



MEMO / NOTE DE SERVICE

To / Destinataire	Mayor and Members of Council/ Maire et membres du Conseil	File/N° de fichier: ACS2008-CPS-OPH-0003-IPD
From / Expéditeur	Dr. Dave Salisbury Medical Officer of Health / Médecin chef en santé publique	
Subject / Objet	2007 Beach Report/ Rapport sur les plages pour 2007	Date: 11 March 2008/le 11 mars 2008

Summary

The water quality at the City's four supervised beaches was better in 2007 than in 2006, resulting in fewer no-swimming advisories being issued. A research study completed at Petrie Island demonstrated that humans, as well as gulls and other waterfowl, are contributors to poor water quality at the beach. The study showed that rainfall impacts the water quality; and that human-related pollution is mostly associated with rainfall events. Ottawa Public Health staff are working to determine a relationship between rainfall and bacteria levels for the purpose of developing a no-swimming rainfall rule at Petrie Island.

Background

Programming and water monitoring are provided by the City of Ottawa at its four supervised beaches: Britannia, Mooney's Bay, Westboro and Petrie Island. At each of these locations, the Beach Program offers public education about water safety and drowning prevention, ensures public safety and emergency response and provides a safe and fun environment for all beach users. Determining if water quality is suitable for swimming is an integral part of protecting the health and safety of beach users. Under the Health Protection and Promotion Act and the Mandatory Programs and Service Guidelines 1997, it is the responsibility of the Medical Officer of Health (MOH) to make recommendations from a health perspective regarding the use of recreational waters for bathing purposes.

Recreational Water Quality Criteria

Assessment of recreational water quality incorporates knowledge of conditions at the site and bacterial analysis of the water. During the recreational water season, Ottawa Public Health (OPH) samples the swimming areas of the four supervised beaches on a daily basis. Water samples are also collected bi-weekly at sixteen monitoring points along the Ottawa and Rideau rivers.

The MOH issues a no-swimming advisory when bacteria counts exceed 200 *E. coli* per 100 ml of water sampled, calculated as a geometric mean or when the geometric mean exceeds 100 *E. coli* per 100 ml of water tested for two or more consecutive days. A 24-hour no-swimming advisory is issued for Westboro Beach following a rainfall of 5 mm or more. The rain rule was developed after historical data demonstrated

elevated bacterial counts following rain events of 5 mm or more. Currently, a geometric mean of 100 *E. coli* per 100 ml of water tested is the recreational water quality standard in Ontario. The federal standard is a geometric mean of 200 *E. coli* per 100 ml of water tested.

During the recreational water season, beach users are able to access daily water quality results by calling 3-1-1 and the automated Beach Information Line or by visiting the Ottawa Beaches section of ottawa.ca. The Ottawa Beaches section of the website is updated during Monday to Friday. At the beach, signs are posted near lifeguard stations and a red or green flag is flown to indicate if water is suitable for swimming. A red flag indicates that swimming is not recommended due to poor water quality. A green flag indicates that water quality is acceptable for swimming.

2007 Beach Water Quality

In 2007, the four supervised beaches were open to the public from June 16 to August 26. Table 1 illustrates the results of the 2007 season, as well as historical data. While the table permits comparison of water quality from one beach to the other it is important to note that each beach has unique physical features that contribute to water quality results. Factors such as runoff, the presence of birds and other waterfowl, variations in rainfall from one location to another and improvements to stormwater flows have all impacted different beaches at different times. It is rare to observe all beaches with similar bacterial results in any given swimming season.

Table 1 – Water quality history at City of Ottawa beaches

Year	Britannia		Westboro		Mooney's Bay		Petrie Island	
	≥100 <i>E. coli</i> / 100 ml water (days)	No-swimming advisories (days)	≥100 <i>E. coli</i> / 100 ml water (days)	No-swimming advisories (days)	≥100 <i>E. coli</i> / 100 ml water (days)	No-swimming advisories (days)	≥100 <i>E. coli</i> / 100 ml water (days)	No-swimming advisories (days)
1990	30	-----	15	-----	14	-----	-----	-----
1991	17	-----	18	-----	2	-----	-----	-----
1992	19	-----	11	-----	3	-----	-----	-----
1993	6	-----	5	-----	1	-----	-----	-----
1994	29	-----	8	-----	8	-----	-----	-----
1995	20	34	14	0	1	0	-----	-----
1996	19	1	14	1	1	0	-----	-----
1997	35	10	19	-----	0	0	-----	-----
1998	32	27	20	20	8	0	-----	-----
1999	21	13	10	13	1	0	-----	-----
2000	30	57	25	46	12	3	-----	-----
2001	19	28	12	20	3	0	-----	-----
2002	18	18	21	20	5	4	-----	-----
2003	2	9	9	11	1	0	-----	-----
2004	4	1	14	22	1	0	5	-----
2005	2	1	22	22	27	19	17	15
2006	2	0	22	29	12	10	48	45
2007	7	3	17	22	8	2	9	6

Britannia Beach

In 2007, three no-swimming advisories were issued and water quality exceeded the provincial standard of 100 *E. coli* per 100 ml of water tested on seven occasions. At Britannia, two management strategies are in place to help improve water quality. An existing pier at one end of the beach has been extended to direct near-shore river flow out past the swimming area, thereby protecting the swimming area with a physical barrier to bacteria carried out by stormwater outfalls. Overhead wiring is also in place to deter gulls from congregating in the swimming area, thus reducing fecal contamination of the beach by waterfowl.

