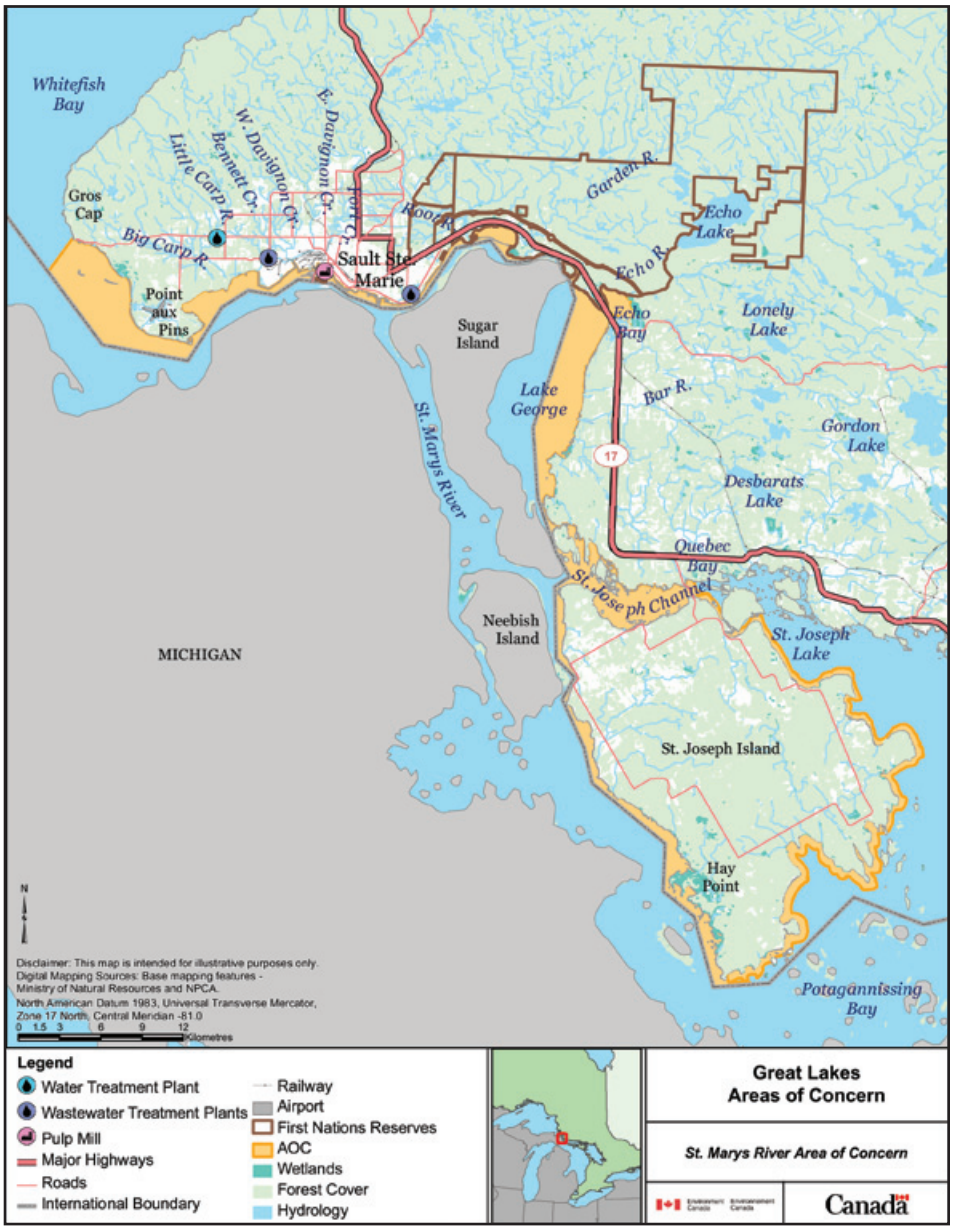
St. Marys River
Area of Concern
Canadian Section
Status of Beneficial Use Impairments
September 2010

The St. Marys River is a 112-km international channel that flows from Lake Superior into the North Channel of Lake Huron. The Area of Concern extends approximately two thirds of the river, from its head at Whitefish Bay downstream to St. Joseph Island. The river is a key part of the Great Lakes–St. Lawrence Seaway, with flow control structures and locks to allow for ship navigation between the lakes. The river's watershed and wetlands provide habitat for numerous fish and wildlife species, and support one of the highest concentrations of biodiversity in the Great Lakes basin. The largest communities in the area are the Canadian and United States cities of Sault Ste. Marie, which serve as industrial, commercial and institutional centres.

