St. Clair River

Remedial Action Plan

St. Clair River Area of Concern

Canadian Remedial Action Plan Implementation Committee

2007-2010 Work Plan Summary of Accomplishments





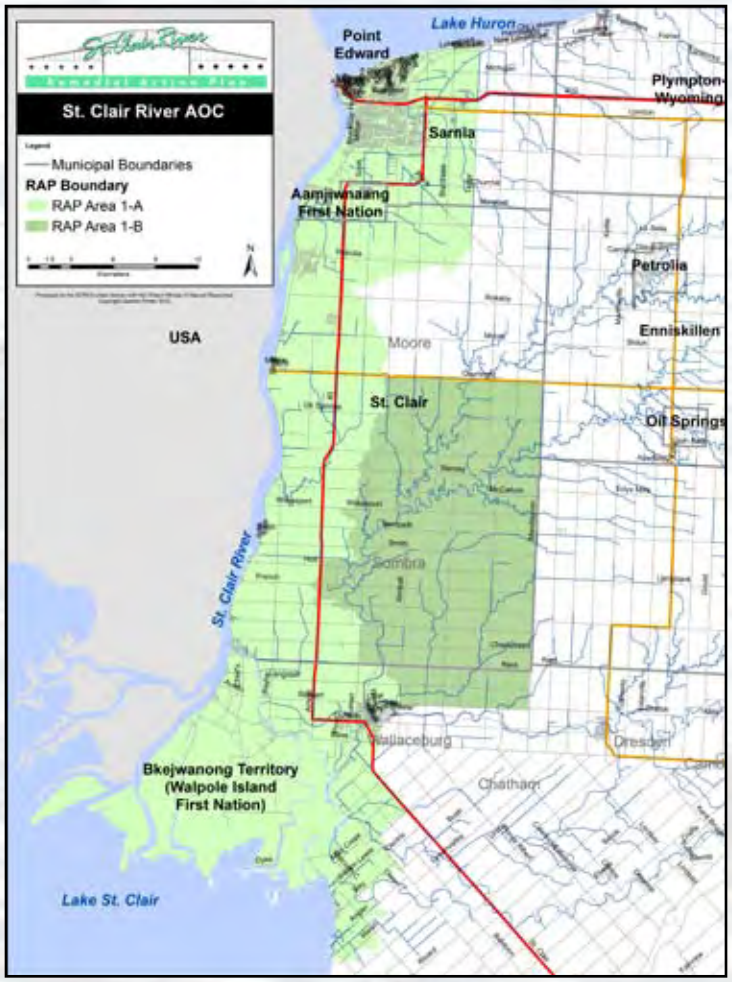
The St. Clair River Area of Concern

The St. Clair River

The St. Clair River flows 64 kilometres connecting Lake Huron and Lake St. Clair. The river provides habitat for many species of fish, birds and mammals and supports a wide variety of recreational activities including fishing, boating and swimming. The main urbanized regions along the St. Clair River shoreline are Sarnia, Ontario, and Port Huron, Michigan; however, the entire area is home to approximately 170,000 residents. The river provides a source of drinking water to nearby communities as well as water for local industry and agriculture.

The Area of Concern

The St. Clair River was identified as an Area of Concern (AOC) in 1987 as a result of an international agreement between the United States and Canada that committed the two countries to rehabilitate and protect water bodies in the Great Lakes Basin. AOCs are sites where the environment has been severely degraded and common uses of the river and natural areas are not possible (also referred to as Beneficial Use Impairments). The St. Clair River was listed as a binational AOC, largely because of the extensive industrial and urban development along its shoreline and the historical release of harmful chemicals and bacteria from chemical plants, refineries, wastewater treatment plants, storm water and agricultural runoff.



The St. Clair River Area of Concern covers an area of 3350 km² (335,000 ha). Urban areas are concentrated in the north end of the river, leading to the downstream movement of harmful contaminants to sensitive regions such as the St. Clair River delta and Walpole Island wetlands.

For over 20 years, US and Canadian government agencies, municipalities, industries, First Nations and community groups have been working to clean up and restore the St. Clair River. A strategy was developed (referred to as a Remedial Action Plan (RAP)) outlining key activities required to rehabilitate the St. Clair River. Restoration activities are put into action by a wide array of partners, all working toward the remediation of the AOC. In celebration of the release of the Canadian 2007-2010 Work Plan Report of Accomplishments, the following pages highlight recent achievements in restoring the St. Clair River. The report listed 114 different activities that would promote the rehabilitation of the St. Clair River; by the end of 2010, over 85% of these activities had been started or completed. The full report is available online at: **www.friendsofstclair.ca**.

