

# **Status Report on the Degradation of Aesthetics Beneficial Use Impairment XI in the Hamilton Harbour Remedial Action Plan**

**Compiled and prepared for  
Environment and Climate Change Canada  
by the Bay Area Restoration Council**

**March 31, 2019**



**BAY AREA RESTORATION COUNCIL**

**ECOLOGY · INDUSTRY · RECREATION**

# Acknowledgements

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Cover image: Chris McLaughlin, looking north across the Leander Boat Club basin, June 27, 2018.

The Bay Area Restoration Council is a registered charitable non-profit organization. Formed in 1991, BARC represents the public interest in the restoration of Hamilton Harbour and its watershed. BARC is responsible for community engagement and educational activities in the implementation of the Hamilton Harbour Remedial Action Plan. BARC encourages public understanding and citizen action through school programs, volunteer participation, public workshops, evaluative reporting on current issues and opportunities for digital communications.

[HamiltonHarbour.ca](http://HamiltonHarbour.ca)

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## Purpose

The purpose of this report is to provide an historical context and current status for the Degradation of Aesthetics Beneficial Use Impairment (BUI) XI for the Hamilton Harbour Remedial Action Plan (HHRAP).

The “Aesthetics BUI” for Hamilton Harbour is currently designated as *impaired* in the HHRAP and to date has not received a comprehensive assessment of what is known or what information is still required in order to define this BUI as *not impaired*.

The process to report on the history and status of the HHRAP Aesthetics BUI involved:

1. A review of similar status reports from other Great Lakes Areas of Concern that assessed the Aesthetics BUI for redesignation to *not impaired* (such as Toronto, Bay of Quinte, Cuyahoga River, St. Clair River and Detroit River).
2. Compiling data collected between 2012 and 2017 regarding the Aesthetics BUI for Hamilton Harbour such that a semi-quantitative assessment could be made using the Toronto RAP Aesthetic Quality Index assessment methodology.
3. Conducting further investigations in 2018 to augment those data, including research, surveys and fieldwork.
4. Providing or recommending additional information that could augment that assessment, such as photos, reports and anecdotes that help to contrast conditions that historically failed to meet the International Joint Commission’s definition of degraded aesthetics with the current situation.
5. Providing recommendations and direction regarding the adequacy of evidence, plans and programming to address the status of the Aesthetics BUI for the Hamilton Harbour RAP and ensure continued and improved aesthetic conditions are achieved and monitored into the future.

This report accomplishes all of these objectives and is intended to inform discussion prior to and during the HHRAP Stakeholder Forum tentatively scheduled for late 2019.

# Introduction

In 1985, the International Joint Commission's (IJC) Great Lakes Water Quality Board identified 42 degraded harbours, embayments and connecting channels in the Great Lakes as Areas of Concern (AOCs; a 43rd was identified in 1991). AOCs were defined by the measurable chemical, physical or biological 'impairment' of one, some or all of 14 'beneficial uses' (BUIs). The federal, provincial and state governments committed to developing and implementing remedial action plans (RAPs) as locally-designed approaches to engaging community stakeholders to define problems and set priorities to remediate BUIs and "delist" the AOC (i.e., remove all BUIs and the AOC designation). This commitment was codified in the 1987 Great Lakes Water Quality Agreement and renewed as recently as 2012.

Hamilton Harbour is the most degraded of the Canadian AOCs from the long history of extensive land reclamation in its coastal wetlands and the overwhelming amounts of raw sewage and toxic industrial waste it has received. More than a century of devastating abuse, neglect and decline caused severe damage to water quality and aquatic habitat, and profound harm to fish and wildlife populations. In the process, the community largely became estranged from the Harbour, cut off physically by fenced industrial lands and psychologically by the inherent public health dangers presented by the physical condition of the waters of the Harbour. BARC's website provides further details on the history and characteristics of Hamilton Harbour<sup>1</sup> and of its Remedial Action Plan.<sup>2</sup>

The Hamilton Harbour RAP has addressed most of these issues with projects to upgrade wastewater treatment, contain legacy toxic sediment and restore fish populations and their habitat. And while slow, steady and sometimes significant improvements have been made, perhaps the most subjective issue for the HHRAP – the Degradation of Aesthetics BUI – has been left largely unexamined. George and Boyd suggest that while "'continuous improvement' may be an admirable guiding principle for environmental management when water quality and wildlife habitat is severely degraded ... as environmental conditions improve, RAP partners must start thinking more quantitatively about what remains to be accomplished before BUIs can be reported as restored. In this context, continuous improvement is no longer sufficient; it describes the journey, but fails to establish the destination."<sup>3</sup>

This report is an attempt to provide structure to the issue of aesthetics in the Harbour, and the status of the Aesthetics BUI in particular, in that it:

1. summarizes the background of initial conditions that provide context for the HHRAP;
2. tracks local changes to the IJC's delisting criteria and efforts to define a framework to guide redesignation of Hamilton Harbour's Aesthetic BUI to *not impaired*;
3. presents evidence of adequate aesthetic conditions in the Harbour between 2012 and 2018 using a semi-quantitative assessment methodology employed recently by the Toronto RAP,
4. discusses the inherent challenges with the subjective nature of the Aesthetics BUI; and
5. concludes with recommendations for policies and programs to ensure improving aesthetic conditions in Hamilton Harbour in the future.

<sup>1</sup> [http://hamiltonharbour.ca/about\\_the\\_bay](http://hamiltonharbour.ca/about_the_bay)

<sup>2</sup> [http://hamiltonharbour.ca/about\\_the\\_rap](http://hamiltonharbour.ca/about_the_rap)

<sup>3</sup> George TK, and D Boyd, 2007. Limitations on the development of quantitative monitoring plans to track the progress of beneficial use impairment restoration at Great Lakes Areas of Concern, Journal of Great Lakes Research 33, 686-692.

## Background

Colin D. Gibson was the Member of Parliament for Hamilton-Wentworth when he rose in the House of Commons in 1969 to provide this damning appraisal of environmental conditions in Hamilton Harbour:

The situation which exists at Hamilton Harbour with respect to pollution is extremely serious. The bay area, once a magnificent natural resource, is now a stinking, rotten quagmire of filth and poisonous waste. For many years the situation has gone from bad to worse. Now, we are faced with a large body of polluted water which constitutes a real and dangerous health hazard.<sup>4</sup>

This was a time of heightening citizen concerns about pollution and a recognition that new approaches to problem-solving would be needed. But there had long been a realization that the infilling of the Harbour and its use for industrial and sanitary waste disposal had the potential for creating significant social problems and competing priorities, as identified in a Hamilton Spectator editorial in 1862:

We have been informed that the refuse from the coal oil refineries, which is emptied into the Bay, is having a very deleterious effect upon the fisheries at the Beach. It is said that the water, on certain mornings, is covered for a considerable distance with oil and the effect has been to drive away the fish from the Beach. The subject is not without difficulty. In the infancy of the coal oil industry, it would be inexpedient to place restrictions on the operations of refiners, but at the same time, it would be disastrous to the fishing industry if the fish are driven away by the noxious effluvia arising from the coal oil.<sup>5</sup>

Mr. Gibson's observation of the dual problems in Hamilton Harbour being "filth" and "poisonous waste" have been well documented through the years, including in these two accounts of public concern from recreational users and from a medical doctor in municipal leadership:

Pollution and contamination of the waters of Hamilton's harbor must cease, declared William Ainslie, chairman of the Harbor Board, this morning, when he received a petition signed by 95 prominent west end residents who patronize north shore boat houses. The petitioners complained that filth and corruption in the form of tar, oil and sewage, which is at present being emptied into the bay in large quantities, is proving a detriment to boating, fishing and bathing, and every phase of aquatic pleasure.<sup>6</sup>

The water in the bay is not fit for kiddies to bathe in, declared Ald. Dr. Wythe, chairman of the board of health ... I have had several cases of children pass through my hands who have developed infectious rashes from bathing in it.<sup>7</sup>

Three decades later, as Hamilton continued to expand in size and population, the situation had only worsened: "The truth of the matter is Hamilton ... has no sewage disposal plant, other than Depew Street which merely is a screening plant. Practically untreated sewage flows into the Bay...."<sup>8</sup> That same

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<sup>4</sup> House of Commons Debates, Volume XI, May 29, 1969, <https://goo.gl/U2CRfQ>

<sup>5</sup> Hamilton Spectator, June 10, 1862

<sup>6</sup> Hamilton Herald, July 4, 1923

<sup>7</sup> Hamilton Spectator, July 9, 1924

<sup>8</sup> Hamilton Review, June 25, 1953.



summer it was reported that “one quarter of the entire Bay was covered – not just with a slick, but with thick, black oil,” a “disgraceful mess” that the Harbour Patrol chief deemed a “fire hazard.”<sup>9</sup>

Persistent, degraded conditions peaked into the 1960s and led to new public and political attention. (Bouchier and Cruickshank tell the social history of the various environmental eras in the Harbour.<sup>10</sup>) In 1967, the Ontario Water Resources Commission concluded that “polluting materials from industrial and domestic sources are being discharged in significant quantities via the City of Hamilton storm sewer system” (Figure 1),<sup>11</sup> turning Hamilton Bay into “an 11 mile square sewer ... Canada’s ‘biggest septic tank’” the Hamilton Spectator reported.<sup>12</sup>

**Figure 1. The 1967 Ontario Water Resources Commission report included these images and descriptions of persistent and deplorable aesthetic conditions in Hamilton Harbour.**



Water coated with black oil and faecal solids, a typical observation in the East Harbour.



Floating solids visible in this close up, bubbles of sour gas rising from accumulation of septic sludge on the slip bottom.



Wellington Street Storm Outfall, extremely large amounts of domestic and industrial pollution from this source, severe contamination from human excrement visible.



Oil on the water surface and floating human excrement.

<sup>9</sup> Hamilton Spectator, June 29, 1953.

<sup>10</sup> Bouchier N, and K Cruickshank, 2016. The People and the Bay: A Social and Environmental History of Hamilton Harbour, UBC Press.

<sup>11</sup> Ontario Water Resources Commission, 1967. City of Hamilton: Water Pollution Survey of Sewer Outfalls and Tributary Streams to Hamilton Bay. Also: Ontario Water Resources Commission, 1964. Report on Industrial Waste Loading Discharged to Hamilton Harbour by the Bayfront Industries.

<sup>12</sup> Whittington, H, (Hamilton Spectator), Hamilton Bay a sewer – OWRC, May 24, 1969.

Although the City of Hamilton’s new wastewater treatment plant at Woodward Avenue, completed in 1964, and industrial discharge regulations in the 1980s began to stem the tide of pollution into Hamilton Harbour, a vast and incredible amount of damage had been done (Figure 2).

**Figure 2. A 1967 aerial photo of infilling and steel-related waste in Hamilton Harbour, with Dofasco at the centre and Stelco on the far right (Photo: John Shaw. Courtesy: Environment Canada).**



As the IJC and others began to identify “problem areas” in the late 1970s – the conceptual precursor to AOCs – Gil Simmons had been leading a citizens’ initiative for change and recovery for several years from her home in Hamilton’s North End overlooking infilling of the West Harbour (Figure 3). Several years later, Hamilton city councillor Henry Merling, chair of the City’s pollution control committee, went “fishing” at Windermere Basin in the industrial east end (Figure 4).

Work continued into the 1980s to define the problems and arrange a multi-stakeholder process to develop the HHRAP – a very new concept at that time. (Hall and O’Connor sketch the unique aspect of the HHRAP’s development<sup>13</sup>.) Of particular importance were provincial reports that investigated technical data and management options for remediation with cost estimates<sup>14</sup> and an initial report defining the priorities of non-governmental and community stakeholders.<sup>15</sup> Relevant parts of the latter report are reproduced as Appendix 1. Notably, that 1986 stakeholders’ report adopted the following

<sup>13</sup> Hall JD, and KM O’Connor, 2016. Hamilton Harbour Remedial Action Plan process: connecting science to management decisions. *Aquatic Ecosystem Health and Management*, 19, 107-113; <https://goo.gl/A99QgG>.

