

The Michigan Department of Environmental Quality Biennial Remedial Action Plan Update for the St. Clair River Area of Concern



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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) and the U.S. Environmental Protection Agency (USEPA). These biennial RAP updates will also be posted on the MDEQ AOC web site.

The biennial RAP update is one component of the MDEQ's process for tracking AOC restoration, removing 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, 2006).

The purpose of this St. Clair 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. Clair 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 1991 and 1995 St. Clair River RAP documents (Ontario Ministry of the Environment [OMOE] and Michigan Department of Natural Resources [MDNR], 1991; Ontario Ministry of the Environment and Energy and MDNR, 1995).

How to Use this Document

For each of the 10 BUIs in the St. Clair 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
- A brief summary of the technical committee's assessment activities and 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 PAC, 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. Clair River. The BUIs provided a tool for describing effects of the contamination, and a means for focusing remedial actions.

The 1991 St. Clair River RAP identified nine of the GLWQA's 14 beneficial uses as being impaired (OMOE and MDNR, 1991). The 2005 RAP Progress Report stated that Tainting of Fish and Wildlife Flavor required further study on a site-specific basis due to the results of a 1996-1997 angler survey (EC et. al., 2005). The MDEQ included this beneficial use as a tenth BUI and will assess its restoration status using the *Guidance* criteria. Table 1 is a matrix for tracking the progress of assessments and removal of these BUIs from the St. Clair River AOC. The impairments are primarily due to intensive agriculture and industrial development in and near the cities of Port Huron and Sarnia. The heaviest concentration of industry (including a large petrochemical complex) lies along the Ontario shore near Sarnia. Several communities along the St. Clair River rely on the river as their primary source of drinking water. Industries -- including petroleum refineries, chemical manufacturers, paper mills, salt producers and electric power plants -- need high quality St. Clair River water for their operations as well. Primarily pollutants such as bacteria, heavy metals, and toxic organics, came from municipal and industrial discharges, urban and rural runoff, combined sewer overflows (CSOs), and contaminated sediments.

Table 1. St. Clair River BUI Removal Matrix.

Beneficial Use Impairment	Beneficial Use Remains Impaired	Assessment in Progress	BUI Removed
Restrictions on fish and wildlife consumption	X		
Tainting of fish and wildlife flavor	X		
Bird or animal deformities or reproductive problems	X		
Degradation of benthos	X		
Restrictions on dredging activities	X		
Restrictions on drinking water consumption or taste and odor problems	X		
Beach closings	X		
Degradation of aesthetics	X		
Added costs to agriculture or industry	X		
Loss of fish and wildlife habitat	X		

The St. Clair River serves as an international boundary between the United States and Canada and connects Lake Huron to Lake St. Clair. The river flows approximately 40 mi (64 km) in a southerly direction from the outflow of Lake Huron to Lake St. Clair. Prior to entering Lake St. Clair, the river divides into several channels creating an extensive delta known as the St. Clair Delta/St. Clair Flats. The boundary of the St. Clair River AOC (Figure 1.) includes the entire river from the Bluewater Bridge (connecting Port Huron and Sarnia) to the southern tip of Seaway Island, west to St. John's Marsh and east to include the north shore of Mitchell's Bay on Lake St. Clair in Ontario. Anchor Bay of Lake St Clair is not included within the AOC (OMOE and MDNR, 1991).

