State of Ohio's

Western Lake Erie Basin

Collaborative Implementation Plan

May 2016

Introduction

On June 13, 2015, the governors of Ohio and Michigan, and the premier of Ontario committed to a goal of reducing phosphorus loadings to Lake Erie by 40 percent as specified in the Western Basin of Lake Erie Collaborative Agreement (Collaborative). The Collaborative is intended to advance efforts toward the proposed nutrient reduction targets put forth in the Great Lakes Water Quality Agreement (GLWQA). This will be done through the development of this Implementation Plan (Plan), two years ahead of the formal timeline for developing a state Domestic Action Plan as set forth in the GLWQA. The Collaborative will focus on the western basin watersheds of the Maumee, Portage and Toussaint rivers. The GLWQA through the Domestic Action Plan will include the Central Basin tributaries of the Sandusky, Huron and Cuyahoga rivers, but will not be addressed in detail in this Plan.

Goals of the Collaborative

- Achieve a 40 percent total load reduction in the amount of total and dissolved reactive phosphorus entering Lake Erie's western basin by the year 2025 with an aspirational goal of a 20 percent reduction by 2020[1].
- To use 2008 as the base year from which progress will be measured.
- That each state and Province commits to developing, in collaboration with stakeholder groups, a Plan outlining actions and timelines toward achieving the goals.

The Plan is based on the following guiding principles:

- **Implementation** of point and nonpoint nutrient reduction practices.
- **Verification** of targeted practice implementation and effectiveness.
- **Documentation** of water quality changes resulting through the implementation of nutrient reduction practices.
- **Adaptability** to allow for the modification of programs, practices and policy as new information is obtained and changes occur.
- **Accountability** to ensure clear areas of responsibilities and that the commitment is made and kept toward achieving the goals.

The Plan was developed with input through meetings and conversations with various stakeholder groups and state agencies. The initial draft was then made available for additional interest group and public comment.

[1] Achieving a spring (March – July) Flow-Weighted Mean Concentration (FWMC) of .23 mg/l TP and .05 mg/l DRP in the Maumee River and a target of 860 MT total phosphorus and 189 MT Dissolved Reactive Phosphorus for the western Lake Erie basin will achieve a 40 percent reduction from 2008. Similar targets will be established for the Portage and Toussaint rivers.

Central to the implementation of the Plan is the adaptive management process. This means the Plan is intended to convey an understanding that there will be changes in data, programs and policy that will need to be reflected in the Plan going forward.

How does the Collaborative fit in the context of Ohio's over-all efforts to address Harmful Algal Blooms in Lake Erie?

Ohio's long history of problems and solutions for nutrient enrichment and nuisance and/or harmful algal blooms in Lake Erie is laid out extensively in the Ohio Lake Erie Phosphorus Task Force I and II reports. To summarize, after a lengthy but successful fight to reduce previously high nutrient levels in Lake Erie, algal blooms had abated in the 1980s. However, in the mid-1990s, toxin-producing blue-green algal blooms began to reappear in the western basin of Lake Erie. A particularly massive bloom occurred in 2003, and blooms of varying intensity have recurred most years since then.

The State of Ohio has been in the forefront of developing a response to the problems impacting Lake Erie. The Ohio Lake Erie Phosphorus Task Force I convened in January, 2007, in response to the increased harmful algal blooms in the early 2000s. Led by the Ohio Environmental Protection Agency (Ohio EPA), Ohio Department of Agriculture (ODA), Ohio Lake Erie Commission (OLEC) and Ohio Department of Natural Resources (ODNR), the Task Force included representatives from state and federal agencies, Lake Erie researchers, soil scientists, agricultural program representatives and wastewater treatment plant personnel and drew on the expertise of many other experts in a variety of disciplines.

The Task Force developed a variety of recommendations to address nutrient reductions, particularly to the western basin of Lake Erie. Recommendations were made for all of the sources examined with a major focus on upland measures that influence agricultural practices. The report included a research agenda, which has served as a basis for directing millions of dollars of state and federal research funds.

In response to the findings of the Task Force, the State of Ohio Directors of ODA, ODNR and Ohio EPA convened the Directors' Agricultural Nutrients and Water Quality Working Group on August 25, 2011. The purpose of this group was to identify and implement, at the state level, those agricultural practice initiatives which would ultimately result in the reduction of harmful algal blooms developing in Ohio's inland lakes and Lake Erie, while at the same time continuing to assure that the region's agricultural base was not impaired by unintended consequences. As a guiding principle, the final report encouraged farmers to adopt nutrient application guidelines known as 4R Nutrient Stewardship (4R). The 4R concept promotes using the right fertilizer source, at the right rate, at the right time, with the right placement. It was believed that this approach would be in part effective in reducing phosphorus and nitrogen from impacting waterways across the state.

Starting in 2012, Ohio EPA, coordinating with ODA and ODNR, developed Ohio's Nutrient Reduction Strategy. This comprehensive plan to manage point and nonpoint sources of nutrients and reduce

their impact on Ohio's surface waters was an outgrowth of Ohio's participation on the Mississippi River/Gulf of Mexico Watershed Nutrient (Hypoxia) Task Force. The strategy recommends regulatory initiatives and voluntary practices that can reduce point and nonpoint sources of nutrients throughout the state.

The Point Source and Urban Runoff work group of the Hypoxia Task Force recommended that Ohio develop a statewide nutrient mass balance that examines both point and nonpoint sources of nutrients to Ohio's watersheds. This is necessary to determine appropriate reductions for all sources and to enable cost-benefit assessments to determine the most environmentally effective and economically feasible mechanism for the state to reduce nutrient loading to watersheds. This effort is currently underway with watersheds in the Lake Erie watershed receiving a high priority for analysis. Results from the mass balance study will be integrated into this Plan as they become available later this spring.

Simultaneously with those efforts, Ohio EPA, OLEC, ODA and ODNR reconvened the Ohio Lake Erie Phosphorus Task Force as a Phase II effort. The Task Force II final report (2013) includes a detailed review of state and federal efforts, including research results from some of the initial studies recommended by the Task Force I. After hearing from a number of experts at several meetings, the Task Force II worked to develop a phosphorus target for Lake Erie's Western Basin.

Based on a comparison of discharge, total phosphorus loads and dissolved reactive phosphorus loads for the Maumee River for water year and spring (March-June) totals for 2000 through 2012, the Task Force II recommended an annual loading reduction of approximately 40 percent to significantly reduce or eliminate HABs in the Western Basin. The Task Force II also recommended an adaptive management approach that would allow annual reviews of progress and evaluation/modification of loading targets.

As the Task Force II was completing its final report, the GLWQA Nutrients Annex Subcommittee was beginning the process of revising the prior GLWQA nutrient loading goal for Lake Erie. Modeling showed that spring loading of phosphorus from the Maumee River is the determining factor. The Subcommittee determined that there should be a reduction of 40 percent in spring loads of both total and dissolved phosphorus from the Maumee River. A 40 percent reduction to the Maumee equates to a target spring load of 860 metric tons per year of total phosphorus and 186 metric tons per year of soluble reactive phosphorus under high spring discharge conditions. This goal is intended to limit the formation of harmful algal blooms in nine years out of 10, which allows for an occasional very wet year in which the goal would not be achievable. The proposed goal, drafted in February 2015, has been finalized, with the development of state and province Domestic Action Plans due by 2018.

This recommended loading goal tracked very closely to the recommended value from the Task Force II. Therefore, the state decided to move forward with accepting the proposed goal in the

Collaborative Agreement and with developing the Collaborative Implementation Plan called for in the Collaborative.

