

Status Report and Strategic Plan

St. Marys River Area of Concern

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Prepared by:

Lisa Derickx

St. Marys River Remedial Action Plan Coordinator
Algoma University

Executive Summary

The purpose of this document is to provide an update on the status of the St. Marys River Area of Concern and activities completed on the Canadian side that have contributed to its improved state. To be updated on a regular basis, it also outlines a rolling five-year plan to undertake activities needed to address the remaining environmental impairments and move the Area of Concern toward restoration and delisting for the Canadian side.

The St. Marys River is one of 43 Great Lakes Areas of Concern (AOCs) identified under the *Canada-U.S. Great Lakes Water Quality Agreement*. The binational agreement affirms the commitment to develop and implement Remedial Action Plans (RAPs) – using a systemic and comprehensive ecosystem approach – to restore environmental conditions in AOCs.

Under Annex 5 of the updated *Canada Ontario Agreement on Great Lakes Water Quality and Ecosystem Health* that came into effect in June 2021, the federal and provincial governments have committed to, “Continue to implement actions required to achieve delisting criteria and restore the six beneficial uses that remain impaired in the St. Marys River AOC: Restrictions on Fish and Wildlife Consumption, Degradation of Fish and Wildlife Populations, Fish Tumours or Other Deformities, Degradation of Benthos, Restrictions on Dredging Activities, and Loss of Fish and Wildlife Habitat.”

Over the history of the AOCs program, the first phase of the St. Marys River RAP identified the environmental problems and sources of pollution within the AOC; the findings of which are outlined in the 1992 Stage 1 RAP report. During the second phase, over 50 remedial actions and monitoring initiatives were identified to help restore the environment by focusing on the AOC’s Beneficial Use Impairments (BUIs). These are presented in the 2002 Stage 2 RAP report.

Of the 14 possible BUIs identified under the *Canada- U.S. Great Lakes Water Quality Agreement*, nine were originally deemed impaired for the St. Marys River AOC, and one required further assessment. Since then four BUI’s have were redesignated to not-impaired (One in 2024 and three in 2018) and the one BUI *requiring further assessment* was found to be not impaired in 2016. Currently there are five impaired BUIs on the Canadian side of the St. Marys River.



Figure 1: View of the St. Marys River at Bell's Point
(Photo Credit: L. Derickx)

Table 2: Current status of Beneficial Use Impairments in the St. Marys River Area of Concern

Beneficial Use Impairment (BUI)	Canada	United States
Restrictions on Fish Consumption	Impaired	Impaired
Degradation of Fish and Wildlife Populations	Not Impaired (2024)	Not Impaired (2019)
Fish Tumours or Other Deformities	Impaired	Impaired
Bird and Animal Deformities or Reproductive Problems	Not Impaired (2015)	Not Impaired (2014)
Degradation of Benthos	Impaired	Impaired
Restrictions on Dredging Activities	Impaired*	Not Impaired (2018)
Eutrophication or Undesirable Algae	Not Impaired (2018)	Not Impaired (2017)
Beach Closings	Not Impaired (2018)	Not Impaired (2016)
Degradation of Aesthetics	Not Impaired (2018)	Not Impaired (2014)
Loss of Fish and Wildlife Habitat	Impaired	Not Impaired (2019)

*Recommendation to redesignate to “not impaired” status currently underway

List of Acronyms

AOC – Area of Concern

BEAST – Benthic Assessment of Sediment

BPAC – Binational Public Advisory Council

BUI – Beneficial Use Impairment

COA – Canada Ontario Agreement on Great Lakes Water Quality and Ecosystem Health

CSM – Conceptual Site Model (related to contaminated sediment)

ECCC – Environment and Climate Change Canada

EEWWTP – East End Wastewater Treatment Plant (in Sault Ste. Marie, Ontario)

EGLE – Michigan Department of Environment, Great Lakes and Energy

IBI – Index of Biotic Integrity (related to fish community health)

IJC – International Joint Commission

MECP – Ministry of the Environment, Conservation and Parks

RAP – Remedial Action Plan

SMRFTG – St. Marys River Fisheries Task Group

USEPA – United States Environmental Protection Agency

Table Of Contents

Executive Summary	1
List of Acronyms	3
Table Of Contents	4
1.0 Introduction	5
1.1 The St. Marys River	5
1.2 The St. Marys River Area of Concern	7
1.3 Remedial Action Plan	9
1.4 Community Involvement	10
2.0 Beneficial Use Impairments	10
2.1 Current Status.....	10
2.2 Summary of Beneficial Use Impairments.....	12
2.2.1 Re-designated Beneficial Use Impairments	12
(i) Degradation of Fish and Wildlife Populations (BUI #3)	12
(ii) Bird and Animal Deformities or Reproductive Problems (BUI #5)	15
(iii) Eutrophication or Undesirable Algae (BUI #8).....	16
(iv) Beach Closings (BUI #10).....	17
(v) Degradation of Aesthetics (BUI #11)	19
2.2.3 Remaining Beneficial Use Impairments	21
(i) Restrictions on Fish and Wildlife Consumption (BUI #1)	21
(iii) Fish Tumours or Other Deformities (BUI #4)	23
(iv) Degradation of Benthos (BUI #6)	24
(v) Restrictions on Dredging Activities (BUI #7)	27
(vi) Loss of Fish and Wildlife Habitat (BUI #14).....	29
Loss of Fish Habitat	29
Loss of Wildlife Habitat	31
3.0 Remaining Stage 2 Actions.....	33
3.1 Action NPS-1: Development of a multi-agency sediment management plan.....	33
3.3 Action NPS-5: Evaluation of Algoma Slip sediment and implementation of clean-up	35
3.4 Action FF-2 & FF-3: Watershed development plans for Bennett, West Davignon, East Davignon and Fort Creeks	37
3.6 Action FF-6: Remediation of rapids habitat and associated wetlands	37
.....	38
3.7 Action NPSM4: Task team monitoring recommendations.....	38
3.8 Action NPSM-5: Re-sampling of river sediments to obtain trend information.....	39
3.9 Action FFM-4: The fish contaminant monitoring programs	40
3.10 Action FFM-7: Monitoring of population changes due to habitat enhancement	40
4.0 Work Plan to Address Remaining BUIs	41
5.0 Recommendations for Future Initiatives and Actions.....	0
6.0 References.....	1
7.0 Appendix	0

1.0 Introduction

In order to make progress towards restoring environmental conditions in the St. Marys River and moving toward delisting it as an Area of Concern (AOC), it is critical to evaluate work completed and identify work remaining under the St. Marys River Remedial Action Plan (RAP). The St. Marys River is one of 5 binational AOCs. This Status Report and Strategic Plan outlines remaining remedial and monitoring actions required to re-designate the remaining beneficial use impairments (BUIs) and achieve delisting on the Canadian side of the AOC. It will also help gain appreciation for the RAP's past successful initiatives and accomplishments, and help inform the community about the RAP's current status and planned/future initiatives.

1.1 The St. Marys River

The St. Marys River is a 112km waterway dividing the twin cities of Sault Ste. Marie in Ontario and Michigan. The river is a connecting channel, with outflows from Lake Superior and flows into Lake Huron. As a shipping route for large vessels, it is an important part of the Great Lakes – St. Lawrence Seaway.

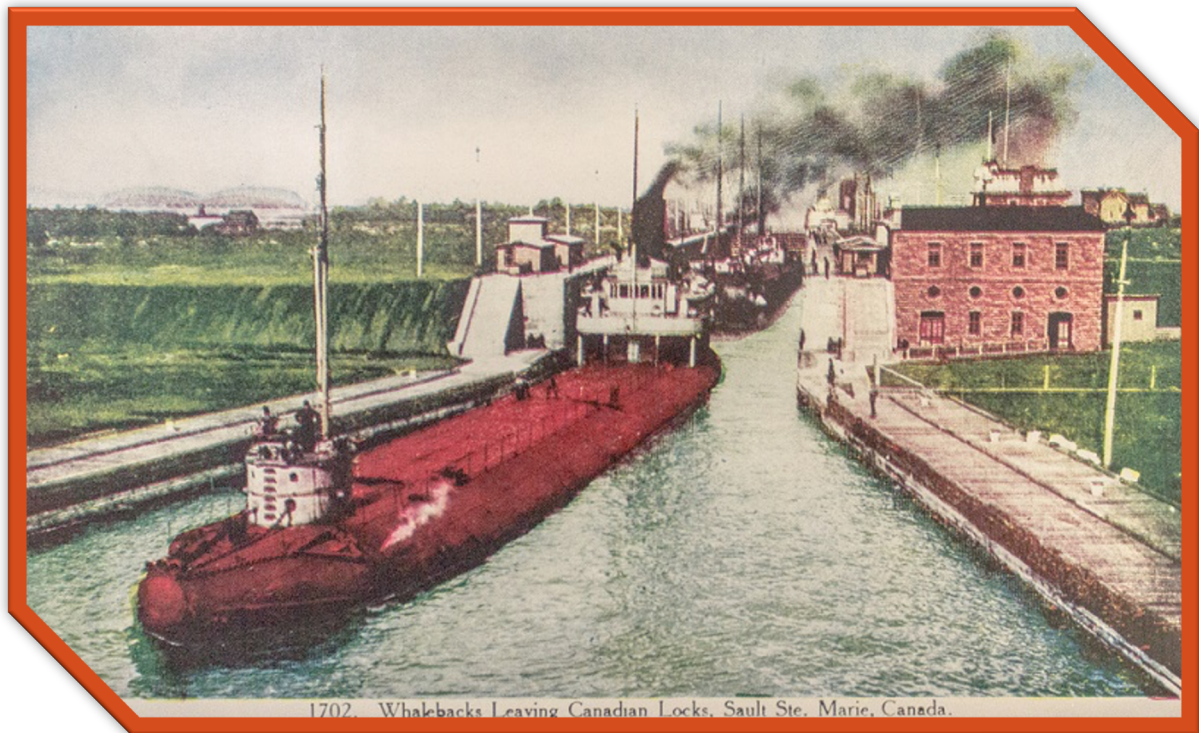


Figure 3: Vessels leaving the Canadian Locks in Sault Ste. Marie, Canada (Image Courtesy of the Sault Ste. Marie Museum).