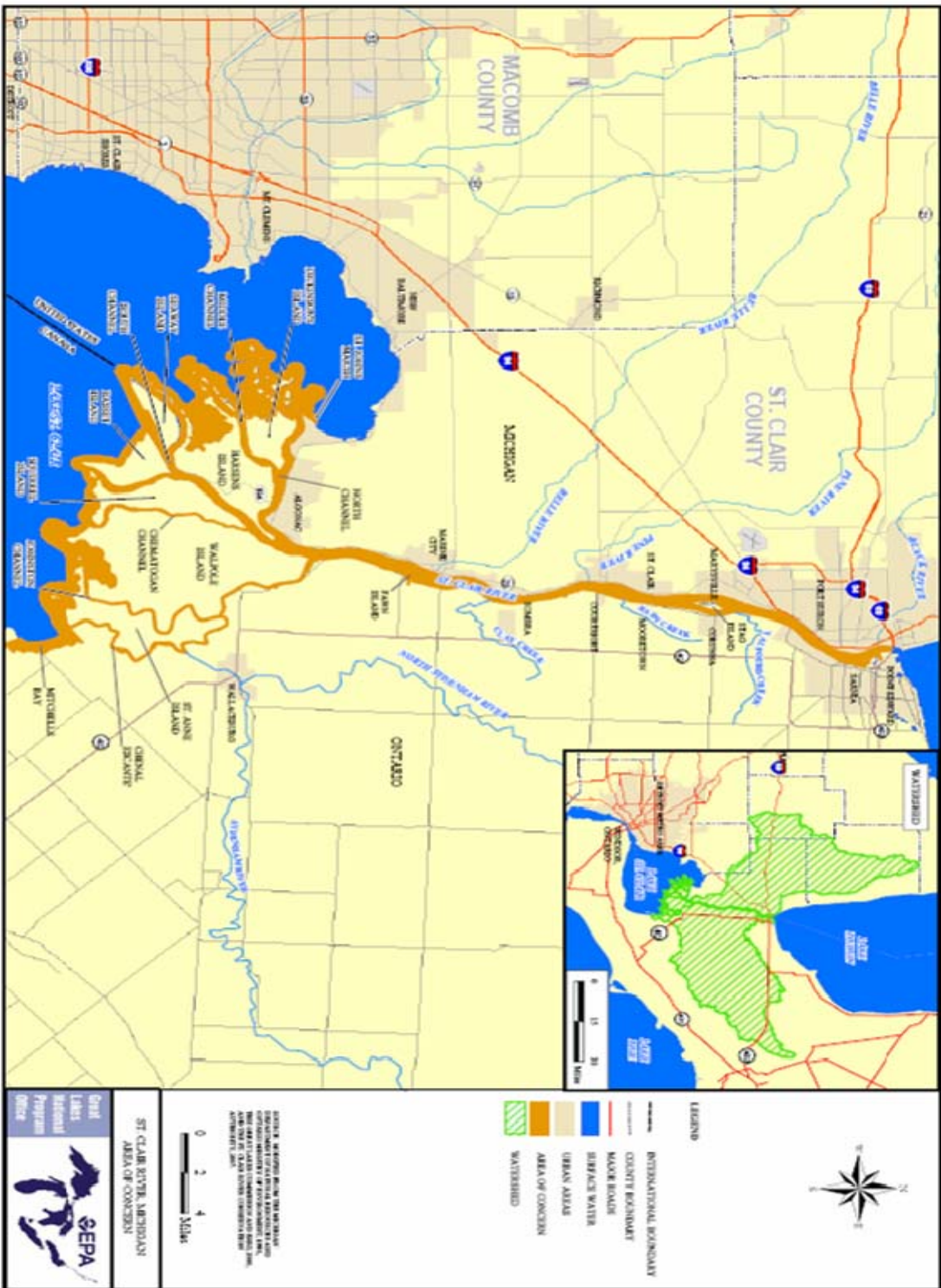


Figure 1. The St. Clair River Area of Concern.

Restrictions on Fish and Wildlife Consumption

Significance in the St. Clair River Area of Concern

In Michigan waters of the St. Clair 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 carp, freshwater drum, gizzard shad, and walleye (MDCH, 2007). Ontario has also issued fish consumption advisories for white sucker and yellow perch captured in the St. Clair River (OMOE and MDNR, 1991). 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). The most recent guide includes consumption advisories for northern pike, smallmouth bass, largemouth bass, rock bass, white bass, redhorse sucker, and brown bullhead (OMOE, 2007).

Restoration Criteria

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

Remedial Actions

No remedial actions have taken place since the 2005 Stage 2 RAP.

Assessment Activities and Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Clair 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.

Annotated References and Studies

Bohr, J. and J. Zbytowski. 2006. Michigan Fish Contaminant Monitoring Program: 2005 Annual Report. MDEQ-WB Report #MI/DEQ/WB-06/091. Michigan.gov/egle/about/organization/water-resources/glwarm/fish-contaminant-monitoring

The MDEQ's fixed station whole fish contaminant trend monitoring project was initiated to measure spatial and temporal trends of certain bioaccumulative contaminants. Since 1992, carp and walleye have been collected three times and once, respectively, from the St. Clair River for trend monitoring. In addition to Michigan's whole fish trend monitoring, caged channel catfish are used to monitor the presence and distribution of persistent bioaccumulative chemicals (Edly and Wuycheck, 2006).

Michigan Department of Community Health. 2007. Michigan Family Fish Consumption Guide: Important Facts to Know if You Eat Michigan Fish. Michigan.gov/mdhhs/safety-injury-prev/environmental-health/topics/eatsafefish

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.

