UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

08 DEC 2016

REPLY TO THE ATTENTION OF:

Mr. Jon W. Allan, Director
Office of the Great Lakes
Michigan Department of Environmental Quality
525 West Allegan Street
P.O. Box 30473
Lansing, Michigan 48909-7973

Dear Mr. Allan:

Thank you for the September 28, 2016, request to remove the "Eutrophication or Undesirable Algae" Beneficial Use Impairment (BUI) at the St. Marys River Area of Concern (AOC), MI. As you know, we share your desire to restore all of the Great Lakes AOCs and to formally delist them.

Based upon a review of your submittal and the supporting data, the U.S. Environmental Protection Agency hereby approves your BUI removal request at the St. Marys River AOC. In addition, EPA will notify the International Joint Commission of this significant positive environmental change at this AOC.

We congratulate you and your staff, as well as the many federal, state, and local partners who have worked so hard and been instrumental in achieving this important environmental improvement. This progress will benefit not only the people who live and work in the St. Marys River AOC, but all the residents of the Great Lakes basin as well.

We look forward to the continuation of this important and productive relationship with your agency and the Binational Public Advisory Committee as we work together to delist this AOC in the years to come. If you have any further questions, please contact me at (312) 353-4891, or your staff may contact John Perrecone, at (312) 353-1149.

Sincerely,

Tinka G. Hyde

Tinka G. Hyde, Director
Great Lakes National Program Office

Recycled/Recyclable • Printed with Vegetable Oil Based Inks on 100% Recycled Paper (100% Post-Consumer)

cc: John Riley, MDEQ
Rick Hobrla, MDEQ
Rajesh Bejankiwar, IJC
Marc Tuchman, EPA, GLNPO
Edwin Smith, EPA, GLNPO

STATE OF MICHIGAN
OFFICE OF THE GREAT LAKES
LANSING

RICK SNYDER
GOVERNOR

JON W. ALLAN
DIRECTOR

September 28, 2016

Mr. Chris Korleski, Director
Great Lakes National Program Office
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard (G-17J)
Chicago, Illinois 60604-3507

Dear Mr. Korleski:

I am writing to request the United States Environmental Protection Agency (USEPA), Great Lakes National Program Office's (GLNPO) concurrence with the removal of the Eutrophication or Undesirable Algae Beneficial Use Impairment (BUI) from the St. Marys River Area of Concern (AOC). The Michigan Department of Environmental Quality (MDEQ), Office of the Great Lakes (OGL) has assessed the status of this BUI in accordance with the state's *Guidance for Delisting Michigan's Great Lakes Areas of Concern*, and recommends that the BUI be removed from the list of impairments in the St. Marys River AOC.

Enclosed please find documentation to support this recommendation, including the BUI Removal Recommendation prepared by Office of the Great Lakes staff. The St. Marys River Binational Public Advisory Council provided a letter of support for this action, dated August 5, 2016. A copy is included as part of the Removal Recommendation.

Please note that a public comment period was held from August 22 to September 20, 2016. One set of trifling comments was received during the 30-day comment period.

We value our continuing partnership in the AOC Program and look forward to continuing to work with GLNPO in the removal of other BUIs and the delisting of AOCs. If you need further information concerning this request, please contact Mr. John Riley at 517-284-5045, or you may contact me.

Sincerely,

Emily Finnell, Acting

Jon Allan, Director
Office of the Great Lakes
517-284-5035

Enclosure
cc/enc: Mr. Marc Tuchman, USEPA
Mr. John Perrecone, USEPA
Mr. Ted Smith, USEPA
Mr. Rick Hobrla, MDEQ
Mr. John Riley, MDEQ

Removal Recommendation
Eutrophication or Undesirable Algae Beneficial Use Impairment
St. Marys River Area of Concern

Issue

The Michigan Department of Environmental Quality (MDEQ), Office of the Great Lakes, Areas of Concern (AOC) Program recommends the removal of the Eutrophication or Undesirable Algae Beneficial Use Impairment (BUI) from the U.S. side of the St. Marys River AOC, based on the review of relevant documentation and in accordance with the process and criteria set forth in the *Guidance for Delisting Michigan's Great Lakes Areas of Concern* (*Guidance*) (MDEQ, 2015). This recommendation is made with the support of the St. Marys River Binational Public Advisory Council (BPAC) and staff from the United States Environmental Protection Agency (U.S. EPA), Great Lakes National Program Office.

