Appendix 1. Social Indicator Study

LCEB Social Indicators Study
Your Views on Local Water Resources

A social indicators study was conducted within the LCEB watershed to identify the needs and concerns of the community regarding water quality. Another primary goal of the survey was to inform the watershed plan's planning and implementation activities. This survey also provides baseline data that can be used to estimate changes in community knowledge and concerns over time. The survey covered the social indicators developed for use in 319 funded watershed projects. The indicators are grouped into four categories: awareness, attitudes, constraints, and behaviors. Sociodemographic information was also collected.

A regional team of researchers from University of Illinois, Purdue University, Michigan State University, University of Minnesota, The Ohio State University, and University of Wisconsin developed the Social Indicator Planning and Evaluation System (SIPES) for Nonpoint Source Management. The survey produced for the LCEB watershed was a subset of relevant questions provided by SIPES. For more information on the SIPES project, please go to http://greatlakeswater.uwex.edu/social-indicators.

The survey was implemented using a five-wave mailing survey (Dillman, 2000). The 12-page survey was sent to 750 households in the LCEB watershed with 254 responses, which is an overall response rate of 34%. An advance notice letter was sent to potential respondents to inform them of the survey's purpose and that it would arrive the following week. The letter also included instructions on how to complete the survey on-line. The paper survey was sent the following week and a postcard reminder was sent two weeks later. A replacement survey was sent a week after the postcard. After two more weeks, a third replacement survey was sent to those not responding.

Rating of Water Quality

Overall, how would you rate the quality of the water in your area?

	Poor (1)	Okay (2)	Good (3)	Don't Know	Mean (SD)	Valid/Total Responses
1. For canoeing / kayaking / other boating	13.2	30	28.6	28.2	2.22 (0.73)	158 / 220
2. For eating locally caught fish	26	30.6	18.3	25.1	1.9 (0.76)	164 / 219
3. For swimming	23.2	41.4	22.3	13.2	1.99 (0.73)	191 / 220
4. For picnicking and family activities	7.4	31.9	49.5	11.1	2.47 (0.65)	192 / 216
5. For fish habitat	16	36.5	22.8	24.7	2.09 (0.71)	165 / 219
6. For scenic beauty	5	25.2	65.3	4.5	2.63 (0.58)	212 / 222

Your Water Resources

1. ***Of these activities, which is the most important to you? (Responses: 190)***

9.5% For canoeing / kayaking / other boating

10.5% For eating locally caught fish

17.9% For swimming

10% For picnicking and family activities

15.8% For fish habitat

36.3% For scenic beauty

2. ***Do you know where the rainwater goes when it runs off of your property? (Responses: 222)***

32.9% No

67.1% Yes

3. ***If you answered 'Yes' above, where does your rain water drain to?***

(see appendix for responses)

Your Opinions

Please indicate your level of agreement or disagreement with the statements below.

	Strongly Disagree (1)	Disagree (2)	Neither Agree Nor Disagree (3)	Agree (4)	Strongly Agree (5)	Mean (SD)	Valid/Total Responses
1. The way that I care for my lawn and yard can influence water quality in local streams and lakes.	5	5	6.3	54.8	28.9	3.97 (1)	239 / 239
2. It is my personal responsibility to help protect water quality.	1.3	1.3	13.1	51.3	33.1	4.14 (0.78)	236 / 236
3. It is important to protect water quality even if it slows economic development.	3.8	2.6	18.7	51.5	23.4	3.88 (0.93)	235 / 235
4. My actions have an impact on water quality.	3	2.6	12.1	57.3	25	3.99 (0.87)	232 / 232
5. I would be willing to pay more to improve water quality (for example: though local taxes or fees)	18.6	19.5	31.8	25.8	4.2	2.78 (1.15)	236 / 236
6. I would be willing to change the way I care for my lawn and yard to improve water quality.	4.7	5.1	21.3	53.6	15.3	3.7 (0.95)	235 / 235
7. The quality of life in my community depends on good water quality in local streams, rivers and lakes.	2.1	2.5	14.7	49.6	31.1	4.05 (0.87)	238 / 238

Water Impairments

Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe problem (4)	Don't Know	Mean (SD)	Valid/Total Responses
1. Sedimentation (dirt and soil) in the water	11.4	13.6	25.8	11.9	37.3	2.61 (0.99)	148 / 236
2. Nitrogen	5.9	5.9	17.2	7.1	63.9	2.71 (0.97)	86 / 238
3. Phosphorus	5.9	5.5	15.7	7.2	65.7	2.7 (0.99)	81 / 236
4. Bacteria and viruses in the water (such as *E.coli* / coliform)	6.3	7.6	20.2	19.3	46.6	2.98 (0.99)	127 / 238
5. Salt / TDS / Chlorides	6.7	7.6	11.8	10.5	63.4	2.71 (1.08)	87 / 238
6. Not enough oxygen in the water	7.2	8.1	12.3	8.1	64.3	2.6 (1.05)	84 / 235
7. Invasive aquatic plants and animals	7.2	6.8	23.6	21.5	40.9	3.01 (0.99)	140 / 237
8. Habitat alteration harming local fish	7.6	8.8	19.3	13.9	50.4	2.8 (1.02)	118 / 238
9. High water temperature	13.1	9.7	12.7	5.5	59.1	2.26 (1.05)	97 / 237
10. Pesticides	4.7	6.4	20.8	17.8	50.4	3.04 (0.93)	117 / 236

Sources of Water Pollution

The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know	Mean (SD)	Valid/Total Responses
1. Discharges from industry into streams and lakes	5.6	6.5	29.4	41.1	17.3	3.28 (0.88)	191 / 231
2. Discharges from sewage treatment plants	7.8	10.4	28.1	29.9	23.8	3.05 (0.97)	176 / 231
3. Soil erosion from construction sites	8.5	17	32.3	9.4	32.7	2.63 (0.88)	150 / 223
4. Soil erosion from farm fields	10.4	22.6	25.2	8.7	33	2.48 (0.91)	154 / 230
5. Soil erosion from shorelines and/or streambanks	11.3	22.6	28.3	10	27.8	2.51 (0.92)	166 / 230
6. Excessive use of lawn fertilizers and/or pesticides	5.2	17.8	30.4	21.7	24.8	2.91 (0.89)	173 / 230
7. Grass clippings and leaves entering storm drains	14.4	22.3	24	8.3	31	2.38 (0.95)	158 / 229
8. Improperly maintained septic systems	10	15.2	22.5	11.7	40.7	2.61 (0.99)	137 / 231
9. Manure from farm animals	14.8	20.5	17	9.2	38.4	2.33 (1)	141 / 229
10. Waste material from pets	19.6	23.9	13	6.5	37	2.1 (0.96)	145 / 230
11. Excessive use of fertilizers for crop production	8.6	15.5	23.3	18.1	34.5	2.78 (1)	152 / 232
12. Urban stormwater runoff	9.6	14.9	29.8	11	34.6	2.64 (0.93)	149 / 228
13. Residential stormwater runoff	10.9	19.7	29.7	6.6	33.2	2.48 (0.88)	153 / 229
14. Channelization of streams	10.9	9.6	15.7	7.9	55.9	2.47 (1.05)	101 / 229
15. Removal of riparian vegetation	8.4	8	14.7	6.7	62.2	2.52 (1.03)	85 / 225
16. Drainage/filling of wetlands	9.6	9.6	24.9	17.5	38.4	2.82 (1.02)	141 / 229
17. Wildlife	27.8	20.4	9.6	3	39.1	1.8 (0.88)	140 / 230
18. Yard maintenance	13.9	21.6	26.4	5.2	32.9	2.34 (0.89)	155 / 231

Consequences of Poor Water Quality

Poor water quality can lead to a variety of consequences for communities. In your opinion, how much of a problem are the following issues in your area?

	Not a Problem (1)	Slight Problem (2)	Moderate Problem (3)	Severe Problem (4)	Don't Know	Mean (SD)	Valid/Total Responses
1. Contaminated drinking water	38.7	18.3	16.5	9.1	17.4	1.95 (1.06)	190 / 230
2. Beach closures	7.3	22.8	42.2	19.4	8.2	2.8 (0.86)	213 / 232
3. Contaminated fish	6.5	19	28.9	23.3	22.4	2.89 (0.93)	180 / 232
4. Loss of desirable fish species	6.5	12.1	26.4	25.1	29.9	3 (0.95)	162 / 231
5. Reduced beauty of lakes or streams	16.5	27.8	24.3	16.5	14.8	2.48 (1.02)	196 / 230
6. Reduced quality of water recreation activities	10.7	26.6	28.3	15.5	18.9	2.6 (0.94)	189 / 233
7. Excessive aquatic plants or algae	8.6	15.9	25	20.7	29.7	2.82 (0.99)	163 / 232
8. Odor	20.2	26.6	17.2	11.2	24.9	2.26 (1.02)	175 / 233
9. Lower property values	24.9	18.5	15	10.3	31.3	2.16 (1.08)	160 / 233

Practices to Improve Water Quality

Please indicate which statement most accurately describes your level of experience with each practice listed below.

	Not Relevant for my Property	Never Heard of it (1)	Somewhat Familiar with it (2)	Know How to Use it; Not Using it (3)	Currently Use it (4)	Mean (SD)	Valid/Total Responses
1. Following the manufacturer's instructions when fertilizing lawn or garden	12.8	0	12	18.8	56.4	3.51 (0.73)	204 / 234
2. Keep grass clippings and leaves out of the roads, ditches, and gutters	13.3	3	10.3	8.6	64.8	3.56 (0.83)	202 / 233
3. Follow pesticide application instructions for lawn and garden	16.3	0.4	11.2	21	51.1	3.47 (0.74)	195 / 233
4. Regular servicing of septic system	45.9	2.2	7.8	6.5	37.7	3.47 (0.89)	125 / 231
5. Repair home sewage treatment system	50.4	3.9	10.5	7.9	27.2	3.18 (1.03)	113 / 228
6. Properly dispose of household waste (chemicals, batteries, florescent light bulbs, etc.)	2.6	0.9	12.8	9.8	73.9	3.61 (0.75)	228 / 234
7. Create wetland	58.6	10.8	16.8	3.4	10.3	2.32 (1.12)	96 / 232
8. Restore/enhance wetland	57.2	10	18.3	5.7	8.7	2.31 (1.05)	98 / 229
9. Protect streambanks and/or shorelines with vegetation	59	7	19.7	3.1	11.4	2.46 (1.07)	94 / 229
10. Use grass swales	47	27.6	8.2	4.7	12.5	2.04 (1.25)	123 / 232
11. Use wetland detention	57.8	21.7	10	3.9	6.5	1.89 (1.11)	97 / 230
12. Use porous pavement	42.7	25.9	13.8	6.9	10.8	2.05 (1.15)	133 / 232

Specific Constraints of Practices

Rain Garden: A garden that uses native plants to absorb and filter stormwater collected off a roof, parking lot, sidewalk, or driveway.

1. How familiar are you with this practice? (Responses: 232)

11.6% Not relevant
28.4% Never heard of it
35.8% Somewhat familiar with it
12.5% Know how to use it; not using it
11.6% Currently use it

2. If the practice is not relevant, please explain why.
(See appendix for responses)

3. Are you willing to try this practice? (Responses: 203)

28.6% Yes or already do
51.2% Maybe
20.2% No

How much do the following factors limit your ability to implement this practice?

	Not at All (1)	A Little (2)	Some (3)	A Lot (4)	Don't Know	Mean (SD)	Valid/Total Responses
4. Don't know how to do it	20.8	17.8	26.2	18.3	16.8	2.49 (1.09)	168 / 202
5. Time required	18.7	15.7	30.8	17.2	17.7	2.44 (1.06)	163 / 198
6. Cost	14.6	13.1	26.3	23.7	22.2	2.24 (1.08)	154 / 198
7. The features of my property make it difficult	19.3	17.8	13.2	19.8	29.9	2.52 (1.17)	138 / 197
8. Insufficient proof of water quality benefit	30.5	15.5	11.5	6	36.5	3.11 (1.02)	127 / 200
9. Desire to keep things the way they are	35.5	16.2	17.8	12.7	17.8	2.91 (1.12)	162 / 197
10. Physical or health limitations	50.7	15.4	11.4	9.5	12.9	3.23 (1.05)	175 / 201
11. Hard to use with my farming system	59.7	3.1	3.1	2.6	31.6	3.75 (0.71)	134 / 196
12. Lack of equipment	23.9	13.9	15.9	14.9	31.3	2.68 (1.17)	138 / 201

Phosphate Free Fertilizer: Fertilizer without phosphates, designed to reduce phosphorus runoff and water pollution

13. How familiar are you with this practice? (Responses: 229)

19.2% Not relevant
30.1% Never heard of it
28.8% Somewhat familiar with it
10% Know how to use it; not using it
11.8% Currently use it

14. If the practice is not relevant, please explain why.

(See appendix for response)

15. Are you willing to try this practice? (Responses: 195)

37.4% Yes or already do
46.7% Maybe
15.9% No

How much do the following factors limit your ability to implement this practice?

	Not at all (4)	A little (3)	Some (2)	A lot (1)	Don't Know	Mean (SD)	Valid/Total Responses
16. Don't know how to do it	34.9	8.9	14.1	20.3	21.9	2.75 (1.27)	150 / 192
17. Time required	38.9	11.6	15.3	10	24.2	3.05 (1.12)	144 / 190
18. Cost	27.5	10.1	18.5	14.8	29.1	2.71 (1.19)	134 / 189
19. The features of my property make it difficult	48.7	8.4	5.8	6.3	30.9	3.44 (0.98)	132 / 191
20. Insufficient proof of water quality benefit	41.7	8.3	7.8	5.7	36.5	3.35 (1.01)	122 / 192
21. Desire to keep things the way they are	50	7.9	13.7	6.3	22.1	3.3 (1.03)	148 / 190
22. Physical or health limitations	56.3	11.1	6.8	6.3	19.5	3.46 (0.95)	153 / 190
23. Hard to use with my farming system	58.8	2.1	2.7	2.1	34.2	3.79 (0.67)	123 / 187
24. Lack of equipment	39.6	7.3	9.8	5.5	37.8	3.3 (1.03)	102 / 164

Proper Pet Waste Disposal (including horses): Disposing of pet waste in a manner that prevents runoff to local waterways.

25. How familiar are you with this practice? (Responses: 229)

47.2% Not relevant
16.2% Never heard of it
14% Somewhat familiar with it
5.2% Know how to use it; not using it
17.5% Currently use it

26. If the practice is not relevant, please explain why.
(See appendix for responses)

27. Are you willing to try this practice? (Responses: 155)

47.1% Yes or already do
23.2% Maybe
29.7% No

How much do the following factors limit your ability to implement this practice?

	Not at all (4)	A little (3)	Some (2)	A lot (1)	Don't Know	Mean (SD)	Valid/Total Responses
28. Don't know how to do it	50.6	5.6	9.9	9.9	24.1	3.28 (1.12)	123 / 162
29. Time required	53.5	8.2	9.4	3.1	25.8	3.51 (0.87)	118 / 159
30. Cost	54.1	5.7	7	4.5	28.7	3.54 (0.91)	112 / 157
31. The features of my property make it difficult	59.5	5.1	3.8	0.6	31	3.79 (0.58)	109 / 158
32. Insufficient proof of water quality benefit	56.3	5.7	4.4	3.8	29.7	3.63 (0.83)	111 / 158
33. Desire to keep things the way they are	56.4	5.1	9	5.8	23.7	3.47 (0.97)	119 / 156
34. Physical or health limitations	64.2	3.1	4.4	3.1	25.2	3.71 (0.76)	119 / 159
35. Hard to use with my farming system	62.8	1.9	0.6	0	34.6	3.95 (0.26)	102 / 156
36. Lack of equipment	57.7	3.8	3.8	1.9	32.7	3.74 (0.69)	105 / 156

Rain Barrels: Devices designed to collect stormwater from roofs and gutters that can later be used to water a garden, lawn, or house plants.

37. How familiar are you with this practice? (Responses: 233)

6.4% Not relevant
3.4% Never heard of it
32.6% Somewhat familiar with it
42.9% Know how to use it; not using it
14.6% Currently use it

38. If the practice is not relevant, please explain why.
(See appendix for responses)

39. Are you willing to try this practice? (Responses: 208)
43.3% Yes or already do
38.9% Maybe
17.8% No

How much do the following factors limit your ability to implement this practice?

	Not at all (4)	A Little (3)	Some (2)	A Lot (1)	Don't Know	Mean (SD)	Valid/Total Responses
40. Don't know how to do it	54.2	17.7	12	6.8	9.4	3.32 (0.97)	174 / 192
41. Time required	43.9	18.4	20.9	7.7	9.2	3.08 (1.02)	178 / 196
42. Cost	33.8	15.9	21	17.4	11.8	2.75 (1.17)	172 / 195
43. The features of my property make it difficult	51.5	10.8	14.9	9.3	13.4	3.21 (1.08)	168 / 194
44. Insufficient proof of water quality benefit	58.2	12.4	7.7	5.2	16.5	3.48 (0.9)	162 / 194
45. Desire to keep things the way they are	61	6.2	12.8	8.2	11.8	3.36 (1.04)	172 / 195
46. Physical or health limitations	64.1	10.1	6.6	7.1	12.1	3.49 (0.94)	174 / 198
47. Hard to use with my farming system	70.8	2.7	2.7	1.6	22.2	3.83 (0.58)	144 / 185
48. Lack of equipment	36.5	9.5	16.9	21.2	15.9	2.73 (1.26)	159 / 189

Making Decisions for my Property

In general, how much does each issue limit your ability to change your management practices?

