

Hamilton Public Health Services 2016 Beach Monitoring Report

This is an annual update regarding Hamilton Public Health Services (PHS) recreational water quality monitoring at Hamilton's public beaches and the activities undertaken by stakeholders to improve the water quality at these beaches.

Hamilton Harbour Beach Management Group meets at least twice per year to share research and discuss issues, projects and activities being done in and around Hamilton Harbour to improve the recreational water quality at the harbour beaches. Members of the group include staff from PHS, Hamilton Harbour Remedial Action Plan (RAP), Environment Canada, City of Hamilton Public Works Department, Parks Section and the Landscape Architectural Services Section, and the Bay Area Restoration Council (BARC).

The percentage of days that public beaches are open during the swimming season is an indicator of the recreational quality of the water at Hamilton's public beaches. The City of Hamilton's Vision 2020 Plan and the Hamilton Community Vision place an importance on improving water quality in Hamilton Harbour to allow safe swimming and recreational use of public beaches and other aquatic activities. Hamilton Harbour remains on the Great Lakes Areas of Concern (AOC) List. As a result, stakeholders have developed a Remedial Action Plan (RAP) for Hamilton Harbour in order to identify the challenges in the harbour and how they may be addressed. One criterion that needs to be satisfied in order to remove Hamilton Harbour from the AOC List is the harbour beaches must be open for swimming 80% of the time.

Background

The Ontario Public Health Standards (OPHS) specify the public health programs and services Boards of Health must provide. Program and topic-specific protocols under the OPHS further define the minimum responsibilities every Board of Health is accountable to provide.

The Beach Management Protocol (2014) and the Beach Management Guidance Document (2014) direct Boards of Health on the delivery of local recreational water public health programs to assist in the prevention and reduction of water-borne illness and injury related to recreational water use at a public beach. A public beach is a public bathing area owned/operated by a municipality to which the general public has access, and where there is reason to believe that there is recreational use of the water.

The OPHS requires Public Health Units to determine the suitability of a public beach for public recreational use. Due to a history of poor water quality at Bayfront Beach, PHS advised Hamilton Public Works that Bayfront Beach is not a suitable recreational area and that Bayfront Beach should be closed in 2016 until action is taken to improve the water quality. Bayfront Beach was closed for the 2016 season and Hamilton Public Health Services did not monitor the water quality. AECOM Engineering was contracted by the City of Hamilton Public Works Department to assess the historical water quality data for Bayfront Beach and provide potential fixes and use options for Bayfront Beach. AECOM will report their findings and recommendations in 2017. Hamilton PHS continued to conduct routine beach surveillance at three public beaches on Lake Ontario, one beach in the Hamilton Harbour, and at three local

conservation areas. Beach surveillance includes the inspection of public beaches after operations commence, at least once per week during the period of operation or use to monitor the safety of the public bathing areas and establish strategies for management of health hazards.

PHS monitors the safety of public beaches by collecting and testing the beach water for *E.coli* at least once per week during the swimming season, which typically begins after Victoria Day in May and ends on Labour Day in September. *E. coli* are naturally found in the intestines of humans and warm-blooded animals. High numbers of *E. coli* in the water at public beaches indicate the presence of faecal contamination and the potential presence of other harmful microorganisms in the water. The recreational water quality guideline in Ontario is 100 *E. coli* Colony Forming Units (CFU's) per 100 ml of water. *E. coli* concentrations at or above this level could represent an increased risk of infection to swimmers.

The Beach Management Guidance Document (2014) states that a minimum of five samples must be collected at each beach and the geometric mean (GM) of *E. coli* concentrations must be used to assess recreational water quality and guide public health action. When the GM of *E. coli* concentrations are at or above 100 CFU's per 100 ml of water, warning signs are posted at the affected beach to advise potential bathers that the water may pose a health risk and the beach is deemed as unsafe for swimming. Additionally, PHS updates the City of Hamilton's Beach Water Quality Website www.hamilton.ca/beaches and the Safe Water Information Line outgoing phone message (905-546-2189) to reflect the current beach water quality status.

