

**EVALUATING WATERSHED
MANAGEMENT PLANS -
NUTRIENT MANAGEMENT APPROACHES
IN THE LAKE ERIE BASIN AND KEY
LOCATIONS OUTSIDE OF THE LAKE ERIE
WATERSHED**

**PREPARED FOR:
THE INTERNATIONAL JOINT COMMISSION
GREAT LAKES WATER QUALITY BOARD**



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EXECUTIVE SUMMARY

The International Joint Commission (IJC) tenders advice and recommendations to the United States and Canada on matters related to the water quality of the Great Lakes and approaches and options that the governments may consider to improve effectiveness in achieving the purpose and objectives of the Great Lakes Water Quality Agreement (GLWQA). Under the GLWQA, the IJC is served in an advisory capacity by the Great Lakes Water Quality Board (WQB). The WQB includes a Legacy Issues Work Group (Work Group) that identified a priority topic related to Lake Erie watershed management with respect to nutrient/algae issues.

Following the signing of the GLWQA in 1972, significant actions were taken by both federal governments and by the state and provincial governments, including monitoring to track Lake Erie's response to the actions taken. By the mid-1980s, phosphorus loadings to Lake Erie were reduced by more than half of the 1970s levels. Lake Erie showed visible improvements and a remarkable recovery. However, by the early 2000s, Lake Erie was again experiencing increasingly severe eutrophication problems due to excessive nutrient enrichment. Therefore, the WQB sought to identify and review nutrient assessments including 'Key Success Factors' from watershed management plans within the Lake Erie basin and other jurisdictions that could be used to achieve nutrient load reduction targets and thereby restore and protect Lake Erie.

The objective of this report is to compile nutrient management information from Lake Erie watershed management plans and agencies, and select watersheds outside of the Lake Erie drainage basin. Consultants consisting of Hull & Associates, Inc. and BluMetric Environmental Inc. (the Project Team) were retained to review and assess nutrient management components in the subject watershed management plans to identify key success factors for achieving nutrient load reductions. A review of the information gathered in this report will provide the IJC's Work Group and the WQB with approaches that have created effective frameworks for meeting nutrient load reduction targets, and support general recommendations for future basin-wide planning initiatives. This objective was divided into two tasks: (1) collection and compilation of watershed management plans, and (2) preparation of a summary of nutrient management strategies.

The Project Team initially identified and provided an inventory of agencies and other governmental and community organizations, interest groups, and stakeholders that develop and/or implement watershed management plans within and outside of the Lake Erie basin. A screening matrix for both the Lake Erie watershed and key areas outside the Lake Erie watershed was completed prior to selecting specific watershed plans for further in-depth review. The plans were initially screened by the Project Team, and final selections for future review were made by the Work Group. The selected plans were reviewed in

detail and a Watershed Plan Summary Sheet was completed for each plan reviewed to summarize the important aspects of each plan and score each plan as objectively as possible.

The in-depth review of the watershed management plans revealed that most plans have a similar list of nutrient sources, and where total maximum daily loads (TMDLs) have been established, incorporate these into the plan. None of the plans appear to correlate nutrient data to harmful algal blooms (HABs) downstream and in Lake Erie and some do not address the issue of HABs at all. However, some plans generally identify algal blooms as an issue related to nutrient loading. Nutrient impairment in most of these plans is attributed to agricultural practices (both cultivation and livestock), erosion, aging septic systems, urban runoff, and inadequate wastewater treatment and combined sewer overflows (CSOs). Few plans included models to estimate the amount of nutrient loading occurring or to determine the load reductions needed and expected based on management practices within a specific watershed. Additionally, although most plans have a list of common management practices, the criteria for determining success are typically not well-established. In general, the most common strategies and management practices for minimizing nutrient loading included minimizing the source of nutrients, limiting the transport of nutrients from agricultural soils, repairing or replacing septic systems, updating wastewater treatment facilities, and eliminating CSOs. Assessments of source allocation tended to be qualitative and only on rare occasions were adaptive management strategies discussed.

Observations made during these reviews led to a set of recommendations for a framework to develop a comprehensive watershed management approach for the Lake Erie basin:

- Successful plans from the review may be used as **models** for developing and implementing management plans for areas draining into Lake Erie on both the U.S. and Canadian sides of the border.
- Clear **goals** should be set with intermediate **milestones** to track progress and maintain accountability. Clear benchmarks keep management activities on a trajectory toward success. With a strong adaptive management program, these milestones can always be modified to meet future goals
- To increase the probability of success, a science-driven **adaptive management process** that includes an economic cost benefit component should be a foundational principle of a watershed management plan for Lake Erie. Structuring the plan around a systematic, scientific approach provides the flexibility needed to learn from successes and failures.
- Watershed planning should have a **consistent** watershed-specific approach, including the unique aspects of the western, central and eastern basins. A network of watershed planners is needed to develop common methodologies to characterize, model, implement recommendations, monitor, evaluate, and track success, recognizing the imperative need to understand the cumulative effect of sub-watershed nutrient contributions and the need to dedicate reduction-effort resources accordingly.

- A **coalition** of federal, state, local, tribal, academic, and private stakeholders with defined responsibilities to assist in the implementation of the plan should be developed and should include representation of the planning team in the subsequent implementation/administration. The allocation of responsibilities needs to be fair, based on good science and incorporate capabilities of the political subdivisions. Combined efforts are more likely to bring implementation and research funding to the region, including resource allocation and special funding initiatives to address priority areas.
- A strategy for generating **public awareness** should be incorporated. Even though this unique water resource impacts so many North Americans, many do not know or appreciate the extent and immediacy of the problem. Residents of the watershed must understand the problems associated with excessive nutrient release, how they might be contributing to the problem, and what they can do to mitigate the issue.
- A comprehensive **monitoring program** should be in place to assess the performance of management practices developed from actual data and scientific models. Successful monitoring programs seemed to incorporate the latest science and understanding of the problem(s), such as monitoring the appropriate forms of the pollutant (dissolved, total, etc.), targeting specific critical locations, and a strategy for accountability of reporting progress. The program should be detailed, incorporate a specific schedule, and discuss how and where the results will be used to evaluate success.

The review of these plans revealed that while there have been many watershed management plans developed for portions of the Lake Erie drainage basin, most do not contain the level of detail and strategies necessary for an effective response plan. The reviewed plans generally do not reflect cumulative loading effects or downstream impacts, provide for appropriate monitoring, nor recommend mechanisms to address nutrient loading and achieve nutrient impairment goals.

1.0 INTRODUCTION

1.1 Report Objectives

Lake Erie is the shallowest, warmest, and most biologically productive of the five Great Lakes. Although it is the fourth largest by surface area of the Great Lakes, it is the smallest by volume. Lake Erie is bordered to the north by the Canadian province of Ontario, to the south by the U.S. states of Ohio, Pennsylvania and New York, and to the west by the state of Michigan. The Lake Erie Watershed also includes the state of Indiana, via the Maumee River.

The lake is naturally divided into three basins: west, central, and east. Like the rest of the Great Lakes, Lake Erie was formed by the movement of glaciers. The glaciers carved away more land in the central and eastern basins because the bedrock is made of shale, which is much softer than the dolomite and limestone of the western basin. The western basin is shallow, with an average depth of 24 feet and a maximum depth of 64 feet. The central basin is fairly uniform in depth, with an average depth of 60 feet and a maximum depth of 82 feet. The eastern basin is the deepest, with an average depth of 82 feet and a maximum depth of 210 feet. The large differences in the basins cause them to behave quite differently, and each basin has its own unique characteristics and sub-issues, in addition to the challenges of the lake as whole.

About one-third of the total population of the Great Lakes basin resides in the Lake Erie watershed. Approximately 11 million people live in the watershed and rely on Lake Erie for their drinking water. The Lake Erie basin includes 17 metropolitan areas with more than 50,000 residents.

Lake Erie experienced early and intense development of its lands for agricultural and urban uses and was the first of the Great Lakes to demonstrate a serious problem of eutrophication. At the time, Lake Erie surpassed all other lakes in the volume of effluent received from sewage treatment plants (Government of Canada and U.S. EPA, 1995). The combination of nutrient-rich organic pollutants, synthetic fertilizers, and phosphate detergents caused an acceleration of biological productivity in the lakes. By the early 1950s, Lake Erie showed the first evidence of lake-wide eutrophic imbalance with massive algal blooms and the depletion of oxygen.

Significant efforts were initiated the 1970s to reduce pollutant loading into Lake Erie, including removal of phosphorus in detergents, improved wastewater treatment systems, and modified agricultural practices. By the mid-1980s, the levels of phosphorus were reduced to about 50 percent of the levels in the 1970s. However, more recent studies have shown that nutrient loading to Lake Erie is increasing, resulting in significant adverse effects, most notably, harmful algal blooms (HABs). Several international, federal, and

state initiatives are underway to address HABs in Lake Erie. Through Annex 4 of the Great Lakes Water Quality Agreement of 2012, the governments of the United States and Canada agree to:

- by 2016, develop binational substance objectives for phosphorus concentrations, loading targets, and loading allocations for Lake Erie (complete); and
- by 2018, develop binational phosphorus reduction strategies and domestic action plans to meet the objectives for phosphorus concentrations and loading targets in Lake Erie (in development).

Ohio, Michigan and the Canadian province of Ontario agreed to reduce phosphorus by 40 percent in the Lake Erie basin. It is expected that state and provincial plans will be developed to specifically address how this reduction will be accomplished to meet the 2018 deadline. As part of this effort, it is important that successful approaches and lessons learned from other watersheds be identified and considered.

The objective of this report is to compile nutrient management information from existing watershed management plans in the Lake Erie drainage basin and from select watersheds outside of the Lake Erie basin. A Project Team was assembled to review and assess nutrient management components in a group of watershed management plans to ascertain key success factors for achieving nutrient load reductions. The information gathered in this report will provide the International Joint Commission's (IJC) Legacy Issues Work Group (Work Group) and the Great Lakes Water Quality Board (WQB) with approaches that have created effective frameworks for meeting nutrient load reduction targets, if identified. This objective was divided into two tasks: (1) collection and compilation of watershed management plans, and (2) preparation of a summary of relevant nutrient management strategies.

Hull & Associates, Inc. and BluMetric Environmental Inc. were contracted by the IJC to prepare this evaluation. This Project Team has experience with Lake Erie improvement programs and watershed plans in both the United States and Canada. The information gathered in this report will provide the IJC Work Group and the WQB with approaches that have been identified to effectively achieve nutrient load reduction targets and recommendations for the WQB's and the Work Group's consideration to advise and help lead Lake Erie restoration efforts.

1.2 International Joint Commission Role and Background

The IJC tenders advice and recommendations to the United States and Canada on matters related to the water quality of the Great Lakes and approaches and options that the governments may consider to improve effectiveness in achieving the purpose and objectives of the Great Lakes Water Quality Agreement (GLWQA). Under the GLWQA, the WQB serves the IJC in an advisory capacity. The WQB includes a

Work Group that has identified a priority topic related to Lake Erie watershed management with respect to nutrient/algae issues.

In 1970, the Commission submitted a report, *Pollution of Lake Erie, Lake Ontario and the International Section of the St. Lawrence River*, to the U.S. and Canadian governments. The report laid out the requirements for the restoration and long-term sustainability of Lake Erie. On April 15, 1972, the governments of Canada and the United States signed the GLWQA, committing to restore and protect the Great Lakes, including reduction of nutrient loadings to Lake Erie.

Following the signing of the Agreement, significant actions were taken by both federal governments, coordinating with the state and provincial governments, to track Lake Erie's response to the actions taken to achieve nutrient reduction goals. To date, many nutrient plans are completed through state watershed management programs. While the efforts of the IJC proved successful in reducing total phosphorus loading, Lake Erie is once again experiencing severe eutrophication problems that require a coordinated response effort by federal, state/province, and local officials and stakeholders within the entire basin.

2.0 WATERSHED MANAGEMENT PLAN INVENTORY

2.1 Approach/Methodology Overview

The Project Team identified and provided an inventory of agencies and other governmental and community organizations, interest groups, and stakeholders that develop and/or implement watershed management plans within and outside the Lake Erie basin. The inventory was limited to watershed plans that were publicly available online.

It is important to note that many of the plans reviewed were written to address different federal, state, or provincial programs. Thus, plans evaluated may address specific requirements of the program for which they were written but lack some of the information/data evaluated for this project. Additionally, while hundreds of watershed plans exist for the Lake Erie watershed and other areas of interest, a specific methodology was established to ensure that plans selected for review met the overall project objectives:

- Preliminary Screening – An inventory of readily available plans was completed and the basic information/relevant report topics within each watershed plan were entered into a matrix. Specific code identifiers were assigned to each topic area to describe the level of detail to which the plan addresses the topic.
- Project Team Review and Selection – The matrices and recommendations were reviewed by the Project Team and the Work Group. Based on the work group's consensus, a decision was made whether to include the watershed plan in a more detailed evaluation. Twenty Lake Erie watershed management plans were included in the detailed review (Appendix A-1). A further 12 plans, two each, from the Lake Champlain, Chesapeake Bay, Everglades, Mississippi River/Gulf of Mexico, Lake Winnebago, and Lake Simcoe watersheds were also reviewed (Appendix A-2).
- Inventory and Evaluation – Once the final watershed plan selections were made, the plans were reviewed in detail and the reviewer completed a Watershed Scoring Sheet. The purpose of the Watershed Scoring Sheet was to summarize the important aspects of each plan and score each plan as objectively as possible.

2.2 Preliminary Screening

Prior to the selection of the specific watershed plans to be included in the review, preliminary screening matrices for both the Lake Erie watershed and areas outside of the Lake Erie watershed were completed to inventory publicly available watershed plans. The screening matrices include 48 Lake Erie basin watershed plans (Appendix A-1) and 32 plans from the Lake Champlain, Chesapeake Bay, Everglades, Mississippi River/Gulf of Mexico, Lake Winnebago, and Lake Simcoe watersheds (Appendix A-2). While these matrices do not include every watershed plan, a concerted effort was made to provide a representative list of plans from each requested basin. For the Lake Erie watershed, at least one watershed plan from all of Lake Erie's 8-digit HUC watersheds, with the exception of the Cattaraugus (HUC 04120002), was included, as

illustrated on Figure 1. While we could not find an existing plan from the Cattaraugus watershed, it appears that a plan is currently being developed.

The information gathered through on-line research included the plan name, date, agency responsible for the development of the plan, state or province, website address of the agency, and where initially available, contact names, email addresses and phone numbers. Additionally, the table of contents was reviewed to determine the types of information contained within:

- Identification of major nutrient sources
- Methods to minimize nutrient loading
- Nutrient monitoring (in general)
- Nutrient monitoring correlated to harmful algal blooms (HAB)
- Information on 303(d) and Areas of Concern (AOC)
- Information on Total Maximum Daily Load (TMDL) reports

Based on the preliminary review, the plans were assigned a code of A, B, C, or NA to identify the amount of information pertaining to each category:

- A – Proposed implementation/not implemented
- B – Metric established - baseline implemented
- C – Post implementation metric/data available
- NA – Not addressed

For the “identification of major nutrient sources” category, several plans provide only a general list of major nutrient sources for the watershed (runoff from agricultural areas, wastewater treatment plants, etc.). In such cases, these plans were assigned a code of ‘C.’ In the case of “methods to minimize nutrient loading,” when methods are proposed, they were assigned a code of ‘A’ or ‘B’ depending on whether there were supporting implementation data. For the most part, the methods proposed were usually high level and non-prescriptive; e.g. “promote the use of low-phosphorus fertilizer.” In a few instances a lot of methods were proposed, but relatively few are being implemented watershed-wide in a systematic fashion, and even fewer that have data available.

The extent of nutrient monitoring programs appears to vary substantially from one watershed to another. Therefore, if any data has been collected, they were assigned a code of 'B' or 'C' depending on whether future sample collection efforts are discussed.

None of the plans appear to correlate nutrient data to downstream/Lake Erie HABs or did not address the issue of HABs at all. Those plans were assigned a code of NA. Some plans identify algal blooms as an issue related to nutrient loading. In those instances, the information is presented with a code of "general statement."

For source allocation and downstream effect, the assessment of source allocation tended to be qualitative and only on rare occasions were adaptive management strategies generally discussed.

Based on the codes for each plan on the matrices, 20 Lake Erie plans and 12 plans, two each, from the Lake Champlain, Chesapeake Bay, Everglades, Mississippi River/Gulf of Mexico, Lake Winnebago, and Lake Simcoe watersheds were preliminarily identified for inclusion in the study for consideration of the work group. The matrices summarizing all of the watershed plans reviewed are included in Appendix A. The watersheds selected for in-depth review are illustrated on Figure 2 for inside the Lake Erie Drainage Basin, and Figure 3, for key locations outside of Lake Erie.

2.3 Project Team Review and Selection of Plans

The initial screening matrices, and preliminary recommendations, were reviewed by the Work Group. Each watershed plan listed on the matrix was reviewed and discussed. Based on the Work Group consensus, a decision was made whether to include the watershed plan in the detailed evaluation. In some cases, plans that were preliminarily selected for inclusion were removed and other plans added as a replacement. Twenty Lake Erie watershed management plans were included in the detailed review (Appendix A-1). Twelve watershed management plans, two each from the Lake Champlain, Chesapeake Bay, Everglades, Mississippi River/Gulf of Mexico, Lake Winnebago, and Lake Simcoe watersheds, were also included in this review (Appendix A-2).

2.4 Inventory and Evaluation

Once the final watershed plan selections were made, the plans were reviewed in detail and a Watershed Plan Summary Sheet was completed by the reviewer. The purpose of the Watershed Plan Summary Sheet was to summarize the important aspects of each plan and score each plan as objectively as possible. The following five categories were included in the summary sheet:

- Identification of the nutrient causes and sources of impairment or threats to the water body
- Description of the management measures needed to achieve the proposed nutrient load reductions
- Estimate of the nutrient load reductions expected from the proposed management measures
- Criteria to determine whether or not nutrient load reductions are being achieved
- Monitoring component to evaluate the effectiveness of implementation

Each category had review criteria in which a score of 1 to 4 was assigned based on the amount of information in the plan:

- 1 – Absent – Item is not discussed
- 2 – Minimal – Includes some information but significant additional information/data is needed to fully address the item
- 3 – Good – Includes an acceptable amount information and addresses the item
- 4 – Excellent – Includes a significant amount of applicable, exceptional and current information while addressing the item

Using this scoring system, the range of possible scores was between a minimum of 22 and a maximum of 88. In addition to the scoring, areas for comments, page/section reference, and recommendations were included on the summary sheet.

2.5 U. S. and Canadian Programmatic Approach

2.5.1 U.S. Programmatic Approach

The plans were reviewed to determine whether they incorporated findings of TMDL studies. TMDL studies have been completed for 303(d) impaired waters throughout the Lake Erie watershed and watersheds outside of the Lake Erie Drainage Basin. The environmental stresses identified in those reports (chemical, physical, and/or biological) have prompted a number of local watershed groups to create management plans aimed at alleviating those impairments. The goal of the TMDL program is to identify polluted surface water bodies and establish a quantitative value to reduce pollutants to meet surface water quality standards. The TMDL allocates pollutant load reductions, and provides the basic actions to be taken to restore a waterbody to attainment levels. TMDLs have been established for nutrients for a number of these watershed based on the surface water quality criteria of the water body; however these TMDLs were not established to meet a drinking water criteria. Watershed plans that incorporate TMDLs for phosphorus were identified in the initial screening matrices (Appendix A-1 and A-2).

2.5.2 Canadian Programmatic Approach

Addressing nutrient impaired waters on the Canadian side, specifically in Ontario, has taken a somewhat different approach than that of the U.S. Ontario's Great Lakes Protection Act received Royal Assent (required before a bill can become a law) in November 2015. Section 9(2) of this Act commits to establishing a target within the next two years for reducing algae blooms within all or part of the Great Lakes-St. Lawrence Basin.