	Not at All (4)	A Little (3)	Some (2)	A Lot (1)	Don't Know	Mean (SD)	Valid/Total Responses

1. Personal out-of-pocket expense	15.1	16	29.8	32	7.1	2.15 (1.07)	209 / 225
2. My own physical abilities	40.2	16.1	21.4	16.1	6.2	2.86 (1.15)	210 / 224
3. Not having access to the equipment that I need	19.1	20.9	30.9	19.5	9.5	2.44 (1.05)	199 / 220
4. Lack of available information about a practice	19.1	21.4	27.7	22.3	9.5	2.41 (1.08)	199 / 220
5. No one else I know is implementing the practice	32.9	17.1	21.3	7.9	20.8	2.95 (1.04)	171 / 216
6. Approval of my neighbors	60.8	8.3	8.8	4.6	17.5	3.52 (0.9)	179 / 217
7. Don't know where to get information and/or assistance about those practices	29.2	18.7	25.6	12.3	14.2	2.76 (1.08)	188 / 219
8. Environmental damage caused by practice	42.5	9.3	15	3.7	29.4	3.28 (0.98)	151 / 214
9. Legal restrictions on my property	44.7	8.8	6.5	7.8	32.3	3.33 (1.06)	147 / 217
10. Concerns about resale value	47.5	13.8	12.4	7.8	18.4	3.24 (1.03)	177 / 217
11. Not being able to see a demonstration of the practice before I decide	32.6	17	22.5	11.5	16.5	2.85 (1.09)	182 / 218
12. The need to learn new skills or techniques	29.9	18.7	25.7	11.7	14	2.78 (1.07)	184 / 214

Interest in a Cost-Share Program

13. Would you be interested in participating in a cost-share program that could reimburse you for a portion of the expenses associated with installing practices on your property that improve water quality? (Responses: 226)

22.6% Yes

46% Unsure

31.4% No

About You

1. Do you make the home and lawn care decisions in your household? (Responses: 235)

88.9% Yes

11.1% No

2. What is your gender? (Responses: 231)

57.1% Male
42.9% Female

3. What is your age?

(Mean=57.52; SD = 14.37; Min = 22; Max = 91; Range = 69; n = 218)

4. What is the highest grade in school you have completed? (Responses: 231)

1.7% Some formal schooling
23.8% High school diploma/GED
20.8% Some college
7.4% 2 year college degree
26.4% 4 year college degree
19.9% Post-graduate degree

5. What was your total household income last year? (Responses: 191)

8.4% Less than $24,999
20.4% $25,000 to $49,999
19.4% $50,000 to $74,999
19.4% $75,000 to $99,999
32.5% $100,000 or more

6. What is your occupation?

(See appendix for responses)

7. What is the approximate size of your residential lot? (Responses: 234)

37.6% 1/4 acre or less
18.4% More than 1/4 acre but less than 1 acre
32.1% 1 acre to less than 5 acres
12% 5 acres or more

8. Do you own or rent your home? (Responses: 234)

99.6% Own
0.4% Rent

9. How long have you lived at your current residence (years)?

(Mean=19.82; SD = 14.38; Min = 0.5; Max = 66; Range = 65.5; n = 229)

10. Which of the following best describes where you live? (Responses: 233)

54.5% In a town, village, or city
25.8% In an isolated, rural, non-farm residence

16.7% Rural subdivision or development
3% On a farm

11. In addition to your residence, which of the following do you own or manage? (check all that apply)(Responses: 228)

4.8% An agricultural operation
9.6% Forested land
3.9% Rural recreational property
86.8% None of these

12. Do you use a professional lawn care service? (Responses: 231)

5.2% Yes, just for mowing
2.6% Yes, for mowing and fertilizing
10.4% Yes, just for fertilizing and pest control
2.6% Yes, for mowing, fertilizing, and pest control
79.2% No

13. Where are you likely to seek information about water quality issues? (Responses: 233)

38.2% Newsletters/brochure/fact sheet
45.5% Internet
6.4% Radio
43.3% Newspapers/magazines
18% Workshops/demonstrations/meetings
28.3% Conversations with others
10.7% None of the above

Information Sources

People get information about water quality from a number of different sources. To what extent do you trust those listed below as a source of information about soil and water?

	Not at all (1)	Slightly (2)	Moderately (3)	Very Much (4)	I Am Not Familiar	Mean (SD)	Valid/Total Responses
1. Local watershed project	4.4	7.1	24.8	40.7	23	3.32 (0.87)	174 / 226
2. Local government	9.3	24	42.2	16.4	8	2.71 (0.88)	207 / 225
3. U.S. Environmental Protection Agency	11.9	17.3	35.4	28.3	7.1	2.86 (1)	210 / 226
4. University Extension	7.5	5.8	30.1	42.9	13.7	3.26 (0.92)	195 / 226
5. State environmental agency	11	17.6	38.3	23.3	9.7	2.82 (0.96)	205 / 227
6. Environmental groups	11.5	19	31.4	28.3	9.7	2.85 (1.01)	204 / 226
7. Local garden center	5.8	16.6	36.8	32.7	8.1	3.05 (0.89)	205 / 223
8. Lawn care company	31.6	28.9	23.6	3.1	12.9	1.98 (0.88)	196 / 225
9. Neighbors / friends	14.2	31.4	33.2	13.7	7.5	2.5 (0.93)	209 / 226
10. State natural resources agency	10.3	15.2	33.9	27.7	12.9	2.91 (0.98)	195 / 224
11. County Health department	11.2	17.9	37.9	22.3	10.7	2.8 (0.96)	200 / 224
12. Land trust	15.6	17.4	20.1	11.2	35.7	2.42 (1.04)	144 / 224

Septic Systems

1. Do you have a septic system? (Responses: 229)

52.4% No
1.3% Don't Know
46.3% Yes

2. If you answered 'yes' to the previous question, in what year was it installed?
(Mean=1987.09; SD = 14.75; Min = 1955; Max = 2013; Range = 58; n = 78)

3. Within the last five years, have you had any of the following problems? (Check all that apply) (Responses: 185)

14.1% Slow drains
5.4% Sewage backup in house
6.5% Bad smells near tank or drain field
1.6% Sewage on the surface
0.5% Sewage flowing to ditch
0.5% Frozen septic
1.1% Other
78.9% None
1.6% Don't know

4. In the future, would you like a reminder from your local health department regarding inspection/maintenance of your septic system? (Responses: 171)

14.6% Yes
69.6% No
15.8% Don't know

5. Do you have a garbage disposal? (Responses: 196)

13.8% Yes, I use it daily
18.4% Yes, I use it occasionally
6.1% Yes, but I don't use it
61.7% No

6. Does your septic system have an absorption field (finger system)? (Responses: 156)

52.6% Yes
24.4% No
23.1% Don't know

7. How would you know if your septic system was NOT working properly? (Check all that apply) (Responses: 145)

46.9% Slow drains
50.3% Sewage backup in house

49.7% Bad smells
46.9% Toilet backs up
45.5% Wet spots in lawn
15.9% Pumping tank monthly or more
6.9% Straight pipe to ditch
10.3% Frozen septic
22.8% Don't know
10.3% Other

8. Is your septic system designed to treat sewage or get rid of waste? (Responses: 140)

14.3% Treat sewage
15% Get rid of waste
20.7% Both
10% Neither
40% Don't know

9. Do you think a local government agency should handle inspection and maintenance of septic systems?(Responses: 203)

30.5% Yes
48.3% No
21.2% Don't Know

Social Indicators Study Appendix

3. If you answered 'Yes' above, where does your rain water drain to?

Lower wetland
Absorbed into ground
River
Coffee Creek
Ground
Some to city drains, other to ground
Retention pond
Water table
Coffee creek watershed
Local retention pond
It goes into our pond and if the pond overflows {which is seldom} it goes thru a culvert into a marshy area on church property
Storm sewer to retention pond
Ditch behind property
The grass
Pope O'Connor Ditch
Storm sewer or into the ground
Storm sewer
Into sewer grates near the front and side yard
Storm drain
Retention pond
Little cal river
Into public sewers
Runs to the creek just to the south of our home
City water
Ground
Into a wetland
Coffee Creek and Chubb Lake
Drainage ditches, creeks, and ultimately to Lake Michigan
Next door and street to street drains
Streams
Salt Creek?
Ditches
Porter water plant
Porter water plant
Porter water plant
Sewer lift station
Little Calumet River
Sand Creek
Most ends up in town storm water system
From wake robin to little calumet river
Creeks at either ends of the street

My basement
South to farm acreage
Little Calumet River
In front to city sewer in back to ditch
To river but house is on 3.8 arc
Ditch on south side I-94
Storm sewer in roadway
County sewer
Carlson Pond
Storm ditches
West to a marsh
Lake Michigan
Farmers field
In the ground
Pope ditch
Into storm drain in street
We live in the country - drains eventually into a creek
Storm drain into yard
Aquifer
Local ditch
Storm water pipes direct to sand creek to little calumet
Supposed to drain to the pope O'Connor ditch, but I do not think it does from my yard. To much scrub plants and woods stopping it
The Ground
Into Coffee Creek
Coffee Creek
To a pond and in the ground
Little Calumet
Porter, IN. Sewers then into LCEB
Storm sewers
Sewer
Coffee Creek
Into the Little Calumet
The street and then to a stream
Coffee Creek
Little Calumet River
It drains to the bottom of our lot {we are on a hill, ridge} when there is a small pond on our neighbors property
Storm sewers
Street drains
Coffee Creek - stream runs behind me
Storm Drain
Town storm sewer
Ground-fields
Back into sky- down to ground water- LC River
Water retention area

Sewer at curb - then back to water shed
Storm sewer - city water
Creek @ back of property and Kemper ditch
Into retention pond in my front yard
Ground or neighbors property {north}
In the ground
Storm drain - Little Calumet River
Ditch
Runs into a swale in back or the street in front to the west into a small lake
To storm sewer
Into our wells, and rivers, and lakes
Over the land
The public rain drainage system {we are on a hill}
To the back ditch
Local creek to Little Calumet River
Eventually, Lake Michigan
Sewer then not sure
Storm drain
County ditch to neighboring stream
Our local creek
Coffee Creek
My yard
The ground into aquifer
Coffee Creek
Mud Lake
It sits in my backyard
Wetland to the south
To an illegal wetland
The beginning of Coffee Creek in Jackson TWSP
Swamp areas of our property
Pond, little Cal River
Ground
To front run off ditch which runs into creek
Sewers
Storm sewer inlet at Porter Ave. then north
Rivers and streams
Little Calumet River
To the wetland
Maybe east branch Little Calumet R.
Into the woods
Goes to the river
Yard and street
Drains North to creek just West {near Rice Lake}
Into Chesterton water plant or if full spills into creeks leading to Lake Michigan
Peterson ditch, Little Cal, Lake Michigan
Percolate

To the east of my property, a low swampy area
Wetland conservation area
Griffin Lake
Retention pond - creek
Carver ditch via underground drain pipes
In to coffee creek, but 99 percent stays on my property
Storm water intakes
A drain {storm drain} @ the junction of street and driveway
Drainage ditch
Storm drain
Into the ground or sewer-storm run off
Lake Michigan
My front yard and neighbors pond
Into the town storm sewer or soaks into lawn
I believe it goes to the storm sewer located in the back corner of our property
Wetlands - greater than Little Cal
Storm sewers
Low lying area

2. Rain Garden: If the practice is not relevant, please explain why.

Large parcel with plenty of natural drainage
My property is a farm field with no structures
No garden
No garden
Not a rain garden but permanent plantings 3 sides of home to absorb water
Small yard
no room
RURAL AREA
no gardens
water drains away swiftly into ground
stream behind me
Do not Garden
Live in the dunes, sand base
my property is a hay field
No garden
I do not collect
space not available-mosquitos
not enough yard
no garden at present
yard is large and absorbs water well

14. Phosphate-Free Fertilizer: If the practice is not relevant, please explain why.

do not fertilize
do not fertilize
Don't use fertilizer
I rent the property
We do not fertilize
No Major Pollution
do not use fertilizer
Do not farm
Do not fertilize but if decide to will watch ingredients
Do not fertilize
do not fertilize
do not use fertilizer
I do not use lawn fertilizers
do not fertilize
we do not use any fertilizer
We do not fertilize
Do not fertilize
I do not farm- do not fertilize farm plants
I do not fertilize my property
not a farmer
not interested
do not fertilize
don't use fertilizer
like weeds
I do not fertilizer
Do not use fertilizer
do not use fertilizer
Do not use fertilizer
do not ever fertilizer
do not use fertilizer
I do not farm my property- I rent it out
not farming
not farming
use prof. service
do not use any fertilizer
do not use any
do not use fertilizer
we use no fertilizer
do not use fertilizer in laws or garden

26. Proper Pet Waste Disposal: If the practice is not relevant, please explain why.

I dispose of pet waste in trash
No pets
No pets
No pets
cats
do not own a pet
No pets
No Animals
no pets
no pets
No Pets
no pets
I have no pets.
No pets or animals
No animals
No Pets
Do not own pet
No pets or horses
I do not have a farm
No Animals
no pets
no pets
I do not have pets
No pets, horses, etc.
Have no pets
no pets
no pets
no pets
no pets
no pets
no pets
no pets
no pets
no pets
No pets
No pet
Do not own animals
do not farm
no pets
no animals
no pet waste
do not have pet
no pets
do not own any

no pet
Have dogs - Not cattle
no pets
do not have horses
property does not drain to waterways
no animals
I have no pets
no pet
No Animals
business location-no animals
have no pets
no dogs
no pets
No pets
no pets
no pets
do not have animals
We do not have animals
not a farmer-no pets
we have no pets
we have a dog that is 1.5 lbs
no pets
have no pets
do not have pets
I have 1-2 acre residential, no farm animals
no animals
do not have a pet
no animals
No pets
no animals
no outside pets
no pets
no pets
No pets
no pets
No pets
very small pet dog
not a farmer
no animals
no pets
no animals presently
2 cats - only and always outside
do not have pet
Do not own a pet
do not have pets

38. Rain Barrel: If the practice is not relevant, please explain why.

Barrels fill up so fast it is useless. A 55 gal. drum fills in minutes in a big rain. Unless you store hundreds of gallons, it's a joke
Live on lake
I never water anything
Do not water
have sprinkler system
no gutters
do not water my plants
absorbed by property
good gutters and good water shed
storm water absorbed by yard

6. What is your occupation?

medical
programmer
Retired
Vice President
Computer tech
Consultant
retired
auto repair
Broker
chemist
technical sales
Manager of Manufacturing
Technology
Homemaker
Retired
Small Business Owner
Retired
Bus driver-cashier-sales
Retired
Data center manager
retired
Teacher
retired
dental office
retired
retired

Disabled
military
Park Ranger
teacher
Accountant
steel sales
Retired
Retired
Education - teachers
Supervisor
pipefitter
steelworker
laborer and landscaper
millwright
Electrician and AC tech
retired
Office Staff
Art Teacher and Egg Grower
Sales
Sales
Sales
Nursing
education
Retired
educator
millwright
retired teacher
Engineer
Retired
teacher
construction
truck driver
retired power plant mechanic
steel mills
housewife
construction estimator
HR supervisor
steel worker
homemaker
sales
retired
teacher
researcher at museum

retired
baker
retired
teacher
at-home-mother
retired
forestry
millwright
retired
Self Employed
Bus Repair
Retired with a part-time job + rental property
teacher
retired
maintenance supervisor
retired
medical assistant
electrician
retired public school teacher
retired
manufacturing
retired
retired
retired
Environmental Scientist
retired
retail
welder
retired
steel worker
insurance agent
steel worker
retired
retired
Accountant-Administrator
business owner
drafter
retired
retied
business owner
retired
pharmacist
executive assistant-secretary

military
engineer
retired
Financial Advisor
retired
retired
business owner
college prof.
home health aide
operations manager
housewife
retired
retired
carpenter
farmer
retail sales
editor
sheet metal worker
custody officer
trucking manager
RE development
retired
housewife
retired educator
domestic
stay at home mom --_ husband is an electrician
firefighter
retired
veterinarian
environmental scientist
inside sales rep
retired teacher
production worker
self employed
craneman
retired
retired
homemaker
landscape architect
steel worker
retired
disability
retired

shipping supervisor
teacher aide
retired
house wife
retired
retired
retired
teacher
union millwright
consultant
retired engineer
steelworker
RN
librarian
electrical cont.
retired
social worker
engineer
millwright
teacher
retired
ret.
maintenance
retired
bus driver
power plant operator
retired educator
housewife
retired educator
retired printer
house maker
aquatic biologist
artist
factory worker
attorney
business owner
retired journalist
retired
teacher
carpenter
self employment
retired
supervisor

electrician
sales

Appendix 2. Endangered, Threatened, and Rare Species

ENDANGERED, THREATENED, AND RARE SPECIES
VASCULAR PLANTS
CURRENT RECORDS – 1951 TO PRESENT

SPECIES NAME	COMMON NAME	STATE STATUS	FED STATUS	HABITAT
Actaea rubra	Red baneberry	SR	**	Wetland
Andromeda glaucophylla	Bog rosemary	SR	**	Wetland
Arenaria stricta	Michaux's stitchwort	SR	**	Sand Dune, Prairie
Botrychium matricariifolium	Chamomile grape-fern	SR	**	Sand Dune, Forest
Calla palustris	Wild calla	SE	**	Wetland
Carex atlantica capillacea	Howe sedge	SE	**	Wetland
Carex leptonervia	Finely-nerved sedge	SE	**	Wetland, Forest
Carex pedunculata	Longstalk sedge	SR	**	Forest, Floodplain
Carex scabrata	Rough sedge	SE	**	Wetland, Forest
Chrysosplenium americanum	American golden-saxifrage	ST	**	Wetland
Cypripedium calceolus	Small yellow lady's-slipper	SR	**	Forest
Cypripedium candidum	Small white lady's-slipper	SR	**	Prairie, Wetland
Diervilla lonicera	Northern bush-honeysuckle	SR	**	Forest
Eriophorum angustifolium	Narrow-leaved cotton-grass	SR	**	Wetland
Eriophorum gracile	Slender cotton-grass	ST	**	Wetland
Juglans cinerea	Butternut	WL	**	Forest
Juncus articulatus	Jointed rush	SE	**	Wetland
Juncus balticus littoralis	Baltic rush	SR	**	Wetland
Lycopodium hickeyi	Hickey's clubmoss	SR	**	Forest
Malaxis unifolia	Green adder's-mouth	SE	**	Wetland
Panax trifolius	Dwarf ginseng	WL	**	Forest
Pinus banksiana	Jack pine	SR	**	Forest
Pinus stobus	Eastern white pine	SR	**	Forest

SPECIES NAME	COMMON NAME	STATE STATUS	FED STATUS	HABITAT
Platanthera hyperborean	Leafy northern green orchid	ST	**	Wetland, Forest
Poa alsodes	Grove meadow grass	SR	**	Forest
Potamogeton vaseyi	Vasey's pondweed	SE	**	Aquatic
Sparganium androcladum	Branching bur-reed	ST	**	Aquatic
Spiranthes lucida	Shining ladies'-tresses	SR	**	Wetland
Utricularia geminiscapa	Hidden-fruited bladderwort	SE	**	Wetland
Valerianella chenopodiifolia	Goose-foot corn-salad	SE	**	Forest
Viburnum opulus americanum	Highbush-cranberry	SE	**	Forest, Wetland

STATE EX – Extirpated SE – Endangered ST – Threatened SR – Rare SC – Special concern
WL – Watch list SG - Significant ** - Rarity warrants concern

FEDERAL LE – Endangered LT – Threatened CA – Candidate ** - Not listed

ENDANGERED, THREATENED, AND RARE SPECIES
MAMMALS AND BIRDS

SPECIES NAME	COMMON NAME	STATE STATUS	FED STATUS	HABITAT
Condylura cristata	Star-nosed mole	**SC**	**	Wetlands
Spermophilus franklinii	Franklin's ground squirrel	**SE**	**	Prairie
Taxidea taxus	American badger	**SE**	**	Prairie, Forest
Ammodramus henslowii	Henslow's sparrow	**SE**	**SC**	Prairie
Ardea alba	Great egret	**SC**	**	Wetland
Ardea herodias	Great blue heron	**	**	Wetland
Botarurus lentiginosus	American bittern	**SE**	**	Wetland
Cistothorus platensis	Sedge wren	**SE**	**	Wetland
Dendroica cerulean	Cerulean warbler	**SE**	**SC**	Forest
Dendroica virens	Black-throated green warbler	**	**	Forest
Ixobrychus exilis	Least bittern	**SE**	**	Wetland
Lanius ludovicianus	Loggerhead Shrike	**SE**	**SC**	Prairie
Lasiurus borealis	Eastern Red bat	**SC**	**	Forest
Lasiurus cinereus	Hoary Bat	**SC**	**	Forest
Lynx rufus	Bobcat	**SC**	**	Forest, Prairie
Myotis lucifugus	Little Brown bat	**SC**	**	Forest
Myotis sodalis	Indiana Bat	**SE**	**LE**	Forest
Nycticorax nycticorax	Black-crowned night heron	**SE**	**	Wetland
Pipistrellus subflavus	Eastern pipistrelle	**SC**	**	Forest
Rallus elegans	King rail	**SE**	**	Wetland
Vermivora chrysoptera	Golden-winged warbler	**SE**	**	Forest, Wetland
Wilsonia canadensis	Canada warbler	**	**	Forest
Wilsonia citrine	Hooded Warbler	**SC**	**	Forest