The river is heavily industrialized and urbanized around the rapids at the twin Saults. Figure 3 shows an aerial view of Sault Ste. Marie, Ontario's industry back in 1958. Access to the waterfront has been preserved, and since the time of the photograph, the waterfront has been made more recreationally friendly with projects such as the construction of the waterfront boardwalk. This boardwalk is located along the St. Marys River and is situated in the downtown area of Sault Ste. Marie (City of SSM, 2019). Residents and tourists can enjoy the river by using the shoreline boardwalk or taking a nature hike at Batchewana First Nation's Whitefish Island. Communities downriver, which include Garden River First Nation, Echo Bay, Laird and Richards Landing are smaller and have had less of an impact on the shoreline.

The St. Marys Rapids is a productive habitat for fish and an important sport fishery. Fishing the rapids has always been a vital source of food for Indigenous peoples. The area is called Baawitigong, which means "place of the rapids" (NORDIK, 2017). The rapids are located downstream of the compensating works, a headed dam at the gate of the rapids, which control the outflow of water from Lake Superior (IJC, 2019) in combination with navigational canals with locks and three hydroelectric facilities.



Figure 4: Aerial view of Sault Ste. Marie in 1958 (Image Courtesy of the Sault Ste. Marie Museum).

1.2 The St. Marys River Area of Concern

In the 1987 Protocol to the *Canada-U.S. Great Lakes Water Quality Agreement*, the two nations recognized 43 AOCs in the Great Lakes Basin; including the St. Marys River. The agreement was renewed in 2012. As part of this agreement, RAPs are developed to identify and restore environmental impairments in these areas. An Area of Concern, or AOC, is the term used to identify hotspots on the Great Lakes where the environment has been harmed to the point that it affects the use and enjoyment of that area or the overall health of the lake or river (Canada, 2019).

Historically, pollution from industrial sources, such as effluents from the pulp and paper mill (closed in 2011) and steel production, insufficiently treated municipal and private sewage, and contaminated stormwater runoff from the surrounding watershed had contributed to the degradation of the water quality in the St. Marys River. While inputs of pollution into the river have been significantly reduced, the legacy of environmentally harmful activities has left environmental impairments, particularly on fish and their habitat, and contaminants within the sediment on the river bottom (Stage 2 RAP, 2002).



Figure 5: Historical Photograph of Algoma Steel in 1952 (Image Courtesy of the Sault Ste. Marie Museum).

The Canadian portion of the St. Marys River AOC stretches from Gros Cap, at the mouth of Whitefish Bay and runs downstream into two channels that partially encompass St. Joseph Island at Humbug Point to the north and Hay Point to the south (Figure 5).

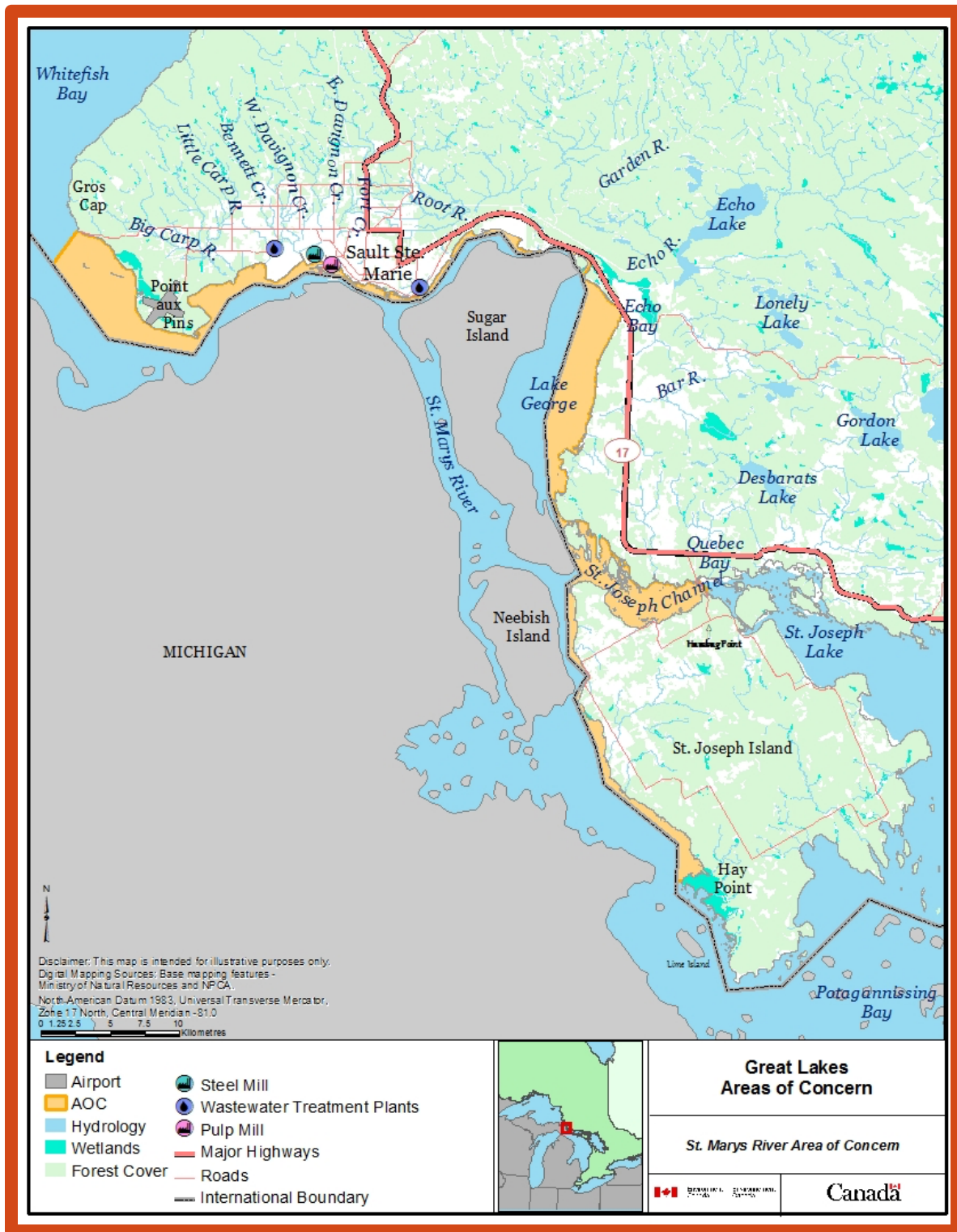


Figure 6: The Canadian portion of the St. Marys River Area of Concern

1.3 Remedial Action Plan

The Stage 1 RAP report for the St. Marys River was completed in 1992, and it provides a summary of environmental conditions and impairments that existed in the early years of the AOC. Based on study data collected in the 1980s and early 1990s, it identified the sources of contaminants and activities that had caused the impairment of beneficial uses. A beneficial use impairment (BUI) is a detrimental change in the chemical, physical or biological integrity in the Great Lakes system. BUIs are used as a framework for directing remediation and monitoring efforts in AOCs.

The Stage 2 RAP report was completed in 2002, and it outlined the strategy to remediate the impaired beneficial uses identified under the Stage 1 RAP report, and defined an original set of BUI delisting criteria to measure progress towards re-designating the BUIs. Delisting criteria are specific targets that measure restoration as it relates to recovery and improvement of the individual BUIs. For “impaired” BUIs to be re-designated to “not impaired”, the delisting criterion developed specifically for the BUI must be met.

The BUI delisting criteria have since been revised to reflect current science and approaches to evaluate ecosystem health. Delisting criteria that are broad, subjective, or immeasurable make the assessment of ecosystem health difficult. Therefore, in an effort to define meaningful targets, the delisting criteria now follow the “SMART test”, meaning that they are Specific, Measurable, Achievable, Relevant, and Time-oriented. The delisting criteria for BUIs on the Canadian side of the AOC were updated in 2015, with the exception of the *Degradation of Benthos* delisting criteria, which was updated in 2020.

Given that the St. Marys River is a binational AOC, both Canada and the United States helped to develop the Stage 1 and Stage 2 RAP reports. Although both countries share information and meet regularly to discuss matters of interest (e.g., Four Agency Managers Working Group), implementation of RAP activities are done domestically within each country. The Status Report and Strategic Plan provides an update on the status of the St. Marys River Area of Concern and activities completed on the Canadian side that have contributed to its improved state. It also outlines the remaining activities needed to address the remaining environmental impairments and move the Area of Concern toward restoration and delisting for the Canadian side. a BUI status table for each country can be found on page 2.

Over 50 recommended remedial and monitoring actions were included in the Stage 2 RAP report to help restore the beneficial uses in the St. Marys River AOC. It should be noted that this document matches the format used in the Stage 2 RAP report so that easy tracking and comparisons can be made. The following table summarizes the acronyms used to describe the different remedial and monitoring actions.

Table 1: Acronyms used in the Stage 2 RAP for remedial and monitoring actions

PS	Point source related actions
NPS	Non-point source related actions
PSM	Point source monitoring actions
NPSM	Non-point source monitoring actions
FF	Flora and fauna related actions
FFM	Flora and fauna monitoring actions

1.4 Community Involvement

The St. Marys River Binational Public Advisory Council (BPAC) was created in November 1988 to advise and assist government agencies responsible for preparing and implementing the RAP for the AOC. As a multi-stakeholder group, BPAC members include residents and property owners, US Tribes, elected officials, health units, municipal staff, and university staff from both Canada and the United States. First Nations and Métis have been invited to participate on the BPAC, but the stated preference is for direct, one-on-one engagement. BPAC serves an important forum for community engagement by informing the responsible agencies about local opinions and perspectives on AOC/RAP related matters.

2.0 Beneficial Use Impairments

2.1 Current Status

When the St. Marys River was originally designated an AOC, 9 of the 14 beneficial use impairments defined by the *Great Lakes Water Quality Agreement* were identified as “impaired” for both sides of the river, and one required further assessment. There has been improved water quality and ecosystem health, leading to several BUIs being re-designated not impaired for the Canadian side of the AOC (Table 2).