<sup>14</sup> Ontario Ministry of Environment, 1985. Hamilton Harbour technical summary and general management options. 125pp. Also: Ontario Ministry of Environment, 1981. Hamilton Harbour Study 1977, Vol. 1. 320pp.

<sup>15</sup> Land Use Research Associates, 1986. Interim Report. Hamilton Harbour’s Water Quality: The Stakeholder’s Proposals.

principle: “that aesthetic improvements, on a Harbour-wide basis, provide the public with a basis for genuine belief that water quality can be improved,” and recommended “a comprehensive Greenbelt plan” to vegetate “unsightly terrain” and industrial areas, and new or enhanced programs to control spills, treat contaminated sediment, contain sewer overflows, reduce discharges from industrial and municipal sources and storm sewers to streams, remove nutrients by reducing municipal, industrial and non-point contaminant loadings, ensure effluent meets acceptable water quality guidelines and institute physical clean-up programs at Windermere Basin and Cootes Paradise, among others.

Several of those early community stakeholders, Gil Simmons among them, went on to form the Bay Area Restoration Council in 1991, a registered charitable organization in large part for “promoting, monitoring and assessing the implementation of plans for the environmental protection and restoration of Hamilton Harbour as outlined in the Hamilton Harbour Remedial Action Plan.” Refer to Appendices 2 and 3 for text related to the Aesthetics BUI in the initial HHRAP documents that set out environmental conditions and problem definitions (Stage 1, 1992), and goals, options and recommendations (Stage 2, 1992).



**Figure 3. ABOVE, Gil Simmons looks out over infilling in the West Harbour in the 1970s (Photo: Hamilton Spectator).**

**Figure 4. LEFT, Hamilton city councillor Henry Merling, chair of Hamilton’s pollution control committee, pulls oily debris from Hamilton Harbour’s industrial east end in 1980 (Photo: Hamilton Spectator).**



## Hamilton Harbour Aesthetics BUI

Delisting criteria for beneficial use impairments are intended to provide targets that are both indicators of the impairment and benchmarks to assess progress towards restoration of the beneficial use.

The original IJC delisting criteria stated that the Degradation of Aesthetics BUI would be *not impaired*:

When the waters are devoid of any substance which produces a persistent objectionable deposit, unnatural color or turbidity, or unnatural odor (e.g., oil slick, surface scum).

The IJC's rationale was that the criteria "emphasizes aesthetics in water; accounts for persistence."<sup>16</sup> The HHRAP adopted a version of the IJC's suggested criteria, stating in the 1992 Stage 2 Report that the *impaired* status of the HHRAP Degradation of Aesthetics BUI will be redesignated to *not impaired*:

When any substance in water produces a persistent objectionable deposit, unnatural color or turbidity, or unnatural odor (e.g., oil slick, surface scum).

In 2002, the HHRAP Stage 2 Update referred to algae as an "emerging issue" and added it to the delisting criteria, where the status of the Aesthetics BUI would be redesignated to *not impaired*:

When the waters are free of any substance which produces a persistent objectionable deposit, unnatural colour or turbidity, or unnatural odour (e.g. oil slick, surface scum, algae).

The Hamilton Harbour RAP Stakeholder Forum of agencies, companies, institutions, organizations and citizens – as Hall and O'Connor state, a unique aspect of the HHRAP's governance among AOCs – in both cases produced a collective agreement on the language of the criteria. In addition, the Stage 2 Update also identified ongoing actions associated with the HHRAP's Aesthetics BUI delisting objectives: Hamilton and Halton's wastewater treatment plant upgrades, Hamilton's construction of combined sewer overflow tanks, and the implementation of the provincial MISA (Municipal/Industrial Strategy for Abatement) program to monitor and control effluent discharge to receiving waters such as Hamilton Harbour.

Most recently, the Stakeholder Forum convened in 2012 confirmed the *impaired* status and approved the **current delisting criteria for the Hamilton Harbour RAP Degradation of Aesthetics BUI**:

The waters are free of any substance due to human activity which produces a persistent objectionable deposit, unnatural colour or turbidity, unnatural odour (e.g. oil slick, surface scum, algae) for a period of three consecutive years.

This most recent change continues to specifically include algae as an example of this impairment, and added that the criteria must be met for a period of three consecutive years. The minutes of the 2012 meeting at which these changes were agreed to are included as Appendix 4. In addition, Forum participants agreed that the HHRAP Technical Team be directed to evaluate the Aesthetics BUI, that a pilot project begin in 2012 to collect data on a regular basis through researchers working on the Harbour and that those data be evaluated to determine how to expand the process for future use.

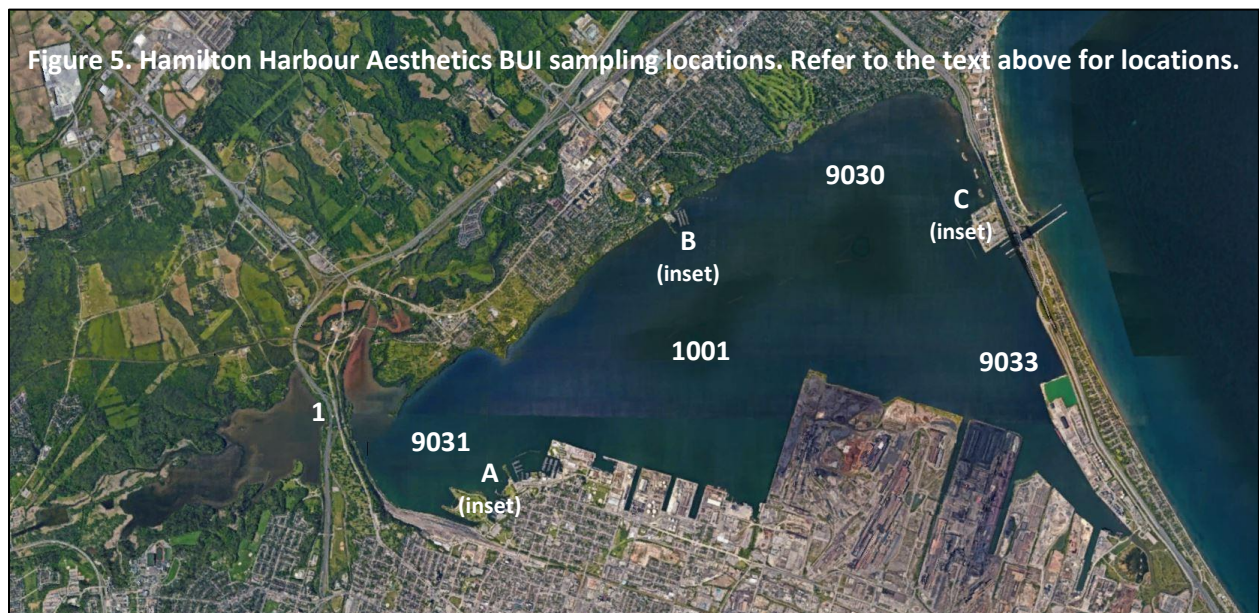
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<sup>16</sup> IJC, 1991. Commission approves list/delist criteria for Great Lakes areas of concern. FOCUS On International Joint Commission Activities, Volume 16, Issue 1, March/April. ISSN 0832-6673.

## Methods

The Hamilton Harbour RAP, like most RAPs for Great Lakes AOCs, does not have specific, quantitative targets for the redesignation of the Degradation of Aesthetics BUI, and therefore multiple lines of evidence have been used to inform this status report.

Following the direction from the 2012 Stakeholder Forum on the HHRAP Aesthetics BUI, the HHRAP office and Environment Canada began to augment that agency's established water quality monitoring program to gather three years of data on the standard metrics related to assessing water quality: clarity, colour, odour and debris. These data were collected by Environment Canada staff for 2012 and 2014 through 2017 at four of the agency's established open water sampling sites across the Harbour. Royal Botanical Gardens staff also collected data on these metrics at the Cootes Paradise fishway upstream of the Desjardins Canal in 2015 and 2016. When Environment Canada began to discuss producing this report with BARC, it was decided to suspend the open water data collection and focus in 2018 on several nearshore sampling locations with public accessibility. BARC staff partnered with current or retired HHRAP agency staff to collect semi-qualitative and visual evidence of aesthetic conditions at the northeast shoreline adjacent CCIW, at LaSalle Park on the North Shore, and at several locations in the West Harbour: **(1)** Cootes fishway, **(2)** Waterfront Trail, **(3)** Bayfront boat launch, **(4)** Macassa Bay, **(5)** Pier 4, **(6)** Pier 5, **(7)** Pier 7, **(8)** Pier 8, **(9)** LaSalle boat launch, **(10)** LaSalle marina, **(11)** LaSalle Pier, **(12)** LaSalle spit, **(13)** northeast shoreline adjacent CCIW, and the four open water sites (Figure 5).



To assess the HHRAP Degradation of Aesthetics BUI we used the Aesthetic Quality Index (AQI) recently developed for the Toronto RAP.<sup>17</sup> All data collected by all technicians between 2012 and 2018 for all locations were assessed using the scoring scale in Table 1:

**Table 1. The AQI scoring rubric for each parameter of water quality.**

PARAMETER	DESCRIPTOR	SCORE	PARAMETER	DESCRIPTOR	SCORE
Clarity	Clear	10	Odour	None	10
	Cloudy	7		Musty	6
	Opaque	0		Petroleum (transitory)	5
Colour	Clear	10		Sewage	2
	Green	7		Petroleum (spill)	0
	Yellow/Amber	6		Anaerobic	0
	Brown	5	Debris	None	10
	Grey	2		Natural (unusual accumulation)	8
	Black	0		Oil film (non-natural)	3
		Trash (large amount)		2	
			Foam (non-natural)	2	
			Sewage	0	

At each location, observational data were collected for clarity, colour, odour and debris. Each score was assigned by the author of this report for consistency and used to calculate an average AQI score for each sampling event (i.e., each unique date, time and location). Combining the average AQI scores for all four parameters produces an average AQI for each sampling location (AQI<sub>site</sub>), and combining all AQI<sub>site</sub> scores produced an AQI for the entire AOC (AQI<sub>AOC</sub>). The Toronto RAP's assessment of the Aesthetics BUI also included a table of characteristic descriptions of ranges of AQI scores (Table 2):

**Table 2. Characteristic descriptions of each range of AQI values.**

AQI Range	Aesthetic Condition
AQI ≥ 9	Excellent
8 ≤ AQI < 9	Good
6 ≤ AQI < 8	Fair (minimum acceptable)
AQI < 6	Poor

BARC also engaged with CivicPlan<sup>18</sup> to develop and conduct an online survey of public perception using their PlanLocal platform. The survey ran between November 8, 2018 and January 26, 2019 and asked respondents to share thoughts, experiences and photographs of Hamilton Harbour from throughout the period in which they have lived in the Harbour's watershed. People were invited using BARC's electronic distribution list and across social media platforms. The questions were similar in nature to the AQI parameters, although they did not align in a way that we could assign scores to those observations, particularly as we could not know the identity of the respondents. Some of the results are presented in this report, and more results will be released later in 2019 as this secondary project progresses.

<sup>17</sup> Refer to the Toronto RAP's BUI Status Re-designation Report: Degradation of Aesthetics, August 2017 for more details about its sampling and assessment methodology: <https://goo.gl/XjAG5f>.

<sup>18</sup> <https://civicplan.ca>

# Results

## AQI ASSESSMENT

There were 952 unique sampling events ( $n$ ; i.e., each unique date, time and location), at dates and locations listed in Table 3.

Comparing the  $AQI_{site}$  scores against the characteristic descriptions of AQI scores ranges, there were 5 “excellent”, 4 “good” and 3 “fair” West Harbour locations in 2018. The samples from the Cootes fishway in 2015 and 2016 were “fair” on average despite poor scores for colour and clarity, and the open water samples across time were “excellent” on average despite having only “fair” colour. The  $AQI_{AOC}$  – that is, the overall score for all locations and all years sampled – is 8.4.