Resources Allocated Since 2008

As a scientific consensus began to form around goals and changes in practices needed to achieve those goals, state and federal resources were allocated or reallocated to begin to implement on-the-ground practices. This includes agricultural practices, projects to reduce urban storm water runoff, upgrades to wastewater treatment facilities and septic system improvements.

Through the Ohio Clean Lakes Initiative, the Ohio Legislature with Governor Kasich's support appropriated more than $3.55 million for the installation of best management practices (BMPs) to reduce nutrient runoff in the Western Lake Erie Basin. State and local partners worked with more than 350 farmers to implement BMPs on more than 40,000 acres. Additional stream monitoring stations have also been installed to measure the effectiveness of these practices.

Ohio EPA has used funds it has received through the Great Lakes Restoration Initiative to award grants to local and state organizations for projects to protect or improve Lake Erie water quality, including storm water projects, home septic system replacement/improvements and stream restoration projects. In total, for the five-year period ending in 2015, the Great Lakes Restoration Initiative has funded $182 million for 196 projects in the State of Ohio.

Ohio EPA works with local communities to develop, implement and fund long-term control plans to reduce overflows of sewage into streams and lakes following heavy storms and snow melt. Since 2010, Ohio EPA has awarded more than $292 million in low-interest and interest-free loans from the Water Pollution Control Loan Fund for 138 projects in the Western Lake Erie watershed.

Since 2008, the State of Ohio, working with various federal and private partners, have implemented numerous programs and practices directed at reducing nutrients from both point source and nonpoint sources and increased monitoring throughout the Maumee and Sandusky watersheds, two of Ohio's primary contributors of nutrients to Lake Erie. Following is a sample of the key initiatives, programs and funding directed at nutrient reduction in the western Lake Erie basin since 2008:

- 2009 – 2012 – NRCS Conservation Program WLEB Funding
- 2010 – 2015 – Great Lakes Restoration Initiative funding for Ohio projects
- 2010 – Phosphorus Taskforce I Report issued
- 2011 – NRCS Great Lakes Conservation Effects Assessment Project (CEAP)
- 2012 – Directors Ag Nutrient Working Group Report issued
- 2012 – NRCS Western Lake Erie Basin CEAP issued
- 2012 – NRCS Revised 590 standards
- 2012 – Ohio Clean Lake Initiative/Healthy Lake Erie Fund initiated
- 2012 – Ohio EPA Point and Urban Runoff Nutrient Workgroup Report issued
- 2013 – Phosphorus Taskforce II Report issued

- 2013 – Ohio Nutrient Reduction Strategy issued
- 2013 – Scotts/Miracle Grow eliminated phosphorus in their lawn fertilizer
- 2014 – Ohio 4R Stewardship program initiated
- 2014 – U.S. EPA provided funding for expanding targeted watershed monitoring
- 2014 – $17 million Multi-state Regional Conservation Partnership Program initiated
- 2015 – Ohio Nutrient Reduction Strategy Addendum finalized

It is estimated that since 2011 alone, more than $2 billion has been invested in Ohio's portion of the Lake Erie Basin for both point source and nonpoint source nutrient reduction and drinking water treatment. The Plan proposes that before any new funding is requested for programs, practices or administration that an evaluation be conducted of how funds and resources are currently being allocated to determine if a re-allocation of those resources toward the new priorities or programs could be made. Any new funding will need to be addressed by the appropriate state agency through the state budget process. It is recognized that a need exists for long-term funding commitments especially for water quality monitoring and certain on-going nutrient reduction practices. It is recommended that a comprehensive funding plan for both short-term (two years) and long-term (two to 10 years) for both the state and federal budget cycle be completed and serve as a fiscal plan and added as an addendum to this Plan.

Legislative Activity 2014 – 2015

As each task force and work group provided additional information and recommendations about potential solutions, state officials responded not only by adding resources and refocusing programs, but also through legislative channels.

In 2014, Governor John Kasich signed into law Senate Bill 150, an update of Ohio's regulatory structure specifically geared to improving water quality. The bill requires fertilizer applicators to undergo education and certification by ODA, encourages producers to adopt nutrient management plans, allows ODA to better track the sales and distribution of fertilizer throughout the state, and provides ODNR the authority to repurpose existing funding for additional BMP installation.

Governor Kasich signed Senate Bill 1 into law in April 2015. This bill prohibits spreading manure and other fertilizers with phosphorous and nitrogen when the ground is frozen, snow-covered or saturated. It also prohibits spreading manure if the forecast calls for a 50 percent chance of half an inch of precipitation over 24 hours or, for commercial fertilizers, an inch over 12 hours. The winter and spring of 2015-2016 will be the first test of this legislated change in practices.

In addition, regulatory changes have been made to the point source regulated community. Senate Bill 1 requires that by December 1, 2017, a technical capability and feasibility study is to be completed by those wastewater treatment plants over 1 MGD that have a phosphorus discharge limit above 1mg/l to determine the costs and feasibility of reducing the phosphorus discharge to 1mg/l. In addition, any

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wastewater treatment facility currently not performing phosphorus monitoring shall implement total phosphorus and dissolved reactive phosphorus monitoring program by December 1, 2016.

Partner Agencies and Related Areas of Responsibility

In general, the responsibility and accountability for ensuring implementation of programs and progress toward the agreed to goals will be with the various state agencies. In general, ODA has responsibility for agricultural nonpoint; Ohio EPA has responsibility for point source and water quality monitoring; and the Ohio Department of Health (ODH) for home sewage treatment systems. Specific areas of responsibility are listed below for the primary state agencies and partners engaged in this initiative. In addition to those organizations listed, there is involvement and coordination from time-to-time on specific issues, such as monitoring and research by other universities, non-profit organizations, Indiana and Michigan state agencies and international agencies, such as Environment and Climate Change Canada and the Ontario Ministry of the Environment and Climate Change and Ontario Ministry of Agriculture - Agri-Food.

The Ohio Lake Erie Commission is comprised of the directors for six state agencies most directly involved in implementing this Plan and five public members and will serve as the overall Collaborative Implementation Strategy coordinating entity. OLEC through the Lake Erie Protection and Restoration Strategy has identified Nutrient Reduction as a Priority Area for 2016. The Ohio Revised Code 1506.21 states that the Commission shall ensure the coordination and implementation of federal, state and local policies, issues and programs pertaining to Lake Erie with a priority on policies, issues and programs identified in the Lake Erie Protection and Restoration Strategy.

Ohio Department of Agriculture (ODA)

- Agricultural nonpoint program implementation
- Agriculture Fertilizer Applicator Certification Program
- CAFO permitting and regulatory oversight
- Certified Livestock Manager training and inspections
- Manure and Fertilizer Application (SB 1) enforcement
- Fertilizer sales records
- Watershed coordinator program administration
- Agricultural nonpoint BMP technical assistance and oversight
- Agricultural Pollution Abatement Program
- Ohio Runoff Risk Forecast website
- Conservation Reserve Enhancement Program

Ohio Environmental Protection Agency (Ohio EPA)

- NPDES permit approval and monitoring
- Wastewater treatment technical and feasibility studies
- Storm water management program administration
- Water quality monitoring (Watershed and Lake Erie)
- Combined Sewer Overflow monitoring
- Environmental Infrastructure funding (wastewater, drinking water)
- 319 Grant, Surface Water Improvement Fund (SWIF), GLRI Fund administration
- Areas of Concern program administration
- Harmful Algal Bloom program administration
- Total Maximum Daily Load (TMDL) studies
- Administer and enforce a program for the regulation of sewage sludge management

Ohio Department of Health (ODH)

- Home Sewage Treatment System oversight (local health departments)
- Swimming Beach monitoring

Ohio Department of Natural Resources (ODNR)

