

An Assessment and Status Report of Beach Closings in the Saginaw River/Bay Area of Concern

April 2011

Prepared for
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Bay City, Michigan

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Executive Summary

The Partnership for the Saginaw Bay Watershed (Partnership) hired Public Sector Consultants Inc. (PSC) to conduct an assessment of current beach monitoring efforts, including beach closings, to advance the delisting of the Beach Closings Beneficial Use Impairment (BUI) in the Saginaw River/Bay Area of Concern (AOC) pursuant to state delisting criteria. Since 1987, through stakeholder involvement, planning, and targeted restorative actions, two BUIs have been delisted Tainting of Fish And Wildlife Flavor and Restrictions on Drinking Water Consumption or Taste and Odor Problems.

ASSESSMENT APPROACH AND RESULTS

In May 2008 the Partnership adopted new criteria and delisting targets issued by the Michigan Department of Environmental Quality (MDEQ) for delisting BUIs in the State of Michigan's AOCs. According to the new guidance, the Beach Closings BUI (exposure to water-borne human pathogens) will be considered restored and ready for delisting when a series of criteria have been met (e.g., at least 90 percent of sample results are below the daily geometric mean limits of 300 counts *E. coli* per 100 ml). These criteria are outlined on page 7.

Six coastal and riverine counties within the Saginaw Bay watershed—Arenac, Bay, Huron, Iosco, Saginaw, and Tuscola Counties—are home to 83 public beaches and access areas that are located throughout the region. In these six counties there are 54 public beaches and access areas that are located inside the AOC. The remaining 29 are located on inland waters and along Lake Huron, outside the AOC but in many cases very close to the boundary. They were included in this assessment (1) because data is largely available at the county level and (2) to capture interactions between the watershed and the AOC. The analysis in this report focuses on the 54 beaches and access areas within the AOC, however. Additionally, many private beaches exist in the AOC that are not included in this assessment because they are rarely sampled for microbial contamination due to lack of resources and accessibility by county health departments.

PSC convened a beach monitoring coordinating committee, including directors, or their designee, of the Environmental Health Departments of Arenac, Bay, Huron, Iosco, and Tuscola Counties¹, to review existing beach monitoring strategies; assess delisting criteria and targeted restored conditions, and develop recommendations for moving toward BUI delisting. Once restoration targets are achieved the Partnership, in collaboration with the MDEQ, can petition the United States Environmental Protection Agency (USEPA) for formal delisting of the BUI.

A distinction was made between swimming advisories and/or closures issued due to *E. coli* levels and those caused by an agglomeration of organic debris, commonly referred to as “muck.” Although public concern has grown regarding the presence of *E. coli* in organic debris in the nearshore zone and onshore (MDEQ, March 28, 2008), the coordinating committee noted that muck, in and of itself, does not constitute a human health risk and should be evaluated independently of *E. coli* contamination as part of the Eutrophication and/or the Undesirable Algae BUIs. If, however, the muck contains *E. coli* that exceeds water quality standards, it would provide a reason to issue an advisory, close a beach, and potentially, be listed in the *Integrated Report* for total or partial body contact, which would be reflected in the data reviewed as part of this assessment and procedures related to *E. coli* sampling (this report, issued bi-annually by the

¹ The Saginaw County Environmental Health Department was not included in the beach monitoring coordinating committee because the county's two public beaches and access areas are not located along the Saginaw River or the AOC.

MDEQ and submitted to the USEPA, identifies beaches for which chronic microbial contamination exists).

At the recommendation of the coordinating committee, the status of beaches and public access areas within the six coastal and riverine counties were reviewed using the MDEQ BeachGuard online database that tracks beach and public access area monitoring samples and closure history collected by local health departments. A detailed review of beaches identified in the 2010 *Integrated Report* was conducted. This review identified two beaches and two public access areas within the AOC (Veterans Park North, Kawkawlin River Boat Launch, Twining Road, and Singing Bridge) as not meeting BUI restoration targets. These four beaches and public access areas have relatively frequent and continued closures or advisories due to microbial contamination. Other beaches and public access areas within the AOC may also occasionally experience advisories or closures (e.g., a one-day closure) but are not considered to have “chronic” microbial contamination, and therefore are not included in the *Integrated Report*.

The four beaches and public access areas identified in the 2010 *Integrated Report* represent only 5 percent of the 83 public beaches and public access areas in the six coastal and riverine counties in the Saginaw Bay watershed and suggests that approximately 95 percent of public beaches and access areas in the Saginaw River and Bay coastal and riverine counties meet current restoration targets.

Additional analysis focuses on 54 public beaches and access areas within the AOC (a detailed list is included in Appendix 1). The four beaches identified in the 2010 *Integrated Report* represents 7 percent of those 54 beaches, which suggests that approximately 93 percent of AOC beaches and access areas within the AOC meet current restoration targets.

It should be noted that not all beaches and access areas are sampled on a regular basis. Monitoring priority is generally given to beaches and access areas that local stakeholders who are familiar with local conditions identify as most important. In 2010, 35 beaches within the AOC were sampled, which represents 65 percent of beaches and access areas in the AOC.

SUMMARY AND RECOMMENDATIONS

This assessment concludes that significant progress toward restoration goals has been achieved since beach closings and microbial contamination were identified as a concern in the Saginaw River and Bay. For example, within the watershed, discharges of untreated combined sewer overflows (CSOs) have been eliminated through facility upgrades and investment in infrastructure. Since the 1990s, over \$255 million has been invested to eliminate untreated CSOs from occurring at the, Bay City, Essexville, and Saginaw treatment plants through the use of expanded retention treatment basins (Bay County 2009). These facilities have the appropriate National Pollution Elimination Discharge System (NPEDS) permits in place and, to the knowledge of the coordinating committee, are meeting their permit conditions. Additionally, these facilities are not known to impact the two beaches or two public access areas identified as impaired by the 2010 *Integrated Report*.

This study concludes that the Beach Closing BUI delisting could occur within ten to 12 months, depending in part on a 2011 statewide beach assessment being conducted by the MDEQ to confirm that current monitoring data support delisting.

