

Hamilton Public Health Services 2014 Beach Monitoring Report

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

City of Hamilton Public Works, Public Health Services, Hamilton Harbour Remedial Action Plan (RAP), National Water Research Institute, and the Bay Area Restoration Council (BARC) have been working together on an ongoing basis in an effort to improve the water quality at Hamilton Harbour Beaches. Bird deterrent measures and enhanced beach maintenance that have been in place at Pier 4 Beach since August 2005 appear to have improved the water quality at that beach. Efforts to improve water quality at Bayfront Beach continue. While Pier 4 Beach water quality has responded favourably, water quality at Bayfront Beach has not improved significantly or consistently in the past decade. E coli contamination from large resident bird populations has been suggested as a potential source of ongoing poor water quality.

The City of Hamilton's Strategic Plan (Focus Area 6) aims to remove Hamilton Harbour from the Great Lakes areas of concern list by 2020. One component of achieving this requires increasing recreational use of the harbour waters, measured by the water quality at the two harbour beaches during the bathing season (Victoria Day to Labour Day). Overall, the percentage of days when the harbour beaches were open for swimming was much higher at Pier 4 Beach compared to Bayfront Park Beach.

Background

In accordance with the Ministry of Health and Long Term Care Beach Management Protocol under the Ontario Public Health Standards 2008, Hamilton Public Health Services monitors the recreational water quality at three public beaches along Lake Ontario, two beaches in Hamilton Harbour, and at three Conservation Areas.

The Protocol requires that these beaches be sampled and tested for E.Coli at least once per week during the swimming season. E. coli are bacteria normally and 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 fecal contamination and the potential presence of other harmful microorganisms in the water. The Ontario recreational water standard is 100 E. coli bacteria cells (also known as Colony Forming Units (CFU's)) per 100 ml of water. E. coli concentrations at or above 100 CFU's per 100 ml of water could represent an increased risk of infection to bathers. When E. coli concentrations are at or above 100 CFU's per 100 ml, warning signs are posted at the affected beaches, advising potential bathers that the water may pose a health risk and is deemed as unsafe for swimming. Additionally, Public Health Services updates the Safe Water website

(www.hamilton.ca/beaches) and the Safe Water Information Line (905-546-2189) outgoing phone message to reflect the current beach water quality status.

The Beach Management Protocol also requires Public Health Services to monitor the presence of Blue Green Algae (BGA) or Cyanobacteria blooms. These bacteria can produce toxins called microcystins, which can be harmful to humans and animals. The Canadian Recreational Water Guideline for microcystin concentrations in recreational water is 20 parts per billion (ppb). When potential BGA blooms are observed, Public Health Services uses Abraxis™ microcystin test strips to detect the presence of microcystin. When microcystin concentrations exceed 10 ppb, Public Health Services warns the public by advising beach owners/caretakers to post specific BGA warning signs in order to inform potential bathers that the area is not safe for people or animals to swim or wade and not to eat any of the fish caught at this time. Additionally, Public Health Services updates Beach warning signs, the Safe Water website and the Safe Water Information Line, to reflect the current status of the water quality.

2014 Beach Sampling Results

In 2014, the public beach sampling program took place over a 16 week period, starting the week of May 20 and ending the week of September 02. Table 1 summarises the data for the 2014 swimming season.

