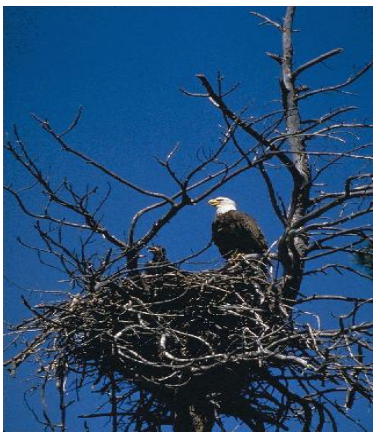
The Michigan Department of Environmental Quality Biennial Remedial Action Plan Update for Michigan's Portion of the St. Marys River Area of Concern



Compiled by:

Michelle D. Selzer
Water Bureau
Aquatic Nuisance Control & Remedial Action Unit
Michigan Department of Environmental Quality

P.O. Box 30273
Lansing, MI 48909-7773
Ph: 517-241-3731
Fax: 517-373-9958
selzerm@michigan.gov

Last Updated: October 26, 2009

Purpose of the Biennial Remedial Action Plan Update

A Michigan Department of Environmental Quality (MDEQ) Biennial Remedial Action Plan (RAP) Update will be prepared at least every 2 years for each Area of Concern (AOC), and will be the primary tool for documenting and communicating progress to the public and agencies. These documents are meant to be brief, user-friendly updates on recent remedial actions and assessments in the AOC. They are prepared by the MDEQ in consultation with the Binational Public Advisory Council (BPAC), Ontario Ministry of the Environment (OMOE), Environment Canada (EC), and the U.S. Environmental Protection Agency (USEPA). These biennial RAP updates will also be posted on the AOC web site (MDEQ, 2006).

The biennial RAP update is one component of the MDEQ's process for tracking AOC restoration, removing Beneficial Use Impairments (BUIs), and ultimately delisting AOCs. These processes and relevant restoration criteria are described in more detail in the MDEQ's *Guidance for Delisting Michigan's Great Lakes Areas of Concern* (*Guidance*) (MDEQ, 2008).

The purpose of this St. Marys River biennial RAP update is to track progress on the Michigan portion of the AOC by providing an update on those remedial actions completed in recent years, and BUI assessment results that are based on the readiness of a BUI removal and subsequent technical committee review. The Appendix highlights some of the recent remedial activities that have been completed in Canada's portion of the St. Marys River AOC. Some of these activities have had, or are likely to have, an impact on restoring beneficial uses in Michigan's portion of the AOC. Comprehensive background information is provided in the 1992 and 2003 St. Marys River RAP documents (OMOE and Michigan Department of Natural Resources [MDNR], 1992; EC, USEPA, OMOE, and MDEQ, 2002).

How to Use this Document

For each of the 10 BUIs in the St. Marys River AOC, this biennial RAP update includes:

- A description of the significance of the BUI based on previous RAP documentation
- A summary of the restoration criteria for the BUI outlined in the *Guidance* document
- A brief summary of relevant remedial actions, if any, completed in recent years. Highlights of recent remedial activities completed in Canada's portion of the AOC are outlined in the Appendix
- A brief summary of the technical committee's assessment results, if any, completed in recent years
- A list of annotated references and studies that may be used by a technical committee when the MDEQ AOC coordinator, in consultation with the BPAC, determines the BUI is ready for formal review of remedial actions and restoration according to the applicable criteria.

Introduction

Background

In 1987, amendments to the Great Lakes Water Quality Agreement (GLWQA) were adopted by the federal governments of the U.S. and Canada. Annex 2 of the amendments listed 14 BUIs which are caused by a detrimental change in the chemical, physical, or biological integrity of the Great Lakes system (International Joint Commission, 1988). The Annex directed the two countries to identify AOCs that did not meet the objectives of the GLWQA. The RAPs addressing the BUIs were to be prepared for all 43 AOCs identified, including the St. Marys River. The BUIs provided a tool for describing effects of the contamination, and a means for focusing remedial actions.

The 1992 St. Marys River RAP identified nine of the GLWQA's 14 beneficial uses as being impaired (OMOE and MDNR, 1992). These BUIs were primarily listed due to industrial and municipal point sources, combined sewer overflows (CSOs) discharging conventional pollutants (e.g., phosphorus), heavy metals, bacteria, and trace organics. These inputs resulted in contaminated sediments, fish consumption advisories, and impacted biota (OMOE and MDNR, 1992; EC et al., 2002). The 2003 RAP document stated that the Bird and Animal Deformities or Reproductive Problems BUI required further assessment. However, because researchers found three cross-bill common tern chicks out of 120 birds sampled on Lime Island in 1998 in the Michigan portion of the river (EC et al., 2002), the MDEQ included this beneficial use as a tenth BUI and will assess its restoration status using the *Guidance* criteria. In December 2008, the St. Marys River BPAC voted to adopt the statewide restoration criteria included in the *Guidance* to evaluate the status of all of the BUIs, except the Degradation of Benthos BUI for the Michigan portion of the AOC. The BPAC chose to develop local criteria for this BUI. In addition to developing local criteria for the Benthos BUI, the BPAC formed a Fish and Wildlife Technical Committee to develop local restoration criteria for the Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations BUIs for the Michigan portion of the AOC. Table 1 is a matrix for tracking the progress of assessments and removal of the listed BUIs for the St. Marys River AOC.

Table 1. The St. Marys River AOC BUI Removal Matrix.

