BEACON ENVIRONMENTAL

GUIDING SOLUTIONS IN THE NATURAL ENVIRONMENT

Gull Lake Invasive Species Report

Prepared For:

Gull Lake Cottagers Association

Prepared By:

Beacon Environmental Limited

Date: *Project:*

April 2019 **218240**

MARKHAM
80 Main Street North
Markham, ON L3P 1X5
T) 905.201.7622❖ F) 905.201.0639

BRACEBRIDGE
126 Kimberley Avenue
Bracebridge, ON P1L 1Z9
T) 705.645.1050

GUELPH
373 Woolwich Street
Guelph, ON N1H 3W4
T) 519.826.0419

PETERBOROUGH
305 Reid Street
Peterborough, ON K9J 3R2
T) 705.243.7251

BARRIE
6 Cumberland Street
Barrie, ON L4N 2P4
T) 705.999.4935

Table of Contents

page

1. Introduction 1
2. Methods 1
3. Results 1
3.1 Site Descriptions 2
3.1.1 Site 1 2
3.1.2 Site 2 2
3.1.3 Site 3 2
3.1.4 Site 4 3
3.1.5 Site 5 3
3.1.6 Site 6 3
3.1.7 Site 7 3
3.1.8 Site 8 3
3.1.9 Site 9 3
3.1.10 Site 10 4
3.1.11 Site 11 4
3.1.12 Site 12 4
3.1.13 Site 13 4
3.2 Species Descriptions 4
3.2.1 Bluntnose Minnow 4
3.2.2 Largemouth Bass 5
3.2.3 Logperch 5
3.2.4 Pumpkinseed 5
3.2.5 Rock Bass 5
3.2.6 Smallmouth Bass 5
3.2.7 Yellow Perch 6
4. Discussion 6
5. Conclusion 6
6. References 8

Figures

Figure 1. Sample Locations ..... after page 2

Tables

Table 1. Gull Lake Fish Community Summary (Number of Fish Captured at Each Sample Location) 2

Appendices

A. Sampling Location Photos
B. Fish Voucher Photos
C. Detailed Fish Measurement Results

1. Introduction

Beacon Environmental Limited (Beacon) was retained by the Gull Lake Cottagers Association to undertake a high level fish community study of Gull Lake. The purpose of this study was to survey and document the fish community of Gull Lake, with a focus on invasive species. Located north of Miners Bay along Highway 35, Gull Lake is a deep coldwater lake. The lake is known to support Cisco species (*Coregonus* spp), Lake Trout (*Salvelinus namaycush*), Largemouth Bass (*Micropterus salmoides*), Pumpkinseed (*Lepomis gibbosus*), Rainbow Trout (*Oncorhynchus mykiss*), Yellow Perch (*Perca flavescens*), Rock Bass (*Ambloplites rupestris*), White Sucker (*Catostomus commersonii*), and Smallmouth Bass (*Micropterus dolomieu*) (MNRF, 2018).

2. Methods

Several methods were considered while determining the most effective way to survey the fish community of the lake. Seine net sampling was selected as the most effective technique based on the size of the lake and the available sampling time. Utilizing a large seine net, samples were gathered from 13 separate locations across the lake. Sample locations are provided on **Figure 1**. Photos of the seine netting technique are provided in **Appendix A**. Care was taken to ensure that samples were taken from a diversity of habitat types across the lake.

The main goal of each sampling event was to collect, identify and catalogue each fish species captured. In this manner, the largest portion of the lake could be sampled in the shortest amount of time, all while searching for possible invasive species. Although the overall goal was to determine the threat or presence of invasive species, voucher photos and length measurements were also taken for each species of the native community. Five length measurements were taken per species and per site location. When dealing with instances in which more than five of a species were captured at one site, a dot tally was used to keep track of the additional number of specimens captured at that location. Overall habitat conditions were also noted at each site location, as well as any abnormalities among the sampled fish.