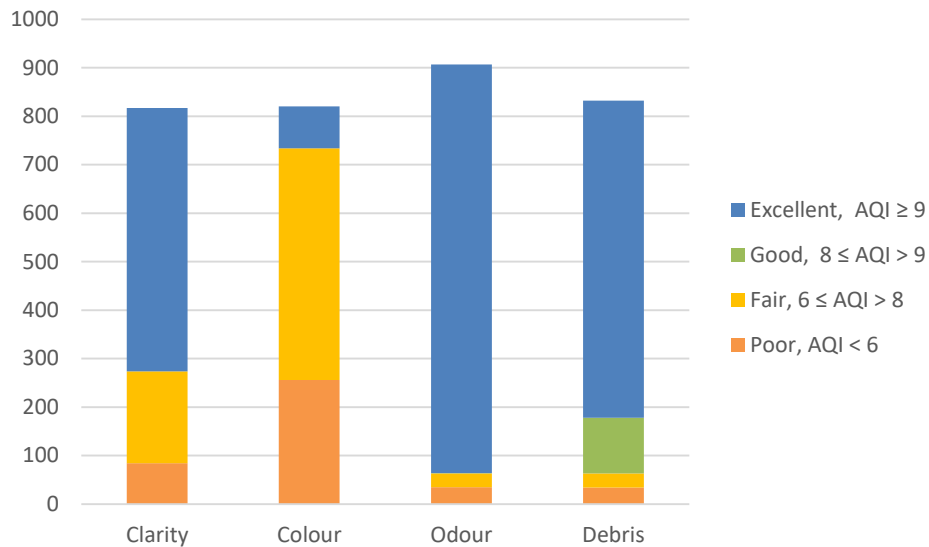
**Table 3. The average AQI scores for each parameter at each location through time.**

YEAR	LOCATION	$n$	CLARITY	COLOUR	ODOUR	DEBRIS	$AQI_{site}$
2018	Bayfront boat launch	19	7.7	7.2	8.3	8.3	7.9
2018	LaSalle boat launch	16	7.9	7.6	10.0	9.5	8.8
2018	LaSalle marina	16	8.8	8.0	10.0	9.8	9.1
2018	LaSalle pier	14	8.5	7.6	10.0	9.5	9.0
2018	LaSalle spit	16	8.8	8.0	10.0	9.9	9.2
2018	Macassa bay	5	8.2	7.0	7.6	8.4	7.8
2018	Northeast shoreline	15	8.5	9.3	10.0	10.0	9.4
2018	Pier 4	18	8.3	8.1	9.5	9.2	8.6
2018	Pier 5	2	8.5	8.5	10.0	9.0	9.0
2018	Pier 7	2	8.5	8.5	10.0	9.0	9.0
2018	Pier 8	14	8.3	8.2	9.1	8.3	8.3
2018	Waterfront trail	14	8.3	7.9	7.5	8.0	7.9
<b>Shoreline</b>	<b>AQI combined means</b>	<b>151</b>	<b>8.3</b>	<b>7.9</b>	<b>9.3</b>	<b>9.2</b>	<b>8.6</b>
2015-2016	Cootes fishway	296	3.9	5.7	9.3	8.6	7.1
<b>Fishway</b>	<b>AQI combined means</b>	<b>296</b>	<b>3.9</b>	<b>5.7</b>	<b>9.3</b>	<b>8.6</b>	<b>7.1</b>
<b>Shoreline/Fishway, AQI combined means</b>		<b>447</b>	<b>6.0</b>	<b>6.5</b>	<b>9.3</b>	<b>8.8</b>	<b>7.6</b>
2012, 14-17	Open water, 1001	124	9.9	6.7	9.8	9.6	9.2
2012, 14-17	Open water, 9030	130	9.8	6.6	9.7	9.7	9.1
2012, 14-17	Open water, 9031	127	9.8	6.5	9.9	9.8	9.1
2012, 14-17	Open water, 9033	124	9.9	6.7	9.7	9.7	9.1
<b>Open water</b>	<b>AQI combined means</b>	<b>505</b>	<b>9.8</b>	<b>6.6</b>	<b>9.8</b>	<b>9.7</b>	<b>9.1</b>
<b>AOC/Harbour</b>	<b>AQI combined means</b>	<b>952</b>	<b>8.3</b>	<b>6.5</b>	<b>9.6</b>	<b>9.3</b>	<b>8.4</b>
AQI $\geq$ 9	Excellent	2126	543	86	843	654	
8 $\leq$ AQI < 9	Good	116	0	0	0	116	
6 $\leq$ AQI < 8	Fair (minimum acceptable)	725	190	478	28	29	
AQI < 6	Poor	409	84	256	35	34	



Table 3 also indicates the number of individual parameter scores (and their summed totals in the *n* column) as described by the AQI assessment methodology (i.e., excellent, good, fair or poor). There was a total of 3,376 of a possible 3,808 individual parameter scores, as not all parameters were measured at each sampling event. Note that it was not possible for a “good” score for an individual sample for clarity, colour or odour given there are no scores available between 7 and 10, although average scores could fall in the “good” range. Figure 6 provides a visual indication of the characteristic descriptions of the four parameters (and note that  $n < 952$  for each parameter because not all sampling events recorded all four parameters).

**Figure 6. Counts of the characteristic descriptions of the four parameters used to assess the HHRAP Aesthetics BUI; data are from the bottom four rows of Table 3.**



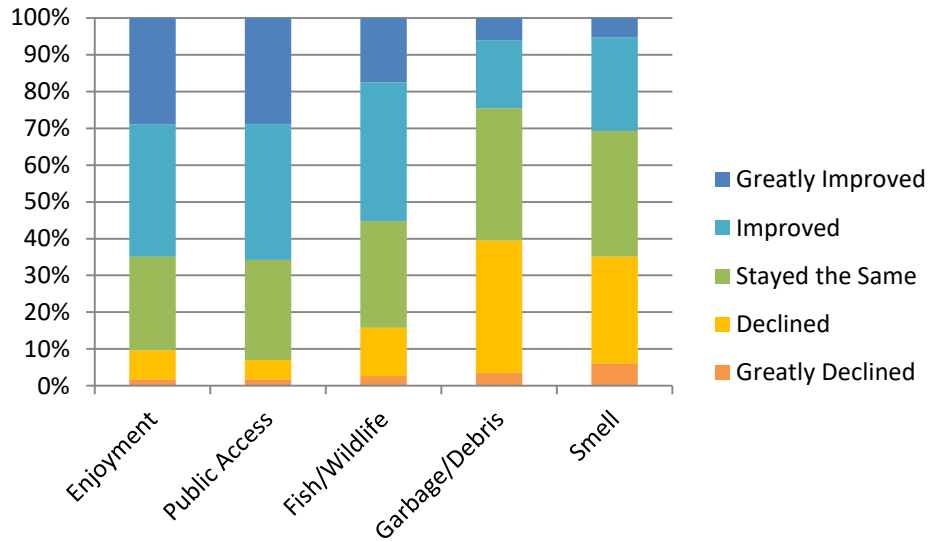
## CIVICPLAN ONLINE SURVEY

In 2018, we augmented the data collected by BARC staff and volunteer RAP colleagues and analyzed using the AQI with an online survey of public perception. Participants indicated their enjoyment of the Harbour, their access to the Harbour, the presence of fish and wildlife in the Harbour, amounts of visible garbage and debris in the Harbour, and the smells they encounter at the Harbour. The survey ran for 2.5 months recently and attracted 114 participants, all of whom responded to all sections of the survey. The survey was open to any member of the public, and participants were solicited using BARC’s electronic mailing list and the survey shared and promoted on various social media platforms.

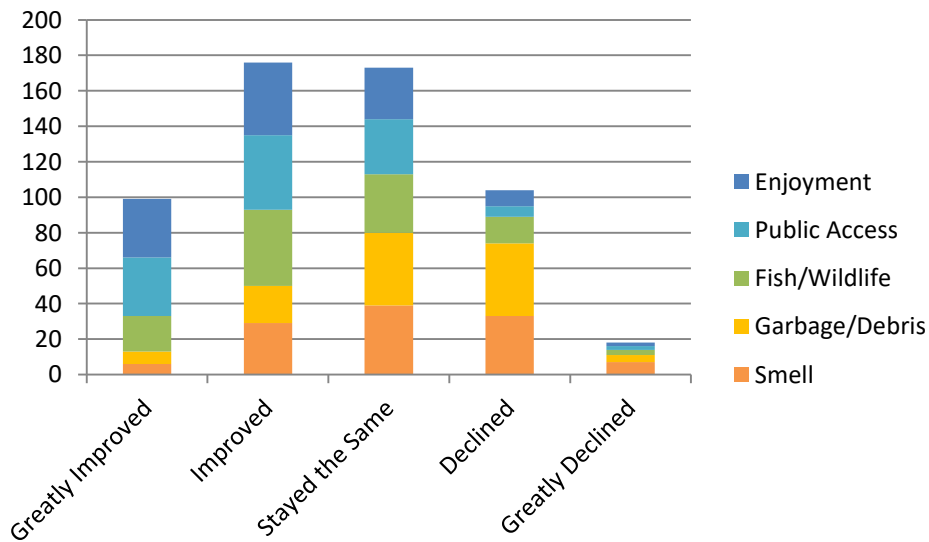
The next two charts illustrate the same information in two different ways. Figure 7 shows the relative perception of participants as improving or declining on a scale of zero to 100 per cent. For example, the enjoyment of the Harbour for a vast majority (approximately 90%) of respondents has either stayed the same, improved or greatly improved over indicated resident time periods (e.g., 42% have resided in the watershed for more than 30 years, 12% less than 5 years). The greatest decline is regarding garbage and debris, though it is difficult to know if respondents were indicating that garbage and debris itself had declined or if their perceptions of the situation had declined.

Figure 8 turns this information around and counts the actual perceptual responses to each issue. For example, participants responded “greatly improved” regarding their enjoyment, public access, etc., and again, the perceptions of the vast majority of respondents has either stayed the same, improved or greatly improved.

**Figure 7. Public perceptions of Hamilton Harbour from an online survey of 114 participants. Data are presented as relative percentages among five categories of personal experience, with characterizations of those experiences ranging from “greatly improved” to “greatly declined” (n=114 for all five categories).**

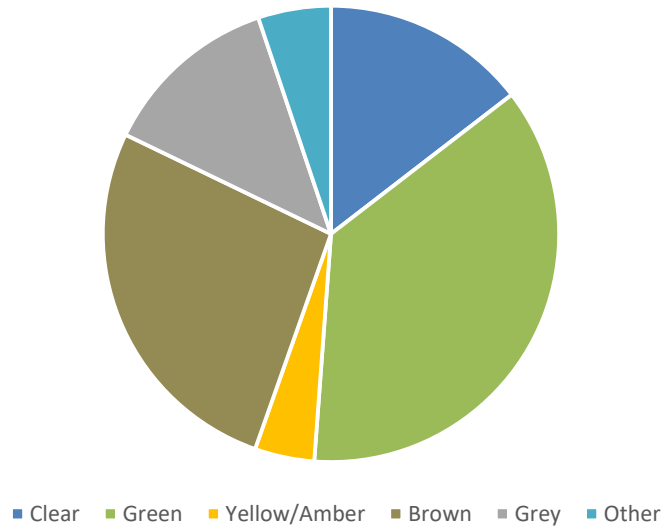


**Figure 8. Public perceptions of Hamilton Harbour from an online survey of 114 participants. Data are presented in absolute counts of each of five possible responses such as “improved” to five categories of personal experience such as “enjoyment”. The most common response was “improved” (n=176), the least common was “greatly declined” (n=18), and perceptions of experience for most participants (79%) ranged from “stayed the same” to “greatly improved”.**

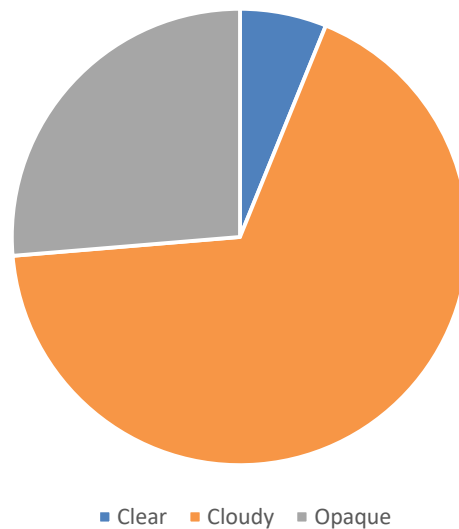


Online survey participants were also asked to characterize the quality of the water they have observed in the Harbour over the period of their residency. The next two figures illustrate the relative number of responses regarding the colour (Figure 9) and clarity (Figure 10) of the water in Hamilton Harbour, although these data differ from those collected for the purpose of the AQI in that the persons providing these observations are unknown, as are the locations.