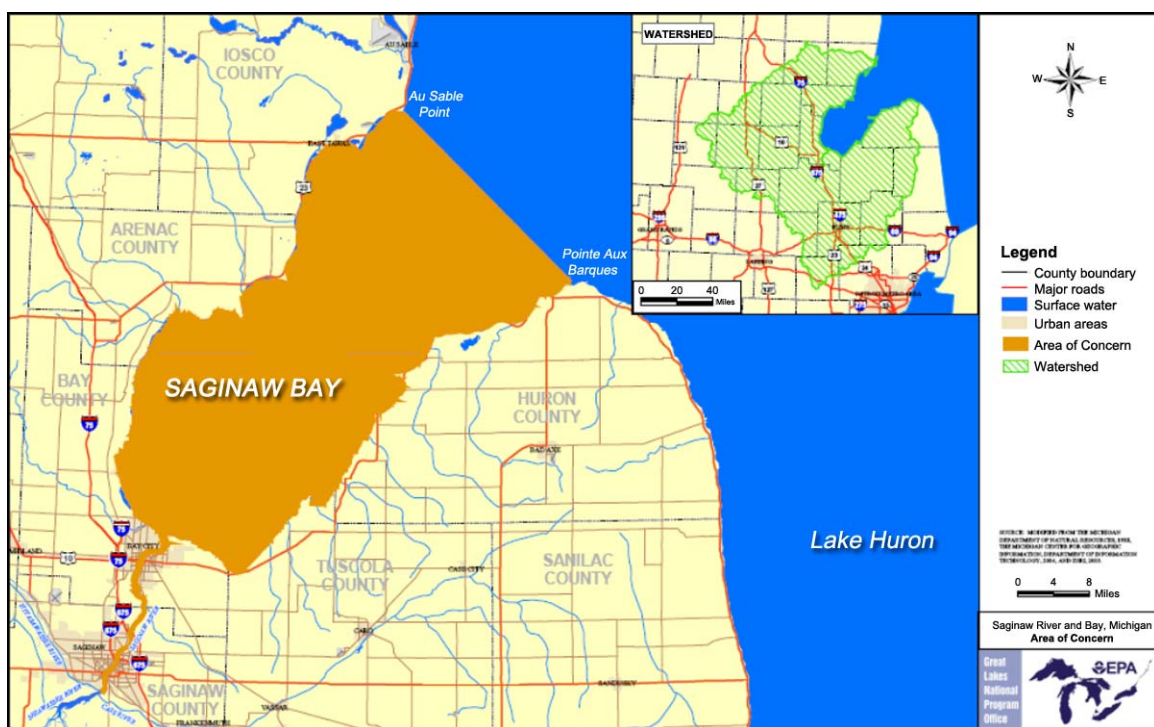
In addition, the following recommendations will help the Partnership continue to focus on important beach and public access area monitoring and restoration activities:

- Support funding to continue monitoring all public beaches and access areas and ensure that no new beaches or access sites are added to the 2012 *Integrated Report* for total or partial body contact.
- Focus remedial and planning efforts on the two beaches and two access areas currently identified in the 2010 *Integrated Report* and conduct corrective actions based on the results of the sanitary surveys funded by the Great Lakes Restoration Initiative (GLRI) taking place in 2011.
- Increase the sampling regime at beaches identified in the 2010 *Integrated Report* to three samples per week during the recreation season to establish trend data to meet the delisting requirements.
- Encourage adoption of a common wet weather monitoring standard by the local health departments to improve consistency of methods used throughout the watershed.
- Encourage adoption of a point-of-sale septic inspection ordinance in addition to regular onsite sewage disposal system (OSSD) maintenance and inspection at the local level to establish a means of assessing and decreasing nonconforming and failing systems. Such an ordinance would create an opportunity to educate citizens on maintenance requirements and decrease untreated human waste entering waterbodies in the watershed.
- Assess delisting in light of the 2011 MDEQ statewide beach assessment, as 95 percent of beaches in the six coastal and riverine counties adjacent to the AOC and 93 percent of beaches within the AOC meet restoration goals.

BACKGROUND

The Saginaw River/Bay was designated as a Great Lakes Area of Concern (AOC) in 1987. It is one of 14 AOCs in Michigan identified as “toxic hot spots” in need of comprehensive remediation and restoration to improve water quality in the Great Lakes. The physical boundary of the Saginaw River/Bay AOC is defined as extending from the head of the Saginaw River, at the confluence of the Shiawassee and Tittabawassee Rivers upstream of the city of Saginaw, to its mouth, including all of Saginaw Bay out to its interface with Lake Huron, at an imaginary line drawn between Au Sable Point and Pointe Aux Barques (see Exhibit 1).

EXHIBIT 1
Saginaw River/Bay Area of Concern



SOURCE: USEPA, 2011.

The Partnership for the Saginaw Bay Watershed is a local watershed group comprising citizens, government representatives, and members of the environmental community. The Partnership provides the necessary framework to address beneficial use impairments (BUIs) in the Saginaw River/Bay AOC.

When first assessed, the Saginaw River/Bay AOC contained 12 of the 14 BUIs determined under Annex 2 of the *Great Lakes Water Quality Agreement (GLWQA)*. Through stakeholder involvement, planning, and targeted restorative actions two BUIs have been delisted: Tainting of Fish and Wildlife Flavor, and Restrictions on Drinking Water Consumption or Taste and Odor Problems Ten beneficial uses remain impaired in the AOC. These are:

- Beach Closings
- Bird or Animal Deformities or Reproductive Problems
- Degradation of Aesthetics
- Degradation of Benthos
- Degradation of Fish and Wildlife Populations
- Degradation of Phytoplankton and Zooplankton Populations
- Eutrophication or Undesirable Algae
- Loss of Fish and Wildlife Habitat
- Restrictions on Dredging Activities
- Restrictions on Fish and Wildlife Consumption

This report focuses on assessing the Beach Closing BUI.