Table 2: Status of Beneficial Use Impairments for the St. Marys River AOC

Beneficial Use Impairment (BUI)	Original Status (1992)	Current Status (2022)
Restrictions on Fish Consumption	Impaired	Impaired
Tainting of Fish and Wildlife Flavour	Not Impaired	Not Impaired
Degradation of Fish and Wildlife Populations	Impaired	Not Impaired (2024)
Fish Tumours or Other Deformities	Impaired	Impaired
Bird and Animal Deformities or Reproductive problems	Impaired	Not Impaired (2016)
Degradation of Benthos	Impaired	Impaired
Restrictions on Dredging Activities	Impaired	Impaired (Change to Not Impaired recommended)
Eutrophication or Undesirable Algae	Impaired	Not Impaired (2018)
Restrictions on Drinking Water Consumption or Taste and Odour Problems	Not Impaired	Not Impaired
Beach Closings	Impaired	Not Impaired (2018)
Degradation of Aesthetics	Impaired	Not Impaired (2018)
Added Cost of Agriculture and Industry	Not Impaired	Not Impaired
Degradation of Phytoplankton and Zooplankton	Not Impaired	Not Impaired
Loss of Fish and Wildlife Habitat	Impaired	Impaired

2.2 Summary of Beneficial Use Impairments

2.2.1 Re-designated Beneficial Use Impairments

(i) Degradation of Fish and Wildlife Populations (BUI #3)

Status: Re-designated to Not Impaired in January 2024

Delisting Criteria: *This beneficial use will no longer be impaired when the overall fish community health within the Area of Concern is comparable to that of a suitable reference site, as assessed using an index of biotic integrity through a minimum of two consecutive studies.*

Background:

Fish: For the St. Marys River AOC, the concern raised in the Stage 1 and 2 RAP reports outlined that native fish populations were being stressed by habitat alteration, over-fishing, pollution, and invasive species. This BUI is based on fish population dynamics and assessed whether local environmental conditions support healthy, self-sustaining communities of fish.

In 2009, DFO (Pratt & O'Connor, 2011) compared the status of communities from four distinct areas of the river including the upper river above the compensating works, the main river, Lake George and the lower river. They provided an overall assessment of the fish community using an index of biotic integrity (IBI) approach. An IBI is a scientific tool used to identify and classify faunal communities. Several matrices are used to provide an overall assessment of fish community including mortality rates, age-class structure, survival to spawning age, reproductive success, total biomass, productivity, richness, assemblage, and abundance. The study concluded that the overall health of the St. Marys River fish community compared favourably with healthy reference sites from Lake Huron.

In 2014, DFO (O'Connor & Pratt, 2017) initiated a follow-up 2-year survey that again used the IBI approach called for in the BUI delisting criteria, and relied on the Mississagi River near the North Channel as the reference site. Key findings from this study include:

- Using the Great Lakes scoring system, the overall IBI score for the St. Marys River AOC is 60.3 which borders between fair (>41 -60) and good (>61-80).
- A small decline in IBI was observed between 2006-2009 and 2014-2015. The lower IBI scores can be attributed to more generalist species, lower percent piscivorous community, and lower biomass. However, these are expected and reflective of a cold-water, lower productivity, riverine environment such as the St. Marys River.
- The St. Marys River maintains a native fish community that is complex, diverse, and healthy.

Together, these studies directly answer the BUI delisting criteria and present a case for not impaired status, because: fish community health was assessed using an index of biotic integrity approach and in these two consecutive studies the health of the AOC fish community was found to be comparable to suitable reference sites.

Wildlife: The wildlife portion of the *Degradation of Fish and Wildlife Populations* BUI was designated as “requires further assessment” in the Stage 2 RAP report (2002) due to a lack of assessment and documentation indicating impairment, or not. However, there was an assumption at the time that habitat loss and chemical contaminants could be having a negative impact on wildlife populations.

In 2014, ECCC completed a wildlife population assessment for common terns and black terns based on nest count surveys conducted between 2010 and 2013, supplemented with historical breeding data from 1978-80, 1989, 1999-00, and 2007-08 (Hughes et al. 2014). Population trends for colonial waterbirds breeding on the North Channel of Lake Huron were included to provide a broader context of trends in diversity and abundance within the AOC. The study concluded common terns and black terns are breeding within the AOC, that there is no evidence that breeding status within the AOC differs from that outside of AOC, and that nesting and population patterns are influenced by life history strategies of the species and factors that are regional or basin-wide in nature, and not specific to influences within the AOC.

In parallel to the above-mentioned assessment of common tern and black tern populations within the AOC, in 2014, ECCC also completed its three-year common tern and herring gull study based on fieldwork and laboratory analysis to assess deformities, reproductive health, and chemical contamination in eggs of these indicator species. The report concludes that there is no evidence of impaired reproduction or deformities in colonial waterbirds attributable to local contamination effects within the AOC, and the reproductive success for birds studied within the AOC is similar to that from outside the AOC.

The BUI Status Report serves as an official record to account and recommend a change in status, on the Canadian side of the St. Marys River AOC, of the *Degradation of Fish and Wildlife Populations* BUI to “Not Impaired”. The re-designation is supported by studies that address the Stage 2 RAP recommended actions on fish and wildlife and that showcase how the delisting criteria have been met.

Supporting Reports:

Status of the Degradation of Fish and Wildlife Populations Beneficial Use Impairment (2023). St. Marys River Area of Concern (Canadian Section). Algoma University. 205 pp. Available here: http://bpac.algomau.ca/wp-content/uploads/2024/04/SMR_Fish-and-Wildlife-Populations_FINAL_JULY-2023.pdf

Table 3: Completed Actions for Degradation of Fish and Wildlife Populations (BUI #3)

Remedial Actions and Monitoring Initiatives		Status
PS-1	Virtual elimination of all persistent and bioaccumulative contaminants	Ongoing
NPS-1	Development of a multi-agency sediment management plan	Drafted
NPS-4	Identification and control of contaminants from the Algoma Slag Dump	Completed in 2010
NPS-7	Remediation of contaminated terrestrial and aquatic disposal sites	Addressed
FF-7	Develop a 10 year Fisheries Assessment Program for the river	Completed in 2002
FF-8	Continued support for Sea Lamprey control efforts	Addressed
FFM-3	The fish harvest survey	Completed in 2019
FFM-5	The CWS surveys of the Common and Black Tern populations	Completed in 2014
FFM-6	Analysis of contaminant levels in eggs	Completed in 2014
FFM-7	Monitoring of population changes due to habitat enhancement	Pending
PSM-6	Monitoring receiving water at St. Marys Paper	No Longer Applicable
PSM-8	Monitoring study of contaminant discharges from wastewater treatment plants	Addressed
NPSM-2	Aerial monitoring of Cannelton Industries site	Not Applicable – Michigan Action
NPSM-3	Biological monitoring at the Cannelton Industries site	Not Applicable – Michigan Action
NPSM-9	Identify terrestrial and aquatic disposal sites transferring contaminants into waterways	Addressed
NPSM-11	Assess the potential hazards associated with spills from shipping vessels	Completed in 2013

(ii) Bird and Animal Deformities or Reproductive Problems (BUI #5)

Status: Re-designated to Not Impaired January 2016

Delisting Criteria: Delisting criteria were not required, as this BUI was designated as “requires further assessment” in the Stage 2 report

Background: *Bird and Animal Deformities or Reproductive Problems* was designated as “requires further assessment” in the Stage 2 RAP report (2002). No deformities were noted in wildlife along the St. Marys River other than three cross-bill common tern chicks observed on Lime Island in 1998. Due to the fact that a full assessment of bird and animal populations had not been conducted at the time of the creation of the Stage 2 RAP report, it was deemed that further studies were required to determine its status.

Reason for Re-designation: The official re-designation to “not impaired” is based on four years of study by Environment and Climate Change Canada’s (ECCC’s) Ecotoxicology and Wildlife Health Division. The assessment report (2014) concluded that there is no evidence of impairment in colonial water birds attributable to local contamination effects within the AOC, and the reproductive success for birds studied within the AOC is similar to that from outside the AOC. Key findings include:

- No physical deformities detected in herring gull or common tern chicks or adults.
- Low incidence of embryonic deformities that cannot be linked to contaminant burdens or to geographical area (i.e., there is no significant difference between AOC and non-AOC bird colonies).
- Contaminant levels are low overall, and not sufficiently elevated to have an adverse impact on reproductive success and development. This is the case for polychlorinated biphenyls (PCBs) and other organochlorines, dioxins/furans, heavy metals like mercury, and polybrominated diphenyl ethers (PBDEs).
- Reproductive success for herring gulls within the AOC is high, and that of the common tern is similar to the rest of the region.

Supporting Reports:

Chambers, M., K. Hughes, D. Crump, K. Williams, and P. Martin. 2014. Beneficial Use Impairment Redesignation: *Bird and Animal Deformities or Reproductive Problems*. St. Marys River Area of Concern (Canadian Section). Environment Canada. 41 pp. Available here: <http://bpac.algomau.ca/wp-content/uploads/2015/09/BUI-Redesignation-Report-SMR-Bird-Animal-Deformities-Dec-12-2014.pdf>

Table 4: Completed Actions for Bird and Animal Deformities or Reproductive Problems (BUI #5)

Remedial Actions and Monitoring Initiatives		Status
FFM-5	The CWS surveys of the Common and Black Tern populations	Completed in 2014
FFM-6	Analysis of contaminant levels in eggs	Completed in 2014
FFM-8	Reproductive assessment of gulls and terns	Completed in 2014

(iii) Eutrophication or Undesirable Algae (BUI #8)

Status: Re-designated to Not Impaired October 2018

Delisting Criteria: *This beneficial use will no longer be impaired when comprehensive tests of the Area of Concern's water quality demonstrate the river is free from persistent or reoccurring problems associated with oxygen stress (eutrophication) and large algal blooms, as determined through a comparison to established guidelines for the relevant physical and chemical parameters.*

Background: *Eutrophication or Undesirable Algae* was identified "impaired" in both the Stage 1 RAP (1992) and Stage 2 RAP (2002) reports. The Stage 1 report identified localized impairments due to the presence of algae floating over slow-moving portions of the river and within embayments. Large algal mats were reported floating downstream of the East End Wastewater Treatment Plant (EEWTP). At the time of the Stage 2 RAP report, eutrophication and algae continued to be an issue in the vicinity of the EEWTP.



Figure 7: Algae growing on a rock.

Reason for Re-designation:

The official re-designation to "not impaired" is based on a three-year water quality monitoring study by Algoma University (2016). Analysis of the monitoring data concludes that there was no evidence of oxygen stress, large quantities of algae, or high levels of nutrients typically found in culturally-eutrophic waters and that conditions that originally led to the beneficial use being designated as "impaired" no longer exist.