**Figure 9. What colours do you commonly associate with the water in Hamilton Harbour? (n=114, note that respondents could choose multiple options)**

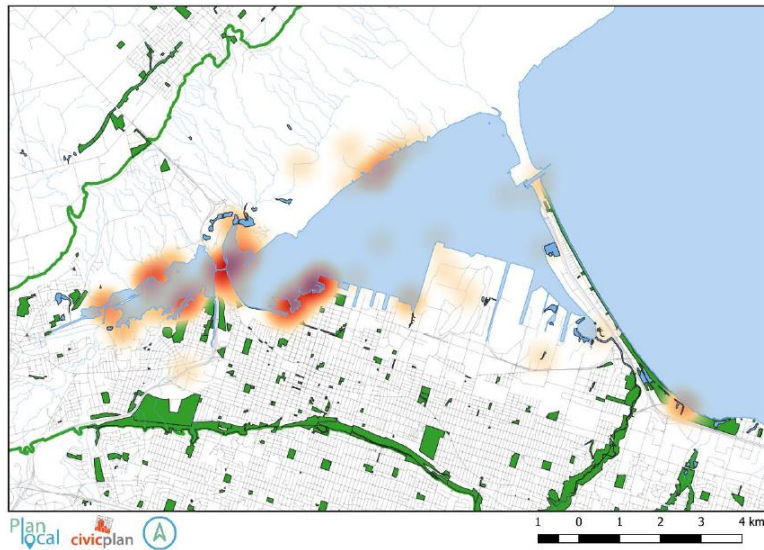


**Figure 10. How would you commonly describe the clarity of the water near the shoreline of Hamilton Harbour? (n=114)**



In addition to responding to the aesthetic questions, survey participants were invited to upload photographs and corresponding commentary about locations around the Harbour and its watershed through an interactive crowd map. They were asked, for example, why did you point to this spot in the Harbour? What information do you want to share about this place? There were 73 responses, and Figure 11 is a heat map illustrating the concentration of locations shared by survey participants, and an image from July 2018 of a scene at Pier 4 beach where the City of Hamilton tests for water quality throughout the swimming season.

**Figure 11. A heat map of locations identified, discussed and photographed by online survey participants (n=73), with an image of people enjoying safe swimming conditions at Pier 4 beach – one of the locations identified in the survey – on July 6, 2018 (Photo: Julie Vanden Byllaardt).**

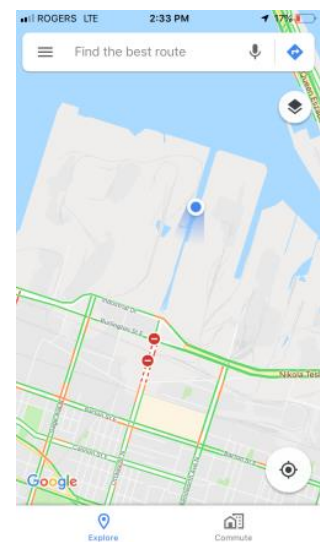
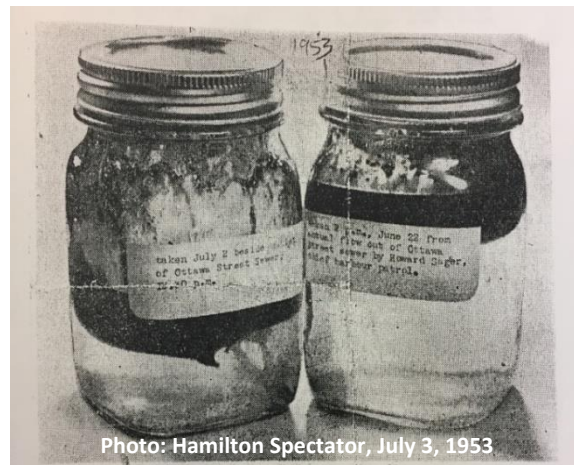




## Discussion & Recommendations

In 1953, a chemical engineer from the Ontario Department of Health and the chief of the Harbour Patrol collected water samples near sewer outlets along Hamilton's industrial south shoreline as part of an investigation into the "general problem of Bay pollution." A photograph of two of those samples appeared in the Hamilton Spectator (Figure 12, top); the sample on the left was taken at the Ottawa Street slip near the sewer outfall and contains deposits on the surface, and the sample on the right captured the actual flow of oil from the sewer.<sup>19</sup> Comparative samples collected by BARC in 2018 show an absence of such matter (Figure 12, bottom).

**Figure 12. Photographs of samples of oil deposits on surface water (top, left) and actual flow captured from the sewer outfall (top, right) at the Ottawa Street slip in June and July 1953, and samples of water taken by BARC in the Ottawa Street slip in November 2018 (bottom, with accompanying screen shot of location).**



<sup>19</sup> Photo and caption text from the Hamilton Spectator, July 3, 1953.

We include these photographs of the jars as a stark reminder of progress in restoring Hamilton Harbour, despite the fact that there remains so much to do. Although collectively we will continue to labour over small but important details in the implementation of the Harbour's Remedial Action Plan, be assured that remarkable successes have been achieved in eliminating the persistent and overwhelming polluted conditions in Hamilton Harbour – the “filth and poisonous waste” – that characterize so many decades of human impacts on the Harbour's aquatic ecology and human community.

A story in the news in 2018 was a helpful reminder of this success, when an oil-covered Canada goose was rescued from an apparent mystery spill in Hamilton Harbour. “It was a rare rescue for a few reasons,” it was reported, “particularly since no one can find any spilled oil or floating pools of crude, which is the substance bird rescuers believe coated the unlucky migratory icon.”<sup>20</sup> Chantal Theijn, founder of the local wildlife refuge centre that recovered the bird, said that “we've had no other reports of affected animals in the area,” calling this case “a real anomaly” because the substance appeared “heavy,” like crude oil. “That would be a first for us in Hamilton,” she said. The Hamilton Port Authority alerted the City's animal services department and then went searching for the source, but nothing was found in the port, said spokesperson Larissa Fenn. “There was no oil on the water where the bird was found,” she said, “and waters around the port are monitored closely for sheen, discolouration or other indicators of pollution — so that part remains a bit of a mystery.”

The story of the oil-covered goose ended with mention of Ms. Theijn's frequent dilemma in deciding whether to attempt to rehabilitate injured wildlife. “The problem is it's a slippery slope, deciding if an animal deserves to live or not. Some people don't like squirrels and some people think we have too many deer. I say, this is not my decision to make. I'm just here to help.”

This anecdote mirrors the broader challenges of restoring degraded environments such as Hamilton Harbour, because the diversity of viewpoints, perspectives and priorities can make the adequacy of such efforts difficult to define and measure, especially as the world has continued to change around us, and as people adapt to the present and slowly forget the past. As George and Boyd pointed out earlier, it's easier to agree when conditions are deplorable, but we must think more quantitatively as environmental conditions improve.

Several other Great Lakes AOCs have previously redesignated the Degradation of Aesthetics BUI from *impaired* to *not impaired* using a variety of methods to assess environmental conditions against the delisting criteria defined by those particular RAPs. These have ranged from the simple absence of public complaints about nuisance sights and smells, to semi quantitative methods such as public surveys and the AQI employed in this report. Although the HHRAP dates to 1985 when advances in sewage treatment and the regulation of industrial effluent had generated improvements in general aesthetic conditions, concerted efforts to clearly define a process to assess and redesignate its Aesthetic BUI began only in 2012. As described, the Hamilton Harbour RAP Stakeholder Forum at that time confirmed the *impaired* status and approved the **current delisting criteria for the Hamilton Harbour RAP Degradation of Aesthetics BUI:**

The waters are free of any substance due to human activity which produces a persistent objectionable deposit, unnatural colour or turbidity, unnatural odour (e.g. oil slick, surface scum, algae) for a period of three consecutive years.

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<sup>20</sup> Matthew Van Dongen (Hamilton Spectator), Oil-smothered goose rescued from Hamilton harbour, April 11, 2018.

Further, the HHRAP Technical Team was directed to evaluate the Aesthetics BUI with both a semi quantitative monitoring program and qualitative stakeholder user input, and a pilot project began to collect data to characterize the Harbour’s aesthetic conditions and formalize the BUI’s status. So in 2012, Environment Canada researchers began to collect such data at four established Harbour water quality sampling locations. The first three-year series of data collected to measure clarity, colour, odour and debris occurred in 2014-2016 at sample locations 1001, 9030, 9031 and 9033 in Table 5 and Figure 3. We have analyzed those data alone and can report that the  $AQI_{AOC}$  during that period was 9.1 which the AQI deems “excellent”. Including poorer results from sampling by Royal Botanical Gardens in 2015-2016 with those 2014-2016 open water data drops the  $AQI_{AOC}$  to 8.4 which is considered “good”.

George and Boyd suggest that a standard ecological risk assessment framework ensures that the steps necessary for transforming the initial statement of the issue into a scientifically sound monitoring program are met, and that within this type of framework a pass/fail statement would serve as a BUI delisting criteria. In this context, the initial sampling program described above produced results arguably sufficient to meet the HHRAP delisting criteria. But George and Boyd also remark that “in some instances it is difficult to objectively measure and monitor the degradation of aesthetics in an ecological monitoring capacity given that this BUI can be open to a wide range of interpretations and is not always amenable to quantification” (Figure 13).

**Figure 13. Macassa Bay in mid summer, 2018. What do you see in the photo? Do you see problems or success with respect to water quality and environmental and aesthetic conditions?**





In fact, George and Boyd suggest that such examples as shown in Figure 13 illustrate the difficulty in characterizing aesthetic conditions generally, and the challenge of the Aesthetics BUI in particular:

“For example, naturalists recognize macrophytes not only as aesthetically pleasing, but also as vital components of wetland ecosystems. Contrarily, during public consultations on wetland protection and restoration it has been observed that some members of the boating community have tended to portray ‘weed beds’ as a nuisance. It is apparent from these opposing opinions that although the abundance and diversity of the macrophytes can be quantified at a selected location, categorization of the area as aesthetically pleasing or impaired is a value judgment that depends upon the perspective of the observer.”

The Aesthetics BUI is an important marker of progress in Hamilton Harbour because aesthetic conditions generally have such a significant influence on value judgments and observer perspectives. This report presents a framework for evaluating those conditions as they have been observed over the past several years and presents the results of that evaluation. We have involved experts from the HHRAP community to assist in scoping and conducting this work and by employing an established methodology for compiling and evaluating all data collected. We are confident that these measures are rigorous and appropriate, and that the framework provides some clarity on the status of the HHRAP’s Aesthetics BUI.

The initial delisting criteria for the HHRAP’s Aesthetics BUI did not include algae as an explicit example of “a substance which produces a persistent objectionable deposit, unnatural color or turbidity, or unnatural odor.” (Nor did it include reference to “human activity” or the requirement that the criteria – however they were to be defined – be met for three consecutive years). The 1992 HHRAP Stage 1 Report on environmental conditions and problem definition stated that “(a) water quality as reflected in the advanced eutrophic condition of the Harbour, poor water clarity, excessive algae production and low dissolved oxygen conditions” was to be solved with “more advanced treatment of sewage treatment plant effluents for nutrients and suspended solids and reduction of suspended solids loadings from creeks due to erosion – primarily erosion from construction activities, and stream bank erosion.” Further, the Stage 1 Report stated that “aesthetic aspects of water clarity, water colour, and unsightly algae accumulations have been dealt with in dealing with item (a),” noting that that “combined sewer overflows and urban runoff are also major sources of ‘unsightly materials’” (Appendix 2, Figure 14).