Mooney's Bay Beach

In 2007, two no-swimming advisories were issued and water quality exceeded the provincial standard on eight occasions. Two engineering controls are employed at Mooney's Bay to reduce bacteria levels in the water. A pump at the south end of the beach circulates water through the swimming area at an increased rate than would normally occur at this point. Overhead wiring is also in place to deter gulls from the swimming area.

Westboro Beach

In 2007, twenty-two no-swimming advisories were issued, half of which were issued based on the established rain rule. The provincial recreational water quality standard was exceeded on seventeen occasions. As Westboro Beach suffers from poor water quality during both wet and dry weather, Baird and Associates and the City of Ottawa's Water Environment Protection Program (WEPP) conducted a four-year study that included monitoring and physical mapping of the underwater geography of the site. The study focused on monitoring creeks, outfalls, the Ottawa River and beach area. Data was used to produce a three-dimensional computer model to identify the effectiveness of potential solutions in the remediation of elevated bacteria levels. It was found that high *E. coli* counts experienced during dry weather conditions were not specific to one particular source, such as gulls and other waterfowl. As wet weather events are responsible for approximately 65% of no-swimming advisories, it was postulated that remediation of wet weather impacts would offer the greatest benefits with respect to reducing no-swimming advisories. Formalization of the sandbar near the beach and use of stormwater detention facilities were suggested remediation strategies.

Petrie Island Beach

In 2007, six no-swimming advisories were issued and the provincial standard was exceeded on nine occasions. During the 2006 recreational water season, Petrie Island was plagued by very poor water quality and 46 no-swimming advisories were issued. Concern among residents and beach users prompted staff to conduct a study in 2007 to better understand factors affecting water quality at Petrie Island. The results of this study are discussed in the Petrie Island Study section of this report.

Monitoring Points

Of the samples collected at the sixteen monitoring points along the Ottawa and Rideau rivers during the 2007 season, none of the results yielded a geometric mean that exceeded the provincial standard of 100 *E. coli* per 100 ml of water.

Petrie Island Study

The study was conducted by Environment Canada's National Water Research Institute to investigate the respective impacts of local pollution sources and the overall quality of the river on *E. coli* levels in beach water, and to characterize human and animal impacts on recreational water quality. Field observations and water samples were collected weekly at Petrie Island Beach and at upstream Ottawa River locations from May 7 to October 15, 2007. Water samples were analyzed for *E. coli*, and detection of a human *Bacteroides* DNA marker. *Bacteroides* are found in the bodies of warm-blooded animals and have been found useful in microbial source tracking studies as they contain a DNA sequence specific to humans. Thus, the presence of human *Bacteroides* DNA in a water sample indicates the presence of human-related waste. The laboratory technique employed when analyzing water samples for human *Bacteroides* DNA will detect the human-specific DNA sequence from both alive and dead organisms.

Field observations found evidence of contamination at Petrie Island Beach from both bird and human sources. Bird droppings were numerous at some places, although their role in beach postings or human health risks remains uncertain. Visual cues of human-related contamination were observed on the beach at times. Presence of these objects along shorelines may be a sign of a sewer overflow event. Visual observations taken at the beach provide valuable evidence of factors impacting water quality and enrich quantitative data collected during the study. *E. coli* concentrations at Petrie Island Beach were higher in the sand than in the adjacent beach water and they increased in the sand and beach water over the course of the bathing season. These results are consistent with other studies that have found sand serving as a reservoir for *E. coli*. The human *Bacteroides* DNA marker was detected in 26% of the beach water samples from Petrie Island Beach in 2007. Both *E. coli* concentrations and the occurrence of the human *Bacteroides* DNA marker were more numerous at the Beach following rain events than during dry weather.

Water quality monitoring upstream of Petrie Island Beach found that *E. coli* concentrations and the occurrence of the human *Bacteroides* DNA marker were lowest at the Ottawa River transect above the City of Ottawa and City of Gatineau municipal wastewater treatment plant outfalls. At each transect, *E. coli* concentrations and the human *Bacteroides* marker were more numerous at sampling locations on the Quebec side of the Ottawa River than on the Ontario side. An exception was the high occurrence of the human *Bacteroides* DNA marker at the sampling location downstream from the outfall of the City of Ottawa wastewater treatment plant. As the marker can detect the human-specific DNA sequence from both alive and dead organisms, a high positive occurrence downstream from a chlorinated outfall is not unexpected. Bilberry Creek had the highest *E. coli* concentrations and occurrence of the human *Bacteroides* DNA marker among the three sampled tributaries to the Ottawa River. The source of human-related contamination at the Beach appeared to be most closely associated with sources on the Ontario side of the Ottawa River. This finding is consistent with an earlier study conducted by the City of Ottawa prior to establishment of a public beach at Petrie Island.