SAGINAW BAY BEACHES

Six coastal and riverine counties within the Saginaw Bay watershed—Arenac, Bay, Huron, Iosco, Saginaw, and Tuscola Counties—are home to 83 public beaches and access areas that are located throughout the region. Some of these beaches are located on inland waters and along Lake Huron. They are outside of the AOC boundary but were included in this assessment (1) because data is largely available at the county level and (2) to capture interactions between the watershed and the AOC. Exhibit 2 shows the distribution of these beaches and access areas by county and the number that were closed or had official advisories issued in 2010 due to *E. coli* contamination (MDEQ 2009). Of the 83 public beaches and access areas in the six coastal and riverine counties, 14 experienced closures or advisories in 2010 due to *E. coli* contamination. However, many of these closures or advisories can be considered “acute” occurrences (e.g., a one-day closure) that did not meet the threshold requirements for “chronic” conditions that warrant inclusion in the *2010 Integrated Report* issued by the Michigan Department of Environmental Quality (MDEQ).

EXHIBIT 2

Saginaw Bay Public Beaches and Access Areas*

County	All public beaches and access areas in the county	Beaches and access areas with closures or advisories in 2010
Arenac County	24	3
Bay County	9	3
Huron County	24	5
Iosco County	23	3
Saginaw County	2	0
Tuscola County	1	0
Total	83	14

SOURCE: MDEQ, BeachGuard database, 2011.

* This includes Lake Huron beaches outside the AOC boundary and inland lakes.

Of the 83 public beaches and access areas in the six coastal and riverine counties, 54 are located along the AOC boundary (see Appendix 1 for a detailed list of beaches and access areas). Exhibit 3 shows the distribution of AOC beaches and access areas by county.

EXHIBIT 3
Saginaw River/Bay AOC Public Beaches and Access Areas*

County	All public beaches and access areas in the county	Coastal and Inland beaches outside the AOC	Beaches and access areas within the AOC
Arenac County	24	4	20
Bay County	9	0	9
Huron County	24	9	15
Iosco County	23	13	10
Saginaw County	2	2	0
Tuscola County	1	1	0
Total	83	29	54

SOURCE: PSC analysis based on MDEQ, BeachGuard database, 2011.

Microbial contamination, indicated by concentrations of *E. coli* above water quality standards, indicates risk to human and environmental health. Untreated human waste and runoff from agricultural operations can transmit a variety of bacterial, viral, and parasitic diseases that threaten public health. The high use of the Saginaw River and Bay for swimming, fishing, boating and other recreational activities makes microbial contamination in waterbodies is a high priority for restoration.

PREVIOUS BUI ASSESSMENTS

The Beach Closing beneficial use impairment was assessed in detail in the 2000 *Measures of Success* report (PSC), the 2001 *Remedial Action Plan (RAP) Update* (PSC 2002), and the 2008 *Biennial Remedial Action Plan Update for the Saginaw River/Bay Area of Concern* (MDEQ 2008b), which identify beach closures due to microbial contamination as one of several impairments in the Saginaw River/Bay AOC. These previous studies identify combined sewer overflows (CSOs) as a direct contributor to beach closings in the AOC. A number of other potential sources of bacteria identified in those studies include sanitary sewer overflows (SSOs), treatment plant bypass discharges, onsite treatment system failures, agricultural runoff, and waterfowl concentrations.

A targeted restored condition for microbial contamination based on beach closings was developed in the *Measures of Success* report (PSC 2000) and revised in the 2001 *Remedial Action Plan (RAP) Update* (PSC 2002) as follows:

- Saginaw River: Three consecutive years of testing for *E. coli* bacteria, an indicator of the presence of harmful microorganisms, confirm that the state water quality standards for full-body recreation are being met.
- Saginaw Bay: Testing for *E. coli* bacteria confirms that state water standards have not been exceeded more than three times in any one swimming season, and that exceedances not last more than two days.

In May 2006, the Partnership for the Saginaw Bay Watershed accepted the state's criteria for restored conditions related to the Beach Closing BUI, as outlined in the 2006 *Guidance for Delisting Michigan's Great Lakes Areas of Concern* (MDEQ 2006).

TARGETED RESTORED CONDITIONS

Criteria for restored conditions were again updated in the 2008 updated *Guidance* (MDEQ 2008a) as follows (p. 37). Conditions for the beach closing BUI are considered restored when:

1. No waterbodies within the AOC are included on the list of non-attaining waters due to contamination with pathogens 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 U.S. EPA every two years.
2. OR, in cases where the waterbodies within the AOC are on the list of non-attaining waters due to the presence of Combined Sewer Overflows (CSOs) or are impacted by upstream CSOs, this BUI will be considered restored when:
 - A. Updated information reveals that the CSOs have been eliminated or are being treated.
3. OR, in cases where CSOs still exist and significant progress has been made towards their elimination or treatment, this BUI will be considered restored when:

Monitoring in the AOC during the recreation period, using the sampling protocol outlined in Rule 62 of the Michigan WQS, meets the following criteria:

- A. The sampling plan and Quality Assurance Project Plan are approved by the MDEQ;
- B. *E. coli* concentrations are below a 30-day geometric mean of 130 counts per 100 milliliters (ml);
- C. At least 90% of sample results are below the daily geometric mean limits of 300 counts *E. coli* per 100 ml;
 - No more than 1 of the sample results exceed the partial-body contact water quality standard of 1,000 counts *E. coli* per 100 ml based on a daily geometric mean; and
- D. DEQ-approved plans in a National Pollutant Discharge Elimination System (NPDES) permit are in place for addressing any remaining CSOs that are causing BUIs and the implementation plan is on schedule.

Sampling under approach 3 is done systematically throughout the recreation season, and does not specifically monitor wet weather discharges from CSOs. Meeting the above criteria does not negate regulatory requirements for separating CSOs in order to meet water quality standards.

ASSESSMENT APPROACH

The MDEQ and local health departments play a vital role in efforts to monitor beach closings due to bacterial contamination. A Beach Monitoring Coordinating Committee² was formed to review monitoring activities, assess the status of beach closings, and develop recommendations to achieve restoration targets. The committee comprised environmental health directors (or their designee) of the Bay, Central Michigan (Arenac County), Huron, and Tuscola Health Departments, as well as representatives of the MDEQ.