Background

The 1992 Stage 1 Remedial Action Plan (RAP) for the St. Marys River, prepared jointly by the Ontario Ministry of the Environment and the Michigan Department of Natural Resources (OMOE and MDNR, 1992), provides the following rationale for determining which BUIs were assigned to the AOC:

> *"A determination as to whether a specific use impairment exists in the St. Marys River AOC was made using the Listing/Delisting Guidelines for Great Lakes Areas of Concern in conjunction with applicable standards, guidelines, and objectives, where available. In the absence of standards, guidelines, or objectives, impairment status is based on best professional judgement from the evidence available."*

The RAP goes on to provide a specific rationale for inclusion of the Eutrophication BUI:

> *"The open waters of the St. Marys River are characterized by phytoplankton which are typical of oligotrophic waters (i.e., no evidence of eutrophication). Citizens' reports have identified localized impairments due to the presence of algae floating on the river in some embayments and other slow-moving portions of the river. In 1990, large algal mats were reported floating downstream of the East End Water Pollution Control Plant."*

Based on this explanation, the addition of the Eutrophication or Undesirable Algae BUI may have been somewhat arbitrary, or at the very least may not have been due to conditions uniquely associated with Great Lakes AOCs.

Restoration Criteria

Michigan's 2015 draft statewide restoration criteria for this BUI read in part as follows (*Guidance*, p. 32, Attachment A):

"This BUI will be considered restored when:

1. *No waterbodies within the AOC are included on the list of non-attaining waters due to excessive algal growths from high nutrient loadings 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 by the MDEQ to the U.S. EPA every two years.

2. *Or, in cases where water bodies within the AOC are either on the non-attainment list or exhibit excessive algal growth from high nutrient loadings, this BUI will be considered restored when no persistent or high levels of nuisance algal growths or nuisance algal blooms occur for 2 consecutive monitoring cycles.*

For the purposes of these criteria, the properties that cause AOC BUI impairment are unnatural or natural algal growths which are exacerbated by human activities. They must be persistent and high enough levels to be a nuisance. The assessments are not for the purpose of determining whether water quality standards are being met under state or federal law."

Analysis

Review of the 2016 Draft Integrated Report and the 2014, 2012, and 2010 Integrated Reports submitted to the U.S. EPA reveals no listings for any part of the St. Marys River as being in non-attainment for nuisance algal growths due to high nutrient loadings. Thus, Tier 1 of the restoration criteria above is met, no monitoring is required under Tier 2, and the BUI can be considered restored. However, there are a few additional items to consider in making a final determination that the beneficial use is not impaired.

First, it should be noted that *Didymosphenia geminata* (didymo) was found to be present in the rapids near Sault Ste. Marie in 2015. Didymo is a type of single-celled algae that can produce nuisance growth conditions in freshwater rivers and streams with typically cold water temperatures and low nutrient concentrations. Its presence does not appear to be related to municipal or industrial inputs in the AOC. The MDEQ will continue to monitor its impact in the St. Marys River in 2016 and beyond.

Second, although the State of Michigan does not have numeric ambient water quality standards for nutrients in surface waters, the U.S. EPA provides recommendations based on an ecoregional approach. Ecoregions account for variations in geology, land use, ecosystem type and nutrient conditions. There are 14 nutrient ecoregions in the contiguous United States, with the St. Marys River falling entirely within Ecoregion VIII. The country is further broken into 84 more specific Level III Ecoregions, or subecoregions. The St. Marys River is located within subecoregion 50, identified as "Northern Lakes and Forests" (U.S. EPA, 2001).