Supporting Reports:

SMR RAP Team, 2018. *Degradation of Aesthetics and Eutrophication or Undesirable Algae*: Recommendation to designate these Beneficial Use Impairments as Not Impaired for the St. Marys River Area of Concern (Canadian section). Available here:

http://bpac.algomau.ca/wp-content/uploads/2016/09/Water-Quality-Technical-Report-2013-15_Aug-2016.pdf

Table 5: Completed Actions for *Eutrophication or Undesirable Algae* (BUI #8)

Remedial Actions and Monitoring Initiatives		Status
PS-3	Upgrade EEWWTP to secondary treatment	Completed in 2006
NPS-6	Control of agricultural and other non-point sources of pollution	Completed in 2016
NPSM-8	Monitor non-point sources of pollution in the AOC	Completed in 2016

(iv) Beach Closings (BUI #10)

Status: Re-designated to Not Impaired October 2018

Delisting Criteria: *This beneficial use will no longer be impaired when: i) stormwater infiltration is reduced to help prevent sewage treatment bypasses, and a Stormwater Management Master Plan is completed and being implemented by the City of Sault Ste. Marie that outlines the preferred solution for managing stormwater quantity and quality; ii) the East End Water Pollution Control Plant is upgraded to secondary treatment; and iii) potential human health risks resulting from floating material near and downstream of Bellevue Marine Park are assessed and managed, as required.*

Background: Beach Closings was identified “impaired” in both the Stage 1 RAP (1992) and Stage 2 RAP (2002) reports because *E. coli* bacteria densities were reported to be in excess of the Provincial Water Quality Objective, specifically in waters downstream of storm sewers and the East End Wastewater Treatment Plant in Sault Ste. Marie, Ontario.

Reason for Re-designation: The official re-designation to “not impaired” is based on the completion of remedial actions identified in the Stage 2 RAP report for the Beach Closings BUI for which the delisting criteria focused on. This includes:

- (i) The development of a stormwater management plan for the City of Sault Ste. Marie,
- (ii) East End Wastewater Treatment Plant upgrades; and
- (iii) Confirmation that the floating masses observed in the vicinity of Bellevue Marine Park were predominantly comprised of algae, detritus and pollen, and not a significant source of *E. coli* bacteria.

In addition, a multi-year beach water quality assessment was completed by Algoma University in 2016. Results from this study conclude there are no major anthropogenic sources of bacterial contamination on the Canadian side of the St. Marys River, and water quality within the AOC and its beaches are comparable to non-AOC areas.



Figure 8: East End Wastewater Treatment Plant Upgrades (photo credit “ECCC 2005”). I believe it was taken by ECCC’s Sandra Kok in August 2005

Supporting Reports:

Derickx, L. 2017. St. Marys River Area of Concern (Canadian Section) Beneficial Use Impairment Re-designation Report: *Beach Closings*. Algoma University. 27 pp. Available here: http://bpac.algomau.ca/wp-content/uploads/2018/01/St.-Marys-River-Beach-Closings-Redesignation-Report_Final.pdf

Table 6: Completed Actions for Beach Closings (BUI #10)

Remedial Actions and Monitoring Initiatives		Status
PS-2	Reduce stormwater infiltration at the EEWWTP	Ongoing
PS-3	Upgrade EEWWTP to secondary treatment	Completed in 2006
NPSM-7	Assess potential health risks resulting from floating contaminated masses	Completed in 2010

(v) Degradation of Aesthetics (BUI #11)

Status: Re-designated to Not Impaired October 2018

Delisting Criteria: *This beneficial use will no longer be impaired when comprehensive tests of the Area of Concern's water quality demonstrate the river is devoid of any substances that produce a persistent objectionable deposit, unnatural colour or turbidity, or unnatural odour, and is free from persistent or reoccurring problems associated with degraded aesthetics.*

**Figure 9: Sample Jars for water testing**

Background: *Degradation of Aesthetics* was identified “impaired” in both the Stage 1 RAP (1992) and Stage 2 RAP (2002) reports. Floating scum and mats of oily fibrous material mixed with wood chips were occasionally observed between the city of Sault Ste. Marie, Ontario and the Lake George Channel. At the time of the Stage 2 RAP report, aesthetic impairment continued to be an issue downstream of the East End Wastewater Treatment Plant.

Reason for Re-designation: The official re-designation to “not impaired” is based on a three-year water quality monitoring study by Algoma University (2016). Analysis of the monitoring data confirms that the conditions that originally led to the beneficial use being designated as impaired no longer exist and the delisting criteria was met. In particular, there was an absence of characteristics associated with degraded aesthetics with no objectionable deposits, unnatural colour, unnatural turbidity, or unnatural odour.

Supporting Reports:

SMR RAP Team, 2018. *Degradation of Aesthetics and Eutrophication or Undesirable Algae*: Recommendation to Designate these Beneficial Use Impairments as Not Impaired for the St. Marys River Area of Concern (Canadian section). Available here:

http://bpac.algomau.ca/wp-content/uploads/2016/09/Water-Quality-Technical-Report-2013-15_Aug-2016.pdf

Table 7: Completed Actions for *Degradation of Aesthetics* (BUI #11)

Remedial Actions and Monitoring Initiatives		Status
PS-4	Relocate discharge pipe at EEWWTP	Completed in 2006
PS-9	Algoma Steel to limit dischargers from its dekish operation	Completed in 2014
FF-9	Stabilize shoreline of the Algoma Slag Dump	Completed in 2010
PSM-2	The Sault Ste. Marie, Michigan, air quality monitoring project	Not Applicable – Michigan Action
PSM-4	The Sault Ste. Marie, Ontario, air quality monitoring project	Addressed
PSM-5	Monitoring for particulate emissions at Algoma’s dekish operation	Addressed

2.2.3 Remaining Beneficial Use Impairments

There are currently 5 BUIs that are considered “impaired” for the St. Marys River AOC. These BUIs are discussed below along with rationale for their impairment and actions recommended for re-designation.

(i) Restrictions on Fish and Wildlife Consumption (BUI #1)

Status: IMPAIRED (fish); NOT IMPAIRED (wildlife)

Background: *Restrictions on Fish Consumption* is a BUI in the Stage 1 and Stage 2 RAP reports. The status is assessed through the MECP’s Fish Contaminant Monitoring Program. Consumption advisories for eating St. Marys River fish have generally been based on mercury, polychlorinated biphenyls (PCBs), dioxins/furans, and dioxin-like PCBs. The wildlife component has never been deemed impaired.

Delisting Criteria: *This beneficial use will no longer be impaired when the fish consumption advisories in the Area of Concern are no more restrictive than the advisories for the same contaminants in suitable reference sites. Comparisons shall be based on samples collected in the same timeframe for a minimum of two consecutive sampling events.*

Initial results of an assessment of the *Restrictions on Fish Consumption* BUI was published in March 2020 through the MECP and the University of Toronto. These results suggest that levels of contaminants in fish from the St. Marys River have declined to an extent that the BUI can be considered “not impaired”. The assessment report however, also recommends that a community fish consumption survey be conducted to better define what fish species are being caught and consumed within the river.

The St. Marys River Community Fish Consumption Survey was active from May 2021 – November 2023. It gathered information from anglers and community members, including Indigenous communities, on preferences for catching and eating fish in the AOC, which will assist in the BUI assessment. A total of 673 surveys were completed. Analysis of the survey data will commence in the Spring as part of a multi-tier assessment approach of the BUI.

Table 8: Completed Actions for Restrictions on Fish and Wildlife Consumption (BUI #1)

Remedial Actions and Monitoring Initiatives		Status
PS-1	Virtual elimination of all persistent and bioaccumulative contaminants	Ongoing (industry must comply with regulatory controls)
NPSM-2	Aerial monitoring of Cannelton Industries site	Not Applicable – Michigan Action
NPSM-3	Biological monitoring at the Cannelton Industries site	Not Applicable – Michigan Action

Table 9: Remaining Actions for Restrictions on Fish and Wildlife Consumption (BUI #1)

Remedial Actions and Monitoring Initiatives		Status
FFM-4	The fish contaminant monitoring programs	Underway

Additional Actions identified since the Stage 2 RAP report.

- A fish consumption survey report based on the survey data collected between 2022-2024, in order to confirm what types of fish are being caught and consumed by local anglers and the assumption that consumption of 8+ meals per month can be considered non-restrictive. This will help to inform the status of this BUI.
- Prepare a BUI status report with examination against the set delisting criteria and three-tier assessment approach. Present and discuss results with the AOC community.
 - If a “not impaired” status results, present recommendation to BPAC, stakeholders and Indigenous Communities to officially re-designate BUI
 - If an “impaired” status results, identify next steps required to re-designate

Relevant Documents:

Gandhi, N., Jackson, D., Bhavsar, S.P. 2020. Assessment of fish consumption beneficial use impairment at the Great Lakes Thunder Bay and St. Marys River Areas of Concern, Canada. *Journal of Great Lakes Research* 46(3):560-568.

<https://doi.org/10.1016/j.jglr.2020.03.009>

(iii) Fish Tumours or Other Deformities (BUI #4)**Status:** IMPAIRED

Delisting Criteria: *This beneficial use will no longer be impaired when a survey from within the Area of Concern of a locally abundant member of the sucker family, encompassing a diverse age range, indicates a liver tumour prevalence rate of less than 5%.*

Background: This BUI was designated *impaired* for the St. Marys River AOC after 185 white suckers sampled from 1985-90 exhibited a tumour prevalence rate of 9.2%. In 2012, ECCC completed tumour diagnoses for white suckers collected in 2009 and found that tumour rates remained elevated at 10.6%. The likely cause is exposure to polycyclic aromatic hydrocarbons (PAHs) within the river sediment. In 2015, analysis of 100 white suckers revealed a tumour rate of 6%. This is a marked improvement from the higher rates detected in the past, but remains above the 5% threshold the Great Lakes Commission established as an indicator of environmental degradation. In August 2021, ECCC collected 100 white suckers for an updated tumour analysis. In August 2023, ECCC collected additional White suckers (n = 50) for the assessment of the Fish Tumours BUI, with sampling focused on the lower reaches of the AOC. Results will be combined with samples collected from the upper part of the AOC in 2021 (n = 100). An assessment report is targeted for 2025.