Beneficial Use Impairment	Beneficial Use Remains Impaired	Assessment in Progress	BUI Removed
Restrictions on fish and wildlife consumption	x		
Fish tumors or other deformities	x		
Bird or animal deformities or reproductive problems	x		
Degradation of benthos	x		
Restrictions on dredging activities	x		
Eutrophication or undesirable algae	x		
Beach closings	x		
Degradation of aesthetics	x		
Degradation of fish and wildlife populations	x		
Loss of fish and wildlife habitat	x		

The St. Marys River AOC boundary (Figure 1) includes the area of the river which extends from Whitefish Bay between Point Iroquois, Michigan and Gros Cap, Ontario; east and downstream

between Quebec Bay and Humbug Point, Ontario in the St. Joseph Channel; between the Michigan side of the river and St. Joseph Island, downstream to the De Tour Passage, Michigan (EC et al., 2002).

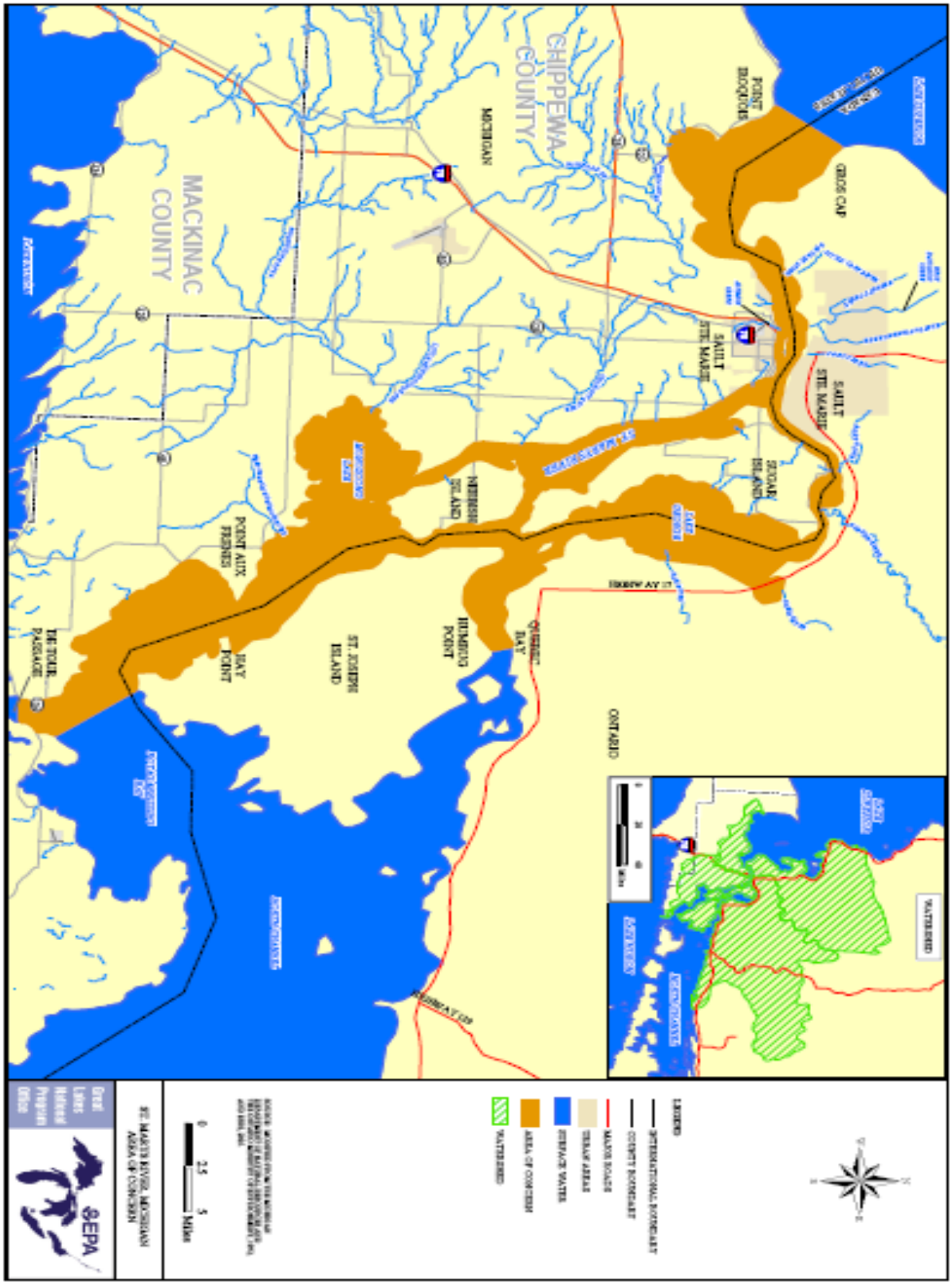


Figure 1. The St. Marys River Area of Concern.

Restrictions on Fish and Wildlife Consumption

Significance in the St. Marys River Area of Concern

In Michigan waters of the St. Marys River, contamination mainly due to mercury and polychlorinated biphenyls (PCBs) has resulted in Michigan Department of Community Health (MDCH) issuing fish consumption advisories for various sizes of walleye, northern pike, and carp (MDCH, 2008). Fish consumption advisories also have been issued for trout and salmon species migrating to and from Lake Huron (MDCH, 2008). The *Guide to Eating Ontario Sport Fish* gives consumption advice for sport fish from Ontario waters and is published every other year by the OMOE in cooperation with the Ministry of Natural Resources (OMOE, 2007).