Through its Water Chemistry Monitoring Program (WCMP), the MDEQ has collected St. Marys River water samples from two different sites and analyzed them for water chemistry parameters since 1998. The monitoring sites are upstream of Sault Ste. Marie (near Brush Point) and downstream of the city, south of Munuscong Bay (near Pointe Aux Frenes).

Generally, phosphorus is the limiting nutrient in freshwater aquatic systems, meaning that if all phosphorus is used, plant growth will cease, no matter how much nitrogen is available. A review of the WCMP data shows that total phosphorus has remained relatively low during the entirety of the St. Marys River data collection effort, as indicated in the two graphs that follow. Complete data tables are available upon request. The U.S. EPA suggests a classification boundary between oligotrophic (nutrient poor) and mesotrophic (moderately enriched) waters at 0.025 mg/L of total phosphorus (U.S. EPA, 2001). The data below show that St. Marys River

phosphorus levels rarely reach this threshold and don't even approach the highly enriched eutrophic range, which begins at concentrations of 0.075 mg/L (U.S. EPA, 2001).

The U.S. EPA's *Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria for Rivers and Streams in Nutrient Ecoregion VIII* (the nutrient-poor, largely glaciated, upper Midwest and northeast) recommends a potential reference condition for total phosphorus of 0.012 mg/L in the Northern Lakes and Forests subecoregion, based on all data reviewed over a ten year period (U.S. EPA 2001). Reference conditions represent the most natural, least culturally impacted waters, or what are considered to be the best attainable conditions. St. Marys River total phosphorus monitoring data beginning in 1998 show concentrations relatively unchanged over time and demonstrate that the upstream median total phosphorus concentration of 0.005 mg/L is slightly lower than the downstream median of 0.009 mg/L (MDEQ, 2013), both of which are less than the U.S. EPA reference condition as indicated in Figures 1 and 2.