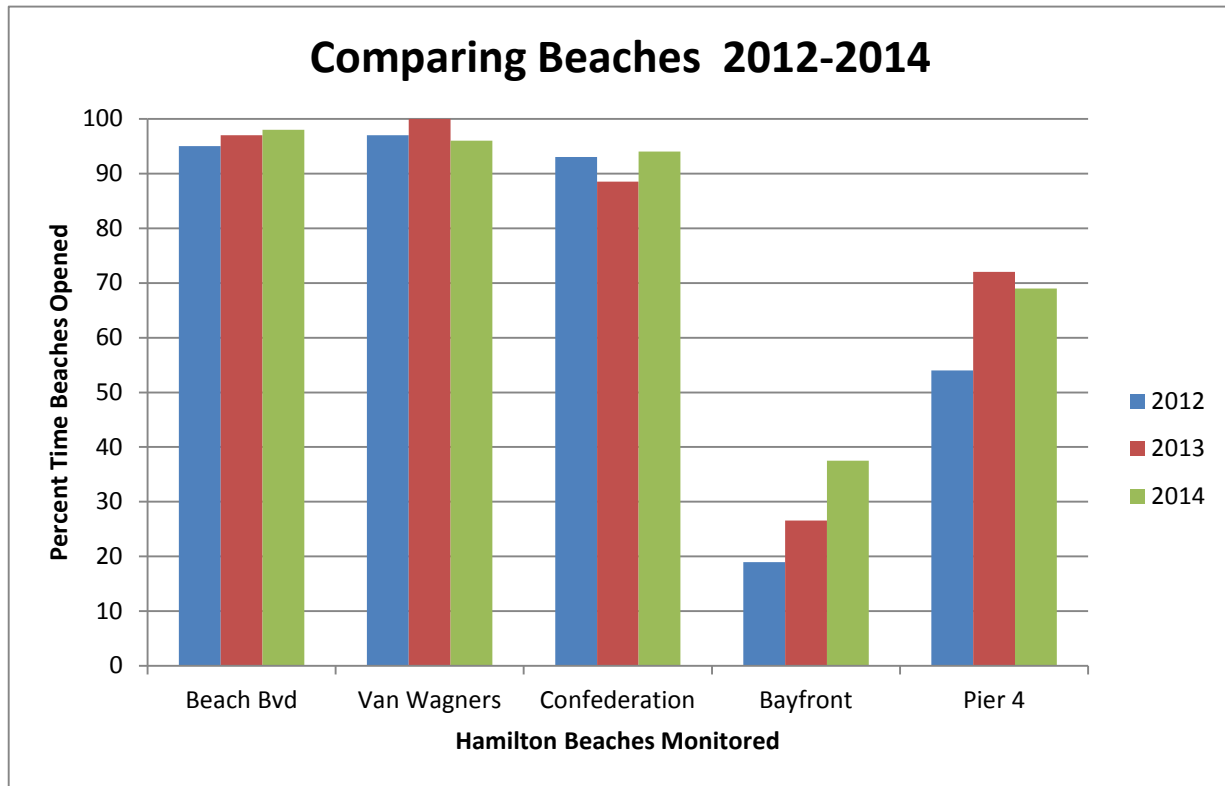
Table 1: 2014 Bathing Beach Monitoring Summary

Water body	Name of Beach	# of sampling sites	# weeks sampled	# days in bathing season	# days beach closed	% days beach open
Lake Ontario	Beach Boulevard	14	16	104	2	98
	Van Wagners	6	16	104	4	96
	Confederation Park	6	16	104	6	94
Hamilton Harbour	Bayfront Park Beach	5	16	104	65 *	37.5
	Pier 4 Beach	5	16	104	32 *	69
Christie Reservoir	Christie Conservation	5	16	103	4	96
Lake Niapenco	Binbrook Conservation	5	16	103	2	98
Valens Reservoir	Valens Conservation	5	16	103	4	96

* Includes 12 days closed due to the detection of microcystins

* Includes 7 days closed due to the detection of microcystins

Graph 1: Hamilton Beaches Days Open (percentage) in 2012 - 2014



Lake Ontario beaches have had consistently acceptable E. coli concentrations during the 2012, 2013, and 2014 swimming seasons. Bayfront beach has experienced a slight improvement over the past several swimming seasons in percentage of days open for swimming but remains very distant from meeting the delisting criteria of 80%. Pier 4 beach water quality remains significantly improved since the implementation of bird exclusion barriers in 2005, however, water quality remains below the delisting criteria. The presence of blue green algae at Bayfront and Pier 4 beaches is affecting the percentage of days the two Harbour beaches are open for swimming.

