



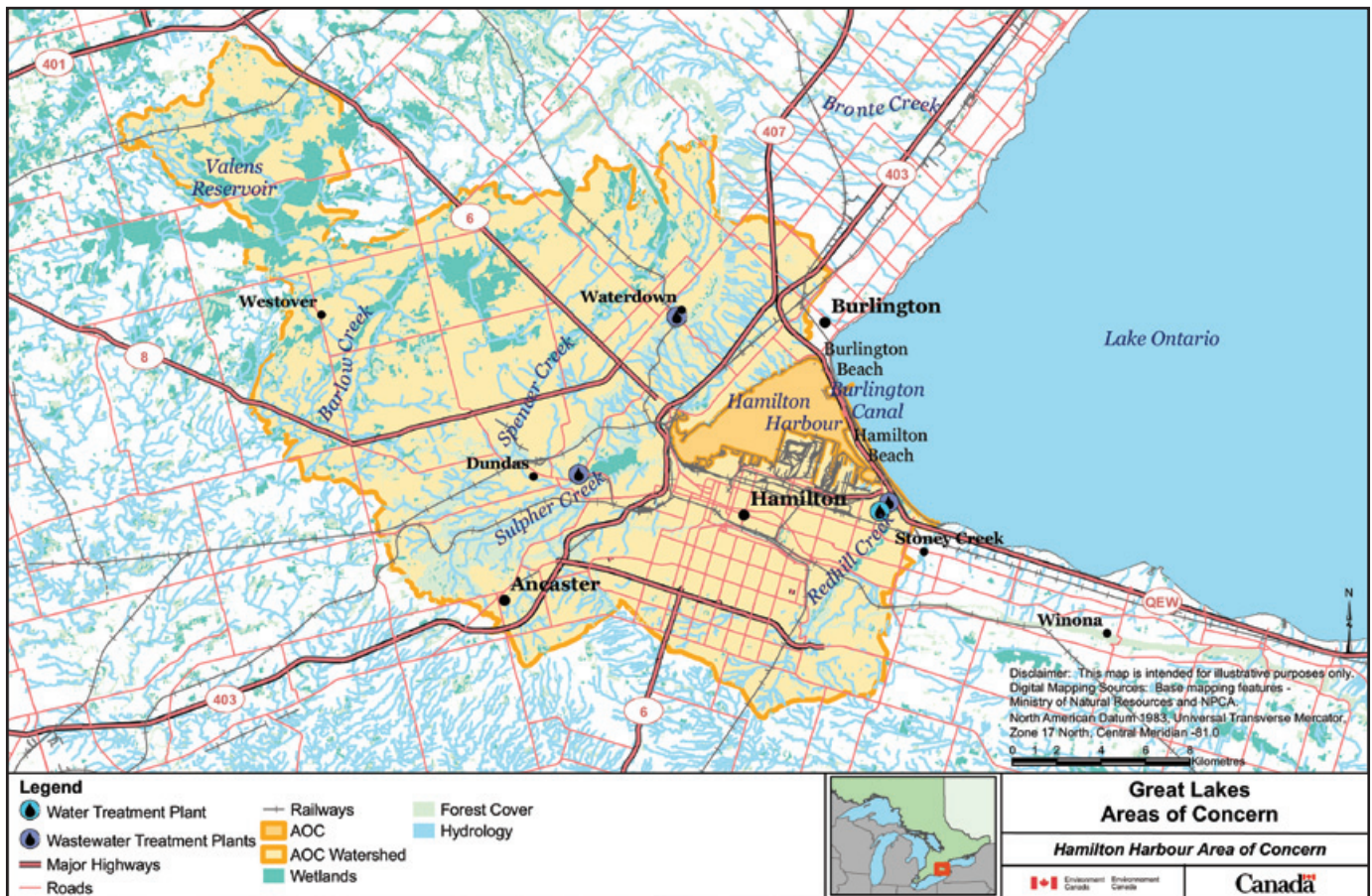
Hamilton Harbour Area of Concern

Status of Beneficial Use Impairments

September 2010

Hamilton Harbour is a 2150-ha bay located at the western tip of Lake Ontario. The Area of Concern covers about 500 km² (50 000 ha) and includes the harbour, the Cootes Paradise wetland and open water, and the surrounding watershed drained by three main tributaries: Grindstone Creek, Red Hill Creek and Spencer Creek. The area population of nearly 700 000 is concentrated in the cities of Hamilton and Burlington, and portions of the Regional Municipality of Halton and the Township of Puslinch.

The Hamilton Harbour Area of Concern has been subject to the impacts of intensive industrial and urban development around its shores for many years. Historically, the economy of the region was based on the iron and steel industries. Today, Hamilton Harbour remains a major shipping centre, supporting one the largest concentrations of heavy industry in Canada. The harbour is the main recipient of four wastewater treatment plant discharges and urban runoff from the cities of Hamilton and Burlington. All these municipal and industrial point sources meet provincial standards; however, as the harbour is a contained water body in which water is retained for a long period of time, the impacts on the harbour's aquatic ecosystem, fish and wildlife continue to occur. The water quality of the



harbour continues to be characterized by poor clarity, low oxygen levels and high nutrient levels resulting from a combination of soil erosion in the watershed, a large volume of treated urban sewage, urban runoff and combined sewer overflows. The water and sediments of the harbour are contaminated by metals, pesticides, PCBs¹ and PAHs.² In particular, the sediments of Randle Reef in the industrial port are highly contaminated with PAHs and other contaminants.