At the recommendation of the coordinating committee and pursuant to BUI restoration targets, the status of waterbodies identified on the 2010 *Integrated Report* as not supporting partial or total body contact was identified and compared to water quality standards (restoration target 3.A). Additionally, a review of CSOs within the AOC and its upstream waters (restoration targets 3.B and 3D) and available beach monitoring data was conducted for waterbodies identified as not supporting partial or total body contact due to elevated *E. coli* concentrations (restoration target 3.C).

For the purposes of assessing BUI restoration targets, a differentiation was made between beaches at which a closure occurred due to “acute” *E. coli* contamination and beaches with “chronic” *E. coli* contamination identified **in the *Integrated Report*** as not supporting the designated uses of total body contact and partial body contact, due to *E. coli* contamination. Not all beaches or access sites that experience closures or advisories due to *E. coli* are identified in the *Integrated Report*.

A distinction was also made between swimming advisories and/or closures issued due to *E. coli* levels and those caused by an agglomeration of organic debris, commonly referred to as “muck.” Although public concern has grown regarding the presence of *E. coli* in organic debris in the nearshore zone and onshore (MDEQ, March 28, 2008), the coordinating committee noted that muck, in and of itself, does not constitute a human health risk and should be evaluated independently of *E. coli* contamination as part of the Eutrophication and/or the Undesirable Algae BUI. If, however, the muck contains *E. coli* that exceeds water quality standards, it would provide cause for issuing an advisory, closing a beach, and potentially, being listed in the *Integrated Report* for total or partial body contact, which would be reflected in the data reviewed as part of this assessment and procedures related to *E. coli* sampling.

CRITERIA

The following sections assess the status of the beach closing BUI within the AOC as outlined by the restoration criteria listed on page 7.

Criterion 1: Waterbodies within the AOC Identified as Impaired in the 2010 Integrated Report

A review of the 2010 *Integrated Report* indicates that two swimming beaches and two access areas are listed within the AOC as not supporting total or partial body contact for recreational purposes due to *E. coli* contamination (see Exhibit 4). Additionally, Whites Beach, in Arenac County, is identified in the 2010 *Integrated Report* as having insufficient information regarding the total and partial body contact designated use. At the recommendation of MDEQ staff, a

² The members of the Beach Monitoring Coordinating Committee were Charlie Bauer, Thomas McDowell, and Michelle Selzer, of the MDEQ and environmental health directors: Doug Getty (Iosco County), Tip MacGuire (Huron and Tuscola Counties), Michelle Patton (Arenac County), and Joel Straz (Bay County).

review of beach monitoring data for Whites Beach was conducted due to sampling results from previous years.

EXHIBIT 4

Waterbodies within the AOC Identified as Impaired Due to *E. coli* Concentrations

Beach	Watershed	Watershed HUC	AUID	Use Support
Lake Huron Twining Road Beach	Au Gres-Rifle	04080101	040801010503-03	Not Supporting
Saginaw Bay Singing Bridge Beach	Au Gres-Rifle	04080101	040801010504-02	Not Supporting
Lake Huron Whites Beach	Au Gres-Rifle	04080101	040801020104-01	Insufficient Information
Kawkawlin River Boat Launch	Kawkawlin-Pine	04080102	040801020106-01	Not Supporting
Veteran's Park North Bay City	Saginaw	04080206	040802060204-01	Not Supporting

SOURCE: Michigan Department of Environmental Quality, 2010.

According to Sylvia Heaton with the MDEQ's Surface Water Assessment Section—the MDEQ entity responsible for compiling the *Integrated Report*—the United States Environmental Protection Agency (USEPA) has a 1994 guidance document that describes how a previously listed waterbody may be removed from the *Integrated Report*. Sites may be removed from the *Integrated Report* if: (1) the waterbody meets applicable water quality standards (outlined above), or if pollution control measures have been implemented and the waterbody is expected to meet these standards within a reasonable time frame; or (2) if, upon re-examination, the original basis for listing is determined to be inaccurate (Selzer 2011). To meet these water quality standards, at least three weekly samples must be collected over the course of 16 weeks during the recreational season between May 1 and October 31 (MDEQ 2010). Furthermore, a waterbody listed for more than one pollutant may be removed from the *Integrated Report* for that individual pollutant if standards are met (Selzer 2011).

Criterion 2: CSOs in the Watershed

Within the 22-county watershed, discharges of untreated CSOs have been eliminated through facility upgrades and investment in infrastructure. Since the 1990s, over \$255 million has been invested to prevent untreated CSOs from occurring at the Bay City, Essexville, and Saginaw treatment plants through the use of expanded retention treatment basins (Bay County 2009). These facilities (see Exhibit 5) have the appropriate National Pollution Elimination Discharge System (NPEDS) permits in place and, to the knowledge of the coordinating committee, are meeting their permit conditions. Additionally, these facilities are not known to impact the four beaches and access areas identified as impaired by the 2010 *Integrated Report*.

EXHIBIT 5

Facilities Permitted for Treated CSO Discharge

County	Facility	NPEDS Permit Number
Bay County	Bay City	MI0022284
Bay County	Essexville	MI0022918
Saginaw County	Saginaw	MI0025577
Saginaw County	Saginaw Township	MI0023973

SOURCE: MDEQ, Combined Sewer Overflow facilities Database.

Criterion 3: Beach Monitoring Review

The MDEQ maintains the BeachGuard online database that tracks beach and public access area monitoring samples and closure history collected by local health departments. Sampling and closure history available through the BeachGuard database for the two beaches and two public access areas identified by the 2010 *Integrated Report* were reviewed to determine the status of these beaches and public access areas within the context of BUI restoration targets.

Given that the majority of CSOs in the watershed have been eliminated and all remaining CSOs receive treatment, the coordinating committee identified nonpoint source pollution as the most significant remaining source. Failing and nonconforming onsite sewage disposal systems (OSSDs) were identified as one nonpoint source of microbial contamination in the watershed. Additionally, runoff from agricultural operations was identified as a second nonpoint source of bacteria in the watershed.