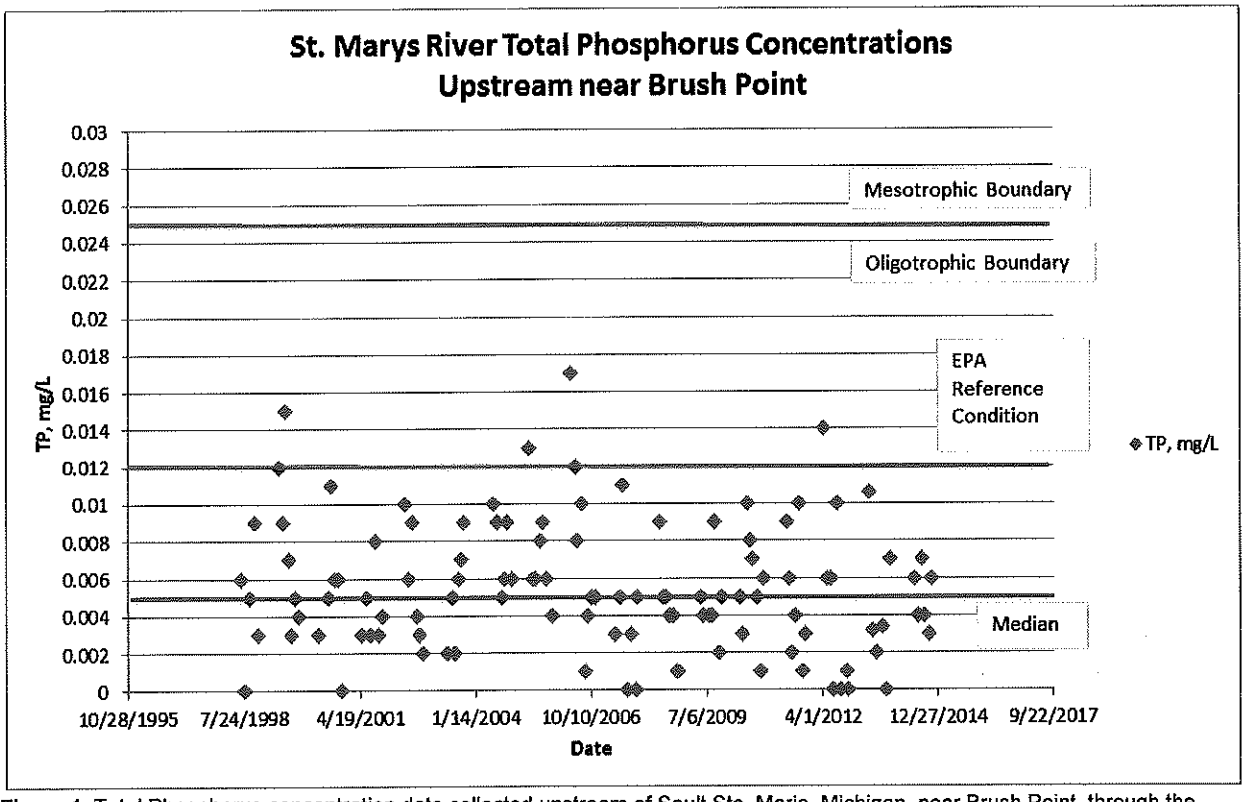

Figure 1. Total Phosphorus concentration data collected upstream of Sault Ste. Marie, Michigan, near Brush Point, through the MDEQ's Water Chemistry Monitoring Program, 1998-2014, where the median concentration of 0.005 mg/L is indicated, along with the U.S. EPA's reference condition for streams in the Northern Lakes and Forests subecoregion. The graph also includes the U.S. EPA's recommended trophic boundary between nutrient poor and moderately enriched concentrations.