STATE EX – Extirpated SE – Endangered ST – Threatened SR – Rare SC – Special concern
WL – Watch list SG - Significant ** - Rarity warrants concern

FEDERAL LE – Endangered LT – Threatened CA – Candidate ** - Not listed

ENDANGERED, THREATENED, AND RARE SPECIES
AMPHIBIANS AND REPTILES

SPECIES NAME	COMMON NAME	STATE STATUS	FED STATUS	HABITAT
Ambystoma laterale	Blue-spotted salamander	SC	**	Forest
Clemmys guttata	Spotted turtle	SE	**	Wetland, Aquatic
Emydoidea blandingii	Blandings turtle	SE	**	Wetland, Aquatic
Necturus maculosus	Common mudpuppy	SC	**	Aquatic
Rana pipiens	Northern leopard frog	SC	**	Wetland

ENDANGERED, THREATENED, AND RARE SPECIES
INSECTS

SPECIES NAME	COMMON NAME	STATE STATUS	FED STATUS	HABITAT
Aeshna mutate	Spatterdock darner	SR	**	Wetland
Sympetrum semicimctum	Band-winged meadowhawk	ST	**	Wetland

STATE EX – Extirpated SE – Endangered ST – Threatened SR – Rare SC – Special concern
WL – Watch list SG - Significant ** - Rarity warrants concern

FEDERAL LE – Endangered LT – Threatened CA – Candidate ** - Not listed

Appendix 3. Description of Study Sites

2012 Baseline Sampling Sites						
SITE ID	IDEM Site #	County	Latitude (DD)	Longitude (DD)	Stream Name	Description
1	LMG060-0005	Porter	41.6125	-87.173889	Burns Waterway	CRISMAN RD
2	LMG-03-0002	Porter	41.599583	-87.146438	Salt Creek Outlet	US HWY 20
3	LMG-04-0043	Porter	41.611505	-87.150245	Little Calumet River East Branch 11	IN DUNES NATIONAL LAKESHORE
4	LMG-04-0044	Porter	41.612456	-87.147137	Samuelson Ditch Downstream	IN DUNES NATIONAL LAKESHORE
5	LMG060-0008	Porter	41.616944	-87.126111	Little Calumet River East Branch 10	SR 149
6	LMG-04-0001	Porter	41.622533	-87.094516	Little Calumet River East Branch 9	HOWE RD
7	LMG-04-0002	Porter	41.620309	-87.091617	Peterson Ditch Downstream	HOWE RD
8	LMG-04-0003	Porter	41.607661	-87.094115	Peterson Ditch Upstream	OLD PORTER RD
9	LMG-04-0004	Porter	41.622104	-87.087075	Little Calumet River East Branch 8	HOWE RD
10	LMG-04-0005	Porter	41.62219	-87.067504	Little Calumet River East Branch 7	WAVERLY RD
11	LMG-04-0006	Porter	41.621305	-87.049151	Little Calumet River East Branch 6	CALUMET RD
12	LMG-04-0007	Porter	41.617223	-87.050261	Coffee Creek 6	CALUMET RD
13	LMG-04-0008	Porter	41.608867	-87.049684	Coffee Creek 5	MORGAN AVE - COFFEE CREEK PARK
14	LMG-04-0009	Porter	41.599712	-87.048395	Pope O'Connor Ditch Downstream	CALUMET RD
15	LMG-04-0010	Porter	41.586329	-87.061366	Pope O'Connor Ditch Upstream	CR 1050 N
16	LMG-04-0011	Porter	41.593686	-87.040189	Coffee Creek 4	CR 1100 N
17	LMG-04-0012	Porter	41.57013	-87.030305	Johnson Ditch	UNNAMED ROAD
18	LMG-04-0013	Porter	41.571135	-87.027963	Coffee Creek 3	CR 200 E
19	LMG-04-0014	Porter	41.573136	-87.028068	Shooter Ditch	CR 200 E
20	LMG-04-0015	Porter	41.555632	-87.007617	Coffee Creek 2	MANDER RD
21	LMG-04-0016	Porter	41.542129	-87.003628	Coffee Creek 1	OLD SUMAN ROAD
22	LMG-04-0017	Porter	41.616913	-87.03231	Lower Sand Creek	INDIAN BOUNDARY RD
23	LMG-04-0018	Porter	41.585804	-87.009135	Middle Sand Creek	CR 1050 N
24	LMG-04-0019	Porter	41.571279	-86.989096	Upper Sand Creek	CR 400 E
25	LMG-04-0020	Porter	41.616947	-87.022035	Little Calumet River East Branch 5	WOODLAN RD
26	LMG-04-0021	Porter	41.62249	-87.010524	CR 1200 N Tributary	CR 1300 N
27	LMG-04-0022	Porter	41.606911	-86.989634	Rice Lake Outlet	CR 1200 N
28	LMG-04-0023	Porter	41.593937	-86.989876	Mar Mac Lake Creek	CR 400 E
29	LMG-04-0024	Porter	41.593799	-86.975069	Rice Lake Inlet East	CR 475 E

2012 Baseline Sampling Sites						
SITE ID	IDEM Site #	County	Latitude (DD)	Longitude (DD)	Stream Name	Description
30	LMG-04-0025	Porter	41.609392	-86.980248	CR 450 E Tributary	CR 450 E
31	LMG-04-0026	Porter	41.622471	-86.987077	CR 1300 N Tributary	CR 1300 N
32	LMG-04-0027	Porter	41.623877	-86.980522	Little Calumet River East Branch 4	CR 450 E
33	LMG-04-0028	Porter	41.6274	-86.951488	Little Calumet River East Branch 3	600 E
34	LMG-04-0029	Porter	41.629716	-86.941804	Carver Ditch Downstream	CR 1350 N
35	LMG-04-0030	Porter	41.64406	-86.951364	Kelleys Ditch	CR 600 E
36	LMG-04-0031	Porter	41.651302	-86.941878	Carver Ditch Upstream	CR 1500 N
37	LMG-04-0032	Porter	41.651432	-86.9325	Kemper Ditch	CR 1500 N
38	LMG-04-0033	Porter	41.617216	-86.946359	Massauga Creek Downstream	CR 1275 N
39	LMG-04-0034	Porter	41.606993	-86.948035	Spring Branch	CR 1200 N
40	LMG-04-0035	Porter	41.602435	-86.936543	Massauga Creek Upstream	CR 1200 N
41	LMG-04-0036	Porter	41.61722	-86.941943	Reynolds Creek Downstream	CR 1275 N
42	LMG-04-0037	Laporte	41.598106	-86.92209	Reynolds Creek Upstream	SNYDER RD
43	LMG-04-0038	Porter	41.621951	-86.932241	Little Calumet River East Branch 2	COUNTY LINE RD
44	LMG-04-0039	Laporte	41.612775	-86.906092	Little Calumet River East Branch 1	OTTIS RD
45	LMG-04-0040	Laporte	41.599986	-86.895417	Lake Lee Outlet	SNYDER RD
46	LMG-04-0041	Laporte	41.614002	-86.885886	Walton Lake Outlet	HOMESVILLE RD
47	LMG-04-0042	Laporte	41.602372	-86.880367	Round Lake Outlet	HOMESVILLE RD
48	LMG-04-0045	Porter	41.6194	-87.1453	Samuelson Ditch Upstream	US-12 (N side of South Shore RR)
49		Porter	41.35443	-86.59391	Mar Mac Lake Inlet	CR 450 E
50		Porter	41.35441	-86.59511	Mar Mac Lake Outlet	CR 450 E

Appendix 4. Water Quality Data

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
11/28/11	3	9.0	11.0	8.01	<0.1	0.5	0.12	21	387.3	36
1/3/12	3	5.7	14.2	8.04	0.3	0.6	0.05	12	72.8	44
2/6/12	3	7.3	13.3	8.18	0.1	0.7	<0.03	4	26.6	41
3/5/12	3	8.3	12.7	8.23	0.2	0.7	<0.05	5	38.8	43
4/2/12	3	15.5	10.6	8.22	0.2	0.7	<0.05	<10	14.6	32
4/30/12	3	17.1	9.0	7.96	0.2	0.8	0.08	<10	39.3	35
6/4/12	3	21.9	7.8	8.05	0.2	1	0.07	<10	88.6	39
6/12/12	3	26.2	7.9	8.14						
7/2/12	3	27.5	6.6	7.94	0.2	0.78	0.06	<10	64.4	33
8/6/12	3	27.7	7.2	8.04	0.2	0.6	0.08	<10	78.4	29
8/6/12	3	28.4	7.4	8.05						
9/10/12	3	23.9	7.9	8.21	0.2	1	0.10	10	150	37
10/1/12	3	22.4	7.9	8.02	0.2	0.7	<0.05	<10	60.9	30
11/13/12	3	13.6	10.8	8.35	0.3	0.8	0.06	<10	86	23
11/28/11	4	14.2	9.4	8.12	0.3	0.4	0.04	6	5.2	30
1/3/12	4	8.9	12.4	8.09	0.4	0.4	0.04	7	7.2	40
2/6/12	4	9.7	12.6	8.37	0.3	0.4	<0.03	4	13.2	34
3/5/12	4	12.0	10.9	8.35	0.4	0.5	<0.03	4	6.3	35
4/2/12	4	17.3	8.9	8.17	0.3	0.4	<0.05	<10	2	28
4/30/12	4	18.8	8.6	7.91	0.3	0.5	0.06	<10	13.5	26
6/4/12	4	24.6	7.8	8.03	0.2	0.4	<0.05	<10	29.9	28
6/12/12	4	27.1	7.8	7.88						
8/6/12	4	29.6	7.7	8.10	0.2	0.3	0.07	<10	26.5	29
8/6/12	4	29.7	7.3	7.95						
9/10/12	4	27.3	7.4	8.20	0.2	0.4	0.07	<10	12.1	26
10/1/12	4	24.0	7.3	8.07	0.2	0.3	0.06	<10	7.5	25
11/13/12	4	15.2	9.3	8.18	0.4	0.5	<0.05	13	13.2	27
12/1/11	5	2.7	11.8	8.25	<0.1	0.7	0.06	10		43
1/17/12	5	2.7	12.7	8.26	<0.1	0.8	0.05	15		89
2/23/12	5	3.1	12.7	8.37	<0.1	1.1	<0.03	5	260	67
3/20/12	5	16.8	8.4	8.37	<0.1	1.3	0.04	17	100	56
4/19/12	5	14.1	8.7	8.12	<0.1	1.3	0.04	13	64	55
5/22/12	5	16.1	8.5	8.18	<0.1	1.5	0.10	29	550	49
6/5/12	5	19.9	8.5	8.16						
6/26/12	5	18.2	7.9	8.23	<0.1	2.6	0.07	23	200	63
7/24/12	5	24.3	6.8	8.17	<0.1	2.3	0.09	34	920	62
8/13/12	5	19.1	7.8	7.71						

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
8/14/12	5	18.2	8.1	8.21	<0.1	2	0.10	40	1000	60
9/26/12	5	14.3	9.0	8.09	<0.1	2.6	0.05	19	550	61
10/16/12	5	10.7	9.2	8.00	<0.1	1.3	0.06	14	320	49
11/20/12	5	7.7	10.6	8.00	<0.1	1.9	0.03	7	140	58
11/28/11	6	6.5	11.0	7.85	<0.1	0.5	0.17	19	387.3	38
1/3/12	6	0.0	14.3	8.07	<0.1	0.6	0.05	7	83.9	47
2/6/12	6	2.7	14.0	8.27	<0.1	1.2	0.03	6	108.1	49
3/5/12	6	2.5	14.1	8.14	<0.1	0.9	<0.03	6	95.9	54
4/30/12	6	11.7	9.3	7.91	<0.1	0.9	0.10	11	248.1	41
6/4/12	6	18.7	8.0	7.94	<0.1	1.2	0.15	17	285.1	40
6/7/12	6	20.2	7.4	8.28						
7/2/12	6	23.2	6.9	7.48	<0.1	2	0.19	18	387.3	45
8/6/12	6	22.6	7.6	8.01	<0.1	1.1	0.21	15	435.2	38
8/13/12	6	18.8	7.2	7.75						
9/10/12	6	14.6	9.2	7.91	0.1	0.7	0.14	<10	307.6	110
10/1/12	6	13.8	9.0	8.05	<0.1	2.9	0.15	10	290.9	48
11/13/12	6	7.0	11.9	7.96	<0.1	1	0.06	<10	186	38
11/28/11	7	6.8	10.8	7.74	<0.1	0.3	0.10	5	365.4	64
1/3/12	7	1.4	14.5	7.87	<0.1	0.5	0.04	<4	35.4	106
2/6/12	7	3.3	15.7	8.21	<0.1	0.3	<0.03	<4	67	102
3/5/12	7	4.6	14.3	8.00	<0.1	0.3	<0.03	4	21.6	114
4/2/12	7	13.3	13.4	8.38	<0.1	0.2	<0.05	<10	57.3	100
4/30/12	7	11.8	9.7	7.81	<0.1	0.5	0.11	<10	547.5	95
5/18/12	7	15.2	9.5	8.33						
6/4/12	7	18.3	9.3	7.83	<0.1	0.7	0.10	<10	178.9	140
7/2/12	7									
8/6/12	7									
8/6/12	7	21.6	8.8	7.85						
9/10/12	7	17.3	8.1	7.94	<0.1	1.3	0.14	17	461.1	46
10/1/12	7									
11/13/12	7	5.8	11.3	7.77	<0.1	0.6	0.08	<10	613.1	100
6/19/12	7	22.8	7.9	7.86	0.10	0.68	<0.1	4.4	689.6	
6/26/12	7	19.8	9.0	7.97		0.73	<0.1	3.6	774.6	
7/2/12	7	22.6	7.7	7.77	0.087	0.65	<0.1	4.4	976.8	
7/10/12	7	21.3	9.8	8.02		0.75	<0.1	4.2	476.4	
7/17/12	7	22.3	7.6	7.81	0.095	0.67	0.19	4.2	1454.0	
7/19/12	7	23.4	6.1	7.39		0.83	0.18	19	11000.0	
7/19/12	7	23.5	6.1	7.40	Dup at 38				6400.0	
7/24/12	7	22.4	6.4	7.53	0.2	0.64		11	7945.2	
7/31/12	7	22.0	6.6	7.46	0.097	0.65	0.13	9.8	9678.4	
8/7/12	7	21.4	8.0	7.86	0.07	0.68	<0.1	2.4	1960.8	
8/14/12	7	20.0	7.3	7.7		<0.5	<0.1	<2	1844.4	

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11/28/11	8	7.0	10.3	7.53	<0.1	0.3	0.07	<4	146.7	57
1/3/12	8	2.0	15.0	7.59	<0.1	0.4	0.04	<4	62	77
2/6/12	8	3.8	15.1	7.92	<0.1	0.4	<0.03	4	47.9	83
3/5/12	8	5.8	13.6	7.55	<0.1	0.3	<0.03	<4	27.9	101
4/2/12	8	14.0	13.4	7.72	<0.1	0.4	0.07	<10	67.7	21
4/30/12	8	11.8	10.5	7.6	<0.1	0.5	0.10	<10	579.4	79
6/4/12	8	15.9	5.6	7.62	0.2	1.1	0.17	<10	187.2	86
6/4/12	8	15.7	5.5	7.82						
7/2/12	8	18.3	4.5	7.54	0.2	1	0.18	<10	579.4	57
8/6/12	8	18.0	4.8	6.55						
9/10/12	8	15.7	5.0	7.95	0.1	1.5	0.30	<10	1046.2	70
10/1/12	8	13.1	5.9	7.59	<0.1	1.6	0.20	<10	137.6	73
11/13/12	8	6.5	7.1	7.79	<0.1	1.2	0.17	13	178.5	69
11/28/11	9	6.4	10.0	7.86	<0.1	0.6	0.16	18	613.1	39
1/3/12	9	0.1	14.4	8.03	<0.1	0.8	0.06	5	123.4	45
2/6/12	9	2.8	14.1	8.27	<0.1	1.2	0.03	4	25.6	49
3/5/12	9	2.6	14.1	8.6	<0.1	1.1	<0.03	9	83.6	55
4/2/12	9	11.5	11.5	8.27	<0.1	1.3	0.07	<10	37.3	48
4/30/12	9	11.5	9.3	7.84	<0.1	1.2	0.11	10	165.8	44
6/4/12	9	18.8	8.3	7.96	<0.1	1.2	0.12	14	344.8	40
6/6/12	9	17.2	8.5	8.13						
7/2/12	9	23.8	7.5	7.94	<0.1	1.2	0.11	14	435.2	40
8/6/12	9	22.4	7.6	8.02	<0.1	1.1	0.18	17	579.4	39
8/6/12	9	22.9	7.4	7.84						
9/10/12	9	17.5		8.14	0.1	1	0.12	19	488.4	43
10/1/12	9	14.0	9.6	8.07	<0.1	1.3	0.11	12	298.7	41
11/13/12	9	7.0	11.8	8.12	<0.1	0.8	0.12	<10	146.7	39
6/26/12	9	21.5	7.6	8.08		1.3	<0.1	17	615.2	
7/2/12	9	24.2	7.1	7.97	0.069	1.4	<0.1	16	402.8	
7/10/12	9	24.6	7.1	8.03		1.3	<0.1	14	396.6	
7/17/12	9	27.0	6.0	7.94	0.071	1.3	<0.1	13	402.8	
7/19/12	9				0.1	1	0.14	49	9400	
7/24/12	9	24.4	6.1	7.87	0.097	2.3		24	1461.6	
7/31/12	9	24.1	6.3	7.86	0.15	1.6	<0.1	21		
8/7/12	9	23.1	6.9	7.91	0.061	1.3	<0.1	19	334.0	
8/14/12	9	19.8	7.6	7.95			0.11	22	471.2	
11/28/11	10	6.4	10.2	7.88	<0.1	0.6	0.16	20	228.2	38
1/3/12	10	0.5	14.7	8.07	<0.1	1	0.07	7	167.4	46
3/5/12	10	3.2	14.6	8.22	<0.1	1.2	<0.03	6	172.5	53
4/2/12	10	11.6	11.4	8.28	<0.1	1.3	0.07	<10	50.4	43
4/30/12	10	11.7	9.3	7.76	<0.1	1.5	0.13	12	275.5	40
6/4/12	10	18.0	8.5	7.99	<0.1	2.5	0.11	12	218.7	41
6/5/12	10	16.0	10.0	8.11						
7/2/12	10	23.1	7.7	7.85	<0.1	2.6	0.21	14	488.4	40