Singing Bridge Beach, Arenac County

The Singing Bridge Beach is located at the mouth of the Whitney Drain in the AuGres Watershed.

- (3.A) Sample results exceeded the 30-day geometric mean standard in the following years: 2003, 2005, and 2008–2010.
- (3.B) In 2001 and 2002 no documented exceedances occurred, meeting the daily geometric mean standard. In each year from 2003 to 2010 the delisting threshold of 90 percent of sample results below 300 counts of *E. coli* was not met.
- (3.C) In each year from 2001 through 2010 not more than one sample exceeded the partial body contact standard of 1,000 counts *E. coli* per 100 ml.
- (3.D) There are no facilities with a CSO in Arenac County, or in counties with contributing waterbodies (Iosco and Ogemaw Counties).

Data available through the BeachGuard system indicate that restoration targets were not met from 2003 through 2010. Microbial contamination can likely be attributed to nonpoint sources. The Whitney Drain is the outlet for the East Branch of the Au Gres River Watershed, which covers approximately 150 square miles, or 95,930 acres. Current land uses within the watershed have been estimated at 61 percent forest, 36 percent agricultural, and 3 percent other uses, which include quarries, urban, and other water. Much of the residential development is along the shoreline or near the Whitney Drain. The Singing Bridge Beach is scheduled for a Total maximum Daily Load (TMDL)³ in 2017.

Twining Road Beach, Arenac County

Twining Road Beach is located in the Au Gres River watershed.

- (3.A) Sampling data indicate that between 2001 and 2010 no documented exceedances of the 30-day geometric mean standard occurred.
- (3.B) From 2001 through 2005 and 2007 through 2010, at least 90 percent of sample results were below the daily geometric mean limit of 300 counts *E. coli* per 100 ml. In 2006, 85 percent of samples were below 300 counts *E. coli*, which is below the delisting threshold of 90 percent.

³ Total Maximum Daily Load is: “The sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources and natural background, and a margin of safety. TMDLs can be expressed in terms of mass per time, toxicity, or other appropriate measures that relate to a state's water quality standard” (USEPA, 2010).

- (3.C) In each year from 2001 through 2005 and 2007 through 2010, not more than one sample exceeded the partial body contact standard. In 2006 two samples exceeded 1,000 counts *E. coli*.
- (3.D) There are no facilities with a CSO in Arenac County, or in counties with contributing waterbodies (Iosco and Ogemaw Counties).

Data available through the BeachGuard system indicate that all restoration targets were met from 2001 through 2005, and 2007 through 2010. Microbial contamination can likely be attributed to nonpoint sources. The beach is scheduled for a TMDL in 2021.

Whites Beach, Arenac County

Whites Beach is located in the Kawkawlin-Pine Watershed.

- (3.A) Sampling data indicate that exceedances of the 30-day geometric mean standard occurred in 2005 and 2009.
- (3.B) In 2001, 2002, 2008, and 2010 at least 90 percent of samples met the daily geometric mean standard. In 2003 through 2007 and in 2009, the delisting threshold of 90 percent of sample results below 300 counts of *E. coli* was not met.
- (3.C) In each year from 2001 through 2010 not more than one sample exceeded the partial body contact standard.
- (3.D) There are no facilities with a CSO in Arenac County, or in counties with contributing waterbodies (Iosco and Ogemaw Counties).

Data available through the BeachGuard system indicate that restoration targets were met in 2010. These targets were not met in 2009; however, this suggests that while the beach is not in the *Integrated Report* due to insufficient information, it should be monitored and restoration efforts put in place to ensure that it is not added to the report during a future assessment. Microbial contamination can likely be attributed to nonpoint sources.

Kawkawlin River Boat Launch, Bay County

The Kawkawlin River Boat Launch is located in the Kawkawlin-Pine Watershed.

Full data was not available in the BeachGuard system for 2005.

- (3.A) Samples result exceeded the 30-day geometric mean standard in the following years: 2003, 2004, 2006, 2008, and 2010.
- (3.B) In each year from 2002 to 2004 and 2006 to 2008, and in 2010, the daily geometric mean standard was not met. In 2009 there were no documented exceedances.
- (3.C) In each year from 2001 through 2004 and 2006 through 2009, not more than one sample exceeded the partial body contact standard. In 2010 two samples exceeded 1,000 counts *E. coli* per 100 ml.
- (3.D) As of this review, all CSOs within the watershed have NPEDS permits in place (MDEQ 2005).

Data available through the BeachGuard system indicate that restoration targets have not been met. Microbial contamination can likely be attributed to nonpoint sources.

Veteran's Park North, Bay County

Veteran's Park North is located along the Saginaw River in the Saginaw River watershed.

- (3.A) Sample results indicate that the 30-day geometric mean standard was exceeded in 2007. Data in the Beach Guard system indicate that the 30-day geometric mean standard was met from 2002 through 2006, and 2008 through 2010.
- (3.B) In each year from 2002 to 2006 and 2008 to 2010 the daily geometric mean standard was met. In 2007, 87 percent of samples met the daily geometric mean standard.
- (3.C) In each year from 2002 through 2010 not more than one sample exceeded the partial body contact standard, meeting the delisting criteria.
- (3.D) As of this review, all CSOs within the watershed have NPEDS permits in place (MDEQ 2005)

Data available in the Beach Guard system indicate that standards were met from 2002 through 2006, and 2008 through 2010. Microbial contamination can likely be attributed to nonpoint sources.

Exhibit 6 compares the number of beaches identified in the 2010 *Integrated Report* to the number of beaches and access areas along the AOC by county to calculate the percent of beaches meeting restoration targets by county, and for the AOC as a whole. The figures indicate that in 2010, 93% of beaches along the AOC met current restoration targets.