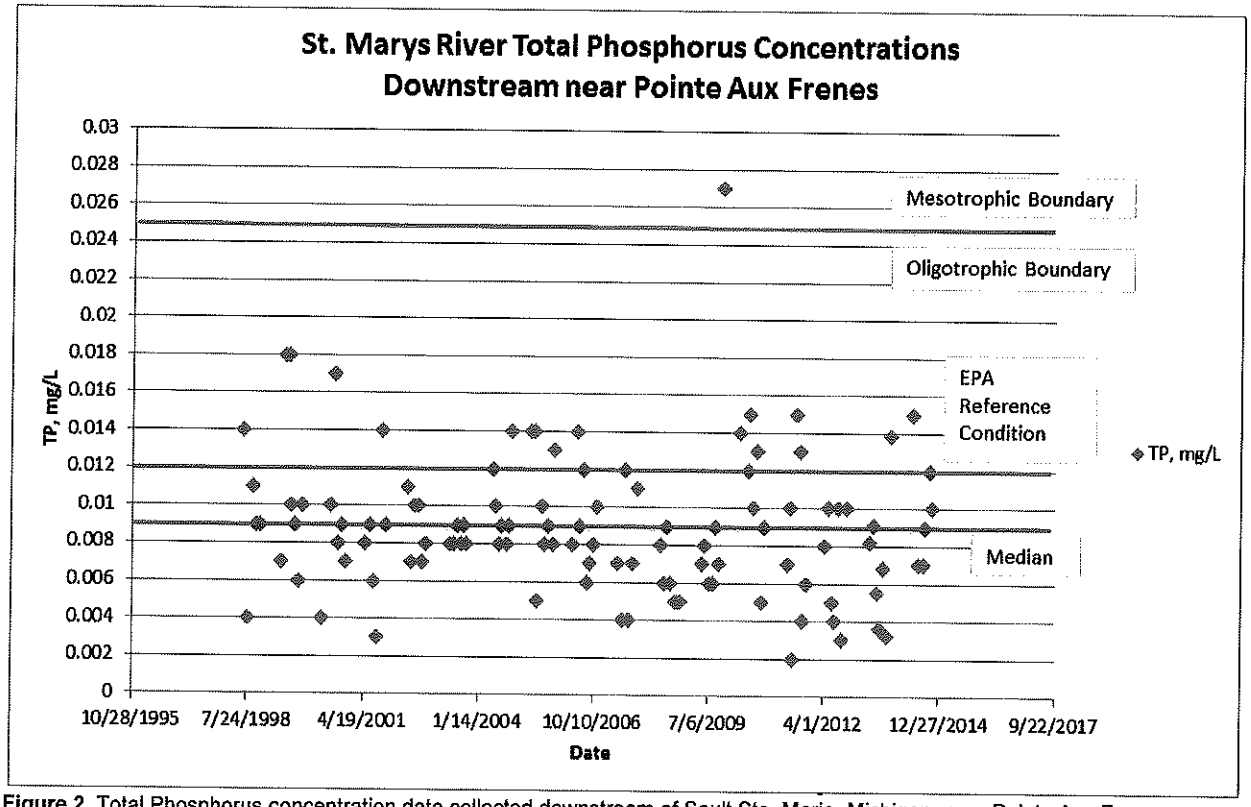

Figure 2. Total Phosphorus concentration data collected downstream of Sault Ste. Marie, Michigan, near Pointe Aux Frenes, through the MDEQ's Water Chemistry Monitoring Program, 1998-2014, where the median concentration of 0.009 mg/L is indicated, along with the U.S. EPA's reference condition for streams in the Northern Lakes and Forests subecoregion. The graph also includes the U.S. EPA's recommended trophic boundary between nutrient poor and moderately enriched concentrations.

Finally, preliminary results from an ongoing study in Canadian waters of the AOC, *Water Quality Monitoring and Analysis for the St. Marys River Area of Concern Technical Report (2014-2015)*, (Ginou, 2015) appear to support the assertion that eutrophic conditions and undesirable algae are no longer present in the AOC. The Executive Summary of the preliminary report states in part,

> "*In the second year of a three-year (2013-2016) water quality monitoring and analysis project, progress was made in the process of re-assessing the status of the Eutrophication and Undesirable Algae and Degradation of Aesthetics beneficial use impairments. Field work, involving monitoring aesthetic, physical, and chemical parameters at five sites within the Canadian St. Marys River Area of Concern, was conducted on 11 dates from May to October 2014. Analysis of the monitoring data suggests that the conditions that originally led to the beneficial uses being designated as impaired no longer exist. In particular, there was no evidence of oxygen stress, large quantities of algae, or high levels of nutrients typically found in culturally-eutrophic waters.*"

The preliminary report's conclusion goes on to say:

> *"Results of the second field season (2014) of water quality monitoring within the Canadian St. Marys River Area of Concern, indicate that, at the sites investigated, oxygen stress is absent, large algal blooms and high concentrations of microscopic algae are non-existent, and the vast majority of nutrients measured (phosphorus, carbon, and nitrogen) always fell below the recommended guidelines and within the levels typically found in either oligotrophic or mesotrophic, but not eutrophic, waters."*

Given the evidence described above, the Eutrophication or Undesirable Algae beneficial use is no longer impaired.

The recommendation to remove the Eutrophication or Undesirable Algae BUI from the U.S. side of the AOC was discussed with the St. Marys River BPAC at its June 15, 2016, meeting where support was expressed for removal of the BUI. The BPAC submitted a formal letter of support for removal of the BUI, dated August 5, 2016, (Attachment B). This proposed action was public noticed via listing in the MDEQ Calendar and on the Mich-RAP listserv. Supporting documents were posted on the MDEQ's AOC program web page for public review and comment from August 22 through September 20, 2016.

Consistent with the consultation requirements under the Four Agency Letter of Commitment, this removal recommendation was reviewed by Environment and Climate Change Canada, and the Ontario Ministry of Environment and Climate change. Both agencies responded supportively to the removal of the Eutrophication or Undesirable Algae BUI on the U.S. side of the AOC.

Recommendation

Based on review of existing data, technical input from the MDEQ Surface Water Assessment Section, the U.S. EPA's Great Lakes National Program Office, and the St. Marys River Binational Public Advisory Council, Michigan's Office of the Great Lakes recommends removal of the Eutrophication or Undesirable Algae BUI from the U.S. side of the St. Marys River AOC.