3. Results

Species composition results are outlined below in **Table 1.** A brief description of each site location is provided below followed by a description of each fish species captured. Site Location photos are included in **Appendix A** and fish voucher photos are included in **Appendix B**. Detailed length measurement results are documented in **Appendix C.**

Table 1. Gull Lake Fish Community Summary (Number of Fish Captured at Each Sample Location)

Species	Sample Location												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Bluntnose Minnow *Pimephales notatus*	-	22	-	-	-	47	-	22	-	2	-	-	31
Largemouth Bass *Micropterus salmoides*	-	1	-	-	-	2(1)*	-	-	1(1)	-	2	-	4
Logperch *Percina caprodes*	-	2	2	-	-	12(12)	-	1	-	1(1)	2	-	11(3)
Pumpkinseed *Lepomis gibbosus*	-	20	-	-	-	1	-	-	-	-	3	-	7
Rock Bass *Ambloplites rupestris*	-	2	-	-	-	1	-	-	-	-	-	-	-
Smallmouth Bass *Micropterus dolomieu*	2	-	-	4	6	6(4)	2	-	-	1(1)	3	1	1(1)
Yellow Perch *Perca flavescens*	-	-	-	-	-	20(15)	-	-	-	1	-	-	4

**Number between brackets indicates the number of individuals identified with black spot disease*.

3.1 Site Descriptions

3.1.1 Site 1

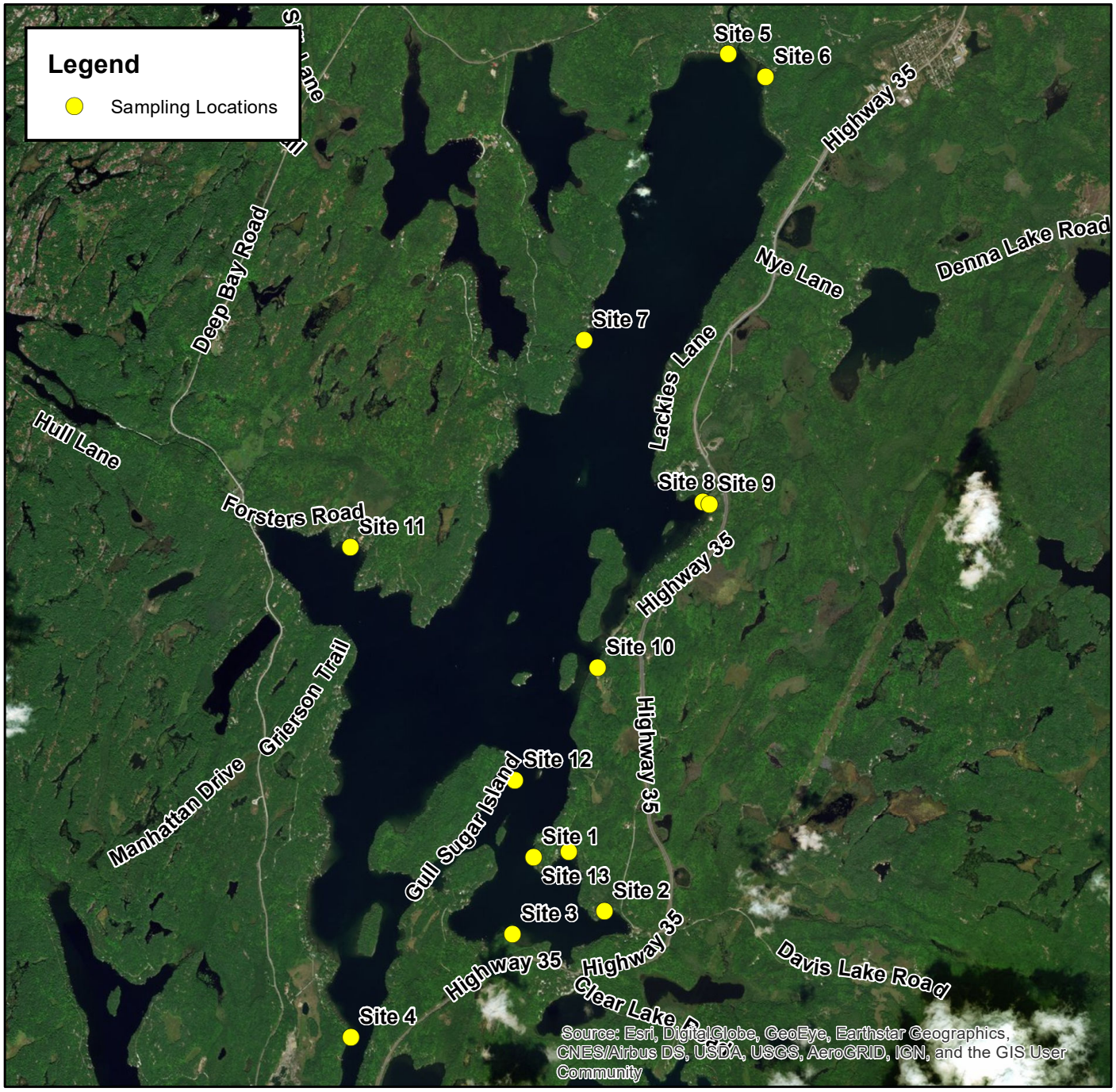
Located at the southeastern end of the lake, habitat at this location was composed of a moderate depth gradient with sand as the dominant substrate adjacent to a rock shoal outcropping. Sparse aquatic vegetation was noted at the outermost limit of the seine net. Two Smallmouth Bass were captured and sampled while multiple others were identified hiding amongst the rocks of the shoal. No invasive species were captured at this location.