EXHIBIT 6 AOC Beaches and Access Areas Meeting Restoration Targets

County	Beaches and access areas within the AOC identified in the Integrated Report (Beaches and access areas within the AOC	% of Beaches meeting restoration goals(
Arenac County	2	20	90%
Bay County	2	9	78%
Huron County	0	15	100%
Iosco County	0	10	100%
Saginaw County	0	0	NA
Tuscola County	0	0	NA
Total	4	54	93%

SOURCE: PSC analysis based on MDEQ, BeachGuard database, 2011

ONGOING BEACH AND ACCESS AREA MONITORING AND RESTORATION EFFORTS

Numerous efforts are ongoing throughout the watershed and the bay region to monitor microbial contamination and restore environmental quality. The Great Lakes Restoration Initiative (GLRI), the Michigan BEACH Act, and the Clean Michigan Initiative – Clean Water Fund (CMI-CWF) have provided funding to counties in the watershed to collect *E. coli* samples and implement restoration projects. However, environmental health directors indicated that continued funding to maintain sampling regimes and implement remedial activities is at risk due to declining budgets. In 2011 local health departments will continue to sample beaches during the recreation season between May 1 and October 31 (see Exhibit 7). The coordinating committee recommended adoption of a common guidance document on wet weather sampling (see Appendix 2) to improve

the consistency of methods across jurisdictions, providing consistent monitoring results. The guidance document would have to be adopted by each of the health departments.

EXHIBIT 7
Beach Sampling, May 1–October 31, 2011

County	Beaches scheduled for sampling in 2011*	Duration	Frequency
Arenac County	11	16 Weeks	1/Week
Bay County	5	16 Weeks	>3/Week
Huron County	13	16 Weeks	1/Week
Iosco County	12	16 Weeks	1/Week
Tuscola County	0	0	0

SOURCE: Beach Monitoring Coordinating Committee, 2011.

*Some of these beaches are located along inland waters or beyond the boundary of the AOC.

In addition to continued sampling of Saginaw Bay beaches and access sites, many efforts throughout the watershed have been developed and put in place to decrease beach closures and microbial contamination in the Saginaw Bay and its contributing waterways. Ongoing activities identified by the coordinating committee and other sources include:

- Continued financial assistance for the Conservation Reserve Enhancement Program (CREP) to exclude animals from over 26 miles of stream banks while continuing to fund best management practices on more than 47,000 acres in the watershed (MDEQ, March 28, 2008).
- The GLRI funded a project to develop a predictive modeling and rapid response system to monitor beaches in Bay County. The project is a partnership between Bay County, Saginaw Valley State University, and the United States Geological Survey, among others (USGS 2010).
- The GLRI-funded project, “Integrated Beach Sanitary Surveys Using qPCR Tools,” coordinated by Michigan State University, will “compare the performance of the molecular methods with conventional tests, to produce an approach/protocol to use these assays and/or target organisms in routine and annual sanitary surveys, and will aid in current surveys to identify sources of microbial contamination influencing recreational water quality” (MSU n.d.).
- The MDEQ “established CSO control requirements in NPEDS permits issued to municipal point source dischargers. Six communities in the watershed have spent over \$143 million to eliminate 52 untreated CSOs into the watershed” (MDEQ, March 28, 2008).
- In 2011 the West Bay County Wastewater Treatment Plant opened a 54-million-gallon retention basin that is capable of holding three days of wet weather flows from Hampton Township and the City of Essexville. The new facility is expected to substantially reduce CSOs from Essexville, if not eliminate them completely. The new facility is part of a broader regional system that makes additional capacity available at the Bay City Wastewater Treatment Plant, which will reduce the number of CSOs originating from that facility (McDowell 2011).
- The Saginaw Bay Coastal Initiative (SBCI) is a group comprising representatives from county, state, and federal government to “develop and implement a comprehensive approach to promoting environmentally sound economic development and resource restoration in the

Saginaw Bay coastal area.” The SBCI is involved in multiple projects throughout the watershed to improve environmental quality (Bay County, n.d.).

- The Central Michigan District Health Department (Arenac County) has received 2010 GLRI pass-through funding from the MDEQ to conduct sanitary surveys at Singing Bridge Beach, Twining Road Beach, and Whites Beach.
- The Bay County Health Department received 2010 GLRI pass-through funds to conduct source tracking in the Kawkawlin watershed. Corrective actions will likely lead to improved beach conditions at the Kawkawlin Boat Launch.
- The Kawkawlin River Watershed Management Plan is bringing together the MDEQ, the Bay County Drain Commission, the Bay County Health Department, and other groups to address bacterial contamination and other environmental quality concerns in the watershed.

Summary and Recommendations

This assessment concludes that significant progress toward restoration goals has been achieved since beach closings and microbial contamination were identified as a concern in the Saginaw River and Bay. Currently, 95 percent of beaches in the six coastal and riverine counties adjacent to the AOC and 93 percent of beaches within the AOC meet restoration goals. Recently enacted and ongoing efforts will continue to decrease microbial contamination in the watershed with the potential for this BUI to be delisted within 10–12 months. The following recommendations will help the Partnership continue to move toward BUI delisting.

RECOMMENDED STRATEGY AND ACTIONS

- Support funding to continue monitoring all beaches and access sites and ensure that no new beaches or access sites are added to the 2012 *Integrated Report* for total or partial body contact.
- Focus remedial and planning efforts on the four beaches and access areas currently identified on the 2010 *Integrated Report* and conduct corrective actions based on the results of the GLRI funded sanitary surveys taking place in 2011.
- Increase the sampling regime at beaches identified on the 2010 *Integrated Report* to three samples per week during the recreation season to establish trend data to meet the delisting requirements.
- Encourage adoption of a common wet weather monitoring standard at the local health departments to improve consistency of methods used throughout the watershed.
- Encourage adoption of a point-of-sale septic inspection ordinance in addition to regular onsite sewage disposal system (OSSD) maintenance and inspection at the local level to establish a means of assessing and decreasing nonconforming and failing systems. Such an ordinance would create an opportunity to educate citizens on maintenance requirements and decrease untreated human waste entering waterbodies in the watershed.
- Assess delisting in light of the 2011 MDEQ statewide beach assessment, as 95 percent of beaches in the six coastal and riverine counties adjacent to the AOC and 93 percent of beaches within the AOC meet restoration goals.