Historical inputs of man-made chemicals from the heavily industrialized region of Sarnia, Ontario into the St. Clair River contributed to its designation as an Area of Concern (AOC). Recent improvements in technology, monitoring, and legislation have led to significant decreases in industrial loadings to the river system.

What are Beneficial Use Impairments?

Beneficial Use Impairments (BUIs) are common uses or services supplied by a water body that can no longer be used due to impacts on the local environment. There are 14 recognized BUIs that must be un-impaired before an AOC can be removed from the list of AOCs (referred to as "delisting"). Currently, eight BUIs are designated as impaired in the St. Clair River with three others requiring further assessment to determine status.

The following lists the 14 BUIs and their current status in the St. Clair River AOC:

Restrictions on Fish and Wildlife Consumption – ***Impaired***
Tainting of Fish and Wildlife Flavour – ***Not Impaired***
Degraded Fish and Wildlife Populations – ***Requires Further Assessment***
Fish Tumours or Other Deformities – ***Requires Further Assessment***
Bird or Animal Deformities or Reproductive Problems – ***Requires Further Assessment***
Degradation of Benthos – ***Impaired***
Restrictions on Dredging Activities – ***Impaired***
Eutrophication or Undesirable Algae – ***Not Impaired***
Restrictions on Drinking Water Consumption or Taste and Odour Problems – ***Impaired***
Beach Closings – ***Impaired***
Degradation of Aesthetics – ***Impaired***
Added Costs to Agriculture or Industry – ***Impaired***
Degradation of Phytoplankton and Zooplankton Populations – ***Not Impaired***
Loss of Fish and Wildlife Habitat – ***Impaired***

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Point Source Pollution

Point source pollution refers to easily identifiable sources of contamination such as discharge pipes and drains from industrial facilities or Water Pollution Control Plants. Many of the problems in the St. Clair River stem from the municipal and industrial discharge of contaminants from point sources located adjacent to the river. In particular, historical inputs of metals, bacteria and man-made chemicals led to poor water and sediment quality. In the past, industrial and municipal spills were frequent and contributed to water use restrictions and ecosystem impacts. Since its designation as an AOC, many improvements in technology, legislation, and monitoring have reduced the impact of point source pollution in the St. Clair River.

Spill Prevention and Contingency Plans

In 2008, the Ontario government passed Spill Prevention and Contingency Plan legislation that required industries to review their facilities and treatment processes to reduce spills into water bodies. In recent years, millions of dollars have been spent to prepare plans and improve and upgrade equipment. Additionally, the Ontario Ministry of Environment hands out more severe penalties to those facilities that do not comply with legislation. Since its implementation, only one plant upset has led to the precautionary closing of a drinking water intake along the St. Clair River. It was later determined that the discharge that led to the notification would not have posed a risk to the source of drinking water. This event highlights the precautionary nature of water treatment plant notification and closure procedures on the St. Clair River.

Elimination of Combined Sewer Overflows

Combined sewers are systems that collect both sanitary sewage and stormwater runoff. During periods of heavy rainfall, they can become over filled, leading to overflows of untreated sewage into the river. In 2009, the City of Sarnia eliminated two combined sewer systems from Exmouth and Christina Streets. Monitoring of bacteria along local shorelines has shown marked improvement since their removal, especially in Sarnia Bay.

What is Stormwater Runoff?

Stormwater runoff is when rain or snow falls over land such as sidewalks, roads and driveways and flows to municipal sewer systems or discharges directly into a lake or river. Stormwater runoff can pick up chemicals and other pollutants (such as oil and grease deposited on roads) and transport it untreated into local water bodies that are used for recreation and drinking water.