Table 10: Completed Actions for Fish Tumours or Other Deformities (BUI #4)

Remedial Actions and Monitoring Initiatives		Status
PS-1	Virtual elimination of all persistent and bioaccumulative contaminants	Ongoing
PS-7	Encourage major point source dischargers to continue process improvements	Completed in 2012
NPS-4	Identification and control of contaminants from the Algoma Slag Dump	Completed in 2005
NPSM-9	Identify terrestrial and aquatic disposal sites transferring contaminants into waterways	Addressed
FFM-2	Identify the causes of fish tumours and other deformities which originate within the AOC	Completed in 2018

Table 11: Remaining Actions for Fish Tumours or Other Deformities (BUI #4)

Remedial Actions and Monitoring Initiatives		Status
NPS-1	Development of a multi-agency sediment management plan	Underway
NPS-5	Evaluation of Algoma Slip sediment and implementation of clean-up	Underway

Additional actions identified since the Stage 2 RAP report.

- Follow-up fish tumour survey completed. Awaiting results of lab analysis in 2024.
- Based on survey results, prepare a status report and recommend status of BUI based on delisting criteria. Present and discuss results with the AOC community.
 - If a “not impaired” status results, present recommendation to BPAC, stakeholders and Indigenous Communities to officially re-designate BUI
 - If an “impaired” status results, identify next steps required to re-designate

Relevant Documents:

Chambers, M. & McMaster, M. (2018) St. Marys River Area of Concern – Fish Tumours or Other Deformities: Current Status of the Beneficial Use Impairment for the St. Marys River Area of Concern (Canadian Section). Environment and Climate Change Canada. 22 pg. <http://bpac.algomau.ca/wp-content/uploads/2018/08/SMR-Fish-Tumours-Assessment-Report-Final-July-25-2018.pdf>

(iv) Degradation of Benthos (BUI #6)

Status: IMPAIRED

Background: In the Stage 1 RAP report (1992), the *Degradation of Benthos* BUI was divided into 2 parts: (i) Dynamics of benthic populations (ie. Benthic macroinvertebrate communities are impaired along the Ontario shore downstream of the Algoma Steel, St. Marys Paper and East End Waste Water Treatment Plant as evidenced by the presence of pollution tolerant species and low diversity) and (ii) Body burdens of benthic organisms (ie. The original impetus for this BUI being deemed impaired was the exceedance of the Severe Effect Level for polycyclic aromatic hydrocarbons (PAHs) in several locations in the St. Marys River; for iron at several sites; and for arsenic, nickel and manganese at the Algoma Steel slag yard.

Delisting Criteria: *This beneficial use will no longer be impaired when:*

- *Assessments of St. Marys River sediment using multiple lines of evidence (sediment chemistry, benthic community alteration, toxicity, and biomagnification potential) conclude negligible environmental risk¹ requiring no further management action, as demonstrated under the Canada-Ontario Decision Making Framework for Assessment of Great Lakes Contaminated Sediment.*

¹ The use of the term “Negligible Environmental Risk” is in reference to the *Canada-Ontario Decision Making Framework for Assessment of Great Lakes Contaminated Sediment* and is in context to what is described therein.

- *And for these specific sites, the following criteria need to be met:*
 - *The contaminated sediment in the Algoma Boat Slip is: i) assessed, ii) removed through dredging (down to native material/point of refusal), and iii) reported upon post-cleanup. This shall be done in a manner consistent with the Legacy Environmental Action Plan (LEAP) agreement between Algoma Steel and the Province of Ontario, which requires source track-down investigations and a recourse should contaminants redeposit at elevated concentrations; and*
 - *Assessments using multiple lines of evidence (sediment chemistry, benthic community alteration, toxicity, and biomagnification potential) on the area east of Bellevue Marine Park and the “Transport Canada Water Lot” conclude negligible environmental risk¹ requiring no further management action, as demonstrated under the Canada-Ontario Decision Making Framework for Assessment of Great Lakes Contaminated Sediment. If there is environmental risk requiring management actions, evidence of successful implementation of management action – as indicated by improving trends over three monitoring cycles and as determined through expert technical review – will be required for BUI re-designation.*

A Conceptual Site Model (CSM) was developed for the St. Marys River AOC in 2019 which represents the current state of understanding of the sources, extent, fate and transport of contaminants within the sediment. The CSM provides an organized framework for understanding and communicating current conditions in the river bottom and how it effects humans and the environment. The information gathered within the CSM is essential to aid in effective remediation decision-making.

The CSM was developed as a precursor to the development of a contaminated sediment management strategy for the river, the goal of updating the CSM was to determine one of the following;

- Sufficient evidence exists to conclude that current conditions in the AOC do not pose a significant risk to the environment and therefore risk management actions are not warranted; OR
- Insufficient evidence exists to draw conclusions regarding risks to the environment under current conditions and further investigation and/or monitoring is warranted; OR
- Sufficient evidence exists to conclude that current conditions pose significant risks to the environment and therefore risk management actions are warranted in specific locations.

Of these three the first statement best describes the conclusions of the CSM.

The Canada-Ontario Decision Making Framework for Assessment of Great Lakes Contaminated Sediment identified the need to “determine reason(s) for sediment toxicity” to for the area of EBMP. This happens in cases where sediment chemistry and laboratory toxicity tests indicate toxicity to invertebrates but the benthic community is not altered. In 2020, a review of the 2018 EBMP data and related case studies was completed (see Appendix A in CSM). Based on the results of the review, together with the risk evaluations presented in the main CSM for fish, wildlife, and humans, it was concluded that the available data is adequate to support an analysis of sediment management options for EBMP. Given the status of benthic community recovery, and that past and current causes of sediment toxicity are sufficiently well understood sediment management measures such as dredging or capping do not appear to be warranted and that activities such as monitored natural recovery and safeguarding against unintended exposure of buried contaminants should be put in place.

A Sediment Management Strategy for the Canadian section of the St. Marys River Area of Concern (AOC) was drafted in 2021. It provides a plain language summary of the history, current status, and future actions required as related to the management of contaminated sediment in the AOC. This strategy is intended to provide the AOC community with a clear understanding of the sediment assessment process and outline management approaches appropriate for the St. Marys River. It is scheduled to be finalized in 2024 after public and indigenous engagement are complete.

Table 12: Completed Actions for *Degradation of Benthos* (BUI #6)

Remedial Actions and Monitoring Initiatives		Status
NPS-2	Further characterize sediment quality in several high priority areas	Complete
NPS-3	Completion of the St. Marys River contaminated sediment zones evaluation	Completed in 2015
PSM-1	Long-term water monitoring at the Cannelton Industries site	Not Applicable – Michigan Action
PSM-6	Monitoring receiving water at St. Marys Paper	No Longer Applicable
NPSM-1	Monitoring EEWTP and identification of upstream sources	No Longer Applicable
NPSM-3	Biological monitoring at the Cannelton Industries site	Not Applicable – Michigan Action
NPSM-6	Benthic, toxicity, and sediment chemistry studies at BMP	Completed in 2010

Table 13: Remaining Actions for Degradation of Benthos (BUI #6)

Remedial Actions and Monitoring Initiatives		Status
NPS-1	Development of a multi-agency sediment management plan	Underway
NPS-5	Evaluation of Algoma Slip sediment and implementation of clean-up	Underway
NPSM-5	Re-sampling of river sediments to obtain trend information	Underway

Additional actions identified since the Stage 2 RAP report.

- Complete Sediment Management Strategy started in 2021. Final edits to the document are underway and are anticipated to be completed by early fall 2024.

Relevant Documents

Integral Consulting Inc. & Ramboll. 2022. St. Marys River Area of Concern Sediment Management Strategy. Prepared for Algoma University. http://bpac.algomau.ca/wp-content/uploads/2023/12/Draft-SMR-Sediment-Management-Strategy_for-review.pdf

Ramboll. 2020. Conceptual Site Model and Recommendations: St. Marys River Sediments. Prepared for Environment and Climate Change Canada. http://bpac.algomau.ca/wp-content/uploads/2022/08/DRAFT_SMR_CSM-March-15-2020-1.pdf

(v) Restrictions on Dredging Activities (BUI #7)

Status: IMPAIRED (Change to NOT IMPAIRED recommended)

Background: This BUI is focused on contaminated sediment and applies to specific cases where commercial-navigational dredging is routinely required but is considered *impaired* when contaminants are above concentrations that permit open water disposal. It is the additional financial cost associated with disposing the contaminated dredgate on land, instead of freely in the open waters, which is considered the impaired beneficial use. Regardless, open water disposal does not happen on the Canadian side of the St. Marys River. Doing so can affect aquatic communities and habitat by smothering the area and introducing different types.

Delisting Criteria: *This beneficial use will no longer be impaired when administrative controls and other regulatory procedures are in place within the Area of Concern that provide guidance and oversight for dredging proponents and permitting agencies in the planning and undertaking of dredging activities, including mitigating measures to reduce negative impacts. Such guidance will be made clear in a multi-agency Dredging*

Administrative Controls document that will be part of a broader sediment management plan for the Area of Concern.

Recommendation to re-designate is based upon the fact that there are administrative controls and regulatory procedures in place through local, provincial and federal permitting and review requirements – all of which are outlined in a guidance document developed in 2016 and updated/expanded in 2021 and 2024. This is further supported with the completion of a multi-agency sediment management strategy that is undergoing community review, at which point the Dredging BUI delisting criteria will be fulfilled and no further action will be warranted apart from the established dredging and in-water works administrative controls and regulatory procedures continuing at the local, provincial and federal levels as per legislative requirements. This recommendation is based on the following:

- The St. Marys River Dredging and In-Water Works Administrative Controls Document (2024) has been created to provide guidance and oversight for dredging proponents and permitting agencies in the planning and undertaking of dredging and in-water activities.
- The multi-agency sediment management strategy for the St. Marys River AOC has been drafted and is scheduled to be finalized in 2024.
- The two recommendations listed in the Stage 2 RAP (Actions NPS-1 and NPS-5) report are underway.

Table 14: Completed Actions for Restrictions on Dredging Activities (BUI #7)

Remedial Actions and Monitoring Initiatives		Status
NPSM-3	Biological monitoring at the Cannellton Industries site	Not Applicable – Michigan Action

Table 15: Remaining Actions for Restrictions on Dredging Activities (BUI #7)

Remedial Actions and Monitoring Initiatives		Status
NPS-1	Development of a multi-agency sediment management plan	Underway
NPS-5	Evaluation of Algoma Slip sediment and implementation of clean-up	Underway
NPSM-4	Task team monitoring recommendations	Underway

Additional actions identified since the Stage 2 RAP report.

