The Muskoka Watershed

REPORT CARD

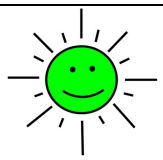
Background Report #1

Our Water – Swimability (Bacteria)

Muskoka
WATERSHED COUNCIL

July 2004

OUR WATER
SWIMABILITY - BACTERIA

Indicator	Are We Happy	Trend
Supervised public beaches that meet the provincial standard for swimming.		
Other swimming areas at lakes, rivers, cottages and homes that meet the provincial standard.		?
Natural background *E.coli* levels in all our inland lakes and along our Georgian Bay coastline.		?

Why are we concerned about beach closings?

Beaches are monitored to determine pollution levels in the water at and to prevent illness in bathers. Examples of infections which can be acquired from swimming in polluted water are: conjunctivitis (eye), ear infections, nose infections, throat infections, or more serious infections such as diphtheria, typhoid fever, dysentery, infectious hepatitis and gastrointestinal illnesses. As an indicator of health risk, the Provincial water quality objective for body contact recreation is 100-counts/100 ml for E-coli. At this level, less than 1 percent of swimmers will experience some gastrointestinal illnesses.[1]

Bacteria are found naturally in surface water as a result of animal activity and surface run-off. However, when excessively high bacteria counts are experienced in lakes and large rivers, it is generally a result of human activity such as heavy use of swim areas that do not have proper sanitary facilities or nearby faulty septic systems. Where there is a heavy concentration of live-aboard boats, bacteria levels can increase due to large amounts of gray water discharge.

Current state

<u>Public beach program</u>

The Muskoka-Parry Sound Health Unit monitors public beaches that offer swim programs or have lifeguards on duty for *E. coli* bacteria contamination. Table 1 provides the Health Unit's sampling results for 2002 and 2003.

Georgian Bay Island National Park monitors five swim beaches on Beausoleil Island in Georgian Bay. *E. coli* counts have been below the provincial standard of 100 counts/100 ml since 1996.

[1] Francy Donna S., Donna N. Myers, and Kevin D. Metzker, *Escherichia* Coli *and Fecal-Coliform Bacteria as Indicators of Recreational Water Quality*

Table 1
Beach Monitoring Program Results

Year	Number of Occurrences Over 100 Counts/100ml
2002	2
2003	0

Six Mile Lake Provincial Park, in the Township of Georgian Bay and Arrowhead Provincial Park, in the Town of Huntsville also monitor their swim beaches. No beaches exceeded the Provincial standard in Arrowhead Provincial Park; however, the beaches at Six Mile Lake Provincial Park were posted six times during the summer of 2003 due to high bacteria counts.

Other Recreational Areas

Lake associations have been collecting bacteria data for the last several years. These data are collected using a coliplate. Although this methodology does not provide the same scientific rigor as lab analyzed data, it does provide a good indication of areas with possible sources of bacteria contamination. Table 2 provides the results of the available association data.

Table 2:
Bacteria Counts Over the Provincial Standard

Lake	Year	Number of Occurrences Over 100-Counts/100ml
Lake of Bays	2001	0
	2002	0
	2003	0
Lake Rosseau	2002	0
	2003	0
Lake Joseph	2002	0
	2003	0
Lake Muskoka	2002	0
	2003	0
Brandy	2002	0
	2003	0
Leonard	2003	0
Silver	2003	0
Muskoka River	2003	0
Gull and Silver	2003	0
Sucker	2003	0

Georgian Bay	Year	Number of Occurrences Over 100-Counts/100ml
Controls	1999	0
	2000	0
	2001	0
	2002	0
	2003	0
Cottage Bays	1999	0
	2000	0
	2001	0
	2002	2
	2003	2(rain events)
Boat Mooring Bays	1999	0
	2000	0
	2001	0
	2002	0
	2003	0
Multi-Use/Marina Bays	1999	0
	2000	0
	2001	0
	2002	2
	2003	1

In 2002, The Ontario Boating Forum monitored seven (7) locations in South Bay of Georgian Bay in the Honey Harbour area and six (6) locations in Longuissa Bay of Georgian Bay. All sites had readings below the Provincial standard.

Local bacteria standard

The Georgian Bay coastline and the inland lakes of Muskoka and are relatively pristine with average *E. coli* readings of less than 5-counts per 100 ml. The provincial standard of 100-count/100 ml has been developed to indicate a health risk and not to provide a monitoring tool to track changes in bacteria levels. A local standard of 10-counts/100 ml reflects the lower natural background levels of *E. coli* enjoyed throughout Muskoka. Monitoring of bacteria at this lower level will enable smaller increases to be detected and will provide an early warning tool with respect to increasing average levels of background bacteria.