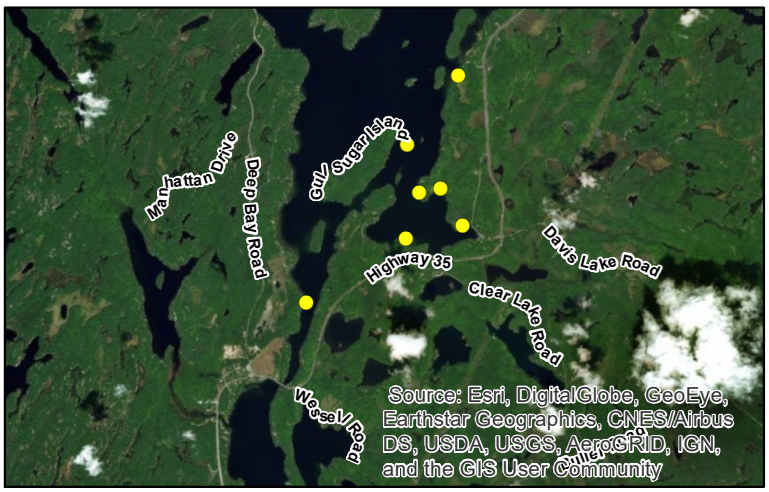
3.1.2 Site 2

Located at the southeastern end of the lake, habitat at this location was composed of a combination of sand and muck with large amounts of emergent and submerged aquatic vegetation. Located at the southernmost end of the lake, this sample location demonstrated the second highest level of diversity of any site. Bluntnose Minnow was the most common species captured at this location (22) followed closely by Pumpkinseed (20). Largemouth Bass (1), Logperch (2), and Rock Bass (2) were also captured but in much fewer numbers. Rock Bass were the only invasive/introduced species captured at this location.

3.1.3 Site 3

Habitat at this location was composed of 5 to 8 cm of muck above predominantly sand substrate. The depth gradient at this location was very gradual, remaining quite shallow until well out into the bay. Emergent vegetation was common across this site location. Two Logperch were captured and sampled at this site location. No invasive species were found.





