observer 2: name and hours:	Observer 3: name and hours:	Total hours worked:
Site #	Depth (ft)	Dominant sediment type (M, S, R)	
	Rake pole (P) or rake rope (R)?		
	Total Rake Fullness		
	EWM 1,2,3		
	CLP 1,2,3		
	1 Cerbe		
	2 P-Ru		
	3 NYMOD		
	4 POT-20		
	5 LeWTR		
	6 Lemmi		
	7 WolfH		
	8 SprPa		
	9 Fl alge		
	10 Nupla		
	11 SCNTA		
	12 HetBa		
	13 ValAm		
	14 Polka!		
	15 PanAm		
	16 MYS!		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
175	14		
176	13		
177	13		
178	12.5		
179	12.5		
180	12.5		
181	12.5		
182	12		
183	11.5		
184	12		
185	12		
186	12		
187	11.5		
188	11.5		
189	10.5		
190	10		
191	10.5		
192	11		
193	12.5		
194	13		
195	14		
196	13		
197	13		
198	12.5		
199	12		
200	11.5		
201	11		
202	11		
203	11		

Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?	Total Rake Fullness	EWM 1,2,3	CLP 1,2,3	1 Cer De	2 PotR	3 NYMOD	4 Pot20	5 LemTR	6 LemM	7 WOHYA	8 SPTPO	9 FI a19a2	10 SPTVA	11 SCNTA	12 Hetbu	13 Va1AM	14 PotKI	15 Kamng	16 NMS!	17	18	19	20	21	22	23	
233	2																													
234	5																													
235	10																													
236	9																													
237	9																													
238	9																													
239	7.5																													
240	8																													
241	10																													
242	9																													
243	9																													
244	8																													
245	6.5 R																													
246	7																													
247	Nym bed																													
248	9.5																													
249	8.5																													
250	8.5																													
251	6																													
252	4																													
253	rice bed																													
254	7																													
255	8.5																													
256	8																													
257	7																													
258	4																													
259	7.5																													
260	8																													
261	7																													

Observer 1: name and hours:

Observer 2: name and hours:

Observer 3: name and hours:

Total hours worked:

Observer 1: name and hours:	Observer 2: name and hours:	Observer 3: name and hours:	Total hours worked:
Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?
262	5	CLP 1,2,3	1 CERDE
263	6	EYM bed	2 POTPA
264	7		3 NYMOD
265	45		4 POT-20
266	4		5 LENTR
267	shore		6 LENTR
268	4		7 WOLFRA
269	3		8 SPR PO
270	3		9 FLAM
271	3		10 3:30M
272	dump bed		11 NUPVA
273			12 SCHTA
274			13 HETPA
275			14 VALAM
276			15 POTK
277			16 POTK
278			17 KANMA
279			18 NVRST
280			19 POTPR
281			20
282			21
283			22
284			23
285			
286			
287			
288			
289			
290			

6/2/14 Jw kth
6/3/14 Jw kth GW

Big Blake Lake Polk County WBIC 2627000

Date: Page 1 of 29

Site #	Depth (ft)	Dominant sediment type (M, S, R)	Total rake fullness	Observer 1: name and hours:			Observer 2: name and hours:			Observer 3: name and hours:			Total hours worked:
				Observer 1	Observer 2	Observer 3	Observer 1	Observer 2	Observer 3	Observer 1	Observer 2	Observer 3	
1	8.0	M	CLP 1,2,3	1	1	1	1	1	1	1	1	1	
2	8.2	M	EWM 1,2,3	1	1	1	1	1	1	1	1	1	
3	7.6	M		1	1	1	1	1	1	1	1	1	
4	AD	M		1	1	1	1	1	1	1	1	1	
5	6.0	M		1	1	1	1	1	1	1	1	1	
6	7.8	M		1	1	1	1	1	1	1	1	1	
7	8.5	M		1	1	1	1	1	1	1	1	1	
8	8.9	M		1	1	1	1	1	1	1	1	1	
9	8.3	M		1	1	1	1	1	1	1	1	1	
10	8.3	M		1	1	1	1	1	1	1	1	1	
11	8.3	M		1	1	1	1	1	1	1	1	1	
12	6.9	M		1	1	1	1	1	1	1	1	1	
13	7.0	M		1	1	1	1	1	1	1	1	1	
14	3.9	M		1	1	1	1	1	1	1	1	1	
15	1.5	M		1	1	1	1	1	1	1	1	1	
16	5.8	M		1	1	1	1	1	1	1	1	1	
17	7.6	M		1	1	1	1	1	1	1	1	1	
18	8.3	M		1	1	1	1	1	1	1	1	1	
19	4.3	M		1	1	1	1	1	1	1	1	1	
20	8.1	M		1	1	1	1	1	1	1	1	1	
21	8.4	M		1	1	1	1	1	1	1	1	1	
22	8.6	M		1	1	1	1	1	1	1	1	1	
23	8.6	M		1	1	1	1	1	1	1	1	1	
24	7.7	M		1	1	1	1	1	1	1	1	1	
25	7.4	M		1	1	1	1	1	1	1	1	1	
26	7.8	M		1	1	1	1	1	1	1	1	1	
27	Shallow	M		1	1	1	1	1	1	1	1	1	
28	4.0	R-D		1	1	1	1	1	1	1	1	1	
29	8.3	M		1	1	1	1	1	1	1	1	1	
30	8.5	M	Nothing										

