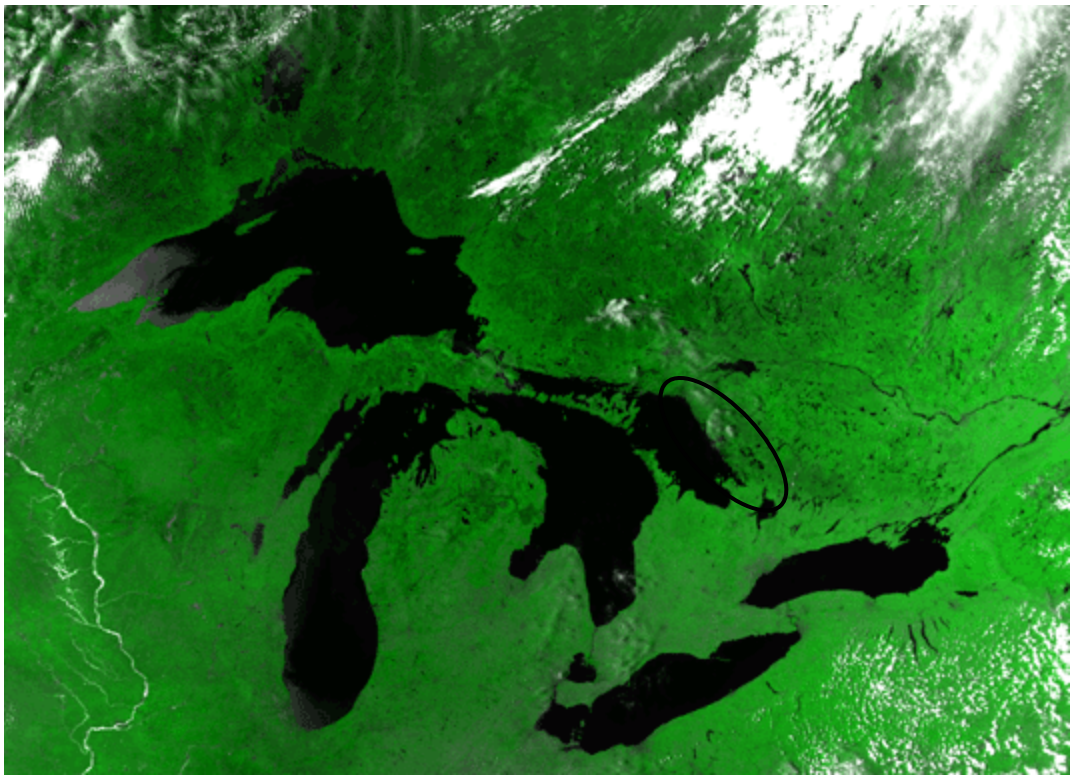
Volunteer Water Quality Monitoring Program
Data Report – 2005

&

Environment Update



Township of The Archipelago
April, 2006

Acknowledgements

This monitoring program represents a successful partnership between the Township of The Archipelago, its constituent communities, and cottager associations in areas along the coast. The volunteer-based program has been ongoing for several years and represents an important avenue for relaying information about the environment to ratepayers and for providing valuable information to the Township to help make decisions.

Considerable thanks are to be extended to all the volunteers who commit significant energy toward the success of this program. The volunteers offer their valuable time, boats, "laboratory space" and much more to help ensure we understand potential changes to our environment. The Township is very appreciative of your commitment.

Report Compiled by the Township of The Archipelago:

Greg Mason, Planner & Ted Thompson, Septic Inspector

For information on its content please contact:

Greg Mason
gmason@thearchipelago.on.ca
(705)746-4243 x 321
Township of The Archipelago
9 James St.
Parry Sound, ON
P2A 1K1

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Area Data

1.0 Introduction

This report outlines the results from the 2005 Water Quality Monitoring Program for the Township of The Archipelago. For most areas, bacterial sampling and water clarity were the two parameters measured while a few locations also sampled conductivity, water temperature, and water pH.

The program purpose, rationale, and methods have been presented in previous year's reports and were followed for the 2005 season similar. Similar to the past two season's report, the purpose of this report is to present the data gathered in the 2005 sampling season. In future years, a multi-year analysis will be necessary to evaluate trends in water quality. It should be noted that this report was created by Township of The Archipelago staff and no analysis or review is provided internally. A peer review analysis was undertaken by a professional biologist and provides critical analysis of the data; it is appended to this report.

The Township is very committed to addressing environmental issues and ensuring the maintenance of the high quality environment we all enjoy. This philosophy is integrated into the day to day functioning of the municipality from public works operations to detailed planning analysis. A summary of the past year's focused environment work, including an update on Sturgeon Bay, is provided at the end of this report.

2.0 Results

The following results were tabulated from data gathered in 2005. Different locations were sampled with different intensity and for varying lengths of time. It is not the purpose of this report to provide analysis or draw conclusions from the data. Rather, what is provided are:

- outlines of the standards against which data can be compared; and
- tables outlining the different data sets and averages for each location for each sample area; and where possible, the averages from the previous sampling years.

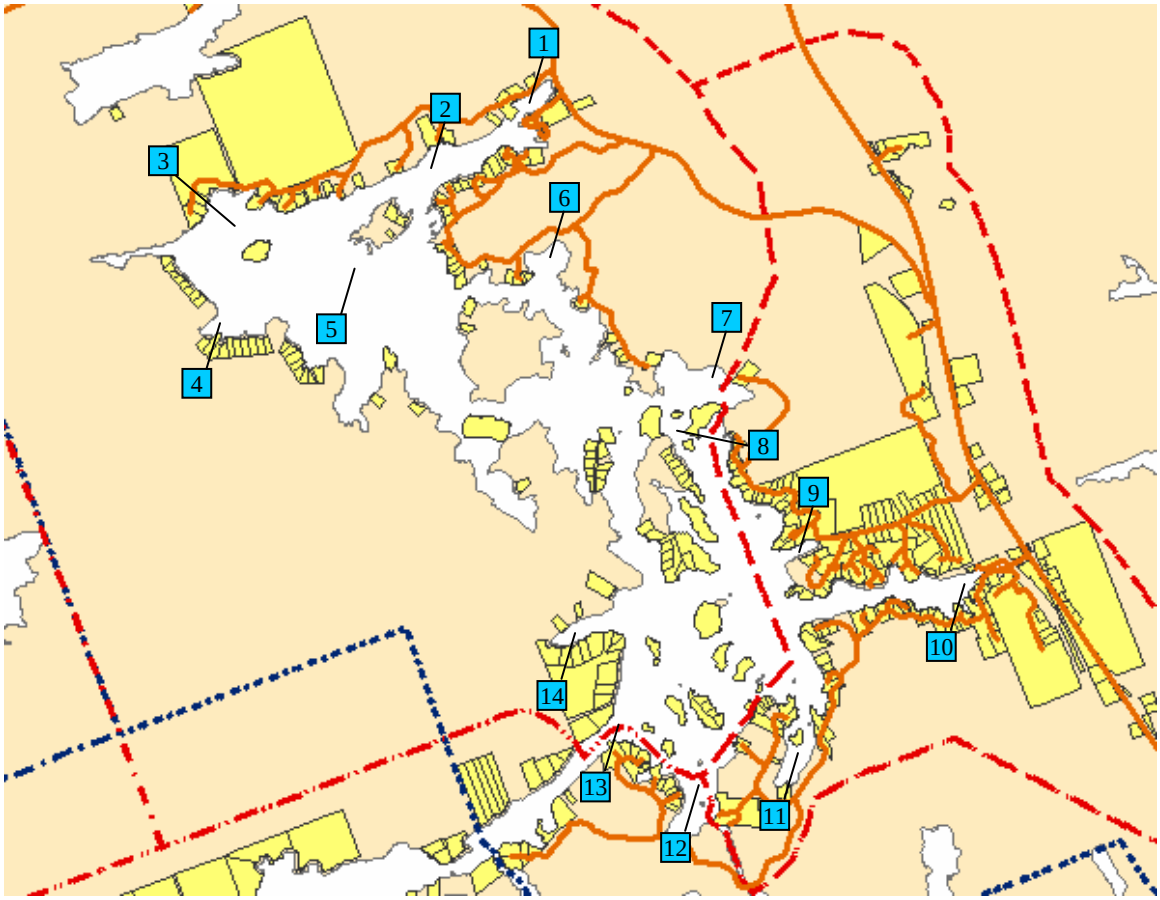
It should be noted that in order to assess the relevance of the data, comparisons should be made between averages and standard deviations (not individual data points per se), previous year averages and against established standards.

New to the data report this year is the culmination of area averages from similar-environment areas. That is, charts are provided comparing water quality in the inland lakes, open bay sampling areas, and back bay sampling areas. When reviewing these data please keep in mind similarities and differences in the surrounding ecosystem and potential differences in sampling methodology (i.e. sampling times).