Nutrient management on agricultural lands in Ontario is regulated under the Nutrient Management Act. An agricultural operation may require one or more of the following documents to be compliant with the regulation depending on their agronomic management decisions and size of operation. These documents include a nutrient management strategy (NMS), a nutrient management plan (NMP) and/or a non-agricultural source material plan (NASM). According to the Ontario Ministry of Agriculture and Rural Affairs "The Act has two basic principles: environmental protection and a sustainable future for agriculture operations and rural development. NMS, NMP and NASM plans recognize the balance between these principles and attempt to help the producer successfully manage the nutrients under his/her control."

In addition to the regulated aspect of nutrient management for agriculture, Ontario has a number of programs designed to encourage the adoption of BMPs to minimize adverse nutrient impacts on surface water. Most notably, the Ontario Soil and Crop Improvement Association is administering the Farmland Health Incentive Program (FHIP) under the Great Lakes Agricultural Stewardship Initiative. This program specifically targets the areas of Lake Erie and Lake St. Clair watersheds and/or the Lake Huron southeast shores watershed. The FHIP offers financial support to implement select BMPs identified during a "Farmland Health Check-Up." The funding levels depend on the priority of the "Farmland Health Challenges" that are being addressed. Eligible BMPs include cover crops, adding organic amendments, crop nutrient plans, buffer strips, field windbreaks and windstrips, equipment customization, erosion control structures, fragile land retirement, BMP adoption through equipment rentals and custom work and runoff water management. These types of programs have been offering incentives to farmers and rural residents in Ontario since the mid to late 1980s. The adoption of some BMPs has resulted in notable ecosystem improvements in some watersheds of Ontario.

2.6 Limitations of Inventory and Evaluation

The detailed review was limited to the 32 watershed management plans selected by the WQB. The majority of the Lake Erie watershed plans reviewed herein do not contain an analysis of results from nutrient management projects. Rather, these plans lay a foundation for future work based on watershed inventories, modeling data, and results from other watersheds. Therefore, the goal of this review was not to evaluate or analyze specific best management practices (BMPs), or the effectiveness of each plan to address their

own specific watershed issues. Rather, the objectives were to identify recurring themes from the group of 32 plans and to discern parts of those plans that could be used to establish the framework for effective plan implementation and that could be considered for adoption as part of a comprehensive approach for watershed management plans throughout the Lake Erie basin.

3.0 NUTRIENT MANAGEMENT COMPONENTS OF WATERSHED MANAGEMENT PLANS

Watershed plans selected for review included the following impairment sources, management opportunities, and monitoring strategies.

3.1 Major Nutrient Sources and Load Allocations

The following nutrient sources were featured in most reviewed plans. This is certainly not a comprehensive list of sources and does not include many other issues associated with HABs such as climate change, invasive species, and water flow modifications. It is also recognized that the following topics are complex issues that are only introduced in this report.

3.1.1 Agriculture

Nearly 70 percent of the Lake Erie watershed is devoted to agricultural land uses, growing crops and meat and dairy producing animals. The temperate climate and fertile topsoil have made the region a prime producer of corn, soybeans, and wheat. Agriculture typically represents the major land use in most of the watershed plans reviewed and is a significant source of nutrients to the Lake Erie watershed through soil erosion, runoff and/or tile drainage from synthetic fertilizer and manure applications and other crop production and livestock operations.

3.1.2 Erosion

Erosion is the process of weathering rocks and soil and transporting the constituents elsewhere. Human activities (e.g., intensification of farming and stream channelization) increase the erosive forces on loose soil and sediments. Farming practices (e.g., tilling close to water courses without the use of buffer strips) loosen soil particles and make them susceptible to transport via wind or runoff, namely precipitation or snowmelt. The network of agricultural and roadside ditches that crisscross much of the Lake Erie watershed transport soil and sediment particles through the watershed. In each case, nutrients that have been bound to soil particles or were otherwise trapped on the landscape become mobile and can enter surface waters.

3.1.3 Livestock

Livestock, including hogs, poultry and cows, produce nutrient-rich waste that, if not properly contained, can find its way into surface waters. In the Lake Erie watershed, concentrated animal feeding operations (CAFOs), or those with animal populations just below regulatory permitted thresholds, have grown in popularity. Animal waste is usually stored in retention basins such as engineered manure storage facilities. But undersized or faulty manure storage facilities and/or improper management can result in discharges of manure to surface waters.

Manure is typically used as a source of fertilizer for growing crops. It is often a more convenient and cheaper source of fertilizer than synthetic fertilizers. However, in some instances, land application of manure is used as a disposal method and accordingly, more manure is applied, and at higher frequencies or at improper timing, than would be necessary or appropriate to achieve/maintain ideal nutrient levels for crop production. Ill-timed or over-applied manure can lead to runoff that impairs surface waters.

3.1.4 Aging Septic Systems

Malfunctioning septic systems are a major, although sometimes hidden, source of nutrients in many watersheds. Septic systems collect large quantities of nutrients and concentrate them in storage tanks and leach fields. High concentrations of nitrogen and phosphorus can be found in human waste, household cleaners, food wastes, and drinking water additives. Aging systems can leak those nutrients into groundwater or even nearby surface waters. There is debate over how much contamination comes from septic systems; but faulty systems have the potential to leach nutrients that impair water resources.

3.1.5 Inadequate Wastewater Treatment and Combined Sewer Overflows (CSOs)

There are hundreds of wastewater treatment facilities throughout the Lake Erie watershed. Many antiquated wastewater treatment facilities are less effective at removing nutrients and some do not utilize dissolved nutrient removal technologies at all. Upgrades are needed to install the equipment necessary for processing modern urban wastewater that contains nitrogen and phosphorus from human waste, food waste, and lawn runoff. State-of-the-art treatment facilities, while expensive, could remove more nutrients that would otherwise impair surface waters.

During periods of rainfall or snowmelt, the volume of wastewater might exceed the capacity of a combined sewer system before the wastewater can be adequately treated. Instead, nutrient-laden raw sewage discharges directly to streams and lakes. Every year, these combined sewer overflows (CSOs) discharge billions of gallons of raw sewage into the Great Lakes. Of the watershed plans reviewed, the Middle Cuyahoga, Chesapeake Bay, and Lake Okeechobee plans emphasized CSOs as sources of nutrient impairments.

3.1.6 Urban Runoff

In some watersheds, urban sources have surpassed agriculture as the leading input of phosphorus. Phosphorus-based lawn (and golf course) fertilizers are commonly over-applied and, because of surrounding impervious road surfaces, contribute nutrients to streams and rivers when they rapidly run off.

3.2 Strategies and Management Practices for Minimizing Nutrient Loading

The goal of nutrient management practices is simple: prevent nutrient loss at its origin and minimize the transport of nutrients from their sources. As exemplified in the plans reviewed, there are many strategies for minimizing nutrient loading. Some (like those listed below) are tried and tested practices that have been used for many years.

3.2.1 Minimize Application of Nutrients

The first step in managing nutrient losses associated with land application is to minimize the amount of nitrogen and phosphorus at their sources. Regular soil testing (every three years per USDA guidelines) ensures that nutrients are applied at the proper rate. For commercial purposes, nutrient applications can be tailored to meet the needs of a specific soil/crop. Whether fertilizing agricultural fields or urban lawns, fertilizers should be used sparingly to balance nutrient inputs (*i.e.*, fertilizer) with the nutrient outputs (*i.e.*, uptake by plants). Applying fertilizer during periods of little or no rainfall can also alleviate the risk of generating nutrient-laden runoff.

3.2.2 Limit Transport of Nutrients from Agricultural Soils

Agriculture is a major source of nutrients into surface waters. As such, strategies for limiting the transport of nutrients via surface runoff, erosion, and agricultural tile drainage are customary in the plans reviewed. Conservation tillage and no-till farming practices are designed to reduce erosion and runoff from farm fields. No-till practices typically decrease the concentrations of total nutrients in runoff, but might lead to elevated concentrations of dissolved nutrients (Sharpley & Smith 1994). Plants are excellent at intercepting those remaining dissolved nutrients. Cover crops (*e.g.*, ryegrass and clover) impede the flow of water and wind at the soil surface to minimize erosion. Plants growing in filter strips between crop rows and at field edges intercept nutrient-laden runoff before it enters ditches or streams. Wetlands - natural or constructed - trap eroded nutrients and concentrate them into biomass. Tile drainage control structures can also be useful tools for maximizing nutrient uptake.

3.2.3 Implement Green Infrastructure Techniques to Absorb Runoff

Rain gardens, bioswales, and porous pavement are all designed to intercept runoff before it enters sewers or streams. Nutrient-laden runoff feeds plants growing in rain gardens and bioswales, thereby binding nutrients in a biological system. Nutrients that penetrate pervious pavement bind to soil particles, trapping them in the ground. Changing longstanding perceptions are part of this management strategy – small systems do help and they raise awareness in the general public. Part of the River Raisin plan is to create a community organization that will establish at least 100 rain gardens in urban areas. Planners will achieve multiple goals by placing these gardens in prominent locations.

3.2.4 Repair Septic Systems or Connect Homes to Municipal Sewer Systems

Sewer systems are expanding to keep up with sprawling urbanization. Many homes that were once isolated in rural areas are now capable of connecting to municipal sewer systems. Residents who maintain home septic systems should regularly inspect the integrity of the system, checking for leaks and clogging. Watershed groups can encourage landowners through education and inspection programs. For example, residents of the Portage River watershed are provided with an inspection program for their home septic systems and are required to obtain household sewage permits. These actions should allow the local health departments to maintain a listing of aging (and possibly failed) septic systems.

3.2.5 Update Wastewater Treatment Facilities

Nutrient discharge limits are being imposed on wastewater treatment facilities. To keep up with these requirements, many facilities are being upgraded to improve nutrient removal capacity. The Chesapeake Bay watershed has been on the leading edge of employing innovative wastewater treatment technologies. “Biological nutrient removal” uses microorganisms in a multi-stage process to treat phosphorus and drop nitrogen concentrations below 8 mg/L. “Enhanced nutrient removal” further reduces those nutrient concentrations to 3 mg/L of nitrogen and 0.3 mg/L of phosphorus.

3.2.6 Eliminate Combined Sewer Overflows (CSOs)

Improving “gray infrastructure,” in the form of improved sewage transport, treatment, or storage capacity, can decrease the occurrence of combined sewer overflows. These projects typically require massive investments, but are ongoing throughout the Lake Erie watershed. Current and planned upgrades in Toledo, Ohio, will reduce combined sewer overflows by 77 percent, equal to 470 million gallons of untreated sewage annually, by 2020 (Toledo Waterways Initiative, 2016). In Cleveland, Ohio, current and planned upgrades will prevent a further four billion gallons of untreated sewage releases annually (NEORS 2016).

Green infrastructure, such as grass filtration strips, retention basins, bioswales, tree boxes, green rooftops, and rain gardens, that are localized to capture nutrients near the source, can also mitigate CSOs by soaking up rainwater before it enters the sewer system. These systems are most effective when receiving sheet-flow rather than channelized flow, because channelized systems sometimes bypass the nutrient retention processes.

3.2.7 Educate the Public about Their Role in Nutrient Management

A strong program that equips the public with the information and skills needed to effectively manage their nutrient load contributions enhances the effectiveness of watershed based nutrient management initiatives. Landowners and homeowners are often unaware of the impact that over-application of fertilizers can have on aquatic resources and ultimately human health. The Lake Champlain Basin Program, for example, is

recommending major technical and educational support to municipalities and homeowners to increase the use of rain gardens, bioswales, rain barrels, and pervious surfaces that trap nutrients.

3.3 Modeling Nutrient Removal

Many watershed plans predict the effectiveness of proposed management measures by estimating nutrient load reductions using watershed modeling. These predictions offer a means of evaluating management strategies prior to expending resources for implementation. Four watershed models were repeatedly identified in the management plans reviewed here:

- The Watershed Assessment Model (WAM) was developed by Soil and Water Engineering Technology, Inc. and has been in use for over 15 years. WAM simulates alterations in land use to model the transport of sediment and nutrients.
- The Soil and Water Assessment Tool (SWAT) is a widely-used modeling framework for estimating soil and nutrient transport. SWAT has been tested and validated in many peer-reviewed publications since 2005.
- The Spreadsheet Tool for Estimating Pollutant Load (STEPL) and the Watershed Treatment Model (WTM) are simple, spreadsheet-based approaches for estimating modeling nutrient transport. WTM and STEPL are less robust than some of the other modeling programs used here, but both act as good starting points for watershed characterization.

3.4 Nutrient Monitoring

In the Lake Erie watershed, nutrient monitoring plans focus on analysis of nitrogen, total phosphorus, and total suspended solids. Few plans monitored for dissolved reactive phosphorus and nutrient content in sediments. Phosphorus is the limiting nutrient in Lake Erie, with dissolved reactive phosphorus being a critical form, and thus is the contaminant of greatest concern at this time.

Nutrient monitoring takes on many forms in the Lake Erie watershed, but the general structure of monitoring plans are the same. Water quality testing is often completed by governmental agencies, universities, or certified laboratories often in conjunction with sampling by trained citizens. Certified laboratories include USGS, USEPA, state agencies, and private companies. Those samples might be collected (1) in predetermined locations throughout the watershed, such as those established during TMDL sampling, (2) in priority areas established within the watershed management plan, or (3) near implementation projects.

Monitoring plans that incorporate regular sampling, and sampling at appropriate times (i.e, after heavy rainfalls), increase the likelihood of successful nutrient management. The goal of many Lake Erie watershed plans is to analyze nutrient levels at priority locations weekly or monthly throughout the year. For more accurate measures of dissolved nutrients, water samples must be sent to certified analytical laboratories. Processing of those samples can cost upwards of \$25 per sample. Unfortunately, funds for monitoring are

often limited. Adaptive management requires frequent sampling to respond rapidly to changing environmental conditions, so limited monitoring budgets pose a challenge to plan implementation.

3.5 Correlating Nutrient Loads to HABs

Of the twenty Lake Erie watershed management plans evaluated for this report, fewer than half mention the critical ties between nutrient loads from the watersheds and HABs in the lake. Outbreaks of cyanobacteria have been a nuisance in Lake Erie for many years. The critical state of the issue was brought into public focus when human health was threatened due to “Do Not Drink” advisories for public water supplies in Carroll Township, Ottawa County, Ohio in 2013 and Toledo, Ohio in 2014. While most watershed management plans evaluated did not correlate phosphorus to HABs, the more recent 2011 Portage River Watershed Plan discussed the link between soluble phosphorus and HABs in Lake Erie.

Of the twelve outside of Lake Erie watershed management plans, the Chesapeake, Lake Champlain, and Everglades had some discussion of HABs. The Chesapeake Bay Program stood out as having a strong nutrient reduction effort correlated to HABs in receiving waters. Although many of the other selected watersheds have strong nutrient reduction programs, they have not traditionally experienced large-scale HABs, and instead work to address increased biological productivity and formation of dead zones due to nutrient-enriched systems.

3.6 Downstream Effects

Most management plans from the Lake Erie watershed acknowledge the impacts of nutrient pollution on water quality in downstream receiving waters (*i.e.*, Lake Erie), and the goal is to ultimately remove that burden. In fact, many of these watershed groups monitor and report nutrient export.

Generally speaking, nutrients released from small watersheds ultimately accumulate in downstream bodies of water such as Lake Erie or the Gulf of Mexico. Small-scale discharges upstream can contribute to large-scale impairments in waters critical to human health. Dissolved nutrients—particularly soluble reactive phosphorus—are responsible for HABs in the western and central basins of Lake Erie. Six of the twenty Lake Erie watershed management plans mention the correlation between elevated nutrients and HABs, and the importance of local nutrient control. HABs also threaten water quality in large water bodies outside of the Great Lakes.

High levels of biological productivity can sometimes lead to formation of hypoxic areas, or **dead zones**, in aquatic systems. The Gulf of Mexico provides one of the most imposing examples of dead zone formation, encompassing nearly 6,500 square miles near the mouth of the Mississippi River. Nutrients released from many small, upstream watersheds eventually make their way to the Gulf and increase biological productivity,

hypoxia. The Gulf Hypoxia Action Plan was one of the first management plans to confront the issue on such a large scale. The authors recognized the need to manage nutrients upstream, rather than trying to confront the resulting symptoms in a vast body of water. Although a hypoxic area has been recognized in the Lake Erie Lakewide Management Plan, no specific Hypoxia Action Plan has been developed for Lake Erie.

3.7 Measurement Metrics and Report Cards

Scientific and/or social metrics may be used to establish baseline watershed conditions and to gauge future improvements in water quality. Although improved water quality is the ultimate goal of management activities, metrics go beyond analyzing nutrient concentrations in water. In fact, these metrics can be characterized in two ways:

- **Water quality** parameters include chemical (e.g., nutrients and dissolved oxygen), physical (e.g., suspended sediment), and biological (e.g., chlorophyll and cyanobacteria) characteristics within the watershed.
- **Societal impacts** include human health effects (e.g., contaminated drinking water), contact advisories (e.g., bathing restrictions) or lost revenue (e.g., decline in tourism).

Most of the watershed management plans reviewed identify criteria for determining whether nutrient load reductions are being achieved. The most meaningful criteria combine clear measures of progress with detailed timelines for assessment.

Watershed report cards are not included in any of the watershed management plans reviewed. Instead, report cards can occasionally be found through watershed watch groups. For example, the Erie Soil and Water Conservation District has published a report card for Old Woman Creek; the creek received a C+ grade in the 2014 publication. The report card outlines the characteristics of the watershed, weather and other factors affecting water quality parameters, and management strategies that involve the general public. Report cards offer a concise, comprehensible form of information to the public that can be compared from year to year.

3.8 Adaptive Management

Adaptive management is a systematic process aimed at continuous improvement based on results of previous practices. The process is a scientific approach to managing conservation and restoration projects that involves planning, implementation, monitoring, and modification. Briefly, management groups must first effectively articulate the goals of conservation and restoration, plan monitoring and performance evaluation steps and procedures to modify plan implementation activities where appropriate. Planners will then develop and implement a management strategy to achieve those goals. The detailed monitoring program component should be developed using common benchmarks and sample collection techniques. Monitoring

data can then be used to assess the success of the management strategy, and make adjustments for future implementation projects and contribute data from sub-watersheds to a basin-wide database

Adaptive management is one of the key components for successful conservation and restoration on a watershed scale. Successful adaptive management requires detailed planning and dedicated personnel that are involved in all stages of the scientific process. Many of the Lake Erie watershed management plans reference adaptive management, but none outline specific measures or identify responsible entities to enact these processes. Conversely, watershed management plans for Lake Champlain, Chesapeake Bay, and the Everglades have extensive discussion of adaptive management strategies:

- The Lake Champlain Basin plan uses continuous monitoring of key parameters “to support the adaptive management process.”
- The Chesapeake Bay Program maintains the *ChesapeakeStat* system (www.chesapeakestat.com) that “improves information-sharing and decision-making” for the bay.
- The Comprehensive Everglades Restoration Plan (CERP) has relied on a detailed adaptive management program to improve the condition of the Everglades over the past 15 years. The program has provided great insight and learning opportunities for successful adaptive management in other areas of the country (LoSchiavo, et al. 2013). Through the cooperation of numerous federal, state, local, tribal, academic, and private stakeholders, a system that was once wrought with problems (nutrients and otherwise) is on a steady trajectory toward recovery.

Work has been ongoing for decades in each of these watersheds to reverse two centuries of human impacts. And though they are touted as success stories, the work is not done. Lake Erie might benefit from a similarly comprehensive watershed plan built around a framework of adaptable restoration goals and practices.