References

- Bay County, Michigan. N.d. *Saginaw Bay Coastal Initiative (SBCI)*. [Online, accessed 3/23/11.] Available: <http://www.baycounty-mi.gov/executive/saginawbaycoastalinitiativesbci.aspx>.
- . June 5, 2009. *Overview of CSO Control in Michigan and Within the Saginaw River Watershed (RTBs Presentation)*. [Online, accessed 3/23/11.] Available: <http://www.baycounty-mi.gov/uploads/Presentation%20Saginaw%20RTBs%2006-02-09%20Pete%20Ostlund.pdf>.
- Law, Neely, Lisa Fraley-McNeal, Karen Capiella, and Robert Pitt. August 2008. *Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies Using Six Example Study Designs*. Ellicott City, Md.: Center for Watershed Protection. [Online, accessed 4/5/11.] Available: <http://basineducation.uwex.edu/centralwis/pdfs/StormwaterMonitoringGuidance.pdf>.
- McDowell, Thomas (MDEQ, Water Bureau, Senior Environmental Engineer). January 11, 2011. Personal communication.
- Michigan Department of Environmental Quality (MDEQ). 2010. *Water Quality and Pollution Control in Michigan 2010 Sections 303(d), 305(b), and 314 Integrated Report*, Report MI/DEQ/WB-10/001. Lansing, Mich.: MDEQ.
- . 2009. *BeachGuard*. [Online, accessed 3/23/11.] Available: <http://www.deq.state.mi.us/beach/>.
- . March 28, 2008. Interoffice memorandum. *Saginaw Bay Integrated Report Listing Response*.
- . 2008a. *Guidance for Delisting Michigan's Great Lakes Areas of Concern*, Report MI/DEQ/WB-06/001. Lansing, Mich.: MDEQ.
- . 2008b. *Biennial Remedial Action Plan Update for the Saginaw River/Bay Area of Concern*. Lansing, Mich.: MDEQ.
- . January 2006. *Guidance for Delisting Michigan's Great Lakes Areas of Concern*. Report MI/DEQ/WB-06/001. Lansing, Mich.: MDEQ. [Online, accessed 3/23/11.] Available: http://www.michigan.gov/documents/deq/wb-aoc-delistguide_247421_7.pdf.
- . 2005. *Combined Sewer Overflow Facilities*. [Online, accessed 3/23/11.] Available: http://www.deq.state.mi.us/csosso/find_csso_facilities.asp.
- Michigan State University, The Water Quality, Environmental, and Molecular Microbiology Laboratory. N.d. *Current Projects*. [Online, accessed 3/23/11.] Available: http://www.fw.msu.edu/~rosejo/projects.htm#qPCR_Tools.
- Public Sector Consultants (PSC). 2002. *Targeting Environmental Restoration in the Saginaw River/Bay Area of Concern: 2001 Remedial Action Plan Update*. Lansing, Mich.: PSC.
- . 2000. *Measures of Success: Addressing Environmental Impairments in the Saginaw River and Saginaw Bay*. Lansing, Mich.: PSC.
- Selzer, Michelle (MDEQ, Water Bureau, Remedial Action Plan Liaison). February 1, 2011. Personal Communication.
- U.S. Geological Survey (USGS), Great Lakes Restoration Initiative (GLRI). September 21, 2010. *Enhance Great Lakes Beach Recreational Water Quality Decision Making*. [Online,

- accessed 3/23/11.] Available: http://cida.usgs.gov/glri/projects/nearshore_health/beach_water_quality.html.
- U.S. Environmental Protection Agency (USEPA). February 18, 2011. Saginaw River and Bay Area of Concern [Online, accessed 3/24/11.] Available: <http://www.epa.gov/glnpo/aoc/sagrivr.html>.
- . January 6, 2010. Total Maximum Daily Loads (303d) Glossary. [Online, accessed 4/6/11.] Available: <http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/glossary.cfm#t>.

Appendix 1: *Beaches and Access Areas*

The following table⁴ provides a list of the 83 public beaches in the six Saginaw Bay coastal and riverine counties included in the BeachGuard system and indicates whether or not monitoring information was available.

County	Beach Name	Waterbody Type	Along AOC	Sampled in 2010
Arenac	Flint Park Hunt Club	Inland Lake	N	N
Arenac	Big Bend Campground	Inland Lake	N	N
Arenac	Outdoor Adventures	Inland Lake	N	N
Arenac	Oasis Lake County Park	Inland Lake	N	Y
Arenac	DNR Access-Au Gres River	River	Y	N
Arenac	Pine River Public Access	River	Y	N
Arenac	Augres Township Park Beach	Great Lake	Y	N
Arenac	Booth Road Beach	Great Lake	Y	N
Arenac	City of Augres Public Access	Great Lake	Y	N
Arenac	Gordon Road Beach	Great Lake	Y	N
Arenac	Terrace Road	Great Lake	Y	N
Arenac	Au Sable State Forest- Greens Point	Great Lake	Y	N
Arenac	Pump Station	Great Lake	Y	N
Arenac	16th Street Beach	Great Lake	Y	Y
Arenac	28th Street Beach	Great Lake	Y	Y
Arenac	Arenac County Park	Great Lake	Y	Y
Arenac	Bessinger Road Beach	Great Lake	Y	Y
Arenac	Cemetery Beach	Great Lake	Y	Y
Arenac	Dyer Road Beach	Great Lake	Y	Y
Arenac	Foster Road Beach	Great Lake	Y	Y
Arenac	Hammel Beach Road Access	Great Lake	Y	Y
Arenac	Singing Bridge Beach	Great Lake	Y	Y
Arenac	Twining Road Beach	Great Lake	Y	Y
Arenac	Whites Beach	Great Lake	Y	Y
Bay	Nayanquing Point Wildlife Area	Great Lake	Y	N
Bay	Boat Launch on Kawkawlin River	River	Y	Y
Bay	Bay City State Recreation Area	Great Lake	Y	Y
Bay	Brissette Beach Township Park	Great Lake	Y	Y

⁴ Compiled by Public Sector Consultants using data obtained from *BeachGuard*, <http://www.deq.state.mi.us/beach>.