**Figure 14. The City of Hamilton’s Royal Avenue combined sewer overflow tank under construction in 2007, one of several such facilities that have dramatically reduced the amount of untreated waste reaching Hamilton Harbour (Photo: City of Hamilton).**



We conclude that the change in the delisting criteria in 2002 created a redundancy that should be resolved by reverting to the original HHRAP delisting criteria for the Degradation of Aesthetics BUI adopted in 1992. The HHRAP is alone among AOCs with impaired aesthetics where algae is included explicitly in the delisting criteria for the Degradation of Aesthetics BUI. This highlights the challenge in providing local discretion to define and solve problems without setting standards for some AOCs higher than for others. But even if a higher standard for Hamilton Harbour has been set, arguably the AQI incorporates the presence of algae into the weight of evidence through scoring of clarity and colour, and through scoring of odour and debris where floating mats accumulate.

The issues of defining problems and appropriate methods for evaluating and solving them aside, let it be emphasized: algal blooms create nuisance aesthetic problems, such as the algal mats that formed at the Bayfront Park public boat launch in 2018 (Figure 15). But nuisance algae is an issue already being addressed explicitly by the HHRAP's Eutrophication or Undesirable Algae BUI and therefore should be removed from the delisting criteria for the HHRAP's Degradation of Aesthetics BUI. We draw this conclusion not to dismiss the significant and complex issue of cultural eutrophication, but to draw heightened attention to the underlying causes of the algal problem in Hamilton Harbour. (We will make only passing reference here to the macro issue of algae being an emerging concern in 2019 on a global scale, and the possibility that the chemistry and turbidity of Hamilton Harbour in the past may have been limiting factors in the absence of algal blooms historically.)

**Figure 15. The algal bloom and cyanobacteria outbreak in 2018 were significant and created aesthetic problems evident in the photo. The photo also illustrates new and ongoing actions that will be necessary in order to more effectively address the algae issue in the future.**



Photo: Chris McLaughlin, September 20, 2018

We conclude that the Degradation of Aesthetics BUI for Hamilton Harbour should be redesignated to *not impaired* based on the weight of evidence and line of reasoning presented in this report in order to acknowledge – reasonably and appropriately – the significant removal of filth and poisonous waste from Hamilton Harbour and the undeniable improvement in its water quality and aesthetic conditions prior to and throughout the implementation of the Hamilton Harbour RAP.

In 1986, the Stakeholders' report to the federal and provincial governments recommended that action be taken immediately to develop an inter-agency program to control stream bank erosion and non-point source loadings of nutrients (Appendix 1). Similarly, we conclude that the Eutrophication or Undesirable Algae BUI for Hamilton Harbour requires heightened attention, and advise that all necessary actions be taken to adequately reduce materials and nutrients that continue to cause degraded water quality in Hamilton Harbour and its tributaries and marshes in order that the delisting criteria for the Algae BUI can be met (Appendix 3, page 28). In 2016 and 2017, four task groups of the Hamilton Harbour RAP's Watershed Nutrient and Sediment Management Advisory Committee delivered their final reports and recommendations following comprehensive examinations of urban, rural, and construction site nonpoint source runoff and the resulting sediment and phosphorus loadings that continue to impact water quality and aesthetic conditions in Hamilton Harbour (Appendices 5-8). However, important questions remain regarding the necessary implementation of those recommendations:

1. What is the current status of the numerous task group recommendations?
2. What policies and actions are being developed to address the deficiencies in programs and management identified by those task groups?
3. Who will initiate further progress on improving water quality and aesthetic conditions in Hamilton Harbour and how will those actions be monitored and evaluated?

The Bay Area Restoration Council commits to establishing in 2019 a citizen science program to monitor and assess these questions routinely into the future. Based on our recent aesthetics investigation, we intend to monitor and report on the recommendations of those task groups and actions taken to implement the Hamilton Harbour RAP's Algae BUI, and we will look for the continued support of the governments and our other Hamilton Harbour RAP partner agencies in conducting this work.

## RECOMMENDATIONS

The Bay Area Restoration Council recommends to Environment and Climate Change Canada:

1. Continuation of a process to restore the initial delisting criteria for BUI XI, Degradation of Aesthetics in the Hamilton Harbour RAP and redesignate this BUI as *not impaired*.
2. Support for BARC to conduct a pilot aesthetics sampling, surveying and monitoring program in 2019 to enhance the work of this report and focus on future needs related to algae and other water quality and aesthetic issues.
3. Support for BARC and other member agencies of the Hamilton Harbour RAP to establish a communications strategy related to aesthetic environmental conditions, algae and other continuing water quality issues, and the implementation of BUI VIII, Eutrophication or Undesirable Algae in the Hamilton Harbour RAP.

# APPENDIX 1

**Hamilton Harbour's Water Quality: The Stakeholders' Proposals**  
**Dialogue on Hamilton Harbour, Interim Report**  
**Prepared by Land Use Research Associates**  
**September 8, 1986**

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## 2.4 The Principle of Access

It is estimated that less than 5% of the Harbour's shoreline is available for uninhibited public use. It is understood that actions taken through The Planning Act are needed to achieve access goals, recognizing that there will be conflicts between land use planning and water quality, stemming from clear inter-relationships between the two. For example, some forms of access can affect water quality, either negatively or positively.

The following principles were agreed upon:

**THAT public access is an important factor in achieving public awareness and support for Hamilton Harbour remedial actions; and**

**THAT public support for these actions will result in water quality improvement, leading to community benefits; and**

**THAT increased access is a key to achieving remedial actions and should become part of the overall solution, whilst recognizing that access is a local authority concern.**

The following actions were recommended to achieve increased access:

1. Institute public information and education programs as a means of encouraging public use;
2. Utilize existing land and new sites as they become available;
3. Encourage municipalities to acquire and develop land for public use (such as parks), subject to water quality compatibility;
4. Re-examine present zoning by-laws and official plans and recommend changes to improve access potential;
5. Control and reduce contaminant loadings through: combined sewer separation, urban storm water management programs and municipal, industrial and non-point pollutant sources controls, to reduce impacts, in those locations where public access exists or may be developed.

Participation by all agencies with jurisdiction over land is considered essential to achieve the above actions.

## 2.5 The Principle of Aesthetics

Shoreline and water aesthetic improvements were the subject of much discussion.

Landscape and water aesthetic improvements were viewed to be an important part of public perception in water quality improvement.

An aesthetically appealing Harbour shoreline and water body would encourage users and visitors to make use of the Harbour and its facilities.

The following principle was agreed:

**THAT aesthetic improvements, on a Harbour-wide basis, provide the public with a basis for genuine belief that water quality can be improved.**

In support of this principle it is recommended that the following actions begin immediately:

1. Develop an inter-agency program to control stream bank erosion and non-point source loadings;
2. Develop a comprehensive Greenbelt plan to cover unsightly terrain, and encourage natural vegetative cover for industrial areas and the Northshore;
3. Review spill control procedures and policing – strengthen regulations if needed;
4. Institute physical clean-up programs in Windermere Basin and other areas of the Harbour;
5. Reduce the use of streams as storm sewers;
6. Institute a physical clean-up in Cootes Paradise.

All actions should conform, where applicable, with the best principles of urban and environmental design.

Over the long term, specific actions are recommended:

1. Combined sewer separation including storm water management plans such as the treatment of storm water discharges in containment facilities.
2. Reduction of municipal, industrial and non-point contaminant loadings, by applying best available treatment processes. Reduce discharges from industrial and municipal sources;
3. Nutrient removal;
4. Effluent which achieves Ministry of the Environment water quality criteria (based on loading targets) is acceptable in the Harbour;
5. Removal and treatment of contaminated sediments, to the extent practicable.



# APPENDIX 2

## Hamilton Harbour Remedial Action Plan Stage 1 Report, Second Edition Environmental Conditions and Problem Definition October 1992

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### Executive Summary

A summary of the scientific and technical information available on Hamilton Harbour and areas draining into the Harbour has been prepared with the assistance of several agencies. The report has built upon the earlier Ministry of Environment summary report on sediment and water quality (MOE, 1985), and the first Stage I Report (COA, 1989) for the Harbour. New information has been added on fish and wildlife populations, marsh and other habitat, contaminated sediments, water levels, socio-economic conditions and human health. Water quality data and mass balance loadings have been updated.

The substantial improvements in water quality, the abundance of fish, the increased and more diverse waterbird populations and improvements in the contaminant content of both fish and birds are documented. These are the results of remedial actions taken to date. The funds expended in this effort locally have been in the order of \$600 million (in 1990 dollars).

Some problems remain. The Harbour receives all industrial and municipal waste, as well as urban and rural runoff from the complete watershed. No wastewater discharges from the watershed are made directly to Lake Ontario. All municipal and industrial 'point sources' presently meet the current provincial standards and go beyond them in several respects. Despite this, the aquatic ecosystem upon which these discharges impact and the uses of the water are still adversely affected. The difficulty lies in the small size of the Harbour receiving these wastewaters.

There remains a substantial stress on the quality of this body of water, and serious habitat stresses for fish and wildlife. The key issues are as follows:

#### (a) Water Quality/Eutrophication/Water Clarity

General water quality as reflected in the advanced eutrophic condition of the Harbour, poor water clarity, excessive algae production and low dissolved oxygen conditions in the summer hypolimnion still places constraints on the nature of the fishery, and on swimming, boating and viewing conditions.

The solution to these conditions lies in more advanced treatment of sewage treatment plant effluents for nutrients and suspended solids and reduction of suspended solids loadings from creeks due to erosion – primarily erosion from construction activities, and stream bank erosion.

#### (e) Aesthetics and Access

Aesthetic aspects of water clarity, water colour, and unsightly algae accumulations have been dealt with in Item (a). Combined sewer overflows and urban runoff are also major sources of 'unsightly materials'. Air pollution and noise from various sources are also factors affecting the enjoyment of the water-side or on-water human experience.

More seriously, though, there is major lack of access to the waterfront for the general public. In our public consultations there are repeated calls for more access and higher quality access where it already exists. Amenities in these locations are required as well as easy public transit access.

If the benefits of improved water quality are not realized by the general public as a whole we will have lost a major benefit of the water quality clean-up.

**Table A: Summary of the state of beneficial uses in Hamilton Harbour.**

USE IMPAIRMENT	SIGNIFICANCE TO THE HAMILTON HARBOUR RAP	CAUSES OF IMPAIRMENT	SOURCE OF PROBLEM	INFORMATION DEFICIENCIES
viii Eutrophication or Undesirable Algae	Ammonia and phosphorus concentrations exceed the requirements for the growth of algae at acceptable levels in the Harbour. The algae present an aesthetic problem as they reduce water clarity and foul beaches and rocks.	<ul style="list-style-type: none"> <li>• High Phosphorus</li> <li>• High ammonia</li> </ul>	<ul style="list-style-type: none"> <li>• CSOs</li> <li>• STPs</li> <li>• Steel Industry</li> <li>• Runoff</li> </ul>	Non point source contribution not known accurately enough. Update estimates of impact from phosphorus and Ammonia loadings.
xi Degradation of Aesthetics	Oil sheens are observed occasionally and there are periodic occurrences of objectionable turbidity, floating scum, debris, and putrid material. Reduced water clarity persists in shallow areas particularly. This is due primarily to discharge of suspended solids from tributaries, resuspension of bottom sediments by waves and by carp, and to some extent, by algal production.	<ul style="list-style-type: none"> <li>• Occasional oil sheens</li> <li>• Algal blooms</li> <li>• Suspended solids</li> <li>• Debris and putrid matter</li> </ul>	<ul style="list-style-type: none"> <li>• Spills – industrial, highway, shipping</li> <li>• Runoff</li> <li>• Resuspension of sediment</li> <li>• Inadequately treated sewage (STPs, CSOs)</li> </ul>	

**V.2.5 Aesthetics and Access**

Persistent objectionable loadings of oil and grease have been deposited in the deeper parts of the Harbour, but are not present now in the shallower areas. Oil sheens are observed infrequently and seem to be related primarily to shipping activities. Discharges from urban areas and combined sewer overflows result in periodic occurrences of objectionable turbidity. In small quiescent embayments or the upper ends of boat slips there can be found floating scum, debris, trash and putrid materials. Combined sewer overflows are probably the main concern in this regard. Water clarity, discussed above, is also an aesthetic concern.