Environmental concerns in the St. Marys River Area of Concern include impacts on water quality and river sediment from discharges of effluent from local steel and pulp and paper industries, as well as discharges from municipal storm sewers and wastewater treatment plants. While improvements in the treatment of municipal wastewater and industrial effluent have significantly reduced the water quality impacts, bottom sediments along parts of the river remain contaminated due to a century of industrial activity. In addition, there are impacts to fish and wildlife habitat due to shoreline alteration, industrialization, urban development and shipping activities, and the infestation of Sea Lamprey (an alien invasive species).



Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

The St. Marys 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. Marys 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. Marys 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. Marys River, the Detroit River and the St. Clair River.

On the Canadian side of the 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 this Area of Concern. Other partners in the cooperative effort include (in alphabetical order) the Algoma Health Unit, the Binational Public Advisory Council, the City of Sault Ste. Marie (Ontario), Fisheries and Oceans Canada, the Garden River First Nation, local industry (including Essar-Algoma Steel), the Ontario Ministry of Natural Resources, and the Sault Ste. Marie Region Conservation Authority.

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

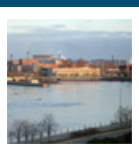
In Stage 1, the governments of Canada, Ontario, the United States and the State of Michigan, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1992. It pointed to past and ongoing industrial activities, municipal storm and wastewater effluent, the water control structure and shipping activity, and urban development as being primary causes for environmental concerns.

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 10 environmental challenges known as *beneficial use impairments* in the Remedial Action Plan process, was completed in 2002. The report identified more than 60 recommended remedial actions. The Implementation Annex, which outlines the roles and responsibilities and costs and timelines for implementing the remaining priority actions, will be completed in 2011. The current status of the beneficial use impairments is described below in **Progress on Environmental Challenges**.

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

The ***Stage 3 Remedial Action Plan Report*** and delisting of St. Marys River as an Area of Concern will take place when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. Several priority actions remain to be completed with respect to contaminated sediment, municipal stormwater and habitat restoration. As of summer 2010, agencies are assessing whether management of contaminated sediments is required. There is no estimate yet of when the St. Marys River will be delisted as an Area of Concern.



PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made substantial progress in addressing the environmental challenges in the Area of Concern. Notable successes have included upgrading the main wastewater treatment plant to secondary treatment in Sault Ste. Marie (Ontario), which has significantly improved the quality of effluent entering the river. In addition, with federal and provincial support, the city undertook an investigative study to reduce untreated stormwater outflows into the St. Marys River, which will help to further improve the river's water quality. Other achievements include the development of wetland protection strategies, fostering the recovery of Walleye populations and supporting the design of habitat features in the city's waterfront development.

Future efforts will need to focus on sediment management concerns. The partners are currently assessing the need for a sediment management plan. If such action is needed, then sediment management options will be evaluated and a detailed engineering design and environmental assessment of the preferred option will be undertaken. The earliest that a sediment management plan could be implemented is 2013. Other concerns include the impacts to fish habitat caused by the operations at the Compensating Works that control water levels and flows over the rapids.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 10 beneficial use impairments in the St. Marys 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