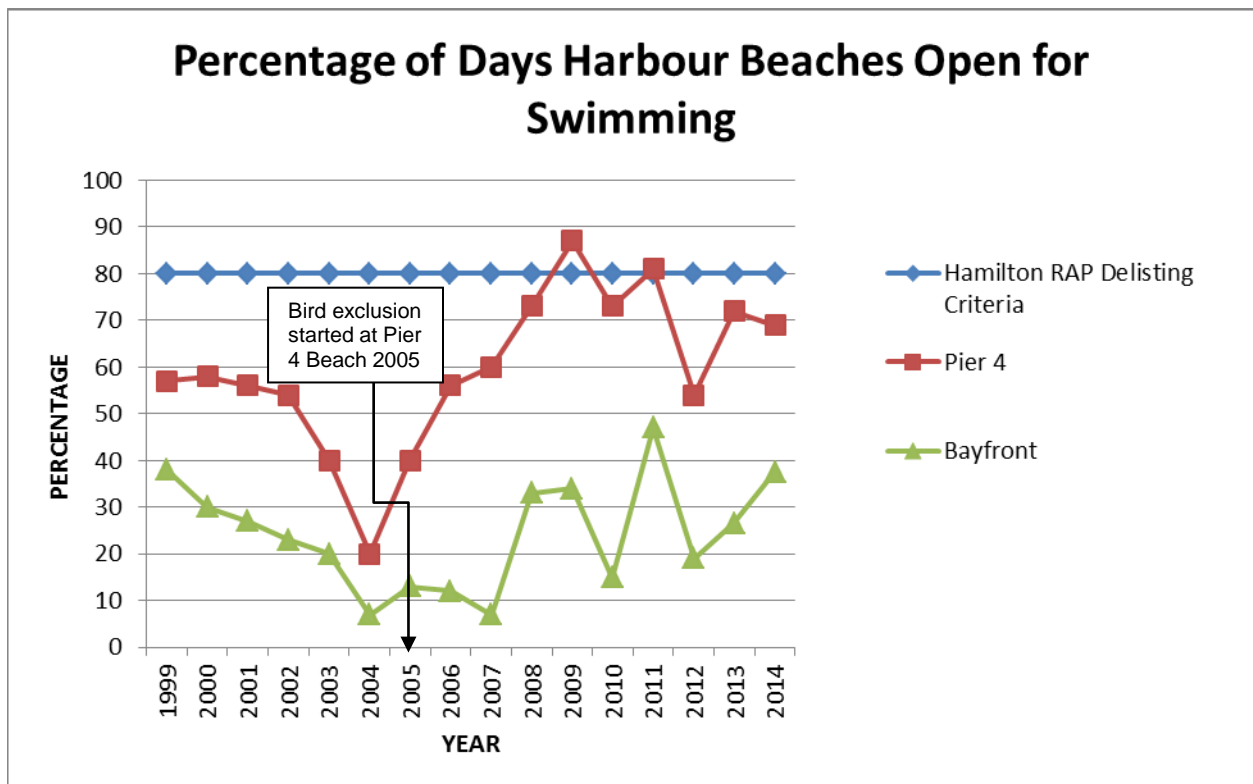
Hamilton Harbour Beaches

Public Health Services is a member of the Hamilton Harbour Beach Management Group. This group meets twice per year to share research information and discuss issues, projects and activities being done in and around Hamilton Harbour. Members of the group include staff from the Canadian Centre for Inland Waters, Public Works is represented by staff from both Parks and Cemeteries and Landscape Architectural Services, Bay Area Restoration Council (BARC), Bay Area Implementation Team (BAIT).

In 2014 Pier 4 Beach was open 69 per cent of the time while Bayfront Park Beach was open 37.5 percent of the time. Bayfront Beach experienced an improvement in the number of days open for swimming while Pier 4 Beach decreased slightly.

In 2013, microcystins were detected near the end of the bathing season (late August) and remained at the Bayfront Boat launch until early December. In 2014, microcystins were detected above the Canadian Recreational Water Guidelines a week sooner than in 2013.

Graph 2: Hamilton Harbour Beaches Days Open (percentage) from 1999 to 2014



NOTE:

- * Bayfront Park Beach closed for 12 days due to the detection of microcystins.
- * Pier 4 Beach closed for 7 days due to the detection of microcystins.

