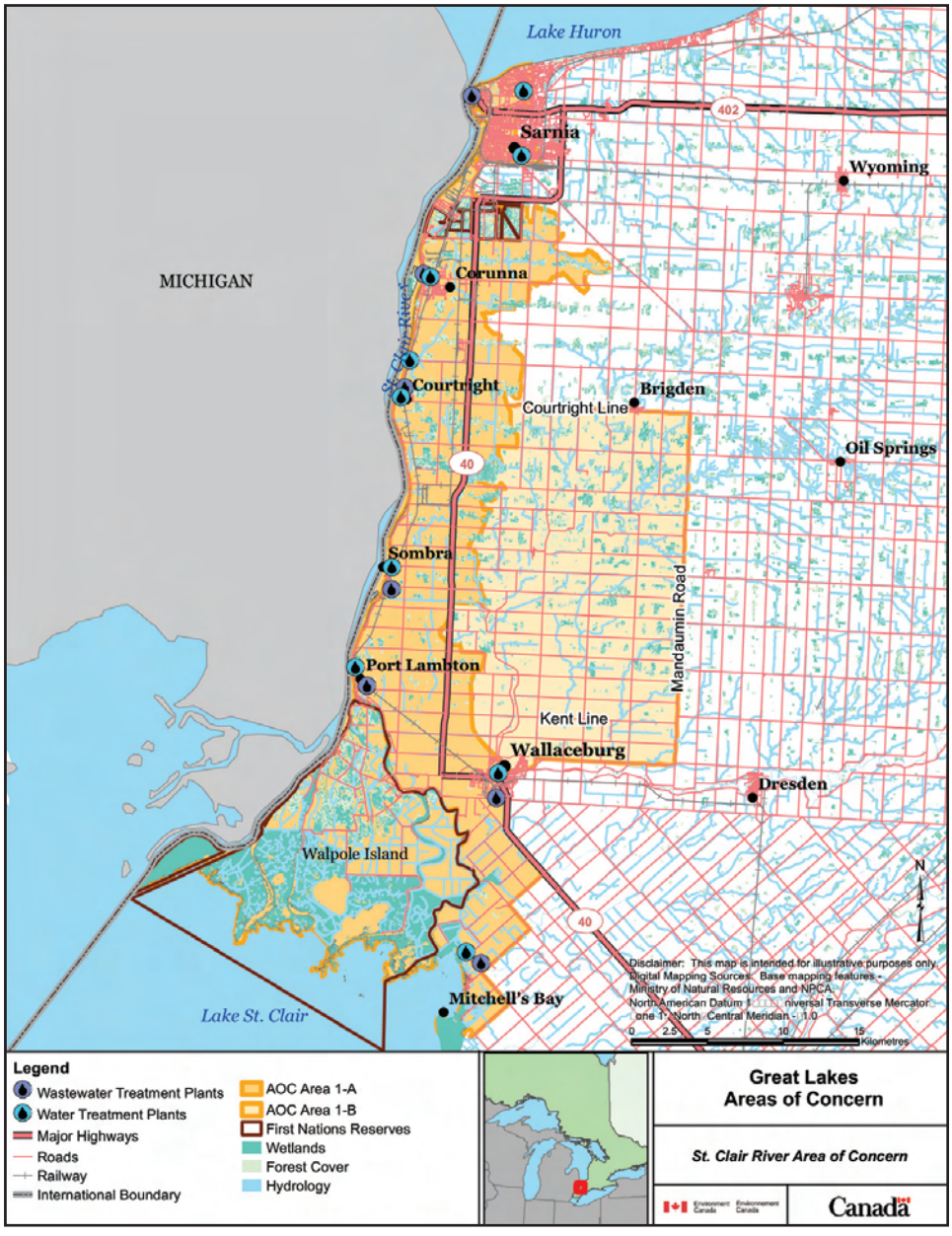
St. Clair River
Area of Concern
Canadian Section
Status of Beneficial Use Impairments
September 2010

The St. Clair River, a key shipping channel in the Great Lakes Seaway system, flows 64 km from Lake Huron to Lake St. Clair. The Area of Concern covers 3350 km^2 (335 000 ha) and includes the river, its delta channels and its immediate drainage basin, composed of the Talford, Baby, Bowens, Clay, and Marshy Creek sub-watersheds. The wetlands and shallow open waters of the lower St. Clair River and Lake St. Clair provide important habitat for many species and are considered some of the most important wetland areas in the Great Lakes basin.