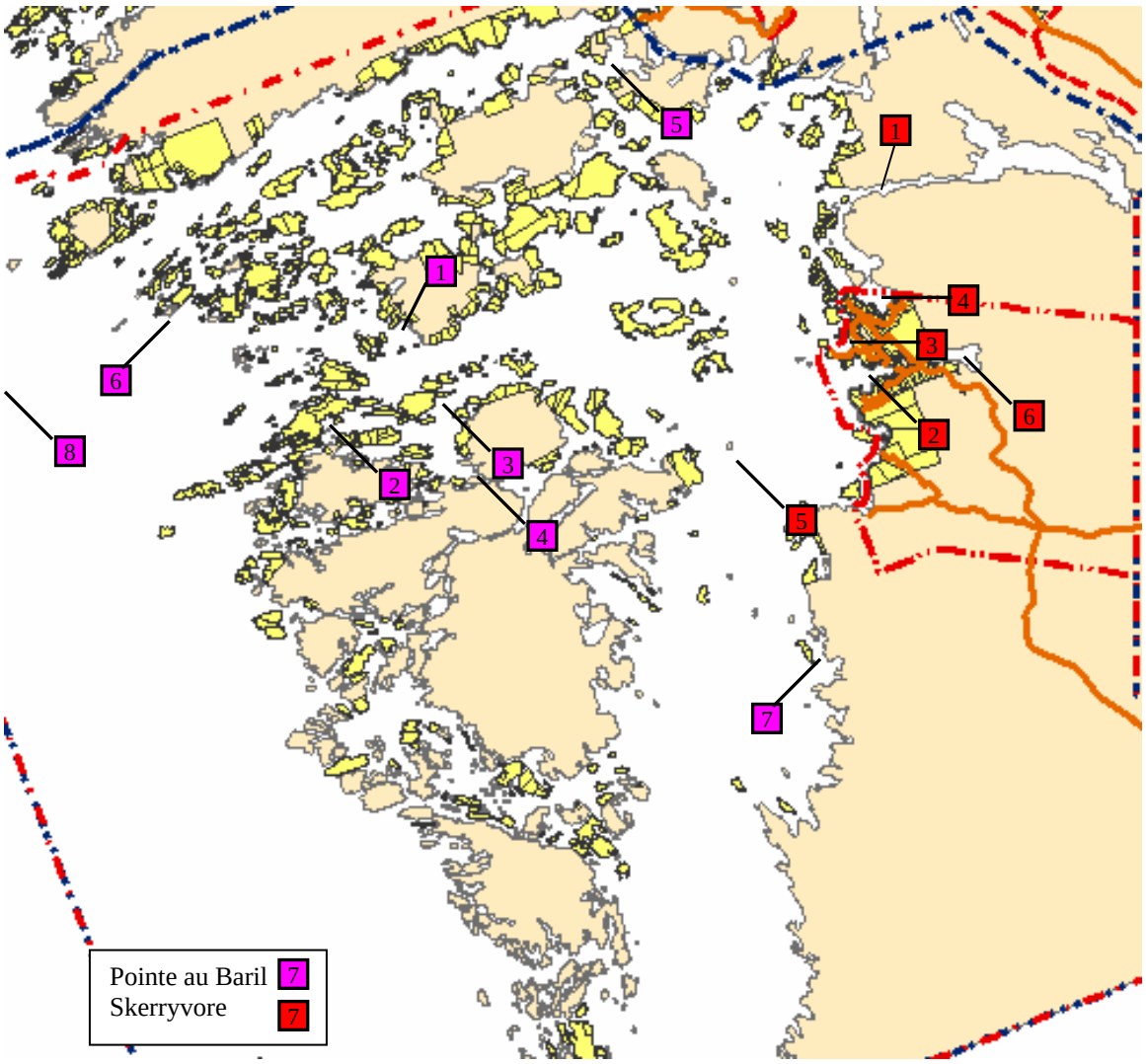
2.1 Sample Locations

Sampling sites have typically been focused on known or expected “hot spots”; areas that may be more likely to be polluted. Some sample areas have also been selected as control stations; these allow comparison between the variety of ecosystem types that exist along the coast and within inland lakes. Maps of the sample areas indicate the sampling locations for the different areas throughout the township. The sample sites include many of the sampling stations used in previous years and volunteers are encouraged to return to those sites in subsequent years. Unlike previous years, results for the different parameters are shown in table format, not on individual maps; refer to the maps when positioning the different samples.

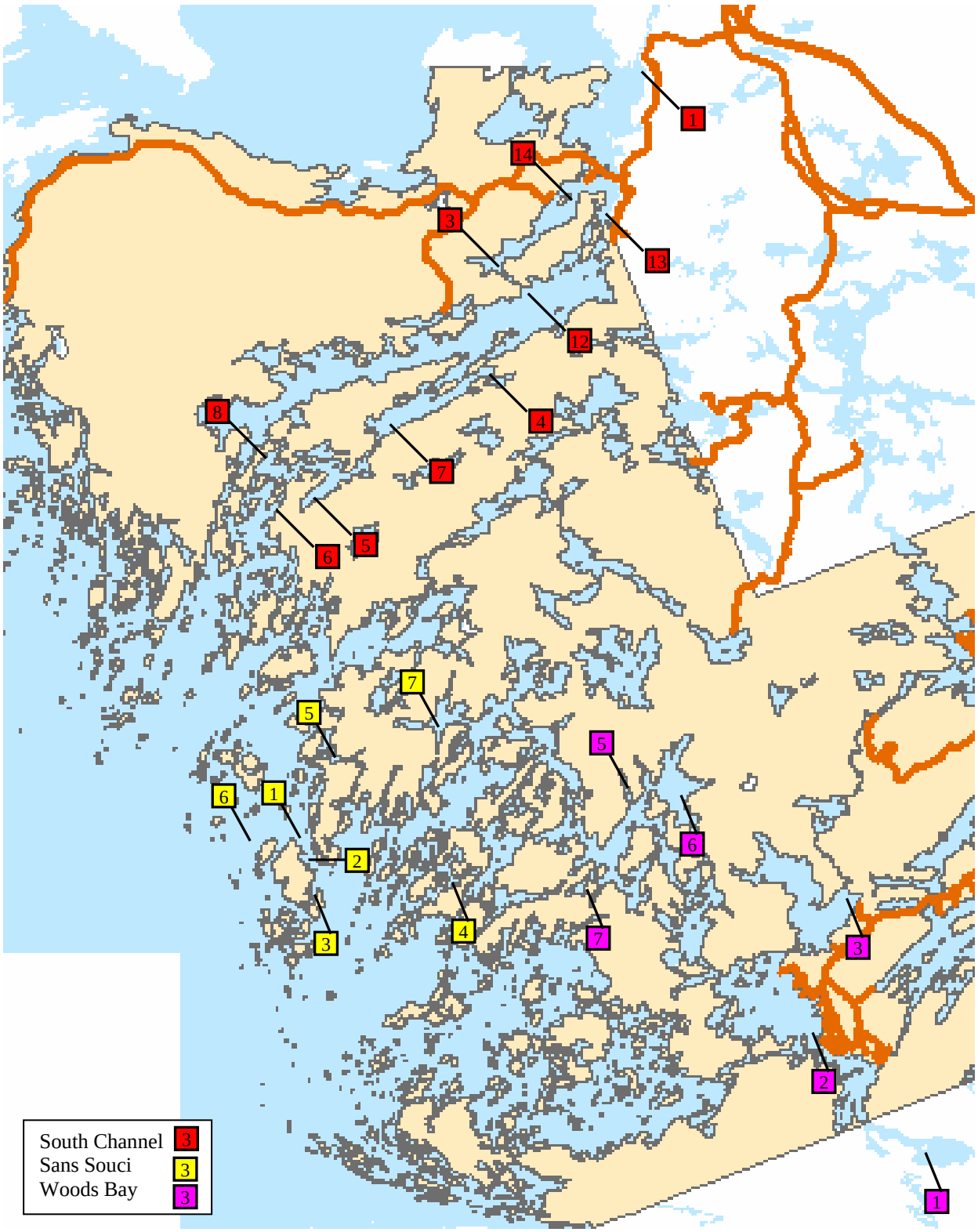
2.1.1 Sturgeon Bay Sampling Locations



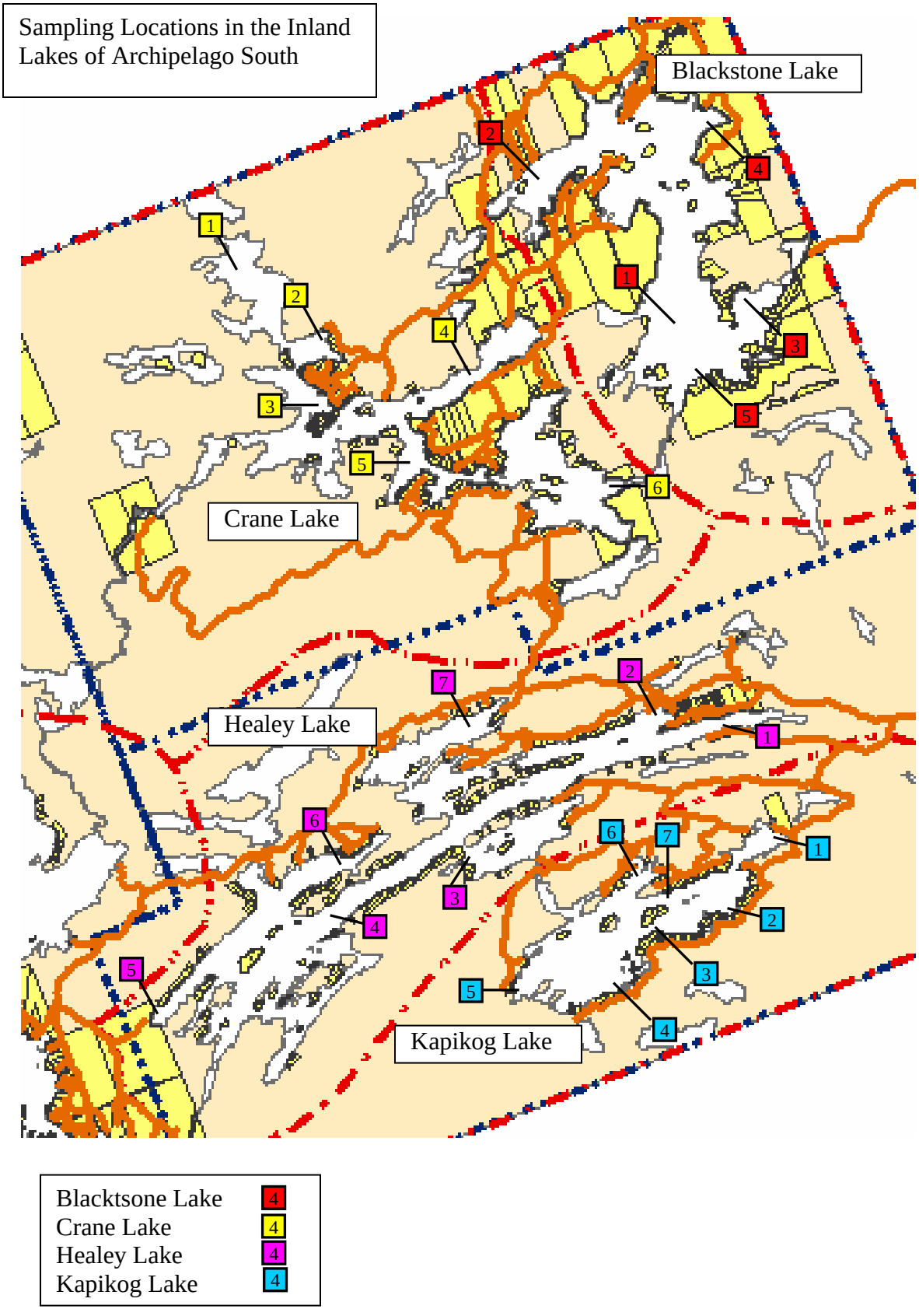
2.1.2 Pointe au Baril Islands and Skerryvore Sampling Locations



2.1.3 South Channel, Sans Souci and Woods Bay Sampling Locations



2.1.4 Inland Lakes of Archipelago South, Sampling Locations



2.2 Water Conductivity and Acidification

Water conductivity measures the ability of water to transmit an electrical current. Generally, water conductivity provides an indicator of water source, flow and mixing patterns along the coast. Areas with higher conductivity readings are generally indicative of open, well mixed areas of The Bay. Low circulation bays and inland lakes, more heavily influenced by runoff, tend to have lower conductivity readings. Shield runoff tends to have very low dissolved solids and thus low conductivity whereas open Georgian Bay waters have higher amounts of dissolved solids and thus higher conductivity. As such, conductivity readings tell a story of the likely source of water in a given area.

Water pH provides a measure of the degree of acidification of water. Waters in the Georgian Bay area typically have a pH between 6.5 and 8.5. Aquatic ecosystems are said to function well within this range; as pH drops below 6.5, various aspect of the aquatic ecosystem come under increased stress and may disappear completely at pH levels below 6.0 (Schiefer 2002). Two key natural influences affect the pH of Georgian Bay waters. Open Georgian Bay waters tend to be more alkaline (higher pH) due to the limestone bedrock of Georgian Bay's southern and western basins. Conversely, runoff from the east shore of Georgian Bay tends to be acidic due to the granite rock which has a lower buffering capacity. A gradient is likely to occur between near-shore low circulation bays and open Georgian Bay. Inland lakes are typically more acidic then open Georgian Bay waters.