- Continue to promote and communicate the St. Marys River Ontario Dredging and In-water Works Administrative Controls document to dredging proponents and permitting agencies, including municipalities and potential project proponents throughout the AOC.
- Continue seeking AOC community review on the BUI assessment and re-designation report (first drafted in 2018). Final report will account for feedback received.

Relevant Documents

Algoma University. 2023. St. Marys River Area of Concern Dredging and In-Water Works Administrative Controls Guidance Document. http://bpac.algomau.ca/wp-content/uploads/2023/12/SMR-In-water-Admin-Controls-Guidance-Doc_November2023_.pdf

(vi) Loss of Fish and Wildlife Habitat (BUI #14)

STATUS: IMPAIRED for Fish, IMPAIRED for Wildlife (Change to NOT IMPAIRED recommended)

Loss of Fish Habitat

Background: The Stage 1 and 2 RAP reports identify shoreline alteration, industrialization and urbanization, shipping activities, and shoreline cottage development as having caused significant loss in both fish and wildlife habitat along the river; particularly around the city of Sault Ste. Marie.

Delisting Criteria: *This beneficial use will no longer be impaired when: (i) coastal wetland wildlife habitat conditions within the Area of Concern are comparable to those of suitable reference sites, as assessed using an index of biotic integrity; (ii) rapids habitat conditions are enhanced through feasible conservation and restoration measures identified in the Stage 2 Remedial Action Plan; and (iii) the closely linked Degradation of Fish Populations BUI is no longer deemed impaired.**

*This set of delisting criteria pertains to the loss of both fish and wildlife habitat. Only delisting criterion (ii) and (iii) pertain to the loss of fish habitat specifically.

An AOC-wide habitat restoration feasibility study was completed in 2015 that included several conceptual ideas and designs. The most feasible option identified – based on economic, physical and ecological considerations – involved channel modifications/enhancements and wetland creation on Whitefish Island. This led to further study and concept drawings produced in 2019 for habitat options around Whitefish Island for naturalizing channel bed and bank areas, replacing concrete/rock berms with natural materials and plants, creating wetland features, improving fish passage and sediment transport to benefit Brook Trout and other fish, and building a series of islands and/or shoals east of the island to provide nursery habitat for Whitefish and Walleye.

Table 16: Completed Actions for Loss of Fish Habitat

Remedial Actions and Monitoring Initiatives		Status
NPS-6	Control of agricultural and other non-point sources of pollution	Completed in 2014
NPS-7	Remediation of contaminated terrestrial and aquatic disposal sites	Addressed
FF-1	Bar River habitat project	Completed in 2013
FF-4	Sedimentation reduction in the Munuscong River/Bay	Not Applicable – Michigan Action
FF-5	Characterization/feasibility study for waste removal in Mission Creek	Not Applicable – Michigan Action
FF-7	Develop a 10 year Fisheries Assessment Program for the river	Completed in 2002
FF-8	Continued support for Sea Lamprey control efforts	Addressed
FF-9	Stabilize shoreline of the Algoma Slag Dump	Completed in 2010
PSM-1	Long-term water monitoring at the Cannelton Industries site	Not Applicable – Michigan Action
NPSM-3	Biological monitoring at the Cannelton Industries site	Not Applicable – Michigan Action
NPSM-9	Identify terrestrial and aquatic disposal sites transferring contaminants into waterways	Addressed
NPSM-11	Assess the potential hazards associated with spills from shipping vessels	Completed in 2013
FFM-2	The marsh monitoring program	Completed in 2016
FFM-9	Evaluate influence of water levels and flows on spawning and production	Addressed
FFM-10	Determine minimum water levels and flows rates necessary for spawning	Addressed
FFM-11	Monitoring water quantity	Addressed

Table 17: Remaining Actions for Loss of Fish Habitat

Remedial Actions and Monitoring Initiatives		Status
FF-6	Remediation of rapids habitat and associated wetlands	Underway
FFM-7	Monitoring of population changes due to habitat enhancement	Pending

Additional actions identified since the Stage 2 RAP report.

- ECCC continues to work with the Batchewana First Nation to advance the Whitefish Island fish habitat restoration planning and permitting work. Both organizations have been engaging local agencies and stakeholders, including Parks Canada as the neighboring landowner/manager. ECCC has been supporting the effort via a contribution agreement with Batchewana.

Loss of Wildlife Habitat

Delisting Criteria: *This beneficial use will no longer be impaired when: (i) **coastal wetland wildlife habitat conditions within the Area of Concern are comparable to those of suitable reference sites, as assessed using an index of biotic integrity;** (ii) rapids habitat conditions are enhanced through feasible conservation and restoration measures identified in the Stage 2 Remedial Action Plan; and (iii) the closely linked Degradation of Fish Populations BUI is no longer deemed impaired.*

This portion of the Loss of Fish and Wildlife BUI has been recommended for re-designation to “Not Impaired” and is based on a five-year monitoring effort by ECCC’s Canadian Wildlife Service and its 2016 study report. The study assessed baseline wildlife habitat conditions and evaluated coastal wetland water quality, and breeding bird, amphibian, aquatic macroinvertebrate and submerged vegetation communities within the AOC, concluding the wildlife habitat and populations are not impaired. Key findings include:

- Water quality within the AOC’s coastal wetlands is comparable to non-AOC reference sites; suggesting overall water quality can be considered not impaired. Algoma University’s water quality survey (2013-15) supports this conclusion (Ginou 2016).
- Breeding marsh birds in the AOC are in relatively undisturbed condition, and sites inside and outside the AOC are in comparable condition; suggesting there is no impairment.
- There is no clear changes within the amphibian and aquatic macroinvertebrate communities, suggesting those populations are not impaired.
- There are some differences between submerged aquatic vegetation communities in the AOC versus non-AOC reference sites, but the overall area is not impaired for this community type.



Figure 10: Wetland at Whitefish Island

Based on the above-mentioned study, a change of status to “not impaired” is recommended for the wildlife portion of this BUI. The fish portion remains in a state of impairment, pending the completion of remedial actions and an evaluation on the current conditions. This BUI will not be fully re-designated until all elements of the delisting criteria have been met.

Supporting Reports:

Darwin, A. 2016. St. Marys River Area of Concern: Coastal Wetland Habitat Assessment Report. Environment and Climate Change Canada – Canadian Wildlife Service. 40 pp. Available here: <http://bpac.algomau.ca/wp-content/uploads/2016/12/CWS-SMR-Coastal-Wetland-Assessment-Final-Report-Aug-20161.pdf>

Derickx, L. 2018. Beneficial Use Impairment Status Report: Degradation of Wildlife Populations and Loss of Wildlife Habitat. St. Marys River Area of Concern (Canadian Section). Algoma University. 26 pp. Available here: <http://bpac.algomau.ca/wp-content/uploads/2019/06/St-Marys-River-AOC-Wildlife-Redesignation-Report-2018.pdf>

Table 18: Completed Actions for Loss of Wildlife Habitat

Remedial Actions and Monitoring Initiatives		Status
FFM-2	The marsh monitoring program	Completed in 2016

3.0 Remaining Stage 2 Actions

These actions are recommendations and may not necessarily be required to meet the delisting criteria for individual BUIs. Restoring beneficial uses in the St. Marys River AOC requires a cooperative effort aimed at reducing impacts on the ecosystem and rehabilitating historically degraded sites. The Stage 2 RAP report outlines recommended actions to help achieve the goal of beneficial use restoration.

3.1 Action NPS-1: Development of a multi-agency sediment management plan

Overview: The development of a multi-agency sediment management plan, including a wide scope of planning, remediation, and monitoring activities is described in the sub-sections below.

Status: Underway (first draft was tabled with BPAC in December 2021)

Applicable BUIs: Fish Tumours or Other Deformities, Degradation of Benthos, Restrictions on Dredging Activities

Work completed, underway or remaining to complete action:

This action includes both short and long-term activities ranging from the assessment of immediate remedial options to the implementation of management actions. As such, there are ten sub-actions listed in the Stage 2 RAP report that support the development of the sediment management strategy.

- (a) Sediment mapping of the St. Marys River AOC (Complete)
 - a. Maps are available on the BPAC website:
 - i. Metals: <http://bpac.algomau.ca/wp-content/uploads/2015/10/SMR-sediment-maps-Metals-April-2015.pdf>
 - ii. PAHs: <http://bpac.algomau.ca/wp-content/uploads/2015/10/SMR-sediment-maps-Total-PAH-April-2015.pdf>
- (b) Development of a decision-making framework (Complete)
 - a. A common element in developing the Strategy is the use of the Canada-Ontario Decision-Making Framework for Assessment of Great Lakes Contaminated Sediment which was completed in (??). The Framework uses four lines of evidence to evaluate all sites and determine whether further management of these sites is required. These lines of evidence include sediment chemistry, toxicity, benthic community structure, and biomagnification potential.

(c) Identify suitable management actions (Complete)

- This sub-action deals with identifying suitable management actions that can be incorporated into the final Sediment Management Strategy for the AOC. The Sediment Management Strategy takes a site-specific approach to identify what management action is required for each of the five priority areas that have been identified in the St. Marys River. The actions identified for each of these priority areas is based on the circumstances specific to it and could be different from another area of the river. For example, the management approach at the Algoma Boat Slip (an active industrial site that long had the highest contaminant concentrations in the AOC) will be different from the Lake George Channel (a site far from industry that has recovered naturally over time)

(d) Prevent additional accumulation of contaminants (Complete)

Substantial progress has been made in implementing source control measures and through MECP regulation of major point sources. Currently there are no sites operating outside current provincial compliance standards.

An active steel manufacturing facility (Algoma Steel) was historically a source of oil, polycyclic aromatic hydrocarbons (PAHs), and metals to St. Marys River. The following source control measures have been implemented at the facility:

- Wastewater treatment plant upgrades between 1997 and 1999 that reduced phenol, ammonia, cyanide, oil and grease, and suspended solids in wastewater and optimized water re-use by up to 90%.
- Upgrades and refurbishment activities on all three coke oven batteries since 2016 to control air emissions of particulate matter and PAHs (namely benzo(a)pyrene), which resulted in significant reductions in emissions from those processes.
- Coal tar collection system installed in 1990 to address contaminated groundwater migration to the river.
- Partial dredging of the Algoma Boat Slip in 1995 (11,500 cubic metres [m³] of material removed) for maintenance purposes, with subsequent dredging in 2006 (2,630 m³). Company carried out remedial dredging in 2017 and 2019 (10,900 m³ and 6,198 m³ respectively, and suggests plans to complete remedial dredging in 2024-25.