Prepared by: John Riley, St. Marys River AOC Coordinator
Great Lakes Management Unit
Office of the Great Lakes
Michigan Department of Environmental Quality
September 2016

Attachments

A – Eutrophication or Undesirable Algae; pages 32-34 of the *Guidance for Delisting Michigan's Great Lakes Areas of Concern*

B – St. Marys River BPAC letter supporting BUI removal, August 5, 2016

References

Ginou, Carrie. 2015. Water Quality Monitoring and Analysis for the St. Marys River Area of Concern Technical Report (2014-2015).

Michigan Department of Environmental Quality. 2013. Michigan's Water Chemistry Monitoring Program. A Report of Statewide Spatial Patterns 2005-2009 and Fixed Station Status and Trends 1998-2008. February 2013. Revised February 22, 2013. Report #MI/DEQ/WRD-13/005

Michigan Department of Environmental Quality. 2014. Water Quality and Pollution Control in Michigan 2010 Sections 303(d), 305(b), and 314 Integrated Report. Water Resources Division, Michigan Department of Environmental Quality, Lansing, Michigan

Michigan Department of Environmental Quality. 2015. Guidance for Delisting Michigan's Great Lakes Areas of Concern. Report OGL-002

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

U.S. Environmental Protection Agency, 2001. Ambient Water Quality Criteria Recommendations. Information Supporting the Development of State and Tribal Nutrient Criteria for Rivers and Streams in Nutrient Ecoregion VIII. EPA 822-B-01-015

Attachment A
DRAFT
Eutrophication or Undesirable Algae Restoration Criteria from the 2015
Guidance for Delisting Michigan's Great Lakes Areas of Concern

Significance in Michigan's Areas of Concern

Originally eight of Michigan's AOCs were listed as impaired due to eutrophication, including: River Raisin, Rouge River, Clinton River, Saginaw River/Bay, St. Marys River, Deer Lake, Muskegon Lake, and White Lake. The AOC Program tracking table with current information about which BUIs have been restored in each AOC can be found at www.michigan.gov/deqaocprogram.

Michigan Restoration Criteria and Assessment

This BUI will be considered restored when:

1. No waterbodies within the AOC are included on the list of non-attaining waters due to excessive algal growths from high nutrient loadings 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 by DEQ to the U.S. EPA every two years.

2. Or, in cases where water bodies within the AOC are either on the non-attainment list or exhibit excessive algal growth from high nutrient loadings, this BUI will be considered restored when no persistent or high levels of nuisance algal growths or nuisance algal blooms occur for two consecutive monitoring cycles.

For the purposes of these criteria, the properties that cause AOC BUI impairment are unnatural or natural algal growths which are exacerbated by human activities. They must be persistent and high enough levels to be a nuisance. The assessments are not for the purpose of determining whether water quality standards are being met under state or federal law.

Rationale

Practical Application in Michigan

The MDEQ regulates water pollution under the authority of Part 31 of the NREPA, P.A. 451 of 1994. The AOC restoration criteria are consistent with the state's WQS, and how the State identifies waters for inclusion on the Clean Water Act section 303(d) list, which is submitted to the U.S. EPA every two years. If a waterbody exhibits growths of undesirable algae in quantities which interfere with a water body's "designated uses" as identified in rules R323.1060 and R323.1100 of the Michigan WQS (e.g., inhibits swimming due to the physical presence of algal mats and/or associated odor; inhibits the growth and production of warm water fisheries, and/or other indigenous aquatic life and wildlife), the waterbody is included on Michigan's Section 303(d) list.

In cases where waterbodies are on the non-attainment list or exhibit excessive nuisance algal growth, consideration may be given to assessment of the BUI using monitoring data. These assessments will be accomplished using protocol developed as described below.

In many locations in Michigan, eutrophication of a waterbody is a natural occurrence in certain seasons and circumstances. In some locations, natural eutrophication is augmented by watershed-wide agricultural practices that contribute non-point source nutrients to waterbodies. Neither situation is considered an issue to be addressed by the AOC Program in Michigan.

In considering when eutrophication is an AOC issue, guidelines from non-regulatory actions may be used as supporting documentation, including nutrient targets under the GLWQA.