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8/6/12	10	22.3	7.9	8.02	<0.1	2.5	0.19	25	435.2	44
8/13/12	10	18.4	8.0	7.81						
9/10/12	10	16.8	9.2	8.16	<0.1	2.2	0.15	13	325.5	45
10/1/12	10	13.5	9.7	8.08	<0.1	3.1	0.16	10	410.6	43
11/13/12	10	6.7	11.5	8.13	<0.1	1.5	0.06	<10	161.6	35
11/28/11	11	6.3	10.0	7.85	<0.1	0.3	0.16	17	249.5	31
1/3/12	11	0.6	15.4	8.11	<0.1	0.2	0.04	7	3.0	34
2/6/12	11	3.2	15.3	8.38	<0.1	0.2	<0.03	5	22.3	33
3/5/12	11	4.2	15.2	8.3	<0.1	0.2	<0.03	7	5.2	37
4/2/12	11	13.1	12.0	8.39	<0.1	<0.1	0.06	11	35.9	28
4/30/12	11	12.5	9.3	7.87	<0.1	<0.1	0.10	10	133.3	29
6/4/12	11	19.5	8.8	8.01	<0.1	0.1	0.15	19	214.2	31
6/5/12	11	16.0	8.3	8.15						
7/2/12	11	24.3	7.6	7.98	<0.1	0.13	0.10	20	461.1	29
8/6/12	11	23.6	7.8	8	<0.1	0.1	0.23	27	307.6	29
8/14/12	11	17.0	7.6	7.78						
9/10/12	11	16.6	8.5	8.12	0.1	<0.1	0.16	16	461.1	30
10/1/12	11	12.3	9.0	8.03	<0.1	<0.1	0.12	16	325.5	26
11/13/12	11	6.4	11.1	8.08	<0.1	<0.1	<0.05	<10	78.0	29
11/28/11	12	6.3	11.5	8.05	<0.1	0.4	0.06	6	325.5	51
1/3/12	12	0.1	15.6	8.16	<0.1	0.2	<0.03	4	13.4	53
2/6/12	12	2.7	14.8	8.33	<0.1	0.2	<0.03	5	95.9	54
3/5/12	12	3.4	14.2	8.17	<0.1	0.2	<0.03	5	16.1	71
4/2/12	12	12.6	12.0	8.39	<0.1	<0.1	<0.05	<10	52.0	45
4/30/12	12	12.0	9.6	7.91	<0.1	<0.1	0.08	<10	488.4	37
6/4/12	12	18.7	8.5	7.96	<0.1	0.1	0.10	12	290.9	35
6/4/12	12	19.2	8.4	8.41						
7/2/12	12	23.8	8.1	8.03	<0.1	0.14	0.07	<10	816.4	30
8/6/12	12	22.9	8.9	8.18	<0.1	<0.1	0.12	<10	579.4	29
8/7/12	12	20.3	7.3	8.01						
8/7/12	12	20.3	7.3	8.01						
9/10/12	12	16.9	9.3	8.14	0.1	<0.1	0.11	<10	410.6	32
10/1/12	12	12.9	10.0	8.07	<0.1	<0.1	0.08	<10	344.8	28
6/11/12	12	20.8	6.7	8.12		0.18	<0.1	33	922.2	
6/19/12	12	22.1	6.5	8.03	0.26	<0.5	<0.1	29	1034.4	
6/26/12	12	18.0	7.7	8.15		0.14	<0.1	31	976.8	
7/2/12	12	21.7	6.7	8.03	0.095	0.18	<0.1	26	1095.0	
7/10/12	12	21.4	6.6	7.98		0.16	0.11	34	922.2	
7/17/12	12	24.2	6.2	7.97	0.068	0.17	<0.1	16	651.0	
7/19/12	12	23.6	5.6	7.64	0.11	0.45	0.24	100	9000.0	
7/24/12	12	23.9	6.4	7.84	0.19	0.29		73	5654.4	
7/31/12	12	22.3	6.3	7.87		0.33	0.10	30		
8/7/12	12	20.3	6.9	8.03	0.071	0.16	<0.1	17	1397.6	
8/14/12	12	17.7	7.8	8.05		0.14	<0.1		1549.2	

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11/28/11	13	6.2	11.6	8.05	<0.1	0.4	0.04	4	290.9	50
1/3/12	13	0.1	14.9	8.15	<0.1	0.2	<0.03	4	18.3	48
2/6/12	13	2.8	14.3	8.31	<0.1	0.2	<0.03	7	99.0	52
3/5/12	13	4.1	13.7	8.18	<0.1	0.2	<0.03	5	18.9	62
4/2/12	13	13.5	12.1	8.42	<0.1	<0.1	<0.05	<10	43.9	42
4/30/12	13	12.1	9.6	7.98	<0.1	0.1	0.11	12	365.4	44
6/4/12	13	19.2	8.3	8.09	<0.1	<0.1	0.10	<10	365.4	31
6/4/12	13	19.6	8.2	8.42						
7/2/12	13	24.4	7.9	8.08	<0.1	0.12	0.07	<10	579.4	29
8/6/12	13	23.3	8.2	8.17	<0.1	<0.1	0.15	<10	517.2	26
8/7/12	13	20.3	8.2	8.06						
9/10/12	13	17.5	9.0	8.31	<0.1	<0.1	0.10	<10	344.8	29
10/1/12	13	13.0	10.1	8.21	<0.1	<0.1	<0.05	<10	727.0	26
11/13/12	13	6.3	12.1	8.14	<0.1	<0.1	<0.05	<10	65.0	27
11/28/11	14	6.4	9.6	7.67	<0.1	0.8	0.06	<4	272.3	113
1/3/12	14	0.7	15.3	7.85	<0.1	0.5	<0.03	4	90.6	128
2/6/12	14	2.5	16.6	8.16	<0.1	0.4	<0.03	<4	290.9	140
4/2/12	14	16.6	15.4	8.52	<0.1	<0.1	<0.05	<10	30.5	140
4/30/12	14	12.9	9.0	7.21	<0.1	<0.1	0.08	11	285.1	120
6/4/12	14	21.5	9.9	7.93	0.2	0.5	0.21	<10	90.6	120
6/4/12	14	22.3	8.3	8.17						
7/2/12	14	27.9	3.1	7.66	1.6	0.14	0.59	<10	307.6	73
8/6/12	14	25.7	5.2	7.71	0.3	0.3	0.27	<10	290.9	92
8/7/12	14	22.4	5.3	7.51						
9/10/12	14	19.4	8.1	8.11	0.1	0.2	0.18	<10	686.7	71
10/1/12	14	13.8	7.4	7.92	<0.1	<0.1	0.14	<10	517.2	180
11/13/12	14	6.9	9.6	7.95	<0.1	<0.1	0.14	20	290.9	84
11/28/11	15	6.2	9.3	7.46	<0.1	0.9	0.05	<4	260.3	128
2/6/12	15	2.0	16.8	7.98	<0.1	0.6	<0.03	<4	18.7	134
3/5/12	15	5.8	15.1	7.75	<0.1	0.6	<0.03	<4	6.3	152
4/2/12	15	13.5	19.9	7.63	<0.1	<0.1	<0.05	<10	20.9	160
4/30/12	15	12.4	10.3	7.62	<0.1	<0.1	0.05	<10	235.9	170
6/4/12	15	18.3	7.2	7.89	0.7	<0.1	0.37	<10	37.3	140
11/28/11	16	5.4	10.7	7.93	<0.1	0.3	<0.03	4	261.3	35
1/3/12	16	0.1	15.4	8.15	<0.1	0.2	<0.03	6	12.0	37
2/6/12	16	2.8	14.2	8.3	<0.1	0.2	<0.03	5	44.8	36
3/5/12	16	4.2	14.0	8.21	<0.1	0.2	<0.03	4	12.1	39
4/2/12	16	13.8	11.6	8.42	<0.1	<0.1	<0.05	<10	18.5	29
4/30/12	16	14.1	9.8	7.9	<0.1	<0.1	0.09	12	235.9	39
6/4/12	16	20.4	8.2	8.17	<0.1	<0.1	0.14	11	135.4	24
6/4/12	16	20.7	10.2	8.54						
7/2/12	16	25.2	8.1	8.16	<0.1	0.091	0.05	<10	579.4	22
8/6/12	16	24.0	8.6	8.31	<0.1	<0.1	0.11	<10	387.3	24
8/7/12	16	22.6	13.1	8.08						

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
8/7/12	16	22.6	13.1	8.08						
8/7/12	16	22.6	13.1	8.08						
9/10/12	16	18.4	9.3	8.28	<0.1	<0.1	0.08	<10	387.3	23
10/1/12	16	13.6	9.9	8.22	<0.1	<0.1	<0.05	<10	365.4	19
11/13/12	16	6.1	12.3	8.14	<0.1	<0.1	<0.05	<10	86.0	24
11/28/11	17	5.7	11.1	7.87	<0.1	0.2	0.06	14	1413.6	35
1/3/12	17	0.4	14.2	8.02	<0.1	0.1	<0.03	<4	34.5	39
2/6/12	17	2.8	14.8	8.23	<0.1	0.1	<0.03	<4	65.0	39
3/5/12	17	4.6	14.5	8.18	<0.1	0.1	<0.03	<4	8.6	37
4/2/12	17	14.4	13.1	8.4	<0.1	<0.1	0.06	<10	66.3	30
4/30/12	17	11.6	9.8	7.81	<0.1	<0.1	0.11	<10	866.4	29
6/4/12	17	19.1	8.0	8.06	<0.1	0.2	0.20	50	> 2419.6	27
6/5/12	17	17.6	8.6	8.50						
7/2/12	17	24.3	7.4	8.06	<0.1	0.2	0.11	22	1119.9	27
8/6/12	17	22.8	8.2	8.38	<0.1	0.1	0.14	<10	727.0	26
8/7/12	17	23.8	8.1	8.07						
9/10/12	17	17.6	8.9	8.25	<0.1	<0.1	0.13	<10	613.1	27
10/1/12	17	13.6	9.1	8.09	<0.1	<0.1	0.09	<10	2419.6	24
11/13/12	17	5.4	11.7	8.02	<0.1	<0.1	0.12	<10	107.1	35
11/29/11	18	5.2	11.3	8.01	<0.1	0.2	0.05	6	228.2	21
1/3/12	18	0.7	14.8	8.09	<0.1	0.1	0.04	5	38.9	22
2/6/12	18	2.7	14.1	8.23	<0.1	0.2	<0.03	12	45.0	22
3/5/12	18	4.1	13.0	8.16	<0.1	0.2	<0.03	5	16.1	22
4/2/12	18	14.5	10.6	8.35	<0.1	<0.1	0.06	<10	41.4	20
4/30/12	18	12.3	9.7	7.88	<0.1	<0.1	0.08	<10	91.0	19
6/4/12	18	19.6	8.3	8.04	<0.1	<0.1	0.07	<10	139.6	19
6/5/12	18	18.1	8.6	8.46						
7/2/12	18	23.9	7.8	7.98	<0.1	0.073	0.05	<10	156.5	19
8/6/12	18	23.4	8.3	8.23	<0.1	<0.1	0.15	<10	166.4	20
8/7/12	18	23.4	8.0	7.98						
9/10/12	18	17.8	9.0	8.18	<0.1	<0.1	0.07	<10	307.6	18
10/1/12	18	13.4	9.9	8.07	<0.1	<0.1	0.06	<10	613.1	18
11/13/12	18	5.4	12.2	8.08	<0.1	<0.1	<0.05	<10	68.9	18
11/29/11	19	4.5	9.6	7.68	<0.1	0.3	0.07	4	131.4	59
1/3/12	19	1.3	13.5	7.6	0.2	0.3	0.06	16	48.8	72
2/6/12	19	2.7	12.3	7.8	0.2	0.2	0.05	19	24.1	101
3/5/12	19	4.3	12.3	7.77	<0.1	0.2	<0.03	8	14.4	63
4/2/12	19	15.4	12.0	8.27	<0.1	<0.1	0.10	17	86.0	71
4/30/12	19	12.6	5.4	7.61	<0.1	<0.1	0.11	<10	816.4	91
6/5/12	19	20.2	9.0	8.15						
7/2/12	19	20.1	1.2	7.39	0.6	0.067	0.14	17	50.4	57
8/6/12	19	22.0	1.6	7.32	0.2	<0.1	0.24	14	67.7	45
8/8/12	19	20.3	2.3	7.24						
9/10/12	19	18.5	5.5	7.81	0.1	<0.1	0.23	27	101.9	85

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
10/1/12	19	13.1	5.0	7.74	0.2	<0.1	0.13	25	307.6	40
11/13/12	19	7.0	10.9	7.87	<0.1	<0.1	0.27	33	151.5	65
11/29/11	20	5.5	11.0	7.9	<0.1	0.3	0.05	4	517.2	21
1/3/12	20	2.1	14.4	7.99	<0.1	0.2	<0.03	4	21.8	22
2/6/12	20	4.0	13.5	8.15	<0.1	0.2	<0.03	7	18.3	23
3/5/12	20	7.0	11.9	8.04	<0.1	0.2	<0.03	6	11.0	24
4/2/12	20	16.1	10.5	8.25	<0.1	<0.1	0.05	<10	36.9	21
4/30/12	20	12.9	9.3	7.78	<0.1	<0.1	0.14	16	365.4	21
6/4/12	20	21.0	8.4	8.08	<0.1	<0.1	<0.05	<10	95.9	21
6/5/12	20	21.0	7.4	8.12						
7/2/12	20	25.9	7.8	7.99	<0.1	0.065	0.06	<10	517.2	21
8/6/12	20	23.8	7.9	8.16	<0.1	<0.1	0.11	<10	290.9	22
8/8/12	20	17.3	8.5	7.86						
8/8/12	20	17.3	8.5	7.86						
9/10/12	20	19.5	9.0	8.15	<0.1	<0.1	0.12	<10	228.2	20
10/1/12	20	14.7	9.4	8.06	<0.1	<0.1	0.08	11	248.1	19
11/13/12	20	7.7	11.3	7.98	<0.1	<0.1	0.08	<10	137.4	20
6/11/12	20	22.9	7.9	8.14		<0.5	<0.1	8.2	181.2	
6/19/12	20	24.6	8.0	8.05	0.11	<0.5	<0.1	8.4	208.6	
6/26/12	20	21.5	8.6	8.05		<0.5	<0.1	6.6	251.8	
7/2/12	20	23.6	7.8	7.96	0.14	<0.5	<0.1	6.8	551.0	
7/10/12	20	21.2	8.1	7.97		<0.5	<0.1	8.0	497.8	
7/17/12	20	26.5	7.2	7.96	0.027	0.11	<0.1	6.2	730.8	
7/24/12	20	22.5	7.5	7.81	0.1	0.14	<0.1	9.4	1163.6	
7/31/12	20	22.2	7.6	7.80		<0.5	<0.1	6.8		
7/31/12	20	22.3	7.5	7.81		0.11	<0.1	8.6		
8/7/12	20	21.9	7.5	7.89	0.035	0.11	<0.1	3.8	130.6	
8/14/12	20	21.1	7.6	7.82	0.089	0.21	<0.1	11	211.2	
8/14/12	20	21.1	7.6	7.82			<0.1		226.0	
11/29/11	21	5.3	8.9	7.73	<0.1	0.5	0.16	66	1413.6	12
1/3/12	21	1.6	15.0	7.89	<0.1	0.2	<0.03	7	9.7	13
2/6/12	21	3.6	13.4	8.06	<0.1	0.2	<0.03	4	30.1	11
3/5/12	21	6.2	12.5	7.93	<0.1	0.3	<0.03	6	70.3	12
4/2/12	21	16.1	9.5	8.09	<0.1	<0.1	0.06	<10	39.9	12
4/30/12	21	13.0	9.0	7.72	<0.1	<0.1	0.11	<10	93.3	11
6/4/12	21	22.7	7.8	7.95	<0.1	<0.1	0.09	<10	190.4	11
6/5/12	21	22.2	7.5	8.77						
7/2/12	21	27.3	7.4	7.99	<0.1	0.084	0.08	<10	1299.7	11
8/6/12	21	25.2	7.3	8.07	<0.1	<0.1	0.15	14	378.4	12
8/8/12	21	20.2	8.6	7.93						
10/1/12	21	15.8	9.1	8.02	<0.1	<0.1	0.09	14	201.4	10
11/13/12	21	7.3	11.2	7.95	<0.1	0.1	0.13	<10	29.5	10
11/28/11	22	6.8	11.0	8.14	<0.1	0.4	0.07	7	37.3	34
1/4/12	22	0.2	15.3	8.11	<0.1	0.5	0.04	<4	85.7	40

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
2/7/12	22	2.9	13.8	8.2	<0.1	0.5	<0.03	5	22.8	42
3/6/12	22	4.1	13.7	8.18	<0.1	0.4	<0.03	9	12.1	42
4/3/12	22	11.8	9.3	8.09	<0.1	<0.1	0.20	38	62.7	37
6/5/12	22	15.6	7.7	7.75	0.1	0.6	0.15	<10	579.4	49
6/5/12	22	16.2	8.5	8.98						
7/3/12	22	22.0	7.6	7.58	0.1	0.61	0.30	11	980.4	62
8/7/12	22	22.1	6.7	7.86	0.1	0.5	0.23	<10	579.4	64
8/13/12	22	18.4	8.9	7.57						
9/11/12	22	15.5	8.6	8	<0.1	0.4	0.25	<10	1203.3	72
10/1/12	22	12.6	7.1	7.89	<0.1	0.4	0.18	<10	547.5	76
11/13/12	22	4.1	12.1	7.97	<0.1	<0.1	<0.05	<10	126.7	47
6/26/12	22	15.6	7.6	7.82		0.66	<0.1	53	976.8	
7/2/12	22	19.9	5.6	7.68	0.15	0.67	0.13	5.4	1373.4	
7/10/12	22	19.2	5.8	7.74		0.59	0.17	8.4	656.4	
7/17/12	22	22.8	5.1	7.67	0.15	0.53	0.15	6.2	2092.4	
7/19/12	22	22.8	5.0	7.03	0.18	0.73	0.32	56	6700.0	
7/24/12	22	23.1	5.6	7.40	0.39	0.43		21	6212.4	
7/31/12	22	20.9	5.5	7.51	0.25		0.12	9.4	9678.4	
8/7/12	22	18.3	5.2	7.62	0.13	0.43	0.12	7	615.2	
8/14/12	22	17.3	5.8	7.53			<0.1		1379.2	
11/29/11	23	5.5	11.3	7.88	<0.1	0.4	0.09	10	920.8	54
1/4/12	23	1.0	16.1	8.11	<0.1	0.4	0.04	<4	78.0	60
2/7/12	23	3.3	16.2	8.34	<0.1	0.4	<0.03	<4	114.5	55
4/3/12	23	10.7	14.0	8.34	<0.1	0.1	0.05	<10	435.2	50
5/1/12	23	12.4	11.2	8.09	<0.1	0.3	0.05	<10	275.5	67
6/4/12	23	16.0	9.0	7.81						
6/5/12	23	15.4	9.3	7.91	0.1	0.5	<0.05	<10	> 2419.6	46
7/3/12	23	21.0	9.0	7.78	<0.1	0.53	0.11	48	866.4	45
8/7/12	23	21.0	9.7	8.3	<0.1	0.3	0.12	<10	155.3	48
8/14/12	23	18.1	9.5	8.14						
9/11/12	23	15.5	9.2	8.15	<0.1	0.4	0.10	12	488.4	47
10/2/12	23	12.5	9.7	8.12	<0.1	0.2	0.10	<10	517.2	64
11/14/12	23	4.8	12.9	7.92	<0.1	<0.1	<0.05	<10	111.2	52
11/29/11	24	4.7	11.0	7.61	<0.1	0.2	0.12	24	> 2419.6	93
1/4/12	24	0.6	15.4	7.64	<0.1	0.2	<0.03	9	4.1	647
2/7/12	24	2.3	14.7	7.98	<0.1	0.2	<0.03	4	12.0	488
3/6/12	24	6.7	13.1	7.91	<0.1	0.1	<0.03	<4	3.1	580
4/3/12	24	9.9	11.0	7.88	<0.1	0.2	<0.05	<10	110.6	500
5/1/12	24	12.4	9.5	7.67	<0.1	0.1	0.12	<10	48.7	820
11/28/11	25	6.2	10.0	7.86	<0.1	0.3	0.16	14	66.3	30
1/4/12	25	0.7	13.8	8.06	<0.1	0.2	<0.03	5	63.8	34
2/7/12	25	3.0	13.5	8.26	<0.1	0.2	<0.03	<4	30.5	30
3/6/12	25	3.3	13.1	8.11	<0.1	0.2	<0.03	8	35.9	38
4/3/12	25	11.5	9.5	8.16	<0.1	<0.1	0.12	13	122.3	26