In addition, Algoma Steel has entered into a risk-based environmental management agreement with the Ministry of the Environment, Conservation and Parks called the Legacy Environmental Action Plan (LEAP). Objectives of LEAP include: identifying, assessing, managing, and mitigating off-site adverse environmental effects caused by legacy environmental contamination.

(e) Monitoring program for major dischargers (Complete)

(f) Monitoring and control during sediment remediation activities (Complete)

- Administrative controls are required and they play a key role in minimizing the disturbance of sediments within the St. Marys River AOC when in-water activities are being planned and implemented, such as dredging. This practice is being applied in other Great Lakes Areas of Concern. A key objective of administrative controls is to minimize the disturbance, exposure or resuspension of contaminated sediment. The St. Marys River Dredging and In-water Work Administrative Controls Guidance Controls document (2024) outlines the local, provincial and federal regulations and requirements that govern such activities within the river.

(g) Track atmospheric inputs (Not Applicable)

- This sub-action is beyond the scope of the AOC and the RAP program. Atmospheric inputs are already addressed under a number of other programs (ie. Lake Superior and Lake Huron Lakewide Action and Management Plans and in particular federal and provincial regulations with respect to domestic sources of atmospheric emissions).

(h) Monitoring and remediation of the Sediment Management Strategy (Underway)

- Monitoring is a component of the Sediment Management Strategy.

(i) Incorporate benefits of advancing technology (Complete)

(j) Coordinate monitoring and remediation activities with Lake Huron LAMP (Complete)

- The development of a Sediment Management Strategy is one of the activities listed within the Lake Huron LAMP.

3.3 Action NPS-5: Evaluation of Algoma Slip sediment and implementation of clean-up

Overview: The Stage 2 RAP report recommended that the sediment quality and quantity within the Algoma Boat Slip required evaluation and remediation.



Figure 11: Dredging of the Algoma Steel Boat Slip (Photo Courtesy of Algoma Steel)

Status: Underway

Applicable BUIs: Fish Tumours or Other Deformities, Degradation of Benthos, Restrictions on Dredging Activities

Work completed, underway or remaining to complete action:

Environmental (remedial) dredging is the management approach adopted to date for the Algoma Boat Slip. Algoma Steel dredged a total of nearly 30,000 cubic meters (m³) of sediment from the boat slip in 1995, 2006, 2017, and 2019. While early dredging events focused on maintaining shipping access, those undertaken since 2017 have targeted the removal of contaminated sediments from the boat slip. The dredging conducted in 2019 focused on the northern end of the slip, where previous sediment assessments had identified elevated concentrations of polycyclic aromatic hydrocarbons.

As mentioned above, Algoma Steel entered into a risk-based environmental management agreement with the Ministry of Environment, Conservation and Parks in 2019. This agreement is called the Legacy Environmental Action Plan (LEAP) and includes: identifying, assessing, managing, and mitigating off-site adverse environmental effects caused by legacy environmental contamination. Remediating the boat slip sediment is part of the LEAP process, and in the future, Algoma Steel is expected to issue a long-term monitoring plan to comply with the LEAP agreement.

In 2020, Algoma Steel hired a consultant, Golder Associates Ltd., to conduct a sediment assessment for the purpose of developing site-specific criteria to determine risk management actions and progress towards restoration.

3.4 Action FF-2 & FF-3: Watershed development plans for Bennett, West Davignon, East Davignon and Fort Creeks

Overview: Identify specific remedial options to address habitat components and outline preventative measures to help protect the watershed.

Status: Not Applicable

Applicable BUIs: Loss of Fish and Wildlife Habitat

Work completed, underway or remaining to complete action:

- The status of these actions is not applicable as the tributaries themselves are not within the AOC.
- A tributaries report was drafted in 2017 by Algoma University suggesting possible areas where habitat improvements can be made. Algoma University has consulted with the SSMRCA to determine the feasibility of improving habitat along these channels. SSMRCA is willing to allow certain habitat improvements to be implemented by other organizations as long as it does not impede flood flows resulting in public safety concerns.
- The St. Marys River Tributary Enhancement Project was completed. Algoma University received funding from the Ontario Community Environment Fund to implement this project. The project was designed to help protect and restore water quality and wildlife habitat along flood control channels and other riparian areas in Sault Ste. Marie, Ontario. The three main objectives of the project include (i) Increase water quality and aesthetics in tributaries flowing into the St. Marys River (a designated Heritage River and Great Lakes Area of Concern), (ii) removal of invasive species that threaten ecosystem health, and (iii) protect and restore habitat through implementation of edge feathering techniques and the creation of artificial nesting structures.

3.6 Action FF-6: Remediation of rapids habitat and associated wetlands

Overview: Creation of wetlands in association with existing rapids.

Status: Underway

Applicable BUIs: Loss of Fish and Wildlife Habitat

Work completed, underway or remaining to complete action:

- In March 2019, ECCC's contractor (Riggs Engineering) completed draft engineered designs detailing some options for naturalizing the channel bed and bank areas of the Whitefish Channel and constructing islands and shoals east of Whitefish Island

to benefit native fish populations. Staff at the Batchewana First Nation was involved.

- As landowner, Batchewana will determine what enhancements are to be done and pursued by the community, and these final decisions will be scoped in updated engineer “stamped” drawings that are needed for applicable permitting requirements.
- Confirm partnerships and leverage funds.
- Complete project, with a post-construction monitoring plan.



Figure 12: Whitefish Channel

3.7 Action NPSM4: Task team monitoring recommendations

Overview: The Sediment Task Team that is developing the Sediment Management Strategy will provide monitoring recommendations as needed when developing the Sediment Management Strategy.

Status: Underway

Applicable BUIs: Degradation of Benthos, Restrictions on Dredging Activities

Work completed, underway or remaining to complete action:

- A Sediment Management Strategy for the Canadian section of the St. Marys River Area of Concern (AOC) was drafted in 2021. This strategy is intended to provide the AOC community with a clear understanding of the sediment assessment process and outline management approaches appropriate for the St. Marys River.

- The *Canada-Ontario Decision-Making Framework for Assessment of Great Lakes Contaminated Sediment* was used to determine the most suitable management approach to address contaminated sediment at five sediment management sites. For three of the sites, it was determined that no management action is required. These sites include (i) Bellevue Marine Park, (ii) East of Bellevue Marine Park, and (iii) Lake George, Little Lake George and the Lake George Channel. Management action and monitoring recommendations for the remaining two sites include the following:
 - Algoma Boat Slip: Remediating the boat slip sediment is being conducted as part of the Legacy Environmental Action Plan (LEAP), and in the future Algoma is expected to issue a long-term monitoring plan to comply with LEAP.
 - St. Marys River Federal Water Lot: The outcome of those studies was a recommendation to adopt monitored natural recovery as a management approach and continue monitoring every five years at nine stations. The most recent round of monitoring occurred in 2023, with the goal of determining whether sediment chemistry and toxicity are improving, stable, or worsening. If dredging is contemplated in the future, characterization of deeper sediment will be considered

3.8 Action NPSM-5: Re-sampling of river sediments to obtain trend information

Overview: Benthic, toxicity, and sediment chemistry studies should be continued in the Bellevue Marine Park area and at reference locations to confirm and document further water and sediment quality.

Status: Complete

Applicable BUIs: Degradation of Benthos

Work completed, underway or remaining to complete action:

- The CSM has incorporated all studies and knowledge pertaining to benthic, toxicity and sediment chemistry. A toxicity identification evaluation was conducted to complete the CSM for the St. Marys River and to provide additional information needed for the development of the Sediment Management Strategy for the AOC.
- In 2018, Environment and Climate Change Canada (ECCC) performed sediment toxicity testing using sediment collected from eight EBMP stations, four upstream reference stations within the St. Marys River, and two Great Lakes references stations. A subset of these stations were represented through side-by-side testing of sediment samples from two depth intervals: 0-5 centimeters (cm) and 0-10 cm. Toxicity was judged in comparison to an ECCC data set of toxicity test results from 27 Great Lakes reference sediment samples tested between 2011 and 2018.
- In 2020, a review of the 2018 EBMP data and related case studies was completed (see Appendix A in CSM). Based on the results of the review, together with the risk evaluations presented in the main CSM for fish, wildlife, and humans, it was

concluded that the available data is adequate to support an analysis of sediment management options for EBMP. Given the status of benthic community recovery, invasive sediment management measures such as dredging or capping do not appear to be warranted. However, past and current causes of sediment toxicity are sufficiently well understood to support planning activities such as monitoring natural recovery and safeguarding against unintended exposure of buried contaminants.

3.9 Action FFM-4: The fish contaminant monitoring programs

Overview: The Ministry of Environment, Conservation and Parks implements the Fish Contaminant Monitoring Program on the Canadian side of the St. Marys River. Results are used to determine consumption advisories in the AOC.

Status: Underway

Applicable BUIs: Restrictions on Fish Consumption

Work completed, underway or remaining to complete action:

- In 2013, the MECP reviewed the availability of fish contaminant data for the AOC and identified priorities for monitoring. Fish were collected from 2014- 2016 in order to provide an update on contaminant levels in comparison to reference sites. The preliminary results suggest that the levels of contaminants in fish have declined such that the beneficial use can likely be considered “not impaired”.
- The St. Marys River Community Fish Consumption Survey was launched (May 2021 – November 2023). The data collected from this survey is an important action in moving forward with the assessment of the *Restrictions on Fish Consumption* BUI.

3.10 Action FFM-7: Monitoring of population changes due to habitat enhancement

Overview: This action is to be addressed after fish and wildlife enhancement efforts are implemented. A monitoring program should be developed to assess change in fish and wildlife populations in the AOC in response to these efforts.

Status: Pending

Applicable BUIs: Degradation of Fish and Wildlife Populations, Loss of Fish and Wildlife Habitat

Work completed, underway or remaining to complete action:

- It is anticipated that there will be a post-construction monitoring component of the proposed aquatic habitat restoration project on Whitefish Island being planned in partnership with Batchewana First Nation.

4.0 Work Plan to Address Remaining BUIs

Maintaining the work plan first developed in the January 2020 and updated in April 2024, the following is an updated 5-year work plan identifying actions necessary to re-designate the remaining six BUIs for the Canadian side of the St. Marys River AOC. Re-designation is dependent upon meeting the delisting criteria for each respective BUI.