For the 2005 sample season, conductivity and pH were measured only for Woods Bay and South Channel Areas. Sample locations are depicted on Figures 1 and 2. Data from previous years have been provided where possible.

2.2.1 Conductivity and Water pH for Woods Bay area of Georgian Bay, 2005

	Station												Average all Stations	
	1		2		3		5		6		7			
Date:	**pH**	**Cond**	**pH**	**Cond**	**pH**	**Cond**	**pH**	**Cond**	**pH**	**Cond**	**pH**	**Cond**	**pH**	**Cond**
11-Jul		58.2		58.5		52.0		62.3		61.3		57.1		58.2
11-Aug	8.9	56.3	8.9	53.2	7.9	48.6	8.9	65.0	8.6	63.8	9.0	4.2	8.7	48.5
26-Aug	8.4	54.7	9.0	52.1	9.7	50.5	8.0	61.5	7.9	61.3	8.1	65.8	8.5	57.7
3-Sep**	8.6	52.5	7.9	58.9	8.2	48.0	9.0	63.4	8.9	60.4	9.3	68.9	8.7	58.7
8-Oct	9.9	45.7	9.8	44.0	10.1	42.1	9.1	61.8	8.9	56.2	6.8	76.6	9.1	54.4
Average	**9.0**	**53.5**	**8.9**	**53.3**	**9.0**	**48.2**	**8.8**	**62.8**	**8.6**	**60.6**	**8.3**	**54.5**	**8.7**	**55.5**
Std Dev	0.7	4.8	0.8	6.0	1.1	3.8	0.5	1.4	0.5	2.8	1.1	29.0	0.3	4.2
Previous Year's Averages														
2004	7.8	48	7.6	47.3	7.7	48.1	7.9	56.1	7.8	56.6	7.6	59	7.7	51.2
2003	8.7	46.0	8.3	43.3	7.9	38.0	8.0	54.5	7.8	55.1	7.9	55.3	8.1	48.7
2002				47						67		72		
2001		55		57						76		84		

Conductivity -- µS/cm ** - denotes significant recent rainfall

2.2.2 Conductivity and pH for South Channel Area of Georgian Bay, 2005

	Station									
	1		3		4		5		6	
Date	pH	cond	pH	cond	pH	cond	pH	cond	pH	cond
30-May	7.3	47.1	8.3	74.4	7.2	91.9	7.0	188.0	7.1	153.5
14-Jun**	6.8	50.4	7.0	89.2	7.0	92.9	6.8	121.4	7.1	152.2
6-Jul	6.8	62.3	7.0	101.6	7.0	100.5	6.9	126.0	6.9	178.9
19-Jul	7.2	71.2	7.1	111.4	7.2	98.7	7.2	117.8	7.2	162.6
2-Aug**	7.0	77.7	7.1	114.3	7.0	100.8	7.1	134.9	7.2	187.8
24-Aug*	6.9	91.5	7.1	116.9	6.9	114.3	7.0	152.5	7.2	195.0
6-Sep	6.9	83.0	7.5	113.1	7.1	98.6	7.5		7.7	184.0
20-Sep*	7.0	106.4	7.1	120.4	6.9	111.9	7.0	150.7	7.6	198.0
11-Oct	6.7	164.4	6.7	121.1	6.7	116.1	6.6	141.4	7.0	199.9
Average	6.9	83.8	7.2	106.9	7.0	102.9	7.0	141.6	7.2	179.1
Std. Dev.	0.2	35.7	0.5	15.8	0.1	9.0	0.2	22.7	0.3	18.7
Past Year's Averages										
2004	6.9	83.8	7.2	106.9	7.0	102.9	7.0	141.6	7.2	179.1
2003	6.1	70.6	6.2	104.0	6.3	104.8	6.3	131.8	6.7	174.6
2002									8.1	162.0
2001									8.1	179.0

	Station								Average All Stations	
	7		8		12		13			
Date	**pH**	**cond**	**pH**	**cond**	**pH**	**cond**	**pH**	**cond**	pH	cond
30-May	7.0	96.0	7.5	141.9	7.0	94.4	6.0	148.5	7.2	115.1
14-Jun**	7.1	97.7	7.2	141.7	6.9	90.2	6.8	151.4	7.0	109.7
6-Jul	6.7	110.2	7.2	151.6	6.8	97.4	6.9	115.9	6.9	116.0
19-Jul	7.1	104.1	7.2	145.3	7.1	101.7	7.1	141.8	7.2	117.2
2-Aug**	6.5	111.8	6.9	163.3	7.1	101.3	7.0	122.6	7.0	123.8
24-Aug*	6.7	120.8	7.2	196.5	6.9	112.8	6.9	130.5	7.0	136.8
6-Sep	6.9	125.7	7.3	160.6	7.0	99.7	7.1	125.6	7.2	123.8
20-Sep*	6.5	130.7	7.1	199.4	6.9	106.7	7.5	137.9	7.1	140.2
11-Oct	6.5	122.6	7.0	193.1	6.7	117.7	6.6	138.7	6.7	146.1
Average	6.8	113.3	7.2	165.9	6.9	102.4	6.9	134.8	7.0	125.4
Std. Dev.	0.2	12.4	0.2	24.0	0.1	8.7	0.4	12.0	0.2	12.7
Past Year's Averages										
2004	6.8	113.3	7.2	165.9	6.9	102.4	6.9	134.8	7.0	125.4
2003	6.3	120.3	6.1	158.6	6.2	99.4	6.3	122.3	6.3	113.1
2002	7.5	84.0			7.6	78.0				
2001	7.8	99.0			7.8	84.0				

Conductivity – µS/cm

2.3 Water Clarity

Water clarity is usually measured using a black-and-white Secchi disc which is lowered into the water until it just disappears from view. This depth is the Secchi depth of visibility, which is directly related to water clarity and can be used as a simple yet effective monitoring tool for determining the effects of human activities on water clarity and, indirectly, on eutrophication. In general, water clarity, as measured by Secchi depth, tends to be higher in open areas of Georgian Bay and in bays with good water circulation. Water clarity tends to diminish (lower Secchi depths) in enclosed bays, near wetlands or sources of organic material, and in lakes or areas that may naturally be more nutrient enriched. When examining the data, expect to see a small decline in Secchi depth throughout the year with lowest depths reading near the end of the summer and into September however a major decline in the readings should be evaluated more carefully. A multi-year comparison of data is of particular value here to assess the water clarity trends for a particular area and where possible, data from previous years have been included with the tables.

2.3.1 Secchi Depths (Water Clarity) in the Sans Souci Area of Georgian Bay, 2005

	Station							Average for All Stations
Date	1	2	3	4	5	6	7	Water Clarity
29-May	10.7	4.3	3.7	3.1	6.1	10.7	3.1	6.0
20-Jun	7.6	4.3	3.1	6.1	7	9.1	3.1	5.8
2-Jul	9.8	5.2	3.7	3.7	4.6		4.6	5.3
16-Jul	9.1	5.2	3.1	4.6	6.1	9.1	4.6	6.0
31-Jul	7.6	6.1	3.7	4.6	3.1	7.6	3.1	5.1
13-Aug	3.4	6.1	3.7	4.6	4.6	9.1	3.7	5.0
28-Aug**	6.1		3.7	3.1	6.1	7.6	4.6	5.2
Average	**7.8**	**5.2**	**3.5**	**4.3**	**5.4**	**8.9**	**3.8**	**5.5**
Std Dev.	2.5	0.8	0.3	1.1	1.3	1.2	0.8	0.4
Previous Years Average								
2004	8.9	5.5	3.5	4.5	5.2	12.1	5.0	6.5
2003	8.3	3.4	2.5	4.1	5.6	9.8	5.1	5.5
2002								7.8
2001								8.5

Depths in metres (m)

2.3.2 Secchi depths (Water Clarity) for the Woods Bay Area of Georgian Bay, 2005

	Station						Average all stations
Date:	**1**	**2**	**3**	**5**	**6**	**7**	**Water Clarity**
11-Jul	2.5	2.0 t.b.	1.5 t.b.	2.5	2.5	2.5	2.5
11-Aug	2	1.6 tb	1.0 tb	3.5	3.5	3.3	3.1
26-Aug	3.5	2.0 tb	2.0 tb	4.5	3.5	3.5	3.8
3-Sep**	3	2.0 tb	3	3.8	3.5	4	3.5
8-Oct	3.2	1.4 tb	3.8	4.0 tb	2.3	3.5	3.2
Average	**2.8**		**3.4**	**3.6**	**3.1**	**3.4**	**3.2**
Std Dev	0.6		0.6	0.8	0.6	0.5	0.5
Previous Years Average							
2004	2.8	1.7	2.9	3.3	3.3	3.4	2.3
2003	2.4		2.7	2.7	2.4	2.9	2.6
2002		3.2			3.8	4.2	
2001		4.5			5.0		

Depths in metres (m)

2.3.4 Secchi depths (Water Clarity) for the South Channel Area of Georgian Bay, 2005

	Station									Average all Stations
Date	**1**	**3**	**4**	**5**	**6**	**7**	**8**	**12**	**13**	
30-May	2.7	2.1	4	5.2	9.1	5.8	6.1	4.3	2.4	4.6
14-Jun**	2.7	3.1	4.6	4.6	6.7	4.6	5.8	4.3	2.1	4.3
27-Jun	3.1	3.4	4.6	5.2	7	5.2	6.1	4.3	2.7	4.6
11-Jul	3.4	3.1	4.3	4	6.4	4.6	5.8	4.6	3.1	4.4
18-Jul	2.7	3.4	5.5	4.8	6.1	4.6	5.2	4.6	2.4	4.4
2-Aug**	3.4	4.3	5.2	4.6	5.5	4.9	4	4.6	2.4	4.3
15-Aug*	3.7	4	5.8	4.9	4.6	4.6	4.6	4.9	3.1	4.5
6-Sep	4	4.6	4.6	3.7	7	3.4	4.3	4.9	3.1	4.4
19-Sep*	3.7	4.6	5.2	4.3	5.5	4.6	4.6	4.9	3.1	4.5
12-Oct	3.4	4	6.1	3.4	7	4.9	4.6	4.9	3.7	4.7
Average	**3.3**	**3.7**	**5.0**	**4.5**	**6.5**	**4.7**	**5.1**	**4.6**	**2.8**	4.5
Std. Dev.	0.5	0.8	0.6	0.5	1.3	0.6	0.8	0.3	0.4	0.1
Previous Years Average										
2004	2.7	3.7	4.8	4.3	6.2	4.2	5.1	4.2	2.9	4.3
2003	2.7	3.3	4.5	4.5	6.1	4.2	4.9	3.8	2.9	4.0
2002	3.5				5.5	4.6		5.5		
2001	3.0				6.0					