Contaminated Sediment

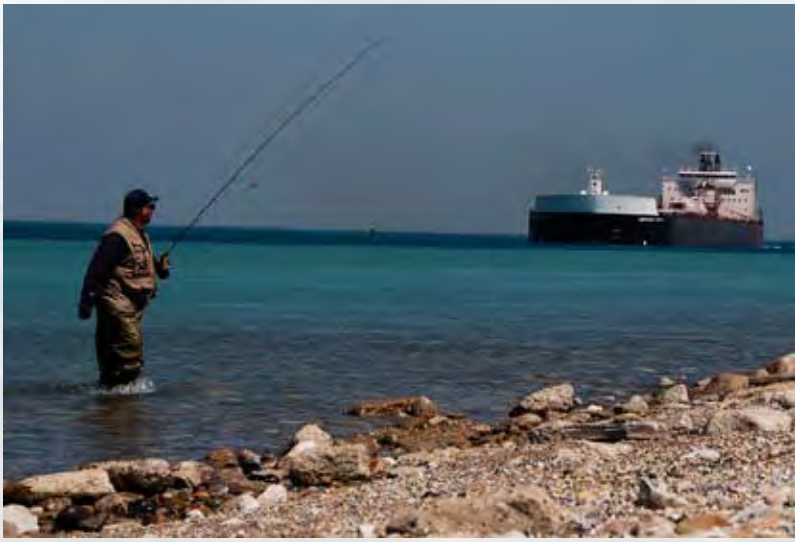
There are three zones of severely contaminated sediments remaining in the St. Clair River. The contamination is attributed to historical discharges and spills of man-made, organic contaminants and mercury in the river system. These pollutants can impact aquatic ecosystem populations and food chains, especially in fish and bottom-dwelling organisms. In 2004, one zone of contaminated sediment was removed from the river by Dow Chemical Canada. Recent work conducted over the last five years has been aimed at developing remediation techniques to address and restore the remaining two zones of contaminated sediment.

The consulting firms ENVIRON, Canadian Seabed Research, and Pollutech EnviroQuatics were hired to conduct the studies required to develop appropriate options to remediate the contaminated sediment in the St. Clair River.

Biomagnification in Fish

Biomagnification is the biological process by which contaminant concentrations increase throughout a food chain. Generally, large sportfish, animals, and humans will have greater contaminant concentrations in their bodies than consumers lower in the food chain.

In 2009, federal and provincial governments assessed possible impacts of the contaminated sediments in the St. Clair River on the surrounding environment. Results of this study suggested that the two remaining zones of contamination had the potential to cause mercury biomagnification in fish. A strategy for rehabilitating the contaminated sediments was recommended.



The biomagnification of contaminants such as mercury in fish limits fish consumption in the St. Clair River. The Ontario Ministry of Environment provides information on restrictions on fish consumption (www.ontario.ca/fishguide).

Sediment Management Options – Which One to Choose?

There are many different ways to address contaminated sediments in rivers. The actions depend on many factors outside of the contamination itself including the amount and type of debris located on the river bottom, water currents, obstacles (e.g., docks), and other activities such as shipping. Since 2009, over $700,000 in studies were done in the St. Clair River to determine which options would be best for rehabilitating the contaminated sediment. Results are expected in late 2012.

Three possibilities for sediment remediation show the greatest promise:

1. **Natural Recovery** – Requiring no action, natural processes reduce the effects of contaminated sediment through decay, biological decomposition or natural burial.
2. **Capping** – Place clean sediment or synthetic cover over contaminated areas to reduce downstream transport and/or to prevent interaction with the water column and aquatic organisms.
3. **Dredging** – The complete removal of contaminated sediment from the river bottom.

Habitat Restoration and Non-point Sources of Pollution

Urban and agricultural development along with non-point sources of pollution, including stormwater runoff, and leachate from landfills and septic systems, have contributed to the loss of fish and wildlife habitat in the St. Clair River AOC. Since 2007, priorities in habitat restoration and protection have focused on shoreline and wetland enhancement and the development of streambank buffers along major tributaries of the St. Clair River.

Completed in 2010, steel sheet wall was replaced along the Guthrie Park shoreline with armour stone and native vegetation, providing habitat for fish, birds and insects. Small mammals, such as muskrat and mink, are already using the easier river access for foraging and hunting.

Adjacent to Marshy Creek, the Port Lambton Lagoons were restored with native vegetation by Rural Lambton Stewardship Network (RLSN) and St. Clair Township and serves as a demonstration and education area for the public.

Through the hard work and commitment of partners and stakeholders and collaborations with private landowners, the protection of fish and wildlife habitat has been enhanced.

Major successes include:

- 280 hectares (an area equal to 523 football fields) of wildlife habitat was restored (over 105 individual wetland, tallgrass prairie and tree planting projects);
- 29 kilometres of riparian buffer habitat was created along tributaries of the St. Clair River;
- The Prairie Passage along Highway 40 was expanded by 28 hectares; and
- Biological connectivity between the St. Clair River and the north branch of the Sydenham River was improved.