The area supports extensive recreational activities, including sport fishing, boating and swimming. The river is a source of drinking water for shoreline communities, and serves as a source of cooling and process water for industry and thermal generating stations. About 170 000 people live in the area, concentrated in Sarnia, Ontario and Port Huron, Michigan.

For many years, the river has been subject to industrial activity and urban development along its shores. The primary sources of contaminants to the river have been the discharges from a complex of 27 industrial facilities in Ontario in the Sarnia area and 6 in the United States. These sites include a number of large petrochemical plants. Other sources of contaminants include 10 municipal point sources and associated lagoons, urban stormwater runoff, and runoff from agricultural operations in rural areas of the watershed.



Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

The St. Clair River 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 (including the St. Clair River) 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

Responsibility for the St. Clair River Area of Concern is shared jointly by both Canada and the United States. In 1998, Environment Canada, the U.S. Environmental Protection Agency, the Ontario Ministry of the Environment and the Michigan Department of Environmental Quality (now the Department of Natural Resources and Environment) signed the Four Agency Letter of Commitment. The Letter outlined agency roles and responsibilities during implementation of the remedial action plans for three binational Areas of Concern—the St. Clair River, the Detroit River, and St. Marys River.

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plan to protect and restore the St. Clair Area of Concern in Canada. Other partners in the cooperative effort for the Canadian side include (in alphabetical order) the Aamjiwnaang First Nation, the City of Sarnia, the Friends of the St. Clair River, the Municipality of Chatham Kent, the Ontario Ministry of Natural Resources, the Rural Lambton Stewardship Network, the Sarnia-Lambton Environmental Association (formerly Lambton Industrial Society) and member companies, the St. Clair Region Conservation Authority, the Township of St. Clair, and the Walpole Island First Nation.

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

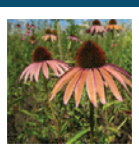
In Stage 1, the governments of Canada, Ontario, the United States and the State of Michigan, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1991. The binational report identified 12 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, Ontario, the United States and the State of Michigan, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in both the Canadian and United States sections of the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified 38 recommended remedial actions, was completed in 1995. A progress report was completed by the Canadian Remedial Action Plan Implementation Team in 2005 and an updated work plan for the Canadian side was completed in 2007. As of early 2010, all but one of the remedial actions from the Stage 2 Report are either completed or underway. Implementation of all priority actions is targeted for 2015.

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

The ***Stage 3 Remedial Action Plan Report*** and delisting of St. Clair River as an Area of Concern will take place when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. As of September 2010, there is no estimate of when St. Clair River will be delisted as an Area of Concern.



PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made substantial progress over the past decade on restoring environmental quality within the St. Clair River Area of Concern. All of the main industrial and municipal facilities on the St. Clair River have made progress in controlling and reducing their discharge of chemical and bacterial contaminants into the river. An example of these partnership efforts, which included the removal of 13 300 m^3 of contaminated sediment by Dow Chemical Canada in 2004, is that the widespread pollution of the river bottom that was identified in the 1950s was, by 1990, limited to an area of impact within a 9 km stretch of the river. In addition, considerable progress has been made in protecting and restoring fish and wildlife habitat, including site-specific shoreline habitat enhancement measures, the development of a landowner habitat enhancement program and multi-million dollar efforts to remove combined sewer overflows in the City of Sarnia.