Depths in metres (m)

2.3.5 Secchi Depths (Water Clarity) for the Sturgeon Bay area of Georgian Bay, 2005

	Station									
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1-Jun	2.6	1.1 tb	2.8	2.8	2.8	1.6	1.6	1.6	2.1	2.8
17-Jun*	1.7	2.4	2.7	2.7	2.7	1.5	1.8	2.1	2.2	2.2
14-Jul	2.1	3.1	3.7	3.3	3	2.0 tb	2.6	2.7	2.5	3
3-Aug	2	2	2.1	2	2	2.0 tb	3.0 tb	2.1	2.8	3.4
24-Aug	2.3	2.4	2.3	2.6	2.5	1.8 tb	3.5	2.7	2.7	3.3
7-Sep	1.9 tb	2.1	2.1	2.2	2.2	1.5 tb	2.9	2.3	2.5	2.6
21-Oct	1.7	1.6	1.8	1.6	1.8	1.6	2.9	1.8	2.2	1.8
Average	**2.1**	**2.3**	**2.5**	**2.5**	**2.4**	**1.6**	**2.6**	**2.2**	**2.4**	**2.7**
Std. Dev.	0.4	0.5	0.6	0.6	0.4	0.1	0.7	0.4	0.3	0.6
Previous Years Average										
2004	1.9	2	1.9	1.9	2	1.6	2.2	2.2	2.6	2
2003	1.2	1.4	1.5	1.5	1.5	1.3	1.6	1.6	1.9	1.6
2002	0.6				0.7					
2001	1.2				1.6					

	Station				Average All Stations
Date	**11**	**12**	**13**	**14**	
1-Jun	2.5	2	2.5	2.2	**2.3**
17-Jun*	1.8	1.7	1.8	1.8	**2.2**
14-Jul	3.6	3.6	3.6	2.9	**2.9**
3-Aug	2.6	2.5	2.5	2	**2.3**
24-Aug	2.7	3	2.7	2.4	**2.7**
7-Sep	2.3	2.3	2.4	2.2	**2.4**
21-Oct	2	2.1	2.2	1.6	**1.9**
Average	**2.5**	**2.5**	**2.5**	**2.2**	**2.4**
Std. Dev.	0.6	0.7	0.6	0.4	**0.3**
Previous Years Average					
2004	2.6	2.3	2.7	2.4	2.0
2003	1.9	2.1	2.0	1.5	1.6
2002	2.1				
2001	2.8				

Depths in metres (m)

2.3.6 Secchi Depths (Water Clarity) for the Skerryvore area of Georgian Bay, 2005

	STATIONS				
DATE	**1**	**2**	**3**	**5**	**Average All Stations**
14-Jun**	7	3.4	3.4	5.2	4.8
30-Jun	6.7	3.4	3.4	4.9	4.6
1-Aug**	3.7	3.1	3.1	3.7	3.4
Average	**5.8**	**3.3**	**3.3**	**4.6**	**4.3**
Previous Seasons Average					
2004	3.6	4.5	3	4.5	3.9

Depths in metres (m)

2.3.7 Secchi Depth (Water Clarity) in Blackstone Lake, 2005

	Station					Average for all stations
Date	**1**	**2**	**3**	**4**	**5**	
8-Jul	5.8	4.3	5.5	5.2		5.2
6-Aug	5.2	5.2	5.5	4	4.3	4.8
8-Sep	5.2	4.7	5.8	5.3	4.9	5.2
average	5.4	4.7	5.6	4.8	4.6	5.1
std	0.3	0.5	0.2	0.7	0.4	0.4
Previous Years Average						
2004	4.1	4.6	4.4	3.8	4.4	4.3
2003	4.7	4.5	4.8	4.9	4.2	4.6

Depths in metres (m)

Station 1 – Centre of Lake Station 2 – McRoberts Bay Station 3 – Lawson Bay(old)
Station 4 – Blackstone Landing Station 5 – Lawson Bay (new)

2.3.8 Secchi Depth (Water Clarity) in Crane Lake, 2005

	STATIONS						Average All Stations
DATE	**1**	**2**	**3**	**4**	**5**	**6**	
19-Jun	4	4	4	3.8	3.5	3.5	**3.8**
10-Jul	5	5	5	5	5	5	**5.0**
25-Jul	4.5	4.5	4.5	5	5.5	4.7	**4.8**
15-Aug	5	5	5	4.5	5	5	**4.9**
27-Sep	5	5	5	4	5	6	**5.0**
Average	**4.7**	**4.7**	**4.7**	**4.5**	**4.8**	**4.8**	**4.7**
Std. Dev.	0.4	0.4	0.4	0.6	0.8	0.9	0.5
Previous Years Average							
2004	**4.3**	**4.4**	**4.4**	**4.1**	**4.4**	**5**	**4.4**
2003	**2.6**	**2.6**	**2.6**	**2.5**	**2.8**	**2.9**	**2.6**

Depths in metres (m)

Station 1 – North End
Station 2 – Armstrong/Fish Bay
Station 3 – Fish Bay/Agaming Landing
Station 4 -- Marina
Station 5 – Overflow Bay (Narrows)
Station 6 – Mouth of Blackstone

2.3.9 Secchi Depth (Water Clarity) in Healey Lake, 2005

	Station							Average for all stations
Date	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
20-May	3.1	3.7	3.4	3.4	3.1	4	1.2	3.1
25-Jun*	3.1	2.7	4	3.7	3.1	3.4	1.5	3.1
23-Jul	3.1	2.7	3.7	3.7	3.1	3.1	1.5	3.0
13-Aug*	2.7	2.7	3.1	3.7	3.4	3.4	1.8	3.0
3-Sep	3.1	2.7	3.4	3.4	3.4	3.7	1.8	3.1
Average	**3.0**	**2.9**	**3.5**	**3.6**	**3.2**	**3.5**	**1.6**	**3.0**
Std.Dev.	0.2	0.4	0.3	0.2	0.2	0.3	0.3	0.1
Previous Years Average								
2004	2.9	3.2	3	3.3	3.2	3.2	1.1	2.9
2003	2.6	2.5	3	2.9	3.1	2.7	1.3	2.8

t.b. – disk to bottom Depths in metres (m)

#1 Healey Lake Lodge
#2 Between Two Marinas
#3 Kapikog Bay
#4 Main Channel (Btw Lots 337 & 264
#5 West End (Lot #105)
#6 Lot #209
#7 East end of Dollar Bay

2.3.10 Secchi Depth (Water Clarity) in Kapikog Lake, 2005

	Station								Average all stations
Date:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
4-Jul	4	4.3	4.3	t.b.	4	4.3	3.7	4.6	4.2
18-Jul**	4.6	4.8	4	t.b.	4.6	4.6	4.6	4.6	4.5
15-Aug**	4	4.3	4.3	t.b.	4	4.6	4.6	4.6	4.3
30-Aug**	4.6	4.6	4.6	t.b.	4.6	4.6	4.6	4.6	4.6
Average	**4.3**	**4.5**	**4.3**		**4.3**	**4.5**	**4.4**	**4.6**	**4.4**
Std. Dev.	0.3464	0.24	0.245		0.346	0.15	0.45	0	0.2
Previous Years Averages									
2004	**3.8**	**3.7**	**4.2**		**3.8**	**4.3**	**4.3**	**4.2**	**4.1**
2003	**3.1**	**3.4**	**3.3**	**2.9**	**3.1**	**3.2**	**3.1**	**3.4**	**3.2**

t.b. – disk to bottom Depths in metres (m)

Station 1 – Marina Station 2 – Lot 14 Station 3 – Lot 42 Station 4 – Lot 48

Station 5 – Chin's Bay Station 6 – Monroe's Bay Station 7 – Lot 89 Station 8 – Mid Lake

2.4 Bacterial Monitoring

Results of bacterial monitoring in a number of locations of the Township of The Archipelago are provided by location in this section of the report

2.4.1 Bacterial Reference Guidelines and Objectives

The following bacterial guidelines and objectives are provided to assist in the interpretation of bacterial monitoring results presented in this report.

Provincial Regulatory Guideline levels for total coliforms (TC) are as follows:

- 1,000 – levels higher than this are considered unsuited for recreational water use;
- 200 – levels higher than this are considered to be indicative of deteriorating water quality; and
- 10 – levels higher than this are considered unsafe for human consumption

NOTE: total coliforms are no longer used as a regulatory guideline in Provincial Water Quality Objectives. Total coliform levels have been found to be too variable and are largely considered to be a natural component of ecosystems

The objectives for *E. coli* (EC) are as follows:

- 100 – levels higher than this are considered unsuited for recreational water use
- 0 – levels higher than this are considered unsafe for human consumption without prior treatment.

NOTE: provincial bacterial levels are to be based on a geometric mean of five samples taken in the same local area at the same time.

Based on a number of years of intensive bacterial monitoring throughout the Township of Georgian Bay and the Township of The Archipelago, the following has been recommended as a suggested bacterial objective for recreational waters of Georgian Bay and the associated inland lakes:

- **Total Coliforms (annual average): - 100 TC**
- ***E. Coli* (annual average): - 10 EC**

The following tables present the data by sample area for each sampling location and date within that area. A calculated standard deviation and average is presented for each sample locations and an average of all sampling locations for each general area is also provided.

Recent heavy rain events are indicated by (**) beside the sampling dates and medium to light recent rain events are indicated by (*) beside each sample date.

2.4.2 Bacterial Sampling of Surface Water for Total Coliforms (TC) and E. Coli (EC) in the Sans Souci Area of Georgian Bay, 2005

	Station														Average for All Stations	
	1		2		3		4		5		6		7			
Date	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**
29-May	79	0	13	0	8	0	8	3	5	0	3	0	5	0	17.3	0.4
20-Jun	16	0	43	3	25	0	177	0	19	0	5	0	90	3	53.6	0.9
2-Jul	13	0	43	3	13	3	161	19	119	11			65	11	69.0	7.8
16-Jul	69	3	5	0	28	0	59	5	87	3	5	0	43	3	42.3	2.0
31-Jul	16	0	39	0	132	5	22	0	119	3	59	0	123	0	72.9	1.1
13-Aug	30	0	19	5	30	0	69	8	22	0	0	0	39	0	29.9	1.9
28-Aug **	52	3	28	3	49	3	43	0	62	8	19	0	28	0	40.1	2.4
avg	**39.3**	**0.9**	**27.1**	**2.0**	**40.7**	**1.6**	**77.0**	**5.0**	**61.9**	**3.6**	**15.2**	**0.0**	**56.1**	**2.4**	**46.4**	**2.4**
std	27.3	1.5	15.3	2.0	42.4	2.1	66.3	6.9	48.0	4.4	22.5	0.0	39.9	4.0	20.2	2.5
2004																
avg	**24.7**	**0.4**	**40.1**	**1.6**	**42.6**	**2.7**	**72.3**	**2.4**	**67.7**	**4.6**	**9.0**	**0.0**	**48.0**	**1.3**	**43.5**	**1.9**
std	21.4	1.1	25.5	2.1	27.1	3.0	52.8	2.9	51.6	5.2	12.0	0.0	35.2	1.6	19.4	1.0
2003																
avg	**415.0**	**19.3**	**37.6**	**0.6**	**35.6**	**2.8**	**366.6**	**45.6**	**109.7**	**12.3**	**8.6**	**3.6**	**8.6**	**3.6**	**140.9**	**10.3**
std	889.0	24.3	38.1	1.3	37.4	4.8	744.0	71.8	70.9	19.8	6.8	5.7	6.8	5.7	133.6	12.46
2002																
avg	**32.7**	**0.3**	**28.0**	**1.6**	**15.6**	**2.4**	**16.5**	**1.1**	**300.0**	**4.4**	**4.4**	**0.0**	**41.3**	**1.4**	**70.9**	**1.7**
std	48.0	1.0	35.0	3.0	11.9	4.5	12.0	1.6	748.0	5.7	3.4	0.0	27.7	2.0	316.0	3.4
2001																
avg	**14.9**	**0.0**	**240.0**	**1.3**	**49.5**	**3.7**	**42.1**	**5.1**	**139.0**	**1.3**	**11.7**	**0.0**	**81.2**	**1.4**	**82.6**	**1.8**
std	14.4	0.0	724.0	1.8	43.3	5.7	24.7	5.1	204.0	2.2	9.0	0.0	55.1	1.9	260.3	2.2