- Private lands wildlife habitat management
- Lake Erie fisheries

Ohio Lake Erie Commission (OLEC)

- Collaborative Implementation Plan coordination
- Lake Erie Protection and Restoration Strategy coordination

Natural Resource Conservation Service (NRCS)

- Farm Bill implementation and cost share administration
- GLRI grants

Farm Service Agency (FSA)

- Conservation Reserve Program administration
- Conservation Reserve Enhancement Program administration
- Farmable wetlands program administration

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U.S. Environmental Protection Agency (U.S. EPA)

- Great Lakes Water Quality Agreement administration
- Total Maximum Daily Load review
- NPDES permit review
- Nine Element Watershed Plan oversight
- 319 funding and GRLI funding administration

US Geological Survey (USGS)

- Stream gauge operation and monitoring

National Ocean and Atmospheric Agency (NOAA)

- Ohio Sea Grant
- Satellite imaging
- Coastal Resource Management

Heidelberg University National Center for Water Quality Research (NCWQR)

- Water quality monitoring and data analysis

Ohio Department of Higher Education

- Water Quality Research Projects

The Ohio State University (OSU – Stone Lab)

- Water quality monitoring
- Data analysis
- Research coordination and summaries

University of Toledo (UT)

- Lake Erie water quality monitoring

Stakeholder Groups providing input for draft Collaborative Implementation Plan

- Ohio Corn Growers
- Ohio Soybean Association
- Ohio Cattleman's Association
- Ohio Pork Producers
- Ohio Agri-business Association
- Ohio Federation of Soil and Water Conservation Districts
- Ohio Farm Bureau Federation
- The Nature Conservancy

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- National Wildlife Federation
- Environmental Defense Fund
- Ohio Environmental Council
- Black Swamp Land Conservancy
- Alliance for the Great Lakes
- Pheasants Forever
- Great Lakes – St. Lawrence Cities Initiative
- Toledo Metropolitan Area Council of Governments
- Ohio Charter Boat Captains Association
- Ohio Association of Soil and Water Conservation District Employees
- County Commissioner Association of Ohio
- Lake Erie Improvement Association
- Stone Lab/Sea Grant

Collaborative Implementation Plan Actions

Action items are broken down into two timeframes in which implementation should be initiated within 12 months and within 12-36 months.

Following are proposed actions to be taken by the state in cooperation with federal agencies and stakeholder groups within 12 months:

Ohio Environmental Protection Agency (Ohio EPA)

- Ohio EPA will establish a process and protocol for empirical sampling and water quality monitoring specific to tracking progress toward meeting the requirements of the Collaborative and Annex 4. While some currently available water quality data will be initially used in this process, there is a need to establish processes and protocols specific to tracking the progress toward the Collaborative and Great Lakes Water Quality Agreement goals.

- Ohio EPA will continue to develop a process to identify and recommend priority watersheds at the HUC 12 level. Priority watersheds are initially based on the results of a recent report examining six water quality models (Scavia, 2016), nutrient monitoring data collected as part of the Ohio EPA Watershed Assessment Program and specific knowledge of each watershed. Priority watersheds can be placed in groups based on characteristics that will affect specific nutrient sources and nutrient management practices. These groups are:
    1) High proportion of hydrologic soil group D (intense tillage and drainage)
    2) High soil slope (erosion)
    3) High livestock density (nutrient source and timing)
    4) Various landscape characteristics

Further, within these priority watersheds other known nutrient sources exist. These would include NPDES permitted point sources (focus on those without total phosphorus limits) Biosolid Land Application Management Plans, and known unsewered communities with failing household sewage treatment systems. If these sources exist within a priority watershed they will be identified.

- Ohio EPA will take a leadership role with member entities on the Annex 4 Monitoring Task Team (Ohio, Indiana, Michigan and Ontario) to ensure a consistent sampling and lab testing protocol is in place and being followed. This data will be used to track progress toward and verification of achieving the Great Lakes Water Quality Agreement and Collaborative goals.

- Ohio EPA has identified (Table 2) those top 30 facilities in the Maumee basin with an NPDES permit. Ohio EPA will evaluate those facilities that currently do not have a permit limit for total phosphorus and that are discharging <1MGD to determine options on a facility by facility basis for reducing the phosphorus discharge level.

- Ohio EPA will develop a recommended target "nutrient diet" for priority watersheds based on empirical monitoring data, the Statewide Nutrient Mass Balance Study, multi-scenario modeling and other available information. This target will be used to help in meeting the ultimate nutrient reduction goal for Lake Erie to be measured at the Maumee River Waterville USGS Station.

- Ohio EPA, in coordination with ODH and local agencies, will track the installation of point source nutrient reduction BMPs installed since 2008. In addition, tracking will include all NPDES permits with discharge limits, those required to complete a technical and feasibility study (SB1), CSO outfalls, documented failed home sewage system locations and state or federal funded storm water management practices.

- Ohio EPA, in cooperation with OLEC, will institute a tracking program by priority watershed and county showing the total public dollars allocated for point source and when possible nonpoint source nutrient management/reduction practices.

- Ohio EPA will implement the requirement of SB1 that all facilities discharging >1.0 MGD will include monitoring of both total phosphorus and ortho-phosphorus if this requirement does not currently exist, by December 1, 2016.

- Ohio EPA and ODA will cooperate in the development and anticipated implementation of a pilot Lake Erie Basin nutrient trading and stewardship credit program being developed by the Great Lakes Commission. Ohio EPA would recommend a stronger focus on a stewardship program.

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- Ohio EPA will establish a contractual arrangement with Battelle to conduct an evaluation of processes, and products effectiveness for addressing nutrient and/or microcystin management, treatment and control with a focus on drinking and wastewater treatment systems, products and processes.

Ohio Lake Erie Commission (OLEC)

- OLEC will take the lead to ensure there is annual coordination between state and federal agencies for identifying priority programs, priority areas and timelines related to Lake Erie and the Lake Erie Basin. Each OLEC members' state agency will coordinate with the OLEC staff to maximize opportunities for the coordination of state and federal priorities.

- OLEC will coordinate with the member agencies and federal partners on the establishment of a WLEB fiscal operations plan. This plan will serve as guide for identifying short-term and long-term state funding requests and funding re-allocation as well as federal program dollar needs and opportunities for the WLEB. Priority should be given to a consistent and possibly a dedicated funding source for water quality monitoring.

- Significant dollars and other resources are made available annually from various federal, state, local and private sources to address the issues of Lake Erie. These funds include the Great Lakes Restoration Initiative Funds (GLRI), 319 Grants and other federal funding programs through United States Department of Agriculture (USDA), U.S. EPA, NOAA, United States Army Corps of Engineers (USACE), United States Fish and Wildlife Service (USFWS) and USGS. Several state agencies, ODNR, Ohio EPA, ODA and ODH also have provided significant funding over the years to help address Lake Erie issues. While the combination of funds is significant and it is often easy to point to the resulting projects, there continues to be the need to ensure dollars are being directed to projects and programs that truly address coordinated or stated priority issues. OLEC will seek cooperation, request coordination and may review funding requests made to federal or state agencies from state agencies, government subdivisions and organizations for funding related to Lake Erie or Lake Erie Basin projects. OLEC does not have the authority to approve or disapprove an application but will evaluate the funding request to confirm if the project is helping to achieve state or federal priorities related to Lake Erie or the Lake Erie Basin.

- OLEC will work with the Ohio Public Works Commission and local Green Space Conservation Program's Natural Resource Assistance Councils (Clean Ohio) in the WLEB to evaluate the use of Clean Ohio funds toward projects that also result in nutrient reduction practices. Grant applications should reflect the preference toward this goal. Priority points should be awarded to those projects that result in water quality improvements.