4.0 SUMMARY OF WATERSHED MANAGEMENT PLAN SCORES

4.1 Lake Erie Watershed

The Watershed Plan Summary Sheets for each Lake Erie watershed are included as Appendix B-1 of this report. Scores ranged from 37 to 76 for the twenty Lake Erie watershed management plans evaluated herein (Appendix C-1). The top-scoring Lake Erie watershed management plans were the Portage River Watershed Plan and the River Raisin Watershed Management Plan, each with a total score of 76. The Portage River plan received maximum scores for its identification of nutrient causes and sources, estimates of nutrient reductions expected from proposed management activities, and detailed criteria for determining successful nutrient reductions. This plan includes a detailed breakdown of conditions in a number of tributaries to the Portage River. Each sub-watershed receives about 20 pages of information regarding impairments, loads, load reductions, etc. The River Raisin plan received maximum scores for its description of the management measures needed to achieve load reductions and for its robust monitoring plan. A synthesis of the information contained within these two plans might serve as a good template for future Lake Erie plans. Four other plans, the Middle Cuyahoga River Watershed Action Plan (score of 71), the Upper Maumee River Watershed Management Plan (score of 69), the Outlet/Lye Creek (score of 68), and the Combined Downriver Watershed Management Plan (score of 67) also provide a significant level of detail for nutrient planning.

For the most part, the plans evaluated within the Lake Erie drainage basin scored very well in their identification of the nutrient causes and sources of impairments, in their estimates of nutrient load reductions expected from the proposed management measures, and to a lesser extent in their criteria for determining whether load reductions are achieved.

A few plans within the Lake Erie drainage basin provided some descriptions of management measures needed to achieve the proposed nutrient load reduction. However, only a few plans included a detailed monitoring component to evaluate the effectiveness of implementation, and most were lacking when it came to including adaptive management measures.

Some of the documents reviewed were not intended to be a watershed management plan, and as such, scored lower on many of the criteria used to evaluate the effectiveness of watershed management planning. Such is the case for the Thames River watershed. Although scoring on the lower end of the scoring matrix, it provides a very thorough and solid study of existing water quality conditions in the Thames River watershed and forms a very strong basis from which an effective watershed management plan can be developed. The assessment of spatial and temporal water quality trends in the Thames River watershed can likely provide useful insight for water quality monitoring in other watersheds around Lake Erie.

4.2 Plans from Outside of the Lake Erie Watershed

The Watershed Plan Summary Sheets for each watershed outside of the Lake Erie basin are included as Appendix B-2 of this report. Scores ranged from 47 to 81 for the twelve watershed management plans from outside of the Lake Erie basin (Appendix C-2). The majority of these plans received scores greater than 50. The top-scoring plan from outside of the Lake Erie basin was the Chesapeake Bay Program with a total score of 81. This plan received maximum scores for its description of management measures needed to reduce nutrient loading and for its detailed benchmarks indicating nutrient reductions. The plan is web-based, meaning it is constantly updated and accessible to the public. The Chesapeake Bay Program also maintains the *ChesapeakeStat* website that serves as a repository for monitoring data and implementation projects.

A few larger watershed plans were created to establish requirements for management strategies to be developed at the sub-watershed level. Such is the case for the Lake Simcoe Protection Plan, which was likely intended for a target audience that includes citizens, and as such, technical information was kept to a minimum. This contributed to the low scores in the review sheet. However, this should not be interpreted as there being significant gaps in information, as the plan was preceded by extensive studies and management strategies, which are referenced within the text.

One important aspect of this plan is that while it was developed to assist in the development of smaller sub-watershed plans in the region, it recognizes that some policies and management measures cannot reasonably be applied in a consistent manner. Also, the plan recognizes that not all municipalities and organizations have the same level of resources and funding at their disposal, and some may be more limited than others in their ability to meet specific targets. As such, it does not impose overly strict requirements and goals that may not be feasible or even applicable for some sub-watersheds. This also resulted in the plan scoring low on a number of components of the evaluation criteria. Unlike many other watershed plans, the Lake Simcoe Protection Plan outlines policies that are legally enforceable, and therefore care was taken to avoid placing unreasonable burdens on individuals, groups and local regulatory bodies.

Other sub-watershed management plans benefitted from the many management plans, studies and reports that were developed at the regional level (e.g. the Lake Simcoe watershed, in which the East Holland River sub-watershed is located; and the Oak Ridges Moraine, from which the headwaters of the East Holland River originate). For example, the Lake Simcoe Region Conservation Authority had already developed an inventory of BMPs, in which they identified 8,656 BMP opportunities throughout the Lake Simcoe watershed. The East Holland River Subwatershed Plan drew from this inventory to select BMPs that were appropriate and applicable to the sub-watershed. The ability of watershed planners to develop effective management

plans for their own watersheds may therefore be limited by the amount of information and study that was previously conducted at the regional level.

One drawback is that the policies, plans and practices that may exist at a regional scale can be very extensive and may be overwhelming to organizations attempting to implement them at the local level. The sub-watershed plan for the East Holland River effectively and efficiently summarized the available information, bringing forward the details that are of most relevance to the sub-watershed.

These types of broader, better-funded, regional watersheds plans can establish guidance and strategies for the smaller sub-watersheds might provide a good model for the Lake Erie basin.

5.0 NUTRIENT MANAGEMENT APPROACH AND STRATEGY CONSIDERATIONS FOR THE LAKE ERIE BASIN BASED ON RESEARCH FINDINGS

With the goal of identifying critical components of effective watershed management plans, the Project Team inventoried 48 plans from inside and 32 plans from outside of the Lake Erie watershed. The group of plans was pared down to 20 and 12 for in-depth evaluation. Many elements within the plans appear again and again – watershed inventories, common nutrient sources, and management practices. But successful watershed plans go beyond the inventory to create a framework for nutrient reduction. Recurring components characterize the most effective plans, and could be adapted to create a watershed-scale management plan for Lake Erie.

1) Observation: Watershed management plans from outside of the Lake Erie basin generally scored higher than those from inside the basin.

The average score of watershed management plans from outside of the Lake Erie basin was 63 (maximum of 81) while those inside the basin averaged 56 (maximum of 76). The watershed plan for River Raisin was the highest-scoring example from the Lake Erie basin. The clearest scoring differences between high- and low-scoring plans are in the post-implementation components. Most of the plans from within the Lake Erie basin lack post-implementation follow-up with clear milestones for restoration. A good example of post-implementation follow-up outside of the Lake Erie basin is *ChesapeakeStat*, a website for monitoring implementation and effectiveness of management practices in the Chesapeake Bay watershed. A similar repository for water quality data might foster collaboration throughout the Lake Erie watershed.

Recommendation: Successful plans, such as the Chesapeake Bay Program, may be used as **models** for developing and implementing management plans for areas draining into Lake Erie on both the U.S. and Canadian sides of the border.

2) Observation: Many of the plans from sub-watersheds of Lake Erie lack clear milestones for implementation and frameworks for accountability.

The River Raisin Management Plan could serve as a good model for defining goals with clear milestones for watershed restoration in the Lake Erie basin. The plan contains detailed goals, objectives, priority sub-basins for addressing each objective, quantitative targets, and preferred locations for monitoring progress. This level of detail and clarity might be necessary for maintaining accountability.

The Chesapeake Bay Program seems to have formulated an innovative strategy for setting long-term goals with short-term milestones that holds each partner organization accountable for completing their part of the project. The coalition has created Goal Implementation Teams to develop management strategies that identify the steps to achieve the Agreement's vision. These strategies are meant to provide broad guidelines, and are substantiated by two-year work plans that address each goal of the Bay Program. Work plans address proposals to reach the prescribed outcomes, as well as monitoring, assessment, and reporting requirements from each partner.

Recommendation: Set clear **goals** with intermediate **milestones** to track progress. Clear benchmarks keep management activities on a trajectory toward success. With a strong adaptive management program, these milestones can always be modified to meet future goals.

3) Observation: Adaptive management is the cornerstone of successful restoration projects for the Everglades, Chesapeake Bay, and Lake Champlain.

Adaptive management is a science-based process for planning, implementing, assessing, and modifying protection and restoration efforts. Successful watershed groups use adaptive management as the framework around which an entire plan is created. Adaptive management is not the act of arbitrarily changing management practices. Instead, adaptive management is a never-ending process of watershed characterization, setting goals, evaluating influential factors, identifying current efforts and gaps, developing management strategies, comprehensive monitoring, assessment, and refining goals. The Comprehensive Everglades Restoration Plan has served as an example of a scientifically managed effort for restoration ecologists since the beginning of the project. Likewise, the Chesapeake Bay Program has developed adaptive management plans for each of its many goals that coordinate and manage restoration activities at all levels of the organization.

Recommendation: To increase the probability of success, a science-driven **adaptive management process** that includes an economic cost benefit component should be a foundational principle of a watershed management plan for Lake Erie. Structuring the plan around a systematic, scientific approach provides the flexibility needed to learn from successes and failures.

4) Observation: There is not a consistent approach for developing watershed management plans in the sub-basins of Lake Erie.

Some sub-watersheds on the U.S. side of Lake Erie rely on TMDL reports to attempt to direct restoration plans in addition to their water quality assessment function. Unfortunately, some are intended to cover only a small portion of a watershed, and some TMDL segments neglect nutrients in lieu of more immediate threats from pathogens or toxic contaminants. It appears that the most successful watershed groups use a broad-scale management plan to frame smaller plans for individual sub-watersheds. To maximize the value of sub-watershed plans, they should have commonality in terms of format and content. The plans for the Portage and Maumee Rivers in Ohio are similarly formatted making them more complementary and potentially a good template for comprehensive watershed management plans in the Lake Erie basin.

Recommendation: Watershed planning should have a **consistent** watershed-specific approach, including the unique aspects of the western, central and eastern basins. A network of watershed planners is needed to develop common methodologies to characterize, model, implement recommendations, monitor, evaluate, and track success, recognizing the imperative need to understand the cumulative effect of sub-watershed nutrient contributions and the need to dedicate reduction-effort resources accordingly.

5) Observation: The most successful watershed management plans have been developed by coalitions of government, citizen groups, and academics with continued participation of original planning participants in the implementation of the plan.

The Chesapeake Bay Program, for example, is a regional partnership organization that oversees restoration and protection of the Bay. The Bay Program is headquartered in Annapolis, Maryland and staffed by personnel from federal, state, non-profit, and academic agencies. While they come from an array of organizations, staff members work together in a common location toward a common goal. The direct, everyday

interaction between these organizations contributes to the good collaboration and productivity of the Bay Program.

Recommendation: Develop a **coalition** of federal, state, local, tribal, academic, and private stakeholders with defined responsibilities to participate in the preparation of the plan and include representation of the planning team in the subsequent implementation/administration team. The allocation of responsibilities needs to be fair, based on good science and incorporate capabilities of the political subdivisions. Combined efforts are more likely to bring implementation and research funding to the region, as exemplified by projects in Florida and Chesapeake Bay.

6) Observation: The largest, most successful management plans create a desire to conserve and restore the watershed within and beyond its borders.

The Chesapeake Bay Program, Everglades Restoration, and the Lake Champlain Basin Program have extended public awareness beyond their respective watersheds. Each of these watershed plans has become a living document maintained on accessible, user-friendly websites. Social media engages the public and generates interest in current water quality issues. By using multiple forms of media to sustain the plan, these planning groups maintain up-to-date records and improve accessibility to the general public.

Recommendation: Incorporate a strategy for generating **public awareness**. Even though this unique water resource impacts so many North Americans, many do not know or appreciate the extent and immediacy of the problem. Residents of the watershed must understand the problems associated with excessive nutrient release, how they might be contributing to the problem, and what they can do to mitigate the issue.

7) Observation: A comprehensive monitoring program is necessary to keep up with a demanding adaptive management program.

Successful comprehensive monitoring programs are based on scientific models and are detailed in terms of scheduling, sampling locations, and parameters measured. A baseline assessment of the watershed (e.g., nutrient TMDL in the U.S.) provides a foundation for determining restoration success. The scheduling of monitoring events, use of common monitoring techniques and analytical methods is necessary to create a useable, quality database. Successful monitoring programs seemed to incorporate the latest science and understanding of the problem(s), such as monitoring several forms of the pollutant (dissolved, total, etc.), targeting specific locations, etc. Comprehensive monitoring programs also account for spatial and temporal variations by incorporating many monitoring groups into the process; the task is too large for one organization to handle alone. Citizen groups are often critical for gathering water quality data from small waterbodies, at multiple times during the year, and throughout a watershed. The Everglades Restoration coalition has often tasked academia with monitoring and analyzing the outcomes of restoration projects. Ecologists have been able to parlay restoration projects into opportunities for advancing science through understanding project successes and failures.

Recommendation: A comprehensive **monitoring program** should be in place to assess the performance of management practices developed from actual data and scientific models. Successful monitoring programs seemed to incorporate the latest science and understanding of the problem(s), such as monitoring the appropriate forms of the pollutant (dissolved, total, etc.), targeting specific critical locations, and a strategy for accountability of reporting progress. The program should be detailed, incorporate a specific schedule, and discuss how and where the results will be used to evaluate success.

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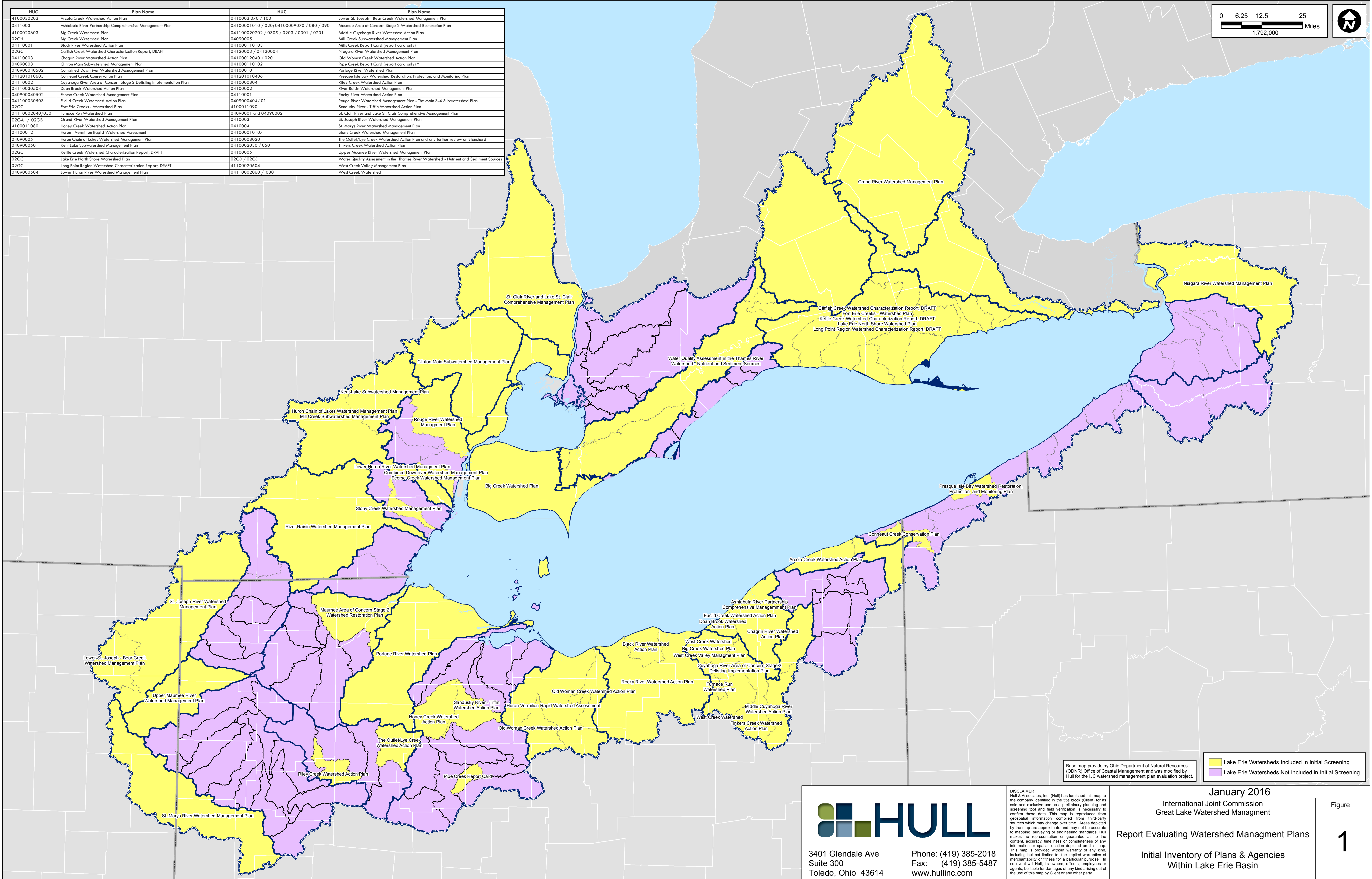
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- United States Army Corps of Engineers. 1999. *Comprehensive Everglades Restoration Plan*.
- United States Environmental Protection Agency. 2010. *Chesapeake Bay Total Maximum Daily Load*.
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<http://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=73903997>

FIGURES



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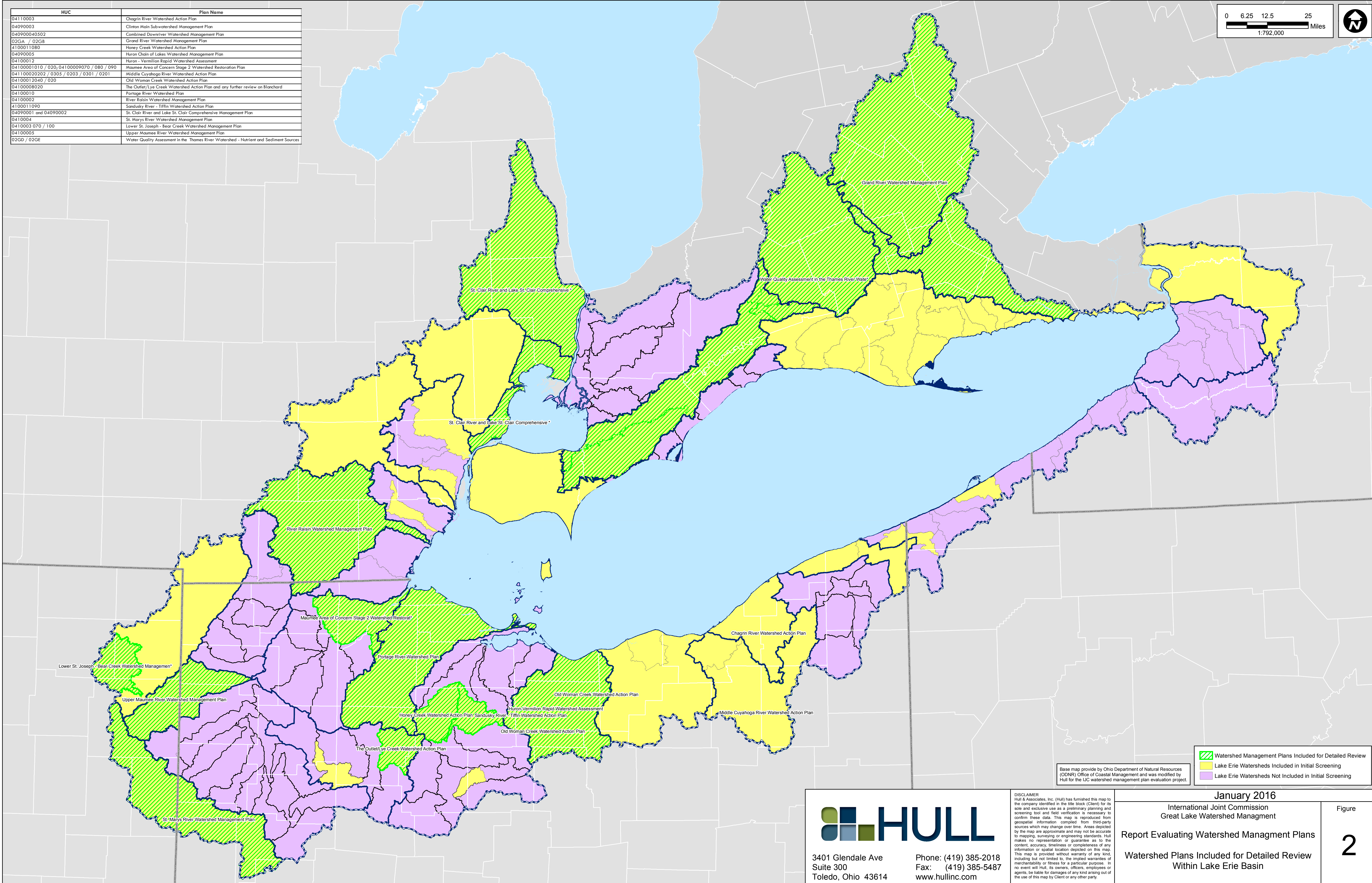
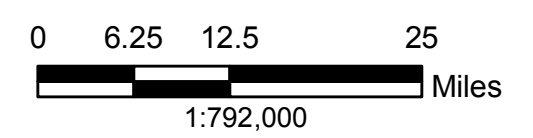
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International Joint Commission
Great Lake Watershed Management

Report Evaluating Watershed Managment Plans

Initial Inventory of Plans & Agencies
Within Lake Erie Basin

Figure
1

HUC	Plan Name
04110003	Chagrin River Watershed Action Plan
04090003	Clinton Main Subwatershed Management Plan
040900040502	Combined Downriver Watershed Management Plan
02GA / 02GB	Grand River Watershed Management Plan
4100011080	Honey Creek Watershed Action Plan
04090005	Huron Chain of Lakes Watershed Management Plan
04100012	Huron - Vermilion Rapid Watershed Assessment
04100001010 / 020; 04100009070 / 080 / 090	Maumee Area of Concern Stage 2 Watershed Restoration Plan
041100020202 / 0305 / 0203 / 0301 / 0201	Middle Cuyahoga River Watershed Action Plan
04100012040 / 020	Old Woman Creek Watershed Action Plan
04100008020	The Outlet/Lye Creek Watershed Action Plan and any further review on Blanchard
04100010	Portage River Watershed Plan
04100002	River Raisin Watershed Management Plan
0410011090	Sandusky River - Tiffin Watershed Action Plan
04090001 and 04090002	St. Clair River and Lake St. Clair Comprehensive Management Plan
0410004	St. Marys River Watershed Management Plan
0410003 070 / 100	Lower St. Joseph - Bear Creek Watershed Management Plan
04100005	Upper Maumee River Watershed Management Plan
02GD / 02GE	Water Quality Assessment in the Thames River Watershed - Nutrient and Sediment Sources



Base map provide by Ohio Department of Natural Resources (ODNR) Office of Coastal Management and was modified by Hull for the IJC watershed management plan evaluation project.