Blue-Green Algae

Blue-green algae (BGA) are cyanobacteria which occur naturally in aquatic environments. BGA flourish in slow-moving or still waters with high nutrient levels and sufficient sunlight. Some BGA produce microcystin toxins which are the most commonly produced toxin of the cyanobacterial toxins. Microcystin toxins are tasteless, colourless and odourless and are toxic to both humans and animals. Typical exposure routes are through ingestion or inhalation from spray or steam from the contaminated water.

PHS monitors public beaches for the presence of BGA throughout the swimming season. The Canadian Recreational Water Guideline for microcystin concentrations in recreational water is 20 parts per billion (ppb). When potential toxin-producing BGA blooms are observed at a public beach PHS uses Abraxis™ microcystin test strips to measure the concentration of microcystin toxins in water samples collected from the beach. When high concentrations of microcystin toxins are measured the beach is closed and a swimming advisory issued. PHS posts beach closure signs and issues a media release. The City of Hamilton's Beach Water Quality website www.hamilton.ca/beaches and the Safe Water Information Line (905-546-2189) are updated. PHS does not monitor beach water quality for *E. coli* concentrations when toxin-producing BGA blooms are present.

2016 Beach Sampling Results

The 2016 public beach monitoring program took place over a 15-week period, beginning the week of May 24 and ending the week of September 5. Table 1 summarizes the data for the 2016 swimming season at seven public beaches in Hamilton. Bayfront Beach was not monitored in 2016.

Table 1: Beach Monitoring Program Summary

Name of Beach	Water Body	Total # of Days in Bathing Season	# of Days Beach Closed due to <i>E. coli</i> *	# of Days Beach Closed due to BGA	Total # of Days Beach Closed	Total # of Days Beach Open	% of Days Beach Open
Bayfront Beach	Hamilton Harbour						
Pier 4 Beach	Hamilton Harbour	105	37	33	70	35	33
Beach Boulevard	Lake Ontario	105	0	0	0	105	100
Van Wagner's	Lake Ontario	105	7	0	7	98	93
Confederation Park	Lake Ontario	105	7	0	7	98	93
Christie Conservation	Christie Reservoir	105	10	0	10	95	90
Binbrook Conservation	Lake Niapenco	105	0	0	0	105	100
Valens Conservation	Valens Reservoir	105	35	0	35	70	67