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- OLEC and member agencies will provide an annual update to the Ohio House and Senate Agriculture, Agriculture and Rural Development, Energy & Natural Resources committee as well as the Lake Erie Caucus on the state of the water quality in the WLEB.

- OLEC, in cooperation with NRCS, will hold biannual round-tables involving the participants and observers involved in the Phosphorus Taskforce II including representatives from Indiana and Michigan to evaluate progress toward Collaborative goals, targets, project implementation and monitoring data, as part of the adaptive management process.

Ohio Department of Agriculture (ODA)

- ODA will monitor the progress of the USDA Agricultural Research Service to finalize and present initial results from edge-of-field monitoring and research.

- ODA will monitor the progress of OSU and other state and federal agencies to complete revisions to the Tri-State Phosphorus Index or develop a Phosphorus Index specific to Ohio.

- ODA will continue the Ohio Clean Lake Initiative - Impaired Watershed Restoration Program through the Ohio Department of Agriculture Division of Soil and Water Conservation. This program aims to reduce phosphorus loading, including dissolved phosphorus loading, from agricultural landscapes to waters of western Lake Erie, the Maumee River and its tributaries. Specifically, this project will target four of the most impaired Watershed Assessment Units (WAU) in the Western Lake Erie Basin Watershed. A “systems approach” using a combination of management practices (soil testing, cover crops, drainage water management, fertilizer placement technology and manure storage structures and/or roofed feedlots) known to reduce nutrient loading will be targeted within portions of 10 counties in Ohio, of select sub-basins of the Maumee and Sandusky Rivers.

- ODA will work with NRCS to establish a Western Lake Erie Basin Technical Advisory committee as a sub-committee to the State Technical Committee to provide technical assistance specific to nutrient management issues and agricultural practices in the basin.

- ODA will coordinate with the United States Department of Agriculture Commodity Credit Corporation to strengthen and stimulate the Ohio Lake Erie Conservation Reserve Enhancement Program (LE-CREP) to achieve its 2004 goal of voluntarily establishing 67,000 acres of filter strips, riparian buffers, hardwood tree plantings, wildlife habitat and field windbreaks. Incentives will be prioritized based on targeted watersheds and on optimal placement and effectiveness of the riparian practices.

- ODA will collaborate with the USDA – NRCS, the Ohio Federation of Soil and Water Conservation Districts, and other partners to identify a suite of agriculture nonpoint BMPs (for example, drainage water management, nutrient placement, soil testing and livestock waste

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management) to be promoted basin-wide but with a priority for placement in targeted watersheds. Additional funds will be sought to provide cost incentives for implementing these BMPs, and BMP implementation will be tracked at the HUC 12 level.

- ODA will educate producers on the importance of following the fertilizer and manure application restrictions and fertilizer certification requirements in the WLEB. Implementation and enforcement of these restrictions will be a top priority for ODA and Ohio's SWCDs.

Ohio Department of Health (ODH)

- ODH will continue to work with Local Health Districts to ensure implementation of their Operation and Maintenance Tracking programs for sewage treatment systems as required in the Ohio Administrative Code, by prioritizing identification of failing sewage treatment systems within targeted watersheds. Upon identification of a failing system, local health districts will establish specific action plans and timeframes for correction of the nuisance conditions which may include repair, alteration or replacement of the sewage treatment system, or connection to public sewers.

Ohio Department of Natural Resources (ODNR)

- ODNR, in cooperation with Ohio EPA, will continue to fund and complete engineering and design work for potential in-water coastal wetland restoration projects in the western basin that beneficially use dredged material and can help assimilate in-lake nutrients.

Following are proposed actions to be taken by the state in cooperation with federal agencies and stakeholder groups within 12-36 months:

Ohio Environmental Protection Agency (Ohio EPA)

- Ohio EPA and ODA will coordinate with local entities in the development of or revisions to existing Watershed Implementation Plans (WIPs) which will cover any priority watersheds that are not already covered by a WIP. The WIP ideally will meet the nine element watershed plan criteria established by U.S. EPA to meet expectations for providing reasonable assurance that nutrient reductions will be achieved and maintained and eliminate nutrient impairment for a particular stream. A WIP meeting the nine element standard will also enable the county and others to apply for 319 grants and other state and federal funding if an approved TMDL is not in place. Cost share from the state for the WIP will be sought through a re-allocation of existing dollars or new funding.

- Ohio EPA, in cooperation with Heidelberg National Water Quality Lab and USGS, will continue to develop and implement a program to track and verify water quality improvements resulting from nutrient reduction practices and BMPs at the HUC 12 level.

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- Ohio EPA will publish a two-year Water Quality Milestone for each county and priority watershed. The Milestones will be used in assessing nutrient reduction progress toward the Collaborative targets from various sources of nutrients.

- Ohio EPA will coordinate with local authorities to conduct monitoring of nutrient discharge levels from priority combined sewer overflows to evaluate the total nutrient load resulting from these periodic discharges and to assist in determining priorities for separation projects.

- Ohio EPA will continue to focus State Revolving Loan Fund dollars and other infrastructure funding programs directed at priority mid-size CSO separation projects and wastewater treatment plant upgrades.

- Ohio EPA, in conjunction with ODA and ODH, will coordinate in the development of a nutrient reduction BMP Implementation, Verification and Evaluation process in watersheds to be administered by the appropriate agency. This would involve developing a record of federal or state cost-shared nonpoint BMPs being implemented, the location, documenting the proper installation, and life-cycle monitoring to ensure functionality at the county and HUC 12 level. While not identical, the program would complement the current NPDES point source Compliance and Compliance Assistance program administered by the Ohio EPA.

Ohio Lake Erie Commission (OLEC)

- OLEC, in conjunction with the Department of Taxation, will evaluate the establishment of a pilot State-wide Conservation Land Tax which would serve as an incentive to landowners to place land which would also provide water quality benefits into long-term conservation programs. As part of this initiative, OLEC could fund through the Lake Erie Protection Fund a study to evaluate tax revenue implications to local governments and school districts and concept acceptance by landowners and other stakeholders.

- OLEC with its member agencies will coordinate the development of an Adaptive Management Process “trigger mechanism” which would cause a change of program, practice or policy if the Milestones are not reached or do not indicate measurable progress toward achieving the goals. Any trigger will be based on the best available science, engagement of interested parties and state agencies.

- OLEC, EPA, ODA and ODNR will meet with the Maumee Conservancy District to evaluate their role related to the design, construction, funding and management of storm water management including water retention/detention options. More effectively managing surface and subsurface water would help to minimize “flashiness” of streams often resulting in short-term but higher nutrient loads. The conservancy district model may be a structure worth evaluating as a way for implementation and funding large-scale water management issues in the WLEB.

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Ohio Department of Agriculture (ODA)

- ODA will develop a Farm Stewardship Certification for farmers who protect farmland and natural resources by voluntarily implementing best management practices (BMPs) on their farms. Farmers that fully implement the 4Rs, including nutrient placement or nutrient application onto a living crop, will be eligible to receive this newly created certification. A farm level nutrient management plan (NMP) will provide verification that appropriate BMPs have been implemented and all aspects of the 4Rs are being utilized. Ohio's SWCDs will assist with the review and verification components of the NMP and will recommend farms deserving of the stewardship certification. Acres included in the NMPs and enrolled in the certification program will be tracked at the HUC 12 level.

- ODA will identify existing programs and consider development of new programs to install practices that reduce or eliminate water quality impacts from agricultural drainage. This will include programs for the installation of drainage control structures and developing incentives for water detention/retention structures in the agricultural landscape.