The aesthetic quality of an area cannot be easily quantified. Hamilton Harbour is important in the life of the Hamilton and Burlington region; it provides jobs as well as recreation and scenery. However, the murkiness of nearshore waters, an unsightly shoreline, noise from highways, and the odours and dust from industrial operations all detract from enjoyment of the Harbour.

It is hard to suggest to citizens the importance of cleaning up a Harbour they can hardly see or get to. Views of the Harbour are blocked by industrial and marine facilities, and there are few paths or beaches where people can walk. What there is to see in the Harbour is not always worth the effort – little wildlife and few recreational activities. Often there is an unpleasant odour in the air.

Cleaning up the Harbour is required for many reasons unrelated to the public’s access to it. However, the goals of the Stakeholders include making the Harbour swimmable and available for simple enjoyment. To some citizens this may mean passive recreational facilities such as boardwalks, while to others it may include more active recreation such as boating, swimming, or windsurfing. The Harbour and the RAP also provide opportunity for public education. Information programs, both at the site and in other settings, could contribute to public understanding of the specific needs of Hamilton Harbour and of the general need for all citizens to take responsibility for environmental problems such as we find in the Harbour.

Measures that reunite the citizens of the region and their waterfront can demonstrate how all citizens will share in the benefits of the remedial program.

# APPENDIX 3

## Hamilton Harbour Remedial Action Plan Stage 2 Report, Volume 2 – Main Report Goals, Options and Recommendations November 1992

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### VI. Attainability of Designated Uses

#### VI.1 Introduction

The analysis of impairment of the beneficial uses proposed for Hamilton Harbour shows that the Harbour would benefit from a coordinated remedial action program. The Plan is designed, ideally, to restore these beneficial uses and to maintain the conditions necessary for their continued use.

It is important, however, to make some assessment of whether these uses can be fully attained with reasonable certainty. While no specific study has been conducted to assess attainability, some issues can be identified based on an extrapolation of the existing information. Monetary constraints are not being considered at this juncture.

#### VI.8 Aesthetics

Litter and debris as they relate to general aesthetic quality will be much improved by the CSO remedial program. However, a concerted effort on the part of the entire community will be required to address the whole problem. Stricter enforcement of litter by-laws and special volunteer clean-up efforts will have to be more effective.

Odours and visually unpleasant aspects of the shoreline will need measures that go beyond issues of water quality. There are currently few, if any, problems with odour or water clarity originating with water quality that are not addressed in the remedial measures proposed. Air emission control programs and shoreline landscaping can contribute as much or more to the aesthetic quality or viewing or recreational water uses as can remediation of water quality problems.

In some areas, weeds will be encouraged to grow as necessary habitat to ensure a suitable fish population. This may not be compatible with uses where weeds are considered an impediment to some beneficial uses such as viewing or boating.

### IX. Delisting Criteria

#### IX.1 Criteria for Delisting

The beneficial uses selected for Hamilton Harbour call for achievement of a set of environmental conditions that are deemed necessary to ensure that these uses are not impaired. The following table makes those conditions explicit in both general and specific terms.

As well as can be established with our existing knowledge, these conditions or objectives are the measurable targets against which we can gauge our progress towards completion and maintenance of a restored Harbour. They are patterned on the International Joint Commission guidelines for the impaired uses listed in Annex 2 of the Great Lakes Water Quality Agreement (1978/87).

These criteria focus on conditions that can be corrected through local action. For example, a health advisory on fish in the Harbour that is no different than the health advisory for the whole Lake is not a

reason to keep the area listed. Some of these 'whole Lake' problems will, however, require a coordinated effort on the part of all communities contributing to the problem, and in this context the final report on this Harbour will have to be consistent with lakewide management plans.

It is clearly understood the “common sense” will be needed in the application of these guidelines. It may not be possible to fully restore some areas. Natural factors (such as sedimentation) or social or economical factors (e.g. dredging of navigation channels) may preclude restoring the benthic community, for example (IJC Focus Magazine. Vol. 16 #1, March/April, 1991). At later stages in the implementation of the Plan information may arise that will undoubtedly give cause for revisions as well.

Implicit in all these criteria is that all water quality and sediment objectives are to be met. The fisheries ‘targets’ represent our current estimate of what is achievable. This is a relatively new science and research behind these figures have yet to be published in the scientific literature. Questions regarding these targets and the current conditions, if they cannot be answered by reference to the Second Edition of the Stage 1 Report (COA, 1992), should be addressed to the Department of Fisheries and Oceans at the Canada Centre for Inland Waters.

For each of the beneficial uses identified in accordance with the 1987 Protocol for the Great Lakes Water Quality Agreement between Canada and the United States (Annex 2), the following criteria have been agreed upon for delisting Hamilton Harbour.

**Table A: Objectives to be achieved in order to permit delisting of Hamilton Harbour.**

USE IMPAIRMENT	PROPOSED HAMILTON HARBOUR DELISTING OBJECTIVES
viii Eutrophication or Undesirable Algae	<i>Omitted. (For the purposes of this report on the Aesthetics BUI we have instead reproduced the most recent criteria for BUI viii, Eutrophication or Undesirable Algae, on the following page.)</i>
xi Degradation of Aesthetics	When the waters are free of any substance which produces a persistent objectionable deposit, unnatural colour or turbidity, or unnatural odour (e.g., oil slick, surface scum).

## BUI viii/8, Eutrophication or Undesirable Algae

(Note: the table below has been updated and is current as of March 31, 2019)

**TABLE A: Environmental Conditions – Hamilton Harbour**

	Final Goals	Compliance Criteria
Phosphorus concentration	≤ 20 µg/L	15 of 17 epilimnetic integrated samples analyzed weekly* at the centre station from June to September are at or better than the targeted goal.
Chlorophyll a concentration	≤ 10 µg/L	*Although weekly sampling is recommended at only one location, there will be periodic sampling of a larger number of locations Harbour-wide to confirm representativeness of the centre station.
Secchi disc transparency	≥ 2.5 m	
Un-ionized Ammonia concentration	≤ 0.02 mg/L	Biweekly epilimnetic integrated samples from ice-out to the end of May, and weekly epilimnetic integrated samples in June at the centre station do not exceed the targeted goal.
Minimum Dissolved Oxygen concentration	≥ 6 ppm; but ≥ 3 ppm during allowable exceedance period	During June to September inclusive, the water column at centre station should have a minimum 4 metre thick layer of water with a temperature <20°C and a DO >6 mg/L. Compliance with this goal is to occur in at least 15 of 17 profiles measured weekly, and during any exceedance episode, the water column at centre station should still have a minimum 2 metre thick layer of water with a temperature <20°C and a DO >3 mg/L.

**TABLE B: Environmental Conditions – Cootes Paradise and Grindstone Marsh Area**

	Cootes Paradise	Grindstone Marsh Area
Phosphorus concentration	60-70 µg/L*	60-70 µg/L*
Chlorophyll a concentration	20 µg/L*	20 µg/L*
Secchi disc transparency	1.5 m*	1.0 m*
Un-ionized Ammonia concentration	< 0.02 mg/L	< 0.02 mg/L
Minimum Dissolved Oxygen concentration	> 5 ppm*	> 5 ppm*
Submergent/emergent aquatic plant area	230 ha*	40 ha*
Suspended solids	25 ppm*	25 ppm*

**TABLE C: Net Loading Targets – Annual Average (kg/day)**

	Phosphorus	Ammonia	Suspended Solids
Woodward WWTP	74	1000	1488
Skyway WWTP	17	115	280
King WWTP (Dundas)*	TBD	TBD	TBD
CSOs	8	48	329
Streams**	TBD	-	-
Industry (combined)	-	270	-
U. S. Steel Canada (Stelco)	-	-	1500
ArcelorMittal Dofasco	-	-	1500

\* Cootes Paradise Water Quality Technical Team is working to develop final goals.

\*\* Stream loadings work ongoing by Water Quality Technical Team.



## **II.5 Environmental Conditions and Problem Definition**

This section has been significantly altered in content and layout from the 1992 Stage 2 Report to better reflect the situation in the late 1990s. (The following is as approved by the RAP Forum in 1999.)

### **II.5.6 Public Access and Aesthetics**

Adequate and usable public access to the Harbour shorelines is improving but still below the target. The target is for 35% of the Harbour shoreline to be accessible to the public and suitable for the enjoyment of residents and visitors. Shoreline aesthetics are much improved, but there remain occasions when floatables are visible, and there continue to be water- and air-related odour problems.

## **III. GOALS AND OBJECTIVES**

Considerable work went into designing the goals and objectives for the 1992 Stage 2 Report. Some of the rationales behind the selections can be found in the 1992 report (pg. 31 – 48). After making some changes to the original lists, the RAP Forum endorsed the following updated Goals and Objectives in 1999.

### **III.4 Secondary Principles**

1. Human health protection with multiple Harbour uses.
2. Public support requires access and attention to foreshore uses of shoreline – land use planning.
3. Improved aesthetics and amenities are required.
4. Public education facilitates implementation.

## **BENEFICIAL USE IMPAIRMENTS AND HAMILTON HARBOUR DELISTING OBJECTIVES**

### **(xi) Degradation of aesthetics**

When the waters are free of any substance which produces a persistent objectionable deposit, unnatural colour or turbidity, or unnatural odour (e.g. oil slick, surface scum, algae).

## APPENDIX 4

**Hamilton Harbour Remedial Action Plan  
2012 Stakeholder Forum  
Meeting #3  
Meeting Summary  
April 18, 2012**

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### **c) Reporting on resolution of Aesthetics BUI xi**

Information was presented by Kristin O'Connor, from the Hamilton Harbour Remedial Action Plan Office. The presentation covered work completed by a small group of Stakeholders following the March 20th RAP Stakeholder Forum meeting.

Members were directed to the revised recommendation #3: *That the RAP Technical Team be directed to evaluate Beneficial Use xi through both a semi quantitative monitoring program and qualitative stakeholder user input.* It was pointed out recommendation #3 is necessary as it provides direction for the future.

### **d) Stakeholder Discussion, public questions; consensus**

Qualitative stakeholder user input was clarified: qualitative stakeholders include those using the harbour on a regular basis such as the harbour master, Harbour Queen boat captain and/or regular fishermen. Algae will be dealt with if it is considered an aesthetics issue by these users.

*Are we prepared to accept that frequent harbour users are satisfied, therefore we are satisfied? If algae affect the public perception of the harbour algae could still be an issue.*

Public perception is very important. We do not have an answer as to how best to incorporate this in an evaluation.

*Is the smell of algae considered a natural odour? Change "unnatural" odour in recommendation #2 to "objectionable" odour. This would include algae rather than exclude it.*

*Having "due to human activity" in recommendation #2 creates an inability to include other things like algae.*

What is linked to the concept around human activity is identifying what is controllable versus what is uncontrollable. In addition, BUI viii also addresses undesirable algae.

*Algae should not be part of this BUI as it is covered under BUI viii, Eutrophication or Undesirable Algae.*

*BUI xi recommendation #2 originally listed oil slick, surface scum and algae in parentheses. By removing these, the recommendation lacks clarity. Issues if known should be identified as concrete examples.*

*Was there some idea of what the issue was when this was first listed?*

Historically in the 1950s and 1960s oil slicks were an issue; currently some issues are now cladophora and cyanobacteria.

*The current RAP delisting objective was simple, measurable and achievable. The more complex the wording the further away it gets from the objective. Maintain the original delisting objective. It might be determined down the road that human activity is not causing the problem. I am in agreement. Why change it?*

In 2002, the current Hamilton Harbour delisting objective was revised to add the examples in parentheses. The remainder of the statement remained unchanged from the original 1992 delisting objective. The current change to recommendation #2 is the addition of “due to human activity” and the removal of the examples in parentheses as the examples were considered redundant and exclusive.

*We have to be more subjective. Human beings are responsible for degrading our natural environment and many other jurisdictions are using the same wording stating human activity is causing the problem.*

Based on the comments received, the following four versions of the delisting objective recommendation #2 wording were presented to the group for review:

Version A

Beneficial Use xi will be considered restored when the waters are free of any substance due to human activity which produces a persistent objectionable deposit, unnatural colour or turbidity, or unnatural odour for a period of three consecutive years.