Tainting of Fish and Wildlife Flavor

Significance in the St. Clair River Area of Concern

Based on historical knowledge of fish tainting reported by Walpole Island First Nation, a controlled subjective olfactory sensory evaluation of walleye caught from the St. Clair River was conducted in 1995. Results revealed that no identifiable tainting was detected by a panel of BPAC members and the public. Therefore, it was recommended that the status of this BUI be changed from “requires further study on a site specific basis” to “not impaired”. The change in status was to be based on further confirmation by results of an extensive angler survey in late 1997 (EC et al., 2005). However, the results of an angler survey (1996 – 1997) funded by Health Canada’s Great Lakes Health Effects Program revealed that just under half of St. Clair fish consumers (291) had concerns about the fish they caught. Of these, four percent reported fish tainting and provided specific descriptions such as “didn’t smell/taste right” and odors and flavors like “oil”, “crude”, “petrochemicals” and “gasoline” (Dawson, 2000). Given that these reports were derived from experiences in the early to mid 1990s, and the study did not include Walpole Island First Nation residents or the United States shore, this BUI was considered impaired (EC et al., 2005).

Restoration Criteria

The St. Clair River BPAC has accepted the state’s criteria for restoring this beneficial use for Michigan’s portion of this AOC. According to the *Guidance*, this BUI will be considered restored when no more than three reports of fish tainting have been made to the MDNR or MDEQ for a period of three years, or if there have been reports of tainting, a one time analysis of representative fish species in an AOC in accordance with MDEQ Surface Water Assessment Section Procedure #55 for conducting taste and odor studies indicates that there is no tainting of fish flavor.

Remedial Actions

No remedial actions have taken place since the 2005 Stage 2 RAP.

Assessment Activities and Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Clair 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.

Annotated References and Studies

Environment Canada. 2007. St. Clair River Anglers Survey.

<https://friendsofstclair.ca/>

Greg Mayne with Environment Canada is conducting an anglers survey to obtain information on the quality of fish caught in the St. Clair River. The survey includes questions regarding fishing frequency, rating of taste and smell of fish caught, specific areas where fish are caught but not eaten due to taste or smell, and the overall assessment of the river. This survey is being conducted on the U.S. and Canadian side of the river.

Bird or Animal Deformities or Reproductive Problems

Significance in the St. Clair River Area of Concern

According to the 1991 RAP document, chironomid mouth part (ligula) deformities were the basis for impairment. Mouth part deformities occurred in some chironomid species but there was no evidence of bird or other animal deformities or reproductive problems (OMOEE and MDNR, 1995). Cause-effect linkages between chironomid deformities and chemicals have not been made. In the St. Clair River AOC, however, the occurrence of chironomid mouth part deformities and degraded chironomid communities (based on the density of chironomids) corresponded to the area offshore and immediately downstream of the Sarnia industrial area. This area was also found to have severely degraded to impaired benthic communities living in sediments contaminated with a variety of metals and organics (OMOE and MDNR, 1991).

Restoration Criteria

The St. Clair River BPAC has accepted the state's criteria for restoring this beneficial use for Michigan's portion of this 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 when bird or other wildlife data are not available. This approach will use levels of contaminated fish tissue as an indicator of the likelihood that deformities or reproductive problems may exist in the AOC.

Remedial Actions

No remedial actions have taken place since the 2005 Stage 2 RAP.

Assessment Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Clair 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.

Degradation of Benthos

Significance in the St. Clair River Area of Concern

Benthic community health on the Michigan side of the St. Clair River AOC appears to be good, but as of 1985, was impaired along the Ontario shore for a distance of about 12 km (7.4 mi) beginning in the reach between the Sarnia Water Pollution Control Plant and Dow Chemical and extending downstream past Stag Island to approximately Novacor Chemical (Canada) at Mooretown (OMOE and MDNR, 1991).

Restoration Criteria

The St. Clair River BPAC has accepted the state's criteria for restoring this beneficial use for Michigan's portion of this AOC. According to the *Guidance*, an assessment of the benthic community will be conducted by either MDEQ's Surface Water Assessment Section (SWAS) procedures for wadeable or non-wadeable streams; or, in cases where MDEQ procedures are not applicable and benthic degradation is caused by contaminated sediments, this beneficial use will be considered restored when 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 MDEQ's SWAS Procedure #51 (MDEQ, 2002) for wadeable streams and the MDEQ's pending rapid assessment procedure for non-wadeable rivers are not applicable to the St. Clair River AOC because the river is non-wadeable and is a federally maintained navigational channel. Therefore, the assessment of this BUI will depend on whether or not all remedial actions for known contaminated sediment sites with degraded benthos are completed and monitored.