As the impacts of human pollution at Petrie Island Beach were sporadic in 2007 and mostly associated with rain events, the report recommends that it is important to better understand when these impacts are likely to occur in the future and that establishment of a no-swimming rainfall rule may be appropriate. Regular monitoring of the water quality at Bilberry Creek and downstream of the outfall of the Robert O. Pickard Environmental Centre (ROPEC), the City's wastewater treatment plant is also recommended. In addition, the authors of the technical report recommend close communication between operators of ROPEC and Ottawa Public Health (OPH). Currently, OPH and staff from the Water and Wastewater Services Branch communicate regularly pre and post season, regarding beach operations, water quality issues and

monitoring of the Ottawa and Rideau rivers. The report highlights the importance of recognizing the limitations of using a bacterial indicator like *E. coli* for making water quality decisions in a riverine setting downstream from a chlorinated outfall of a large municipal wastewater treatment plant. However, *E. coli* remains the provincially mandated indicator organism for freshwater settings. The report concludes that additional research is required to better define and remediate human contamination sources having the most significant impact on Petrie Island Beach. A copy of this report is held on file with the City Clerk.

2007 Motion Related to Beach Operations

On February 15, 2007, the following motion was put forward and carried by the Environmental Advisory Committee:

Whereas public beaches are intended to be open for the enjoyment of people;

Whereas last summer, some Ottawa beaches, particularly the one located at Petrie Island, had to be frequently closed for health reasons, to the dismay of adults and children;

Whereas City staff have had success implementing similar pollution prevention measures at Britannia and Mooney's Bay beaches;

BE IT RESOLVED THAT City Council approve the funds (for Petrie Island), required to:

- *Accelerate the necessary research aimed at ascertaining the sources of pollution; and*
- *Provide appropriate on-site garbage containers, overhead gull wiring and other devices aimed at preventing animal and human pollution of the river water, during the summer season.*

CARRIED

In addition to conducting a research study at Petrie Island, specially modified garbage receptacles were erected in 2007. These receptacles are designed to prohibit gulls and other scavenging animals from accessing litter and debris inside garbage bins. At Petrie Island there is a mix of specially modified receptacles and traditional garbage bins. Despite improving the overall number and quality of garbage receptacles, at times there are not enough bins to accommodate large volumes of park and beach users. Minimizing the amount of easily accessible garbage is essential to reducing the numbers of scavenging animals, limiting the numbers of gulls at the beach and maintaining a clean environment for park and beach users. While evidence from the research study at Petrie Island indicates that gulls are not the sole contributor to poor water quality at this location, it is nonetheless important to take steps to limit gull populations at the beach. Installing overhead wiring to deter gulls is not currently being looked at for Petrie Island but staff from the Parks and Recreation Branch are exploring one-time funding options to cover the cost of new garbage receptacles.

2008 Beach Operations

Season Schedule

In 2008, the City of Ottawa will open the four supervised beaches to the public from June 21 to August 24.

Procedures

1. A no-swimming advisory will be issued when bacteria levels exceed 200 E. coli/100 ml of water, calculated as a geometric mean or when the geometric mean exceeds 100 E. coli/100 ml of water on two or more consecutive days.
2. A 24-hour no-swimming advisory will be issued for Westboro Beach following a rainfall of 5 mm or more.

OPH will continue to monitor the water quality of the four supervised beaches on a daily basis. Results will be posted at the beach and available to the public via telephone and website. OPH will continue to monitor the water quality of the sixteen monitoring points along the Ottawa and Rideau rivers.

New Initiatives

In 2007, staff from the Parks and Recreation Branch submitted an application for the Blue Flag Award to recognize the City of Ottawa's four supervised beaches. The Blue Flag Award is an international symbol of clean beaches and is given to beaches that achieve high standards in water quality, environmental education, environmental management and safety and services. In Ontario, the Blue Flag Program is administered by the non-governmental organization Environmental Defence. This is a new program in Canada but it has been established in Europe for more than twenty years. Currently, nine beaches in Canada fly the Blue Flag. All four City of Ottawa beaches have been designated as candidates for the program and will fly the Blue Flag in 2008. Establishing on-site recycling is a requirement for official Blue Flag certification and is targeted as an area for improvement. Enrolment in the Blue Flag program has been a positive experience for many municipalities around the world by raising the profile of public beaches while ensuring environmental sustainability.

Next Steps

Further to Petrie Island Study recommendations, OPH staff are working to determine a relationship between rainfall and bacteria levels for the purpose of developing a no swimming rainfall rule at Petrie Island. OPH staff and ROPEC operators will continue to communicate on a regular basis. The City of Ottawa's Water Environment Protection Unit will continue its baseline water quality monitoring during the recreational water season, which includes regular monitoring of Bilberry Creek and the ROPEC outfall.

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