X

Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?	EWM 1,2,3	GLP 1,2,3	Observer 1: name and hours:	Observer 2: name and hours:	Observer 3: name and hours:	Total hours worked:
31	7.5	M	P	1	1	1 Pot Pt	1 Pot Pt	1 SPADA	
32	8.1	M	P	1	1	2 Pot Pt	1 Pot Pt	10 NYMOD	
33	8.1	M	P	1	1	3 Pot Pt	1 Pot Pt	11 SPADA	
34	8.1	M	P	1	1	4 Lem Pt	1 Pot Pt	12 SPADA	
35	8.1	M	P	1	1	5 Lem Pt	1 Pot Pt	13 NYMOD	
36	8.5	M	P	1	1	6 WABR	1 Pot Pt	14 NYMOD	
37	8.5	M	P	1	1	7 FI	1 Pot Pt	15 NYMOD	
38	2.5	M	P	1	1	8 Cend	1 Pot Pt	16 NYMOD	
39	8.7	M	P	1	1	9 WABR	1 Pot Pt	17 NYMOD	
40	9.0	M	P	1	1	10 WABR	1 Pot Pt	18 NYMOD	
41	9.0	M	P	1	1	11 WABR	1 Pot Pt	19 NYMOD	
42	8.5	M	P	1	1	12 WABR	1 Pot Pt	20 NYMOD	
43	8.0	M	P	1	1	13 WABR	1 Pot Pt	21 NYMOD	
44	8.3	M	P	1	1	14 WABR	1 Pot Pt		
45	8.6	M	P	1	1	15 WABR	1 Pot Pt		
46	7.9	M	P	1	1	16 WABR	1 Pot Pt		
47	2.5	M	P	1	1	17 WABR	1 Pot Pt		
48	3	S	P	1	1	18 WABR	1 Pot Pt		
49	8.2	M	P	2	1	19 WABR	1 Pot Pt		
50	10.5	M	P	1	1	20 WABR	1 Pot Pt		
51	11.1	M	P	1	1	21 WABR	1 Pot Pt		
52	10.5	M	P	1	1	22 WABR	1 Pot Pt		
53	11	M	P	1	1	23 WABR	1 Pot Pt		
54	10.7	M	P	1	1	24 WABR	1 Pot Pt		
55	8.3	M	P	1	1	25 WABR	1 Pot Pt		
56	4.8	M	P	1	1	26 WABR	1 Pot Pt		
57	1.5	M	P	1	1	27 WABR	1 Pot Pt		
58	2.7	M	P	1	1	28 WABR	1 Pot Pt		
59	6.5	M	P	2	1	29 WABR	1 Pot Pt		
60	10.5	M	P	1	1	30 WABR	1 Pot Pt		

X

Observer 1: name and hours:	Observer 2: name and hours:	Observer 3: name and hours:	Total hours worked:																								
Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R?)	Total Rake Fullness	EWM 1,2,3	CLP 1,2,3	1 Pat PR	2 Pat PR	3 LemTR	4 LemMI	5 WalfR2	6 Car PR	7 Pr	8 Pat 20	9 Pat 20	10 NWald	11 S PABO	12 S24T2	13 Nup Vg	14	15	16	17	18	19	20	21

Observer 1: name and hours:

Observer 2: name and hours:

Observer 3: name and hours:

Total hours worked:

Site #

Depth (ft)

Dominant sediment type (M, S, R)

Rake pole (P) or rake rope (R?)