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
5/1/12	25	12.0	9.5	7.85	0.1	0.4	0.15	23	272.3	32
6/5/12	25	15.6	6.2	7.99	<0.1	0.1	0.06	19	549.3	24
6/6/12	25	15.7	8.4	8.12						
7/3/12	25	22.0	7.9	7.75	<0.1	0.13	0.10	23	410.6	29
8/7/12	25	20.2	8.4	8.2	<0.1	<0.1	0.15	16	613.1	28
8/14/12	25	16.4	8.7	7.91						
9/11/12	25	15.6	7.9	8.07	<0.1	<0.1	0.13	14	435.2	27
11/14/12	25	4.4	12.6	7.99	<0.1	<0.1	<0.05	<10	98.7	28
6/13/12	25	17.3	8.3	8.34		0.17	<0.1	16	689.6	
6/13/12	25	17.5	8.2	8.27		0.17	<0.1	15	496.2	
6/19/12	25	21.6	6.6	8.07	0.16	0.18	<0.1	27	651.0	
1/4/12	26	0.5	13.0	7.66	<0.1	0.2	0.05	<4	32.3	86
2/7/12	26	2.3	7.9	7.92	<0.1	0.2	0.03	10	124.6	82
3/6/12	26	2.7	13.5	7.75	<0.1	0.2	0.04	5	44.6	116
4/3/12	26	9.9	8.7	7.73	<0.1	<0.1	0.12	<10	107.1	75
5/1/12	26	12.0	8.9	7.7	1.1	1.8	0.16	20	770.1	190
6/5/12	26	14.5	6.8	7.59	0.1	0.1	0.14	19	86.0	110
6/6/12	26	13.6	4.5	7.16						
7/3/12	26									
8/7/12	26	20.3	3.7	7.78	0.2	<0.1	0.44	17	344.8	100
8/13/12	26	18.6	5.3	7.66						
9/11/12	26	15.6	8.8	8.12	<0.1	<0.1	0.25	<10	1203.3	130
10/2/12	26	12.6	3.5	7.85	<0.1	<0.1	0.49	<10	23.3	86
11/14/12	26	3.3	9.7	8	<0.1	<0.1	0.06	<10	410.6	130
11/28/11	27	6.8	11.1	8.08	<0.1	<0.1	<0.03	<4	26.5	35
1/4/12	27	2.5	14.5	8.09	<0.1	0.1	0.03	<4	18.3	34
2/7/12	27	3.7	13.9	8.23	<0.1	0.2	<0.03	4	37.7	33
3/6/12	27	6.0	13.0	8.15	<0.1	<0.1	<0.03	<4	19.7	32
4/3/12	27	13.0	10.7	8.28	<0.1	<0.1	0.09	<10	32.3	28
5/1/12	27	13.5	9.9	8.11	<0.1	<0.1	0.08	<10	34.1	26
6/4/12	27	19.6	7.7	7.98						
6/5/12	27	14.6	8.3	7.92	<0.1	<0.1	0.08	32	248.1	25
7/3/12	27	23.6	7.1	7.71	<0.1	0.34	0.21	<10	866.4	26
8/7/12	27	32.1	7.2	8.03	<0.1	0.3	0.39	14	93.3	25
8/14/12	27	19.5	7.9	7.96						
8/14/12	27	19.5	7.9	7.96						
9/11/12	27	17.8	8.7	8.14	<0.1	0.3	0.25	<10	172.6	24
10/2/12	27	13.7	9.8	8.05	<0.1	<0.1	0.15	<10	191.8	38
11/14/12	27	6.9	11.4	7.94	<0.1	<0.1	<0.05	40	108.1	31
6/13/12	27	18.0	7.9	8.14		0.23	<0.1	7.4	164.0	
6/20/12	27	22.4	6.8	7.88	0.17	0.30	<0.1	6.0	330.0	
6/27/12	27	21.1	7.4	7.90		0.36	<0.1	8.0	251.8	
7/5/12	27	25.8	6.4	8.01	0.051	0.31	0.22	5.8	832.0	
7/11/12	27	21.8	7.5	7.87		0.37	0.14	3.6	520.6	

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7/18/12	27	25.1	6.1	7.72	0.24	0.27	<0.1	8.6	387.0	
7/25/12	27	23.9	6.4	7.80	0.15	1.1	0.18	4.6	159.6	
8/1/12	27	23.5	6.6	7.74	0.16	0.27	0.18	6.2	121.8	
8/8/12	27	23.6	6.2	7.76	0.074	0.29	0.21	4	69.0	
8/15/12	27	21.4	7.0	7.85	0.21	0.26	0.26	5.2	105.8	
11/29/11	28	6.3	10.4	7.93	<0.1	0.2	0.04	<4	23.1	41
1/4/12	28	2.7	13.6	8.02	<0.1	0.2	<0.03	<4	5.2	43
2/7/12	28	3.8	13.4	8.18	<0.1	0.2	<0.03	<4	81.6	37
3/6/12	28	6.3	12.4	8.03	<0.1	0.2	<0.03	<4	172.3	38
4/3/12	28	11.9	10.8	8.21	<0.1	<0.1	0.07	<10	344.8	33
5/1/12	28	12.0	9.7	7.88	0.1	0.1	0.09	<10	172.2	35
6/4/12	28	16.9	7.9	7.96						
6/5/12	28	16.0	3.0	7.84	0.1	0.2	0.10	14	193.5	29
7/3/12	28	21.0	8.1	7.77	<0.1	0.16	0.16	15	435.2	29
8/7/12	28	20.9	8.1	7.95	<0.1	0.1	0.14	<10	201.4	31
8/14/12	28	18.2	8.4	8						
9/11/12	28	16.8	9.3	8.21	<0.1	<0.1	0.16	<10	325.5	35
10/2/12	28	12.9	9.4	8.07	<0.1	<0.1	0.09	<10	816.4	44
11/14/12	28	6.3	10.7	7.9	<0.1	<0.1	<0.05	<10	56.5	44
6/13/12	28	16.9	8.0	8.06		0.20	<0.1	5.4	391.2	
6/20/12	28	18.3	7.6	7.85	0.17	0.21	<0.1	2.8	651.0	
6/20/12	28	18.5	7.6	7.86	0.19	0.24	<0.1	3.0	370.0	
6/27/12	28	19.6	7.8	7.88		0.20	<0.1	3.4	344.4	
6/27/12	28	19.6	7.7	7.88		0.21	<0.1	3.2	293.4	
7/5/12	28	23.3	6.6	7.91	0.060	0.21	<0.1	3.2	3465.8	
7/11/12	28	20.3	7.2	7.85		0.24	<0.1	2.6	254.8	
7/11/12	28	20.3	7.2	7.86		0.24	<0.1	3.4	244.6	
7/18/12	28	22.8	6.6	7.80	0.16	0.21	0.26	3.0	581.8	
7/25/12	28	22.0	7.0	7.82	0.058	0.27	<0.1	3	262.8	
8/1/12	28	21.3	7.0	7.79		0.13	<0.1	2.2	140.6	
8/1/12	28	21.3	7.0	7.80		0.14	<0.1	2.2	197.0	
8/8/12	28	21.4	6.9	7.8	0.023	0.15	<0.1	<2	162.6	
8/15/12	28	19.0	7.7	7.85	0.17	0.17	<0.1	2.6	229.0	
8/15/12	28	19.0	7.7	7.86	0.12	0.14	<0.1	<2	202.4	
1/4/12	29	3.3	7.9	7.94	<0.1	0.4	<0.03	<4	59.1	32
2/7/12	29	3.7	14.4	8.19	<0.1	0.4	<0.03	<4	1299.7	35
3/6/12	29	6.9	12.6	7.99	<0.1	0.4	<0.03	12	488.4	39
4/3/12	29	12.0	11.6	8.02	<0.1	0.2	0.06	<10	224.7	38
5/1/12	29	11.7	9.9	7.82	<0.1	0.2	0.12	20	186.0	34
6/4/12	29	17.8	7.7	7.9						
6/5/12	29	16.0	7.5	7.81	0.1	0.1	0.08	13	2419.6	53
7/3/12	29	21.4	8.5	7.65	<0.1	0.21	0.17	85	> 2419.6	65
8/7/12	29	22.0	8.0	8.21	0.1	0.1	0.21	46	461.1	63
8/14/12	29	17.4	7.9	7.8						

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
9/11/12	29	16.4	9.2	8.15	<0.1	<0.1	0.34	42	461.1	55
10/2/12	29	13.6	8.6	7.99	<0.1	<0.1	0.08	<10	1119.9	32
11/14/12	29	6.2	10.8	7.88	<0.1	<0.1	<0.05	<10	150.0	48
11/29/11	30	5.1	10.7	7.88	<0.1	<0.1	0.07	9	344.8	21
1/4/12	30	1.2	13.6	7.9	<0.1	0.1	0.04	<4	24.1	27
2/7/12	30	1.8	13.6	8.09	<0.1	0.1	<0.03	<4	24.5	23
3/6/12	30	4.7	12.6	7.98	<0.1	0.2	<0.03	6	17.1	26
4/3/12	30	10.1	10.1	8.07	<0.1	0.1	0.18	26	206.4	7.8
5/1/12	30	12.0	9.4	7.84	<0.1	<0.1	0.15	28	129.1	22
6/4/12	30	17.4	7.2	7.99						
7/3/12	30	21.5	6.9	7.59	<0.1	0.55	0.34	140	> 2419.6	34
8/7/12	30	20.6	7.7	8.06	<0.1	0.4	0.28	13	1553.1	38
8/13/12	30	17.4	8.8	7.95						
10/2/12	30	12.6	8.1	7.94	<0.1	0.3	0.15	25	> 2419.6	63
11/14/12	30	6.0	10.5	7.87	<0.1	0.2	0.44	720	> 2419.6	41
11/29/11	31	5.6	7.2	7.37	<0.1	0.1	0.19	20	461.1	28
1/4/12	31	0.2	11.3	7.61	<0.1	0.3	0.19	96	866.4	27
2/7/12	31	2.2	13.5	8.04	<0.1	0.2	0.03	<4	30.5	27
3/6/12	31	3.7	13.3	7.8	<0.1	0.2	0.04	5	22.3	23
4/3/12	31	9.9	8.7	7.76	<0.1	<0.1	0.17	<10	58.3	18
5/1/12	31	12.2	9.2	7.69	0.1	<0.1	0.20	<10	435.2	24
6/4/12	31	17.5	5.8	8.18						
8/13/12	31	19.3	5.1	7.61						
9/11/12	31	15.7	7.2	7.83	0.2	0.7	0.28	14	29.5	210
10/2/12	31	12.7	4.4	7.86	0.2	0.3	0.19	18	14.8	250
11/14/12	31	5.0	7.4	7.63	<0.1	0.4	0.70	190	920.8	250
11/29/11	32	5.6	10.8	7.95	<0.1	0.3	0.15	10	228.2	29
2/7/12	32	3.4	13.8	8.3	<0.1	0.2	<0.03	<4	29.2	30
3/6/12	32	3.1	13.7	8.15	<0.1	0.2	<0.03	8	101.9	38
4/3/12	32	10.5	10.1	8.26	<0.1	<0.1	0.09	<10	90.6	27
5/1/12	32	11.8	9.7	7.92	0.1	0.3	0.16	30	160.7	33
6/5/12	32	14.2	8.5	8	<0.1	0.1	<0.05	12	410.6	25
6/6/12	32	13.9	8.7	8.13						
7/3/12	32	20.4	7.9	7.74	<0.1	0.12	0.07	14	727.0	29
8/7/12	32	18.6	9.2	8.3	<0.1	<0.1	0.13	<10	435.2	29
8/14/12	32	16.1	9.6	7.97						
8/14/12	32	16.1	9.6	7.97						
9/11/12	32	14.6	9.6	8.18	<0.1	<0.1	0.12	12	648.8	27
10/2/12	32	12.3	9.6	8.1	<0.1	<0.1	0.09	<10	727.0	28
11/14/12	32	4.0	12.9	8.07	<0.1	<0.1	<0.05	<10	96.0	27
6/11/12	32	18.0	7.9	8.19	0.072	0.18	<0.1	28	551.0	
6/19/12	32	20.0	7.7	8.12	0.11	0.17	<0.1	31	1226.2	
6/26/12	32	15.6	8.8	8.19	0.096	0.14	<0.1	20	870.4	
7/2/12	32	18.7	7.8	8.06	0.079	0.17	<0.1	24	1034.4	

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
7/10/12	32	18.6	7.7	8.09	0.030	0.21	<0.1	13	976.8	
7/17/12	32	21.2	6.9	8.02	0.068	0.14	<0.1	8.0	1373.4	
7/19/12	32	20.5	6.7	7.72	0.081	0.50	0.27	210	9800.0	
7/24/12	32	20.8	7.4	8.02	0.061	0.18	<0.1	21	1461.6	
7/31/12	32	19.5	7.5	8.04		0.13	<0.1	19		
8/7/12	32	18.0	7.7	8.08	0.034	0.12	<0.1	14	870.4	
8/7/12	32	18.0	7.6	8.08	0.099	0.13	<0.1	14	522.6	
8/14/12	32	15.9	8.5	8.04			<0.1	29	1953.6	
11/29/11	33	5.6	10.8	7.92	<0.1	0.3	0.22	49	360.9	27
1/4/12	33	1.2	13.3	8.07	<0.1	0.2	<0.03	8	107.6	34
2/7/12	33	3.5	13.6	8.25	<0.1	0.2	<0.03	4	105.0	32
3/6/12	33	3.1	12.9	8.1	<0.1	0.2	<0.03	9	69.7	39
4/3/12	33	10.1	10.2	8.24	<0.1	<0.1	0.08	10	133.4	28
5/1/12	33	11.7	9.6	7.89	<0.1	0.3	0.15	32	290.9	33
6/5/12	33	13.7	8.7	7.97	<0.1	0.1	0.08	17	325.5	26
6/5/12	33	17.2	8.7	8.23						
7/3/12	33	19.5	8.1	7.74	<0.1	0.12	0.08	28	1299.7	30
8/7/12	33	18.1	9.5	8.32	<0.1	<0.1	0.14	15	727.0	27
8/14/12	33	17.5	9.3	8.03						
9/11/12	33	14.4	9.8	8.25	<0.1	<0.1	0.09	12	365.4	27
10/2/12	33	12.0	9.7	8.11	<0.1	<0.1	0.10	<10	613.1	28
11/14/12	33	4.1	12.8	8.07	<0.1	<0.1	<0.05	<10	122.3	27
11/29/11	34	4.8	10.7	7.89	<0.1	0.3	0.51	34	770.1	33
1/4/12	34	-0.3	14.3	7.86	<0.1	0.3	0.07	<4	96.0	61
2/7/12	34	1.6	14.2	8.22	<0.1	0.2	0.04	<4	69.1	56
5/1/12	34	12.5	9.1	7.84	<0.1	1.8	0.23	11	261.3	100
6/5/12	34	15.1	5.3	7.6	0.1	<0.1	0.26	20	1203.3	68
6/5/12	34	20.3	7.9	8.04						
7/3/12	34	23.4	2.0	7.43	0.3	0.025	0.52	29	2419.6	30
8/7/12	34	20.2	4.9	7.67	<0.1	<0.1	0.64	68	201.4	94
8/7/12	34	24.1	8.4	8.27						
9/11/12	34	15.2	9.1	8.19	<0.1	<0.1	0.50	75	1553.1	110
10/2/12	34	12.2	6.4	7.91	<0.1	<0.1	0.16	<10	648.8	24
11/14/12	34	2.0	10.7	8.18	<0.1	<0.1	0.06	40	88.2	62
7/19/12	34	23.4	5.2	7.21		4.80	0.21	100	17000.0	
7/31/12	34	21.9	5.4	7.61		<0.5	0.39	68		
8/7/12	34	20.4	5.4	7.65	0.05	<0.5	0.28	7.8	262.8	
8/14/12	34	18.3	6.9	7.77			0.23		186.0	
11/29/11	35	4.3	10.5	7.64	<0.1	0.1	0.66	40	579.4	28
2/7/12	35	1.8	12.0	7.89	<0.1	0.6	0.08	4	121.1	20
3/6/12	35	4.1	13.8	7.83	<0.1	0.3	0.15	10	27.9	15
5/1/12	35	11.1	7.3	7.63	<0.1	0.3	0.21	<10	178.5	26
6/4/12	35	19.9	10.3	7.63						
6/5/12	35	15.2	6.5	7.44	<0.1	<0.1	0.56	41	29.8	18