Sample Locations	Figure 1
Gull Lake Invasive Species Sampling	
BEACON ENVIRONMENTAL	Project: 218240 Last Revised: January 2019
Client: Gull Lake Stewardship Committee	Prepared by: BD Checked by: TD
N	1:48,800 — Inset Map:1:100,000

C:\Dropbox\Dropbox (Beacon)\All GIS Projects\2018\218240\MXD\2018-11-29_Figure01_SampleLocations_218240.mxd

3.1.4 Site 4

Located in the southernmost end of the lake, habitat at this location was composed of predominantly sand substrate. Located along a small beach, depth of this site location descended rapidly as it extended outwards to a deeper channel of the lake. Submergent vegetation was observed commonly throughout the sample area. Four Smallmouth Bass were captured at this site location. No invasive species were present.

3.1.5 Site 5

Located at the northern end of the lake, habitat at this location transitioned from a cobble dominant substrate into a mixture of sand, muck, and emergent aquatic vegetation. Six Smallmouth Bass were sampled, no invasive species were found.

3.1.6 Site 6

Located towards the northernmost extent of the lake, Site Location 6 is situated a short distance east of the inlet of the Gull River. This location displayed the highest species diversity as well as the highest volume of fish captured of any site. The habitat at this location was composed of muck with submergent vegetation transitioning into a sandy beach. Site 6 was the first location in which black spot disease (discussed further in Section 4) was noted amongst the captured population. Four out of seven of the different species sampled displayed some degree of infection. One Rock Bass was the only invasive/introduced species found at this location.

3.1.7 Site 7

Site 7 was located along the northeastern shore of the lake with a reasonably compacted clay and silt shoreline and sparse submergent vegetation. The depth gradient at this location was quite gradual. Two Smallmouth Bass were the only fish captured at this location. No invasive species were captured.

3.1.8 Site 8

Site 8 was located at a small peninsula along the eastern portion of the lake. Habitat at this site location was composed of a gravel boat ramp leading into deep muck with dense emergent and submergent aquatic vegetation. Logperch and Bluntnose Minnow were the only fish species captured at this site location. No invasive species were captured.

3.1.9 Site 9

Site 9 was located immediately east of Site 8 along a sand beach. The depth gradient at this location was extremely gradual. Sparse emergent vegetation was present across the beach. A single Largemouth Bass was captured at this location. One additional school of 20 to 30 Bluntnose Minnow

were observed but were able to evade capture by the seine net. No invasive species were identified at this location.

3.1.10 Site 10

Site 10 was located on a sand and gravel beach along the eastern portion of the lake. Submergent and emergent aquatic vegetation were both moderately abundant at this location. Five individuals (total) of four different species were captured at this location. Black spot disease was noted in 40% of these individuals. No invasive species were captured.

3.1.11 Site 11

Site 11 was located along the western side of the lake at a large rock shelf with substrate of cobble and muck. Pumpkinseed, Largemouth Bass, Smallmouth Bass, and Logperch were all captured at this location. No invasive species were captured.

3.1.12 Site 12

Site 12 was located along an island in the central region of the lake. The sample location was situated on north end of the island within a 1.5 m deep saddle of gravel, cobble, and boulder. One Smallmouth Bass was captured at this location. No invasive species were present.

3.1.13 Site 13

Site 13 was located along a long sandy beach in the southeastern end of the lake. Moving outwards from shore the sand substrate transitioned in 0.3 m to 0.6 m of muck with sparse submergent aquatic vegetation. Six species (58 individuals) were captured at this site location. Black spot disease was noted in a small percentage of the Logperch captured. No invasive species were captured at this location.

3.2 Species Descriptions

3.2.1 Bluntnose Minnow

The Bluntnose Minnow is a member of the Cyprinid or Minnow family of fish. Bluntnose minnows are common and widespread and are known to inhabit lakes, rivers, ponds and streams, with a preference for shallow, clear water with a sandy bottom. Their range extends across North America, east of the Rockies. Their diet consists of aquatic insects, algae, diatoms, aquatic insect larvae, and small crustaceans. They reach a size of around 6-7 cm and form an important component of the forage base in aquatic systems.