2.4.3 Bacterial Sampling of Surface Water for Total Coliforms(TC) and E. Coli (EC) in the Woods Bay Area of Georgian Bay, 2005

	Station												Average all Stations	
	1		2		3		5		6		7			
Date:	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**
11-Jul	52	11	76	11	98	13	127	5	3	0	5	5	60.2	7.5
11-Aug			43	0	25	5	22	0	25	11	177	28	58.4	8.8
26-Aug	151	11	39	0	79	3	156	3	87	0	206	8	119.7	4.2
3-Sep**	43	36	166	3	49	13	65	13	28	3	16	8	61.2	12.7
8-Oct	65	3	19	13			151	90			39	13	68.5	29.8
Average	**77.8**	**15.3**	**68.6**	**5.4**	**62.8**	**8.5**	**104.2**	**22.2**	**35.8**	**3.5**	**88.6**	**12.4**	**73.6**	**12.6**
Std Dev	49.7	14.3	58.2	6.2	32.3	5.3	58.5	38.2	35.9	5.2	95.3	9.2	26.0	10.1
2004														
avg	**155.8**	**9.4**	**95**	**6.2**	**46.4**	**11.6**	**73.6**	**9.6**	**189**	**13.4**	**66.6**	**10.8**	**66.6**	**10.8**
std	199.3	3.507	54.64	3.899	27.82	8.173	49.62	5.459	209.9	10.74	49.66	7.497	49.66	7.497
2003														
avg	**58.9**	**17.1**	**77.9**	**6.9**	**48.0**	**8.9**	**94.7**	**40.9**	**33.2**	**3.9**	**59.7**	**10.6**	**182.6**	**15.3**
std	15.6	13.7	62.5	4.3	15.3	3.9	42.6	34.4	4.5	1.2	38.5	2.4	77.1	15.9
2002														
avg	**75.0**	**4.8**	**108.0**	**6.0**	**46.6**	**8.0**	**107.2**	**11.4**	**73.4**	**1.2**	**66.6**	**8.2**	**79.3**	**6.6**
std	48.0	4.9	37.0	4.7	26.1	8.0	39.7	9.9	33.1	1.6	35.4	7.4	40.5	6.9
2001														
avg	**158.0**	**5.8**	**113.0**	**5.6**	**21.4**	**3.4**	**70.5**	**6.0**	**39.1**	**2.1**	**60.4**	**3.6**	**77.1**	**4.4**
std	171.0	7.2	91.2	2.7	17.0	5.4	21.3	6.1	16.9	2.8	33.1	4.3	62.0	1.8

2.4.4 Bacterial Sampling of Surface Water for Total Coliforms (TC) and E.Coli (EC) in the South Channel Area of Georgian Bay, 2005

	Station											
	1		3		4		5		6		7	
Date	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**
30-May	55	3	8	3	0	0	5	3	177	0	0	0
14-Jun**	206	136	46	0	226	0	2424	33	16	0	219	33
27-Jun	2424	559	76	3	3	0	3	0	3	0	11	0
11-Jul	2424	280	0	0	1370	0	1370	0	0	0	2424	0
18-Jul**	2424	938	194	3	28	0	30	0	22	0	39	5
2-Aug*	79	65	3	0	16	0	2424	0	5	0	59	5
15-Aug	255	52	28	0	36	0	22	0	72	0	136	0
6-Sep	255	156	858	0	308	0	25	0	375	0	30	0
19-Sep*	43	0	16	0	11	0	5	3	36	0	271	0
12-Oct	30	8	28	3	33	0	19	3	19	3	13	0
Average	**819.5**	**219.7**	**125.7**	**1.2**	**203.1**	**0.0**	**632.7**	**4.2**	**72.5**	**0.3**	**320.2**	**4.3**
Std. Dev.	1110.4	305.1	263.6	1.5	423.5	0.0	1034.3	10.2	118.8	0.9	745.1	10.3
2004												
avg	**529.1**	**43.7**	**1114.3**	**8.2**	**1202.6**	**2.8**	**1115.9**	**2.7**	**833.3**	**4.2**	**901.9**	**1.1**
Std	777.4	23.8	1243.0	8.7	1186.8	4.1	1062.9	4.3	1193.3	7.7	1146.7	2.2
2003												
Avg	**677.9**	**38.0**	**48.3**	**5.0**	**26.1**	**0.9**	**94.6**	**14.0**	**353.3**	**0.0**	**374.1**	**1.7**
Std	834.1	26.3	65.6	11.2	17.3	1.5	122.2	37.0	913.1	0.0	904.4	2.0
2002												
Avg	**1789.0**	**91.0**	**794.0**	**3.4**	**489.0**	**0.9**	**136.0**	**0.9**	**726.0**	**1.6**	**748.0**	**0.9**
Std	1085.0	59.0	784.0	2.9	862.0	1.5	89.0	1.5	1160.0	3.0	942.0	1.5
2001												
Avg	**2148.0**	**113.0**	**860.0**	**11.9**	**1021.0**	**5.3**	**874.0**	**8.9**	**866.0**	**9.9**	**1139.0**	**3.0**
Std	731.0	87.1	887.0	16.2	1009.0	10.1	1066.0	9.2	1081.0	9.0	1209.0	1.7

Continued next page….

South Channel Data Cont…

	Station								Average All Stations	
	8		12		13		14			
Date	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC
30-May	0	0	43	0	22	11			34.4	2.2
14-Jun**	19	5	22	13	94	30	76	0	334.8	25.0
27-Jun	8	0	8	0	43	3			286.6	62.8
11-Jul	2424	19	3	0	55	5			1118.9	33.8
18-Jul**	19	8	46	3	110	3	106	0	301.8	96.0
2-Aug*	28	0	33	5	39	13			298.4	9.8
15-Aug	39	0	49	3	94	0			81.2	6.1
6-Sep	161	0	280	3	98	8	28	3	241.8	17.0
19-Sep*	16	0	11	0	43	5			50.2	0.9
12-Oct	0	0	196	0	19	0			39.7	1.9
Average	**271.4**	**3.2**	**69.1**	**2.7**	**61.7**	**7.8**	**70.0**	**1.0**	**278.8**	**25.5**
Std. Dev.	757.8	6.2	92.6	4.1	34.0	8.9	39.3	1.7	319.6	31.3
2004										
Avg	**564.3**	**3.3**	**1408.6**	**10.7**	**1058.2**	**27.1**			**969.8**	**11.5**
Std	763.6	5.1	1205.3	13.1	1059.2	52.5			609.6	6.9
2003										
Avg	**23.4**	**0.4**	**450.9**	**6.0**	**77.1**	**8.6**			**231.2**	**8.0**
Std	24.6	1.1	883.3	4.5	39.1	9.5			213.4	5.8
2002										
Avg	**631.4**	**2.4**	**462.0**	**14.6**	**1210.0**	**17.7**			**780.0**	**14.0**
Std	923.3	1.8	870.0	14.2	972.0	21.1			961.0	32.0
2001										
Avg	**375.0**	**3.0**	**998.0**	**11.0**	**1330.0**	**27.4**			**1067.9**	**21.5**
Std			999.0	11.1	1039.0	34.5			142.1	27.9

2.4.5 Bacterial Sampling of Surface Water for Total Coliforms (TC) and E. Coli (EC) in the Sturgeon Bay Area of Georgian Bay, 2005

	Station											
	1		2		3		4		5		6	
Date	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC
1-Jun	94	8	76	16	16	0	19	0	11	0	62	0
17-Jun**	114	39	55	28	49	25	36	13	13	13	59	13
14-Jul	132	79	2424	8	171	13	72	33	177	13	271	52
3-Aug	654	11	33	11	16	5	5	3	46	19	87	19
24-Aug	654	11	33	11	22	5	46	5	11	3	219	83
7-Sep	226	22	52	5	39	0	25	0	13	0	156	16
21-Oct	25	0	13	0	13	5	5	0	16	3	19	0
Avg	**271.3**	**24.3**	**383.7**	**11.3**	**46.6**	**7.6**	**29.7**	**7.7**	**41.0**	**7.3**	**124.7**	**26.1**
Std	268.1	27.2	899.9	8.9	56.5	8.8	24.0	12.1	61.3	7.6	93.2	30.5
2004												
Avg	**159.4**	**5.0**	**267.4**	**2.0**	**395.0**	**2.3**	**311.1**	**1.6**	**186.0**	**0.4**	**88.6**	**3.6**
Std	135.6	3.6	487.5	2.0	619.3	4.9	385.7	2.1	146.8	1.1	48.0	3.7
2003												
Avg	**1107.5**	**4.6**	**466.5**	**2.6**	**744.3**	**0.4**	**991.8**	**1.4**	**963.4**	**0.4**	**570.6**	**6.8**
Std	1133.1	6.6	807.9	3.7	1046.0	1.1	1190.7	2.0	1210.4	1.1	799.9	11.5
2002												
Avg	**1039.0**	**9.7**	**871.0**	**5.4**	**548.0**	**1.8**	**619.0**	**2.4**	**941.0**	**1.8**	**488.0**	**4.1**
Std	1066.0	10.4	1031.0	8.0	826.0	2.9	669.0	2.1	1229.0	3.9	569.0	6.1

	Station											
	7		8		9		10		11		12	
Date	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC
1-Jun	62	3	59	3	43	0	22	0	65	3	106	0
17-Jun**	52	22	22	16	119	25	119	52	33	19	28	28
14-Jul	55	22	46	25	132	65	98	36	46	25	63	46
3-Aug	59	22	55	19	46	8	52	5	98	8	49	22
24-Aug	226	30	83	13	403	5	226	22	19	5	46	22
7-Sep	255	30	39	3	76	11	1370	8	59	0	87	11
21-Oct	30	3	19	0	5	0	55	0	16	3	13	0
Avg	**105.6**	**18.9**	**46.1**	**11.3**	**117.7**	**16.3**	**277.4**	**17.6**	**48.0**	**9.0**	**56.0**	**18.4**
Std	93.1	11.4	22.3	9.5	133.4	23.1	486.3	20.0	28.9	9.4	32.4	16.4
2004												
Avg	**247.9**	**11.3**	**174.7**	**2.6**	**419.7**	**4.3**	**186.6**	**11.3**	**183.7**	**3.9**	**109.3**	**1.6**
Std	330.5	12.6	235.7	3.4	884.3	1.9	132.8	10.0	248.2	4.4	111.3	2.1
2003												
Avg	**332.8**	**2.6**	**688.0**	**1.6**	**664.3**	**11.5**	**914.6**	**6.8**	**508.4**	**4.3**	**742.4**	**5.1**
Std	419.7	5.0	1077.9	3.1	1086.9	26.4	1036.3	11.5	888.3	8.1	1149.8	13.6
2002												
Avg	**226.0**	**6.0**	**212.0**	**11.6**	**186.0**	**11.5**	**204.0**	**6.0**	**355.0**	**4.8**	**209.0**	**6.8**
Std	332.0	6.0	193.0	16.8	242.0	14.8	220.0	7.1	837.0	6.4	343.0	10.0

Continued Next Page…

Sturgeon Bay Data Continued….