Remedial Actions

No remedial actions have taken place since the 2005 Stage 2 RAP.

Assessment Activities and Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Clair 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.

Restrictions on Dredging Activities

Significance in the St. Clair River Area of Concern

Sediments on the Michigan side of the river are generally much less polluted than those on the Ontario side. Concentrations of oil and grease, total Kjeldahl nitrogen, arsenic, chromium, copper, iron, lead and nickel occasionally exceeded the Ontario open water disposal of dredged material guidelines. The heavily polluted category of the U.S. EPA interim guidelines for the disposal of harbor sediments was exceeded by concentrations of oil and grease, total Kjeldahl nitrogen, arsenic, copper, iron, lead and manganese from Michigan locations. The highest concentrations of chromium and nickel found in sediments along the Michigan shore were classified as moderately polluted. The most heavily polluted sediments were found in the river adjacent or immediately downstream of Port Huron, Marine City and Algonac as well as at the mouths of the Black and Pine Rivers. There are currently no restrictions on dredging or disposal of dredged material from U.S. waters of the St. Clair River due to the presence of contaminants (OMOE and MDNR, 1991).

Restoration Criteria

The St. Clair River BPAC has accepted the state's criteria for restoring this beneficial use for Michigan's portion of this 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

No remedial actions have taken place since the 2005 Stage 2 RAP.

Assessment Activities and Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Clair 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.

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.

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

Restrictions on Drinking Water Consumption or Taste and Odor Problems

Significance in the St. Clair River Area of Concern

According to the 1991 St. Clair River RAP, treated water on both the Michigan and Ontario sides of the river is not impaired for human consumption. The Restriction on Drinking Water Consumption or Taste and Odor Problems BUI was originally identified primarily due to periodic water treatment/filtration plant intake closures due to spills at upstream industrial facilities. Most closures have been a precautionary measure. Historical closures were reported for water treatment plants in the City of Marysville, East China Township, Marine City, Algonac, and Old Club Water Filtration Plant (OMOE and MDNR 1991).

Restoration Criteria

The St. Clair River BPAC has accepted the state's criteria for restoring this beneficial use for Michigan's portion of this AOC. According to the *Guidance*, this beneficial use will be considered restored when monitoring data for two years indicates that public water supplies: meet the current and most stringent human health standards, objectives, or guidelines (at the point of distribution into the water system) for levels of disease-causing organisms, hazardous or toxic chemicals, or radioactive substances; and treatment needed to make raw water potable and palatable does not exceed standard methods in those supplies. In the event a public drinking water intake must be closed due to contamination of surface water, standard treatment methods are considered to have been exceeded.

Remedial Actions

No remedial actions have taken place since the 2005 Stage 2 RAP.

Assessment Activities and Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Clair 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.

Annotated References and Studies

- Aiello, C. 2003. Michigan Water Chemistry Trend Monitoring 2001 Report. Michigan Department of Environmental Quality, Water Division. Report #MI/DEQ/WD-03/085.
- Aiello, C. 2004. Michigan Water Chemistry Monitoring Great Lakes Tributaries 2002 Report. Department of Environmental Quality, Water Bureau. Report #MI/DEQ/WD-04/049.
- Aiello, C. 2005. Michigan Water Chemistry Monitoring Great Lakes Tributaries 2003 Report. Department of Environmental Quality, Water Bureau. Report #MI/DEQ/WB-05/058.
- Aiello, C. 2006. Michigan Water Chemistry Trend Monitoring Great Lakes Tributaries 2004 Report. Michigan Department of Environmental Quality Water Division. Report #MI/DEQ/WD-06/045.

The Water Chemistry Monitoring Project allows for the calculation of contaminant loadings from key Michigan tributaries. The key goals of this project are to: 1) assess the current status and condition of individual waterbodies and determine whether standards are being met, 2) measure temporal and spatial trends, 3) to detect new and emerging water quality problems, and 4) provide data to support MDEQ water quality programs and evaluate their effectiveness. Water chemistry reports are available at: Michigan.gov/egle/about/organization/water-resources/glwarm/water-quality-monitoring-reports

- GLEC and LimnoTech, Incorporated. 2006. Great Lakes Connecting Channels Data Evaluation and Trend Analysis Report. Report #MI/DEQ/WB-06/092. Michigan.gov/egle/about/organization/water-resources/glwarm/water-quality-monitoring-reports

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. Mary's 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. Clair River Area of Concern

All areas downstream of Michigan combined sewer overflows (CSOs) are identified as impaired areas due to the periodic discharge of inadequately treated sewage (OMOEE and MDNR, 1995). According to the 2005 RAP Progress Report, CSOs, storm sewer outfall discharges and discharges from the Sarnia Water Pollution Control Centre and the Port Huron Waste Water Treatment Plant still constitute major sources of pollution to the St. Clair River and contribute to beach closures. Additional research is needed to determine the role of non-point

source pollution relative to local point source from treatment plants in beach closures (EC et. al., 2005).