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Hamilton Harbour was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Other partners in the cooperative effort in the Hamilton Harbour Area of Concern include (in alphabetical order) ArcelorMittal Dofasco, the Bay Area Restoration Council, the City of Burlington, the City of Hamilton, Conservation Halton, Fisheries and Oceans Canada, the Hamilton Conservation Authority, the Hamilton Halton Home Builders' Association, the Hamilton Port Authority, the Hamilton Waterfront Trust, McMaster University, the Ontario Ministry of Natural Resources, the Regional Municipality of Halton, the Royal Botanical Gardens and U.S. Steel Canada (formerly Stelco).

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

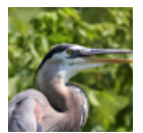
In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The *Stage 1 Remedial Action Plan Report*, summarizing the outcome of these efforts, was completed in 1989 and updated in 1992. The report identified 11 environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process. Their current status is described below in **Progress on Environmental Challenges**.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The *Stage 2 Remedial Action Plan Report*, which identified 50 recommended remedial actions, was completed in 1992. An updated report, identifying 57 recommendations expanding upon the original 50 recommendations, was completed in 2002. A work plan detailing tasks from 2006–2011 was completed in 2006. An update to the workplan is proposed for 2012–2015.

¹ *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

² *Polycyclic aromatic hydrocarbons* (PAHs) are chemical compounds found in oil, coal and tar deposits, and that also are produced as byproducts of fuel burning (whether fossil fuel or biomass). As pollutants, they are of concern because some compounds have been identified as carcinogenic.



Stage 3: Monitoring Actions and Delisting of the Area of Concern

The *Stage 3 Remedial Action Plan Report* and delisting of Hamilton Harbour as an Area of Concern will take place when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. The target date for the completion of most remedial actions is 2015; however, as of September 2010, there is no estimate of when Hamilton Harbour will be delisted as an Area of Concern.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made considerable progress in addressing the environmental challenges identified through the remedial action plan process, particularly in the areas of water quality improvement and fish and wildlife habitat restoration. Many of the remaining environmental challenges affecting the harbour require significant capital costs. In particular, substantial resources are required for upgrades to wastewater treatment plants in Hamilton and Halton and the remediation of contaminated sediment at Randle Reef to meet Remedial Action Plan targets. In 2010, Canada and Ontario announced infrastructure funding for projects to upgrade the Woodward and Skyway wastewater treatment plants. The funds necessary to remediate the contaminated sediments at Randle Reef remain to be fully committed as of September 2010.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 11 beneficial use impairments in the Hamilton Harbour Area of Concern, their status as of September 2010: key actions taken by various partner agencies and organizations under the remedial action plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Beach Closings

KEY ACTIONS	
COMPLETED	REMAINING
<p><i>Status: Impaired</i></p> <p>There are numerous posted advisories that bacterial levels (<i>E. coli</i>) exceed safe levels for swimming and other body contact recreational activities at Bayfront Park Beach and Pier 4 Park Beach.</p> <ul style="list-style-type: none"> Constructed combined sewer overflow tanks to allow for initial opening of the beaches Conducted research that identified birds as the source of <i>E. coli</i> levels causing subsequent beach postings Carried out pilot bird management program at Pier 4 Park Beach to reduce impacts of birds on beaches 	<ul style="list-style-type: none"> Expand bird management and public education programs to promote cleaner beaches Investigate causes for cyanobacteria blooms (blue-green algae) that result in late summer and early fall beach closures

Degradation of Aesthetics

Status: *Impaired*

Aesthetics are degraded as a result of the presence of oily sheens, debris, scum, poor water clarity and blue-green algal blooms.

KEY ACTIONS

COMPLETED

- Reduced amount of raw sewage and surface debris entering the harbour through the construction of combined sewer overflow tanks
- Reduced incidence and size of spills from industrial sites through implementation of pollution prevention plans

REMAINING

- Investigate causes of algal blooms that result in late summer and early fall beach closures
- Complete upgrades to wastewater treatment plants discharging into the harbour
- Continue the implementation of municipal stormwater management program

Degradation of Benthos³

Status: *Impaired*

Monitoring has confirmed impairment of the benthic community structure within both the nearshore and deep water zones of Hamilton Harbour.

KEY ACTIONS

COMPLETED

- Carried out a range of stewardship actions resulting in cleaner sediment entering the harbour and improved monitoring of benthic conditions
- Completed initial upgrades to wastewater treatment plants discharging into the harbour

REMAINING

- Undertake sediment remediation projects at Randle Reef and the ArcelorMittal Dofasco boat slip

Degradation of Fish and Wildlife Populations

Status: *Impaired*

Impairment of colonial waterbirds and the fish populations has been identified as a result of the loss of 65 percent of Hamilton Harbour fish and wildlife habitat, eutrophication,⁴ and contaminants.