	Station				Average All Stations	
	13		14			
Date	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**
1-Jun	30	0	43	0	50.6	2.4
17-Jun**	22	22			55.5	24.2
14-Jul	280	11	28	11	285.4	31.4
3-Aug	46	19	33	19	91.4	13.6
24-Aug	79	33	39	11	150.4	18.5
7-Sep	49	5	49	3	178.2	8.1
21-Oct	16	0	16	0	18.6	1.0
Avg	**74.6**	**12.9**	**34.7**	**7.3**	**118.6**	**14.2**
Std	93.0	12.4	11.7	7.6	92.8	11.3
2004						
Avg	**183.4**	**2.0**	**148.0**	**4.4**	**218.6**	**4.0**
Std	299.9	2.0	161.7	4.4	250.5	1.6
2003						
Avg	**519.8**	**3.0**	**1084.1**	**1.1**	**729.3**	**3.8**
Std	897.3	6.7	1254.5	3.0	836.4	5.5
2002						
Avg	**145**	**3**	**328**	**8.2**	**456**	**6**
Std	201	5	469	15.8	708	9.4

2.4.6 Bacterial Sampling of Surface Water for Total Coliforms (TC) and E. Coli (EC) in the Skerryvore Area of Georgian Bay, 2005

	STATIONS												Average All Stations	
	1		2		3		4		5		6			
DATE	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC
14-Jun**	33	0	69	0	76	3	46	3	59	3	1696	11	329.8	3.3
30-Jun	22	11	141	0	43	36	76	13	87	28	654	13	170.5	16.8
16-Jul**	132	13	200	55	72	13	83	19	559	59	308	22	225.7	30.2
1-Aug**	2424	28	2424	79	2424	2424	2424	69	2424	69	2424	59	2424.0	454.7
20-Aug**	2424	25	2424	166	2424	123	2424	151	2424	102	2424	200	2424.0	127.8
Average	**1007.0**	**15.4**	**1051.6**	**60.0**	**1007.8**	**519.8**	**1010.6**	**51.0**	**1110.6**	**52.2**	**1501.2**	**61.0**	**1114.8**	**126.6**
Std. Dev.	1294.2	11.3	1253.7	68.6	1292.9	1065.5	1290.3	61.4	1215.3	38.1	985.2	80.1	1196.5	189.8
2004														
avg	**158.8**	**6.7**	**174.3**	**8.8**	**484.3**	**22.2**	**68.7**	**6.7**	**225.3**	**1.0**	**1296.0**	**35.2**	**401.3**	**13.4**
std	70.4	6.6	224.4	12.4	951.9	34.1	71.7	6.6	465.4	1.5	1029.3	46.2	258.9	9.1
2003														
avg	**1787.3**	**19.9**	**1788.3**	**93.4**	**1787.2**	**1033.1**	**1787.2**	**83.1**	**1793.5**	**65.3**	**1833.6**	**100.0**	**1789.8**	**224.7**
std	744.5	7.9	738.6	49.0	744.5	1004.6	744.1	45.9	729.3	27.5	713.5	67.3	733.0	156.1
2002														
avg	**1905.0**	**10.8**	**65.2**	**7.3**	**81.2**	**10.8**	**332.0**	**10.8**	**878.0**	**3.2**	**1392.0**	**40.3**	**775.0**	**13.9**
std	961.0	9.1	65.0	9.6	66.8	8.8	465.0	7.3	1003.0	4.4	1156.0	37.3	993.0	19.9
2001														
avg	**52.2**	**4.4**	**78.4**	**8.2**	**55.4**	**1.6**	**42.4**	**7.6**	**523.0**	**0.6**	**2070.0**	**40.6**	**470.2**	**10.5**

2.4.7 Bacterial Sampling of Surface Water for Total Coliforms (TC) and E. Coli (EC) in the Pointe au Baril Islands Area of Georgian Bay, 2005

	Station									
	1		2		3		4		5	
Date	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC
1-Jul	136	76	90	16	2425	3	136	25	94	0
14-Jul	5	3	16	8	5	5				
28-Jul	16	5	46	22	0	0	5	3	11	5
5-Aug	350	3	114	49	36	3	30	8	22	3
26-Aug	375	0	8	3	8	0	11	0	11	0
avg	**176.4**	**17.4**	**54.8**	**19.6**	**494.8**	**2.2**	**45.5**	**9.0**	**34.5**	**2.0**
std	177.7	32.8	46.1	18.0	1079.1	2.2	61.3	11.2	40.0	2.4
2004										
avg	**564.1**	**9.6**	**441.0**	**6.4**	**526.7**	**7.4**	**417.1**	**24.3**	**468.0**	**14.0**
std	893.8	10.9	600.3	3.9	915.1	7.4	548.5	31.6	865.5	18.8
2003										
avg	**64.3**	**7.3**	**93.7**	**11.0**	**57.0**	**2.7**	**60.7**	**13.7**	**60.3**	**3.3**
std	29.2	12.7	46.1	12.2	23.1	2.5	30.0	14.4	33.4	2.9
2002										
avg	**56.3**	**3.0**	**135.0**	**2.7**	**47.7**	**3.7**	**52.0**	**1.7**	**58.3**	**3.3**
std	41.0	0.0	196.0	4.6	22.3	1.2	39.3	2.9	56.1	2.9
2001										
avg	**178.0**	**0.5**	**40.3**	**5.8**	**21.3**	**1.0**	**55.7**	**9.7**	**28.5**	**2.3**
std	335.6	1.2	28.1	9.5	17.5	1.5	29.8	7.0	13.8	2.0

	Station						Average for All Stations	
	6		7		8			
Date	TC	EC	TC	EC	TC	EC	TC	EC
1-Jul	1696	30	2424	8	25	3	878	20
14-Jul	8	3	46	11	0	0	13	5
28-Jul	5	5	3	0	3	3	11	5
5-Aug	119	3	39	16	8	0	90	11
26-Aug	55	0	30	0	3	0	63	0
avg	**376.6**	**8.2**	**508.4**	**7.0**	**7.8**	**1.2**	**211.0**	**8.3**
std	739.0	12.3	1071.0	7.0	10.0	1.6	374.5	7.5
2004								
avg	**455.4**	**96.7**	**976.9**	**23.4**	**61.2**	**0.6**	**493.4**	**23.5**
std	868.7	216.3	1043.9	27.1	54.4	1.3	530.4	32.0
2003								
avg	**856.0**	**815.3**	**643.0**	**46.7**			**262.1**	**128.6**
std	1357.9	1393.1	913.0	74.0			333.3	215.6
2002								
avg	**60.0**	**3.7**	**187.0**	**41.7**			**85.2**	**8.5**
std	12.3	4.0	56.7	5.1			86.7	14.2
2001								
avg	**136.0**	**10.5**	**1624.0**	**812.0**			**297.7**	**120.3**
std	237.0	20.4	1239.0	1249.0			445.3	469.5

2.4.8 Bacterial Sampling of Surface Water for Total Coliforms (TC) and E. Coli (EC) in Blackstone Lake, 2005

	Station										Average for All Stations	
	1		2		3		4		5			
Date	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC
8-Jul	19	0	8	0	5	0	3	0	3	0	7.6	0.0
6-Aug	13	0	11	3	43	3	30	0	22	0	23.8	1.2
8-Sep	694	0	2424	5	2424	0	1696	0	654	0	1578.4	1.0
5-Oct	1370	0	1696	0	938	3	1174	3	619	3	1159.4	1.8
avg	**524.0**	**0.0**	**1034.8**	**2.0**	**852.5**	**1.5**	**725.8**	**0.8**	**324.5**	**0.8**	**692.3**	**1.0**
std	648.3	0.0	1220.6	2.4	1132.9	1.7	846.3	1.5	360.6	1.5	799.8	0.7
2004												
avg	**19.0**	**0.0**	**34.0**	**4.0**	**17.5**	**1.5**	**26.0**	**4.0**	**22.0**	**6.5**	**23.7**	**3.2**
std	19.8	0.0	12.7	1.4	2.1	2.1	9.9	5.7	15.6	9.2	1.0	2.3
2003												
avg	**23.7**	**2.7**	**43.0**	**0.0**	**18.3**	**0.0**	**52.0**	**2.7**	**21.7**	**0.0**	**31.7**	**1.1**
std	25.4	2.5	51.4	0.0	11.9	0.0	38.3	2.5	25.0	0.0	29.9	0.9
2002												
avg	**21.7**	**2.7**	**43.3**	**1.0**	**52.7**	**3.3**	**59.0**	**6.0**	**38.0**	**4.7**	**42.9**	**3.5**
std	23.9	4.6	26.8	1.7	51.6	2.9	41.4	6.6	35.8	2.9	34.2	3.9
2001												
avg	**18.3**	**2.3**	**13.3**	**3.3**	**6.8**	**1.5**	**42.3**	**5.3**			**20.2**	**3.1**
std	18.6	1.5	3.8	3.9	3.5	1.7	28.2	2.1			12.1	1.1

Station 1 – Centre of Lake Station 2 – McRoberts Bay Station 3 – Lawson Bay(old)
Station 4 – Blackstone Landing Station 5 – Lawson Bay (new)