1991 IJC General Delisting Guideline

When there are no persistent water quality problems (e.g., dissolved oxygen depletion of bottom waters, nuisance algal blooms or accumulation, decreased water clarity, etc.) attributed to cultural eutrophication.

The IJC general delisting guideline is presented here for reference. The Practical Application in Michigan subsection above describes application of specific criteria for restoration based on existing Michigan programs and authorities.

State of Michigan Programs/Authorities for Evaluating Restoration

Michigan assesses water bodies throughout the state on a five-year basin rotation cycle according to the MDEQ's "Strategic Environmental Quality Monitoring Program for Michigan's Surface Waters" (MDEQ, 1997) and "Michigan Water Quality Strategy Update" (MDEQ, 2005). Each year, a set of targeted watersheds are sampled at selected sites for conventional and toxic pollutants, and biological and physical habitat/morphology indicators. The set of watersheds sampled rotates each year, with each major watershed in the state revisited every five years (see Appendix 1 for maps of the basin rotations). Two particularly relevant elements of the strategy are expanded and improved Water Chemistry Monitoring and the Lake Monitoring Program. One of the specific objectives of these programs is to determine whether nutrients are present in surface waters at levels capable of stimulating the growth of nuisance aquatic plants/algae/slimes.

Under the Water Chemistry Monitoring Program, water samples generally are analyzed for nutrients, conventional parameters (i.e., temperature, conductivity, suspended solids, pH, dissolved oxygen), total mercury, and trace metals (i.e., cadmium, chromium, copper, lead, nickel, zinc). A much smaller number of samples are analyzed for organic contaminants such as PCBs and base neutrals. Other parameters may be included as appropriate at specific locations, including observations of nuisance algae in AOCs with this impairment. Nutrients and conventional parameters may also be monitored at sites where biological data are collected during routine watershed assessments. Data are reviewed each year to determine whether additional parameters should be added, removed, or analyzed at a greater or lesser frequency.

The MDEQ developed a 2011 Statewide Aesthetics BUI Assessment Workplan and Monitoring Protocol. (MDEQ, 2011). That protocol will be amended to conduct assessments for eutrophication, primarily by focusing on nuisance algal growth.

Some local AOC communities also have programs for monitoring water quality and related parameters which may be applicable to this BUI. If an AOC chooses to use local monitoring data for the assessment of BUI restoration, the data can be submitted to the MDEQ for review. If the MDEQ determines that the data appropriately address the restoration criteria and meet quality assurance and control requirements, they may be used to demonstrate restoration success.

Attachment B
St. Marys River Binational Public Advisory Council
Letter of Support

ST. MARYS RIVER
BINATIONAL PUBLIC ADVISORY COUNCIL

August 5, 2016

Mr. Rick Hobrla
Office of the Great Lakes
Michigan Department of Environmental Quality

RE: Michigan Eutrophication or Undesirable Algae Beneficial Use Impairment

Dear Mr. Hobrla,

On behalf of the Binational Public Advisory Council (BPAC) for the St. Marys River Area of Concern (AOC), we are writing to convey agreement regarding the removal of the Eutrophication or Undesirable Algae Beneficial Use Impairment from the US side of the AOC.

The State's restoration criteria for this BUI appear to be met, and data collected through the MDEQ's Water Chemistry Monitoring Program in the St. Marys River between 1998 and 2014 appear to further support the assertion that the BUI is no longer impaired. Although Didymo has been recently observed in the rapids near Sault Ste. Marie, we understand that the presence of this potentially nuisance diatom may be indicative of low nutrient conditions, as opposed to the nutrient-enriched conditions typically associated with other algal blooms. As such, it does not appear that Didymo is related to the typical causes of most impairments within the Great Lakes Areas of Concern. Thus, with these factors considered, and upon review and discussion of the Removal Recommendation document, BPAC members present at the June 15th 2016 meeting voted unanimously to support the removal of this BUI.

Sincerely,

Paula Antunes, Ph.D.
Canadian BPAC Chair

Emily Martin
U.S. 1st Vice Chair