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
7/3/12	35	22.8	1.9	7.25	0.2	0.048	0.21	56	325.5	21
8/7/12	35	19.9	2.1	7.62	0.4	<0.1	1.30	740	461.1	27
9/11/12	35	15.6	7.7	7.92	0.1	<0.1	0.51	38	78.9	17
11/29/11	36	4.9	9.0	7.48	<0.1	0.2	0.30	<4	435.2	48
2/7/12	36	1.6	13.6	7.93	<0.1	<0.1	0.05	5	37.3	74
3/6/12	36	2.5	13.0	7.76	<0.1	0.2	0.08	22	198.9	89
4/3/12	36	12.5	9.3	7.99	<0.1	<0.1	0.11	<10	201.4	81
6/4/12	36	22.8	9.5	8.04						
5/1/12	36	12.7	6.1	7.61	0.1	1.1	0.15	11	344.8	220
6/5/12	36	17.3	4.3	7.51	<0.1	<0.1	0.17	31	101.9	58
7/3/12	36	23.9	2.0	7.19	0.2	<0.1	0.47	69	209.8	60
8/7/12	36	19.5	2.4	7.95						
8/7/12	36	19.5	2.1	7.8	0.2	<0.1	1.20	500	325.5	130
9/11/12	36	15.3	5.1	7.95	<0.1	<0.1	0.42	38	131.4	140
10/2/12	36	11.6	4.1	7.68	0.1	<0.1	0.49	38	18.1	150
11/14/12	36	3.0	12.3	8.1	<0.1	<0.1	0.25	79	866.4	150
11/29/11	37	4.7	10.1	7.66	<0.1	0.2	0.30	22	517.2	31
1/4/12	37	-0.2	14.3	7.69	<0.1	0.2	0.06	9	11.0	58
3/6/12	37	2.3	15.9	7.95	<0.1	0.1	0.04	7	12.0	95
4/3/12	37	13.6	14.3	8.45	<0.1	<0.1	0.08	<10	8.6	49
5/1/12	37	13.2	10.0	7.72	<0.1	0.3	0.14	<10	980.4	170
6/4/12	37	24.8	18.4	8.85						
6/5/12	37	14.4	4.4	7.41	<0.1	<0.1	0.09	18	66.3	79
7/3/12	37	24.1	1.8	7.44	<0.1	<0.1	0.67	44	365.4	19
8/7/12	37	22.9	9.3	8.08	<0.1	<0.1	0.54	59	111.9	110
8/7/12	37	18.7	4.8	7.93						
10/2/12	37	13.0	4.3	7.63	<0.1	<0.1	0.16	<10	209.8	46
11/29/11	38	6.0	10.4	7.91	<0.1	0.3	0.12	38	579.4	24
1/4/12	38	1.7	12.8	8.01	<0.1	0.2	<0.03	10	43.5	27
2/7/12	38	3.7	13.1	8.17	<0.1	0.2	<0.03	6	7.5	26
3/6/12	38	8.2	12.3	8.08	<0.1	0.2	<0.03	7	54.8	27
4/3/12	38	9.7	10.1	8.19	<0.1	<0.1	0.12	15	55.6	23
5/1/12	38									
6/5/12	38	12.6	8.3	7.91	<0.1	0.1	<0.05	23	478.6	25
6/6/12	38	14.5	9.3	8.27						
7/3/12	38	17.9	8.2	7.73	<0.1	0.11	0.10	44	1986.3	29
8/7/12	38	16.2	10.5	8.2	<0.1	<0.1	0.14	11	770.1	27
8/7/12	38	21.3	8.6	8.48						
9/11/12	38	13.7	9.3	8.24	<0.1	<0.1	0.15	16	920.8	27
10/2/12	38	11.7	9.7	8.13	<0.1	<0.1	0.13	19	325.5	28
11/14/12	38	3.8	12.5	8.02	<0.1	<0.1	0.11	<10	135.4	27
6/11/12	38	18.9	8.2	8.21		0.16	<0.1	19	279.2	
6/19/12	38	19.5	8.2	8.07	0.066	0.19	<0.1	18	1095.0	
6/19/12	38	19.5	8.1	8.09	0.075	0.13	<0.1	19	1297.6	

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
6/26/12	38	15.6	9.1	8.15		0.14	<0.1	13	870.4	
7/2/12	38	18.0	8.3	8.03	0.048	0.17	<0.1	19	581.8	
7/10/12	38	16.3	8.6	8.06		0.11	<0.1	14	1095.0	
7/17/12	38	20.7	7.9	8.06	0.064	0.11	<0.1	15	1732.8	
7/19/12	38									
7/19/12	38	21.0	6.6	7.80		0.37	0.15	38	9900.0	
7/24/12	38	18.6	7.7	7.98	0.058	0.19		48	2595.2	
7/31/12	38	17.8	8.1	7.98		0.15	<0.1	30		
8/7/12	38	17.1	8.5	8.05	0.031	0.11	<0.1	8	449.4	
8/14/12	38	16.0	8.5	8			<0.1		665.6	
11/29/11	39	5.3	10.2	7.85	<0.1	<0.1	0.07	5	686.7	16
1/4/12	39	1.3	12.8	7.9	<0.1	<0.1	<0.03	7	15.5	21
2/7/12	39	3.0	13.0	8.06	<0.1	<0.1	<0.03	4	21.3	20
3/6/12	39	2.5	12.5	7.96	<0.1	<0.1	<0.03	5	46.4	21
4/3/12	39	10.0	9.9	8.18	<0.1	<0.1	0.11	20	21.6	16
5/1/12	39	11.4	9.3	7.79	<0.1	<0.1	0.13	22	137.9	23
6/4/12	39	17.3	8.1	8.06						
6/5/12	39	12.9	8.8	7.9	<0.1	<0.1	0.06	21	231.0	17
7/3/12	39	17.9	8.5	7.73	<0.1	0.093	0.09	20	1553.1	19
8/7/12	39	16.6	10.0	8.17	<0.1	<0.1	0.14	11	1299.7	20
8/8/12	39	18.0	8.6	8.52						
9/11/12	39	13.5	9.5	8.14	<0.1	<0.1	0.11	<10	816.4	19
10/2/12	39	11.6	10.2	8.1	<0.1	<0.1	0.08	14	648.8	18
11/14/12	39	4.5	11.3	7.93	<0.1	<0.1	0.06	<10	161.6	18
11/29/11	40	6.4	11.5	7.91	<0.1	0.3	0.07	21	488.4	29
1/4/12	40	4.3	12.7	8.05	<0.1	0.2	<0.03	21	70.3	38
2/7/12	40	5.5	12.7	8.25	<0.1	0.2	<0.03	8	21.3	35
3/6/12	40	4.8	12.2	8.09	<0.1	0.2	<0.03	15	69.1	37
4/3/12	40	9.5	10.9	8.19	<0.1	0.1	0.08	<10	27.5	32
5/1/12	40	11.2	10.0	7.87	<0.1	0.1	0.08	13	58.1	35
6/5/12	40	12.0	9.3	7.93	<0.1	<0.1	<0.05	11	165.8	33
6/5/12	40	12.2	11.0	8.8						
7/3/12	40	15.7	9.0	7.62	<0.1	0.084	0.12	16	920.8	33
8/8/12	40	14.8	9.0	8.46						
8/8/12	40	14.8	9.0	8.46						
9/11/12	40	12.8	9.7	8.18	<0.1	<0.1	0.10	<10	275.5	34
10/2/12	40	11.4	9.8	8.12	<0.1	<0.1	0.06	<10	172.2	34
11/14/12	40	6.1	11.9	8.02	<0.1	0.1	0.09	<10	63.1	35
11/29/11	41	6.2	11.4	8.07	<0.1	0.1	0.04	11	325.5	34
1/4/12	41	2.1	13.6	8.17	<0.1	<0.1	<0.03	5	20.1	29
2/7/12	41	4.3	13.3	8.34	<0.1	<0.1	0.03	<4	26.2	30
3/6/12	41	3.7	13.2	8.19	<0.1	<0.1	<0.03	9	31.5	36
4/3/12	41	10.0	10.3	8.3	<0.1	<0.1	0.12	<10	137.4	24
5/1/12	41	11.5	10.2	7.94	<0.1	<0.1	0.10	20	105.4	24

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
6/5/12	41	13.5	9.3	7.99	<0.1	<0.1	<0.05	19	201.4	21
6/5/12	41	14.1	8.6	8.66						
7/3/12	41	18.7	8.7	7.8	<0.1	0.06	0.08	20	770.1	24
8/7/12	41	17.2	10.6	8.3	<0.1	<0.1	0.10	<10	224.7	25
8/7/12	41	20.0	8.5	8.44						
9/11/12	41	14.0	10.1	8.31	<0.1	<0.1	0.08	11	344.8	21
10/2/12	41	11.8	9.9	8.01	<0.1	<0.1	0.07	<10	387.3	20
11/14/12	41	4.6	12.7	8.14	<0.1	<0.1	<0.05	13	84.2	23
6/11/12	41	18.4	9.2	8.25		<0.5	<0.1	16	419.6	
6/19/12	41	19.5	8.9	8.15	0.039	<0.5	<0.1	15	522.6	
6/26/12	41	15.8	9.7	8.18		<0.5	<0.1	13	497.8	
7/2/12	41	18.0	8.9	8.10	0.059	0.10	<0.1	13	551.0	
7/2/12	41	18.0	8.8	8.10	0.16	0.14	<0.1	14	402.8	
7/10/12	41	17.4	8.9	8.10		<0.5	<0.1	8.0	522.6	
7/17/12	41	20.5	8.4	8.04	0.02	<0.5	<0.1	8.4	615.2	
7/19/12	41	20.5	7.4	7.86	0.81	0.23	0.14	68.0	5300.0	
7/24/12	41	18.6	8.4	8.01	0.05	0.18		71.0	2595.2	
7/24/12	41	18.6	8.2	8.02	0.05	0.14	0.10	69.0	2190.0	
7/31/12	41	17.9	8.3	8.06		0.16	0.16	83.0		
8/7/12	41	17.3	8.5	8.10	0.027	<0.5	0.28	7.8	321.4	
8/14/12	41	15.9	9.3	8.06			<0.1		444.8	
11/29/11	42	6.5	10.9	8.02	<0.1	<0.1	<0.03	<4	139.6	29
1/4/12	42	3.3	13.9	8.03	<0.1	<0.1	<0.03	4	16.0	30
2/7/12	42	5.0	12.9	8.24	<0.1	<0.1	<0.03	<4	10.9	32
3/6/12	42	4.2	12.6	8.07	<0.1	<0.1	<0.03	4	26.9	37
4/3/12	42	9.7	10.3	8.2	<0.1	<0.1	0.09	<10	43.2	26
5/1/12	42	11.2	10.1	7.88	<0.1	<0.1	0.08	<10	72.7	28
6/5/12	42	12.3	9.3	7.92	<0.1	<0.1	<0.05	13	201.4	23
6/5/12	42	12.3	11.1	8.37						
7/3/12	42	16.8	8.9	7.66	<0.1	0.04	<0.05	10	344.8	25
8/6/12	42	18.4	8.8	8.14						
8/7/12	42	15.2	10.1	7.93	<0.1	<0.1	0.10	<10	272.3	26
9/11/12	42	13.2	9.7	8.17	<0.1	<0.1	0.05	<10	228.2	22
11/14/12	42	5.7	12.4	8.04	<0.1	<0.1	0.08	<10	34.1	24
11/29/11	43	5.6	11.4	8.06	<0.1	0.2	0.06	15	275.5	36
1/4/12	43	0.9	14.0	8.16	<0.1	0.2	<0.03	<4	241.1	39
2/7/12	43	3.1	13.5	8.28	<0.1	0.2	<0.03	4	18.9	34
3/6/12	43	2.8	13.4	8.17	<0.1	0.1	<0.03	4	43.1	38
4/3/12	43	10.3	10.5	8.27	<0.1	<0.1	0.06	<10	36.9	32
5/1/12	43	11.9	9.9	7.96	<0.1	0.1	0.13	26	224.7	33
6/5/12	43	14.1	8.9	8.02	<0.1	0.2	0.14	14	285.1	31
6/5/12	43	16.1	9.4	8.39						
8/7/12	43	19.0	9.1	8.22	<0.1	0.1	0.12	15	1046.2	33
10/2/12	43	12.3	9.6	8.17	<0.1	<0.1	0.12	<10	920.8	32

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
6/11/12	43	19.5	8.7	8.28		0.21	<0.1	13	922.2	
6/19/12	43	20.8	8.4	8.16	0.066	0.21	<0.1	19	1373.4	
6/26/12	43	16.4	9.4	8.21		0.19	<0.1	8.6	1540.2	
6/26/12	43	16.5	9.4	8.21		0.19	<0.1	9.0	1226.2	
7/2/12	43	19.9	8.3	8.13	0.023	0.19	<0.1	13	774.6	
7/10/12	43	18.5	8.3	8.11		0.18	<0.1	10	1841.6	
7/10/12	43	18.5	8.3	8.11		0.19	<0.1	10	2092.4	
7/17/12	43	22.2	8.1	8.09	0.027	0.21	<0.1	7.4	870.4	
7/19/12	43	21.5	7.0	7.79		0.32	0.41	230		
7/24/12	43	21.2	7.6	8.09		0.24	<0.1	38	6212.4	
7/31/12	43	19.2	7.7	7.90		0.33	0.49	280	9678.4	
8/7/12	43	19.3	8.0	8.11	0.062	0.17	<0.1	12	1226.2	
8/7/12	43	18.4	8.3	8.49						
8/14/12	43	17.2	8.7	8.1			<0.1	26	774.0	
11/29/11	44	5.6	11.2	8.04	<0.1	0.2	0.04	10	344.8	41
3/6/12	44	2.4	13.3	8.09	<0.1	0.2	<0.03	4	64.4	45
4/3/12	44	9.9	10.2	8.23	<0.1	0.1	0.06	<10	42.0	38
5/1/12	44	11.7	9.9	7.86	<0.1	0.1	0.10	20	261.3	38
6/5/12	44	13.8	8.3	7.89	<0.1	0.2	0.06	18	648.8	35
6/5/12	44	14.9	8.8	8.2						
7/3/12	44	20.2	7.8	7.66	<0.1	0.16	0.09	38	1203.3	35
8/6/12	44	20.9	8.1	8.31						
8/7/12	44	18.2	8.9	8.03	<0.1	0.1	0.14	<10	866.4	37
9/11/12	44	14.8	9.5	8.18	<0.1	0.1	0.08	10	365.4	34
10/2/12	44	12.6	9.4	8.06	<0.1	<0.1	0.07	<10	1046.2	35
11/14/12	44	4.2	12.3	8.05	<0.1	<0.1	<0.05	<10	88.0	23
11/29/11	45	6.0	11.9	7.97	<0.1	0.2	0.04	6	120.1	86
1/4/12	45	1.4	14.1	8.05	<0.1	0.3	0.03	6	20.3	79
2/7/12	45	3.0	13.5	8.23	<0.1	0.3	<0.03	10	9.6	67
3/6/12	45	2.1	13.0	8.02	<0.1	0.3	<0.03	5	155.3	82
4/3/12	45	8.8	11.0	8.18	<0.1	0.3	0.09	12	248.9	63
5/1/12	45	10.5	10.0	7.87	<0.1	0.3	0.10	<10	218.7	79
6/5/12	45	11.7	10.0	8.15	<0.1	0.4	<0.05	33	166.4	68
6/5/12	45	11.7	9.7	8.06						
7/3/12	45	17.8	8.6	7.7	<0.1	0.17	<0.05	21	920.8	35
8/6/12	45	18.0	8.7	8.27						
8/7/12	45	15.7	9.3	8.04	<0.1	0.3	0.12	<10	461.1	51
9/11/12	45	13.3	9.6	8.49	<0.1	0.3	0.09	<10	272.3	63
10/2/12	45	11.5	10.1	8.31	<0.1	0.3	0.08	<10	186.0	63
11/14/12	45	4.3	8.4	8.39	<0.1	0.2	0.06	16	44.8	67
11/29/11	46	4.8	10.1	7.81	<0.1	<0.1	<0.03	8	15.5	14
1/4/12	46	1.8	10.9	7.67	<0.1	<0.1	<0.03	4	5.2	16
2/7/12	46	2.3	10.4	7.83	<0.1	<0.1	<0.03	6	32.8	13
3/6/12	46	2.7	10.5	7.71	<0.1	<0.1	<0.03	6	3.1	14

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
4/3/12	46	11.8	5.5	7.7	<0.1	<0.1	0.10	14	26.2	12
5/1/12	46	12.4	7.1	7.68	<0.1	<0.1	<0.05	<10	193.5	11
6/5/12	46	19.4	2.0	7.61	<0.1	<0.1	0.11	20	178.9	9.7
7/3/12	46	26.3	0.9	7.13	<0.1	<0.1	0.12	18	579.4	9.4
8/7/12	46	22.2	1.7	7.43	<0.1	<0.1	0.15	<10	111.2	11
9/11/12	46	18.1	2.6	7.82	<0.1	<0.1	0.11	<10	63.1	15
10/2/12	46	14.5	4.8	7.78	<0.1	<0.1	0.08	16	78.9	14
11/14/12	46	4.2	9.4	8	<0.1	<0.1	0.12	<10	7.3	37
11/29/11	47	5.1	11.3	8.13	<0.1	<0.1	<0.03	5	435.2	33
1/4/12	47	1.8	13.4	7.98	<0.1	<0.1	<0.03	5	2.0	44
2/7/12	47	3.2	12.6	7.97	<0.1	<0.1	<0.03	<4	6.3	40
3/6/12	47	3.3	13.3	8.09	<0.1	<0.1	<0.03	<4	5.2	46
4/3/12	47	11.4	10.5	8.26	<0.1	<0.1	0.07	<10	13.2	41
5/1/12	47	12.5	10.4	7.97	<0.1	<0.1	0.08	<10	15.8	39
6/5/12	47		6.9	7.59	<0.1	<0.1	<0.05	<10	48.7	36
6/5/12	47	16.9	8.7	8.05						
7/3/12	47	20.9	6.8	7.49	<0.1	<0.1	0.08	<10	64.4	36
8/6/12	47	22.2	6.5	7.71						
8/7/12	47	19.6	5.1	7.54	<0.1	<0.1	0.11	<10	21.1	36
9/11/12	47	15.1	7.0	8.12	<0.1	<0.1	0.08	<10	22.8	31
10/2/12	47	12.7	9.0	8.05	<0.1	<0.1	<0.05	<10	121.1	35
11/14/12	47		11.4	8.06	<0.1	<0.1	<0.05	15	14.6	35
6/11/12	47	21.2	8.8	7.98		<0.1	<0.1	2.6	78.6	
6/11/12	47	21.2	8.8	7.98		<0.1	<0.1	3.0	72.8	
6/19/12	47	23.3	7.4	7.72	0.029	<0.1	<0.1	4.4	95.8	
6/26/12	47	20.3	8.5	7.80		<0.1	<0.1	3.8	73.6	
7/2/12	47	22.7	6.7	7.59	0.033	<0.1	<0.1	4.0	90.0	
7/10/12	47	21.1	7.3	7.62	<0.02	<0.1	<0.1	2.8	46.2	
7/17/12	47	23.3	6.4	7.57	0.13	<0.1	<0.1	4.0	84.0	
7/24/12	47	21.8	5.6	7.49	0.14	<0.1	<0.1	7.4	99.0	
7/31/12	47	21.6	5.9	7.45						
8/7/12	47	21.8	5.8	7.52	0.05	<0.1	<0.1	3.8	14.8	
8/14/12	47	19.2	5.9	7.43		<0.1	<0.1		94.0	
1/3/12	48	4.5	14.0	8.18	0.2	0.4	<0.03	22	15.6	21
2/6/12	48	4.0	14.7	8.23	0.5	0.3	<0.03	11	14.4	25
3/5/12	48	7.6	14.3	8.15	0.8	0.4	<0.03	9	37.3	32
4/2/12	48	13.7	11.8	8.09	0.6	0.3	<0.05	<10	18.1	28
6/4/12	48	21.1	9.3	8.17						
6/4/12	48	21.4	9.8	8.29	0.1	0.3	0.06	55	36.4	21
7/2/12	48	21.3	9.8	8.06	0.2	0.31	<0.05	<10	30.5	22
8/6/12	48	26.0	10.9	8.54	0.3	0.2	<0.05	<10	6.2	20
8/7/12	48	23.9	8.4	8.15						
9/10/12	48	24.4	8.5	8.15	0.4	0.3	0.05	<10	4.1	26
10/1/12	48	21.3	9.2	8.2	0.4	0.3	<0.05	<10	2.0	20