Restoration Criteria

The St. Marys River BPAC has accepted the state's criteria for restoring this beneficial use for the Michigan portion of the AOC. The fish consumption advisory in the St. Marys River AOC is more stringent than for Lake Huron. This BUI will be assessed using either a comparison study or trend analysis.

Remedial Actions

See the Degradation of Benthos section below for recent remedial actions completed on contaminated sediments in Michigan's portion of the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A bi-national technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI from the Michigan portion of the AOC.

Annotated References and Studies

Bohr, J., and J. Zbytowski. 2007. Michigan Fish Contaminant Monitoring Program: 2006 Annual Report. MDEQ-WB Report #MI/DEQ/WB-07/053.

Bohr, J. and J. Zbytowski. 2008. Michigan Fish Contaminant Monitoring Program: 2007 Annual Report. MDEQ-WB Report MI/DEQ/WB-08/029.

The MDEQ's fixed station whole fish contaminant trend monitoring project was initiated to measure spatial and temporal trends of certain bioaccumulative contaminants.

Michigan Department of Community Health. 2008. 2008 Michigan Family Fish Consumption Guide: Important Facts to Know if You Eat Michigan Fish. http://www.michigan.gov/mdch/0,1607,7-132-2939_2939_2939-13110--,00.html

Certain kinds and sizes of fish from the Great Lakes, and some Michigan lakes and streams, contain levels of toxic chemicals that may be harmful if those fish are eaten too often. The MDCH advises caution about eating Michigan fish for the general population, women of childbearing age, and children under 15 years old.

Fish Tumors or Other Deformities

Significance in the St. Marys River Area of Concern

An investigation conducted in the late 1990's by the U.S. Fish and Wildlife Service (USFWS) indicated that the incidence of liver tumors in brown bullheads from Munuscong Bay was higher than would be expected for a control site (Smith, Portt, and Rokosh, 1990, as cited in EC et al., 2002). An explanation for the cause of the tumors could not be determined at that time. In addition, white suckers sampled on the Canadian side of the St. Marys River exhibited liver tumor prevalence in excess of 9%, likely associated with exposure to chemical contaminants, such as polycyclic aromatic hydrocarbons (PAHs) in contaminated sediments (OMOE and MDNR, 1992; EC et al., 2002).

Restoration Criteria

The St. Marys River BPAC has accepted the state's criteria for restoring this beneficial use for the Michigan portion of the AOC. According to the *Guidance*, this BUI will be considered restored when no reports of fish tumors or deformities due to chemical contaminants which have been verified through observation and analysis by the MDNR or MDEQ for a period of five years. Or in cases where any tumors have been reported, a comparison study of resident benthic fish, or of fish species which have historically been associated with this BUI, in the AOC and a non-impacted control site indicates that there is no statistically significant difference (with a 95% confidence interval) in the incidence of liver tumors or deformities.

Remedial Actions

See the Degradation of Benthos section below for recent remedial actions completed on contaminated sediments in Michigan's portion of the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A bi-national technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI from the Michigan portion of the AOC.

Annotated References and Studies

Smith, I.R., C. Portt, and D.A. Rokosh. 1992. Induced levels of hepatic mixed function oxidases in white suckers (*Catostomus commersoni*) as a biomarker for contamination of the sediments in Jackfish Bay, and the Kaministiquia and St. Marys Rivers. Queen's Printer for Ontario, 1990. Log 90-2309-043.

Mixed function oxidases in white suckers was investigated as a potential indicator for contamination of sediments by chemicals with dioxin-like activity in three IJC designated AOCs, Jackfish Bay, St. Marys River, and the Kaministiquia River.

Bird or Animal Deformities or Reproductive Problems

Significance in the St. Marys River Area of Concern

According to the 1992 RAP, there was limited data on contaminant concentrations in birds or mammals of the St. Marys River AOC (OMOE and MDNR, 1992). Prior to 1992, concentrations of contaminants (e.g., PCBs) in herring gull eggs from Lake George, while elevated, were typical of other areas of the Great Lakes, including Lake Superior (OMOE and MDNR, 1992). However, the highest PCB concentration measured in common tern eggs from the lower river was in the range that could produce harmful effects in eggs. In 1998, Michigan State University (MSU) researchers found three cross-bill common tern chicks out of 120 birds sampled on Lime Island (EC et al., 2002).

Restoration Criteria

The St. Marys River BPAC has accepted the state's criteria for restoring this beneficial use for the Michigan portion of the AOC. According to the *Guidance*, restoration of this beneficial use will be demonstrated using one of two approaches. The approach taken will depend on the availability of data. The first approach evaluates restoration based on field assessment of birds and/or other wildlife where MDEQ or other state-approved bird and wildlife data are available. The second approach will be applied where bird or other wildlife data are not available. This approach will use levels of contaminated fish tissue known to cause reproductive or developmental problems as an indicator of the likelihood deformities or reproductive problems may exist in the AOC.

Remedial Actions

See the Degradation of Benthos section below for recent remedial actions completed on contaminated sediments in Michigan's portion of the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A bi-national technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI from the Michigan portion of the AOC.

Annotated References and Studies

Michigan Department of Environmental Quality. 2008. Michigan Wildlife Contamination Trend Monitoring. Year 2004 Annual Report. Nestling Bald Eagles. MI/DEQ/WB-08/085.