Beach Closings

Status: ***Impaired***

There were a number of reports about floating material washing up on shoreline property and beaches along the north shore of Sugar Island, often accompanied by high levels of *E. coli* in the surrounding water in some areas.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Upgraded the East End sewage treatment plant to secondary treatment and relocated the effluent outfall (2006) ▪ Undertook a stormwater management study for Sault Ste. Marie (Ontario) to improve quality of urban runoff to the river (2009–2010) ▪ The binational Sugar Island Monitoring Working Group initiated weekly monitoring and analysis of water and floating material, which pointed to natural causes (algae) and stormwater outfalls as the problem source (2007–2009)	▪ Identify and implement restoration actions related to stormwater management to address high bacteria counts following rain events ▪ Revise delisting criteria to include measurable targets and develop the Implementation Annex to identify and evaluate remaining priority actions

Degradation of Aesthetics

Status: ***Impaired***

Aesthetics were deemed degraded as a result of oil slicks downstream of the steel mill and from spills from passing ships. In the past, oily, fibrous material mixed with woody debris was reported along the Ontario shoreline. Related to Beach Closings above, there have been episodes of floating material along the north shore of Sugar Island and the Ontario shoreline of Lake George Channel.

KEY ACTIONS

COMPLETED	REMAINING
▪ Upgraded wastewater treatment at the Essar Algoma Steel mill and the St. Marys Paper mill, substantially improving effluent quality ▪ Decommissioned the Essar-Algoma Steel Terminal Basin settling ponds, reducing discharges into the river ▪ Upgraded the East End sewage treatment plant to secondary treatment and relocated the effluent outfall (2006) ▪ Initiated weekly monitoring and analysis of water and floating material through the binational Sugar Island Monitoring Working Group, which pointed to natural causes (algae) and stormwater outfalls as the problem source (2007–2009)	▪ See Beach Closings above

Degradation of Benthos[1]

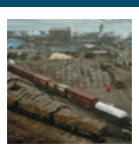
Status: ***Impaired***

Monitoring has confirmed impairment of the benthic community structure within the area downstream of the Algoma slag site to a distance of about 4 km, and on both sides of the Lake George Channel, within Little Lake George, and at the north end of Lake George.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper 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. Marys River ▪ Removed much of the contaminants at the Algoma slip site through maintenance dredging (1995, 2006) ▪ Conducted studies of sediment chemistry, toxicity and benthic communities to define the area of sediment contamination (2006, 2008, 2009) ▪ Commenced a modelling study to determine sediment fate and transport under different hydrologic conditions (2009–2010)	▪ Complete studies on sediment stability, fate and transport to determine the need for sediment management and, if needed, assess options and implement the preferred option ▪ Revise delisting criteria to include measurable targets

[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.



Degradation of Fish and Wildlife Populations

Status: ***Impaired***

Concerns for the fish community were: trends of lower Cisco abundance; the status of specific spawning stocks of walleye within the river; the potential for exotic, invasive species to invade the fish community; and declining populations of Northern Pike.

Waterfowl populations may be adversely affected by elevated concentrations of mercury and PCBs.[2]

KEY ACTIONS

COMPLETED	REMAINING
▪ Supported work of the St. Marys River Fisheries Task Group, made up of fish management agencies from Ontario and Michigan, towards sustainable fisheries in the St. Marys River, including fish population surveys, harvest surveys and a fisheries assessment plan	▪ Determine need for assessment of impacts to waterbird and wildlife populations from shoreline development ▪ Undertake assessment of actions related to contaminant levels of waterfowl populations ▪ Develop local fish community objectives ▪ Revise delisting criteria to include measurable targets and develop the Implementation Annex to identify and evaluate remaining priority actions

Eutrophication[3] or Undesirable Algae

Status: ***Impaired***

Eutrophication and algae were an issue in the vicinity of the East End sewage treatment plant before it was upgraded to secondary treatment in 2006. Conditions in smaller bays and in slow moving parts of the river downstream from the plant have not been documented.

KEY ACTIONS

COMPLETED	REMAINING
▪ See Beach Closings above	▪ See Beach Closings above

[2] *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.

[3] *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.

Fish Tumours or Other Deformities

Status: ***Impaired***

Earlier surveys showed the presence of liver tumours in White Suckers sampled below the power dam on the St. Marys River. Brown Bullheads sampled from Munuscong Bay (Michigan) showed incidence of liver tumours.