KEY ACTIONS

COMPLETED

- Completed fisheries management plan

REMAINING

- Continue implementation of fisheries management plan and monitoring progress
- Maintain ongoing colonial waterbird management and monitoring efforts

³ *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

⁴ *Eutrophication* (or *eutrophic conditions*) is the process by which lakes and other water bodies are enriched by nutrients (usually phosphorus and nitrogen), which leads to excessive plant growth and oxygen depletion.



Eutrophication or Undesirable Algae

Status: *Impaired*

Levels of phosphorus and ammonia remain elevated leading to the presence of undesirable and nuisance algae.

KEY ACTIONS

COMPLETED

- Met initial Remedial Action Plan water quality targets for Hamilton Harbour, through upgrades to the wastewater treatment plants discharging into the harbour
- Prepared a nutrient reduction strategy for the Cootes Paradise Marsh
- Initiated a harbour watershed stewardship program

REMAINING

- Complete upgrades to wastewater treatment plants to meet final water quality targets
- Implement strategy for addressing nutrient loading to Cootes Paradise Marsh

Loss of Fish and Wildlife Habitat

Status: *Impaired*

Degradation of habitat, including the loss of 65% of Hamilton Harbour fish and wildlife habitat, has been identified as one of the causes resulting in the reduction or loss of colonial waterbirds and certain fish populations.

KEY ACTIONS

COMPLETED

- Restored 376 ha (of a projected 402 ha) of combined fish and wildlife habitat
- Restored 12 (of 16) km of shoreline habitat
- Initiated harbour watershed stewardship program

REMAINING

- Undertake proposed habitat restoration projects at Windermere Basin, Fishermen's Pier and North Shore, and complete ongoing restoration work at Cootes Paradise and Grindstone Creek
- Continue implementing the fisheries management plan
- Continue implementing the harbour watershed stewardship program

Restrictions on Dredging Activities

Status: *Impaired*

Dredging of sediment from the navigational areas of Hamilton Harbour is restricted due to elevated levels of a variety of contaminants, including PCBs and PAHs.

KEY ACTIONS

COMPLETED

- Secured dredge sediment in approved confined disposal facility

REMAINING

- Identify and develop an alternate disposal location or method, given the limited capacity of the existing disposal facility

Restrictions on Fish and Wildlife Consumption

Status: *Impaired*

Restricted consumption of 17 fish species is advised due to elevated levels of a variety of contaminants, including PCBs.

KEY ACTIONS

COMPLETED

- Implemented the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial discharges entering Hamilton Harbour
- Dredged Windermere Basin
- Ensured containment of municipal landfill leachate
- Updated sewer system bylaws and enhanced enforcement in both Halton and Hamilton
- Conducted a study of PCBs to better understand ongoing sources of PCBs in the food chain and identify remedial actions

REMAINING

- Implement the Randle Reef contaminated sediment remediation project
- Complete upgrades to Hamilton Harbour wastewater treatment plants

Status – REQUIRES FURTHER ASSESSMENT

Bird (or Other Animal) Deformities or Reproduction Problems

Status: *Requires further assessment*

Incidence rates of bird and animal deformities or reproductive problems in Herring Gulls and Snapping Turtles exceed background levels at suitable reference sites.

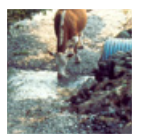
KEY ACTIONS

COMPLETED

- Conducted periodic monitoring of Herring Gull eggs in Hamilton Harbour and Snapping Turtles in Cootes Paradise

REMAINING

- Complete the assessment of wildlife monitoring data on health effects



Degradation of Phytoplankton and Zooplankton⁵ Populations

<p>Status: <i>Requires further assessment</i> Data require further assessment.</p>	
KEY ACTIONS	
COMPLETED	REMAINING
<ul style="list-style-type: none"> Initiated a study to determine status of this environmental challenge 	<ul style="list-style-type: none"> Complete the status study and continue to implement nutrient management program

Fish Tumours or Other Deformities

<p>Status: <i>Requires further assessment</i> Data require further assessment.</p>	
KEY ACTIONS	
COMPLETED	REMAINING
<ul style="list-style-type: none"> Carried out studies of fish tumours in the Area of Concern 	<ul style="list-style-type: none"> Undertake additional surveys of Brown Bullheads to resolve the status of this environmental challenge

⁵ *Phytoplankton* and *zooplankton* are the collection of small or microscopic water-borne plant and animal organisms (respectively) that float or drift in great numbers, especially at or near the water's surface, and that serve as food for fish and other larger organisms.



FOR MORE INFORMATION

Environment Canada:

www.ec.gc.ca/raps-pas

Hamilton Harbour Remedial Action Plan:

www.hamiltonharbour.ca/rap/index.htm

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