Total Rake Fullness

EWM 1,2,3

CLP 1,2,3

1 Pat PR

2 Pat PR

3 LemTR

4 LemMI

5 WalfR2

6 Car PR

7 Pr

8 Pat 20

9 Pat 20

10 NWald

11 S PABO

12 S24T2

13 Nup Vg

14

15

16

17

18

19

20

21

151 11.7

152 11.5

153 11.7

154 11.3

155 10.8 M R P

156 9.6 S P

157 6.8 R P

158 14.5

(159) 13.5

160 12

161 11.4

162 12.7

163 12.5

164 12.5

165 12.7

166 12.5

(167) 11.5

168 11.7

169 11.5

(170) 12.0

(171) 11.4 M R P

172 10.6 M P

173 11.5 M R

174 9.8 R P

175 13

176 12.5

177 12.0

178 12.5

179 12.5

180 12.6

V V

X

Date:

Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?	Total Rake Fullness	Observer 1: name and hours:		Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:																
181	12.4	-	-	-	GLP 1,2,3	1 RTR	2 RTR	3 RTR	4 RTR	5 WATRA	6 CORDE	7 FRI	8 POT2	9 POT2	10 WAD	11 SPAN	12 SCAT2	13 MUP 1A	14	15	16	17	18	19	20	21	
182	12.2	-	-	-																							
183	12.3	-	-	-																							
184	12.1	-	-	-																							
185	11.9	-	-	-																							
186	11.8	-	-	-																							
187	12.2	-	-	-																							
188	11.9	-	-	-																							
189	11.5	-	-	-																							
190	10.7	M	P																								
191	9.5	M	P																								
192	12.3	-	-	-																							
193	11.7	-	-	-																							
194	12.3	-	-	-																							
195	13.2	-	-	-																							
196	12.2	-	-	-																							
197	11.6	-	-	-																							
198	11.2	-	-	-																							
199	11.7	-	-	-																							
200	12.1	-	-	-																							
201	12.0	-	-	-																							
202	11.1	-	-	-																							
203	11.6	-	-	-																							
204	12.0	-	-	-																							
205	11.5	-	-	-																							
206	11.1	-	-	-																							
207	10.1	M	P																								
208	9.2	M	P																								
209	7.0	M	P																								
210	5.0	M	P																								

↑

X

Site #	Depth (ft)	Dominant sediment type (M, S, R)	Total Rake Fullness	EWM 1,2,3	CLP 1,2,3	Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:
						1	2	1	2	
241	9.5	M								
242	4.0	M	1							
243	8.7	M								
244	6.9	R	1							
245	3.0	R	2							
246	6.8	M								
247	2.0	M								
248	8.4	M								
249	8.0	M								
250	8.5	M								
251	7.8	M								
252	4.0	M								
253	Shallow	terrestrial	1							
254	6.0	M								
255	6.3	M								
256	7.5	M								
257	7.0	M								
258	4.0	M								
259	8.0	M								
260	7.8	M								
261	7.2	M								
262	5.8	M								
263	Shallow	terrestrial								
264	6.0	M								
265	7.3	M								
266	5.5	M								
267	3.0	M								
268	1.8	M								
(269)	4.2	M								
270	2.6	M								

Observer 1: name and hours: Observer 2: name and hours: Observer 3: name and hours: Total hours worked:

1 Pat R 1 Pat R 1 Pat R
 2 Pat R 3 Pat R 4 Pat R
 5 WLF 6 WLF 7 WLF
 8 Pat R 9 Pat R 10 Pat R
 11 WLF 12 WLF 13 WLF
 14 WLF 15 WLF 16 WLF
 17 WLF 18 WLF 19 WLF
 20 WLF 21 WLF