Version B

Beneficial Use xi will be considered restored when the waters are free of any substance due to human activity which produces a persistent objectionable deposit, unnatural colour or turbidity, *or objectionable odour* for a period of three consecutive years.

Version C

Beneficial Use xi will be considered restored when the waters are free of any substance due to human activity which produces a persistent objectionable deposit, unnatural colour or turbidity, **or odour** for a period of three consecutive years.

Version D

Beneficial Use xi will be considered restored when the waters are free of any substance which produces a persistent objectionable deposit, unnatural colour or turbidity, or unnatural odour (*e.g. oil slick, surface scum, algae, etc.*) for a period of three consecutive years.

Martin Keller called for a vote on each of the versions. Version A was removed from the table having received only two votes. Version D received the majority of votes.

*At the March 20, 2012 meeting, the issue of personal hygiene products was raised. Should these be included in the list of examples as well?*

This is a list of examples and is not an exclusive list.

*Version D is missing the words “human activity”.* The word “unnatural” means human activities.

Martin Keller asked if any member was strongly opposed to Version B. One member was strongly opposed.

Martin Keller asked if any member was strongly opposed to Version C. One member was strongly opposed.

Martin Keller asked if any member was strongly opposed to Version D. One member was strongly opposed.

Martin Keller called for consensus on the inclusion of “due to human activity” to recommendation #2 version D. Consensus was met.

Martin Keller called for consensus on BUI xi recommendation 1.

### **BUI xi Recommendation 1**

THAT The Beneficial Use xi status remains “impaired”.

The question was called: Do we have consensus on the recommendation?

Consensus was met.

Martin Keller summarized the amended recommendation for the group and called for consensus on BUI xi, recommendation #2.

### **BUI xi Recommendation 2**

Beneficial Use xi will be considered restored when the waters are free of any substance due to human activity which produces a persistent objectionable deposit, unnatural colour or turbidity, or unnatural odour (e.g. oil slick, surface scum, algae, etc.) for a period of three consecutive years.

The question was called: Do we have consensus on the amended recommendation?

Consensus was met.

Martin Keller called for consensus on BUI xi, recommendation #3.

### **BUI xi Recommendation 3**

THAT THE RAP Technical Team be directed to evaluate Beneficial Use xi through both a semi quantitative monitoring program and qualitative stakeholder user input.

The question was called: Do we have consensus on the recommendation?

Consensus was met.

*How will recommendation #3 be implemented?*

This will be presented to the RAP Technical Team for discussion. A pilot project is beginning in 2012 to collect data on a regular basis through Environment Canada and McMaster researchers working on the harbour and through the yacht clubs. The data will be evaluated to determine how to expand the process for future use.

# Appendix 5

**Hamilton Harbour Remedial Action Plan  
Watershed Nutrient and Sediment Management Advisory Committee  
Urban Runoff (Hamilton) Task Group – Recommendations  
October 20, 2016**

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## **Recommendations for Evolution of Stormwater Management Approach and Design**

### REPORTS & MANUALS

- B1) It is recommended that the Province of Ontario complete development of the Low Impact Development (LID) Guidance Manual to complement the current MOECC Stormwater Planning and Design Manual.
- B2) It is recommended that the Province of Ontario provide guidance with respect to the stormwater volume reduction that may be possible through crediting LID techniques as part of a treatment train approach to stormwater management, particularly implications for designing stormwater management wet ponds.
- B3) It is recommended that the Province of Ontario review the existing building code to include recommendations that support and/or promote implementing LID techniques for buildings and structures subject to the building code.
- B4) It is recommended that the City of Hamilton, in consultation with the Hamilton Conservation Authority and Conservation Halton, develop or update a stormwater management manual and Master Plans for development in Hamilton based on the Province of Ontario's LID Guidance Manual, the 2003 MOECC Stormwater Planning and Design Manual, and other relevant references.
- B5) It is recommended that the City of Hamilton develop LID guidance for reconstruction of urban roads based on LID stormwater management techniques developed by the Province, other municipalities, and Conservation Authorities.
- B6) It is recommended that the City of Hamilton, the Hamilton Conservation Authority, and Conservation Halton review their watershed basin reports and develop a list to identify updates and priorities.

### PROGRAMS

- B7) It is recommended that the Hamilton Conservation Authority water quality monitoring program and the associated aquatic monitoring and terrestrial monitoring program continue and be expanded to ensure a thorough understanding of water quality issues from headwaters to Cootes Paradise/Hamilton Harbour.

### TRAINING & EDUCATION

- B8) It is recommended that the City of Hamilton, the Hamilton Conservation Authority, Conservation Halton, and the Province of Ontario develop a local workshop/conference for the development industry and practitioners to share new LID guidelines, LID construction and design tools, LID maintenance, and resources.
- B9) It is recommended that the City of Hamilton, with support from the Province of Ontario, create and implement a training program in LID, SWM, and maintenance for municipal engineers,



planners, building department staff, and maintenance operations staff (Parks and Rec, Roads and Parks Maintenance, etc.) involved in all stages of development to ensure full integration of changes/updates to LID and SWM guidelines and manuals.

- B10) It is recommended that the Hamilton Conservation Authority and Conservation Halton, with support from the Province of Ontario, create and implement a training program in LID, SWM, and maintenance for its engineers, planners, enforcement, and ecology staff involved in all stages of development to ensure full integration of changes/updates to LID and SWM guidelines and manuals.

## **Recommendations for Maintenance and Opportunities to Improve the Existing Stormwater System**

### **REPORTS & MANUALS**

- C1) It is recommended that the Province of Ontario include guidance regarding the frequency of quantity and/or quality monitoring of stormwater management infrastructure.

### **PROGRAMS**

- C2) It is recommended that the City of Hamilton inventory the area to confirm and update location and ownership of all stormwater management infrastructure and OGS on municipal and where possible private lands.
- C3) It is recommended that the City of Hamilton establish a new monitoring procedure for the accumulation of sediment within City owned stormwater management ponds. This would provide information beyond a visual inspection to assist with forecasting dredging work.
- C4) It is recommended that the City of Hamilton, in collaboration with the Hamilton Conservation Authority and Conservation Halton, develop a monitoring program to examine the functioning of stormwater management facilities to determine if they are addressing water quality requirements, functioning as designed, and if their performance can be optimized.
- C5) It is recommended that the City of Hamilton continue the practice of updating its catchbasin inventory and cleanout maintenance program.
- C6) It is recommended that the City of Hamilton, within the Hamilton Harbour watershed, explore opportunities to improve the efficiency of their catchbasin cleaning program with the use of new sediment capturing technologies.
- C7) It is recommended that the City of Hamilton, Hamilton CA, and Conservation Halton update and maintain an inventory of erosion sites within the City and CA owned creek blocks and prioritize appropriate remedial actions.
- C8) It is recommended that the City of Hamilton continue with the program for optimization and improvements in their combined sewer system.

## **Recommendations for Evolution of Stormwater Infrastructure Funding**

- D1) It is recommended that the Province of Ontario provide guidance and direction for new financial models that allow stormwater infrastructure to be separately and predictably funded.
- D2) It is recommended that the City of Hamilton create a municipal financial model for stormwater management based on an equitable rate structure for a stable funding source.

## Recommendations for Evolution of Stormwater Management on Private Properties

### REPORTS & MANUALS

- E1) It is recommended that the City of Hamilton investigate and explore measures to ensure maintenance is carried out by private industrial, commercial, and institutional landowners to ensure the efficiency of all private stormwater management facilities and private OGS systems are maintained.
- E2) It is recommended that the Province of Ontario provide updated guidance for storm sewers and include requirements related to nutrients for incorporation into municipal sewer use bylaws.
- E3) It is recommended that the City of Hamilton review their Sewer Use Bylaw regarding including a limit for total phosphorus discharged into storm sewers.

### PROGRAMS

- E4) It is recommended that the City of Hamilton, the Hamilton Conservation Authority, Conservation Halton, and local community groups provide and/or expand programs for social incentives to recognize community participation in sustainable stormwater management and the adoption of LIDs (e.g. awards, recognition programs).
- E5) It is recommended that a neighbourhood based stormwater stewardship program be delivered in the communities of Ancaster, Upper and Lower Hamilton, and Flamborough and ensure that collaboration in these initiatives occurs between local organizations and governments.
- E6) It is recommended that the numerous existing outreach and education programs being delivered currently by Hamilton Conservation Authority, Conservation Halton, the City of Hamilton, and local non-profit agencies be enhanced and ensure that collaboration in these initiatives occurs.
- E7) It is recommended that the City of Hamilton, in collaboration with Hamilton Conservation Authority and Conservation Halton, investigate the opportunity to develop an incentive program to encourage the use of LIDs on private lands.
- E8) It is recommended that the City of Hamilton continue to provide additional staffing and funding to accelerate the identification and remediation of cross connections from the sanitary to separated storm sewer system.

### TRAINING & EDUCATION

- E9) It is recommended that local government and community groups in the Hamilton Harbour Watershed collaborate on stormwater stewardship outreach and education initiatives to maximize effectiveness of messaging to urban residents to promote acceptance and implementation at the lot level to address urban stormwater runoff.

# Appendix 6

**Hamilton Harbour Remedial Action Plan  
Watershed Nutrient and Sediment Management Advisory Committee  
Urban Runoff (Burlington) Task Group – Recommendations  
October 20, 2016**

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## **Recommendations for Evolution of Stormwater Management Approach and Design**

### REPORTS & MANUALS

- B1) It is recommended that the Province of Ontario complete development of the Low Impact Development (LID) Guidance Manual to complement the current MOECC Stormwater Planning and Design Manual.
- B2) It is recommended that the Province of Ontario provide guidance with respect to the stormwater volume reduction that may be possible through crediting LID techniques as part of a treatment train approach to stormwater management, particularly implications for designing stormwater management wet ponds.
- B3) It is recommended that the Province of Ontario review the existing building code to include recommendations that support and/or promote implementing LID techniques for buildings and structures subject to the building code.
- B4) It is recommended that the City of Burlington, in consultation with Conservation Halton, develop or update the stormwater management manual and Master Plans for development in Burlington based on the Province of Ontario's LID Guidance Manual, the 2003 MOECC Stormwater Planning and Design Manual, and other relevant references.
- B5) It is recommended that the City of Burlington and the Region of Halton develop LID guidance for reconstruction of urban roads based on LID stormwater management techniques developed by the Province, other municipalities, and Conservation Authorities.
- B6) It is recommended that the City of Burlington and Conservation Halton review their watershed basin reports and develop a list to identify updates and priorities.
- B7) It is recommended that the City of Burlington adopt a policy to maintain to the greatest extent possible infiltration through the road and swale system in Aldershot for existing, redevelopment, and new development and to utilize LID techniques for stormwater management.

### PROGRAMS

- B8) It is recommended that the Conservation Halton water quality monitoring program and the associated aquatic monitoring and terrestrial monitoring program continue and be expanded to ensure a thorough understanding of water quality issues from headwaters to Grindstone Creek Marshes/Hamilton Harbour.

### TRAINING & EDUCATION

- B9) It is recommended that the City of Burlington, the Region of Halton, Conservation Halton, and the Province of Ontario develop a local workshop/conference for the development industry and practitioners to share new LID guidelines, LID construction and design tools, LID maintenance, and resources.

- B10) It is recommended that the City of Burlington, with support from the Province of Ontario, create and implement a training program in LID, SWM, and maintenance for municipal engineers, planners, building department staff, and maintenance operations staff (Parks and Rec, Roads and Parks Maintenance, etc.) involved in all stages of development to ensure full integration of changes/updates to LID and SWM guidelines and manuals.
- B11) It is recommended that the Region of Halton, with support from the Province of Ontario, create and implement a training program in LID, SWM, and maintenance for engineers, planners, and maintenance operations staff (Roads and Parks Maintenance, etc.) involved in all stages of development to ensure full integration of changes/updates to LID and SWM guidelines and manuals.
- B12) It is recommended that Conservation Halton, with support from the Province of Ontario, create and implement a training program in LID, SWM, and maintenance for its engineers, planners, enforcement, and ecology staff involved in all stages of development to ensure full integration of changes/updates to LID and SWM guidelines and manuals.