This more stringent standard also recognizes that many residents and other recreational resource users use lake water for drinking. In this situation, it is prudent to maintain the highest standard of water quality possible.

Table 3
Bacteria Counts Below the Local Standard

Lake	Percent of Readings Below 10 counts/100 ml		
	2001	2002	2003
Rosseau	83	86	88
Joseph	77	97	96
Muskoka	88	92	80
Lake of Bays	77	86	93
Brandy		76	67
Sucker			97
Leonard			94
Gull			93
Silver			100
Georgian Bay			
Honey Harbour	86		58
Go Home Bay	88	70	74
Severn River	85	63	82
Gloucester Pool	79	61	50
Go Home Lake	83	96	91
Gibson	100	83	100
12 Mile Bay	86	66	96
Wah Wah Taysee	47	43	75
Cognashene	66		

Bacteria are difficult organisms to monitor and additional data are required before trends or any cause-effect relationship can be developed. When the local standard is established at 10-counts/100 ml, readings over that standard may be a result of natural circumstances. For example, a heavy rain event will wash bacteria from the soil and result in a temporarily elevated reading. Preliminary data, presented in Table 3, above, indicates that generally Muskoka water is low in bacteria but that there are a few locations that appear to have consistently higher bacteria readings. Monitoring should continue in these areas and a preliminary investigation of bacteria sources should be undertaken with remedial action recommended to address any issues identified.

What are the stresses?

High bacteria counts occur in areas of high swimming use with inadequate sanitary facilities and in areas where faulty septic systems may result in bacteria being released into the surface water. In wetlands and areas frequented by significant numbers of waterfowl, naturally high levels of bacteria can be expected and swimming is not recommended in these areas.

In areas with a high density of live-aboard boats, such as Georgian Bay, the dumping of gray water adds both bacteria and phosphorus to the surface water.

What action can be taken?

Activities that can be undertaken by individuals:

1. Ensure that private waste disposal systems are functioning properly and meet current standards.
2. Plant a shoreline vegetative buffer using native species.
3. Do not wash boats in the lake.
4. Do not bathe in the lake.
5. Dispose of both gray and black water in regulated pump out facilities.

Activities that can be undertaken by municipalities:

1. Muskoka has built, and will continue to build as required, tertiary sewage treatment plants to ensure bacteria and other pathogens from areas with higher population concentrations do not enter our recreational waters.
2. Provide proper sanitary facilities at all public beaches.
3. Encourage the retention of shoreline vegetation through the planning and development approval process.
4. Require all septic systems to be set back 30 metres from the high water mark of all waterbodies.
5. Continue and improve septic re-inspection programs.

Activities that can be undertaken by the Muskoka-Parry Sound Health Unit:

1. Monitor additional public beaches that are heavily used during the summer.

Activities that can be undertaken by senior levels of government:

1. Provincial legislation is required that will allow a more thorough septic re-inspection program to be undertaken.
2. Provincial regulation governing the distance a septic system must be setback from surface water should be amended to read 30 metres.
3. Federal legislation is required that will require both gray and black water to be pumped out at regulated facilities.

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References

1. Francy Donna S., Donna N. Myers, and Kevin D, Metzker, *Escherichia Coli and Fecal-Coliform Bacteria as Indicators of Recreational Water Quality*, Water-Resources Investigations Report 93-4083, *In cooperation with the City of Columbus, Ohio, Division of Sewerage and Drainage; City of Akron, Public Utilities Bureau; Summit County Department of Environmental Services; Ohio Water Development Authority; Northeast Ohio Regional Sewer District; and Cuyahoga River Community Planning Organization.*
2. Parks Canada, Georgian Bay Island National Park, Beach Monitoring Data, 1996-2002.
3. Muskoka-Parry Sound Health Unit, Beach Monitoring Data, 2002-2003.
4. http://www.mpshu.on.ca/WaterQuality/beaches.htm
5. http://www.obf.on.ca/Watertest2002.htm
6. Ontario Parks, Arrowhead Provincial Park Beach Monitoring Data 2003.
7. Ontario Parks, Six Mile Lake Provincial Park Beach Monitoring Data 2003.

8. Schiefer, K., *Water Quality Monitoring Report, 1999 – 2003 Township of Georgian Bay*
9. Logan Environmental, *Muskoka Lakes Association Water Quality Initiative: 2001-2003 Annual Reports.*
10. Lake of Bays Association, *Water Quality Reports 2001-2003.*