2.4.9 Bacterial Sampling of Surface Water for Total Coliforms (TC) and E. Coli (EC) in Crane Lake, 2005

	STATIONS												Average All Stations	
	1		2		3		4		5		6			
DATE	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC
19-Jun	1696	0	434	25	362	13	694	11	534	13	123	0	640.5	10.3
10-Jul	2424	16	2424	5	2424	0	2424	3	2424	0	2424	3	2424.0	4.5
25-Jul	248	11	76	8	110	13	72	16	469	11	49	19	170.7	13.0
15-Aug	110	11	33	5	8	5	25	5	11	8	25	3	35.3	6.2
27-Sep	200	8	2424	8	59	19	106	16	52	11	2424	11	877.5	12.2
30-Sep	90	3	87	11	46	5	11	0	19	5	19	3	45.3	4.5
avg	**794.7**	**8.2**	**913.0**	**10.3**	**501.5**	**9.2**	**555.3**	**8.5**	**584.8**	**8.0**	**844.0**	**6.5**	**698.9**	**8.4**
std	1008.5	5.8	1179.2	7.5	950.3	7.0	951.2	6.8	930.8	4.8	1224.4	7.1	911.9	3.9
2004														
avg	**1104.7**	**4.3**	**1175.1**	**12.6**	**1081.3**	**6.9**	**1142.1**	**7.6**	**1077.3**	**7.3**	**1393.3**	**8.3**	**1162.3**	**7.8**
std	1241.5	4.1	1204.2	17.9	1258.7	4.8	1209.9	5.6	1261.5	4.8	1285.5	8.1	1209.3	5.3
2003														
avg	**631.0**	**5.7**	**726.4**	**9.6**	**499.3**	**7.1**	**505.9**	**5.1**	**511.5**	**5.9**	**695.8**	**5.5**	**552.0**	**5.6**
std	480.6	2.6	569.5	1.8	452.2	2.1	472.1	4.5	460.3	1.8	616.2	2.2	451.6	2.5
2002														
avg	**36.3**	**3.0**	**301.0**	**18.4**	**37.6**	**6.6**	**68.7**	**28.1**	**79.4**	**9.4**	**43.0**	**6.7**	**93.1**	**11.8**
std	37.0	4.5	487.0	20.1	30.3	5.0	90.3	35.9	69.6	11.5	40.0	7.9	213.0	18.8
2001														
avg	**68.1**	**5.9**	**125.0**	**17.1**	**67.7**	**9.7**	**93.0**	**7.3**	**34.0**	**5.3**	**614.0**	**8.1**	**167.0**	**8.9**
std	110.0	5.6	143.0	8.6	90.2	6.6	85.5	8.0	31.6	8.0	1010.0	11.8	376.5	2.1

Station 1 – North End Station 2 – Armstrong/Fish Bay Station 3 – Fish Bay/Agaming Landing
Station 4 - Marina Station 5 – Overflow Bay (Narrows) Station 6 – Mouth of Blackstone

2.4.10 Bacterial Sampling of Surface Water for Total Coliforms (TC) and E. Coli (EC) in Healey Lake, 2005

	Station														Average for All Stations	
	1		2		3		4		5		6		7			
Date	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC
20-May	3	0	8	3	5	3	0	0	0	0	3	0	11	5	4.3	1.6
25-Jun*	3	0	11	3	8	3	0	0	3	0	3	0	8	5	5.1	1.6
23-Jul	19	5	22	5	0	0	8	3	5	3	8	5	13	8	10.7	4.1
13-Aug*	28	8	59	5	25	5	36	25	8	3	19	11	43	8	31.1	9.3
3-Sep	106	5			28	5							182	8	105.3	6.0
Average	**31.8**	**3.6**	**25.0**	**4.0**	**13.2**	**3.2**	**11.0**	**7.0**	**4.0**	**1.5**	**8.3**	**4.0**	**51.4**	**6.8**	**31.3**	**4.5**
St. Dev.	42.8	3.5	23.5	1.2	12.5	2.0	17.1	12.1	3.4	1.7	7.5	5.2	74.4	1.6	42.8	3.3
2004																
avg	**402.7**	**8.6**	**89.7**	**3.1**	**31.4**	**2.0**	**737.3**	**3.9**	**47.0**	**1.1**	**38.7**	**2.6**	**85.3**	**4.0**	**204.6**	**3.6**
std	896.1	9.7	115.3	4.6	38.3	3.0	1156.9	4.9	55.1	2.0	46.5	2.5	129.9	4.1	298.6	3.3
2003																
avg	**79.3**	**20.0**	**74.7**	**2.0**	**36.3**	**3.7**	**62.3**	**5.3**	**55.7**	**2.0**	**62.0**	**1.0**	**79.3**	**4.7**	**64.2**	**5.5**
std	30.0	22.9	41.2	1.7	5.8	4.0	43.4	6.8	41.9	1.7	30.6	1.7	59.9	5.7	19.1	5.3
2002																
avg	**158.0**	**6.3**	**94.3**	**4.3**	**230.0**	**5.0**	**39.3**	**6.3**	**17.0**	**2.0**	**55.7**	**1.0**	**42.7**	**1.0**	**91.1**	**3.7**
std	66.4	2.9	11.5	4.0	38.7	0.0	13.7	4.2	6.2	1.7	31.8	1.7	14.8	1.7	19.0	1.5
2001																
avg	**56.5**	**3.5**	**41.5**	**0.0**	**113.0**	**1.3**	**40.8**	**0.8**	**57.8**	**0.8**	**33.8**	**0.8**	**25.3**	**0.0**	**46.1**	**0.9**
std	15.2	3.3	15.9	0.0	107.0	2.5	26.0	1.5	31.7	1.5	33.7	1.5	5.6	0.0	33.5	1.2

#1 Healey Lake Lodge #2 Between Two Marinas #3 Kapikog Bay
#4 Main Channel (Btw Lots 337 & 264 #5 West End (Lot #105)
#6 Lot #209 #7 East end of Dollar Bay

2.4.10 Bacterial Sampling of Surface Water for Total Coliforms (TC) and E. Coli (EC) in Kapikog Lake, 2005

	Station																Average all Stations	
	1		2		3		4		5		6		7		8			
Date:	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**	**TC**	**EC**
4-Jul	25	3	5	0	59	3	16	0	30	0	19	3	11	0	16	0	22.6	1.1
18-Jul**	280	25	87	8	30	5	90	11	119	8	19	11	8	5	22	16	81.9	11.1
15-Aug**	794	3	102	5	2424	0	83	11	72	5	65	0	52	0	166	0	469.8	3.0
30-Aug**	318	3	19	5	3	0	36	8	13	3	25	0	11	3	19	8	55.5	3.8
Average	**354.3**	**8.5**	**53.3**	**4.5**	**629.0**	**2.0**	**56.3**	**7.5**	**58.5**	**4.0**	**32.0**	**3.5**	**20.5**	**2.0**	**55.8**	**6.0**	**157.4**	**4.8**
Std. Dev	320.7	11.0	48.4	3.3	1196.9	2.4	36.0	5.2	47.3	3.4	22.2	5.2	21.0	2.4	73.5	7.7	209.6	4.4
2004																		
Avg	**67.5**	**1.5**	**38.0**	**4.0**	**60.5**	**1.5**	**37.0**	**4.8**	**20.0**	**0.8**	**44.0**	**6.3**	**96.3**	**2.0**	**297.8**	**1.5**	**82.6**	**2.8**
std	29.0	1.7	41.6	3.4	54.1	1.7	28.9	7.6	26.4	1.5	50.8	3.9	83.6	2.4	382.0	1.7	36.5	1.6
2003																		
Avg	**38.5**	**3.2**	**59.7**	**4.5**	**12.8**	**1.3**	**43.3**	**4.0**	**23.5**	**1.5**	**15.8**	**1.3**	**55.7**	**1.5**	**16.7**	**2.3**	**35.6**	**2.5**
std	29.1	1.8	44.8	5.1	13.2	2.2	32.4	6.2	32.7	1.6	6.6	2.2	29.8	1.6	19.0	2.0	9.1	1.6
2002																		
Avg	**449**	**737**	**764**	**7**	**55**	**3**	**471**	**13**	**410**	**5**	**616**	**9**	**727**	**2**	**446**	**4**	**492**	**6**
std	878.0	5.5	1136	7.0	54.0	3.6	865.0	16.3	892.0	6.0	1008	9.7	1160	3.3	878.0	4.4	883.0	8.2

Station 1 – Marina Station 2 – Lot 14 Station 3 – Lot 42 Station 4 – Lot 48
Station 5 – Chin's Bay Station 6 – Monroe's Bay Station 7 – Lot 89 Station 8 – Mid Lake

Figure 2.4.11 Area Comparison of Bacteria Data

	Skerryvore			Sturgeon Bay			Woods Bay	
	Average All Stations			Average All Stations			Average all Stations	
DATE	TC	EC	DATE	TC	EC	Date:	TC	EC
14-Jun**	329.8	3.3	**1-Jun**	50.6	2.4	**11-Jul**	60.2	7.5
30-Jun	170.5	16.8	**17-Jun****	55.5	24.2	**11-Aug**	58.4	8.8
16-Jul**	225.7	30.2	**14-Jul**	285.4	31.4	**26-Aug**	119.7	4.2
1-Aug**	2424.0	454.7	**3-Aug**	91.4	13.6	**3-Sep****	61.2	12.7
20_Aug **	2424.0	127.8	**24-Aug**	150.4	18.5	**8-Oct**	68.5	29.8
			7-Sep	178.2	8.1			
			21-Oct	18.6	1.0			
Average	**1114.8**	**126.6**		**118.6**	**14.2**		**73.6**	**12.6**
Std. Dev.	1196.5	189.8		92.8	11.3		26.0	10.1

	Pointe au Baril Islands			Sans Souci			South Channel	
	Average for All Stations			Average for All Stations			Average All Stations	
Date	TC	EC	Date	TC	EC	Date	TC	EC
1-Jul	878	20	29-May	17.3	0.4	30-May	34.4	2.2
14-Jul	13	5	20-Jun	53.6	0.9	14-Jun**	363.6	27.8
28-Jul	11	5	2-Jul	69.0	7.8	27-Jun	286.6	62.8
5-Aug	90	11	16-Jul	42.3	2.0	11-Jul	1118.9	33.8
26-Aug	63	0	31-Jul	72.9	1.1	18-Jul**	323.6	106.7
			13-Aug	29.9	1.9	2-Aug*	298.4	9.8
			28-Aug **	40.1	2.4	15-Aug	81.2	6.1
						6-Sep	265.6	18.6
						19-Sep*	50.2	0.9
						12-Oct	39.7	1.9
Average	**211.0**	**8.3**		**46.4**	**2.4**		**278.8**	**25.5**
Std. Dev.	374.5	7.5		20.2	2.5		319.6	31.3

	Blackstone Lake			Crane Lake			Healey Lake			Kapikog Lake	
	Average for All Stations			Average All Stations			Average for All Stations			Average all Stations	
Date	TC	EC	DATE	TC	EC	Date	TC	EC	Date:	TC	EC
8-Jul	7.6	0.0	19-Jun	640.5	10.3	20-May	4.3	1.6	4-Jul	22.6	1.1
6-Aug	23.8	1.2	10-Jul	2424.0	4.5	25-Jun*	5.1	1.6	18-Jul**	81.9	11.1
8-Sep	1578.4	1.0	25-Jul	170.7	13.0	23-Jul	10.7	4.1	15-Aug**	469.8	3.0
5-Oct	1159.4	1.8	15-Aug	35.3	6.2	13-Aug*	31.1	9.3	30-Aug**	55.5	3.8
			27-Sep	877.5	12.2	3-Sep	105.3	6			
			30-Sep	45.3	4.5						
Average	**692.3**	**1.0**		**698.9**	**8.4**		**31.3**	**4.5**		**157.4**	**4.8**
Std. Dev.	799.8	0.7		911.9	3.9		42.8	3.3		209.6	4.4

3.0 Township Environment Summary

Township Council and Staff are involved in a variety of environmental programs and activities to ensure the maintenance, protection, and improvement of the environmental quality not only within municipal boundaries, but throughout Georgian Bay. Below is a brief description of some of these programs; if you have any more questions about what we're doing please don't hesitate to contact Township staff.