Since 1999, the MDEQ has funded researchers at MSU and Clemson University to measure contaminant levels in bald eagle blood and feathers each year. Bald eagle productivity is also monitored. Eaglets from selected nests have been monitored annually, while others have been sampled according to the MDEQ's five-year rotating watershed cycle. Samples are analyzed for PCBs, mercury, dichlorodiphenyltrichloroethane (DDT), and a few other selected pesticides (Edly and Wuycheck, 2006).

The same researchers monitoring bald eagles are also assessing contaminant levels (PCBs, DDT, and mercury) in herring gull eggs. This project complements and expands existing herring gull egg monitoring conducted by the Canadian Wildlife Service. The data are used for trend assessment of near-shore areas of the Great Lakes (Edly and Wuycheck, 2006).

Senthilkumar, K. Bowerman, K. Millenbah, D. Best, T. Takasuga, and S. Masunaga. 2004. Polychlorinated-Dibenzo-P-Dioxins/Furans and-Dioxin-Like Biphenyls in Eggs of Common Terns From Lime Island, St. Marys River, Michigan, USA. Toxicological and Environmental Chemistry 85(4):221-232.

This study determined that the population collapse of common tern from Lime Island in the St. Marys River, Michigan, were related to the 2,3,7,8-chlorine substituted dioxins, furans, dioxin-like PCBs, and other possible factors using unhatched egg target contaminant analysis.

Degradation of Benthos

Significance in the St. Marys River Area of Concern

Benthic community health on the Michigan side of the St. Marys River AOC appears to be relatively good. There are slight to moderate benthic impairments along the north side of Sugar Island in the Lake George Channel, likely due to organic enrichment from upstream sources, and at the Cannelton Industries site due to chromium and mercury from the historic tannery operation (EC et al., 2002 and Golder Associates, Ltd., 2004). According to the RAP documents, benthic communities are severely to moderately impaired along the Sault Ste. Marie, Ontario shoreline, specifically downstream from Algoma Steel, Bellevue Marine Park, St. Marys Paper, and the East End Waste Water Treatment Plant (WWTP) (OMOE and MDNR, 1992; EC et al., 2002). These impairments are mainly due to sediments contaminated with metals, organic matter (e.g., pulp fiber), and PAHs (Golder Associates, Ltd., 2004).

Restoration Criteria

In addition to applying the state's criteria, the St. Marys River BPAC chose to develop local criteria for restoring this beneficial use for the Michigan portion of the AOC. According to the *Guidance*, the restoration criteria for this beneficial use requires that all remedial actions for known contaminated sediment sites with degraded benthos are completed (except for minor repairs required during operation and maintenance) and monitored according to the approved plan for the site. The local criteria require that remedial actions are completed for all of the known contaminated sediments sites on the Canadian side of the river before this BUI can be removed from the Michigan side of the AOC.

Remedial Actions

- The Great Lakes Legacy Act (GLLA) cleanup of Tannery Bay on St. Marys River in Sault Ste. Marie, Mich., was completed in September 2007. USEPA, Phelps Dodge, and the MDEQ dredged 44,000 cubic yards of contaminated sediment from the bay. The $8 million cleanup began in September 2006. Dredging contaminated sediment from the bay and a nearby wetland removed approximately one million pounds of chromium and 70 pounds of mercury from the bay (USEPA, GLLA website, retrieved February 25, 2009, from http://www.epa.gov/glnpo/sediment/legacy/tannery/index.html).
- In 2005 and 2006, a total of 11,503 tons of contaminated soil and 7,519 tons of contaminated sediment from the Consumers Energy Manufactured Gas Plant (MGP) site were stabilized and disposed at the Dafter Landfill. During sediment stabilization, a total of 134,123 gallons of contaminated water was treated and discharged back to the St. Marys River under a National Pollutant Discharge Elimination System (NPDES) permit. In 2007, site restoration continued with the re-installation of the peninsula that was removed during

the interim response. Also, four monitoring wells (two shallow and two deep) were installed near the shore to replace wells removed during the soil excavation. Groundwater monitoring continued in 2008 (January and August) with samples being analyzed for BTEX (acronym that stands for benzene, toluene, ethylbenzene, and xylenes), PAHs, lead, and cyanide (Ed Sloan, personal communication, February 27, 2009).

Assessment Results

This beneficial use is currently impaired. A bi-national technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI from the Michigan portion of the AOC.

Annotated References and Studies

Back, R. and B. Keller. 2005. Current Sediment Quality in the St. Marys River AOC (MI:USA). Final Report for USEPA-GLNO Grant #: GL2002-054.

This project sought to revisit and update sediment contaminant data regarding a variety of sediment locations within the St. Marys River that were previously identified in the St. Marys River Stage 1 RAP. The primary focus was on surficial sediment contamination, particularly metals shown to be elevated during previous sampling events. Sediment core samples were also collected within these areas to assess the spatial distribution of the metal contaminants.

STS Consultants. 2001. Interim Response and Remedial Investigation Report.
STS Consultants. 2003. Off Site Interim Response and Sediment Investigation Report.
STS Consultants. 2004. Phase III Sediment Investigation Report.
STS Consultants. 2005. Phase IV Phase V Investigation Report.
STS Consultants. 2007. Interim Response Report.

The above sediment investigation reports provide documentation of visual and laboratory analyses, and characterization of various types of sediment samples collected at the MGP site.