The major challenges remaining include continuing to address sediment contamination in the river downstream of Sarnia; continuing to reduce combined sewer overflows; and continuing efforts to restore creeks, wetlands and forest habitat and promote the naturalization of the St. Clair River shoreline. The prioritization of key remedial actions and the implementation of strategies to complete these actions are targeted for 2015.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 12 beneficial use impairments in the St. Clair River Area of Concern (Canadian Section), 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

Added Costs to Agriculture or Industry

Status: ***Impaired***

There are additional costs required to treat water prior to use in industrial or agricultural processes.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Reduced Sarnia's combined sewer overflow volumes into the St. Clair River by 50% since 2000 through more than $50 million in capital upgrades to the city's combined sewer system ▪ Improved wastewater management by local industry	▪ Continue efforts to eliminate combined sewer overflows in Sarnia ▪ Survey river water users to determine whether there continues to be added costs

Beach Closings

Status: ***Impaired***

There are numerous posted advisories that bacterial levels (*E. coli*) exceed safe levels for swimming and other body contact recreational activities at four parks on the Ontario side of the river (Willow, Seager, Cundick, Brander).

KEY ACTIONS

COMPLETED	REMAINING
▪ Upgraded Sarnia's Water Pollution Control Plant from primary to secondary treatment (2001) ▪ Reduced Sarnia's combined sewer overflow volumes into the St. Clair River by 50% since 2000 through more than $50 million in capital upgrades to the city's combined sewer system ▪ Upgraded wastewater treatment for several villages in the Township of St. Clair (2008) ▪ Reduced impacts from agricultural non-point sources through ongoing efforts since 1993	▪ Continue efforts to eliminate combined sewer overflows in Sarnia ▪ Conduct beach monitoring, assess current beach closing data and update the status of this environmental challenge ▪ Continue with the agricultural non-point source pollution control program, with a focus on priority watersheds

Degradation of Aesthetics

Status: ***Impaired***

Aesthetics are degraded as a result of oily surface films, spills and combined sewer overflows.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted survey of users of the river to gauge whether degradation of aesthetics continues to be an issue (2007 and 2009)	▪ Survey municipalities, health units, provincial ministries and First Nations to clarify status of this impairment in the St. Clair River ▪ Continue efforts to eliminate combined sewer overflows in Sarnia

Degradation of Benthos[1]

Status: ***Impaired***

There is no significant alteration in the benthic community within stretches of the river downstream of Sarnia compared to communities upstream; however, there are elevated levels of mercury in the benthos within the most impacted 9-km stretch of the river.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted benthic surveys between 1993 and 2008 and found no evidence of impairment in the benthic community structure in stretches of the river downstream from Sarnia compared to communities upstream ▪ Completed toxicity tests and a risk assessment on invertebrates and fish respectively related to methyl mercury in the river sediment; the risk assessment identified a potential for mercury biomagnification[2] to some species of fish, due to elevated methyl mercury concentrations in the tissues of benthic invertebrates, a food source for the fish (2009)	▪ Continue to assess environmental risk and develop management actions for contaminated sediments ▪ Continue to track regulated industrial discharges to the river

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Habitat has been lost due to filling, draining, dredging and bulk-heading for industrial, urban, agricultural and navigational uses. Significant losses of wetlands have occurred, particularly in the Walpole Island delta region. Degradation of fish and wildlife habitat including spawning, nursery and rearing sites has been identified as one of the causes resulting in the reduction and loss of fish and wildlife populations.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented habitat restoration projects since 1993 in areas along the shoreline and within various areas of St. Clair River watershed ▪ Carried out two natural shoreline stabilization projects to create fish habitat along the St. Clair River shoreline ▪ Undertook a study of habitat threats in the main tributaries of the St. Clair River	▪ Encourage the use of natural shoreline stabilization techniques by private and municipal landowners through demonstration projects ▪ Continue with the habitat restoration program and focus on priority implementation recommendations of the St. Clair River Remedial Action Plan Work Plan (2007) and the relevant recommendations of the St. Clair River Watershed Plan (2009)

[1] *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.

[2] *Biomagnification* is the increasing concentration of a substance, such as a toxic chemical, in the tissues of organisms at successively higher levels in a food chain. As a result, organisms at the top of the food chain generally suffer greater harm from a persistent toxin or pollutant than those at lower levels.