Restoration Criteria

The St. Clair River BPAC has accepted the state's criteria for restoring this beneficial use for Michigan's portion of this AOC. The *Guidance* criteria require that no waterbodies within the AOC are included on the list of impaired waters due to contamination with pathogens in the most recent Integrated Report.

Remedial Actions

No remedial actions have taken place since the 2005 Stage 2 RAP.

Assessment Activities and Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Clair 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.

Annotated References and Studies

MDEQ's beachguard website: <https://mienviro.michigan.gov/ncore/external/home>

The MDEQ awards grants each year to local health departments to monitor *E. coli* levels at Great Lakes and inland beaches. County health departments use the results to assess whether the total body contact recreation designated use is being attained and whether beach closings are necessary. Results are reported in annual beach monitoring reports and are posted on the MDEQ's beach website above (Edly and Wuycheck, 2006).

CSO & SSO Discharge website: *(The link provided was broken and has been removed.)*

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.

Degradation of Aesthetics

Significance in the St. Clair River Area of Concern

According to the 1991 St. Clair River RAP, occasional floating scums, slicks, periodic spills, and objectionable odors were reported, mainly adjacent to and downstream from Sarnia on the Ontario side (OMOE and MDNR, 1991). The 2005 RAP Progress Report further clarifies this impairment as a result of oily

surface films, spills, and combined sewer overflow events from both Port Huron and Sarnia (EC et. al., 2005).

Restoration Criteria

The St. Clair River BPAC has accepted the state's criteria for restoring this beneficial use for Michigan's portion of this AOC. The *Guidance* criteria require 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 Water Quality Standards) in quantities which interfere with the state's designated uses for surface waters:

- turbidity
- color
- oil films
- floating solids
- foams
- settleable solids
- suspended solids
- deposits

The MDEQ does not routinely monitor this stretch of river for degraded aesthetic conditions. However, once this BUI is ready to be assessed, the MDEQ biologists will monitor for aesthetic conditions during ongoing monitoring projects and/or work with other local water quality efforts to determine the status. For example, the MDEQ's Water Chemistry Monitoring Project does collect contaminant loading data on a routine basis, which includes analysis for turbidity and suspended solids from a sampling station located within the AOC. These data may provide insight into whether or not these unnatural properties are in high enough quantities to interfere with the state's designated uses in the AOC. The remaining unnatural properties can also be observed during routine water chemistry sampling events.

Remedial Actions

No remedial actions have taken place since the 2005 Stage 2 RAP.

Assessment Activities and Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Clair 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.

Annotated References and Studies

- Aiello, C. 2003. Michigan Water Chemistry Trend Monitoring 2001 Report. Michigan Department of Environmental Quality, Water Division. Report #MI/DEQ/WD-03/085.
- Aiello, C. 2004. Michigan Water Chemistry Monitoring Great Lakes Tributaries 2002 Report. Department of Environmental Quality, Water Bureau. Report #MI/DEQ/WD-04/049.

- Aiello, C. 2005. Michigan Water Chemistry Monitoring Great Lakes Tributaries 2003 Report. Department of Environmental Quality, Water Bureau. Report #MI/DEQ/WB-05/058.
- Aiello, C. 2006. Michigan Water Chemistry Trend Monitoring Great Lakes Tributaries 2004 Report. Michigan Department of Environmental Quality Water Division. Report #MI/DEQ/WD-06/045.

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- Great Lakes Environmental Center and LimnoTech, Incorporated. 2006. Great Lakes Connecting Channels Data Evaluation and Trend Analysis Report. Report #MI/DEQ/WB-06/092. Michigan.gov/egle/about/organization/water-resources/glwarm/water-quality-monitoring-reports

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.