JW KH

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Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?	Total Rake Fullness	Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:
					Observer 2: name and hours:	Observer 3: name and hours:	Observer 2: name and hours:	Observer 3: name and hours:	
31	9.0	M	P	CLP 1,2,3	1	1	1	1	1
32	9.0	M	P	EWM 1,2,3	1	1	1	1	1
33	10.0	M	P		1	1	1	1	1
34	10.0	M	P		1	1	1	1	1
35	10.0	M	P		1	1	1	1	1
36	8.6	M	P		1	1	1	1	1
37	7.3	M	P		1	1	1	1	1
38	2.8	M	P		1	1	1	1	1
39	8.5	M	P		1	1	1	1	1
40	9.0	M	P		1	1	1	1	1
41	4.9	M	P		1	1	1	1	1
42	10.9	M	P		1	1	1	1	1
43	10.5	M	P		1	1	1	1	1
44	10.0	M	P		1	1	1	1	1
45	9.0	M	P		1	1	1	1	1
46	8.9	M	P		1	1	1	1	1
47	6.8	M	P		1	1	1	1	1
48	1.3	M	P		1	1	1	1	1
49	6.1	M	P		1	1	1	1	1
50	8.7	M	P		1	1	1	1	1
51	9.6	M	P		1	1	1	1	1
52	9.3	M	P		1	1	1	1	1
53	9.4	M	P		1	1	1	1	1
54	9.2	M	P		1	1	1	1	1
55	8.4	M	P		1	1	1	1	1
56	8.2	M	P		1	1	1	1	1
57	1.0	R	P		1	1	1	1	1
58	6.9	M	P		1	1	1	1	1
59	8.5	M	P		1	1	1	1	1
60	9.7	M	P		1	1	1	1	1

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JW KM

Observer 1: name and hours:		Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:																				
Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rate pole (P) or rake rope (R)?	EWM 1,2,3	CLP 1,2,3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
61	10.1	D																								
62	10.6	D																								
63	11.5	D																								
64	9.7	M																								
65	2.7	M																								
66	8.5	M	P																							
67	10.6	Deep																								
68	10.8	Debr																								
69	13.3	Deep																								
70	13.7	Deep																								
71	7.3																									
72	11.2	Deep																								
73	14.3	Deep																								
74	15.0	Debr																								
75	8.7	R	P																							
76	14.1	Debr																								
77	12.1	Deep																								
78	7.1	R	P																							
79	3.0	R	P																							
80	7.1	R	P																							
81	5.0	R	P																							
82	6.0	R	P																							
83	12.5	Deep																								
84	12.9	Deep																								
85	12.8	Debr																								
86	11.7	Debr																								
87	10.3	M																								
88	9.7	M	P																							
89	4.3	R	P																							
90	8.2	R	P																							

Site #	Depth (ft)	Dominant sediment type (M, S, R)	Observer 1: name and hours:		Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:																																	
			EWM 1,2,3	CLP 1,2,3	Total Rake Fullness	Rake pole (P) or rake rope (R)?	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21															
91	11.8	Deep D	1																																							
92	10.9	Deep D																																								
93	12.1	Deep D																																								
94	11.7	Deep D																																								
95	12.0	Deep D																																								
96	11.7	Deep D																																								
97	11.4	Deep D																																								
98	4.2	R P																																								
99	9.0	R P																																								
100	12.2	Deep D																																								
101	11.0	Deep D																																								
102	12.3	Deep D																																								
103	11.4	Deep D																																								
104	11.8	Deep D																																								
105	11.9	Deep D																																								
106	12.3	Deep D																																								
107	6.5	R P																																								
108	9.8	M P																																								
109	14.3	Deep D																																								
110	12.7	Deep D																																								
111	10.4	Deep D																																								
112	11.4	Deep D																																								
113	11.9	Deep D																																								
114	12.3	Deep D																																								
115	12.5	Deep D																																								
116	4.1	R P																																								
117	7.2	R P																																								
118	13.5	Deep D																																								
119	12.5	Deep D																																								
120	12.3	Deep D																																								