Date	Site ID	Temp (deg C)	DO (mg/l)	pH	Ammonia (mg/l)	Nitrate + Nitrite (mg/l)	Total phosphorus (mg/l)	Total Suspended Solids (mg/l)	E. coli (CFU/100 ml)	Chloride (mg/l)
11/13/12	48	11.8	11.0	8.03	0.7	0.4	<0.05	27	14.6	21

Appendix 5. Qualitative Habitat Evaluation Index (QHEI)

Site	Substrate (20)	In-Stream Cover (20)	Channel Morphology (20)	Riparian Zone (10)	Pool/ Current (12)	Riffle/ Run (8)	Gradient (10)	Total QHEI Score
3	11	12	10	9	10	0	6	58
4	13	10	8	10	10	0	6	57
5	7	13	13	8	10	0	4	55
6	10	15	12	8	5	3	4	57
7	12	15	15	10	7	0	4	63
8	10	12	14	8	3	0	4	51
9	6	14	13	7	10	0	4	54
10	7	12	13	10	9	0	8	59
11	11	13	13	7	9	0	8	61
12	8	13	16	5	8	5	6	61
13	11	14	16	8	7	0	10	66
14	1	8	6	3	3	0	4	25
15								
16	6	14	16	5	8	3	10	62
17	12	11	16	5	4	5	10	63
18	10	13	13	8	7	0	10	61
19	0	6	10	9	0	0	8	33
20	12	18	13	8	6	0	6	63
21	1	11	6	3	7	0	6	34
22	3	11	11	7	4	0	8	44
23	8	12	15	5	3	0	10	53
24								
25	10	15	13	7	9	0	6	60
26	3	13	13	5	4	0	6	44
27	14	8	14	6	7	2	10	61
28	10	6	18	10	3	4	10	61
29	5	6	11	5	2	0	10	39
30	2	6	8	5	2	0	8	31
31	1	7	9	5	0	0	6	28
32	10	12	10	4	10	6	6	58
33	11	13	9	3	9	0	6	51
34	1	4	7	3	8	0	6	29
35	1	7	8	5	2	0	4	27
36	1	7	5	6	6	0	4	29
37	1	6	7	5	4	0	6	29
38	11	14	11	4	10	0	10	60
39	12	9	12	5	6	2	10	56
40	11	13	16	4	5	2	10	61
41	10	13	9	2	4	0	10	48
42	11	14	16	7	8	7	10	73
43	12	10	10	6	5	0	10	53
44	11	7	11	3	7	0	10	49
45	14	13	18	8	5	4	4	66
46								
47	15	5	18	8	3	5	10	64
48	9	14	7	8	7	0	6	51

Appendix 6. Critical and Priority Area Metrics

Nitrogen Critical/Protection Area Metric													
Site ID	Mean	Mean Rank	% Exceed	% Exceed Rank	Single Highest Sample	Highest Sample Rank	Load (lb/yr)	Load Rank	Load/Acre (lb/ac/yr)	Load/acre Rank	Rank Total	Total Possible	Percent Score (Grade)
3	0.74	6	0%	11	1.0	10	100015	2	2.2	2	31	93	33%
4	0.41	11	0%	11	0.5	15					37	67	55%
5	1.62	2	83%	1	2.6	4					7	67	10%
6	1.18	4	45%	4	2.9	3					11	67	16%
7	0.59	7	5%	9	1.3	8	2972	9	1.5	3	36	93	39%
8	0.79	5	36%	5	1.6	7					17	67	25%
9	1.22	3	75%	3	2.3	5	138394	1	3.3	1	13	93	14%
10	1.82	1	82%	2	3.1	2					5	67	7%
11	0.13	33	0%	11	0.3	17	15944	4	0.5	10	75	93	81%
12	0.18	22	0%	11	0.5	15	8560	6	0.9	5	59	93	63%
13	0.13	33	0%	11	0.4	16					60	67	90%
14	0.29	14	0%	11	0.8	12					37	67	55%
15	0.52	9	0%	11	0.9	11					31	67	46%
16	0.14	30	0%	11	0.3	17					58	67	87%
17	0.11	37	0%	11	0.2	18					66	67	99%
18	0.11	36	0%	11	0.2	18					65	67	97%
19	0.14	30	0%	11	0.3	17					58	67	87%
20	0.11	35	0%	11	0.5	15	2619	10	0.6	8	79	89	89%
21	0.16	27	0%	11	0.5	15					53	67	79%
22	0.50	10	0%	11	0.7	13	4189	7	1.2	4	45	93	48%
23	0.33	12	0%	11	0.5	15					38	67	57%
24	0.17	25	0%	11	0.2	18					54	67	81%
25	0.17	24	0%	11	0.4	16	16178	3	0.6	8	62	93	67%
26	0.26	17	10%	7	1.8	6					30	67	45%
27	0.26	16	5%	10	1.1	9	678	13	0.4	12	60	93	65%
28	0.18	23	0%	11	0.3	17	834	12	0.7	7	70	93	75%

Nitrogen Critical/Priority Area Metric													
Site ID	Mean	Mean Rank	% Exceed	% Exceed Rank	Single Highest Sample	Highest Sample Rank	Load (lb/yr)	Load Rank	Load/Acre (lb/ac/yr)	Load/acre Rank	Rank Total	Total Possible	Percent Score (Grade)
29	0.20	19	0%	11	0.4	16					46	67	69%
30	0.20	18	0%	11	0.6	14					43	67	64%
31	0.26	17	0%	11	0.7	13					41	67	61%
32	0.17	26	0%	11	0.5	15	11609	5	0.6	8	65	93	70%
33	0.15	29	0%	11	0.3	17					57	67	85%
34	0.59	8	15%	6	4.8	1					15	67	22%
35	0.19	21	0%	11	0.6	14					46	67	69%
36	0.15	29	9%	8	1.1	9					46	67	69%
37	0.12	34	0%	11	0.3	17					62	67	93%
38	0.15	28	0%	11	0.4	16	1857	11	0.6	9	75	93	81%
39													NA
40	0.14	31	0%	11	0.3	17					59	67	88%
41	0.07	38	0%	11	0.5	15					64	67	96%
42													NA
43	0.19	20	0%	11	0.3	17	3224	8	0.5	11	67	93	72%
44	0.13	32	0%	11	0.2	18					61	67	91%
45	0.28	15	0%	11	0.4	16	562	14	0.8	6	62	93	67%
46													NA
47													NA
48	0.32	13	0%	11	0.4	16					40	67	60%

Phosphorus Critical/Protection Area Metric													
Site ID	Mean	Mean Rank	% Exceed	% Exceed Rank	Single Highest Sample	Highest Sample Rank	Load	Load Rank	Load/Acre	Load/acre Rank	Rank Total	Total Possible	Percent Score (Grade)
3	0.06	33	17	23	0.12	27	8933	3	0.20	15	101	147	69%
4	0.05	41	0	27	0.07	30					98	100	98%
5	0.06	37	25	21	0.10	29					87	100	87%
6	0.12	14	64	6	0.21	20					40	100	40%
7	0.08	26	37	15	0.19	22	429	16	0.21	14	93	147	63%
8	0.12	12	55	10	0.30	13					35	100	35%
9	0.09	22	50	11	0.18	23	10160	1	0.24	9	66	147	45%
10	0.12	12	64	6	0.21	20					38	100	38%
11	0.10	16	58	9	0.23	18	9292	2	0.30	5	50	147	34%
12	0.08	27	29	18	0.24	17	1627	9	0.16	19	90	147	61%
13	0.06	34	33	16	0.15	25	9292	2	0.97	1	78	147	53%
14	0.16	8	55	10	0.59	6					24	100	24%
15	0.08	25	17	23	0.37	10					58	100	58%
16	0.05	40	25	21	0.14	26	1003	10	0.13	23	120	147	82%
17	0.10	18	58	9	0.20	21	154	21	0.22	13	82	147	56%
18	0.06	36	8	25	0.15	25	871	12	0.16	21	119	147	81%
19	0.13	10	64	6	0.27	15					31	100	31%
20	0.06	38	13	24	0.14	26	740	14	0.17	17	119	147	81%
21	0.09	21	55	10	0.16	24					55	100	55%
22	0.14	9	63	7	0.32	12	995	11	0.28	7	46	147	31%
23	0.07	31	45	12	0.12	27					70	100	70%
24	0.12	13	33	16	0.12	27					56	100	56%
25	0.09	23	43	13	0.16	24	7388	4	0.28	8	72	147	49%
26	0.18	6	60	8	0.49	7					21	100	21%
27	0.13	11	50	11	0.39	9	409	18	0.23	11	60	147	41%
28	0.07	30	26	20	0.26	16	185	20	0.16	20	106	147	72%
29	0.11	15	36	15	0.34	11					41	100	41%
30	0.17	7	60	8	0.44	8					23	100	23%

Phosphorus Critical/Protection Area Metric													
Site ID	Mean	Mean Rank	% Exceed	% Exceed Rank	Single Highest Sample	Highest Sample Rank	Load	Load Rank	Load/Acre	Load/acre Rank	Rank Total	Total Possible	Percent Score (Grade)
31	0.22	5	78	4	0.70	3					12	100	12%
32	0.08	24	30	17	0.27	15	5922	6	0.31	4	66	147	45%
33	0.09	20	42	14	0.22	19	6093	5	0.34	3	61	147	41%
34	0.29	3	79	3	0.64	5	2723	7	0.55	2	20	147	14%
35	0.46	1	88	1	1.30	1					3	100	3%
36	0.34	2	82	2	1.20	2					6	100	6%
37	0.23	4	67	5	0.67	4					13	100	13%
38	0.10	17	36	15	0.15	25	765	13	0.23	10	80	147	54%
39	0.08	24	42	14	0.14	26	435	15	0.22	12	91	147	62%
40	0.07	29	27	19	0.12	27					75	100	75%
41	0.07	28	29	18	0.28	14	415	17	0.17	18	95	147	65%
42	0.06	39	18	22	0.10	29					90	100	90%
43	0.09	23	27	19	0.49	7	1965	8	0.30	6	63	147	43%
44	0.07	30	30	17	0.14	26					73	100	73%
45	0.06	35	33	16	0.12	27	120	22	0.18	16	116	147	79%
46	0.09	19	50	11	0.15	25	77	23	0.15	22	100	147	68%
47	0.07	32	5	26	0.11	28	288	19	0.10	24	129	147	88%
48	0.03	42	0	27	0.06	31					100	100	100%

Total Suspended Solids (TSS) Critical/Protection Area Metric													
Site ID	Mean	Mean Rank	% Exceed	% Exceed Rank	Single Highest Sample	Highest Sample Rank	Annual Load	Load Rank	Load/Acre	Load/acre Rank	Rank Total	Total Possible	Percent Score (Grade)
3	7.1	34	0%	18	21	24					76	90	84%
4	6.0	37	0%	18	13	29					84	90	93%
5	18.8	13	17%	11	40	17					41	90	46%
6	11.1	26	0%	18	19	26					70	90	78%
7	5.8	38	0%	18	19	26	36965	13	18.049	14	109	121	90%
8													NA
9	15.7	17	5%	17	49	15	1548644	1	36.680	9	59	121	49%
10	12.0	23	0%	18	25	21					62	90	69%
11	13.5	20	0%	18	27	20	1262995	2	40.87	6	66	121	55%
12	21.7	8	24%	6	100	7	292918	7	29.578	11	39	121	32%
13	5.7	39	0%	18	12	30					87	90	97%
14	4.3	42	0%	18	20	25					85	90	94%
15													NA
16	6.0	37	0%	18	12	30					85	90	94%
17	8.5	30	8%	16	50	14					60	90	67%
18	6.1	36	0%	18	12	30					84	90	93%
19	17.0	14	9%	15	33	19					48	90	53%
20	7.5	33	0%	18	16	27	89278	11	20.958	13	102	121	84%
21	12.8	21	9%	15	66	10					46	90	51%
22	14.4	19	16%	12	56	12	175493	8	49.983	4	55	121	45%
23	6.9	35	9%	15	48	16					66	90	73%
24	7.8	32	100%	1	24	22					55	90	61%
25	14.6	18	0%	18	27	20	1066138	3	40.562	7	66	121	55%
26	9.0	29	0%	18	20	25					72	90	80%
27	8.3	31	9%	15	40	17	31087	14	17.391	15	92	121	76%
28	3.7	43	0%	18	15	28					89	90	99%
29	21.3	10	27%	5	85	8					23	90	26%
30	96.9	2	20%	8	720	2					12	90	13%

Total Suspended Solids (TSS) Critical/Protection Area Metric													
Site ID	Mean	Mean Rank	% Exceed	% Exceed Rank	Single Highest Sample	Highest Sample Rank	Annual Load	Load Rank	Load/Acre	Load/acre Rank	Rank Total	Total Possible	Percent Score (Grade)
31	38.7	4	22%	7	190	6					17	90	19%
32	23.6	7	9%	15	210	5	894995	5	47.43	5	37	121	31%
33	16.4	15	17%	11	49	15	998796	4	55.936	1	46	121	38%
34	36.0	5	46%	4	100	7					16	90	18%
35	116.5	1	70%	2	740	1					4	90	4%
36	72.5	3	55%	3	500	3					9	90	10%
37	20.4	11	18%	9	59	11					31	90	34%
38	19.9	12	18%	10	48	16	168910	9	51.780	2	49	121	40%
39	11.7	24	0%	18	22	23	62097	12	32.02	10	87	121	72%
40	12.4	22	0%	18	21	24					64	90	71%
41	21.4	9	17%	11	83	9	93799	10	38.721	8	47	121	39%
42	4.4	41	0%	18	13	29					88	90	98%
43	34.7	6	14%	13	280	4	340180	6	51.720	3	32	121	26%
44	11.5	25	10%	14	38	18					57	90	63%
45	11.0	27	8%	16	33	19					62	90	69%
46	9.8	28	0%	18	20	25	15229	15	29.38	12	98	121	81%
47	4.6	40	0%	18	15	28					86	90	96%
48	16.1	16	10%	14	55	13					43	90	48%

Temperature Critical/Priority Area Metric									
Site ID	Mean	Mean Rank	% Exceed	% Exceed rank	Single Highest Sample	Highest Sample Rank	Total Score	Total Possible	Percent Score (Grade)
3	22.1	2	50%	5	25.6	2	9	113	8%
4	23.6	1	46%	7	27.1	1	9	113	8%
5	16.7	24	7%	26	18.2	25	75	113	66%
6	16.5	25	15%	20	18.8	20	65	113	58%
7	19.1	10	45%	8	22.2	8	26	113	23%
8	14.1	38	0%	29	15.7	32	99	113	88%
9	19.8	6	45%	8	23.7	3	17	113	15%
10	16.5	26	15%	20	18.0	26	72	113	64%
11	16.1	31	14%	21	16.9	28	80	113	71%
12	19.6	8	36%	11	22.1	9	28	113	25%
13	16.8	22	14%	21	19.5	17	60	113	53%
14	19.7	7	0%	29	22.3	7	43	113	38%
15	14.6	36	31%	12	13.2	35	83	113	73%
16	18.5	12	31%	12	22.6	5	29	113	26%
17	17.0	20	21%	17	18.7	21	58	113	51%
18	17.1	19	21%	17	19.2	19	55	113	49%
19	16.2	29	8%	25	20.1	15	69	113	61%
20	20.3	4	48%	6	22.4	6	16	113	14%
21	18.7	11	31%	13	22.2	8	32	113	28%
22	17.7	16	23%	16	20.7	14	46	113	41%
23	15.4	35	0%	29	16.0	30	94	113	83%
24	9.8	46	0%	29	9.1	38	113	113	100%
25	15.8	33	13%	22	17.4	27	82	113	73%
26	14.0	39	0%	29	14.8	33	101	113	89%
27	20.2	5	40%	9	23.5	4	18	113	16%
28	18.3	15	21%	18	20.9	12	45	113	40%
29	16.1	32	15%	20	17.4	27	79	113	70%
30	14.6	37	8%	24	17.4	27	88	113	78%

Temperature Critical/Protection Area Metric									
Site ID	Mean	Mean Rank	% Exceed	% Exceed rank	Single Highest Sample	Highest Sample Rank	Total Score	Total Possible	Percent Score (Grade)
31	13.0	42	0%	29	14.2	34	105	113	93%
32	16.8	21	4%	28	18.6	22	71	113	63%
33	13.8	40	86%	1	16.5	29	70	113	62%
34	18.4	14	25%	14	20.8	13	41	113	36%
35	17.6	17	9%	23	19.9	16	56	113	50%
36	16.7	23	77%	3	19.5	17	43	113	38%
37	18.5	13	23%	15	20.8	13	41	113	36%
38	16.4	27	4%	27	18.6	22	76	113	67%
39	13.3	41	0%	29	15.8	31	101	113	89%
40	12.0	45	0%	29	12.7	37	111	113	98%
41	16.2	28	0%	29	18.5	23	80	113	71%
42	12.7	43	0%	29	13.2	35	107	113	95%
43	17.4	18	13%	22	19.3	18	58	113	51%
44	15.6	34	83%	2	15.7	32	68	113	60%
45	12.4	44	0%	29	12.9	36	109	113	96%
46	16.1	30	17%	19	18.4	24	73	113	65%
47	19.2	9	39%	10	21.7	11	30	113	27%
48	20.9	3	58%	4	22.0	10	17	113	15%

Dissolved Oxygen Critical/Protection Area Metric									
Site ID	Mean	Mean Rank	Low DO % Exceed	Low DO % Exceed Rank	Single Lowest Sample	Lowest Sample Rank	Rank Total	Total Possible	Percent Score (Grade)
3	10.8	24	0%	12	6.6	16	52	90	58%
4	9.9	13	0%	12	7.3	23	48	90	53%
5	10.2	17	0%	12	6.8	18	47	90	52%
6	11.4	31	0%	12	6.8	18	61	90	68%
7	10.5	19	0%	12	6.1	15	46	90	51%
8	11.0	27	50%	1	4.5	10	38	90	42%
9	10.0	14	0%	12	6.0	14	40	90	44%
10	11.4	30	0%	12	7.7	26	68	90	76%
11	11.8	39	0%	12	7.5	25	76	90	84%
12	9.7	10	4%	10	5.6	13	33	90	37%
13	11.8	37	0%	12	7.9	28	77	90	86%
14	11.5	34	0%	12	3.1	7	53	90	59%
15	17.1	45	0%	12	7.1	21	78	90	87%
16	12.4	41	0%	12	8.1	29	82	90	91%
17	11.8	38	0%	12	7.4	24	74	90	82%
18	11.5	35	0%	12	7.8	27	74	90	82%
19	9.9	12	46%	3	1.1	1	16	90	18%
20	9.6	9	0%	12	7.2	22	43	90	48%
21	11.0	26	0%	12	7.2	22	60	90	67%
22	9.4	6	36%	5	5.0	11	22	90	24%
23	12.6	42	0%	12	9.0	32	86	90	96%
24	14.4	44	0%	12	9.5	33	89	90	99%
25	10.6	21	0%	12	6.1	15	48	90	53%
26	9.6	8	33%	6	3.5	8	22	90	24%
27	9.5	7	0%	12	6.1	15	34	90	38%
28	9.1	2	3%	11	3.0	6	19	90	21%
29	10.6	22	0%	12	7.5	25	59	90	66%
30	11.2	28	0%	12	6.9	19	59	90	66%