Added Costs to Agriculture or Industry

Significance in the St. Clair River Area of Concern

Food and salt processing industries have had to temporarily shut down their intakes due to upstream spills. In Michigan, Akzo Salt (formerly Diamond Crystal Salt), temporarily shut down its water intake from the St. Clair River due to a spill in February 1989 resulting in additional costs to the company (OMOE and MDNR, 1991). In addition, costs have been incurred for proper disposal of contaminated sediment removed from the river for marine and construction purposes (OMOE and MDNR, 1991).

The 2005 RAP Progress Report indicates that since there had been no water treatment plant closures or associated interruptions in water supply to industrial users between 1994 and 1997, the status of this BUI should be changed to "not impaired" (EC et. al., 2005). However, based on recent chemical spills to the St. Clair River, this BUI requires a more current review.

Restoration Criteria

The St. Clair River BPAC has accepted the state's criteria for restoring this beneficial use for Michigan's portion of this AOC. According to the *Guidance*, this beneficial use will be considered restored when there have been no plant shutdowns attributable to water quality over a two year period.

Remedial Actions

No remedial actions have taken place since the 2005 Stage 2 RAP.

Assessment Activities and Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Clair 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.

Loss of Fish and Wildlife Habitat

Deleted: *Degradation of Fish and Wildlife Populations*

Significance in the St. Clair River Area of Concern

Fish and wildlife habitat on both sides of the St. Clair River have been considerably altered due to industrialization, urban development, diking, drainage for agricultural purposes, and the development of navigational channels (OMOE and MDNR, 1991). According to the 1995 RAP document, there have also been significant losses of wetlands, particularly in the delta region of the St. Clair River AOC (OMOEE and MDNR, 1995). In addition, much of the original shoreline has been filled and bulkheaded, eliminating and/or altering the littoral zone which has resulted in major losses of fish and wildlife habitat (OMOE and MDNR, 1991).

Deleted: This beneficial use is impaired due to physical habitat loss.

Restoration Criteria

The restoration criteria outlined in the *Guidance* is a process for local PACs to use to develop locally-derived restoration targets and plans for fish and wildlife habitat and populations. The St. Clair River BPAC is currently in the process of developing restoration criteria. The finalized restoration plans will be part of future biennial RAP updates, and will contain at least the following components:

- A short narrative on historical fish and wildlife habitat or population issues in the AOC
- Description of the impairment(s) and location for each aquatic habitat or population site(s) to address all habitat or population issues identified in the RAP documents
- A locally derived restoration target for each impacted habitat or population site
- A list of all other ongoing habitat or population planning processes in the AOC

- A scope of work for restoring each impacted aquatic habitat or population site
- A component for reporting on habitat or population restoration implementation action(s) to the MDEQ.

Removal of this BUI will be based on achievement of full implementation of actions in the steps above. Habitat values need not be fully restored prior to delisting, as some may take many years to recover after actions are complete. Actions already implemented in the AOC may be reported and evaluated as long as the documentation contains all of the elements above.

Remedial Actions

No remedial actions have taken place since the 2005 Stage 2 RAP.

Assessment Activities and Results

This beneficial use is currently impaired. A technical committee will be convened when the MDEQ and the St. Clair 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.

References

Edly, K. and J. Wuycheck. 2006. Water Quality and Pollution Control in Michigan: 2006 Sections 303(d) and 305(b) Integrated Report. Report MI/DEQ/WB-6/019. <https://www.michigan.gov/egle/about/organization/water-resources/glwarm/integrated-report>

Environment Canada, Ontario Ministry of the Environment, and Michigan Department of Environmental Quality. 2005. The St. Clair River Area of Concern Remedial Action Plan Progress Report.

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. Available at: <http://www.ijc.org/rel/agree/quality.html#ann2>

Michigan Department of Environmental Quality. 2002. Qualitative Biological and Habitat Survey Protocols for Wadable Streams and Rivers, Great Lakes and Environmental Assessment Section, Procedure #51 (Revised May 2002).

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Appendix: Canada/Ontario Remedial Activities

- In 2005, wetlands were developed on the ICI Phosphate site near Corruna, ON in order to treat wastewater prior to discharging into the St. Clair River. Work undertaken on this site is a part of the long term site restoration plan.
- In 2005, a 50-acre naturalization project on Terra Industries property directly adjacent to the St. Clair River south of Sarnia was completed which included planting and restoration of trees and shrubs, tall grass prairie and wetlands. Terra Industries Inc. (which is a nitrogen producing facility) provided the land, and the work was carried out by the St. Clair Region Conservation Authority, Rural Lambton Stewardship Network and Ducks Unlimited Canada.