Restrictions on Dredging Activities

Significance in the St. Marys River Area of Concern

According to the 1992 RAP, uncontaminated dredge spoils from the navigation channel have always been approved for open water disposal (OMOE and MDNR, 1992). However, sediments from several navigational portions of the St. Marys River have been documented as exceeding USEPA's Guidelines for Pollution Classification of Great Lakes Harbor Sediments and/or OMOE's Provincial Sediment Quality Guidelines for Open Water Disposal of Dredged Spoils disposal guidelines. Areas documented as exceeding these guidelines included: Algoma Slip, Algoma Slag Dump, Lake George Channel, Little Lake George, the northern half of Lake George, Tannery Bay, the head of the St. Joseph and West Neebish Channels, and Lake Munuscong (EC et al., 2002).

Restoration Criteria

The St. Marys River BPAC has accepted the state's criteria for restoring this beneficial use for the Michigan portion of the AOC. According to the *Guidance*, this beneficial use will be considered restored when either there have been no restrictions on routine commercial or

recreational navigational channel dredging by the USACE, based on the most recent dredging cycle; or, in cases where dredging restrictions exist, a comparison of sediment contaminant data from the commercial or recreational navigation channel (at the time of proposed dredging) in the AOC indicates that contaminant levels are not statistically different from other comparable, non-AOC commercial or recreational navigation channels.

Remedial Actions

See the Degradation of Benthos section below for recent remedial actions completed on contaminated sediments in the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A Dredging Technical Committee, formed by the MDEQ and comprised of state and federal agency experts, conducted an initial statewide assessment of this BUI in 2008 and found that restrictions on dredging do exist within the St. Marys River AOC due to chemical contamination. No further statewide assessment is planned at this time. A bi-national technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for another formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI from the Michigan portion of the AOC.

Annotated References and Studies

Great Lakes Dredging Team. 1999. Decision Making Process for Dredged Material Management. Draft Final, October 13, 1998, Amendment #1, January 18, 1999. Available at: http://www.glc.org/dredging/dmm/decision.pdf

This document describes how to manage the dredged material, management options, treatment technologies available, the technical evaluation process, and regulatory information.

U.S. Army Corps of Engineers. 2001. Sediment Sampling, Lower St. Marys River, Sault Sainte Marie, Michigan. Final Report.

USACE contractors conduct pre-maintenance dredging surveys of the St. Marys River navigational channel. The surveys involve the collection of sediment and water samples at selected stations for analysis of physical and chemical parameters.

Eutrophication or Undesirable Algae

Significance in the St. Marys River Area of Concern

According to the 1992 RAP, the open waters of the St. Marys River are typical of the oligotrophic trophic status of Lake Superior. However, it was noted that some embayments and other slow moving portions of the river have been impaired by the presence of floating algal mats (OMOE and MDNR, 1992).

Historically, provincial guidelines for phosphorus have been exceeded in the Lake George Channel downstream from the East End WWTP (EC et al., 2002). The addition of phosphorus from the East End WWTP was believed to be the major cause of the rapid algal growth in the channel, which has resulted in a number of citizens' complaints on both sides of the channel.

Restoration Criteria

The St. Marys River BPAC has accepted the state's criteria for restoring this beneficial use for the Michigan portion of the AOC. According to the *Guidance*, this beneficial use will be considered restored when there are no waterbodies within the AOC included on the list of impaired waters due to nutrients or excessive algal growths in the most recent Clean Water Act *Water Quality and Pollution Control in Michigan: Section 303(d) and 305(b) Integrated Report* (Integrated Report), which is submitted to USEPA every two years.

In addition, the MDEQ is in the process of developing nutrient criteria for state surface waters which will be adopted into Michigan's WQS. The MDEQ will evaluate restoration of this BUI consistent with the nutrient criteria once the nutrient criteria are approved by the USEPA and adopted into rule.

Remedial Actions

In 2004, the Chippewa/East Mackinac Conservation District began a Sault Ste. Marie Area Watershed Planning project. The assessment area included approximately 15,000 acres, encompassing several small sub-watersheds of the St. Marys River and creeks within the city of Sault Ste. Marie, Michigan. The project identified and assessed pathogens (e.g., *E. coli*), cultural eutrophication (i.e., human-caused inputs of excess nutrients), and other environmental pollution impacts to the water quality of the St. Marys River. The results of the project were used to develop a watershed plan for the Sault area, which recommends actions to alleviate the identified impairments to the river. The watershed plan was approved by the MDEQ in the fall of 2007.

See the Beach Closings section below for other recent remedial actions completed in the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A bi-national technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI from the Michigan portion of the AOC.

Annotated References and Studies

Great Lakes Environmental Center. 2007. Great Lakes Connecting Channels: 2005 Annual Data Report MI/DEQ/WB-07/066.
http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3728-32361--,00.html

The MDEQ has conducted monitoring to determine the ambient water quality conditions in Michigan's portion of the connecting channels of the Great Lakes since 1969 in the Detroit River, and since 1998 in the St. Clair and St. Marys Rivers. The monitoring was designed to document water quality, calculate loading rates and determine water quality trends over time.

Beach Closings

Significance in the St. Marys River Area of Concern

According to the RAPs, high bacterial densities downstream of CSOs, storm sewers, industrial outfalls, and the East End WWTP have been documented (OMOE and MDNR, 1992; EC et al., 2002). Periodic advisories against swimming and bathing have been issued on the Michigan side of the river.

Restoration Criteria

The St. Marys River BPAC has accepted the state's criteria for this BUI for the Michigan portion of the AOC. The statewide criteria for this BUI was revised in 2008 to account for AOCs listed as having CSO(s), or considered impacted by an upstream CSO(s). The criteria revision outlines a three tiered approach.