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Site #	Depth (ft)	Dominant sediment type (M, S, R)	Total rake fullness	Observer 1: name and hours:					Observer 2: name and hours:					Observer 3: name and hours:					Total hours worked:					
				1	2	3	4	5	1	2	3	4	5	1	2	3	4	5						
181	12.5	Deep	CLP 1,2,3						1	2	3	4	5											
182	12.0	Deep	EWM 1,2,3																					
183	11.7	Deep																						
184	12.0	Deep																						
185	11.7	Deep																						
186	11.7	Deep																						
187	11.9	Deep																						
188	11.2	Deep																						
189	10.9	Deep																						
190	10.6	Deep																						
191	9.5	S P																						
192	11.7	Deep																						
193	13.0	Deep																						
194	13.2	Deep																						
195	13.6	Deep																						
196	13.3	Deep																						
197	11.8	Deep																						
198	12.12	Deep																						
199	11.3	Deep																						
200	11.8	Deep																						
201	10.4	Deep																						
202	11.1	Deep																						
203	16.7	Deep																						
204	11.6	Deep																						
205	11.0	Deep																						
206	10.6	Deep																						
207	9.8	M P																						
208	9.8	M P																						
209	9.1	M P																						
210	7.2	M P																						

Date:

Site #	Depth (ft)	Dominant sediment-type (M, S, R)	Observer 1: name and hours:		Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:										
			EWM 1,2,3	CLP 1,2,3	1 GARC	2 POT RY	3 POT RY	4 RY		5 LEW FV	6 WLF FV	7 LEW WJ	8 NIN RD	9 NIN VA	10 POT VA	11 NIN RJ	12 NIN RJ		
																		Total rake fullness	
241	8.0	V																	
242	8.5	P																	
243	8.1	P																	
244	7.5	P																	
245	2.4	R																	
246	5.7	R																	
247	2.5	R																	
248	7.8	R																	
249	7.7	R																	
250	7.7	R																	
251	7.4	R																	
252	3.0	R																	
253	Rice	R																	
254	6.8	M																	
255	7.7	M																	
256	7.6	M																	
257	5.8	M																	
258	2.8	M																	
259	6.0	R																	
260	7.2	R																	
261	6.6	M																	
262	4.8	M																	
263	Rice	R																	
264	5.7	R																	
265	6.1	M																	
266	4.6	M																	
267	3.7	M																	
268	Terrestrial	R																	
269	3.4	M																	
270	3.8	M																	

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Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?	Total Rake Fullness	Observer 1: name and hours: KH	Observer 2: name and hours: JW	Observer 3: name and hours: JW	Total hours worked: 2.90
1	1	CLP 1,2,3	1	1	1 POT	1 POT	1 POT	
2	1	EMM 1,2,3	3	3	2 POT	2 POT	2 POT	
3	1	EMM 1,2,3	3	3	3 POT	3 POT	3 POT	
4	1	EMM 1,2,3	3	3	4 POT	4 POT	4 POT	
5	1	EMM 1,2,3	3	3	5 POT	5 POT	5 POT	
6	1	EMM 1,2,3	3	3	6 POT	6 POT	6 POT	
7	1	EMM 1,2,3	3	3	7 POT	7 POT	7 POT	
8	1	EMM 1,2,3	3	3	8 POT	8 POT	8 POT	
9	1	EMM 1,2,3	3	3	9 POT	9 POT	9 POT	
10	1	EMM 1,2,3	3	3	10 POT	10 POT	10 POT	
11	1	EMM 1,2,3	3	3	11 POT	11 POT	11 POT	
12	1	EMM 1,2,3	3	3	12 POT	12 POT	12 POT	
13	1	EMM 1,2,3	3	3	13 POT	13 POT	13 POT	
14	1	EMM 1,2,3	3	3	14 POT	14 POT	14 POT	
15	shallow/shore							
16	3							
17	8							
18	8							
19	10							
20	10							
21	10.5							
22	11							
23	11							
24	7.5							
25	7							
26	6.5							
27	shallow/shore							
28	5							
29	8.5							
30	8.5							

Site #	Depth (ft)	Dominant sediment type (M, S, F)	Total Rake Fullness	Rake pole (P) or rake rope (R)?	Observer 1: name and hours:		Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:
					Observer 1	Observer 2	Observer 3	Observer 4	Observer 5	Observer 6	
31	9		CLP 1,2,3	2	1	1	1				
32	10										
33	8.5										
34	9										
35	10.5										
36	8										
37	7										
38	1										
39	8										
40	9										
41	10										
42	10.5										
43	9										
44	10										
45	9.5										
46	8										
47	6										
48	shallow	stratified									
49	8										
50	9.5										
51	9										
52	9										
53	10										
54	10										
55	9.5										
56	8										
57	2.5										
58	3										
59	6.5										
60	8										