County	Beach Name	Waterbody Type	Along AOC	Sampled in 2010
Bay	Pinconning Park	Great Lake	Y	Y
Bay	South Linwood Beach Township Park	Great Lake	Y	Y
Bay	Wenona Beach	Great Lake	Y	Y
Bay	Vet's Park North Bay City	River	Y	Y
Bay	Vet's Park South River Rd.	River	Y	Y
Huron	Harbor Beach Marina	Great Lake	N	N
Huron	Helena Road End	Great Lake	N	N
Huron	Lighthouse County Park-South	Great Lake	N	N
Huron	Stafford County Park	Great Lake	N	N
Huron	Wagener County Park	Great Lake	N	N
Huron	Grindstone Public Access	Great Lake	N	N
Huron	Kinch Road End	Great Lake	N	N
Huron	Harbor Beach City Park	Great Lake	N	Y
Huron	Lighthouse County Park	Great Lake	N	Y
Huron	County Road End (STORET_NUMBER 320272)	Great Lake	Y	N
Huron	Geiger Road Public Access	Great Lake	Y	N
Huron	Larned Road End	Great Lake	Y	N
Huron	Mud Creek Public Access	Great Lake	Y	N
Huron	Bird Creek County Park	Great Lake	Y	Y
Huron	Caseville County Park	Great Lake	Y	Y
Huron	Jenks County Park	Great Lake	Y	Y
Huron	McGraw County Park	Great Lake	Y	Y
Huron	Oak Beach County Park	Great Lake	Y	Y
Huron	Philp County Park	Great Lake	Y	Y
Huron	Port Crescent State Park - Camping Area	Great Lake	Y	Y
Huron	Port Crescent State Park - Day Use	Great Lake	Y	Y
Huron	Sleeper State Park	Great Lake	Y	Y
Huron	Thompson Park	Great Lake	Y	Y
Huron	Veterans Park	Great Lake	Y	Y
Iosco	Chain Lake Beach	Lake	N	N
Iosco	Footsite Park	Inland Lake	N	N
Iosco	Loon Lake Park	Inland Lake	N	N
Iosco	Sand Lake - Sand Lake Road Access	Lake	N	N
Iosco	Interlake Road End	Great Lake	N	N
Iosco	Lake To Lake Road	Great Lake	N	N
Iosco	Greenbush Township beach	Lake	N	Y

County	Beach Name	Waterbody Type	Along AOC	Sampled in 2010
Iosco	Old Orchard Park	Inland Lake	N	Y
Iosco	Long Lake Public Access	Inland Lake	N	Y
Iosco	Oscoda Township Park- Van Ettan Lake	Inland Lake	N	Y
Iosco	MDOT Roadside Park - Three Mile Park	Great Lake	N	Y
Iosco	Oscoda Township Beach	Great Lake	N	Y
Iosco	Au Sable Township Park	Great Lake	N	Y
Iosco	Au Sable Point Beach	Great Lake	Y	N
Iosco	Alabaster Township Douglas Drive Beach Use Area	Great Lake	Y	N
Iosco	Tawas Point State Park-Central	Great Lake	Y	N
Iosco	County Road End (Storet Number 350200)	Great Lake	Y	N
Iosco	Gateway Park	Great Lake	Y	N
Iosco	Alabaster Township	Great Lake	Y	Y
Iosco	Tawas Point State Park Campground	Great Lake	Y	Y
Iosco	Tawas Point State Park-Day Use area	Great Lake	Y	Y
Iosco	East Tawas City Park	Great Lake	Y	Y
Iosco	Tawas City Park	Great Lake	Y	Y
Saginaw	Haitco Lake	Inland Lake	N	N
Saginaw	Lake of Dreams	Inland Lake	N	N
Tuscola	Murphy Lake	Inland Lake	N	N

Appendix 2: *Draft Guidance on Wet Weather Sampling*⁵

The goal of representative monitoring is to establish an understanding of storm water quality under a typical range of wet-weather conditions. Consequently, some guidelines should be used to define when sampling crews prepare and when sampling should begin. While this guidance attempts to define conditions under which Municipalities with Separate Storm Sewer Systems (MS4) discharge points are likely to discharge, there will be times when local health departments have a better understanding of local conditions and how their systems respond to rain.

As a general guide, sampling should only occur following a dry period of 72 hours or more. Additionally, it is recommended that a storm of 0.25 inches or more within a 24-hour period be used as a minimum for sampling. A range of storm events (size and duration) will help establish the expected discharge quality, with the focus on the typical range of storms seen annually. Unusually heavy or severe storms similar to a 100-year 24-hour event may not be sampled at all; and very common small rain events (e.g., < ½ inch) should not be overrepresented in a sampling plan with the goal of understanding discharge quality over a range of conditions. Ideally, if local rainfall is, or can be, divided into categories that represent rain depth, rain intensity, seasons, and/or dry periods, the use of stratified random sampling of storm events is recommended. It is necessary to sample a sufficient number of representative storm events under each of those categories.

If possible, an open line of communication or collaborative agreement should be established with local weather monitoring sources to aid in forecasting incoming storms and screening them for potential monitoring events. A reliable source of storm tracking and forecasting will help reduce the number of “false starts” for monitoring crews when a storm doesn’t fully form or doesn’t produce enough rain to generate a discharge event.

In *Monitoring to Demonstrate Environmental Results: Guidance to Develop Local Stormwater Monitoring Studies Using Six Example Study Designs*, Law et al. mention that at least two years of monitoring is needed to get about 20 to 30 representative wet weather pollution events. In addition, they note that samples from about half of the storm events have the potential of being discarded due to unexpected conditions and sampling errors (Law et al. 2008).

⁵ Draft Guidance on Wet Weather Sampling provided by Charles Bauer, Michigan Department of Environmental Quality and Beach Monitoring Coordinating Committee member.