- ODA will work with NRCS and FSA to evaluate establishing stream-line processes, sign-up periods, and application requirements for various federal and state funding and technical assistance programs. This may include developing a "carve-out" of Farm Bill programs and processes specific to the multi-state Lake Erie basin for a specified period of time.

- ODA will work with NRCS and encourage an assessment of the scoring criteria for Farm Bill program eligibility to ensure that those farmers in most need of technical and financial assistance are receiving higher consideration for assistance.

Ohio Department of Natural Resources (ODNR)

- ODNR will continue to coordinate with and assist the USFWS/NOAA Upper Midwest and Great Lakes Landscape Conservation Cooperative (LCC) coastal conservation workgroup to develop a tool to identify potentially restorable wetlands for the western basin that incorporates landscape conservation design principles and goals, with a focus on restoring and conserving functional coastal wetlands that maximize coastal habitat, water retention, sediment trapping and nutrient processing/reduction benefits and in cooperation with Ohio Sea Grant shall jointly fund projects to investigate and quantify nutrient processing and reduction benefits of coastal wetlands.

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Appendix A

Methodology for Prioritization of HUC 12 Sub-Watersheds

Priority HUC 12 subwatersheds are indicated in Figure 1. Twenty-four HUC 12s in the Maumee River watershed have been identified as high priorities based on nutrient export potential. An additional 24 HUC 12s were previously identified as priorities for nutrient export based on the potential for implementation and monitoring. Of the additional 24, three overlap with the new priority HUC 12s.

Figure 2 shows all of the priority subwatersheds by distinct implementation groups for the newly identified subwatersheds. This appendix explains how the priority subwatersheds were determined and grouped. Limitations of the prioritization method are also outlined in this appendix.

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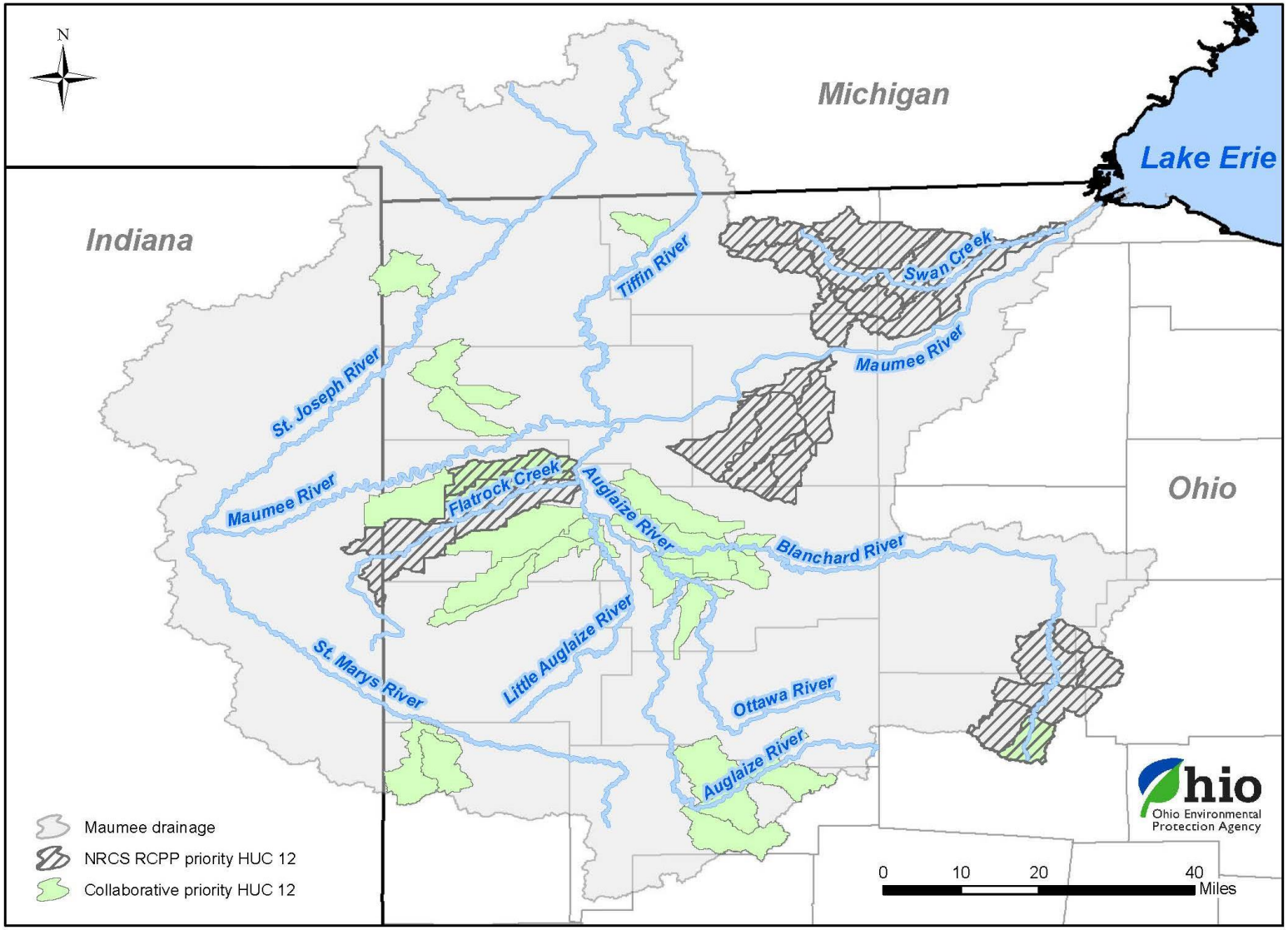

Figure 1: Priority HUC 12 subwatersheds (NRCS RCPP priority HUC 12, collaborative HUC 12).