### **Recommendations for Maintenance and Opportunities to Improve the Existing Stormwater System**

#### **REPORTS & MANUALS**

- C1) It is recommended that the Province of Ontario include guidance regarding the frequency of quantity and/or quality monitoring of stormwater management infrastructure.

#### **PROGRAMS**

- C2) It is recommended that the City of Burlington inventory the area to confirm and update location and ownership of all stormwater management infrastructure and OGS on municipal and where possible private lands.
- C3) It is recommended that the City of Burlington, in collaboration with Conservation Halton, develop a monitoring program to examine the functioning of stormwater management facilities to determine if they are addressing water quality requirements, functioning as designed, and if their performance can be optimized.
- C4) It is recommended that the City of Burlington, within the Hamilton Harbour watershed, explore increasing frequency of maintenance to improve the efficiency of their catch basin cleaning program and explore addition of catch basin technologies to optimize performance.
- C5) It is recommended that the City of Burlington and Conservation Halton continue to update and maintain an inventory of erosion sites within the City and CA owned creek blocks and prioritize appropriate remedial actions.

### **Recommendations for Evolution of Stormwater Infrastructure Funding**

- D1) It is recommended that the Province of Ontario provide guidance and direction for new financial models that allow stormwater infrastructure to be separately and predictably funded.
- D2) It is recommended that the City of Burlington examine a municipal financial model for stormwater management based on an equitable rate structure for a stable funding source.



## Recommendations for Evolution of Stormwater Management on Private Properties

### REPORTS & MANUALS

- E1) It is recommended that the City of Burlington investigate and explore measures to ensure maintenance is carried out by private industrial, commercial, and institutional landowners to ensure the efficiency of all private stormwater management facilities and private OGS systems are maintained.
- E2) It is recommended that the Province of Ontario provide updated guidance for storm sewers and include requirements related to nutrients for incorporation into municipal sewer use bylaws.
- E3) It is recommended that the City of Burlington review their Sewer Use Bylaw regarding including a limit for total phosphorus and total suspended sediment discharged into storm sewers.

### PROGRAMS

- E4) It is recommended that the City of Burlington, the Region of Halton, Conservation Halton, and local community groups provide and/or expand programs for social incentives to recognize community participation in sustainable stormwater management and the adoption of LIDs (e.g. awards, recognition programs).
- E5) It is recommended that the numerous existing outreach and education programs being delivered currently by Conservation Halton, the City of Burlington, the Region of Halton, and local non-profit agencies be enhanced and ensure that collaboration in these initiatives occurs.
- E6) It is recommended that the City of Burlington, the Region of Halton, and Conservation Halton investigate the opportunity to develop an incentive program to encourage the use of LIDs on private lands.

### TRAINING & EDUCATION

- E7) It is recommended that local government and community groups in the Hamilton Harbour Watershed collaborate on stormwater stewardship outreach and education initiatives to maximize effectiveness of messaging to urban residents to promote acceptance and implementation at the lot level to address urban stormwater runoff.

# Appendix 7

## Hamilton Harbour Remedial Action Plan

### Watershed Nutrient and Sediment Management Advisory Committee

#### Erosion and Sediment Control on Active Construction Sites Task Group – Recommendations

October 20, 2016

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NOTE: In all the recommendations “municipalities” refers to the City of Hamilton, City of Burlington, and when applicable, the Regional Municipality of Halton; “conservation authorities” refers to the Hamilton Conservation Authority and Conservation Halton.

#### Recommendations for the ESC Process for Subdivisions

##### PREPARATION OF ESC PLANS AND ON SITE INSPECTION

- E1) It is recommended that prior to initiating engineering design require joint pre-consultation, by the applicant’s engineer with the municipality and conservation authority, for preparing ESC plans in the municipal subdivision application process and for CA applications.
- E2) It is recommended that individualized and tailored ESC plans for the three phases of construction of subdivisions be required to ensure practical and effective ESC controls through all phases of construction: 1) earthworks/site grading; 2) servicing/road construction and; 3) building construction phases of work.
- E3) It is recommended that municipalities shall clearly identify that they will take the lead for ensuring ongoing compliance with ESC measures during the three stages of construction of subdivisions.
- E4) It is recommended that an appropriate development funded inspection and reporting system shall be designed and implemented by the municipalities and conservation authorities to ensure compliance with ESC measures during the three stages of construction.
- E5) It is recommended that municipalities and conservation authorities, through subdivision agreements and CA permits, require applicants to provide notification when a project is to start and require regular ESC inspection reports be filed with the municipalities and CAs.
- E6) It is recommended that the applicant be required to identify an on-site person who is designated responsible for the construction, maintenance, and operation of ESC for each stage of construction.

##### STABILIZING AND VEGETATING STORMWATER MANAGEMENT PONDS AND ASSOCIATED CREEK WORKS

- E7) It is recommended that ESC plans identify the timely stabilization/vegetation of stormwater management ponds and/or associated creek works as early in the site grading process as possible.  
Recommendations for ESC process for Site Plans

##### CORRECTING NON-COMPLIANCE IN CA REGULATED AREAS

- E8) It is recommended that the Province include Stop Work Order or Order to Comply powers through amendments to the Conservation Authorities Act or alternatively/preferably allow CAs the ability to issue Part 1 Certificate of Offence (tickets) for non-compliance of permit (ESC) conditions.

## PRE-CONSULTATION

- E9) It is recommended that prior to initiating engineering design require joint pre-consultation, by the applicant's engineer with the municipality and conservation authority, for preparing ESC plans in the municipal site plan application process and for CA applications.

## PREPARATION OF ESC PLANS AND ON SITE INSPECTION

- E10) It is recommended that municipalities and conservation authorities, through site plan agreements and CA permits, require applicants to provide notification when a project is to start and for large scale projects require regular ESC inspection reports be filed with the municipalities and CAs.
- E11) It is recommended that the applicant be required to identify an on-site person who is designated responsible for the construction, maintenance and operation of ESC for each stage of construction.

## **Recommendations for ESC process for Infrastructure and Capital Projects**

### PRE-CONSULTATION

- E12) It is recommended that municipal departmental pre-consultation with conservation authorities should occur as early as possible in the development of engineering plans for major municipal infrastructure and capital projects within CA regulated areas in order to allow collaboration in the development of ESC.

### PHASING DESIGN OF ESC PLANS

- E13) It is recommended that municipal and conservation authority infrastructure and capital project ESC plans identify specific measures to be employed during the three phases of construction: 1) removals, 2) construction/grading, and 3) site restoration.

### TIMELY SITE RESTORATION

- E14) It is recommended that municipalities and conservation authorities work together to phase site revegetation/restoration efforts on infrastructure and capital projects in order to reasonably reduce the length of time soil is exposed between construction/grading and site restoration phases of construction.

### INSPECTION OF ESC MEASURES FOR MUNICIPAL INFRASTRUCTURE PROJECTS

- E15) It is recommended that municipalities and conservation authorities identify processes of collaboration for the ongoing inspection of ESC requirements for infrastructure projects.

## **Recommendations for ESC process for Single Lot Applications**

- E16) It is recommended that for single lot applications, where no conservation authority approval is required, e.g. infills or demo/rebuilds, that municipalities seek a mechanism to require an approved grading plan complete with an ESC plan prior to issuance of a building permit.
- E17) It is recommended that where applicable, require municipal grading inspectors inspect ESC works to ensure they are installed in accordance with the approved grading plan.

## **Recommendations for Education and Training**

- F1) It is recommended that municipalities and conservation authorities ensure that knowledge of ESC measures and application are translated across department offices and divisions through internal or joint training initiatives. Training for municipal and CA employees should be offered annually to account for staff turnover and sequential upgrades in learning. Employees meeting minimum prequalification requirements to become CPESC and/or CISEC certified are encouraged to take the examinations offered.
- F2) It is recommended that consulting teams hired to prepare municipal tenders and contracts for infrastructure and capital projects be required to demonstrate proper knowledge, training and (preferably) certification in ESC practices.
- F3) It is recommended that municipalities and conservation authorities work with the construction industry to promote and facilitate training workshops for private sector contractors and site supervisors in ESC.
- F4) It is recommended that municipalities along with their respective conservation authorities develop a formal inspection process and reporting forms for ESC inspection.
- F5) It is recommended that municipalities along with their respective conservation authorities prepare a user friendly brochure for citizens and small contractors to explain single lot ESC.

## **Recommendations for Updating and Coordinating ESC Guidelines**

- G1) It is recommended that the municipalities and conservation authorities encourage the Toronto and Region Conservation Authority to initiate an update to the Erosion and Sediment Control Guideline for Urban Construction (Greater Golden Horseshoe Area Conservation Authorities, 2006) document to ensure that it is current, accurate and comprehensive; and work from this updated document when preparing or reviewing ESC plans.
- G2) It is recommended that the municipalities and conservation authorities work with the Ontario Provincial Standards (OPS) and Canadian Construction Documents Committee (CCDC) to further update the OPS and CCDC libraries to advance the status of ESC practice in the Province of Ontario.
- G3) It is recommended that the municipalities and conservation authorities require consultants and contractors to follow the updated ESC guideline document in their submissions for development and infrastructure contracts once approved.

## **Recommendations for Contracting Tools to Improve ESC Performance in the Industry**

### **FORM OF PAYMENT FOR ESC**

- H1) It is recommended that the municipalities and conservation authorities utilize unit prices for ESC contracted items in their infrastructure and capital projects to ensure that ESC measures are installed and maintained appropriately throughout their construction projects.
- H2) It is recommended that the municipalities and conservation authorities encourage through their approval processes that private contracts for ESC items for developments are based on unit costs rather than lump sums.



### SPECIAL CONTRACT PROVISIONS

- H3) It is recommended that municipal and conservation authority contracts include special provisions to ensure that ESC measures are properly installed and maintained during all stages of construction projects.
- H4) It is recommended that the Province consider the implementation of a procurement policy for all provincial contracts that include a provision that requires knowledge and/or training in ESC in active construction projects where there is potential for sediment and erosion control issues.

### PRE-QUALIFICATION OF ESC CONTRACTORS

- H5) It is recommended that the municipalities and conservation authorities be encouraged to begin a process, where applicable, of pre-qualifying contractors to ensure a basic level of ESC competence in ESC is achieved for future projects.

### VENDOR MANAGEMENT SYSTEMS

- H6) It is recommended that the municipalities and conservation authorities are encouraged to add ESC scoring to any existing contractor evaluation processes.

# Appendix 8

**Hamilton Harbour Remedial Action Plan  
Watershed Nutrient and Sediment Management Advisory Committee  
Rural Runoff Task Group – Recommendations  
June 27, 2017**

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## **Recommendations for Phosphorus and Sediment Runoff from Rural Land Uses**

1. That Hamilton Conservation Authority, Conservation Halton and the City of Hamilton undertake the recommendations identified below for phosphorus and sediment targeted rural initiatives in the Spencer Creek and Grindstone Creek watersheds and that the Hamilton Harbour Watershed Stewardship Project strategically focus its work with landowners in subwatersheds contributing highest levels of phosphorus and sediment.

## **Recommendations for Large-Scale Fill Activities**

2. The Rural Runoff Task Group for Nutrient and Sediment Management recommends and supports the ongoing efforts of provincial ministries, municipalities, and conservation authorities to better control the impacts associated with large fill activities.
3. That an outreach and education program regarding large-scale fill be developed and implemented for rural landowners within the Hamilton Harbour Watershed.
4. That provincial ministries, municipalities and conservation authorities develop guidelines and programs to address the impacts of small scale fill activities (less than 1000m<sup>3</sup>).

## **Recommendations for Rural Road and Ditch Contributions to Hamilton Harbour Eutrophication**

5. That the City of Hamilton, in co-operation with the Hamilton Conservation Authority and Conservation Halton, undertake monitoring to examine the relationship of the City's roadside ditch maintenance program with the level and extent of sediment and phosphorus loadings on receiving watercourses and water bodies and ultimately, Cootes Paradise and Hamilton Harbour.