Bayfront Beach

Excessive E. coli concentrations continue to be an ongoing concern. Research has suggested that waterfowl fecal matter is likely to be a large contributor of E. coli, which can adversely affect the recreational water quality at a beach. The “Toward Safe Harbours 2008” report by BARC (Bay Area Restoration Council) cites this research and supports the belief that the large number of Canada geese, ring-billed gulls and other waterfowl present at the Harbour Beaches are a source of E. coli affecting the water quality. This report can be accessed online at www.hamiltonharbour.ca/whysave-harbourreports.htm.

Waterfowl leave fecal matter on the beach, in the swimming area waters, and on the grassy slopes and paved surfaces. During periods of rainfall, this fecal matter can be washed onto the beach and contaminate the water. Therefore, any efforts to exclude waterfowl from the Harbour beaches and swimming areas should improve the recreational water quality.

Since August 2010 a buoy system similar to Pier 4 Beach is installed seasonally at Bayfront Beach. This buoy system was an attempt to deter Canada geese from swimming into the Bayfront swimming area during the 6 week period when the geese do not fly due to feather moulting. In April 2011 shrubs were planted to act as a barrier to surface water run-off and eventually act as a line-of-sight obstacle for Canada Geese. Increased canine harassment on Bayfront Beach and the installation of a hawk kite have proven somewhat successful in 2014. These programs will continue in 2015 along with usual beach grooming measures and the goose egg oiling program.

Although Bayfront Park Beach water quality appears to be weakly improving, it will not likely meet the delisting criteria without additional efforts, such as physical changes to the beach and/or shoreline landscape, or perhaps changes to improve water flow or movement. Blue green algae are a concern that may not be resolved without a broader watershed management approach.

Pier 4 Beach

In 2014, the percentage of days the beach was open for swimming has decreased slightly from 2013. Since 2005, the Pier 4 Beach has exceeded the 80% Hamilton RAP delisting criteria twice. Once in 2009, and again in 2011 while Bayfront Beach has never reached this target.

The bird exclusion project at Pier 4 Beach continued in 2014. It involves several main activities; a buoy line system to deter Canada geese from swimming onto the beach area, a fence around the perimeter of the beach to deter birds from walking into beach areas, and a geese harassment program from trained dogs. Other actions such as diverting rainfall drainage and other beach enhancements at Pier 4 should continue to improve the overall general bacteriological water quality. Blue green algae blooms remain a concern that will not likely be addressed without a broader watershed management approach to control it.

Cyanobacteria (Blue Green Algae)

Cyanobacteria, or commonly referred to as blue green algae, occur naturally in aquatic environments. Cyanobacteria flourish in slow moving or still waters with high nutrient levels

and sufficient sunlight and can remain active in cold temperatures. The occurrence of algae blooms may be enhanced or encouraged by human activities that increase nutrient levels in water bodies. Some cyanobacteria produce microcystins, which is the most commonly produced toxin of the cyanobacterial toxins. Microcystin toxins are toxic to both humans and animals. Toxins are tasteless, colourless and odourless and are not readily absorbed through the skin. Typical exposure routes are through ingestion or inhalation from spray or steam from the contaminated water. Dogs are particularly susceptible because many will drink from or swim in contaminated areas where the bloom material and water is caught on their coat or skin, which they lick and clean.

Beginning in late June, low microcystin concentrations were detected at Bayfront Park boat launch but not elsewhere. It was not until August 26, 2014, that cyanobacteria concentrations exceeded warning levels at the Bayfront Park boat launch and Bayfront Park Beach. Public Health Services continues to monitor and as of October 2nd BGA remained present at the Harbour beaches.

Public Health Services monitors the Harbour for blue green algae after the bathing season has ended and will only lift the advisories once the toxins are not detected. In 2013, blue green algae surface blooms and microcystin toxins were observed and elevated at numerous recreational access points along the harbour from late August until early December. Warning signs stayed in place until December when microcystins concentrations were measured to be less than 10 parts per billion.