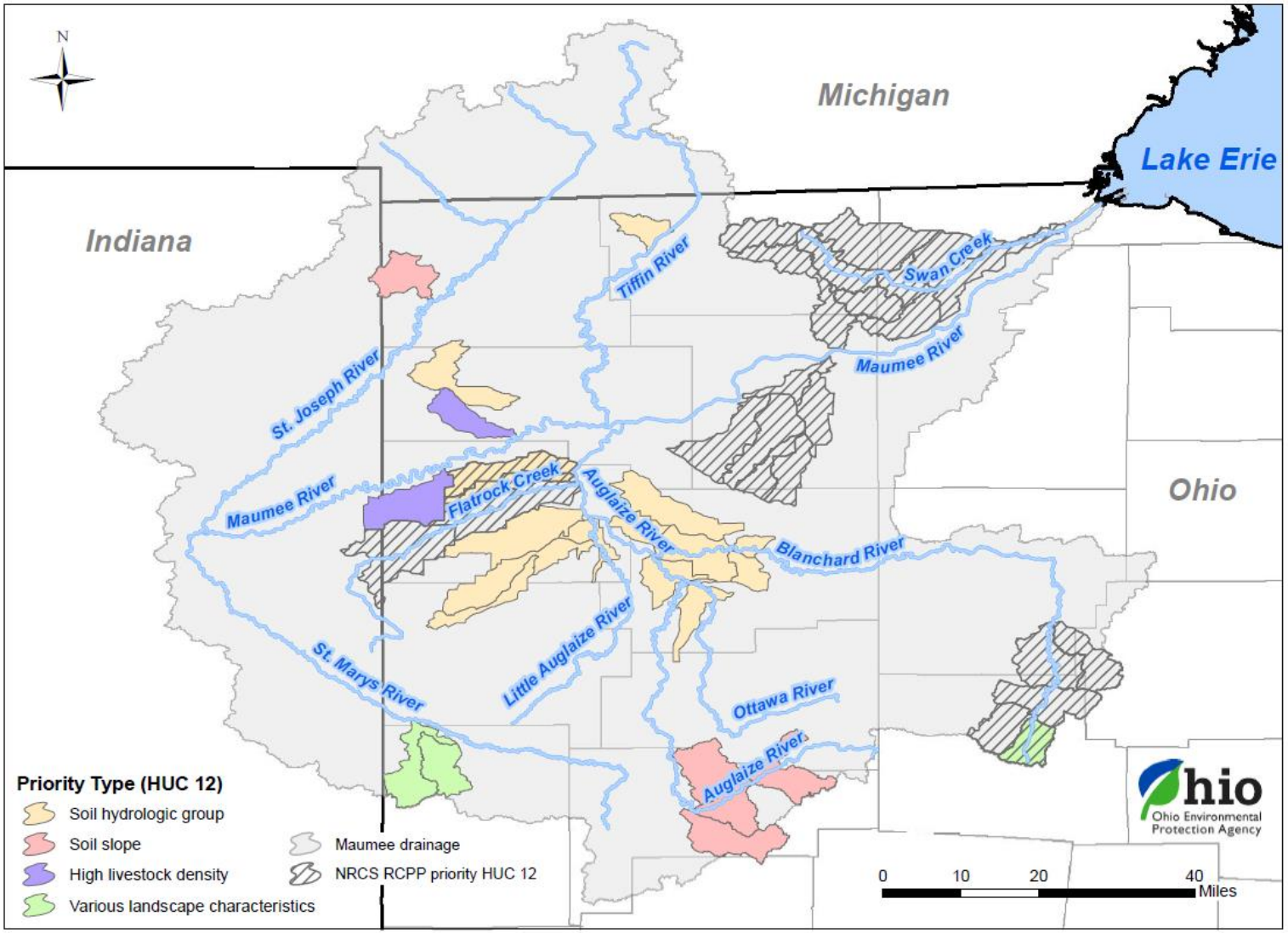

Figure 2: Priority HUC 12 subwatersheds in the Maumee River watershed. Four implementation groups are noted by different colors. Additionally, priority HUC 12s were already determined by NRCS and other groups are noted with hatching.

Some areas of the Maumee River watershed are more prone to phosphorus loss than others. The objective of this prioritization work is to identify those areas so implementation resources can be focused. However, a consensus of multiple watershed models in the Maumee River basin is that phosphorus management practices will have to be adopted widely across the landscape to achieve phosphorus reduction goals (Scavia et al. 2016). Also a report from the Conservation Effects Assessment Project (CEAP) shows a simulated solution that requires adoption of improved nutrient management, erosion control and cover crops on 95% of cropped acres to achieve a total phosphorus reduction of 43% (USDA NRCS 2016). Therefore, the approach of prioritization serves only to identify areas of greatest concern but is not meant to preclude other subwatersheds where on-going nutrient reduction actions will be needed to achieve phosphorus reduction goals. What is learned through the work in these priority subwatersheds should be applied to other areas within the Maumee River watershed and other WLEB tributaries.

The WLEB watershed is a diverse landscape that requires a variety of management practices to sustain the dominant land use: row crop production. Consequently, priority subwatersheds are identified in groups where agricultural practices affecting phosphorus loading may be different.

The priority subwatersheds are grouped according to the primary mechanisms of phosphorus export. Four primary groups represent the largest exported load contribution: 1) high proportion of hydrologic soil group D (intensive drainage and tillage); 2) high soil slope (erosion); 3) high livestock density (nutrient source and timing); and 4) various landscape characteristics. Some prioritized subwatersheds also have high concentrations of failing HSTS due to un-sewered communities and NPDES permits without nutrient limits. These are identified if present in a priority watershed, but not directly used to determine priority subwatersheds. The parameters used for determining these groupings are explained below.

Data Sources

Various sources of data are used to determine priority watersheds. This section outlines these data sources and how they are used.

Scavia et al. 2016

A recent report has directly examined the issue of nutrient export in the Maumee River watershed (Scavia et al. 2016). This report considers the results from modeling analyses carried out by its coauthors, a wide range of resource exports from University of Michigan, Ohio State University, United States Agricultural Research Service, LimnoTech (a consultancy), Heidelberg University, United State Geological Survey, The Nature Conservancy and Texas A&M. Five Soil and Water Assessment Tool (SWAT) models and one SPAtially Referenced Regressions On Watershed attributes (SPARROW) model are examined and aggregated. One product of this

report is the identification of "hotspot" subwatersheds. These hotspots are determined by agreement among the various models on the top 20 percent of nutrient export (Figure 3).
It is important to understand that all pollutant modeling has limitations of resolution. These start with the inputs and are carried through modeling computations into the outputs. One important limitation with regards to the SWAT models examined in Scavia et al. 2016 is that existing row crop agricultural practices (i.e., planting, tilling and fertilizing) and pollutant reduction best management practices are not input with geographic detail at the HUC 12 level. This collaborative document recognizes those limitations when using hotspots to determine priority subwatersheds. Additionally, this document aims to make clear the unknowns of nutrient export inherent in the modeling when describing each implementation group.

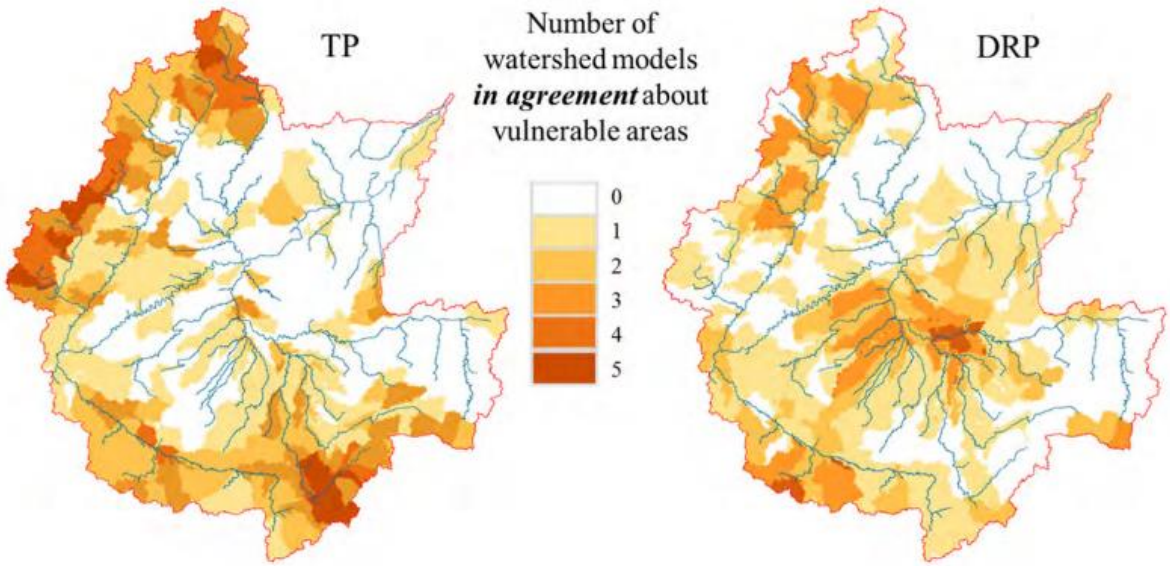

Figure 3: Potential "hotspots" of nutrient export to Western Lake Basin in the Maumee River watershed identified by comparing multiple models. Scale is 0 to 5 based on models in agreement. There were six models used in the total phosphorus (TP) map, however all six models did not agree on any area. Only five models are used in the dissolved reactive phosphorus (DRP) map. Figure source: Scavia et al. 2016.