Status assessments of each BUI will be undertaken in the next five years by the appropriate agency. The draft BUI assessment reports will contain a review of all relevant monitoring data, with input from the RAP steering committee, to determine whether a re-designation to a “not impaired” status is warranted. If so, the recommendation will be presented to BPAC, Indigenous communities and the public (the “AOC community”) to allow opportunity for review and comment on the BUI re-designation.

Once all concerns raised during the review process have been addressed, the BUI will be re-designated. If concerns remain, then next steps will be identified by the RAP and as it is unknown what these next steps will be, or how long it will take to implement them, they are marked as going beyond the 5-year work plan with an “X”.

Table 19: Work Plan for Re-designating *Restrictions on Fish and Wildlife Consumption* (BUI #1)

Action	2024-25	2025-26	2026-27	2027-28	2028-29	Lead
Report on Community Fish Consumption Survey	✓					Algoma University
Create BUI status report using MECP Fish Contaminant Monitoring Program results and Community Fish Consumption survey results to support proposed change to “not impaired”.	✓					Algoma University, ECCC, MECP
Develop engagement plan for stakeholders and the general public.	✓					Algoma University, ECCC, MECP
Present draft Status Report to BPAC, RAPIC, and Indigenous Communities to obtain feedback on moving forward on BUI re-designation.		✓				Algoma University, ECCC, MECP
Incorporate feedback into final report for submission to ECCC and MECP		✓				Algoma University, ECCC, MECP
If support is received, send re-designation report to the Four Agencies (ie. ECCC, MECP, USEPA, EGLE) for review.		✓				ECCC, MECP
Submit re-designation report to COA Annex co-leads and obtain official letter of re-designation.			✓			ECCC, MECP
Public announcement and make final BUI assessment and re-designation report available in digital format			✓			Algoma University

Table 20: Work Plan for Re-designating *Fish Tumours or other Deformities* (BUI #4)

Action	2024-25	2025-26	2026-27	2027-28	2028-29	Lead
Remediation of Algoma Boat Slip <ul style="list-style-type: none"> – Dredge remaining contaminated sediment – Conduct a post dredge sediment sampling program to determine remaining status of contamination within the slip 					✓	Algoma Steel
Finalize Complete Sediment Management Strategy	✓					ECCC, MECP, Algoma University
Complete fourth AOC Fish Tumour Survey & Analysis <ul style="list-style-type: none"> – Analyze liver tumours – Complete AOC fish tumour technical report 	✓ ✓					ECCC
Prepare BUI status report for evaluation against delisting criteria <ul style="list-style-type: none"> – If a “not impaired” status results, present draft re-designation report to BPAC to obtain feedback on moving forward with Indigenous and public engagement on BUI re-designation – If an “impaired” status results, identify next steps to re-designate 		✓				ECCC
Develop engagement plan for stakeholders and the general public.		✓				ECCC, MECP, Algoma University
Develop Indigenous engagement plan. Work with Garden River First Nation, Batchewana First Nation and the Métis Nation of Ontario to identify appropriate methods of engagement.		✓				ECCC, MECP, Algoma University

Implement public/stakeholder and Indigenous engagement plans and collect feedback.			✓			ECCC, MECP, Algoma University
Finalize draft BUI assessment and re-designation report by incorporating feedback collected from public/stakeholder and Indigenous engagement.			✓			ECCC
Present final re-designation report to BPAC to obtain feedback on submission to ECCC and MECP for re-designation.			✓			ECCC
If support is received, send re-designation report to the Four Agencies (i.e. ECCC, MECP, USEPA, EGLE) for review.			✓			ECCC, MECP
Submit re-designation report to COA Annex co-leads and obtain official letter of re-designation.				✓		ECCC, MECP
Public announcement and make final BUI assessment and re-designation report available in digital format.				✓		Algoma University

Table 21: Work Plan for Re-designating *Degradation of Benthos* (BUI #6)

Action	2024-25	2025-26	2026-27	2027-28	2028-29	Lead
Finalize Sediment Management Strategy	✓					ECCC, MECP
Review monitoring data of benthic invertebrate communities to determine if contaminant concentrations in sediments are improving.			✓			ECCC, MECP
Obtain a status update of Transport Canada Site.	✓		✓			Transport Canada
Remediation of Algoma Boat Slip <ul style="list-style-type: none"> – Dredge remaining contaminated sediment – Conduct a post dredge sediment sampling program to determine remaining status of contamination within the slip 					✓	Algoma Steel
Prepare BUI re-designation report for evaluation against delisting criteria <ul style="list-style-type: none"> – If a “not impaired” status results, present draft re-designation report to BPAC to obtain feedback on moving forward with Indigenous and public engagement on BUI re-designation – If an “impaired” status results, identify next steps to re-designate 					X	ECCC, MECP, Algoma University

Develop engagement plan for stakeholders and the general public.					X	ECCC, MECP, Algoma University
Develop Indigenous engagement plan. Work with Garden River First Nation, Batchewana First Nation and the Métis Nation of Ontario to identify appropriate methods of engagement.					X	ECCC, MECP, Algoma University
Implement public/stakeholder and Indigenous engagement plans and collect feedback.					X	ECCC, MECP, Algoma University
Finalize draft BUI assessment and re-designation report by incorporating feedback collected from public/stakeholder and Indigenous engagement.					X	ECCC, MECP, Algoma University
Present final re-designation report to BPAC to obtain feedback on submission to ECCC and MECP for re-designation.					X	ECCC, MECP, Algoma University
If support is received, send re-designation report to the Four Agencies (i.e. ECCC, MECP, USEPA, MDNR) for review.					X	ECCC, MECP, Algoma University

Submit re-designation report to COA Annex co-leads and obtain official letter of re-designation.					X	ECCC, MECP, Algoma University
Public announcement and make final BUI assessment and re-designation report available in digital format.					X	ECCC, MECP, Algoma University

Table 22: Work Plan for Re-designating *Restrictions on Dredging Activities* (BUI #7)

Action	2024-25	2025-26	2026-27	2027-28	2028-29	Lead
Finalize BUI re-designation report drafted in 2018.	✓					ECCC, MECP, Algoma University
Ensure the Dredging Administrative Controls document is part of the Sediment Management Strategy.	✓					Algoma University
Present draft re-designation report to BPAC to obtain feedback on moving forward with Indigenous and public engagement on BUI re-designation.	✓					Algoma University

Develop engagement plan for stakeholders and the general public.	✓					ECCC, MECP, Algoma University
Develop Indigenous engagement plan. Work with Garden River First Nation, Batchewana First Nation and the Métis Nation of Ontario to identify appropriate methods of engagement.	✓					ECCC, MECP, Algoma University
Implement public/stakeholder and Indigenous engagement plans and collect feedback.	✓					ECCC, MECP, Algoma University
Finalize draft BUI assessment and re-designation report by incorporating feedback collected from public/stakeholder and Indigenous engagement.	✓					ECCC, MECP, Algoma University
Present final re-designation report to BPAC to obtain feedback on submission to ECCC and MECP for re-designation.	✓					Algoma University
If support is received, send re-designation report to the Four Agencies (i.e. ECCC, MECP, USEPA, EGLE) for review.	✓					ECCC, MECP
Submit re-designation report to COA Annex co-leads and obtain official letter of re-designation.	✓					ECCC, MECP



Public announcement and make final BUI assessment and re-designation report available in digital format.	✓					Algoma University
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Table 23: Work Plan for Re-designating *Loss of Fish and Wildlife Habitat* (BUI #14)

Action	2024-25	2025-26	2026-27	2027-28	2028-19	Lead
Remediation of fish habitat (i.e. Whitefish Island Habitat Enhancement)						ECCC
– Finalize design plans for naturalizing channel bed and bank areas on Whitefish Island and constructing islands and shoals east of Whitefish Island				✓		
– Collect community input on designs				✓		
– Obtain permitting requirements for construction				✓		
– Confirm partnerships and leverage funds					✓	
– Implement project					✓	
– Develop a post construction monitoring plan						
– Implement the post construction monitoring plan					✓	

<p>Prepare BUI re-designation report for evaluation against delisting criteria</p> <ul style="list-style-type: none"> – If a “not impaired” status results, present draft re-designation report to BPAC to obtain feedback on moving forward with Indigenous and public engagement on BUI re-designation – If an “impaired” status results, identify next steps to re-designate 						ECCC, Algoma University
Develop engagement plan for stakeholders and the general public.						ECCC, Algoma University
Develop Indigenous engagement plan. Work with Garden River First Nation, Batchewana First Nation and the Métis Nation of Ontario to identify appropriate methods of engagement.						ECCC, Algoma University
Implement public/stakeholder and Indigenous engagement plans and collect feedback.						ECCC, Algoma University
						ECCC,

Finalize draft BUI assessment and re-designation report by incorporating feedback collected from public/stakeholder and Indigenous engagement.						Algoma University
Present final re-designation report to BPAC to obtain feedback on submission to ECCC and MECP for re-designation.						ECCC, Algoma University
If support received, send re-designation report to the Four Agencies (i.e. ECCC, MECP, USEPA, EGLE) for review.						ECCC, MECP
Submit re-designation report to COA Annex co-leads and obtain official letter of re-designation.						ECCC, MECP
Public announcement and make final BUI assessment and re-designation report available in digital format.						Algoma University

5.0 Recommendations for Future Initiatives and Actions

Although these actions are not requirements for BUI re-designation, they are recognized as important because they would benefit the health of the St. Marys River ecosystem.

- Coordinate monitoring and remediation activities with the Lake Huron LAMP.
- Monitor changes and impacts of remedial activities associated with the Contaminated Sediment Management Strategy.
- Consider the prospect of increasing flow through the Whitefish channel.

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7.0 Appendix

Table 24: BUI Status and Projections by Fiscal Year for the St. Marys River AOC

Beneficial Use Impairment (BUI)	Canada	United States
Restrictions on Fish Consumption	2025	-
Degradation of Fish and Wildlife Populations	2024	2019
Fish Tumours or Other Deformities	2025	-
Bird and Animal Deformities or Reproductive Problems	2015	2014
Degradation of Benthos	-	-
Restrictions on Dredging Activities	2024	2018
Eutrophication or Undesirable Algae	2018	2017
Beach Closings	2018	2016
Degradation of Aesthetics	2018	2014
Loss of Fish and Wildlife Habitat	2026	2019