Restrictions on Dredging Activities

Status: ***Impaired***

The dredging of sediment along the Ontario shoreline from the Sarnia industrial waterfront as far downstream as Stag Island is restricted due to elevated levels of mercury, metals and other organic contaminants.

KEY ACTIONS

COMPLETED	REMAINING
▪ Removed more than 13 300 m^3 of mercury-contaminated sediments (2004) ▪ Conducted preliminary assessment of restrictions on dredging that concluded contaminant concentrations in dredged sediment within the shipping channel meet provincial sediment quality guidelines (2007)	▪ Continue to assess and develop management actions for remaining contaminated sediment priority areas ▪ Finalize the assessment of the status of this beneficial use impairment

Restrictions on Drinking Water Consumption or Taste and Odour Problems

Status: ***Impaired***

Periodic closings of water treatment plant intakes in Ontario have occurred as a result of chemical spills.

KEY ACTIONS

COMPLETED	REMAINING
▪ Mandated industry, through 2007 Ontario regulations, to have spill prevention and contingency plans in place by September 2008 ▪ Initiated study to assess most recent spills data and water treatment plant shutdowns (2008)	▪ Continue to monitor spill incidents ▪ Review and revise the delisting criteria ▪ Undertake a study to assess status of taste and odour complaints

Restrictions on Fish and Wildlife Consumption[3]

Status: ***Impaired***

Restricted consumption of species such as Walleye, Smallmouth Bass and Yellow perch is advised due to elevated levels of mercury, PCBs,[3] pesticides and mirex and photomirex.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal petroleum refinery regulations and 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 the St. Clair River ▪ Removed more than 13 300 m^3 of mercury-contaminated sediments (2004) ▪ Continued to monitor ongoing improvements to industrial discharges ▪ Conducted sediment sampling (2005–2008) and identified three priority areas for managing contaminated sediment, based on risk to some species of sport fish (2009)	▪ Continue assessment and development of management actions for contaminated sediments ▪ Continue to monitor sport fish for contaminants

[3] *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.

Status – REQUIRES FURTHER ASSESSMENT

Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Requires further assessment***

No evidence of bird or animal deformities was presented in the Stage 1 report; however, deformities have been demonstrated since then in the mouth parts of river bottom microorganisms known as chironomids. Overall, there is a lack of studies examining bird or animal deformities or reproductive problems.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted field studies on birds, reptiles, mammals and amphibians (2006–2008)	▪ Determine status of this environmental challenge, based on most recent data

Degradation of Fish and Wildlife Populations

Status: ***Requires further assessment***

The fish community is considered diverse. Information on wildlife populations is lacking and the potential role of contaminants in affecting populations requires further study on a Great Lakes basin-wide basis.

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed wildlife contaminant studies on Snapping Turtles, Forster's Tern, Black Tern and Mink	▪ Complete wildlife contaminant and population studies ▪ Determine status of this environmental challenge, based on most recent data

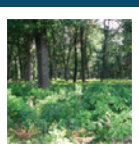
Fish Tumours or Other Deformities

Status: ***Requires further assessment***

Further data collection and analysis are needed to confirm whether fish tumours exist.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted study on 17 fish species that found no tumours in the fish livers (2002) ▪ Conducted an extensive fish liver tumour evaluation study to determine the prevalence of fish tumours (2006)	▪ Determine status of this environmental challenge, based on the most recent data



Tainting of Fish and Wildlife Flavour

Status: ***Requires further assessment***

The recommendation by scientists to re-designate this environmental challenge as *not impaired* was accepted by both the St. Clair Canadian Implementation Committee and the Binational Public Advisory Committee. The Remedial Action Plan partners currently are working through the re-designation process.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted survey of anglers that found tainting was not a major concern (2007); this confirms the results of previous studies, including a controlled olfactory sensory evaluation study (1995) and an angler survey (1996–1997) ▪ Survey conducted by Walpole Island First Nation to get response from the community regarding tainting of fish flavour (2009)	▪ Continue to assess all data (including that from Walpole Island First Nation) to determine the status of this environmental challenge

FOR MORE INFORMATION

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www.ec.gc.ca/raps-pas

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