*PHS does not monitor for *E. coli* when BGA is present

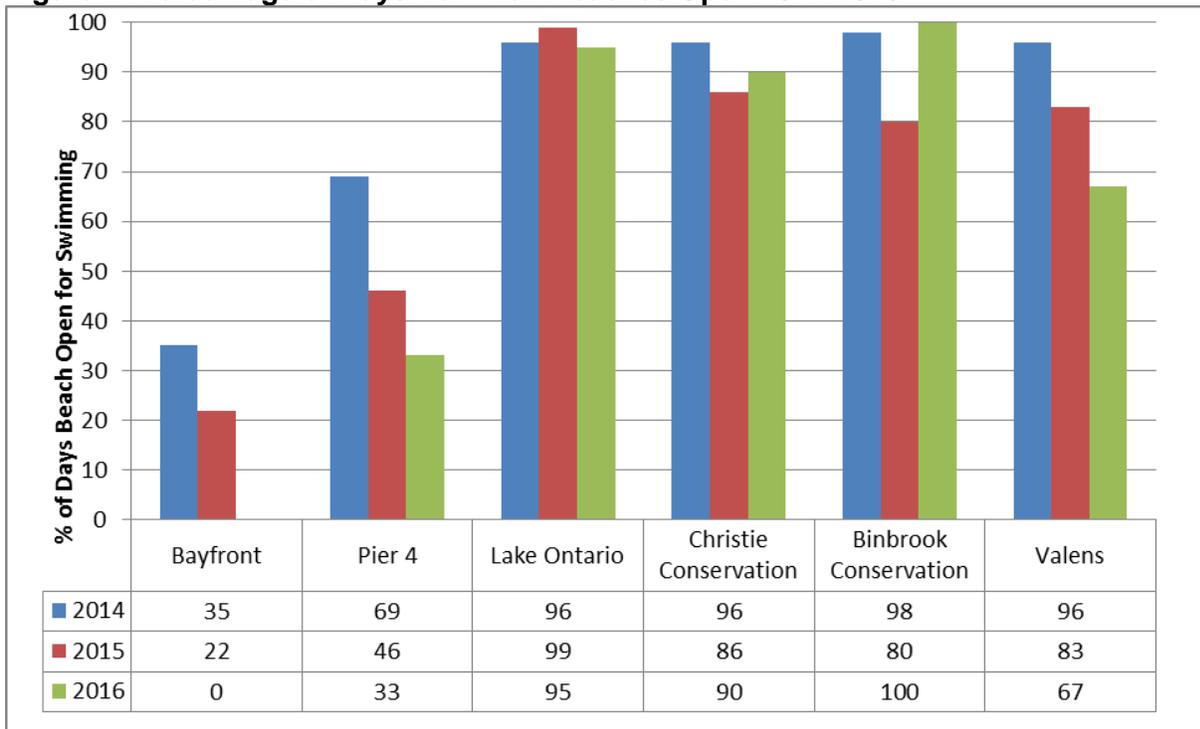
The percentage of days open for Pier 4 Beach was much lower than Lake Ontario and conservation area beaches. Pier 4 Beach was open 33% of the time while Valens, Christie and Binbrook Conservation Areas Beaches were open 67, 90 and 100% respectively. For Lake Ontario beaches, Beach Boulevard was open for 100% of the season, while both Van Wagner's Beach and Confederation Park Beaches were open for 93% of the season.

Pier 4 Park Beach

Pier 4 Park Beach has experienced a significant decrease in percentage of days open for swimming over the 2014-16 seasons (Figure 1). The percentage of days open at Pier 4 beach dropped to 33% in 2016, down from 69% open in 2014, and 46% open in 2015. Pier 4 Park Beach continues to remain very distant from meeting the Remedial Action Plan (RAP) delisting criteria of 80%.

Prior to August 4, 2016 Pier 4 Park Beach was posted as unsafe for swimming for 37 days due to high levels of *E. coli* (Table 1). On August 4 microcystin concentrations were detected and exceeded warning levels of 10 parts per billion (ppb) at Pier 4 Park beach and the Bayfront Park boat launch. PHS does not monitor for *E. coli* levels once toxin-producing BGA blooms are observed and microcystin concentrations are confirmed. Public Health Services issued a media release to inform the public and stakeholders of the presence of microcystin toxins and beach closed signs were posted. Pier 4 Beach remained closed due to BGA toxins for the remainder of the swimming season. During the months of July and August 2016, Pier 4 Park Beach was open for seven days only. In 2016 the presence of BGA was responsible for closing Pier 4 Beach for 31% of the swimming season. PHS continued to monitor for the presence of BGA toxins until December 2016.

Figure 1: Percentage of Days Hamilton Beaches Open 2014-2016



Similar to Bayfront Beach, bird deterrent measures and enhanced beach grooming activities have been in place at Pier 4 Beach since 2005. These measures have included diverting rainfall drainage and providing beach landscape enhancements. Pier 4 Beach had shown signs of improvement following the implementation of bird exclusion barriers in August 2005, however the water quality remains well below the delisting criteria and has been steadily decreasing since 2013 (Figure 2).

Figure 2: Hamilton Harbour and Lake Ontario Beaches % Days Open