SPARROW results do not consider DRP and the model's treatment of livestock manure input is coarse. Because of this, only the SWAT model results from the Scavia et al. 2016 report are considered in this collaborative report. Areas with at least four SWAT models in agreement for TP or three models in agreement for DRP are considered viable hotspots. If those hotspots do not align completely with a HUC 12 boundary, priority is given to the entire HUC 12 containing the hotspot. HUC 12s with headwaters in Indiana or Michigan or that only include a mainstem river and small direct tributaries are excluded from becoming priority subwatersheds. Both of these exclusions are due to practical geographic reasons that would preclude appropriate monitoring of nutrient load reduction.

Ohio EPA Monitoring Data

Ohio EPA stream survey TP data in the Maumee watershed from 1999-2005 were examined to understand prioritized subwatersheds. Approximately 10,500 records were examined throughout this area. Samples of WWTP effluent were removed as not indicative of instream conditions. Records from samples collected as part of complaint response were also removed as not indicative of typical in-stream conditions. In order to focus on HUC 12 subwatersheds, sites draining over 200 square miles were removed. This included samples taken on the main stems of the large rivers.

The bulk of Ohio EPA samples are collected in the summer field season when biological indices are assessed (March through September). The result is a purposeful bias of low flow sources representing a critical condition for stream biology. Using these data alone to prioritize nutrient export (far-field) without hydrologic considerations (i.e., weightings) is not appropriate. Rather these data are used to flag watersheds with relatively high TP concentrations. These data are useful in understanding particular low flow sources for nutrients, such as point source discharges without nutrient controls.

NRCS Priority Implementation Areas

Larger watersheds of the ten-digit size, HUC 10, were previously identified throughout the Western Lake Erie Basin drainage area by efforts organized by USDA's Natural Resources Conservation Service (NRCS). In 2014, Ohio EPA and USGS began intensive streamflow and nutrient monitoring within these HUC 10s. All of the subwatersheds within the NRCS priority HUC10s are included in the collaborative's priorities regardless of their ranking in the Scavia et al. 2016 hotspot analysis.

Miscellaneous Data Sources

Additional data may be used in the future to further quantify factors influencing water quality in particular counties or watersheds. This may include NPDES permit limits, biosolid field application data, fertilizer sales, nutrient management training and certifications and BMP implementation.

Implementation Groups

As explained above, the Scavia et al. 2016 "hotspot" for TP and SRP nutrient export and Ohio EPA water quality data are used to determine these HUC 12s in the Maumee River watershed.

In examining the priority HUC 12s, it is evident that the nature of the modeling input, processes and output makes for some common features that explain nutrient export. Since the collaborative focuses on implementation, it is appropriate to identify the common features of

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the priority watersheds that affect nutrient export. To do this, primary source groups are delineated.

It is important to note that while priority watersheds are placed into these groups, other sources of nutrient export are certainly present in each watershed. Additionally, some sources of TP, such as areas with a high density of failing home sewage treatment systems and sanitary NPDES dischargers without nutrient limits are noted within priority HUC 12s in this appendix.

1) Prioritized HUC 12s with a high density of hydrologic soil group type D

Fourteen priority HUC 12s have been identified in this group. This group has high percentages of soil group D, which is characterized by very low infiltration rates even when drained. In the Maumee River watershed these soils are most common within the extents of the Great Black Swamp, which was drained for agricultural production. The low infiltration rates result in reduced effectiveness of subsurface drainage systems, “tile”, so drainage practices usually include surface enhancements to promote runoff. Tillage intensity is often higher in these subwatersheds in order to maintain level fields that promote runoff.

The SWAT models generally identify these regions as being a high source of dissolved reactive phosphorus (DRP) loading. The models predict elevated DRP loading when subsurface drainage intensity is high. Based on the way subsurface drainage is incorporated into the model these areas are likely treated as heavily tiled (Kalcic and Logsdon Muenich 2016). While tile are most certainly present in these areas, the models may be over predicting the DRP contributions from them. This is because the primary drainage mechanisms promote runoff through grading and shallow surface ditches. Despite this modeling limitation, prioritizing these areas is warranted to promote a better understanding of the phosphorus loading.

The differences noted in agricultural management practices in these areas lead to unique phosphorus management challenges. The soils have high clay content and, when fallowed after tillage operations, these clays are easily suspended by raindrops and carried with the runoff as colloids. These surface clays are likely associated with elevated phosphorus concentrations. Management practices might focus on improved infiltration (if possible), increased residue cover, cover crops and nutrient incorporation since nutrients surface applied would be especially prone to runoff.

2) Prioritized HUC 12s of high slopes (erosion)

Five subwatersheds have been identified in this group. A primary source of phosphorus from the agricultural landscape is that which is bound to sediment eroded from fields. Soil loss due to erosion is strongly affected by slope, as more energy is generated by the water as it moves across the landscape. While much of the Maumee River watershed is characterized by

exceptionally low slopes, the watershed is bounded by glacial moraines. This leads to slightly undulating topography, where potential for erosion is increased. Consequently, agricultural practices that help to mitigate erosion are more common in these areas.

One of the limitations of SWAT is its inability to capture conservation practices as they exist on the landscape. SWAT modeling results often identify areas with higher soil slopes as having elevated total phosphorus loads. While this represents the potential of the landscape to have increased phosphorus yields, it is likely the potential is reduced by existing agricultural practices not included in the SWAT model. The models used in the Scavia et al. hotspot analysis are no exception to this (Confesor 2016; Kalcic and Logsdon Muenich 2016).

Subwatersheds identified in this group are expected to have high potential for phosphorus loading linked to erosion. Consequently, the types of BMPs that should be targeted in these priority areas can be customized to this condition. These practices would include: grassed waterways where concentrated flow exists, conservation tillage, no-till, improved infiltration and cover crops. It is likely that the aforementioned practices are already common in these watersheds. If the adoption of appropriate conservation practices becomes apparent in these watersheds, the information can be used to adapt the models to more realistic conditions and update the hot spot areas.

3) Prioritized HUC 12s of high livestock density (nutrient source and timing)

Manure application is generally difficult to represent using watershed modeling methods. Limitations include the complexity of exactly when, where and how manure is applied and the inability to accurately represent those processes. Consequently, the work by Scavia et al. 2016 does not identify areas that may have increased loading from manure management challenges. However, ODA and Ohio EPA maintain records on locations of CAFOs, and Ohio EPA water quality monitoring data has identified areas where manure management is the most obvious source of elevated phosphorus concentrations.

Only two HUC 12s are currently included in this category. Again, these two HUC 12s were not identified by the Scavia et al. 2016 modeling report. These are watersheds where large animal feeding operations exist, and Ohio EPA has observed elevated ambient nutrient concentrations without other identified sources. Manure spills occurred in both of these HUC 12s in 2015; each resulting in fish kills. This indicates that there are real and current manure management challenges in these areas.

4) Prioritized HUC 12s with various landscape stressors

It is uncommon for the models to agree on hotspot areas in the Maumee watershed where there are not high slopes or high percentages of D soils. However, three HUC 12s fall into this category. Each of these watersheds were identified by the Scavia et al. 2016 report as hot spots for both TP and DRP. These were the only locations where this phenomenon occurred.

Subsurface drainage is nearly ubiquitous in this region, and improved infiltration rates result in more water leaving fields through drainage tile. Understanding the influence of subsurface drainage on water quality in these regions is especially important. Emphasis should be placed on management practices that are linked to improving water quality in tile discharge. These practices might include: blind inlets, saturated buffers, banding fertilizer (reduced short circuiting via macropores) and cover crops.