The first tier requires that no waterbodies within the AOC are included on the 303(d) list of impaired waters due to contamination with pathogens in the most recent Integrated Report. If the waterbody is listed due to the presence of CSOs, or are impacted by upstream CSOs, the second criteria states that this BUI will be considered restored when updated information reveals that the CSOs have been eliminated or are being treated. Or, In cases where CSOs still exist and significant progress has been made towards their elimination or treatment, the third tier allows monitoring data to be used to document that water quality standards for *E. coli* are generally met, which enables removal of the BUI.

Remedial Actions

- In 1995, Sault Ste. Marie, Michigan, initiated a 25 year, five phase project to eliminate CSOs. This project is being funded by low-interest loans from the State of Michigan Revolving Loan Fund. The City's reissued NPDES discharge permit accelerated the sewer separation completion date from December 2020 to December 2018 (R. Conroy, personal communication, February 25, 2009).

- The Sugar Island Monitoring Workgroup (SIMWG) was established in February 2007 in response to reports of floating solids with high *E. coli* levels periodically found in the Lake George channel of the St. Marys River. The multi-agency, bi-national workgroup was tasked by the Four Party Management Committee (consisting of representatives from the USEPA, EC, MDEQ, and MOE) to develop and implement a monitoring plan to determine the source and nature of the floating materials and the cause(s) responsible for the periodic high levels of *E. coli* at the Sugar Island Township Park beach. In response to a recommendation from the report summarizing the 2007 results, the SIMWG developed and implemented an expanded monitoring plan for 2008 (SIMWG, 2008).

See the Eutrophication or Undersirable Algae section above for other recent remedial actions completed in the Michigan waters of the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A bi-national technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI from the Michigan portion of the AOC.

Annotated References and Studies

CSO & Sanitary Sewer Overflow (SSO) Discharge website:
http://www.deq.state.mi.us/csosso/find_event.asp

Facilities are required to report that a CSO and SSO discharge event occurred within 24 hours of the initial discharge. Later, after the event ends, a written report is submitted which contains additional information including volume of the discharge, and the start/end date and time. This information is posted on the above website.

Michigan Department of Environmental Quality. 2007. St. Marys River *E. coli* Data Compilation and Summary. MI/DEQ/WB-07/040.

This St. Marys River *E. coli* data compilation and summary was provided at the request of the MDEQ in response to complaints concerning the presence of floating solids and what was presumed to be sewage within the St. Marys River - specifically the Lake George Channel. Prior to this data compilation and summary effort, no recent comprehensive compilation or summary of St. Marys River *E. coli* data existed.

Sugar Island Monitoring Workgroup. 2008. 2007 St. Marys River – Sugar Island Monitoring: A Final Report of the Sugar Island Monitoring Work Group. April 2008.

A monitoring plan was developed involving daily inspection of the river for floating materials and weekly water monitoring of 30 stations by Chippewa County Health Department, Sault Ste. Marie Tribe of Chippewa Indians, Algoma Public Health and the MOE. Water samples were collected and tested for *E. coli*, coliform, and other parameters. A Quality Assurance Project Plan was developed to ensure data quality and consistency among the agencies. The monitoring plan also called for a sediment assessment survey, an inventory of outfalls, and site inspections of the wastewater treatment facilities on the Michigan and Ontario sides of the river.

Degradation of Aesthetics

Significance in the St. Marys River Area of Concern

According to the 1992 RAP document, nuisance levels of floating material have been periodically reported along the north shore of Sugar Island in the Lake George Channel (OMOE and MDNR, 1992). In addition to nuisance floating scum, the East End WWTP and Algoma Steel were identified as the major point sources contributing to over 88 percent of the oil and grease to the river, followed by St. Marys Paper (EC et al., 2002).

Restoration Criteria

The St. Marys River BPAC has accepted the state's criteria for restoring this beneficial use for the Michigan portion of the AOC. The *Guidance* criteria requires that monitoring data be collected for two successive monitoring cycles to determine whether or not the water bodies in the AOC exhibit persistent, high levels of the following "unnatural physical properties" (as defined by Rule 323.1050 of the Michigan WQS) in quantities which interfere with the state's designated uses for surface waters:

- turbidity
- color
- foams
- settleable solids

- oil films
- floating solids
- suspended solids
- deposits

The MDEQ does not routinely monitor the St. Marys River for degraded aesthetic conditions. However, once this BUI is ready to be assessed, MDEQ will monitor for aesthetic conditions during ongoing monitoring projects and/or work with other local water quality efforts to determine the aesthetic status. For example, the MDEQ's Water Chemistry Monitoring Project does collect data in the AOC on a routine basis, which includes analysis for turbidity and suspended solids from two sampling stations located within the AOC.

Remedial Actions

See the Beach Closings and Eutrophication sections above for other recent remedial actions completed in the St. Marys River AOC.

Assessment Results

This beneficial use is currently impaired. A bi-national technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI from the Michigan portion of the AOC.

Annotated References and Studies

Great Lakes Environmental Center and LimnoTech, Incorporated. 2006. Great Lakes Connecting Channels Data Evaluation and Trend Analysis Report. Report #MI/DEQ/WB-06/092. Available at: http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3728-32361--,00.html

The MDEQ has conducted monitoring to determine the ambient water quality conditions in Michigan's portion of the Connecting Channels of the Great Lakes since 1969 in the Detroit River, and since 1998 in the St. Clair and St. Marys Rivers. The monitoring was designed to document water quality, calculate loading rates and determine water quality trends over time.

