

**GREAT LAKES WATER QUALITY AGREEMENT, ANNEX 4**

Charged with coordinating binational actions to manage phosphorous loadings and concentrations in the Great Lakes, Indiana has been an active member of the Nutrients Annex 4 binational subcommittee of the Great Lakes Water Quality Agreement (GLWQA) since its establishment in 2013. The GLWQA Lake Ecosystem Objectives include the following:

- Minimize the extent of hypoxic zones in the Great Lakes due to excessive phosphorous loading with emphasis on Lake Erie.
- Maintain levels of algal biomass below nuisance level conditions.
- Maintain algal species consistent with healthy aquatic ecosystems in nearshore waters.
- Maintain cyanobacteria biomass at levels that do not produce concentrations of toxins that pose a threat to human or ecosystem health.
- Maintain an oligotrophic state, relative algal biomass, and algal species consistent with healthy aquatic ecosystems in the open waters of Lakes Superior, Michigan, Huron, and Ontario.
- Maintain mesotrophic conditions in the open waters of the western and central basins of Lake Erie, and oligotrophic conditions in the eastern basin of Lake Erie.

Commitments under the Nutrients Annex include the following:

- By February 2016, establish binational Phosphorous objectives, loading targets, and allocations for the nearshore and offshore waters to achieve the Lake Ecosystem Objectives for each lake, starting with Lake Erie.
- Assess and where necessary, develop/implement regulatory and non-regulatory programs/measures to reduce phosphorous loadings from agricultural, rural non-farm, urban, and industrial point and nonpoint sources.
- By 2018, develop a binational phosphorous reduction strategy and *Domestic Action Plans* designed to meet nearshore and open water phosphorous objectives and loading targets for Lake Erie.

On February 22, 2016, the United States and Canada adopted new phosphorus reduction targets for Lake Erie. They are noted in the following table.

<b>BINATIONAL PHOSPHORUS LOAD REDUCTION TARGETS</b>		
<b>Lake Ecosystem Objectives</b> Great Lakes Water Quality Agreement Annex 4, Section B	<b>Western Basin of Lake Erie</b>	<b>Central Basin of Lake Erie</b>
Minimize the extent of hypoxic zones in the Waters of the Great Lakes associated with excessive phosphorus loading, with particular emphasis on Lake Erie	40 percent reduction in total phosphorus entering the Western Basin and Central Basin of Lake Erie – from the United States and from Canada – to achieve 600 MT Central Basin load	
Maintain algal species consistent with healthy aquatic ecosystems in the nearshore Waters of the Great Lakes	40 percent reduction spring total and soluble reactive phosphorus loads from the following watersheds where localized algae is a problem:	
	Thames River – Canada Maumee River – U.S. River Raisin – U.S. Portage River – U.S. Toussaint Creek – U.S. Leamington Tributaries - Canada	Sandusky River – U.S. Huron River, OH – U.S.
Maintain cyanobacteria biomass at levels that do not produce concentrations of toxins that pose a threat to human or ecosystem health in the Waters of the Great Lakes	40 percent reduction in spring total (860 MT) and soluble reactive phosphorus (186 MT) loads from the Maumee River (U.S.)	N/A

Indiana's GLWQA Domestic Action Plan (DAP) for the Western Lake Erie Basin (WLEB) is led by IDEM and developed by an Advisory Committee comprised of representatives from different stakeholder sectors. The DAP will follow an outline that includes: 1) Purpose, 2) Background, 3) Goals, 4) Objectives, 5) Tactics, and 6) Measuring and Reporting Progress.

Indiana's portion of the WLEB is comprised of the St. Joseph, Maumee, Auglaize, and St. Marys sub-basins. The St. Joseph River and the St. Marys River enter Indiana from Ohio and, at their confluence, form the Maumee River, which flows eastward into Ohio with its mouth at Lake Erie. The 40 percent reduction in spring-time total phosphorus (TP) and soluble reactive phosphorus (SRP) noted in the table above for the Maumee River translates to a flow weighted mean concentration of 0.23 mg/L total phosphorus and 0.05 mg/L soluble reactive phosphorus. Progress toward these target values will be measured on the Maumee River at Antwerp, Ohio.

A draft of Indiana's GLWQA DAP for the WLEB was public noticed for comment from August 14, 2017 through October 13, 2017. Seven (7) public meetings were held in Auburn, Decatur, Fort Wayne, and Indianapolis, Indiana to present and discuss the DAP during the public notice period. Indiana's DAP will be finalized by February of 2018.