3.2.2 Largemouth Bass

Largemouth Bass are part of the Centrarchid family of fishes. They are a carnivorous game fish that feeds on small bait fish, scuds, small shrimp, and insects as juveniles and smaller fish, snails, crayfish, frogs, snakes, salamanders, bats and even small water birds and mammals. They are native to most of North America and Mexico but have been introduced in other countries where they are considered invasive. Largemouth Bass typically inhabit areas with an abundance of aquatic vegetation, which provides a place for food and cover if necessary, and clear water. Lakes are their preferred environment, where adults function as top predators.

3.2.3 Logperch

Logperch are a benthic species that inhabit clear, gravelly streams and lakes. They are a native species in Ontario and are common in the eastern United States and Canada. This species reaches a maximum size of about 18 centimeters and a maximum age of about 3 years. Their diet consists primarily of benthic invertebrates, which it hunts by flipping over stones with its snout. Natural predators are primarily piscivorous fish. The common logperch is currently not a threatened or endangered fish species. These fish also comprise part of the forage base.

3.2.4 Pumpkinseed

Pumpkinseeds are also part of the Centrarchid family of fishes and typically inhabit warm, calm lakes, ponds, pools of creeks and small rivers with plenty of vegetation. They prefer clear water where they can find shelter to hide. They tend to stay near the shore and can be found in numbers within shallow and protected areas. These sunfish usually travel together in schools that can also include bluegills and other sunfish. They are native to much of eastern North America including Ontario. The maximum size of these fish is approximately 10 cm and in this regard, they also contribute to the forage base.

3.2.5 Rock Bass

Rock Bass are a native species in Ontario but have been introduced in numerous lakes where they have reached a level of overabundance. They are similar in appearance to smallmouth bass but are usually quite a bit smaller. Identifying characteristics of rock bass are their two dorsal fins that have spinous and soft-rayed united portions, a large mouth, six anal spines, red eyes; rows of dark dots on their sides. They typically inhabit clear, rocky, and vegetated stream pools and lake margins where they congregate, often among other sunfish. They typically reach a size of 15-20 cm and feed on insects, crustaceans and smaller fish and crayfish.

3.2.6 Smallmouth Bass

The smallmouth bass inhabits clear water and rockier less vegetated habitat than Largemouth Bass. They are also found more often in cooler water temperatures than the Largemouth Bass. Smallmouth Bass are less tolerant of compromised water quality and therefore can be an indicator of a healthy environment. Smallmouth Bass are also top predators and feed on crayfish, insects, and smaller fish.

3.2.7 Yellow Perch

Yellow Perch are native to eastern North America and typically inhabit shorelines among reeds and aquatic weeds, docks, and other structures. They are most dense within aquatic vegetation, since they naturally school, but also prefer small, weed-filled water bodies with muck, gravel, or sand bottoms. Large adult perch feed on invertebrates, fish eggs, crayfish, mysid shrimp, and juvenile fish but are also an important part of the forage base and are preyed upon by nearly all piscivore fish and birds. Their size ranges from about 10 to 30 cm.

4. Discussion

Rock Bass were the only invasive/introduced species captured within Gull Lake. A total of three individuals were captured between two site locations. This population makes up less than 2% of the total fish population sampled. Rock Bass have been widely introduced across Ontario. Risks associated with the presence of Rock Bass generally include increased competition against native species such as Smallmouth Bass (Holm, 2009). These two fish species share similar habitat and diets. Abundantly increasing Rock Bass populations usually indicate declining populations of Smallmouth Bass (Holm, 2009). Using the population information of the sampled locations, Smallmouth Bass are still abundant within the lake. However, this relationship should be monitored moving forward in case of any changes.