- Watershed Management Plans Included for Detailed Review
- Lake Erie Watersheds Included in Initial Screening
- Lake Erie Watersheds Not Included in Initial Screening



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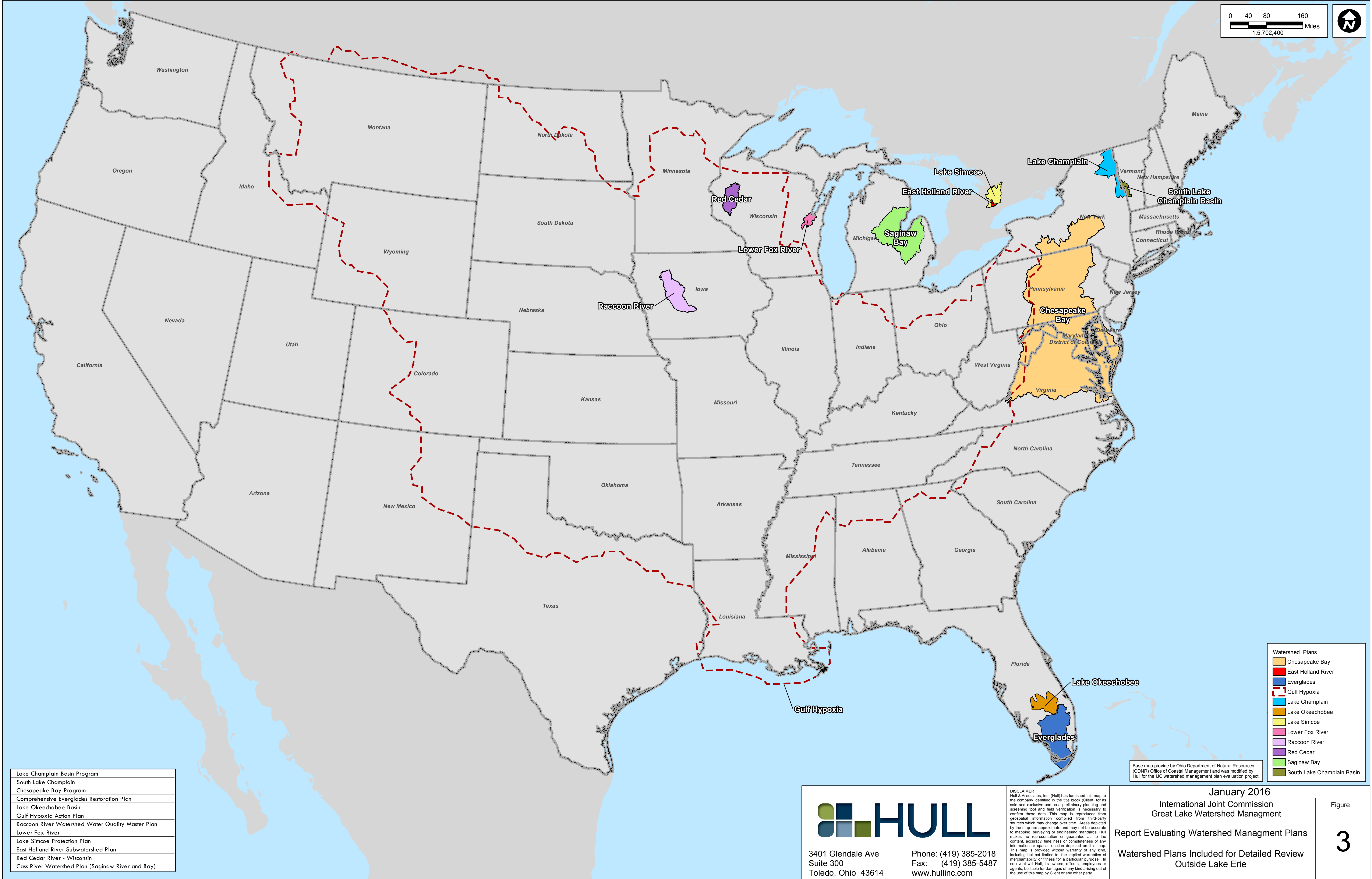
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Report Evaluating Watershed Managment Plans

Watershed Plans Included for Detailed Review
Within Lake Erie Basin

Figure
2



Lake Champlain Basin Program
South Lake Champlain
Chesapeake Bay Program
Comprehensive Everglades Restoration Plan
Lake Okeechobee Basin
Gulf Hypoxia Action Plan
Raccoon River Watershed Water Quality Master Plan
Lower Fox River
Lake Simcoe Protection Plan
East Holland River Subwatershed Plan
Red Cedar River - Wisconsin
Cass River Watershed Plan (Saginaw River and Bay)

Base map provide by Ohio Department of Natural Resources (ODNR) Office of Coastal Management and was modified by Hull for the IJC watershed management plan evaluation project.

Watershed_Plans
Chesapeake Bay
East Holland River
Everglades
Gulf Hypoxia
Lake Champlain
Lake Okeechobee
Lake Simcoe
Lower Fox River
Raccoon River
Red Cedar
Saginaw Bay
South Lake Champlain Basin



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Great Lake Watershed Management

Report Evaluating Watershed Managment Plans

Watershed Plans Included for Detailed Review
Outside Lake Erie

Figure

3

APPENDIX A

Watershed Management Plans – Screening Matrix

APPENDIX A-1

Lake Erie Watershed Plans

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE A-1

INITIAL PLAN TABLE OF CONTENT SCREENING MATRIX - LAKE ERIE BASIN

HUC	Plan Name	Date	Agency / Organization	State / Province	Contact Name / Reference - Email / phone number	Website	Identification of Major Nutrient Sources	Methods to Minimize Nutrient Loading	Nutrient Monitoring (general)	Nutrient Monitoring (correlated to HABs)	303(d) and/or AOC?	Incorporates Nutrient TMDL?
4100030203	Arcola Creek Watershed Action Plan	2013	Lake County Soil & Water Conservation District	OH	Maurine Orndorff morndorff@lakecountyOH.gov 440-350-5863	www.lakecountyOH.gov/	C	C	A	NA	303(d)	A
0411003	Ashtabula River Partnership Comprehensive Management Plan	2001	Ashtabula River Partnership	OH		www.epa.gov/greatlakes/aoc/ashtabula/index.html	NA	NA	NA	NA	303(d); AOC	A
4100020603	Big Creek Watershed Plan	2010	Cuyahoga River Restoration and Big Creek Watershed Planning Partnership	OH		cuyahogariver.org/	C	NA	NA	NA	303(d); AOC	B
02GH	Big Creek Watershed Plan	2013	Essex Region Conservation Authority	ON	Mike Nelson Watershed Planner MNelson@erca.org 519-776-5209	erca.org/	C	A	C	NA	303(d); AOC	B
04110001	Black River Watershed Action Plan	2011	Lorain County Community Development Department	OH		www.loraincounty.us/commissioners-departments/community-development	C	C	A	NA	303(d); AOC	B
02GC	Catfish Creek Watershed Characterization Report, DRAFT	2008	Lake Erie Source Protection Region Technical Team, 2008 (for the Catfish Creek Conservation Authority)	ON	Kim Smale admin@catfishcreek.ca	www.catfishcreek.ca/	C	NA	C	NA	NA	NA
04110003	Chagrin River Watershed Action Plan	2011	Chagrin River Watershed Partners, Inc.	OH	Christina Znidarsic cznidarsic@crwp.org 440-975-3870	www.crwp.org/	C	A	C	NA	303(d)	B (Chagrin River)
04090003	Clinton Main Subwatershed Management Plan	2011	Clinton River Watershed Council - Clinton Main Subwatershed Advisory Group	MI	contact@crwc.org	www.crwc.org/watershed/subwatersheds/clinton-main/	C	A	A	NA	303(d)	B
040900040502	Combined Downriver Watershed Management Plan	2012	Alliance of Downriver Watersheds	MI		www.allianceofdownriverwatersheds.com	C	C	A	NA	303(d)	NA
041201010605	Conneaut Creek Conservation Plan	2010	Lake Erie Region Conservancy	PA	lercerie@gmail.com 814-566-9319	lerc-erie.org/	NA	NA	NA	NA	303(d)	NA
04110002	Cuyahoga River Area of Concern Stage 2 Delisting Implementation Plan	2015	Cuyahoga River Restoration	OH	216-241-2414	cuyahogariver.org/	A	C	A	NA	303(d); AOC	B
04110030504	Doan Brook Watershed Action Plan	2013	Doan Brook Watershed Partnership	OH	info@doanbrookpartnership.org 216-325-7781	www.doanbrookpartnership.org/	C	C	A	NA	AOC	B

A Proposed implementation/not implemented
B Metric established - baseline implemented
C Post implementation metric/data available
NA Not addressed in plan

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE A-1

INITIAL PLAN TABLE OF CONTENT SCREENING MATRIX - LAKE ERIE BASIN

HUC	Plan Name	Date	Agency / Organization	State / Province	Contact Name / Reference - Email / phone number	Website	Identification of Major Nutrient Sources	Methods to Minimize Nutrient Loading	Nutrient Monitoring (general)	Nutrient Monitoring (correlated to HABs)	303(d) and/or AOC?	Incorporates Nutrient TMDL?
040900040502	Ecorse Creek Watershed Management Plan	2012	Alliance of Downriver Watersheds	MI		www.allianceofdownriverwatersheds.com	A	A	A	NA	303(d)	B
041100030503	Euclid Creek Watershed Action Plan	June 2006	Euclid Creek Watershed Council & Cuyahoga Soil & Water Conservation District	OH	Claire Posius cposius@cuyahogawcd.org 216-524-6580	www.cuyahogawcd.org/euclid-creek/about-us/euclid-creek-watershed-council	A	B	A	NA	AOC	B
02GC	Fort Erie Creeks - Watershed Plan	2008	Niagara Peninsula Conservation Authority	ON	Brian Wright, Manager Watershed Projects 905-788-3135 ext. 253 bwright@npca.ca	npca.ca/	NA	NA	C	NA	NA	NA
04110002040/050	Furnace Run Watershed Plan	2011	Cuyahoga River Restoration and Furnace Run Watershed Planning Partnership	OH	216-241-2414	cuyahogariver.org/	NA	NA	NA	NA	303(d); AOC	B
02GA / 02GB	Grand River Watershed Management Plan	2014	Grand River Conservation Authority	ON	Martin Keller Source Protection Program Manager mkeller@grandriver.ca 519-620-7595	www.grandriver.ca/	C	A	C	NA	NA	NA
4100011080	Honey Creek Watershed Action Plan	2006	The National Center for Quality Research - Heidelberg College and Sandusky River Watershed Coalition	OH	Cindy Brookes Watershed Coordinator cbrookesm@wsos.org 419-334-5016	sanduskyriver.org/	C	B	C	NA	303(d)	C
04090005	Huron Chain of Lakes Watershed Management Plan	2007	Huron Chain of Lakes Steering Committee, Huron River Watershed Council	MI	Laura Rubin Executive Director lrubin@hrwc.org 734-769-5123	www.hrwc.org/	C	B	C	NA	303(d)	B
04100012	Huron - Vermilion Rapid Watershed Assessment	2008	USDA Natural Resources Conservation Service	OH	David Arthur Watershed Survey and Planning Program Manager david.arthur@wdc.usda.gov 202-690-2819	www.nrcs.usda.gov/	A	A	C	NA	303(d)	B
0409000501	Kent Lake Subwatershed Management Plan	2002	Kent Lake Subwatershed Workgroup	MI	Laura Rubin Executive Director lrubin@hrwc.org 734-769-5123	www.hrwc.org/	C	C	C	NA	303(d)	C
02GC	Kettle Creek Watershed Characterization Report, DRAFT	2008	Lake Erie Source Protection Region Technical Team (for the Kettle Creek Conservation Authority)	ON	Elizabeth VanHooren elizabeth@kettlecreekconservation.on.ca 519-631-1270 ext.222	www.kettlecreekconservation.on.ca/	C	NA	C	NA	NA	NA
02GC	Lake Erie North Shore Watershed Plan	2010	Niagara Peninsula Conservation Authority	ON	Brian Wright Manager, Watershed Projects bwright@npca.ca 905-788-3135 ext. 253	npca.ca/	NA	A	C	NA	NA	NA
02GC	Long Point Region Watershed Characterization Report, DRAFT	2008	Lake Erie Source Protection Region Technical Team (for the Long Point Region Conservation Authority)	ON	Lorrie Minshall lminshall@lprca.on.ca	www.lprca.on.ca/	C	NA	C	NA	NA	NA

A Proposed implementation/not implemented
B Metric established - baseline implemented
C Post implementation metric/data available
NA Not addressed in plan

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE A-1

INITIAL PLAN TABLE OF CONTENT SCREENING MATRIX - LAKE ERIE BASIN

HUC	Plan Name	Date	Agency / Organization	State / Province	Contact Name / Reference - Email / phone number	Website	Identification of Major Nutrient Sources	Methods to Minimize Nutrient Loading	Nutrient Monitoring (general)	Nutrient Monitoring (correlated to HABs)	303(d) and/or AOC?	Incorporates Nutrient TMDL?
0409000504	Lower Huron River Watershed Management Plan	2005	Lower Huron River Watershed Inter-Municipality Committee, Huron River Watershed Council	MI	Laura Rubin, Executive Director lrubin@hrwc.org 734-769-5123	www.hrwc.org/	C	C	A	NA	303(d)	A
04100001010 / 020; 04100009070 / 080 / 090	Maumee Area of Concern Stage 2 Watershed Restoration Plan	2006	Maumee RAP, Duck & Otter Creeks Partnership, Inc.	OH	Cherie Blair Maumee Rap Coordinator cherie.blair@epa.OH.gov 419-373-3010	www.maumeerap.org/	C	B	B	General Stmt	303(d); AOC	B
041100020202 / 0305 / 0203 / 0301 / 0201	Middle Cuyahoga River Watershed Action Plan	2012	Northwest OH Four County Regional Planning and Development Organization	OH	Maia Peck mpeck@nefcoplanning.org 330-252-0337	www.nefcoplanning.org/	C	B	C	General Stmt	303(d); AOC	B
04090005	Mill Creek Subwatershed Management Plan	2006	Mill Creek Subwatershed Stakeholder Advisory Group, Huron River Watershed Council	MI	Laura Rubin Executive Director lrubin@hrwc.org 734-769-5123	www.hrwc.org/	C	C	C	General Stmt	303(d); AOC	B
041000110103	Mills Creek Report Card (report card only)	2014	Erie County Soil & Water Conservation District	OH	Firelands Coastal Tributaries Watershed Program	www.eriecounty.oh.gov/	B	A	NA	NA	303(d)	Included in Sandusky tribs TMDL
04120003 / 04120004	Niagara River Watershed Management Plan	2014	Buffalo Niagara Riverkeeper	NY		bnriverkeeper.org/	*	*	*	*	303(d); AOC	B
04100012040 / 020	Old Woman Creek Watershed Action Plan	2009	Firelands Coastal Tributaries Watershed Conservation District & Erie Soil & Water Conservation District	OH	Breann Hohman Watershed Coordinator 419-626-5211	www.eriecounty.oh.gov/departments-and-agencies/environmental-resources/erie-soil-and-water-conservation-district/	C	C	C	General Stmt	303(d)	B
04100008020	The Outlet/Lye Creek Watershed Action Plan	2011	Blanchard River Watershed Partnership	OH	Phil Martin Watershed Coordinator 419-422-6487	www.blanchardriver.org/	C	C	B	NA	303(d)	B
041000110102	Pipe Creek Report Card (report card only) *	2014	Erie County Soil & Water Conservation District	OH	Firelands Coastal Tributaries Watershed Program	www.eriecounty.oh.gov/	B	A	NA	NA	303(d)	Included in Sandusky tribs TMDL
04100010	Portage River Watershed Plan	2013	TMACOG, Portage River Basin Council	OH	Kurt Erichsen kurt@tmacog.org 419-241-9155	www.tmacog.org/	C	B	C	General Stmt	303(d)	B
041201010406	Presque Isle Bay Watershed Restoration, Protection, and Monitoring Plan	2010	PA Sea Grant	PA	Sean Rafferty sdr138@psu.edu 814-217-9013 Dave Skellie dus18@psu.edu 814-217-9014	www.paseagrant.org/	A	A	A	NA	303(d)	C
0410000804	Riley Creek Watershed Action Plan	2012	Blanchard River Watershed Partnership	OH	Phil Martin Watershed Coordinator 419-422-6487	www.blanchardriver.org/action-plan/#Action_Plan_Riley_Creek	C	C	C	C	303(d)	B
04100002	River Raisin Watershed Management Plan	2009	River Raisin Watershed Council	MI	rrwc@lenawee.mi.us 517-264-4754	www.riverraisin.org/	C	C	C	General Stmt	303(d); AOC	B

- A Proposed implementation/not implemented
B Metric established - baseline implemented
C Post implementation metric/data available
NA Not addressed in plan