KEY ACTIONS

COMPLETED	REMAINING
▪ Reduced contaminant discharges from industrial sources ▪ Completed secondary treatment upgrades of mill effluent at Essar Algoma Steel and St. Marys Paper, which are expected to lead to declines in pollution (e.g., resin acids) and improved water quality ▪ Completed field study to compare tumour incidence in White Suckers within the Area of Concern with suitable reference areas (2009)	▪ Analyze collected White Sucker samples for comparison to suitable reference sites ▪ Revise delisting criteria to include measurable targets, and develop the Implementation Annex to identify and evaluate remaining priority actions

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Significant loss of fish and wildlife habitat has occurred as a result of shoreline alteration, industrialization, urbanization and shipping activities, particularly within and immediately above and below the St. Marys rapids. The flow regime resulting from the present operation of the gated, flow-control structure at the head of the rapids has resulted in changes to the biological integrity and productive potential of the remaining rapids habitat. Specific habitats throughout the river are also threatened by colonization of exotic, invasive species.

KEY ACTIONS

COMPLETED	REMAINING
▪ Undertook a range of habitat protection and restoration work, including the addition of spawning habitat to the Big Rapids, creating a buffer strip along the shoreline to prevent livestock access to the St. Marys River, and reducing sedimentation along the Bar River, a major spawning tributary used by Walleye ▪ Completed a wetland inventory for inclusion in the Official Municipal Plan of Sault Ste. Marie, Ontario (2005–2006) ▪ Surveyed river for fish community response to nearshore habitat modification (2003–2004) and assessed fish community using a biotic integrity index (2009)	▪ Revise delisting criteria to include measurable targets and develop Implementation Annex to identify and evaluate remaining priority actions

Restrictions on Dredging Activities

Status: ***Impaired***

Dredging of sediments may be restricted due to elevated levels of PAHs,[4] PCBs, metals, oil and grease and organics in numerous locations, including adjacent to the Algoma slag dump site along the Ontario shore, on both sides of Lake George Channel, in Little Lake George, and in the northern half of Lake George.

KEY ACTIONS

COMPLETED	REMAINING
▪ Reduced contaminant discharges to the river from the steel mill and paper mill through improved treatment following introduction of federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement regulations (MISA) in the mid-1990s ▪ Removed much of the contaminants at the Algoma slip site through maintenance dredging (1995, 2006)	▪ Determine the need for sediment management and, if needed, assess options and implement the preferred option

Restrictions on Fish and Wildlife Consumption

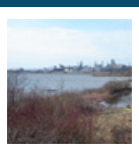
Status: ***Impaired, for fish consumption***

Restricted consumption of Walleye, White Suckers is advised due to elevated levels of mercury and PCBs.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper 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. Marys River ▪ Eliminated all industrial discharges containing mercury ▪ Completed secondary treatment upgrades of mill effluent at Essar Algoma Steel and St. Marys Paper, which are expected to lead to declines in contaminants and improved water quality ▪ Collected fish tissue samples to assess contamination levels (2009)	▪ Assess results of recent sampling studies of Lake Herring and whether the consumption advisories for St. Marys River are due to local sources ▪ Revise delisting criteria to include measurable targets and develop Implementation Annex to identify and evaluate remaining priority actions

[4] *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.



Status – REQUIRES FURTHER ASSESSMENT

Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Requires further assessment***

While a full assessment of bird and animal populations and appropriate reference conditions has not been undertaken, researchers in 1998 identified deformities in three Common Tern chicks.

KEY ACTIONS

COMPLETED	REMAINING
▪ Undertook several waterbird surveys on the St. Marys River in the early 1990s, including for Common and Black Terns and Osprey, that reported no tumours, though results regarding reproduction were not clear	▪ Assess the recommendation in the Stage 2 Remedial Action Plan Report that reproductive assessments of Herring Gulls, Black Terns, and Common Terns should be done within the Area of Concern's boundary and that deformities should be assessed in common terns inhabiting the St. Marys River

FOR MORE INFORMATION

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www.ec.gc.ca/raps-pas

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