Black spot disease is freshwater fish disease cause by flatworm larvae. It was noted within approximately 13% of the sampled fish population. This disease becomes noticeable when parasitic flatworms appear as tiny black spots on the skin, fins and flesh of fish. No method of control is currently available for the elimination of this parasite; however, the organism does little harm to the fish it infects (IDNR, 2018). The largest problem associated with black spot disease is the unappealing appearance it may cause amongst the fish it infects.

Notwithstanding the limited sampling methodology of this program, the capture of 7 species of fish can be considered indicative of a healthy fish population within the nearshore areas. The species captured represent both forage and predator functions within this system, which is also indicative of a healthy population.

5. Conclusion

Sampling of the nearshore areas using a seine net resulted in the capture of six native species and one introduced or invasive species i.e. Rock Bass. The number of Rock Bass captured constituted a small proportion of the overall sample Based on this result, their presence is not likely a concern for the fish community or the overall ecosystem of Gull Lake. Future sampling could be undertaken to monitor the numbers of Rock Bass and to detect any other invasive or introduced species.

Report prepared by:
Beacon Environmental

Blair Kimble, B.A, F.W.T
Aquatic Ecologist

Report reviewed by:
Beacon Environmental

Taco den Haas, M.Sc.
Aquatic Ecologist

Report reviewed by:
Beacon Environmental

Jo-Anne Lane, M.Sc.
Principal

6. References

Holm, E., Mandrak, N.E. and Burridge, M.E. 2009.
The ROM field guide to freshwater fishes of Ontario. ROM.

Indiana Department of Natural Resources (IDNR). 2018.
Fish Parasites and Diseases. State of Indiana.

Maine Inland Fisheries and Wildlife (MIFW). 2017.
Fish Health Issues.

Ministry of Natural Resources and Forestry (MNRF). 2018.
Fish ON-Line Mapping.

Appendix A

Seine Net and Sampling Location Photos

Appendix A

Gull Lake Seine Netting and Sampling Location Photos

Seine Netting 1

Seine Netting 2

Site Location 1

Site Location 2

Site Location 3

Site Location 4

Site Location 5

Site Location 6

Site Location 7

Site Location 8

Site Location 9

Site Location 10

Site Location 11

Site Location 12

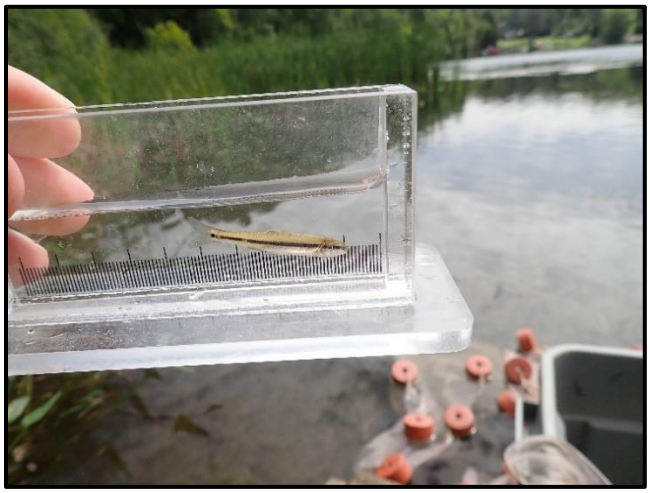
Site Location 13

Appendix B

Photo Vouchers – Sampled Fish

Appendix B

Photo Vouchers – Sampled Fish



Photograph 1.
Bluntnose Minnow - *Pimephales notatus*

Photograph 2.
Largemouth Bass - *Micropterus salmoides*

Photograph 3.
Logperch - *Percina caprodes*

Photograph 4.
Pumpkinseed - *Lepomis gibbosus*

Photograph 5.
Rock Bass - *Ambloplites rupestris*

Photograph 6.
Smallmouth Bass - *Micropterus dolomieu*

Photograph 7.
Yellow Perch - *Perca flavescens*

Photograph 8.
Logperch - (*Percina caprodes)* Displaying Black Spot Disease

Appendix C

Detailed Fish Measurement Results

Appendix C

Detailed Fish Measurement Results

Table 1. Site 1 – Sampled Fish Length Results					
Species	**Length (mm)**				
Smallmouth Bass *Micropterus dolomieu*	98	93	-	-	-