Loss of Fish and Wildlife Habitat
Degradation of Fish and Wildlife Populations

Significance in the St. Marys River Area of Concern

According to the 1992 RAP, fish and wildlife habitat on both sides of the river has been substantially altered and/or eliminated by the construction of the U.S. and Canadian navigation locks, vessel traffic, compensating works at the head of the St. Marys River rapids, hydro facilities, shoreline filling and dredging activities (OMOE and MDNR, 1992). Pollutant loadings from industrial sources, municipal discharges, and urban runoff into inner-city tributaries (e.g., Ashman, East Davignon and Fort Creeks) have also impacted sediment quality and benthic habitat on both sides of the river.

Although the sport fishery is considered to be healthy in general, populations of lake herring and lake whitefish in the lower river have historically decreased (OMOE and MDNR, 1992). In addition, the St. Marys River has been recognized as the main source of sea lamprey in Lake

Huron, accounting for approximately 50 percent of the annual mortality of adult lake trout (EC et al., 2002).

The USFWS, Sea Lamprey Control Program, with funding from the Great Lakes Fishery Commission, conducts treatments of the river and is continuing to work with other agencies and partners to develop proposals for actions that will address the sea lamprey problem in Lake Huron and its tributaries, including the St. Marys River. Because sea lamprey is a long-term, lake-wide concern that is currently being addressed by other programs, it may not be addressed under the AOC program.

Restoration Criteria

The St. Marys River Fish and Wildlife Technical Committee was established to develop criterion for restoration of these two BUIs for the Michigan portion of the AOC. The committee was comprised of representatives from the BPAC, the St. Marys River Fishery Task Group, and other stakeholders.

The criterion specified in Fish and Wildlife Restoration Plan centers on the Loss of Fish and Wildlife Habitat BUI, specifically calling for the restoration of two rapids habitat areas located entirely in Michigan waters; the Little Rapids at Sugar Island, and the historic rapids located at the Neebish Island Rock Cut. These projects were selected based on feasibility and the likelihood that the project would be supported by natural resource agencies and other stakeholders.

The restoration criterion for the St. Marys River AOC is:

- The two fish and wildlife BUIs will be considered restored in the Michigan's portion of the St. Marys River AOC upon the completion of the two projects identified above, which would restore approximately 100 acres of fish and wildlife habitat.

The St. Marys River BPAC does not specify numerical restoration targets in terms of fish populations or other indicator organisms. Restoration targets are instead specified in terms of acreage of habitat restored. The BPAC presumes that restoration of the habitat will result in increased numbers of desired species.

Additional habitat actions have been identified by the St. Marys River Fish and Wildlife Technical Committee that go beyond what is minimally needed to remove these BUIs, but were included in the Plan to raise awareness, and if addressed, may have a positive impact on the habitat conditions in the St. Marys River. These actions include:

- Eliminating invasive species in ballast water.
- Implementing vessel speed limits in an effort to reduce the effects of bow wake on streamside habitat.
- Working with the International Lake Superior Board of Control and its operational representatives, Brookfield Power (formerly Great Lakes Power) and the USACE to mitigate the effects of flow changes and water level fluctuations at the Compensating Gates that impact habitat conditions in the main St. Marys River Rapids.

Removal of the fish and wildlife BUIs will be based on achievement of full implementation of remedial actions, including monitoring conducted according to site plans and showing consistent improvement in quantity of habitat addressed in the restoration targets. Habitat values and

populations need not be fully restored prior to delisting, as some may take many years to recover after actions are complete.

Remedial Actions

In 1996, the MDNR, LSSU and other researchers conducted a feasibility study to provide preliminary data and estimate the suitability of the Little Rapids as a fish spawning and nursery habitat (Acres International Corporation [AIC] 1997). Little was known about the ecology of this rapids area prior to the construction of the causeway from the Sugar Island Ferry dock at Island No. 1 to Sugar Island, which was built in the early 20th century. According to the feasibility study, the Little Rapids site likely had significant value as fisheries habitat. This conclusion was based on the observations of diverse bottom substrate (i.e., gravel, large boulders, bedrock and other hard substrates), well-defined channels with varying depths, and extensive shallow water areas upstream and downstream of the causeway. The researchers determined that the Little Rapids project site, if restored, would be provide needed foraging, spawning, and nursery habitat for a wide variety of sport fish, including those that have declined in the St. Marys River (e.g., trout and salmon, walleye, and whitefish), as well as aquatic invertebrates and small forage fish on which these species depend (AIC, 1997). Lake sturgeon, a state-threatened species, likely utilized this habitat as well (Neal Godby, personal communication, March 23, 2009).

Assessment Results

This beneficial use is currently impaired. A bi-national technical committee will be convened when the MDEQ and the St. Marys River BPAC determine that this BUI is ready for a formal review and assessment. The technical committee will review the results of all remedial actions completed and other supporting documentation to provide a decision on whether or not to support a recommendation to formally remove this BUI from the Michigan portion of the AOC.

Annotated References and Studies

Acres International Corporation. 1997. Little Rapids Restoration Project Feasibility Study. Prepared for Edison Sault Electric Company, Sault Ste. Marie, Michigan.

This feasibility study provided preliminary data and estimated the suitability of the of the Little Rapids area between the Sugar Island ferry dock (Island No. 1) and Sugar Island as a suitable area for fish spawning and nursery habitat, if alternative habitat enhancement measures were taken to replace the culverts in the causeway.