Dissolved Oxygen Critical/Priority Area Metric									
Site ID	Mean	Mean Rank	Low DO % Exceed	Low DO % Exceed Rank	Single Lowest Sample	Lowest Sample Rank	Rank Total	Total Possible	Percent Score (Grade)
31	10.2	16	27%	8	4.4	9	33	90	37%
32	9.7	10	0%	12	6.7	17	39	90	43%
33	11.4	32	0%	12	8.1	29	73	90	81%
34	9.3	5	38%	4	2.0	5	14	90	16%
35	10.6	20	27%	8	1.9	4	32	90	36%
36	9.2	3	46%	3	2.0	5	11	90	12%
37	12.8	43	31%	7	1.8	3	53	90	59%
38	9.9	11	0%	12	6.6	16	39	90	43%
39	10.9	25	0%	12	8.1	29	66	90	73%
40	11.3	29	0%	12	9.0	32	73	90	81%
41	10.3	18	0%	12	7.4	24	54	90	60%
42	11.7	36	0%	12	8.8	31	79	90	88%
43	10.1	15	0%	12	7.0	20	47	90	52%
44	10.7	23	0%	12	7.8	27	62	90	69%
45	11.4	33	0%	12	8.3	30	75	90	83%
46	8.3	1	50%	2	1.7	2	5	90	6%
47	9.3	4	20%	9	5.1	12	25	90	28%
48	12.1	40	0%	12	8.3	30	82	90	91%

Ammonia Critical/Protection Area Metric									
Site ID	Mean	Mean Rank	% Exceed	% Exceed Rank	Single Highest Sample	Highest Sample Rank	Rank Total	Total Possible	Percent Score (Grade)
3	0.201	4	50%	3	0.3	8	15	54	28%
4	0.291	2	64%	2	0.4	6	10	54	19%
5									NA
6									NA
7	0.096	11	7%	13	0.2	11	35	54	65%
8	0.075	17	33%	6	0.2	11	34	54	63%
9	0.081	14	6%	14	0.15	13	41	54	76%
10									NA
11									NA
12	0.097	10	6%	14	0.26	9	33	54	61%
13									NA
14	0.205	3	18%	10	1.6	1	14	54	26%
15									NA
16									NA
17									NA
18									NA
19	0.160	5	45%	4	0.6	5	14	54	26%
20	0.058	19	0%	16	0.14	14	49	54	91%
21									NA
22	0.112	7	18%	10	0.39	7	24	54	44%
23									NA
24									NA
25									NA
26	0.143	6	20%	9	1.1	2	17	54	31%
27	0.098	9	11%	11	0.24	10	30	54	56%
28	0.081	14	0%	16	0.19	12	42	54	78%
29									NA

30									NA
Ammonia Critical/Protection Area Metric									
Site ID	**Mean**	**Mean Rank**	**% Exceed**	**% Exceed Rank**	**Single Highest Sample**	**Highest Sample Rank**	**Rank Total**	**Total Possible**	**Percent Score (Grade)**
31	0.085	13	22%	8	0.2	11	32	54	59%
32	0.070	18	0%	16	0.11	15	49	54	91%
33									NA
34	0.077	16	9%	12	0.3	8	36	54	67%
35	0.099	8	40%	5	0.4	6	19	54	35%
36	0.080	15	27%	7	0.2	11	33	54	61%
37									NA
38	0.057	20	0%	16	0.1	16	52	54	96%
39									NA
40									NA
41	0.092	12	5%	15	0.81	3	30	54	56%
42									NA
43	0.045	21	0%	16	0.1	16	53	54	98%
44									NA
45									NA
46									NA
47	0.044	22	0%	16	0.14	14	52	54	96%
48	0.420	1	80%	1	0.8	4	6	54	11%

E. coli Critical/Protectin Area Metric									
Site ID	**Mean**	**Mean Rank**	**% Exceed**	**% Exceed Rank**	**Single Highest Sample**	**Highest Sample Rank**	**Rank Total**	**Total Possible**	**Percent Score (Grade)**
3	92	43	0%	22	387	30	95	102	93%
4	12	46	0%	22	30	34	102	102	100%
5	410	17	20%	16	1000	17	50	102	49%
6	256	30	0%	22	435	29	81	102	79%
7	2277	1	55%	6	11000	2	9	102	9%
8	278	27	33%	11	1046	16	54	102	53%
9	841	10	25%	13	9400	6	29	102	28%
10	267	28	0%	22	488	27	77	102	75%
11	191	37	0%	22	461	28	87	102	85%
12	1268	5	57%	5	9000	7	17	102	17%
13	286	26	17%	18	727	22	66	102	65%
14	287	25	0%	22	687	24	71	102	70%
15	97	42	8%	21	260	32	95	102	93%
16	210	36	8%	21	579	26	83	102	81%
17	822	11	58%	4	2420	10	25	102	25%
18	159	39	8%	21	613	25	85	102	83%
19	164	38	9%	20	816	21	79	102	77%
20	302	24	9%	20	1164	15	59	102	58%
21	341	20	18%	17	1414	12	49	102	48%
22	1696	3	65%	2	9678	5	10	102	10%
23	580	13	27%	12	2420	10	35	102	34%
24	433	16	17%	18	2420	10	44	102	43%
25	324	21	21%	15	690	23	59	102	58%
26	315	23	20%	16	1203	14	53	102	52%
27	218	34	9%	20	866	20	74	102	73%

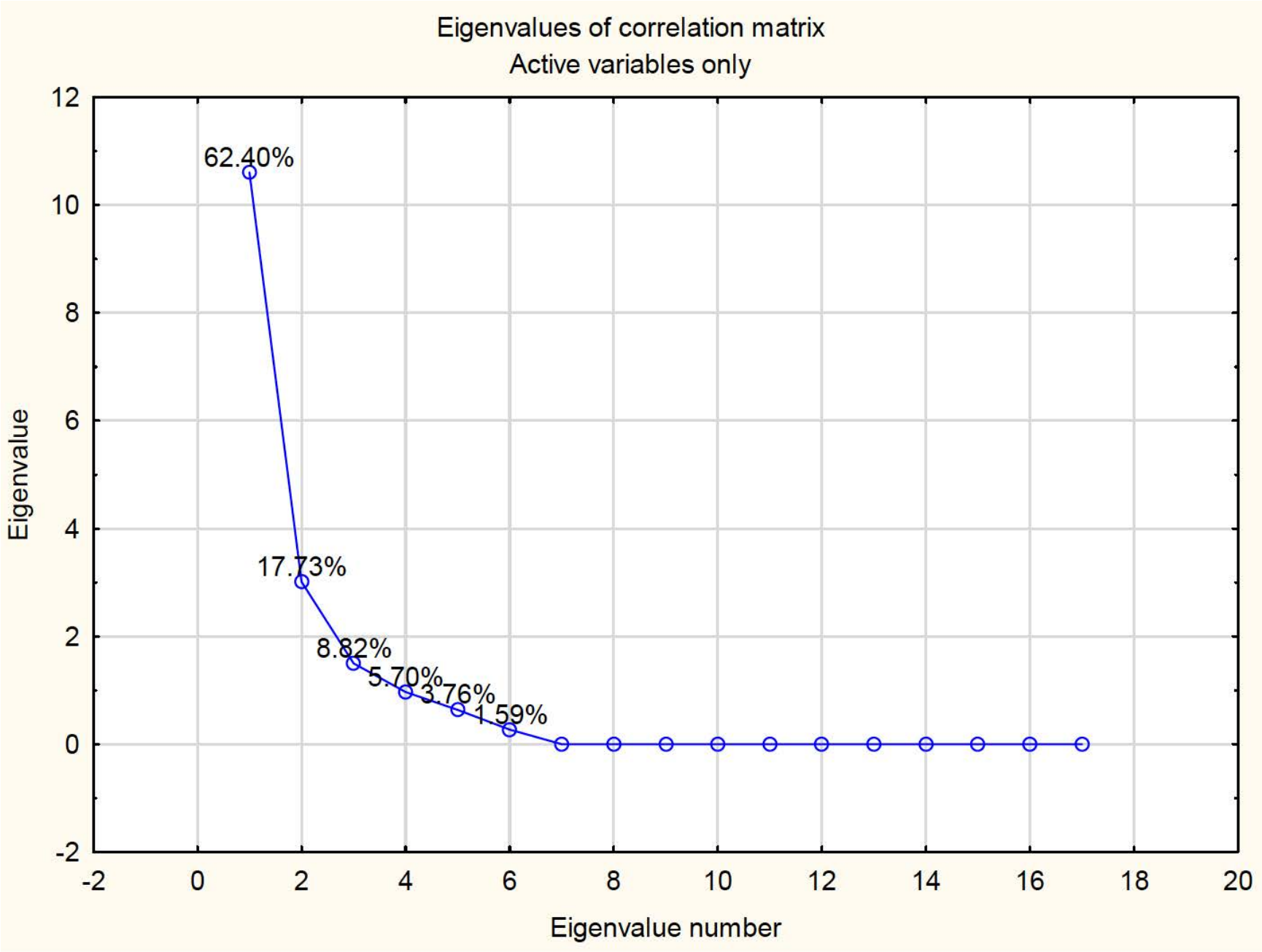
28	393	18	15%	19	3466	9	46	102	45%
***E. coli* Critical/Protection Area Metric**									
Site ID	**Mean**	**Mean Rank**	**% Exceed**	**% Exceed Rank**	**Single Highest Sample**	**Highest Sample Rank**	**Rank Total**	**Total Possible**	**Percent Score (Grade)**
29	844	9	36%	10	2420	10	29	102	28%
30	956	8	40%	9	2420	10	27	102	26%
31	315	22	22%	14	921	19	55	102	54%
32	1104	7	55%	6	9800	4	17	102	17%
33	377	19	25%	13	1300	13	45	102	44%
34	1905	2	46%	7	17000	1	10	102	10%
35	225	33	20%	16	579	26	75	102	74%
36	261	29	9%	20	866	20	69	102	68%
37	254	31	9%	20	980	18	69	102	68%
38	1178	6	59%	3	9900	3	12	102	12%
39	470	15	42%	8	1553	11	34	102	33%
40	212	35	9%	20	921	19	74	102	73%
41	710	12	21%	15	5300	8	35	102	34%
42	126	40	0%	22	345	31	93	102	91%
43	1506	4	67%	1	9678	5	10	102	10%
44	493	14	40%	9	1203	14	37	102	36%
45	235	32	8%	21	921	19	72	102	71%
46	108	41	8%	21	579	26	88	102	86%
47	69	44	0%	22	435	29	95	102	93%
48	18	45	0%	22	37	33	100	102	98%

Biotic Communities Critical/ Protection Area Metric							
Site ID	mIBI	mIBI Rank	IBI	IBI Rank	Rank Total	Total Possible	Percent Score (Grade)
3	32	8	18	4	12	27	44%
4	32	8	28	8	16	27	59%
5	36	10	38	13	23	27	85%
6	26	3	42	15	18	27	67%
7	22	1	30	9	10	27	37%
8	32	8	26	8	16	27	59%
9	32	8	46	16	24	27	89%
10	32	8	22	6	14	27	52%
11	32	8	24	7	15	27	56%
12	27	4	34	11	15	27	56%
13	32	8	36	12	20	27	74%
14	22	1	12	2	3	27	11%
15							NA
16	27	4	40	14	18	27	67%
17	26	3	18	4	7	27	26%
18	30	7	28	8	15	27	56%
19	28	5	0	1	6	27	22%
20	29	6	30	9	15	27	56%
21	26	3	14	3	6	27	22%
22	32	8	18	4	12	27	44%
23	40	11	32	10	21	27	78%
24	22	1			1	11	9%
25	28	5	22	6	11	27	41%
26	32	8	34	11	19	27	70%
27	28	5	22	6	11	27	41%
28	26	3	34	11	14	27	52%
29	26	3	14	3	6	27	22%
30	22	1	26	8	9	27	33%

Biotic Communities Critical/ Protection Area Metric							
Site ID	mIBI	mIBI Rank	IBI	IBI Rank	Rank Total	Total Possible	Percent Score (Grade)
31	22	1	12	2	3	27	11%
32	32	8	38	13	21	27	78%
33	28	5	38	13	18	27	67%
34	30	7	32	10	17	27	63%
35			14	3	3	16	19%
36	30	7	28	8	15	27	56%
37	28	5	28	8	13	27	48%
38	30	7	34	11	18	27	67%
39	26	3	32	10	13	27	48%
40	34	9	36	12	21	27	78%
41	30	7	34	11	18	27	67%
42	32	8	32	10	18	27	67%
43	24	2	20	5	7	27	26%
44	26	3	32	10	13	27	48%
45	34	9	32	10	19	27	70%
46							NA
47	22	1	14	3	4	27	15%
48	28	5	28	8	13	27	48%

Appendix 7. Principal Component Analysis for Critical and Protection Areas

Variable	Mann-Whitney U Test (w/ continuity correction) (Critical Area Analysis_CCM2) By variable Group Marked tests are significant at p <.05000									
	Rank Sum (Group 1)	Rank Sum (Group 2)	U	Z	p-value	Z (adjusted)	p-value	Valid N (Group 1)	Valid N (Group 2)	2*1sided (exact p)
Temp	81.00000	55.0000	19.00000	1.31276	0.189264	1.31276	0.189264	8	8	0.194872
DO	36.00000	100.0000	0.00000	-3.30816	0.000939	-3.30816	0.000939	8	8	0.000155
NTU	97.00000	39.0000	3.00000	2.99310	0.002762	2.99310	0.002762	8	8	0.001088
Cond.	54.00000	82.0000	18.00000	-1.41778	0.156255	-1.41778	0.156255	8	8	0.160528
NH4	76.00000	44.0000	8.00000	2.25669	0.024028	2.33292	0.019653	7	8	0.020513
Nitrate+Nitrite	82.00000	54.0000	18.00000	1.41778	0.156255	1.41778	0.156255	8	8	0.160528
TP	99.00000	37.0000	1.00000	3.20314	0.001360	3.20314	0.001360	8	8	0.000311
TSS	99.00000	37.0000	1.00000	3.20314	0.001360	3.21260	0.001316	8	8	0.000311
Cl	74.00000	62.0000	26.00000	0.57762	0.563524	0.57762	0.563524	8	8	0.573737
TOC	89.00000	47.0000	11.00000	2.15293	0.031325	2.15293	0.031325	8	8	0.028127
Hard.	39.00000	97.0000	3.00000	-2.99310	0.002762	-2.99310	0.002762	8	8	0.001088
TS	62.00000	74.0000	26.00000	-0.57762	0.563524	-0.57762	0.563524	8	8	0.573737
TDS	52.00000	84.0000	16.00000	-1.62783	0.103563	-1.62783	0.103563	8	8	0.104895
Alk.	41.00000	95.0000	5.00000	-2.78306	0.005385	-2.78306	0.005385	8	8	0.002953
TKN	86.00000	50.0000	14.00000	1.83787	0.066083	1.83787	0.066083	8	8	0.064957
Sulfate	42.00000	94.0000	6.00000	-2.67804	0.007406	-2.67804	0.007406	8	8	0.004662
Fl	86.50000	49.5000	13.50000	1.89038	0.058708	1.92026	0.054826	8	8	0.049883
COD	83.00000	53.0000	17.00000	1.52280	0.127809	1.52280	0.127809	8	8	0.130381
Mg	66.50000	69.5000	30.50000	-0.10502	0.916359	-0.10510	0.916298	8	8	0.878477
Ca	40.00000	96.0000	4.00000	-2.88808	0.003876	-2.88808	0.003876	8	8	0.001865
Substrate	43.50000	76.5000	7.50000	-2.31455	0.020638	-2.34619	0.018967	8	7	0.013986
Cover	38.50000	81.5000	2.50000	-2.89319	0.003814	-2.94084	0.003273	8	7	0.001243
Channel	40.00000	80.0000	4.00000	-2.71960	0.006537	-2.77207	0.005570	8	7	0.003730
Bank	53.50000	66.5000	17.50000	-1.15728	0.247161	-1.20212	0.229319	8	7	0.231857
Pool	54.00000	66.0000	18.00000	-1.09941	0.271590	-1.11546	0.264653	8	7	0.280963
Riffle Run	52.50000	67.5000	16.50000	-1.27300	0.203018	-1.51574	0.129586	8	7	0.189277
Gradient	46.00000	74.0000	10.00000	-2.02523	0.042844	-2.15410	0.031233	8	7	0.040093
QHEI	38.50000	81.5000	2.50000	-2.89319	0.003814	-2.91144	0.003598	8	7	0.001243
Water	78.00000	58.0000	22.00000	0.99770	0.318426	0.99770	0.318426	8	8	0.328205
Com.	61.00000	75.0000	25.00000	-0.68264	0.494837	-0.68465	0.493563	8	8	0.505361
Ag	90.00000	46.0000	10.00000	2.25795	0.023949	2.25795	0.023949	8	8	0.020668
HD-Res	71.00000	65.0000	29.00000	0.26255	0.792896	0.26255	0.792896	8	8	0.798446
LD-Res	64.00000	72.0000	28.00000	-0.36757	0.713192	-0.36757	0.713192	8	8	0.720901
G/P	50.00000	86.0000	14.00000	-1.83787	0.066083	-1.83787	0.066083	8	8	0.064957
Forest	46.00000	90.0000	10.00000	-2.25795	0.023949	-2.25795	0.023949	8	8	0.020668
Ind.	64.00000	72.0000	28.00000	-0.36757	0.713192	-0.38371	0.701192	8	8	0.720901


Eigenvalues of correlation matrix
Active variables only
62.40%
17.73%
8.82%
5.70%
3.76%
1.59%
Eigenvalue
Eigenvalue number
12
10
8
6
4
2
0
-2
-2
0
2
4
6
8
10
12
14
16
18
20

Variable	Factor coordinates of the variables, based on correlations	
	Factor 1	Factor 2
Substrate	0.808313	0.160775
Cover	0.818947	-0.111592
Channel	0.869880	-0.276913
QHEI	0.916311	0.102080
DO	0.845256	-0.226556
Hard.	0.842152	-0.520016
TP	-0.907258	-0.279274
TOC	-0.877834	0.320690
NTU	-0.843687	0.326896
NH4	-0.625427	-0.613331
Alk.	0.753178	-0.615480
Ca	0.487809	-0.727212
Ag	-0.694978	-0.667082