Additional nutrient sources noted within priority subwatersheds

Tables 1 through 5 shows the priority HUC 12s subwatersheds. Tables 1-4 represents the HUC 12s in the four different implementation groups. The focus of the prioritization efforts is to address nonpoint sources at the HUC 12 scale. However, there are other sources that should be considered for nutrient reductions. These sources are noted where present within the priority subwatersheds on Tables 1-4. Table 5 shows the RCPP NRCS priority subwatersheds.

Some of these other sources are wastewater treatment plants that are significant minors discharging less than one million gallons a day but do not a have phosphorus limits. These facilities report self-monitoring data to Ohio EPA's discharge monitoring report database. For water year 2014 (October 1, 2013 – September 30, 2014), the top 30 Maumee River watershed load contributors of Ohio's NPDES permitted facilities were calculated (Table 6). The largest facilities, discharging over 1.0 MGD, already have limits of 1 mg/L in the discharge (denoted in green in the table). However, the list includes many smaller facilities that do not have limits but are still significant contributors. For this reason, they rank high on the list for annual total phosphorus load.

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Table 1: Priority HUC 12 subwatersheds within the Maumee River watershed due to high density of hydrologic soil group type D (intensive drainage and tillage) implementation group

HUC 12	HUC name	Soil feature	Other sources
41000060205	Stag Run-Bean Creek	D – 29 percent C – 44 percent	
41000060601	Lost Creek	D – 20 percent C – 57 percent	
41000070503	Village of Kalida-Ottawa River	D – 23 percent C/D – 77 percent	
41000070701	Hagerman Creek	D – 45 percent C/D – 38 percent	Convoy WWTP
41000070703	Prairie Creek	D – 56 percent C/D – 44 percent	
41000070806	Burt Lake-Little Auglaize River	D – 97 percent	
41000070905	Lapp Ditch-Auglaize River	D – 97 percent	
41000070906	Prairie Creek	D – 100 percent	Anaerobic digester with land application
41000071004	Lower Blue Creek	D – 95 percent	Several small WWTPs Paulding biosolids fields
41000071102	Upper Powell Creek	D – 100 percent	Continental WWTP
41000071207	Little Flatrock Creek	D – 100 percent	Paulding biosolids fields
41000071208	Sixmile Creek	D – 100 percent	Paulding biosolids fields
41000080604	Bear Creek	D – 100 percent	
41000080605	Deer Creek-Blanchard River	D – 100 percent	Failing small WWTP Ottawa biosolids fields

* HUC 12 is also an RCPP NRCS Priority subwatershed

Table 2: Priority HUC 12 subwatersheds within the Maumee River watershed due to high slopes (erosion) implementation group

HUC 12	HUC name	Soil feature	Other sources
41000030305	Bear Creek	TBD	Edon WWTP
41000070103	Wrestle Creek-Auglaize River	72 percent	Lima biosolid fields
41000070104	Pusheta Creek	65 percent	
41000070105	Dry Run-Auglaize River	45 percent	Several small WWTPs
41000070201	Twomile Creek	18 percent	Several small WWTPs

Table 3: Priority HUC 12 subwatersheds within the Maumee River watershed due to high livestock density (nutrient quantity and timing) implementation group

HUC 12	HUC name	Other sources
41000050206	Platter Creek	
41000050201	Zuber Cutoff	Antwerp WWTP

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Table 4: Priority HUC 12 subwatersheds within the Maumee River watershed due to row cropped with various landscape characteristics implementation group

HUC 12	HUC name	Other sources
41000080102*	Headwaters Blanchard River	Kenton biosolids fields
41000040301	Little Black Creek	
41000040302	Black Creek	

* HUC 12 is also an RCPP NRCS Priority subwatershed

Table 5: RCPP NRCS priority subwatersheds

HUC 12	HUC name
41000071205	Wildcat Creek-Flatrock Creek
41000071206	Big Run-Flatrock Creek
41000071207	Little Flatrock Creek
41000071208	Sixmile Creek
41000080101	Cessna Creek
41000080102	Headwaters Blanchard River
41000080103	The Outlet-Blanchard River
41000080104	Potato Run
41000080105	Ripley Run-Blanchard River
41000090101	West Creek
41000090102	Upper South Turkeyfoot Creek
41000090103	School Creek
41000090104	Middle South Turkeyfoot Creek
41000090105	Little Turkeyfoot Creek
41000090106	Lower South Turkeyfoot Creek
41000090301	Upper Bad Creek
41000090302	Lower Bad Creek
41000090701	Ai Creek
41000090702	Fewless Creek-Swan Creek
41000090703	Gale Run-Swan Creek
41000090801	Upper Blue Creek
41000090802	Lower Blue Creek
41000090803	Wolf Creek
41000090804	Heilman Ditch-Swan Creek

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Table 6: Analysis of Maumee watershed discharge monitoring report data for water year 2014 (October 1, 2013 – September 30, 2014) to estimate the top 30 total phosphorus NPDES permitted discharges

Maumee River (WY 2014)			Means TP limit	Means No TP limit			
Rank	Permit #	Permit Name	Design Flow (gpd)	Flow Volume (MG)	[TP] (mg/L-P)	TP Load (kg/yr)	% of total NPDES (OH) load
1	2PF00000	Toledo Bay View Park WWTP	130000000	25162	0.44	41909	33.72%
2	2PK00000	Lucas Co WRRF	22500000	5745	0.71	15439	12.42%
3	2PD00008	Findlay WPCF	15000000	4213	0.77	12281	9.88%
4	2PE00000	Lima WWTP	18500000	5413	0.38	7786	6.27%
5	2PD00013	Defiance WWTP	6000000	1190	0.96	4324	3.48%
6	2IF00004	PCS Nitrogen Ohio LP	3740000	1034	1.10	4304	3.46%
7	2IH00021	Campbell Soup Supply Co LLC	10000000	1389	0.71	3707	2.98%
8	2PD00002	Perrysburg WWTP	5400000	2168	0.36	2914	2.34%
9	2PB00034	New Bremen WWTP	900000	254	2.87	2755	2.22%
10	2IH00110	Cooper Farms Cooked Meats Van Wert	N/A	63	10.90	2583	2.08%
11	2PD00001	Rockford STP	250000	240	2.33	2120	1.71%
12	2PB00050	Ada WWTP	2000000	258	2.02	1970	1.59%
13	2PD00006	Van Wert WWTP	4000000	1070	0.49	1964	1.58%
14	2PD00003	Montpelier WWTP	1000000	306	1.51	1750	1.41%
15	2PD00000	Napoleon WWTP	2500000	684	0.63	1630	1.31%
16	2PB00025	Swanton WWTP	920000	216	1.90	1553	1.25%
17	2PK00002	Shawnee No 2 WWTP	2000000	682	0.60	1548	1.25%
18	2PB00046	Elida WWTP	500000	217	1.77	1448	1.17%
19	2PB00042	Hicksville WWTP	400000	314	1.15	1359	1.09%
20	2PD00027	Paulding WWTP	710000	241	1.47	1334	1.07%
21	2PH00007	American-Bath WWTP	1500000	462	0.70	1225	0.99%
22	2PD00026	Saint Marys STP	3000000	693	0.44	1153	0.93%
23	2PA00047	Kalida STP	200000	69	4.08	1060	0.85%
24	2PC00004	Columbus Grove WWTP	820000	251	1.10	1043	0.84%
25	2PA00002	Ottoville WWTP	339000	83	3.02	953	0.77%
26	2PB00040	Leipsic WWTP	1500000	238	0.98	879	0.71%
27	2PB00005	Convoy WWTP	200000	84	2.73	869	0.70%
28	2PD00019	Wapakoneta WWTP	4000000	1088	0.21	844	0.68%
29	2PB00006	Pioneer WWTP	500000	88	2.37	792	0.64%
30	2PA00037	Antwerp WWTP	33000	78	2.62	769	0.62%

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