Observer 1: name and hours: 1 pot pr, 2 pot pr, 3 Cerpe, 4 NTK (19), 5 fl algae, 6 pot pr, 7 pot pr, 8 NTK pr, 9 NTK pr, 10 NTK pr, 11 NTK pr, 12 NTK pr, 13 NTK pr, 14 NTK pr, 15 NTK pr, 16 NTK pr, 17 NTK pr, 18 NTK pr, 19 NTK pr, 20 NTK pr, 21 NTK pr

Observer 1: name and hours:	Observer 2: name and hours:	Observer 3: name and hours:	Total hours worked:
Site #	Depth (ft)	Dominant sediment type (M, S, R)	Total Rake Fullness
121	5.11	GLP 1,2,3	
122	12	EMM 1,2,3	
123	10.5		
124	10.5		
125	10		
126	13		
127	12		
128	11		
129	11.5		
130	12		
131	11.5		
132	11.5		
133	10		
134	9		
135	8	S	
136	13		
137	13		
138	12.5		
139	12		
140	12		
141	11.5		
142	10.5		
143	10.5		
144	9.5		
145	5.8	R	
146	13		
147	14		
148	13		
149	11.5		
150	12		

Observer 1: name and hours:
Observer 2: name and hours:
Observer 3: name and hours:
Total hours worked:

1 PTPR
2 PTPR
3 OMB
4 Kirtles
5 JRC
6 PAT 20
7 HCF 20
8 NWM 24
9 KAN 24
10 KAN 24
11 NWS 1
12 PTF 1
13 CMT 1
14
15
16
17
18
19
20
21

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Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?	Total Rake Fullness	Observer 1: name and hours:		Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:
31	9.6				1	1	1	1	1	1	1
32	9.1										
33	10.4										
34	9.5										
35	9.4										
36	8.8										
37	7.8										
38	8.5										
39	8.9	S									
40	9.1										
41	9.3										
42	9.6										
43	9.8										
44	9.5										
45	9.3										
46	8.7										
47	7.5										
48	2.2	S									
49	8.8										
50	9.1										
51	9.3										
52	9.5										
53	9.7										
54	9.6										
55	9.3										
56	7.5	S									
57	4.6										
58	6.2	R									
59	3.7	R									
60	8.5	S									

Observer 1: name and hours:
Observer 2: name and hours:
Observer 3: name and hours:

1 CLP 12.3
2 Cerbe
3 pot 20
4 pot 10 (9)
5 pot 10
6 Lemm.
7 Lemm.
8 pot 10
9 NMD
10 MDRS!
11 WAFIA
12 5996r
13 Het-pu
14 Vafim
15 Vafim
16 KAMTA
17 KAMTA
18
19
20
21



Site #	Depth (ft)	Dominant sediment type (M, S, R)	Total Rake Fullness	Rake pole (P) or rake rope (R)?	Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:
61	9.9								
62	9.8								
63	10.6								
64	10.4								
65	5.9								
66	8.3								
67	10.1								
68	10.8								
69	12.2								
70	13.0								
71	7.6								
72	11								
73	12.8								
74	14.5								
75	8.0								
76	13.2								
77	11.8								
78	8.0	S							
79	5.3	S							
80	8.0								
81	6.2								
82	10.8								
83	11.8								
84	11.9								
85	11.4								
86	10.3								
87	4.3								
88	9.7								
89	4.2	R							
90	shore								