St. Mary River BPAC Office Staff. 2008. St. Marys River Fish and Wildlife Restoration Plan. Final Draft December 2008.

This report was prepared on behalf of the St. Marys River BPAC and contains criteria for the fish and wildlife related BUIs, background on the impairments, the development process, scope of work to restore these BUIs, and an appendix which describes the key recommendations by the Flora and Fauna Task Team to restore habitat in the St. Marys River AOC, as outlined in the 2002 RAP (EC et al., 2002).

Werner, R. M., B. Evans, B. Keller, A. Moerke, J. Westrick, and G. Zimmerman. 2008. Biotic Integrity and Habitat Assessment within the St. Marys River AOC. Final Report October 2008. EPA Project Number: GL-96538301-0.

LSSU was involved in a four-year project to develop an IBI and assess the current ecosystem health of the St. Marys River. To accomplish these tasks, the LSSU

researchers investigated coastal marshes to determine the status of habitat and the wildlife by collecting biological, sediment, and water quality data, and performing various types of chemical analyses.

References

Edly, K. and J. Wuycheck. 2006. Water Quality and Pollution Control in Michigan: 2006 Sections 303(d), 305(b), and 314 Integrated report. Report #MI/DEQ/WB-06/019.

Environment Canada, United States Environmental Protection Agency, Ontario Ministry of the Environment, Michigan Department of Environmental Quality. 2002. The St. Marys River Area of Concern Remedial Strategies for Ecosystem Restoration.

Golder Associates, Ltd. 2004. Synthesis of Sediment and Biological Investigations in the St. Marys River Area of Concern. Report to Environment Canada, Environmental Conservation Branch, Ontario Region. 04-1112-020. www.lssu.edu/bpac/workshops/GolderReport.pdf

International Joint Commission. 1988. Revised Great Lakes Water Quality Agreement of 1978, as amended by Protocol signed November 18, 1987. Consolidated by the International Joint Commission, United States and Canada. http://www.ijc.org/rel/agree/quality.html#ann2

Kresin Engineering Corporation. 2004. St. Marys River Remedial Action Plan Implementation Review Project.

LeSage, S and J. Smith. 2008. Water Quality and Pollution Control in Michigan: 2008 Sections 303(d) and 305(b) Integrated Report. Report MI/DEQ/WB-08/007. http://www.michigan.gov/deq/0,1607,7-135-3313_3686_3728-12711--,00.html

Michigan Department of Environmental Quality. 2008. Guidance for Delisting Michigan's Great Lakes Areas of Concern. Report MI/DEQ/WB-06/001 www.deq.state.mi.us/documents/deq-wb-aoc-delistguide.pdf

Ontario Ministry of the Environment and Michigan Department of Natural Resources. 1992. The St. Marys River Area of Concern: Environmental Conditions and Problem Definitions. Remedial Action Plan Stage 1.

Ontario Ministry of the Environment. 2005. Guide to Eating Ontario Sport Fish. 2007-2008. Twenty-fourth Edition, Revised. http://www.ene.gov.on.ca/envision/guide/

Smith, I., C. Portt, and D. Rokosh. 1990. Induced Levels of Hepatic Mixed Function Oxidases in White Suckers (*Catostomus commersoni*) as a Biomarker for Contamination of the Sediments in Jackfish Bay, and the Kaministiquia and St. Marys Rivers. Queen's Printer for Ontario, 1990. Log 90-2309-043.

Appendix: Canada/Ontario Remedial Activities

- The East End WWTP was upgraded to secondary treatment in August 2006.

- In conjunction with the Federal and Provincial agencies working on a Contaminated Sediment Management Strategy. Extensive sampling efforts have been undertaken in the area known as Bellevue Marine Park, and at two downstream depositional areas. Sampling indicated the presence of contaminants including oil and grease, PCBs, PAHs, and metals. A decision making protocol is underway to ascertain the best remediation action for each specific site.

- The City of Sault Ste. Marie, ON, is currently conducting a survey to investigate potential improvements to storm water management practices. This survey will lead to remedial actions that will address nutrients, bacteria, and other contaminant inputs from storm sewers and other urban point- and non-point sources.

- An ongoing effort is currently underway to update the status of the individual beneficial use impairments and delisting criteria for the Canadian side of the St. Marys River AOC.

- EC has been working with other Canadian agencies to draft the St Marys River a Canada-Ontario report card on the status BUIs in all Canadian AOCs, including the Canadian portion of the St. Marys River. These report cards will describe the status of BUIs with data available from 2007 or earlier, identify significant past actions towards restoring beneficial uses, as well as identify planned and necessary future undertakings for priority actions in each AOC.

- In 2007, Essar Steel Algoma Inc.'s Certificate of Approval was updated for its waste disposal site. In the new requirements, a condition was included concerning the submission of a water monitoring program for the landfill (slag dump). OMOE has reviewed the plan and requested that the plan be revised to include additional ground water, surface water and sediment sampling.

- In 2008, Canada Ontario Agreement funds enabled the provision of a grant to the Sault Ste. Marie Region Conservation Authority to hire a RAP coordinator to: coordinate and pursue implementation of priority actions for the St. Marys River AOC; support for the development of sediment management options; identify opportunities to improve stormwater runoff, as well as improved local coordination of related initiatives; pursue the development of revised delisting criteria for the Canadian side of the AOC; and, provide additional support for the development of an assessment and monitoring plan for the Canadian side of the AOC.