Table 2. Site 2 – Sampled Fish Length Results					
Species	**Length (mm)**				
Bluntnose Minnow *Pimephales notatus*	41	49	45	43	51
Largemouth Bass *Micropterus salmoides*	120	-	-	-	-
Logperch *Percina caprodes*	54	53	-	-	-
Pumpkinseed *Lepomis gibbosus*	92	131	96	131	112
Rock Bass *Ambloplites rupestris*	170	110	-	-	-

Table 3. Site 3 – Sampled Fish Length Results					
Species	**Length (mm)**				
Logperch *Percina caprodes*	58	71	-	-	-

Table 4. Site 4 – Sampled Fish Length Results					
Species	**Length (mm)**				
Smallmouth Bass *Micropterus dolomieu*	82	71	76	72	-

Table 5. Site 5 – Sampled Fish Length Results					
Species	**Length (mm)**				
Smallmouth Bass *Micropterus dolomieu*	64	65	51	66	58

Table 6. Site 6 – Sampled Fish Length Results					
Species	**Length (mm)**				
Bluntnose Minnow *Pimephales notatus*	53	52	54	48	50
Largemouth Bass *Micropterus salmoides*	54	56	-	-	-
Logperch *Percina caprodes*	90	88	58	56	86
Pumpkinseed *Lepomis gibbosus*	93	-	-	-	-
Rock Bass *Ambloplites rupestris*	35	-	-	-	-
Smallmouth Bass *Micropterus dolomieu*	73	59	55	56	70
Yellow Perch *Perca flavescens*	51	72	52	113	125

Table 7. Site 7 – Sampled Fish Length Results					
Species	**Length (mm)**				
Smallmouth Bass *Micropterus dolomieu*	66	70	-	-	-

Table 8. Site 8 – Sampled Fish Length Results					
Species	**Length (mm)**				
Bluntnose Minnow *Pimephales notatus*	42	50	51	49	45
Logperch *Percina caprodes*	65	-	-	-	-

Table 9. Site 9 – Sampled Fish Length Results					
Species	**Length (mm)**				
Largemouth Bass *Micropterus salmoides*	45	-	-	-	-

Table 10. Site 10 – Sampled Fish Length Results					
Species	**Length (mm)**				
Bluntnose Minnow *Pimephales notatus*	52	61	-	-	-
Logperch *Percina caprodes*	59	-	-	-	-
Smallmouth Bass *Micropterus dolomieu*	51	-	-	-	-
Yellow Perch *Perca flavescens*	62	-	-	-	-

Table 11. Site 11 – Sampled Fish Length Results					
Species	**Length (mm)**				
Largemouth Bass *Micropterus salmoides*	52	56	-	-	-
Logperch *Percina caprodes*	60	70	-	-	-
Pumpkinseed *Lepomis gibbosus*	60	63	91	-	-
Smallmouth Bass *Micropterus dolomieu*	53	58	56	-	-

Table 12. Site 12 – Sampled Fish Length Results					
Species	**Length (mm)**				
Smallmouth Bass *Micropterus dolomieu*	93	-	-	-	-

Table 13. Site 13 – Sampled Fish Length Results					
Species	**Length (mm)**				
Bluntnose Minnow *Pimephales notatus*	52	43	49	61	51
Largemouth Bass *Micropterus salmoides*	66	68	53	44	-
Logperch *Percina caprodes*	70	94	86	61	91
Pumpkinseed *Lepomis gibbosus*	42	43	60	66	40
Smallmouth Bass *Micropterus dolomieu*	63	-	-	-	-
Yellow Perch *Perca flavescens*	63	61	54	58	-