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE A-1

INITIAL PLAN TABLE OF CONTENT SCREENING MATRIX - LAKE ERIE BASIN

HUC	Plan Name	Date	Agency / Organization	State / Province	Contact Name / Reference - Email / phone number	Website	Identification of Major Nutrient Sources	Methods to Minimize Nutrient Loading	Nutrient Monitoring (general)	Nutrient Monitoring (correlated to HABs)	303(d) and/or AOC?	Incorporates Nutrient TMDL?
04110001	Rocky River Watershed Action Plan	2010	Northeast OH Areawide Coordinating Agency, Rocky River Watershed Council	OH	Andy Vidra avidra@mpo.noaca.org 216-621-3024	www.noaca.org/	C	C	A	NA	303(d)	B
0409000404/ 01	Rouge River Watershed Management Plan - The Main 3-4 Subwatershed Plan	2012	Alliance of Rouge Communities	MI	734-272-0291	www.allianceofrougecommunities.com	C	A	A	NA	303(d); AOC	A
4100011090	Sandusky River - Tiffin Watershed Action Plan	2006	Sandusky River Watershed Coalition	OH	Christopher Riddle cmriddle@wsos.org 419-334-5016	sanduskyriver.org/	C	B	C	NA	303(d)	B
04090001 and 04090002	St. Clair River and Lake St. Clair Comprehensive Management Plan	2004	U.S. Army Corps of Engineers, Detroit District	MI		www.lre.usace.army.mil/Portals/69/docs/PP PM/PlanningandStudies/ApprovedReviewPlans/SCRLSCfinal2.pdf	C	A	A	NA	303(d)	B
0410004	St. Marys River Watershed Management Plan	2009	St. Marys River Watershed Project & Allen County SWCD	IN	greg.lake@allenswcd.org 260-484-5848	www.allenswcd.org/	C	B	C	NA	303(d)	A
0410003	St. Joseph River Watershed Management Plan	2006	The St. Joseph River Watershed Initiative	IN	s.partridge@allenswcd.org 260-484-5848	www.sjrwi.org/	C	A	C	NA	303(d)	B
0410003 070 / 100	Lower St. Joseph - Bear Creek Watershed Management Plan	2007	The St. Joseph River Watershed Initiative	IN	s.partridge@allenswcd.org 260-484-5848	www.sjrwi.org/	C	A	C	NA	303(d)	A
041000010107	Stony Creek Watershed Management Plan	2005	Eastern MI University	MI		www.MI.gov/documents/deq/	C	B	C	NA	303(d)	A
0410002030 / 050	Tinkers Creek Watershed Action Plan	2010	Cuyahoga County Board of Health & Tinkers Creek Watershed Partners	OH	Babette Gowda Watershed Coordinator babette@tinkerscreekwatershed.org 330-963-6243	www.tinkerscreekwatershed.org/	C	C	C	General Stmt	303(d); AOC	B
04100005	Upper Maumee River Watershed Management Plan	2014	Allen County Soil & Water Conservation District, Defiance County Soil & Water Conservation District	OH	greg.lake@allenswcd.org 260-484-5848	www.allenswcd.org/	C	C	C	General Stmt	303(d)	B
02GD / 02GE	Water Quality Assessment in the Thames River Watershed - Nutrient and Sediment Sources	2015	Upper Thames River Conservation Authority	ON	Karen Maaskant Water Quality Specialist 519-451-2800 ext. 246 maaskantk@thamesriver.on.ca	thamesriver.on.ca/	C	A	C	NA	NA	NA
41100020604	West Creek Valley Management Plan	2001	Cuyahoga River Restoration	OH		cuyahogariver.org/	C	A	A	NA	303(d)	B
04110002060 / 030	West Creek Watershed	2008	West Creek Preservation Committee	OH	dschafer@westcreek.org 216-749-3720	westcreek.org/	NA	NA	NA	NA	303(d)	A
	Lake Erie Nearshore	*										

- A
- Proposed implementation/not implemented
- B
- Metric established - baseline implemented
- C
- Post implementation metric/data available
- NA
- Not addressed in plan

Recommended by inernal project team

- Selected for indepth evaluation
- *An exhauastive on-line search was completed. No documents were identified for "Lake Erie Nearshore"

APPENDIX A-2

Watershed Plans Outside of Lake Erie

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE A-2

INITIAL PLAN TABLE OF CONTENT SCREENING MATRIX - OUTSIDE LAKE ERIE BASIN

Plan Name	Date	Agency / Organization	State/ Province	Contact	Website	Identification of Major Nutrient Sources	Methods to Minimize Nutrient Loading	Nutrient Monitoring (general)	Nutrient Monitoring (correlated to HABs)	303(d) or AOC	Nutrient TMDL?
Lake Champlain											
Lake Champlain Basin Program	Updated online	Lake Champlain Basin Program	NY, VT	800-468-5227	www.lcbp.org	C	C	C	C	303(d)	C
Lamoille River Basin	2009	Vermont Agency of Natural Resources	VT	802-828-1556	www.anr.state.vt.us/	B	A	B	A	303(d)	B
Missisquoi Bay Basin	2013	Vermont Agency of Natural Resources	VT	802-828-1556	www.anr.state.vt.us/	B	A	B	B	303(d)	B
Northern Lake Champlain Direct Drainages	2015	Vermont Agency of Natural Resources	VT	802-828-1556	www.anr.state.vt.us/	B	B/C	B	B	303(d)	NA
Otter Creek Basin	2012	Vermont Agency of Natural Resources	VT	802-828-1556	www.anr.state.vt.us/	B	A	B	NA	303(d)	NA
Poultney-Mettowee Basin	2005	Vermont Agency of Natural Resources	VT	802-828-1556	www.anr.state.vt.us/	B	NA	B	A	303(d)	NA
South Lake Champlain	2014	Vermont Agency of Natural Resources	VT	802-828-1556	www.anr.state.vt.us/	C	C	B	NA	303(d)	B
Winooski River Basin	2012	Vermont Agency of Natural Resources	VT	802-828-1556	www.anr.state.vt.us/	B	B	B	NA	303(d)	NA
Chesapeake Bay											
Chesapeake Bay Program	Updated online	Chesapeake Bay Program	DE, DC, MD, PA, VA, WV, NY	800-YOURBAY	www.chesapeakebay.net/	C	C	C	A	303(d)	C
Marsh and Rock Creek Watersheds	2012	Pennsylvania Dept. of Environmental Protection	PA	717-787-5267	www.portal.state.pa.us/portal/server.pt/community/ bureau_of_conservation_and_restoration/	A	B	B	NA	303(d)	A
Susquehanna River Basin	2015	Susquehanna River Basin Commission	MD, NY, PA	717-238-0423	www.srbc.net/	B	NA	B	NA	NA	B
Upper Little Patuxent River	2009	Howard County	MD	410-313-6586	www.howardcountymd.gov/	A	A	B	NA	303(d)	A
Everglades											
Comprehensive Everglades Restoration Plan	1999	US Army Corps of Engineers	FL	904-232-1068	www.saj.usace.army.mil/Missions/Environmental/Eco systemRestoration.aspx	C	C	C	C	303(d)	C
Everglades West Coast Basin	2012	Everglades West Coast Basin Technical Stakeholders	FL	850-245-8336	www.dep.state.fl.us/water/watersheds/	C	C	C	NA	303(d)	NA
Lake Okeechobee Basin	2014	Lake Okeechobee Stakeholders	FL	850-245-8336	www.dep.state.fl.us/water/watersheds/	C	C	C	NA	303(d)	C

- A
- Proposed implementation / not implemented
- B
- Metric established - baseline implemented
- C
- Post implementation metric / data available
- NA
- Not addressed in plan

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE A-2

INITIAL PLAN TABLE OF CONTENT SCREENING MATRIX - OUTSIDE LAKE ERIE BASIN

Plan Name	Date	Agency / Organization	State/ Province	Contact	Website	Identification of Major Nutrient Sources	Methods to Minimize Nutrient Loading	Nutrient Monitoring (general)	Nutrient Monitoring (correlated to HABs)	303(d) or AOC	Nutrient TMDL?
<i>Mississippi River / Gulf of Mexico</i>											
Gulf Hypoxia Action Plan	2008	Mississippi River Gulf of Mexico Watershed Nutrient Task Force - US EPA		1-800-490-9198	water.epa.gov/type/watersheds/	C	C	C	C	NA	C
Black Hawk Lake Watershed	2012	Sac County Soil & Water Conservation District	IA		www.iowadnr.gov/Environment/WaterQuality/WatershedImprovement/WatershedPlanning/	B	B	B	A	303(d)	B
Carter Lake Watershed	2008	Carter Lake Environmental Assessment and Rehabilitation (CLEAR) Council	NE, IA		water.epa.gov/polwaste/nps/	B	B/C	B/C	B/C	303(d)	C
Dry Run Creek Watershed	2011	Iowa DNR Watershed Improvement	IA	515-725-8390	www.iowadnr.gov/Environment/WaterQuality/WatershedImprovement/WatershedPlanning/	NA	NA	NA	NA	303(d)	NA
Hickory Grove Lake Watershed	2013	Hickory Grove Lake Watershed Advisory Committee	IA	515-382-6581	www.storycountyiowa.gov/index.aspx?NID=1046	B	B	B	B	303(d)	B
Lake Hendricks Watershed Management Plan	2009	Howard County Soil & Water Conservation District	IA	765-457-2114	www.howardswcd.com/	B	A/B	B	NA	303(d)	A
Price Creek Watershed	2010	Iowa and Benton County Soil & Water Conservation Districts	IA	319-472-2161 ext 109	www.bentonswcd.net/	B	B/C	B	NA	303(d)	NA
Raccoon River Watershed Water Quality Master Plan	2011	M&M Divide Resource Conservation & Development	IA			B	B	C	NA	303(d)	B
Shingle Creek and West Mississippi Watershed	2013	Shingle Creek Watershed Management Commission and West Mississippi Watershed Management Commission	MN	763-553-1144	www.shinglecreek.org/	A	A	A	NA	303(d)	B

A Proposed implementation / not implemented
B Metric established - baseline implemented
C Post implementation metric / data available
NA Not addressed in plan

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE A-2

INITIAL PLAN TABLE OF CONTENT SCREENING MATRIX - OUTSIDE LAKE ERIE BASIN

Plan Name	Date	Agency / Organization	State/ Province	Contact	Website	Identification of Major Nutrient Sources	Methods to Minimize Nutrient Loading	Nutrient Monitoring (general)	Nutrient Monitoring (correlated to HABs)	303(d) or AOC	Nutrient TMDL?
<i>Lake Winnebago</i>											
Fond du Lac Watershed	2010	Wisconsin Dept. of Natural Resources	WI	920-923-3033	www.fdlco.wi.gov/departments/departments-f-m/land-and-water-conservation/watersheds/parsons-creek-watershed	A	A	A	NA	303(d)	B
Greater Milwaukee Watersheds	2013	Southeastern Wisconsin Regional Planning Commission	WI	262-547-6721	www.sewrpc.org/SEWRPC/Environment/	B	B	B	A/B	303(d)	NA
Lower Fox River	2001, 2012	Lower Fox River Basin Integrated Management Plan	WI		www.dnr.wi.gov	C	C	C	A	AOC, 303(d)	C
Upper Fox River Basin	2001	Wisconsin Dept. of Natural Resources	WI	920-923-3033	www.fdlco.wi.gov/	A	A	B	A	303(d)	A
Winnebago County Land and Water Resource Management Plan	2010	Winnebago County Land Conservation Committee	WI	920-232-1950	www.co.winnebago.wi.us/lwcd/	A	B	A	NA	303(d)	NA
<i>Lake Simcoe</i>											
Lake Simcoe Protection Plan	2009	Lake Simcoe Region Conservation Authority	ON		www.lsrca.on.ca/	C	B	C	A		
Integrated Watershed Management Plan	2008	Lake Simcoe Region Conservation Authority	ON		www.lsrca.on.ca/	C	B	C	A		
Maskinonge River Subwatershed Plan	2010	Lake Simcoe Region Conservation Authority	ON		www.lsrca.on.ca/	C	B	C	A		
East Holland River Subwatershed Plan	2010	Lake Simcoe Region Conservation Authority	ON		www.lsrca.on.ca/	C	B	C	A		
<i>Added</i>											
Phosphorus Total Maximum Daily Loads (TMDLs) Tainter Lake and Lake Menomin Dunn County, Wisconsin	2012	Red Cedar River Water Quality Partnership	WI		www.dnr.wi.gov/	B	B	A	A	NA	B
Cass River Watershed Plan (Saginaw Bay)	2014	Saginaw Bay Resource Conservation & Development Council	MI		http://www.cassriver.org/	B	C	B	A	303(d)	A

- A
- Proposed implementation / not implemented
- B
- Metric established - baseline implemented
- C
- Post implementation metric / data available
- NA
- Not addressed in plan

Recommended by internal project team

Selected for indepth evaluation

APPENDIX B

Watershed Management Plans – Review Sheets

APPENDIX B-1

Lake Erie Watershed Plans

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 11/11/2015 (Updated 2/26/16)

Watershed Plan Title - Date: Chagrin River Watershed Action Plan September 2011

Watershed Name and Location: Chagrin Watershed, Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303(d)) of impairments and/or threats (if applicable) are listed by waterbody segment or area	3	Impairments listed but not broken down by area/reach -- Sources of impairment (total phosphorus, nitrate-nitrite, total suspended solids, bacteria, temperature) are clearly stated and backed up by data; Sub-watersheds are described based on exceedances of TMDL targets	Section 6.6 (pg 17); Section 10 (pg 47)
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	Deviations from TMDL targets for total phosphorus, nitrate-nitrite, total suspended solids, bacteria, and temperature are listed	Section 12
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	Sources of impairment broken down by 12-digit HUC	Section 11
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	10-digit HUC concentrations listed	Section 12.1 and 12.2
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	Data is appropriately cited	Throughout
	6. Downstream effects and cumulative impacts are discussed	1	Downstream effects and cumulative impacts are not discussed	NA
	Score	16		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	TMDL included for total phosphorus, Nitrite-nitrate, and total suspended solids. The plan lacks an estimate of load reductions based on the proposed management measures	Section 12
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	1	No listed nutrient load reduction targets based on source location or category	NA
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	2	Some discussion regarding reductions meeting applicable water quality criteria, but only discussed in general terms	Section 12
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Data is appropriately cited	Section 12
	Score	9		

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 11/11/2015 (Updated 2/26/16)

Watershed Plan Title - Date: Chagrin River Watershed Action Plan September 2011

Watershed Name and Location: Chagrin Watershed, Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

(c) Criteria to determine whether or not nutrient load reductions are being achieved			
Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	Concentration criteria identified, but are not linked to the causes and/or sources of impairments/threats -- General criteria for specific TMDL concentrations are listed but could be better linked to specific causes and/or reaches of the watershed	Section 12.2
2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	3	Criteria identified, but are not linked to the causes and/or sources of impairments/threats	Section 12.2
3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Listed criteria include those incorporated into the TMDLs	Section 12.2
4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	2	General mention of updates to the plan, but no specific provisions listed	Section 16
Score	11		
(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	Watershed restoration and protection goals are listed, broken down by section and include costs, responsible parties, etc. -- Proposed management measures are detailed, but are not tied to predicted/calculated load reductions/specific reaches, nor are they prioritized	Section 14
2. Critical locations or high-priority sites for each management measure are mapped or described	1	Critical areas are not identified	NA
3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Watershed restoration and protection goals do not estimate a load reduction	NA
4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	3	Data is appropriately cited	Section 14
Score	9		
(e) Monitoring component to evaluate the effectiveness of implementation			
Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	1	Minimally mentioned; Detailed discussion on monitoring and tracking lacking	Section 16
2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	1	Not discussed	NA
3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	1	Not discussed	NA
4. Adaptive management measures are included	1	Not discussed	NA
Score	4		
Total Score 49			

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 11/10/2015 (Updated 2/25/2016)

Watershed Plan Title - Date: Clinton Main Subwatershed (2010 Revision)

Watershed Name and Location: Clinton River (MI)

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Table of pollutants, sources, causes, subbasins; Includes total phosphorus and nitrogen	Section 4.2; p. 96
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	Total pollutant loads for total phosphorus, dissolved phosphorus, and total nitrogen	Map 16
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Pollutant loadings (including total phosphorus and nitrogen and dissolved phosphorus) in each basin of the Clinton watershed	Map 16
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Nonpoint source modeling using PLOAD; Model output includes total phosphorus, dissolved phosphorus, total nitrogen, and nitrate/nitrite loads in Clinton Main and sub-watersheds	Section 3.4; Map 18
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	PLOAD data and assumptions are presented	Section 3.4
	6. Downstream effects and cumulative impacts are discussed	1	Not addressed	
	Score	20		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	2	Some mention in the text of reductions needed in water quality parameters, including total phosphorus and nitrogen; Proposed nutrient load reductions are mapped	Appendix C; Map 30
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	3	Proposed load reductions presented in maps according to nutrient (total phosphorus or nitrate/nitrite) and sub-watershed	Map 30
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	2	Proposed load reductions will presumably achieve water quality goals	Map 30; Throughout
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	2	Estimates of total nitrogen and phosphorus reductions appear reasonable if management practices are implemented	Map 30
	Score	9		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 11/10/2015 (Updated 2/25/2016)

Watershed Plan Title - Date: Clinton Main Subwatershed (2010 Revision)

Watershed Name and Location: Clinton River (MI)

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	2	BMP table with generic criteria ("What is measured")	Table 5.1
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	1	Not specified	
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	1	E. coli TMDL does not include nutrients	
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	1	Not addressed	
	Score	5		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	List of goals and objectives for each impairment; Community Action Matrix	Section 4.3, p. 101; Section 5, Table 5.5
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	3	Mapped as areas critical for preservation and/or restoration	Map 29
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	3	Effectiveness of each BMP taken from references; does not include data for Clinton River	Table 5.1, p. 107
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	4	Data and estimates for BMPs are cited from multiple sources	Table 5.1
	Score	13		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	3	Appendix C contains monitoring info and recommendations - "Qualitative Program Evaluation Techniques"	Table C.1 in Appendix C
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	Specific requirements for water quality parameters are noted in the text, including total phosphorus and total nitrogen	Appendix C
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	1	Not specified	
	4. Adaptive management measures are included	1	Not specified	
	Score	8		
Total Score		55		

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 11/12/2015 (Updated 2/26/16)

Watershed Plan Title - Date: Combined Downriver Watershed Plan 2012

Watershed Name and Location: Combined Downriver (Detroit River South, Blakely Drain, and Frank & Poet Drain)

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Includes both state and local desired uses for waterbodies and known or suspected causes of impairment; causes are prioritized for each use -- Sources of impairment are clearly stated and backed up by data; Sub-watersheds are described based on exceedances of TMDL targets	Section 4
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	Causes are listed as exceedances from TMDL concentrations for Blakely Drain, the Frank & Poet Drain and the Detroit River South; Current loads are 2 to 4 times the recommended value of 0.05 mg/L TP	Section 3
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Sources of nutrient impairments/threats are listed by category and known/suspected and existing loads of total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS), and fecal coliform are mapped	Sections 4 & 5
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	Sources of nutrient impairments/threats are mapped by load and list load by subwatershed	Section 5
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	Data is appropriately cited; Modeled annual Load estimates were done for total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS), fecal coliform, and runoff volume for the Combined Downriver Watershed.	Throughout
	6. Downstream effects and cumulative impacts are discussed	1	Downstream effects and cumulative impacts are not discussed	NA
	Score	18		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	4	Proposed management actions and resulting pollutant load reductions are estimated for each river/watershed; includes BMPs at privately owned locations -- The plan includes an estimate of load reductions based on the proposed management measures for each river	Section 5.6; Table 5-9 and 5-10
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	2	Listed reductions are not directly correlated to each cause and source	Section 5.6
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	The management practices for which there is sufficient quantitative information to allow modeling and estimation of pollutant reductions are a small subset of all available best management practices.	Section 5.6
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Potential reductions in annual loads stemming from the implementation of select actions and practices were estimated using information provided by the members of the ADW, published reports, and geographical information analysis and modeling using the Watershed Treatment Model.	Section 5.6
	Score	12		

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 11/12/2015 (Updated 2/26/16)

Watershed Plan Title - Date: Combined Downriver Watershed Plan 2012

Watershed Name and Location: Combined Downriver (Detroit River South, Blakely Drain, and Frank & Poet Drain)

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	Criteria area listed but not tied to sources -- General criteria for specific TMDL concentrations are listed but could be better linked to specific causes and/or reaches of the watershed	Section 7
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	3	Includes quantitative and qualitative methods to measure progress, not tied to specific areas/sources	Section 7.1 and 7.2
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Includes TMDL concentration goal for TP, DO	Table 7-2
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	2	General statement on reviewing progress	Section 7-3
	Score	11		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	Watershed restoration and protection goals are listed and goals that each measure addresses is listed -- Proposed management measures are not very detailed in their descriptions, but are prioritized and linked to load reductions	Chapter 5.3
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	4	Critical areas are identified by estimated pollutant load and other criteria (flooding, preservation, etc.)	Chapter 5.4
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	4	Watershed Treatment Model is used to estimate pollutant loads and potential reductions	Chapter 5.5
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	3	Data is appropriately cited	Throughout
	Score	15		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	3	Cites historical TMDL sampling sites and procedures -- Overall good discussion on monitoring. Table 7-2 was well organized in presenting monitoring components and how they will be evaluated	Section 7
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	Table 7-2 includes goal, parameter measured, current condition, measurable goal/target, evaluation method, and implementation	Section 7; Table 7-2
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	3	Cites TMDL cycle for monitoring	Section 7
	4. Adaptive management measures are included	2	Cites periodic review with 5-year permit cycle and completion of major projects	Section 7
	Score	11		
Total Score		67		