The Highway 40 Prairie Passage

The Prairie Passage is a north-south wildlife corridor, connecting three regionally significant wildlife anchor areas; the Walpole Island First Nation (WIFN) wetlands, the Bickford Oak Woods, and the AFN forest. The project is supported by the collaboration between the RLSN, the Ontario Ministry of Transportation and St. Clair Township.

Research and Monitoring

Rehabilitating and re-designating BUIs are the fundamental objectives of the restoration and remedial actions occurring in the St. Clair River AOC. All BUIs must be "not impaired" to delist the St. Clair River as an AOC in the Great Lakes Basin. We now have a better understanding of what is needed to re-designate the remaining BUIs and fulfil the requirements outlined in their delisting criteria. The last year alone has seen the promotion of one BUI and the official re-designation of another. In addition, major progress has been made in meeting the criteria of several other BUIs.

The Tainting of Fish and Wildlife Flavour BUI was officially re-designated as "not impaired" on August 26, 2011. The re-designation was promoted after a survey of community members in the St. Clair River AOC found that 95% of the respondents felt that St. Clair River fish taste was no different than that found in non-AOC areas. The official re-designation of the Added Cost to Agriculture and Industry BUI is expected in 2012.

Studies were conducted between 2006 and 2007, and again in 2011 on deformity rates in frogs on Walpole Island. This information will be used to assess the status of the "Bird or Animal Deformities or Other Reproductive Problems" BUI within the St. Clair River AOC.

Recent activities have found that:

- Many river users believe the appearance of the St. Clair River has drastically improved since the AOC was listed in 1987;
- *E. coli* levels along shoreline beaches and parks indicate that generally, these areas are safe for recreational use during dry weather;
- No tumours related to contamination have been observed in fish; and
- Organic contaminant concentrations in sediments have decreased in the most heavily impacted region of the St. Clair River.

What are delisting criteria?

Delisting criteria are unique guidelines developed for each AOC that outline the level of remediation required for a BUI to be considered restored. Once the criteria for each BUI are met, an endorsement can be made to "delist" an AOC from the list of AOCs in the Great Lakes Basin.

In 2010, delisting criteria for the St. Clair River AOC were reviewed and revised where necessary to reflect environmental, legislative, and scientific changes that occurred since their development in 1995. The purpose of the review was to ensure they were current, achievable, and measurable in the present environment. The new criteria will provide direction and focus in future restoration initiatives and be used to determine if the St. Clair River should be recommended for "delisting."

Public Outreach and Education

Public outreach and education is an important component in progressing towards the restoration of the St. Clair River as it engages and involves the local communities. Many government, First Nations, and non-profit organizations have worked together to provide the public educational opportunities about the St. Clair River AOC and the environment. Public involvement plays a key role in the RAP process of the St. Clair River.

Claude Lafrance, the St. Clair River RAP Coordinator, attends the 2011 Aamjiwnaang First Nation Pow Wow to provide information to community members on the St. Clair River AOC and recent restoration efforts and progress.

Young turtles (or hatchlings) released into a wetland on Walpole Island.

A locally produced "RAP" video by youth in the area proved to be a very well-received and excellent tool for engaging younger generations in St. Clair River AOC initiatives and environmental science in general.

Who are Friends of the St. Clair River?

Friends of the St. Clair River (FOSCR) is a community group of volunteers dedicated to promote the conservation and remediation of the St. Clair River. In addition to raising funds needed to support the implementation of remedial activities associated with the RAP, the group provides information on the most recent advancements in BUI status re-designation, events, and education opportunities. For more information, to get involved, or to subscribe to their E-newsletter, visit www.friendsofstclair.ca.

The charitable community group, Friends of the St. Clair River (FOSCR) has held two very successful photo contests in 2006 and 2011. Hundreds of photos were uploaded onto their website highlighting the natural beauty and activities enjoyed by users of the river.

St. Clair River AOC Partners

- Aamjiwnaang First Nation
- Binational Public Advisory Council
- Canadian Wildlife Service
- Department of Fisheries and Oceans
- City of Sarnia
- Environment Canada
- Lambton County
- Municipality of Chatham-Kent
- Ontario Ministry of Agriculture, Food and Rural Affairs
- Ontario Ministry of Environment
- Ontario Ministry of Transportation
- Rural Lambton Stewardship Network
- Sarnia-Lambton Environmental Association
- St. Clair Region Conservation Authority
- St. Clair Township
- Walpole Island First Nation

Helpful Links

There are many information sources on the St. Clair River, AOCs, and the Great Lakes Basin. The following are just a few of the online resources available from our partners:

St. Clair Region Conservation Authority – www.scrca.on.ca/sediment/

International Joint Commission – www.ijc.org

Environment Canada – www.ec.gc.ca/raps-pas/

Ontario Ministry of the Environment – www.ene.gov.on.ca/environment/en/subject/great_lakes

Friends of the St. Clair River – www.friendsofstclair.ca

Great Lakes Institute for Environmental Research – www.uwindsor.ca/glier

Ontario Ministry of Natural Resources – www.mnr.gov.on.ca/en/Business/GreatLakes

Ontario Ministry of Agriculture, Food and Rural Affairs – www.omfra.gov.on.ca/english/environment/coa/summary-index.htm

International Association for Great Lakes Research – www.iaglr.org

Highlights of Who Monitors What in the St. Clair River AOC

Ontario Ministry of Environment – Municipal and industrial discharges and spills, water quality, waste disposal, spill prevention and contingency plans, air emissions and ambient air quality, many other sources of air, water and land contamination

Environment Canada – Water Quality and quantity, coastal wetland habitat, migratory bird populations and rare wildlife (Species at Risk), and wildlife toxicology

Ontario Ministry of Natural Resources – Fish and wildlife populations, contaminant concentrations in fish (with OMOE), aquatic invasive species, species at risk, wildlife habitat.

Sarnia-Lambton Environmental Association – Air and water quality monitoring stations in Sarnia area

County of Lambton and Chatham-Kent Health Units – Beach monitoring of *E. coli* levels

St. Clair Region Conservation Authority – Stream and watershed health, water quality, aquatic ecosystems

Department of Fisheries and Oceans – Fish community, populations and habitat

What you can do to help

1. Get involved!

- Join an environmental community group.
- Take part in environmental initiatives and events in your area.
- Keep yourself informed through webpage updates and newsletters.
- Pass the word along to others and let them know how important the St. Clair River is and what they can do to help.

2. Keep streambanks natural

- Streambank habitat (or riparian buffers) not only provide habitat for wildlife; the vegetation works as a filter, catching unwanted chemicals and debris from entering the water system.

3. Reduce your water use by:

- Installing a rain barrel – A rain barrel collects rain for use on your gardens, lawns, and flower pots (as opposed to using water from a hose). It reduces runoff and the transport of unwanted chemicals or debris into our river and lake systems.
- Keeping a pitcher of water in the fridge – Drinking water will get cold in the fridge, reducing the need to have water running from taps and straight into the drain.

Photos were provided by the St. Clair Region Conservation Authority, and as listed below:
Photo credits (in order of appearance):

Girl hugging lighthouse - Sigourney Ekanger, St. Clair, MI
Tubing - Julie Fisher, Sarnia, ON
Gull with fish - Linda McCormick, Sarnia, ON
People gathering along the shore - Dorothy Alexander, Sarnia, ON
Fisherman and ship - Peter DeBurger, Port Lambton, ON
Boats on water - Colin Ward, Sarnia, ON
Wading feet - Chris Durand, London, ON
Ducks - Sharon Nethercott, Sarnia, ON
Sunset - Dolores Kahue, Chatham, ON
Two people looking at bridge - Michelle Rondeau, Sarnia, ON
Four kids holding hands - Brenda Lewis, Marine City, MI
Mink - Randy Heath, Marysville, MI
Boy surfing - Laura White, Port Huron, MI
Red flowers in forefront of bridge - Sonia Fox, Sarnia, ON
Boy feeding ducks - Michelle Rondeau, Sarnia, ON
Beach - Tonya Wirgau, Algonac, MI




Did You Know?

The St. Clair River:

- Is one of the 43 Areas of Concern originally identified in the Great Lakes Basin;
- Has a drainage area of approximately 576,000 km^2 (or over 50 million professional soccer fields);
- Has an average flow rate of 5200 m^3/s (equivalent to 19,000 filled bathtubs per second);
- Contains the only delta in the Great Lakes Basin (the delta also represents the largest freshwater delta in North America);
- Is home to one of the most important wetland systems in the Great Lakes Basin, located on Walpole Island;
- Is connected to the Atlantic Ocean – water flowing through the St. Clair River will eventually reach the Atlantic Ocean via the St. Lawrence River;
- Has six shipwrecks located in the waters beneath the Bluewater Bridge;
- Maintains 40% of the total number of fish species known in Ontario (77 individual species); and
- Is home to a number of federally recognized Species at Risk (SARs) including the Eastern Foxsnake, Butler's Gartersnake and Five-lined Skink.

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