## MONITORING

**Fixed Stations:** A map is provided as an attachment.

- 3 on the Maumee River
- 6 on the St. Joseph River
- 3 on the St. Marys River

**Probabilistic:** A map of impaired segments of the Maumee and St. Joseph sub-basins is attached.

- Sampled probabilistically in 2000, 2005, and 2010
- Will sample again in 2018

## WATERSHED MANAGEMENT PLANS (WMPs)

### Approved WMPs:

St. Joseph (Erie) Watershed (04100003)

- Cedar Creek WMP, 01-383, (<http://www.in.gov/idem/nps/3261.htm>)
- St. Joseph River (Lower)-Bear Creek WMP, 5-73, (<http://www.in.gov/idem/nps/3200.htm>)
- St. Joseph River (Maumee) WMP, 02-502, (<http://www.in.gov/idem/nps/3201.htm>)
  - This plan includes the larger 8-digit HUC, as well as Ohio and Michigan portions.
- St. Joseph River (Middle) WMP, 10-65, (<http://www.in.gov/idem/nps/3901.htm>)
  - This plan includes Ohio portions.
- St. Joseph River (Upper) WMP, 2-16, (<http://www.in.gov/idem/nps/3961.htm>)
  - This plan includes Ohio and Michigan portions.

Maumee Watershed (04100005)

- Maumee River (Upper), 2-21, (<http://www.in.gov/idem/nps/3946.htm>)
  - This plan includes Michigan portions.

St. Mary's (04100004)

- St. Mary's River, 7-184, (<http://www.in.gov/idem/nps/3199.htm>)

## IMPLEMENTATION PROJECTS

### Current Projects:

- Upper Maumee Phosphorus-Risk Reduction Pilot, 6-9
  - This grant project is funded through the Clean Water Act (CWA) 319(h) program.
  - It began on January 20, 2016 and will end on January 19, 2019.
  - The objective of this project is to reduce phosphorus run-off within the Black Creek, Marsh Ditch, Sixmile Creek, Trier Ditch, and Bottern Ditch watersheds within the Maumee sub-basin and the WLEB.
  - This is an implementation project in which a Phosphorus-Risk Reduction Pilot (reimbursement) program has been developed implementing Best Management Practices (BMPs) addressing phosphorus water quality concerns outlined within the Upper Maumee River WMP. Reimbursement of BMPs will be based on the amount of phosphorus-risk runoff is reduced from a producer's field(s).
- Upper Maumee River Implementation, 23001
  - This grant project is funded through the Great Lakes Restoration Initiative (GLRI) program.
  - It began on November 6, 2017 and will end on May 5, 2020.
  - The objective of this project is to reduce sediment and nutrient loss within the Black Creek, Marsh Ditch, Sixmile Creek, and Trier Ditch watersheds within the Maumee sub-basin and the WLEB.
  - This is an implementation project in which a cost-share (reimbursement) program will be developed to implement BMPs addressing water quality concerns outlined within the Upper Maumee River WMP, and an education and outreach program will be implemented to bring about behavioral change and encourage BMP implementation.

## SPECIAL PROJECTS

### Current Projects:

- St. Marys River Watershed Initiative
  - This grant project is funded through the CWA 319(h) program.
  - This grant project began on June 6, 2017 and will end on June 5, 2021.
  - The objective of this project is to develop a strong, cohesive work group including all entities and individuals working throughout the St. Marys River Watershed bringing about behavioral changes leading to reduced sediment and nutrient loading to the St. Marys River sub-basin and the WLEB.
  - This a paired watershed study, including the Weber Ditch sub-watershed and the Nickelsen Creek sub-watershed, focusing on deliberately saturating the Nickelsen Creek sub-watershed with BMPs focusing on soil health and 4R practices aimed at reducing nitrogen and phosphorus loading to the WLEB. To achieve this, an aggressive education and outreach program will be developed and implemented within the Nickelsen Creek sub-watershed. Soil health and water quality monitoring will be completed within both sub-watersheds to determine the impact of education and outreach.

## TOTAL MAXIMUM DAILY LOADS (TMDLS)

### Approved TMDL: Summaries attached.

- St. Mary's River and Maumee River TMDL, (<http://www.in.gov/idem/nps/2845.htm>), approved in 2006, addressing *E. coli*, IBC, ammonia, and nutrients.
- St. Joseph River (Lake Erie) TMDL, (<http://www.in.gov/idem/nps/4003.htm>), approved in 2017, addressing *E. coli*, phosphorus, and total suspended solids.

## CONTACTS

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