Reviewer Name/Jordan Rofkar: Muriel Kim/Jordan Rofkar

Review Date: 11/9/2015 (Updated 2/29/2016)

Watershed Plan Title - Date: Grand River Watershed Water Management Plan - 2014

Watershed Name and Location: Grand River Watershed, Ontario

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	2	<ul style="list-style-type: none">• Causes and sources of nitrate and total phosphorus are fairly well discussed at the watershed-scale, but substantially less so at the waterbody segment or area scale.• Some areas of the watershed have more information than others; e.g. the central Grand River, where water quality is generally the most impaired in the entire watershed.• Relative contribution of point sources of nutrients (e.g. sewage treatment plants) and non-point sources of nutrients (e.g. surface runoff from rural and urban land) is understood and explained.• Seasonal trends in river nutrient levels are understood and described.	<ul style="list-style-type: none">• Section 2.4.1, p. 2-10• Section 2.6.1, p. 2-15• Section 5.2, p. 5-5• Section 5.2.1.1, p. 5-6• Section 5.2.1.2, p. 5-9• Section 5.2.1.4.2, p. 5-13
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	<ul style="list-style-type: none">• The causes of nitrate and total phosphorus impairment and threats appear to be well understood, but not all are quantified.• Some contributors to nutrient impairment (e.g. runoff potential) were assessed for the entire watershed, but are characterized in relative terms ('extremely high', 'high', 'medium', 'low').• Some contributors to nutrient impairment (e.g. land cover) are quantified, but only at the scale of the entire watershed (e.g. 70% of the watershed is actively farmed) or as a range (e.g. wetland cover in the watershed ranges from a low of 13% in the Conestoga River subwatershed to a high of 34% in the Eramosa River subwatershed).• Some quantification of nutrient impairment is presented in the Plan, e.g. the maximum rated capacity (in millions of liters per day) of the different sewage treatment plants in the watershed.	<ul style="list-style-type: none">• Section 2.2, p. 2-5• Section 2.6.1, p. 2-15• Section 5.2.1.1, p. 5-7
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	<ul style="list-style-type: none">• The Plan includes several detailed maps illustrating the relative severity of direct and indirect sources of nutrient impairments and threats throughout the watershed (e.g. relative runoff generation, nutrient Water Quality Index, sewage treatment plant maximum rated capacity).• Detailed mapping is sometimes only available for specific subwatersheds. For example, a map is presented of the relative contribution of different sources to total phosphorus load, but this applies only to the upper-middle Grand River region.	<ul style="list-style-type: none">• Section 2.2, p. 2-5• Section 5.2, p. 5-6• Section 5.2.1.2, p. 5-9• Section 5.2.1.3.1, p. 5-10
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	<ul style="list-style-type: none">• Nitrate and total phosphorus contributions, when reported as a quantitative value, are sometimes, but not consistently, available throughout the entire watershed, as monitoring and sampling were sometimes only conducted in specific subwatersheds.	<ul style="list-style-type: none">• Section 5.2.1.2, p. 5-9• Section 5.2.1.3.1, p. 5-10
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	<ul style="list-style-type: none">• The Plan presents information from many studies and assessments that pre-date the development of the Plan. The studies and assessments are cited at the end of each chapter.	<ul style="list-style-type: none">• Section 2, p. 2-18• Section 5, p. 5-18
	6. Downstream effects and cumulative impacts are discussed	3	<ul style="list-style-type: none">• Downstream effects on the lower Grand River and the north shore of Lake Erie are discussed. It is recognized and reported in the Plan that water quality in the southern Grand River is affected by the cumulative impact from areas upstream and also because of the lake-like conditions created by some of the reservoirs in the watershed.• A modelling software called the Grand River Simulation Model is used to evaluate the cumulative impacts of the ten wastewater treatment plants in the central Grand River and the lower Speed River (tributary to the Grand River).• The high phosphorus concentrations leaving the Grand River are hypothesized to be one of the major factors in the observed increase in <i>Cladophora</i> (algae) growth and distribution on the north shore of the eastern basin of Lake Erie.• A thorough cumulative impact assessment does yet not appear to have been conducted, so additional contributors to downstream nutrient impacts may remain unidentified at this time.	<ul style="list-style-type: none">• Section 5.2, p. 5-5, 5-6
Score		18		

Reviewer Name/Jordan Rofkar: Muriel Kim/Jordan Rofkar

Review Date: 11/9/2015 (Updated 2/29/2016)

Watershed Plan Title - Date: Grand River Watershed Water Management Plan - 2014

Watershed Name and Location: Grand River Watershed, Ontario

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

(b) Estimate of the nutrient load reductions expected from the proposed management measures				Page and Section
Pre-Implementation	Review Criteria	Score (1-4)	Comments/Recommendations	
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	2	<ul style="list-style-type: none"> Targets for total phosphorus and nitrate concentrations in wastewater treatment plant (WWTP) effluent are suggested. However, there is recognition in the plan that upgrades to WWTP to reduce nitrate effluent concentration will not effectively address high nitrate concentrations in the watershed as a whole, as non-point sources serve as the greater source. The need for management and reduction of each impairment and threat is recognized, but few nutrient load reduction targets are quantified. A Rural Water Quality Program exists in the watershed, the development of which predates the Plan. The Plan promotes the continued use and refinement of the nutrient management strategies in the Rural Water Quality Program. However, at this time, it appears that the Plan and Program are focusing on making nutrient management strategies feasible and practical in the first place, rather than setting targets for nutrient load reductions. 	<ul style="list-style-type: none"> Section 5.1.3, p. 5-4 Section 5.2.1.2 and 5.2.1.3.1, p. 5-10 Section 5.2.1.4.2, p. 5-14 Section 7.D, p. 7-12, 7-15, 7-16
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	1	<ul style="list-style-type: none"> The Plan aims for an overall reduction of nutrient loading, but estimates associated to each cause, source location or category of nutrient loading are not available. 	
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	2	<ul style="list-style-type: none"> The Plan's proposed nutrient management strategies are expected to lead to a general improvement in nutrient loading, but the probability of success and the anticipated effectiveness of the strategies are not discussed in great detail. 	<ul style="list-style-type: none"> Section 5.2.2, p. 5-16 Section 7.D, p. 7-11
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	2	<ul style="list-style-type: none"> Few estimates or quantifiable data/targets were presented, however the proposed management strategies were developed in consultation with subject matter experts and taking into consideration previous studies and management planning in the Grand River watershed. 	<ul style="list-style-type: none"> Section 1, p. 1-1
	Score	7		
(c) Criteria to determine whether or not nutrient load reductions are being achieved				Page and Section
Implementation	Review Criteria	Score (1-4)	Comments/Recommendations	
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	2	<ul style="list-style-type: none"> Possible metrics for monitoring the effectiveness of various management strategies are identified for several of the causes and sources of nutrient impairment (e.g. retention of phosphorus on land, concentration of phosphorus and nitrogen in wastewater effluent). Specific metrics and criteria do not appear to have been formally selected for determining whether and to what degree each cause/source of nutrient impairment/threat is being addressed. 	<ul style="list-style-type: none"> Section 5.2.1.3.1, p. 5-10 Section 7.D, p. 7-12
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	2	<ul style="list-style-type: none"> The Plan recommends that secondary contact recreation (boating, fishing, etc.) not occur when the concentration of cyanobacteria exceeds 100,000 cells/mL, based on guidelines established by Health Canada for recreational water use. However, cyanobacteria concentration is not one of the parameters that were being monitored by the GRCA at the time when the Plan was written. Quantitative targets are proposed for nitrogen and phosphorus concentrations in wastewater treatment plant effluent. 	<ul style="list-style-type: none"> Section 3.3.4.1, p. 3-14 Section 7.D, p. 7-12
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries Act	1	<ul style="list-style-type: none"> The recommendation for maximum cyanobacteria concentration was based on federal guidelines. It is probable, but not explicitly stated in the Plan, that the development of the other proposed targets took existing federal/provincial regulation into consideration. 	<ul style="list-style-type: none"> Section 3.3.4.1, p. 3-14
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	3	<ul style="list-style-type: none"> The Plan includes provisions that it be reviewed and updated regularly, particularly if changes/projects are being considered in the watershed that could affect some of the major assumptions in the Plan. 	<ul style="list-style-type: none"> Section 7.A, p. 7-1
	Score	8		

Reviewer Name/Jordan Rofkar: Muriel Kim/Jordan Rofkar

Review Date: 11/9/2015 (Updated 2/29/2016)

Watershed Plan Title - Date: Grand River Watershed Water Management Plan - 2014

Watershed Name and Location: Grand River Watershed, Ontario

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

(d) Description of the management measures needed to achieve the proposed nutrient load reductions				
Implementation	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	2	<ul style="list-style-type: none"> General management measures (e.g. upgrading the existing wastewater treatment plants) are identified, and the Plan highlights the causes/sources of pollution that require the development of best management practices. No priority appears to be assigned to specific management measures over others. 	<ul style="list-style-type: none"> Section 5.2.1.1, p. 5-8 Section 5.2.1.3.1, p. 5-10 Section 5.2.1.3.2, p. 5-11 Section 5.2.1.4.2, p. 5-14 Section 5.4, p. 5-17
	2. Critical locations or high-priority sites for each management measure are mapped or described	2	<ul style="list-style-type: none"> Priority areas in the watershed requiring overall improvement in water quality are identified, but priority areas are not proposed for each management measure. 	<ul style="list-style-type: none"> Section 5.2.1.2, p. 5-9
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	2	<ul style="list-style-type: none"> A simulation model was used to estimate the percentage reduction of summer total phosphorus concentrations in two tributaries if some planned WWTP upgrades are implemented. Estimated that the Rural Water Quality Program is keeping 94,000 kg of total phosphorus annually on the land; work is continuing on improving the accounting methodology for phosphorus Estimates of load reductions are not available for each management measure. 	<ul style="list-style-type: none"> Section 5.2.1.1, p. 5-8 Section 5.2.1.3.1, p. 5-10
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	3	<ul style="list-style-type: none"> The Grand River Conservation Authority considers the Grand River Simulation Model to be an effective planning and modelling tool, and strives to maintain it with ongoing data collection for calibration and validation. 	<ul style="list-style-type: none"> Section 7.D, p. 7-14
	Score	9		
(e) Monitoring component to evaluate the effectiveness of implementation				
Post-Implementation	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	2	<ul style="list-style-type: none"> The Grand River Conservation Authority already collects river water quality 10 times/year at 37 sites in partnership with MOECC; new sampling site recently added in the Grand River estuary, downstream of the Dunnville Dam. The Region of Waterloo monitors river water quality at 28 sites above and below their WWTPs. The monitoring includes an evaluation of the health of the aquatic community every 3 years. The Plan notes that further work is still needed to develop appropriate parameters and (if needed) additional monitoring sites for monitoring nutrient enrichment and loading, as the current watershed monitoring program is not sufficient to quantify loads or characterize trends. Specific approaches were not proposed within the Plan. 	<ul style="list-style-type: none"> Section 3.3.1.2, p. 3-7 Section 5.4, p. 5-17
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	<ul style="list-style-type: none"> The Plan itself generally does not prescribe specific monitoring parameters, but rather lays out a set of Broad Water Objectives based on which indicators and targets are to be established. Target dates for upgrades to various wastewater treatment plants are specified. 	<ul style="list-style-type: none"> Section 3-2, p. 3-1, 3-2, 3-4 Section 7-D, p. 7-11
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	3	<ul style="list-style-type: none"> Plan recommends the formation of an Implementation Committee, composed of senior officials who will meet at least once a year to review progress on the plan. The Plan calls for the formation of a Water Managers Working Group, made up of representatives of the Plan partners who are responsible for water management issues within their municipalities and organizations. They are to meet regularly to develop solutions to water issues, oversee work plans, implement actions, report on implementation and evaluate the effectiveness of actions. The Plan calls for annual progress reporting and technical monitoring reports to be issued every 5 years. 	<ul style="list-style-type: none"> Section 7-A, p. 7-2
	4. Adaptive management measures are included	1	<ul style="list-style-type: none"> Plan allows for and encourages adaptive management (e.g. regular committee meetings to discuss progress and any necessary changes, and implement amendments where/when needed). However, specific adaptive management measures are not included in the Plan. 	<ul style="list-style-type: none"> Section 1.1, p. 1-2 Section 1.2, p. 1-3
	Score	8		
Total Score		50		

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 11/18/2015 (Updated 2/26/16)

Watershed Plan Title - Date: Honey Creek Watershed Action Plan 2006

Watershed Name and Location: Honey Creek Watershed, Sandusky, Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	2	Attainment listed by 14-digit HUC but data used is limited and use ICI, QHEI etc.-- Sources of impairment are clearly stated and backed up by data but lacking in detail; Sub-watersheds are not described, sources are listed generally and not mapped	Page 51
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	Annual discharge of load for suspended sediments (SS), total phosphorus (TP), Soluble Reactive Phosphorus (SRP), Nitrate plus nitrite nitrogen (nitrate-N) and chloride listed and compared to other watershed areas; pounds per acre of the aforementioned parameters are included in a table but not compared to a target	Page 39-40
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	Phosphorus sources are listed as percent with nonpoint (agricultural) making up 92%, no maps showing agricultural areas or source areas	Page 65
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	2	Phosphorus sources are listed as percent with nonpoint (agricultural) making up 92%, no maps showing agricultural areas or source areas	Page 65
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	Estimates, assumptions and data used are reasonable	Chapter 6
	6. Downstream effects and cumulative impacts are discussed	2	Export downstream mentioned as pollutant export issues; High rates of sediment and nutrient export impact downstream receiving waters including Sandusky Bay and Lake Erie	Page 38
	Score	15		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	Load reduction goals for aforementioned parameters, except nitrogen, are listed for the whole watershed as point and nonpoint. The plan did not include specific reductions by source or area, only had general reduction targets for aforementioned parameters.	Chapter 6
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	2	Load reduction goalsfor aforementioned parameters are listed for the whole watershed as point and nonpoint	Chapter 6
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	2	Load reduction goal is mostly for point source for phosphorus, which doesn't contribute as much to the load of the parameters as nonpoint	Chapter 6
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Potential reductions in annual loads stemming from the implementation of select actions and practices were estimated using information provided by the members of the ADW, published reports, and geographical information analysis and modeling using the Watershed Treatment Model.	Chapter 6
	Score	10		

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 11/18/2015 (Updated 2/26/16)

Watershed Plan Title - Date: Honey Creek Watershed Action Plan 2006

Watershed Name and Location: Honey Creek Watershed, Sandusky, Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	Criteria area listed but not tied to specific sources; General criteria for specific TMDL concentrations are listed but could be better linked to specific causes and/or reaches of the watershed	Chapter 6
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	3	Includes quantitative and qualitative methods to measure progress, not tied to specific areas/sources	Chapter 6
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Includes TMDL concentration goals for applicable parameters (total phosphorus, fecal coliform; Nitrogen is not included in the plan	Chapter 6
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	2	General statement on reviewing progress	Chapter 6
	Score	11		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	Watershed restoration and protection goals are listed and goals that each measure addresses is listed but not tied to any specific area of the watershed -- Proposed management measures are not very detailed in their descriptions, but are prioritized and linked to load reductions	Table 6.2
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	1	Critical areas are not identified	NA
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	2	Performance indicators are generally how many tasks get implemented; numerical reductions not included with each measure	Chapter 6
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	2	Data is appropriately cited	Throughout
	Score	8		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	3	General monitoring statement, no specific plan -- Discussion on monitoring is vague and lacking detail	Chapter 7
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	No specific discussion of parameters and criteria, benchmarks, etc.	Chapter 7
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	2	General table of monitoring and time frame, no specific plan	Chapter 7
	4. Adaptive management measures are included	1	No discussion on adaptive management	NA
	Score	8		
Total Score		52		

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 11/19/2015 (Updated 2/26/16)

Watershed Plan Title - Date: Huron Chain of Lakes Watershed 2007

Watershed Name and Location: Huron River Watershed

Score Key

1 Absent	Item is not discussed
2 Minimal	Includes some information but significant additional information/data is needed on the item
3 Good	Includes an acceptable amount information and addresses the item
4 Excellent	A significant amount of current, applicable, and/or exceptional information/data is presented on the item

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	3	Nutrient causes (total phosphorus, total suspended solids) are listed by waterbody area -- Sources of impairment are clearly stated and backed up by data; Sub-watersheds are described based on exceedances of TMDL targets	Section 2
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	Causes are listed as exceedances from TMDL concentrations	Section 2
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	Sources of nutrient impairments/threats are listed by category and known/suspected and existing loads are mapped	Section 2, Page 109
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	Sources of nutrient impairments/threats are mapped by load and list load by subwatershed	Section 2
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	Data is appropriately cited	Section 2
	6. Downstream effects and cumulative impacts are discussed	1	Downstream effects and cumulative impacts are not discussed	NA
	Score	16		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	General reductions based on lit review are included, not extrapolated to proposed action in specific reaches -- The plan includes an estimate of load reductions based on the proposed management measures for each river	Section 4.4
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	3	Management actions are linked to sources addressed but does not include specific reductions per source	Section 4.5
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	2	Minimal discussion on whether load reductions will meet specific water quality criteria	Section 4.5
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Data is appropriately cited	Section 4
	Score	11		

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 11/19/2015 (Updated 2/26/16)

Watershed Plan Title - Date: Huron Chain of Lakes Watershed 2007

Watershed Name and Location: Huron River Watershed

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
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	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	General criteria area listed but not tied to sources specifically -- General criteria for specific TMDL concentrations are listed but could be better linked to specific causes and/or reaches of the watershed	Section 5
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	2	Includes quantitative and qualitative methods to measure progress, not tied to specific areas/sources	Section 5
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	At the time of the report, three TMDLs had been completed for subwatershed, all for total phosphorus. Others scheduled include fish consumption, water quality exceedance for dissolved oxygen, and macroinvertebrates.	Section 1.4.2 and Section 5
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	1	No statement on reviewing progress	NA
	Score	9		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	Watershed restoration and protection goals are listed and goals that each measure addresses is listed	Chapter 5
	2. Critical locations or high-priority sites for each management measure are mapped or described	3	Critical areas are identified by estimated pollutant load and other criteria (flooding, preservation, etc.)	Chapter 5
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	3	Watershed Treatment Model is used to estimate pollutant loads and potential reductions	Chapter 5
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	3	Data is appropriately cited	Chapter 5
	Score	12		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Post-Implementation	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	1	No discussion on monitoring sites/procedures	NA
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	Monitoring parameters don't include specific criteria	Chapter 5
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	1	Not discussed	NA
	4. Adaptive management measures are included	1	Concept is discussed but not the applicability to the watershed plan, monitoring, goals, etc.	NA
	Score	5		
Total Score		53		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/12/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Rapid Watershed Assessment - Data Profile Huron-Vermilion Watershed (2008)

Watershed Name and Location: Huron River & Vermilion River - Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303(d)) of impairments and/or threats (if applicable) are listed by waterbody segment or area	2	Impairments are presented according to sub-watersheds -- This document is being reviewed as a standalone watershed assessment. There are TMDLs for the Huron River (2005) and Vermilion River (2005) that might contain more information regarding BMPs and nutrient loadings.	Table 10
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	2	Not specifically identified as causes, but discussed in some detail: agricultural practices, livestock, and erosion.	Table 19
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Total phosphorus and nitrate/nitrite loads and reductions needed in HUC 14 sub-watersheds	Table 10
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Point sources have met TMDL targets; nutrient contributions are tabulated according to HUC 14 sub-watersheds	p. 15; Table 10
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	Data collected during water quality reporting and TMDLs	Throughout
	6. Downstream effects and cumulative impacts are discussed	1	Not specified	
	Score	17		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	Percent reduction needed to meet TMDL targets	Tables 9 & 10
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	3	Percent reductions are linked to branches of the Huron River and HUC 14 sub-watersheds of the Vermilion River	Tables 9 & 10
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Reductions are set according to goals of the TMDLs	Tables 9 & 10
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	4	Data collected during water quality reporting and TMDLs	Throughout
	Score	13		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/12/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Rapid Watershed Assessment - Data Profile Huron-Vermilion Watershed (2008)

Watershed Name and Location: Huron River & Vermilion River - Ohio

Score Key

- | | |
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| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	1	Not specified in this document	
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	1	Not specified in this document	
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	1	Not specified in this document -- This document is clearly linked to the 2005 TMDLs created for the Huron and Vermilion Rivers, but is not an in-depth planning document.	
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	1	Not specified in this document	
	Score	4		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	2	General listing of BMPs without link to specific cause or source of impairment	Tables 7 & 8
	2. Critical locations or high-priority sites for each management measure are mapped or described	2	Locations for BMPs are not prioritized	Tables 7 & 8
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Not specified	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	2	Data collected during water quality reporting and TMDLs -- Document makes reference to data from TMDL reports	Tables 7 & 8
	Score	7		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Post-Implementation	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	1	Not specified in this document	
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	1	Not specified in this document	
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	1	Not specified in this document	
	4. Adaptive management measures are included	1	Not specified in this document	
	Score	4		
Total Score		45		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 2/26/16

Watershed Plan Title - Date: N/A¹

Watershed Name and Location: Lake Erie Nearshore

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area			
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method			
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.			
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method			
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable			
	6. Downstream effects and cumulative impacts are discussed			
	Score	NA		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.			
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category			
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals			
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable			
	Score	NA		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 2/26/16

Watershed Plan Title - Date: N/A¹

Watershed Name and Location: Lake Erie Nearshore

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)			
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources			
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act			
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed			
	Score	NA		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized			
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described			
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates			
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable			
	Score	NA		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described			
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps			
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan			
	4. Adaptive management measures are included			
	Score	NA		
Total Score		NA		

Notes:

1. There is no formal watershed plan for the "Lake Erie Nearshore". The Ohio EPA- Division of Surface Water (DSW) implemented an annual Lake Erie monitoring program in 2014. Impairment in streams and rivers is based on aquatic life criteria. No such criteria exist for lakes, so a method to assess the open waters of Lake Erie was needed. This is discussed in the 2015 Monitoring of Lake Erie and the Maumee River Estuary. Additionally, the Ohio Lake Erie Commission occasionally publishes a State of the Lake - Lake Erie Quality Index report, the last of which was completed in 2004.