Water Quality Monitoring

This report is a prime example of what the water quality program entails. This unique collaboration between volunteers and the municipality has been modeled in other municipalities. Our goals have been to not only monitor the quality of the water but to find a program that would engage and excite everyone in the Township. It has been a success with a long list of dedicated volunteers, early warnings and useful information being provided for such areas as Sturgeon Bay.

As is occasionally needed in all programs, a review of the program is being undertaken. The key to this review is to focus on ways in which the existing program can be improved and augmented if necessary. We're taking a close look at data quality, ensuring proper and sufficient use of protocols and finding ways to link the program more directly with planning and decision-making. We fully expect that the first stage of the review will be complete in time to adopt revised sampling and analysis procedures into the 2006 volunteer program; stay tuned!

Sturgeon Bay Remediation

As described in the 2003 and 2004 reports, Sturgeon Bay is an excellent example of a nutrient-rich body of water. Interestingly, in 2005, blue-green algae reared itself in other waterbodies in the Parry Sound and Muskoka area (i.e. 3 Mile Lake). Accordingly, the research into causes and potential remediation being done on Sturgeon Bay should be of great value elsewhere in the province.

In 2005, the work of the Sturgeon Bay Water Quality Action Group continued with further meetings resulting in greater support from the provincial Ministry of Environment and Environment Canada. Additionally, the Township was able to work closely with the new North Bay-Parry Sound District Health Unit to bring greater clarification to the subsequent Health Advisories. The Ontario Ministry of Natural Resources has also been very supportive, providing funding for some of the research currently underway.

A column of sediment was retrieved from the northern basin of Sturgeon Bay in September 2005. It is expected that this sediment will be successfully analyzed to provide an accurate depiction of natural and human-caused changes to Sturgeon Bay water quality. We're expecting data on this by May 2006.

The background research and water quality assessment undertaken since 2002 has been of great assistance to the scientists involved. At this time, Environment Canada and the Ontario Ministry of Natural Resources are developing an ongoing water quality monitoring program which is necessary in order to fully assess and understand the ongoing changes in Sturgeon Bay. Secondly, work will begin shortly to assess a range of potential remediation options for Sturgeon Bay. This review will seek to understand the implications of a number of options being put forward as potential solutions to the issues in Sturgeon Bay.

Shoreline Survey

The Township hired two students to survey the shoreline of Sturgeon Bay at the beginning of summer 2005. The purpose of the survey was to gather information about the nature of the shoreline (i.e. extent of vegetation and type and extent of built structures) and to provide a pilot study for potential use of the survey in other areas of the Township. This survey will be incorporated into the Township's Geographic Information System and will provide a useful environmental research and planning tool.

Great Lakes Basin – Continued Focus and Involvement in Provincial and Federal Initiatives

This past year has been busy for the Great Lakes and the Township has participated in numerous public consultations and meetings respecting broad Great Lakes issues continuously providing focus on Georgian Bay issues. Last year the Township provided comment at International Joint Commission public meetings respecting a planned Upper Great Lakes Plan of Study which saw the successful inclusion of an examination of the St. Clair River Channel erosion. This is a very important issue raised by the GBA Foundation and Georgian Bay Association and may significantly affect water levels.

Staff are participating in Lake Huron Bi-national Partnership meetings which are aiming to address management and research priorities for the Lake Huron and Georgian Bay. This involvement has successfully brought attention to important Georgian Bay issues such as Sturgeon Bay and water levels and a conference is now being held in Honey Harbour in September 2006 to examine Lake Huron issues.

We continue to monitor the new Source Water Protection legislation (Clean Water Act) which will serve to provide greater focus on water quality at the source. This new legislation may help our water quality and septic inspection efforts.

Sewage System Re-Inspection Program

All developed properties within The Archipelago have been inspected by Township staff with respect to visually deficient sewage systems. **Consequently, the deficient systems identified by the inspectors have been brought into compliance with the Ontario Building Code Act as per the minimum requirements of operation and maintenance for which the owner of a sewage system is responsible.**

Figure 1 summarizes the costing of the Re-Inspection Program as well as the breakdown of deficient systems by the probable risk category of the property. As surmised at the outset of the Program in 1999, the high-risk properties scheduled to be inspected first, displayed the highest number of deficiencies as well as the most serious.

Figure 1.

- **Duration** ➤ 1999-2005 (7 years)
  ➤ All developed properties have been inspected by Township staff
- **Expenditures** (student inspectors' training, wages and expenses) ➤ $130,000
- **Fee Revenues** (400+ permits issued as a direct result of re-inspection) ➤ $110,000
- **Cost per Assessed Property** (considering expenditures only) ➤ $32
- **Properties with Deficiencies** – letter or Order to owner requiring correction of deficiencies
  - ➤ **High Risk Properties (1425)** - sewage system installed prior to regulations (pre-1972)
    ➤ 40% of these were deficient
  - ➤ **Medium Risk Properties (1366)** - MOE issued a permit between 1972-1993
    ➤ 10% of these were deficient
  - ➤ **Low Risk Properties (450)** - the Township issued a permit between 1994-1997
    ➤1% of these were deficient

Figure 2 summarizes the corrected deficiencies by class of sewage system and by degree of deficiency as to whether or not a permit would be required to bring the system into compliance with the Ontario Building Code.

Figure 2.

Class	Deficiencies major in nature A permit was required	Deficiencies minor in nature A permit not required	Total Deficient Systems	Permit Fee Revenues
Class 1 privy	N/A	45	45	N/A
Class 2 greywater pit	167	84	251	20125
Class 4 full septic	175	36	211	73000
Class 4 tank only	35	31	66	6750
Class 4 bed only	7	84	91	1800
Class 5 holding tank	31	12	43	8250
Total	**415**	**292**	**707**	**$109,925**

Figure 3 summarizes the existing sewage systems within the Township (August'05) by class and by agency having responsibility to issue the permits.

Figure 3.

Class	Permit Issued Between **1994-2005** Township has responsibility (12 years)	Permit Issued Between **1972-1993** Min. of Environment has responsibility (22 years)	No Permit Required **Pre 1972** No agency has responsibility	**Totals**
2 (greywater pits)	243	88	477	**788**
4 (septic systems)	812	1103	304	**2202**
5 (holding tanks)	45	75	100	**216**
Totals	**1100**	**1266**	**881**	**3247**

In 2006 the Township will continue to promote property owner education and awareness by means of pamphlets, newsletters, website, etc. Building Department staff will continue to respond to complaints and conduct random re-inspections. Any sewage system that is identified as unsafe will be brought into compliance with the Ontario Building Code. Also, sewage systems will be required to be upgraded where further development of a property adversely affects the existing sewage system. The Township is hoping to be invited to participate in the planning stages of an upcoming joint Ministry of Environment and Housing compulsory re-inspection program. For more information on these results and septic inspections, please contact Ted Thompson at the Township office.

East Georgian Bay and North Channel Fisheries Stewardship Council

The Georgian Bay North Channel Fisheries Stewardship Council was developed in 2000 to assist the Ministry of Natural Resources with recommendations to fishing regulation changes. What has evolved out of this group is a very dynamic council committed to the long haul in preserving and protecting Georgian Bay.

The Council has developed the following vision statement to reflect their expectations of what they expect to accomplish:

"To provide guidance for the protection, enhancement, and utilization of healthy, sustainable fish populations, habitats and aquatic ecosystems."

The Council expects to achieve this vision by addressing the following objectives:

- Protect, improve, enhance, create, promote and maintain high quality water resources, vital to all facets of life;
- Create community ownership for the health of the aquatic ecosystems;
- Involve the local residents in projects that will improve and enhance the environment and the quality of life in the area of the undertaking;
- Develop capacity within the area population to assist in and maintain aquatic resource management programs;
- Develop community awareness of the value of the fishery;
- Develop community awareness of the benefit of water bodies and streams to other components of the greater ecosystem;
- Instill a stewardship ethic within the greater community;
- Access available resources that can support the proposed projects;
- Working in concert with the agricultural, industrial and the municipal sector where/when necessary to promote and protect the aquatic resources;
- Through proper ecosystem management, provide additional resource based opportunities (e.g. improved/enhanced sport fishing experiences, improved water quality, etc.); and

The Council is embarking on several projects this year including bass nest restoration , Moon River pickerel stocking and long term restoration to name a few.

Forest Health Program

For the past two decades the forests of the Township of The Archipelago have been bombarded by an increased number of natural and human caused stresses. Native and introduced insects, various diseases, drought, pronounced climatic swings and acid rain top the list.
In order to apprise ratepayers of the state of health of trees on their property and provide options for forest protection, the Township has for the past 3 years retained the services of a forestry consulting company BioForest Technologies Inc. Using the information gathered through the expertise of BioForest staff, the Archipelago has created a two-phased holistic approach to the Forest Health Program as summarized below.

Phase 1 Objectives

➤ **Monitor** the health of the forest
➤ **Detect and Evaluate** stresses
➤ **Forecast** where, when and what damage may occur
➤ **Design and Implement** an effective communication network
➤ **Avoid Conflicts** with other private or public sector programs
➤ **Promote Public Education and Involvement** through volunteer groups, ratepayer associations, workshops and information sessions
➤ **Partner** with other organizations and government agencies
➤ **Continue to Evaluate and Improve** the Forest Health Program

In 2006 the Township will continue to retain the services of BioForest. Their staff will monitor the health of the forests across the Township by conducting surveys and posting the updates on their web. BioForest will continue to produce forest pest pamphlets, update their website re Archipelago information, and continue to develop the network of forest health volunteers.

The Township is creating a website as a communication enhancement to Phase 1 whereby property owners will be able to explore the make-up and health of The Archipelago's forests, which in turn will better enable them to evaluate their protection options. It will be accessible by the spring of 2006.

Phase 2 Objectives

➤ **Conduct** individual property visits upon request
➤ **Provide Advice** re timely prevention, protection and treatment options
➤ **Minimize** inappropriate or unwarranted use of pesticides

At the request of an individual, BioForest staff will visit a property to assess forest health problems and provide recommendations regarding appropriate protection options. If aerial spraying appears to be the best option, BioForest will help ratepayers organize spray programs for themselves and their neighbours. At the request of a ratepayer association, BioForest will make a presentation at an annual meeting. BioForest will charge a service fee to the individual(s) requesting any such consultations.