Observer 1: name and hours: _____

Observer 2: name and hours: _____

Observer 3: name and hours: _____

Total hours worked: _____

1 CLP 1,2,3

2 CLP 2,3

3 CLP 2,3

4 CLP 2,3

5 CLP 2,3

6 CLP 2,3

7 CLP 2,3

8 CLP 2,3

9 CLP 2,3

10 CLP 2,3

11 CLP 2,3

12 CLP 2,3

13 CLP 2,3

14 CLP 2,3

15 CLP 2,3

16 CLP 2,3

17 CLP 2,3

18 CLP 2,3

19 CLP 2,3

20 CLP 2,3

21 CLP 2,3

Site #	Depth (ft)	Dominant sediment type (M, S, R)	Total Rake Fullness	Rake pole (P) or rake rope (R)?	Observer 1: name and hours:		Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:																
91	11.9		EWM 1,2,3	CLP 1,2,3	1	Gerde	2 Patzo	3 Floca	4 Patpa	5 Lamm	6 Contr	7 Patpa	8 Nwmd	9 Spds	10 Nwvs	11 Wdfta	12 Saggr	13 Hctpa	14 Vctm	15 Bl	16 Pantz	17 Nwpla	18	19	20	21	
92	11.9																										
93	11.2																										
94	11.1																										
95	10.8																										
96	10.1																										
97	10.3																										
98	5.5	R																									
99	10.2																										
100	11.6																										
101	11.5																										
102	10.9																										
103	10.7																										
104	10.6																										
105	10.9																										
106	10.8																										
107	6.6	R																									
108	9.9																										
109	13.0																										
110	11.7																										
111	11.1																										
112	10.5																										
113	10.8																										
114	11.0																										
115	11.2																										
116	8.7	S																									
117	12.8																										
118	12.2																										
119	11.3																										
120	11.1																										



Site #	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?	Total Rake Fullness	EWM 1,2,3	CLP 1,2,3	1 Cer D. e	2 Pot 20	3 Etoc9	4 Pot 24	5 Lem M.	6 Lem M.	7 Lem M.	8 Nymod	9 Spex	10 Mvrs	11 Wo Rtn	12 Saggr	13 Hct br	14 Wt pm	15 Rl	16 Ram Rq	17	18	19	20	21	
121	10.9																											
122	11.1																											
123	11.4																											
124	11.7																											
125	10.6																											
126	12.2																											
127	12.6																											
128	11.9																											
129	11.3																											
130	11.9																											
131	11.5																											
132	11.2																											
133	11.5																											
134	11.0																											
135	10.1																											
136	13.4																											
137	12.7																											
138	11.8																											
139	11.7																											
140	11.3																											
141	11.5																											
142	11.2																											
143	11.2																											
144	9.0	R																										
145	8.3	R																										
146	12.8																											
147	13.8																											
148	12.2																											
149	11.7																											
150	11.6																											

Observer 1: name and hours:

Observer 2: name and hours:

Observer 3: name and hours:

Total hours worked:

Site #	Observer 1: name and hours:			Observer 2: name and hours:			Observer 3: name and hours:			Total hours worked:																		
	Depth (ft)	Dominant sediment type (M, S, R)	Rake pole (P) or rake rope (R)?	Total Rake Fullness	EWM 1,2,3	GLP 1,2,3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
181	11.5																											
182	11.5																											
183	11.3																											
184	11.3																											
185	11.0																											
186	11.1																											
187	10.7																											
188	10.6																											
189	10.2																											
190	10.0																											
191	10.0																											
192	10.8																											
193	13.0																											
194	13.2																											
195	13.5																											
196	12.2																											
197	12.1																											
198	11.5																											
199	11.1																											
200	11.0																											
201	10.5																											
202	10.6																											
203	10.4																											
204	10.6																											
205	10.0																											
206	9.8																											
207	9.4																											
208	9.3																											
209	9.5																											
210	11.8																											
211																												

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Site #	Depth (ft)	Dominant sediment type (M, S, R)	Total Rake Fullness	Observer 1: name and hours:		Observer 2: name and hours:		Observer 3: name and hours:		Total hours worked:																		
				EWM 1,2,3	GLP 1,2,3	1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
211	7.8	R																										
212	11.3																											
213	11.0																											
214	10.5																											
215	11.0																											
216	6.5																											
217	7.3																											
218	5.0																											
219	10.3																											
220	9.8																											
221	9.3																											
222	9.0																											
223	8.9																											
224	8.5																											
225	6.1	R																										
226	5.7																											
227	9.8																											
228	9.0																											
229	8.6																											
230	8.5																											
231	8.5																											
232	8.4																											
233	7.8																											
234	5.2																											
235	4.7																											
236	4.6																											
237	8.5																											
238	8.4																											
239	8.4																											
240	7.6																											

↑ ↓ ↓ ↓