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/5/2016 (Updated 2/26/2016)

Watershed Plan Title - Date: Lower St. Joseph-Bear Creek Watershed Management Plan (2007)

Watershed Name and Location: Lower St. Joseph River, Bear Creek - Ohio, Michigan, Indiana

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	1	Not specified -- Monitoring data are either incomplete or lack specificity with regard to sources of nutrients. Nutrients were not the primary concern in this watershed at the time of the WMP - pathogens, sediment, nutrients, and pesticides affect water quality.	
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	Nutrient loads listed for two sampling locations in Fort Wayne	
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	1	Not specified	
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	1	Not specified	
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	1	Not studied with specificity	p. 50
	6. Downstream effects and cumulative impacts are discussed	2	Brief mentions of downstream impacts without in-depth discussion	Throughout
	Score	9		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	4	Load calculations and reductions needed for total phosphorus and ammonia; not linked to sources	Chapter 7; Tables 24 & 25
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	1	Not studied	p. 50
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Predicted phosphorus and ammonia reductions outlined in Tables 24 & 25 will achieve goals	Chapter 7
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	2	Data from ongoing monitoring; not presented herein	Chapter 7
	Score	10		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/5/2016 (Updated 2/26/2016)

Watershed Plan Title - Date: Lower St. Joseph-Bear Creek Watershed Management Plan (2007)

Watershed Name and Location: Lower St. Joseph River, Bear Creek - Ohio, Michigan, Indiana

Score Key

1 Absent	Item is not discussed
2 Minimal	Includes some information but significant additional information/data is needed on the item
3 Good	Includes an acceptable amount information and addresses the item
4 Excellent	A significant amount of current, applicable, and/or exceptional information/data is presented on the item

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	4	Objectives, indicators, and action items to reduce total phosphorus	Section 6.4; p. 79
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	4	Narrative criteria for Goal 4 - reducing total phosphorus entering the river by 50%; The list of criteria includes objectives, indicators, and action items; Criteria are not quantified at this point	Section 6.4
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	1	No reference to TMDL for the watershed	
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	1	No reference to TMDL for the watershed	
	Score	10		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	2	Objectives, indicators, and action items are described without specific reference to any BMP	Section 6.4
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	3	Priority locations for reductions in phosphorus and/or ammonia are listed; Other contaminants (bacteria, sediment, etc.) are included in these lists; Current loadings and necessary reductions are not specified	Chapter 5
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Total phosphorus and ammonia load reductions are not linked to BMPs	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	1		
	Score	7		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	3	Use established protocols and schedule	p. 91
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	Benchmarks will include monitoring parameters for phosphorus	Chapter 6
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	3	Weekly monitoring throughout watershed; Fort Wayne at two locations; citizen monitoring program	p. 91
	4. Adaptive management measures are included	2	No specified adaptive management plan; revise WMP every 5 years	p. 92
	Score	11		
Total Score		47		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/12/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Maumee AOC Stage 2 Watershed Restoration Plan (2006 - Draft)

Watershed Name and Location: Maumee River, Ottawa River, Swan Creek, Lake Erie Tributaries, Toussaint Creek - Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Segment, cause, source and commentary -- This document is a restoration plan for an entire area of concern (AOC) that encompasses multiple watersheds.	Tables in Chapter 7 (beginning on p. 7-11)
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	1	Not specified	
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Areas in need of restoration are tabulated according to waterbody segment, cause (nutrients, sediment, etc.), and source (urbanization, agriculture, dams)	Tables in Chapter 7 (beginning on p. 7-11)
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	1	Not specified	
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	Data from continuous monitoring throughout the AOC are mentioned; Nutrient monitoring performed at Heidelberg College; No specific references to TMDL data	Chapter 4
	6. Downstream effects and cumulative impacts are discussed	3	Eutrophication and harmful algal blooms in Lake Erie; drinking water quality; habitat degradation	Chapter 5
	Score	17		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	Reduction targets for point and non-point source phosphorus; Goals are specified in terms of total phosphorus and nitrogen, although the report does mention soluble reactive phosphorus and nitrates specifically	Annex III (p. 4-12)
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	3	Agricultural targets listed in tabular format for total phosphorus	p. 4-13
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	2	Goals are intended to comply with limits established through the Great Lakes Water Quality Agreement; Total phosphorus load reductions for sources other than agriculture are not listed	p. 4-13
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	4	Data from continuous monitoring throughout the AOC are mentioned; Nutrient monitoring performed at Heidelberg College; No specific references to TMDL data	Chapter 4
	Score	12		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/12/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Maumee AOC Stage 2 Watershed Restoration Plan (2006 - Draft)

Watershed Name and Location: Maumee River, Ottawa River, Swan Creek, Lake Erie Tributaries, Toussaint Creek - Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	2	Beneficial use impairments (BUIs) represent delisting criteria; progress toward delisting are linked to each subwatershed	Chapter 7
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	2	BUIs are presented as narrative criteria; Habitat assessments expected to continue	Chapter 7
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	2	BUIs represent delisting criteria; progress toward delisting are linked to each subwatershed	Chapter 7
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	2	Maintain as a "living document"	p. 2-7
	Score	8		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	Management measures are listed according to watershed for total phosphorus and BUIs	Chapter 6
	2. Critical locations or high-priority sites for each management measure are mapped or described	3	Management measures are listed according to watershed; Not prioritized	Chapter 6
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Not specified	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	1	Not specified	
	Score	8		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Post-Implementation	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	4	Continue long-term monitoring of phosphorus and nitrogen in coordination Heidelberg College Water Quality Lab	p. 4-14
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	Continue monitoring water quality parameters (nitrogen and phosphorus); no milestones or phases indicated	Chapter 4
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	4	Continuous monitoring of nitrogen, phosphorus, and sediment in the Maumee River	Chapter 4
	4. Adaptive management measures are included	1	Not specified	
	Score	11		
Total Score		56		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/12/2016 (Updated 2/25/2016)

Watershed Plan Title - Date: Middle Cuyahoga River Watershed Action Plan (2012)

Watershed Name and Location: Cuyahoga River Watershed - Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Causes of high total nitrogen and phosphorus listed by sub-watershed	Table 5a-1
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	Total nitrogen and phosphorus loads listed by sub-watershed	Table 5a-1
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Sources of total nitrogen and phosphorus identified by sources: urban, cropland, etc.	Table 5a-1
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Loadings of total nitrogen and phosphorus identified by sources: urban, cropland, etc.	Table 5a-1
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	STEPL model based on CCAP and monitoring data	p. 210
	6. Downstream effects and cumulative impacts are discussed	2	Impacts of eutrophication on water quality and harmful algae in Lake Erie are discussed	p. 159; p. 175
	Score	22		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	4	Total nitrogen and phosphorus load reductions listed by sub-watershed	Tables in Volume II
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	4	Total nitrogen and phosphorus load reductions listed by sub-watershed	Tables in Volume II
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	4	Load reductions are based on TMDL requirements and performance goals	Tables in Volume II
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Estimates based on modeling or previous results using BMPs	Tables in Volume II
	Score	15		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/12/2016 (Updated 2/25/2016)

Watershed Plan Title - Date: Middle Cuyahoga River Watershed Action Plan (2012)

Watershed Name and Location: Cuyahoga River Watershed - Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	4	Nutrient load reductions calculated using HIT2 modeling for total nitrogen and phosphorus	Tables in Volume II
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	4	Numeric water quality criteria and habitat assessments linked to sub-watersheds	Tables in Volume II
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	4	Criteria are based on TMDL requirements	Throughout
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	3	Updates online; Coordinator will track progress using summary tables	Chapter 9
	Score	15		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Post-Implementation	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	BMPs are listed and described for specific watershed problems, including total nitrogen and phosphorus loading; Recommendations are made for each sub-watershed	Table 6-2
	2. Critical locations or high-priority sites for each management measure are mapped or described	4	BMPs are prioritized within each HUC; Total reductions (tons/yr) of sediment and erosion are predicted for each BMP, along with an associated cost and cost/benefit	Table 6-1
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	3	Reductions (tons/yr) in sediment and erosion are listed for specific BMPs in specific sub-watersheds	Table 6-1
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	2	Data assume consistent performance of BMPs at all locations; estimates are based on previous implementation projects	Chapter 6
	Score	13		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Post-Implementation	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	2	Document implementation of BMPs; Might not be monitored, but assume effectiveness based on previous study or implementation	Chapter 8
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	Track implementation of BMPs	Chapter 8
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	1	Not specified	
	4. Adaptive management measures are included	1	Not specified	
	Score	6		
	Total Score	71		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/11/2016 (Updated 2/26/2016)

Watershed Plan Title - Date: Old Woman Creek Watershed Action Plan (2009)

Watershed Name and Location: Old Woman Creek - Sandusky, Ohio

Score Key

1 Absent	Item is not discussed
2 Minimal	Includes some information but significant additional information/data is needed on the item
3 Good	Includes an acceptable amount information and addresses the item
4 Excellent	A significant amount of current, applicable, and/or exceptional information/data is presented on the item

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	2	Causes and sources of nutrient inputs are listed only for Old Woman Creek as a whole and include inadequate wastewater treatment, agricultural run-off, livestock access the stream	Beginning on p. 132
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	1	Not specified	
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	1	Not specified	
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	1	Not specified	
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	2	Data appear reasonable, but are not cited; Presented in tabular form	p. 127
	6. Downstream effects and cumulative impacts are discussed	3	Soluble reactive phosphorus enters Lake Erie through Old Woman Creek; Contributes to dead zone formation	p. 132
	Score	10		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	2	Loads of soluble reactive phosphorus and ammonia are to be reduced by 33%; Goal is to meet TMDL requirements	p. 133
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	1	Not specified	
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	2	Goal is to reduce soluble reactive phosphorus and ammonia by 33%	p. 133
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	1	Not specified	
	Score	6		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/11/2016 (Updated 2/26/2016)

Watershed Plan Title - Date: Old Woman Creek Watershed Action Plan (2009)

Watershed Name and Location: Old Woman Creek - Sandusky, Ohio

Score Key

1 Absent	Item is not discussed
2 Minimal	Includes some information but significant additional information/data is needed on the item
3 Good	Includes an acceptable amount information and addresses the item
4 Excellent	A significant amount of current, applicable, and/or exceptional information/data is presented on the item

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	1	Not specified -- This document might be too early in the planning process to give meaningful criteria	
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	1	Not specified	
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	2	Overall goal is to reduce soluble reactive phosphorus and ammonia by 33%; Requirements are specified for sediment load, phosphorus and nitrogen	p. 125
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	3	Annual review with a plan update at 5 years	p. 175
	Score	7		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	2	Very few specific BMPs; Plan includes recommendations for further studies and plans	Table 36
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	1	Locations for BMPs are not prioritized or mapped	
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Not specified -- Plan mentions that effectiveness of BMPs needs to be studied	Table 36
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	1	Not specified	
	Score	5		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	4	Monitoring Committee will review and compile data; Volunteer watershed monitoring program with detailed sampling locations, protocols and datasheets	p. 174 and Appendices
Post-Implementation	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	1	Monitoring parameters total phosphorus, nitrogen, and soluble reactive phosphorus; There are no clear milestones or benchmarks at this point	
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	3	Ongoing during each project; Monthly watershed-scale sampling; Intensive estuary sampling	p. 174
	4. Adaptive management measures are included	1	Not specified	
	Score	9		
Total Score		37		

Reviewer Name/Secondary reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/8/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: The Outlet/Lye Creek Watershed Action Plan (2011)

Watershed Name and Location: The Outlet/Lye Creek subwatershed within the Blanchard River watershed - Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	2	Some information on total phosphorus and nitrogen and causes in 14-digit HUCs, but doesn't appear to be comprehensive	Throughout
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	Sources of total phosphorus as point source and a breakdown of nonpoint sources	Table 7.1
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	2	Some information on total phosphorus and nitrogen and causes in 14-digit HUCs, but doesn't appear to be comprehensive	Throughout
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	Total phosphorus load contributions from land uses and other sources	Figure 7.1
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	Data from 2005 TMDL and at least seven previous water quality studies in the Blanchard River system	Chapter 7
	6. Downstream effects and cumulative impacts are discussed	4	Pollutant export from Blanchard River watershed is described; Detailed in tables of nutrient (total phosphorus, dissolved reactive phosphorus, nitrate, and total nitrogen) and sediment data	p. 5-7; Tables 5.2 and 5.3
	Score	18		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	2	Reductions in total nitrogen, total phosphorus, and sediment needed to meet TMDL requirements; Listed as the number of acres needed to treat x tons of nutrient	Table 7.2
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	3	Total nitrogen and phosphorus load reductions are attributed to each BMP	Table 7.10
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Total nitrogen and phosphorus load reductions are estimated to meet TMDL requirements	Throughout
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Analysis of total phosphorus loss from cropland (with assumptions and calculations) was completed by Ralph Heimlich	Appendix D
	Score	11		

Reviewer Name/Secondary reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/8/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: The Outlet/Lye Creek Watershed Action Plan (2011)

Watershed Name and Location: The Outlet/Lye Creek subwatershed within the Blanchard River watershed - Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	4	Performance indicators for each BMP are related to individual problem statements and their expected load reduction	Table 7.10
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	4	Performance indicators are specific; Numerical goals for nitrate/nitrite and total phosphorus are provided for each BMP	Table 7.10
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Criteria are intended to achieve TMDL targets for the Blanchard River	Throughout
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	Internal review of the plan annually followed by a "State of the Watershed" report; Plan will be updated in 2017	p. 10-2
	Score	15		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	Problem statements with management goals; BMPs and locations are not prioritized	Chapter 7
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	2	Goals include identification of high-priority sites and opportunities, but those have not yet been named.	Throughout
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	4	BMPs with brief descriptions, estimated load reductions, timeline, and performance indicators are presented in tabular format	Table 7.10
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	4	Process for estimating load reductions of nitrogen and phosphorus is presented in appendices	Appendix D
	Score	13		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	4	Water quality monitoring in coordination with University of Findlay, Owens Community College, and Ohio EPA; Baseline data and progress toward performance indicators -- More detailed monitoring parameters and phases could be provided	p. 10-1; Map 10-1
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	Monitoring will take place in at least nine locations throughout the watershed; Monitoring parameters correspond to TMDL targets for total phosphorus and nitrate/nitrite	Table 7.10
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	3	Frequency of monitoring is not specified; Implementation progress will be assessed annually	p. 10-2
	4. Adaptive management measures are included	1	Not indicated	
	Score	11		
Total Score		68		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/6/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Portage River Watershed Plan (2013)

Watershed Name and Location: Portage River - Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Specific causes and sources in each sub-watershed -- Plan includes a detailed breakdown of conditions in a number of tributaries to Portage River. Each sub-watershed receives about 20 pages of information regarding impairments, nutrient loads, load reductions, etc.	Chapter 5
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	Total phosphorus and nitrate loads included for each sub-watershed	Chapter 5
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Specific causes and sources of total phosphorus and nitrates in each sub-watershed	Chapter 5
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Total phosphorus loads included for each sub-watershed	Chapter 5
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	2008 Water Quality Monitoring and Assessment Report	Cited on p. 66
	6. Downstream effects and cumulative impacts are discussed	4	Goals are set to protect downstream waterbodies	Throughout
	Score	24		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	4	Very specific load allocations and reductions in total phosphorus for each sub-watershed	Chapter 5
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	4	Linked to specific point and non-point sources in each sub-watershed	Chapter 5
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	4	Goals are to meet 2011 TMDL targets for total phosphorus	Chapter 5
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	4	Total phosphorus estimates are presented according to each sub-watershed	Chapter 5
	Score	16		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/6/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Portage River Watershed Plan (2013)

Watershed Name and Location: Portage River - Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	4	Specific performance indicators for each BMP in each sub-watershed based on total phosphorus reductions	Chapter 5; Table 26
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	4	Specific reductions in total phosphorus for each BMP in each sub-watershed	Chapter 5
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	4	Goals are written to meet 2011 TMDL targets for total phosphorus in each sub-watershed	Chapter 5
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	Schedule for reviewing (biennial) and revising (six years); Public involvement	Chapter 7
	Score	16		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	BMPs are listed according to sub-watershed; Coastal Nonpoint Pollution Control Program	Throughout Chapters 5 & 6
	2. Critical locations or high-priority sites for each management measure are mapped or described	3	Critical areas for some BMPs with focus on meeting targets for total phosphorus	Chapter 6
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Not specified	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	1	Not specified	
	Score	9		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Post-Implementation	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	3	Continue ongoing monitoring for some sub-watersheds, and initiate new monitoring protocols for others; Much of the ongoing monitoring includes habitat assessments; Includes some chemical (presumably nutrient) and physical monitoring	Chapter 5
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	Continue ongoing monitoring for some sub-watersheds, and initiate new monitoring protocols for others	Chapter 5
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	3	Continue ongoing monitoring and initiate new protocols; Biennial reports by TMACOG	p. 656
	4. Adaptive management measures are included	2	Adapt the plan to changing conditions; no mention of plan for adapting BMPs themselves	Chapter 7
	Score	11		
Total Score		76		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/6/2016 (Updated 2/26/2016)

Watershed Plan Title - Date: River Raisin Watershed Management Plan (2009)

Watershed Name and Location: River Raisin watershed - Michigan

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303(d)) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	SWAT modeling of subwatersheds; Total loads of TSS, total phosphorus, and total nitrogen listed according to subwatershed	Table 5-9
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	Nonpoint vs. point sources of nitrogen loads estimated in the nitrate TMDL; While total phosphorus data are most common in the report, dissolved reactive phosphorus is identified as a priority pollutant	Table 5-1
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	NPDES point source permit map is included; Includes a map identifying concentrated animal feeding operations in the watershed	Figures 3-19 and 3-20
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Total nitrogen and total phosphorus are enumerated by sub-watershed at different times during the year	Figures 4-9 and 4-11
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	Data from Heidelberg, USGS, and U of Michigan	Chapter 4
	6. Downstream effects and cumulative impacts are discussed	3	Total nitrogen and phosphorus data are reported according to concentrations along the length of the river; Pattern of nutrient accumulation at downstream reaches of the river; Brief mention of impacts to Lake Erie	Figures 4-8 and 4-10
	Score	21		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	Goals are to meet nitrate TMDL requirements; TSS and phosphorus goals also set	Chapter 5
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	3	Nutrient load reduction estimates linked to subwatersheds	Chapter 5
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Based on nitrate TMDL reports	Chapter 5
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	SWAT modeling with data sources and calibration	Section 5.3
	Score	12		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/6/2016 (Updated 2/26/2016)

Watershed Plan Title - Date: River Raisin Watershed Management Plan (2009)

Watershed Name and Location: River Raisin watershed - Michigan

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	Metrics for performance goals; Includes total nitrogen, TSS, and total phosphorus	Tables 5-16 and 5-17
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	3	Impairments are linked to causes with narrative descriptions	Table 5-16
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Nitrate on River Raisin between Blissfield and Lenawee county	p. 82
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	Detailed implementation plan followed by milestones and schedule for initiation, demonstration, and evaluation	Tables 7-4 & 7-5
	Score	13		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	Thorough listing and description with prioritization guidelines	Chapter 6
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	4	Priority sub-watersheds are identified with primary focus on nitrogen	Tables 4-4 and 6-1
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	4	SWAT modeling of total nitrogen, total phosphorus, and TSS reductions linked to BMPs	Section 7.4.1
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	4	Monitoring data and published removal efficiencies	Section 7.4.1
	Score	16		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	4	Continue monitoring program already in place; Descriptions of assessments and locations provided with timeframes for monitoring	Table 8-1
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	4	Detailed implementation plan followed by milestones and schedule for initiation, demonstration, and evaluation	Table 7-5 & 8-1
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	4	Detailed implementation plan followed by milestones and schedule for initiation, demonstration, and evaluation	Table 7-5
	4. Adaptive management measures are included	2	Mentioned in summary without specifics	p. 15
	Score	14		
Total Score		76		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/5/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Sandusky River - Tiffin Watershed Action Plan (2006)

Watershed Name and Location: Sandusky River - Tiffin, Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	1	Not specified according to watershed segment	
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	Point vs. nonpoint sources of total phosphorus	Table 6.2 (p. 70)
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	Point vs. nonpoint sources of total phosphorus	Table 6.2 (p. 70)
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Total phosphorus loads listed by source in kg/yr and %; Table 20 from TMDL	Table 6.1 (p. 69)
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	Total phosphorus data from nutrient TMDL and long-term monitoring program	Throughout
	6. Downstream effects and cumulative impacts are discussed	4	"Pollutant Export Issues"; SS, TP, SRP, nitrate, chloride leaving watershed and entering receiving waters; loads compared to other Lake Erie tributaries -- Most in-depth discussion of downstream effects seen in WMPs to date	p. 40-42; Table 4.2
	Score	19		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	Goals for percent reduction and reduction in lbs./year of total phosphorus are specified	Table 6.2 (p. 70)
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	3	Point vs. nonpoint sources of total phosphorus	Table 6.2 (p. 70)
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Based on assumptions, nutrient reductions would address multiple threats	Table 6.4 (p. 73)
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	2	Data from nutrient TMDL; data for phosphorus reduction estimates are not cited	Table 6.4 (p. 73)
	Score	11		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/5/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Sandusky River - Tiffin Watershed Action Plan (2006)

Watershed Name and Location: Sandusky River - Tiffin, Ohio

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	2	Performance indicators, not true monitoring criteria	Table 6.13
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	2	Performance indicators linked to BMPs; Goals for habitat assessment scores incorporate negative effects of elevated phosphorus	Table 6.13
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Plan frequently refers to data and conditions from Sandusky River TMDL	Throughout
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	2	Monitor and keep officials aware of progress; no specifics on strategy for adapting the plan	p. 110
	Score	9		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	Listed in Executive Summary; List of 24 BMPs to promote in Sidebar 6.1	p. xiv; p. 67
	2. Critical locations or high-priority sites for each management measure are mapped or described	3	Brief listing of targeted areas for phosphorus BMPs	p. 72
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	3	Balance sheet w/ BMPs and total phosphorus reductions	Table 6.4 (p. 73)
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	2	Data from Sandusky River nutrient TMDL; data for total phosphorus reduction are not cited	Table 6.3
	Score	11		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Post-Implementation	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	3	Continue using monitoring protocol already in place for total phosphorus (and other constituents); water samples are collected daily during low flows and three times per day during high-flow events	Chapter 7 (p. 109)
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	1	Not specified	
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	2	Timeframe for implementation and monitoring without specifics	Table 7.1
	4. Adaptive management measures are included	2	Monitor and keep officials aware of progress; no specifics on strategy for adapting the plan	Chapter 7 (p. 110)
	Score	8		
Total Score		58		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/13/2016 (Updated 2/26/2016)

Watershed Plan Title - Date: St. Clair River and Lake St. Clair Comprehensive Management Plan (2004)

Watershed Name and Location: St. Clair River and Lake St. Clair - Michigan

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	1	Not specified	
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	1	Not specified	
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Map of point sources in the watershed; Descriptions of non-point sources of total phosphorus and nitrate/nitrite include agriculture, combined sewer overflows, erosion, fertilizers, etc.	p. 3-53
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	1	Not specified	
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	1	Nutrient loadings for total phosphorus and nitrate/nitrite are not presented	
	6. Downstream effects and cumulative impacts are discussed	2	Discussion of nuisance algae, fish kills, etc.	p. 3-51
	Score	10		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	1	Not specified	
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	1	Not specified	
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	1	Not specified	
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	1	Not specified	
	Score	4		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/13/2016 (Updated 2/26/2016)

Watershed Plan Title - Date: St. Clair River and Lake St. Clair Comprehensive Management Plan (2004)

Watershed Name and Location: St. Clair River and Lake St. Clair - Michigan

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	2	General criteria are listed to address causes (total phosphorus and nitrate/nitrite) and sources (point and non-point)	Throughout
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	2	Criteria for nutrient reductions are narrative without specific water quality goals	Throughout
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	2	Crapaud Creek TMDL and possibly future TMDLs in the watershed are referenced in the plan; Other TMDLs might have been completed since the time of this plan	p. 8-157
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	2	Future TMDLs will likely be incorporated into future adaptations of the plan; adapt the plan to ongoing monitoring	Throughout
	Score	8		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	2	Agricultural and stormwater BMPs are mentioned, but are not specific and not prioritized; Ontario's Nutrient Management Act impacts BMPs on the Canadian side of the lake and river	Throughout; p. 1-39
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	1	Not specified	
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Not specified	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	1	Not specified	
	Score	5		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	4	Maintain online inventory or monitoring data; Monitoring Coordination Committee; Independent monitoring in U.S. and Canada	Table 8-1; p8-149; p. 8-158
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	Monitoring data will address specific milestones, but are not presented herein	Table 8-1
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	4	Monitoring schedules for U.S. parameters will be maintained by many monitoring groups including USEPA and USGS	Table 8-1
	4. Adaptive management measures are included	2	Managing data from monitoring programs is critical to adaptive watershed management	Throughout
	Score	12		
Total Score		39		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/6/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: St. Marys River Watershed Management Plan (2009)

Watershed Name and Location: St. Marys River - Ohio, Indiana

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Listed by subwatershed with detailed description of conditions	Chapter 3
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	1	Nutrient loads are not categorized by specific causes	
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Listed by subwatershed with detailed description of conditions	Chapter 3
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	Nitrate and total phosphorus loads reported as lbs./day/sq. mi	Figures 36 & 37
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	St. Marys Watershed Nutrient Management Program USGS flow data	p. 69; p. 64
	6. Downstream effects and cumulative impacts are discussed	2	Drops in dissolved oxygen lead to nuisance algae and fish kills downstream	Section 4.3
	Score	17		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	Percent reductions needed to meet TMDL targets for ammonia and total phosphorus at specific monitoring stations along the river	Tables 70 & 71
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	3	Nutrient reductions are not linked to causes, but are linked to sources as specified by locations of the monitoring stations	Tables 70 & 71
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Based on current models and using assumptions; necessary reductions were calculated to specifically meet TMDL targets for ammonia and total phosphorus	Tables 70 & 71
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Removal efficiencies were estimated using the STEPL model, but are not linked to this specific watershed	Tables 70 & 71
	Score	12		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/6/2016 (Updated 2/29/2016)

Watershed Plan Title - Date: St. Marys River Watershed Management Plan (2009)

Watershed Name and Location: St. Marys River - Ohio, Indiana

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	Broad criteria for all water quality concerns	Summary (p. 191)
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	2	Broad numeric criteria that are not specifically linked to sources	Summary (p. 191)
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Goals are based on TMDL targets for ammonia and total phosphorus; TMDLs calculated for E. coli, nutrients, and TSS	p. 191
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	3	Review and update the St. Marys Watershed Restoration Action Strategy; No specific timeline for review or revisions is given	p. 62
	Score	11		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	Objectives and management measures with long-term milestones; no specific BMPs	Chapter 6 (p. 171)
	2. Critical locations or high-priority sites for each management measure are mapped or described	4	High priority areas are listed and described with brief mention of impairments and possible BMPs	Chapter 5
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	3	Removal efficiencies for listed BMPs	Tables 78-84
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	3	Removal efficiencies taken from STEPL model, but are not linked to this specific watershed	Tables 78-84
	Score	13		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Post-Implementation	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	3	Grab sampling at 20 locations along St. Marys River; continue current monitoring procedure	p. 190
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	Brief mention of monitoring and benchmarks	p. 190
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	4	Weekly monitoring and continued monitoring at designated sites; Parameters are not specified, but presumably align with TMDL targets	p. 190
	4. Adaptive management measures are included	2	No specific mention, but the plan will be reviewed and updated regularly	Throughout
	Score	11		
Total Score		64		

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	3	<ul style="list-style-type: none"> The scope of the study does not include the determination of the range of specific nutrient sources. Major causes/sources of nutrients are identified (e.g. agriculture, WWTP), but a comprehensive list of specific nutrient causes/sources was not developed. Multiple regression analysis was conducted to assess the temporal and spatial trends in flows on the Thames River and its tributaries, and to determine the extent to which variation in nutrient concentrations can be explained by flows. The study provides a general discussion of the effects of urban vs. rural land cover and fertilizer application on phosphorus concentrations through time for Ontario rivers in general (i.e. not specific to the Thames River watershed). Spatial trends in total nitrogen, nitrate/nitrite, total phosphorus, and dissolved reactive phosphorus and loads are quantified and plotted for the Thames River, although source and causes for the trends are described in very general terms (e.g. more nutrient sources exist in the upper Thames River than in the lower reaches). Nutrient contributions of select major tributaries to the Thames River are quantified, but the potential nutrient sources are described in very general terms and at a high level (e.g. land uses in each tributary's drainage area). An evaluation is provided of the estimated influence (positive, negative) of various tributaries and WWTPs on nutrient and sediment concentrations in the main stem of the Thames River. 	<ul style="list-style-type: none"> Executive Summary, p. ii Section 3.1, p. 11 Section 3.2, p. 14 Section 4.1, p. 34 Section 4.3, p. 38-42 Section 4.4, p. 43-44 Section 5, p. 45-84 Section 5.1.4, p. 57 Section 5.2.3.4, p. 68 Section 5.3.4, p. 84
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	<ul style="list-style-type: none"> Different land cover classes contributing to high nutrient loading (e.g. agriculture, urban runoff) are reported as percentages of total watershed area and subwatershed area, and as percentage of drainage area upstream of specific water quality monitoring stations. Nutrient contribution from each WWTP is reported as average concentrations (mg/L) and average loads (kg/year) of total phosphorus, total nitrogen, nitrate + nitrite, and total suspended solids. Estimates are provided of the internal loading of phosphorus in Fanshawe Lake on the North Thames River Plots are provided for each of the South Thames River, North Thames River, and lower Thames River illustrating the average monthly concentrations of total phosphorus, total suspended solids, total nitrogen, nitrate + nitrite. 	<ul style="list-style-type: none"> Section 3.1, p. 11, p. 12 Section 3.4, p. 17 Section 3.5, p. 27 Section 4.2, p. 35-38
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	<ul style="list-style-type: none"> Recognition of the role played by large impoundment areas as either nutrient sources or sinks, based on factors such as flushing rates, outlet depth, etc. Vegetation cover and land use mapping is provided for the watershed Mapping provided of the average annual total nutrient concentrations and loads measured at various water quality stations throughout the watershed 	<ul style="list-style-type: none"> Executive Summary, p. ii Section 3.1, p. 13 Section 3.5, p. 24 Section 5, p. 45-84
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	<ul style="list-style-type: none"> Spatial trends observed in the concentrations of dissolved reactive phosphorus, total nitrogen and nitrate + nitrite - significant decrease going downstream along each of the South Thames River branch and the North Thames River branch Nutrient contribution into Lake St. Clair was computed from known and modelled contributions from various tributaries closest to the mouth of the Thames River. Estimated annual exports are quantified in metric tonnes. More quantification of nutrient contributions available for tributary inputs (locations from one type of source) than source category (e.g. agriculture, urban runoff). 	<ul style="list-style-type: none"> Executive Summary, p. iii
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	<ul style="list-style-type: none"> The study presents the rationale for the data used (e.g. no. of years, seasonal trends of interest). Descriptions are provided of the various models used to calculate nutrient and load concentrations, the differences between the models, and the implication of these differences on the model results. The study includes a description of the challenges encountered due to infrequent sampling and missing high flow event data. Different statistical tests were used for assessing trends, differences between sites, etc. References to internal reports and general publications are provided in Section 9. 	<ul style="list-style-type: none"> Section 2.2, p.3 Section 2.3.2, p.7 Section 2.3.3., p.8 Section 2.4, p.9 Section 9, p.93
	6. Downstream effects and cumulative impacts are discussed	2	<ul style="list-style-type: none"> Statistical models were used to estimate nutrient loading into Lake St. Clair. Possible causes for seasonal variations in nutrient loading are discussed at a high level. 	<ul style="list-style-type: none"> Section 5.4, p. 85, 87
	Score	19		

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	2	• General methods for reducing total phosphorus, dissolved reactive phosphorus, total nitrogen, and nitrate/nitrite loads are proposed, but quantifiable targets are not presented.	• Section 7.3, p. 89
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	2	• General nutrient load reduction strategies are proposed for select source types (e.g. agriculture, WWTP, urban areas). Quantifiable estimates of nutrient load reductions are not provided.	• Sections 7.2-7.4, p. 88-89
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	1	• Water quality criteria and goals were not proposed; not within the scope of the assessment.	
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	2	• Proposed general methods for reducing nutrient loads are based on recommendations from past studies conducted for the watershed.	
	Score	7		
	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	1	• Not within the scope of the assessment.	
Implementation	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	1	• Not within the scope of the assessment.	
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	1	• Not within the scope of the assessment.	
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	1	• Not within the scope of the assessment.	
	Score	4		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	2	• Potential methods for reducing nutrient loads are suggested, but are described in general terms and are not prioritized.	
	2. Critical locations or high-priority sites for each management measure are mapped or described	1	• Not within the scope of the assessment.	
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	• Not within the scope of the assessment.	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	1	• N/A	
	Score	5		

Reviewer Name/Secondary Reviewer: Muriel Kim/Jordan Rofkar

Review Date: November, 2015 (Updated 2/26/2016)

Watershed Plan Title - Date: Water Quality Assessment in the Thames River Watershed - Nutrient and Sediment Sources (2015)

Watershed Name and Location: Thames River Watershed, Ontario

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Post-Implementation	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	2	• Existing data gaps are identified (e.g. sufficient data at high and low flow events) and recommendations for addressing these gaps are provided. • Recommendations are provided for deciding which sites should be prioritized for additional monitoring (e.g. increasing water quality monitoring frequency at stations with sufficient hydrological data over those that do not).	• Section 7.1, p. 87-88
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	1	• Not within the scope of the assessment.	
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	1	• Not within the scope of the assessment.	
	4. Adaptive management measures are included	1	• Not within the scope of the assessment.	
	Score	5		
	Total Score	40		

Overall comments:

Throughout the Thames River watershed, there are 83 water quality sampling stations and 26 gauges measuring daily flow. Water quality sampling has occurred up to 8 times/year for 24 years, between 1986 – 2012. The water quality study takes advantage of the large amount of water quality and flow data to conduct numerous statistical analyses of temporal and spatial trends in nutrient and sediment loading.

It should be noted that the water quality assessment was not intended to be a watershed management plan, and so it scores low on many of the criteria used to evaluate the effectiveness of watershed management planning. It is nonetheless a very thorough and solid study of existing water quality conditions in the Thames River watershed, and forms a very strong basis from which an effective watershed management plan can be developed. The assessment of spatial and temporal water quality trends in the Thames River watershed can likely provide useful insight for water quality monitoring in other watersheds around Lake Erie.

Reviewer Name/Secondary Review: Jordan Rofkar/Kristin Gardner

Review Date: 1/4/2016 (Updated 2/26/2016)

Watershed Plan Title - Date: Upper Maumee River Watershed Management Plan (2014)

Watershed Name and Location: Upper Maumee River - Ohio, Indiana

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Detailed lists of causes listed by subwatershed -- Plan is detailed and comprehensive when describing Upper Maumee watershed, causes and sources of impairment, loadings, BMPs and load reductions. Plan is lacking in monitoring procedures and adaptive management strategy.	Chapter 6
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	Causes of total phosphorus, dissolved reactive phosphorus, and total nitrogen are listed as "Reason for being critical" in a table of BMPs and priority locations	Table 6.1
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Sources of total phosphorus, dissolved reactive phosphorus, and total nitrogen are listed as "Critical areas" in a table of BMPs and priority locations	Chapter 6
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Contributions of total phosphorus, dissolved reactive phosphorus, and total nitrogen are tabulated along with reductions needed	Section 4.3; Tables 4.4, 4.5, and 4.7
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	Data collected during OEPA and IDEM monitoring; assumptions are listed	Chapter 3
	6. Downstream effects and cumulative impacts are discussed	2	Downstream impacts on Lower Maumee; mention of Lower Maumee TMDL in development	p. 59
	Score	21		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	4	Detailed list of total phosphorus, dissolved reactive phosphorus, and total nitrogen loadings according to subwatershed; Loads reductions needed to achieve targets are also tabulated	Section 4.3; Tables 4.4, 4.5, and 4.7
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	4	Total phosphorus, dissolved reactive phosphorus, and total nitrogen reduction estimates are linked to each source and subwatershed	Chapter 6
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Ambitious goals, but they're clearly outlined according to subwatershed with milestones, cost estimates, and load reduction estimates; Load reductions might be unreasonable with predictions of large nutrient reductions within one year of implementation	Ch. 6.3.2 - tables therein; Table 7.1
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Data collected during OEPA and IDEM monitoring; assumptions are listed; data for output models are listed	
	Score	14		

Reviewer Name/Secondary Review: Jordan Rofkar/Kristin Gardner

Review Date: 1/4/2016 (Updated 2/26/2016)

Watershed Plan Title - Date: Upper Maumee River Watershed Management Plan (2014)

Watershed Name and Location: Upper Maumee River - Ohio, Indiana

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

(c) Criteria to determine whether or not nutrient load reductions are being achieved			
Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	4	Goal statement, indicator for loadings in each subwatershed; Water quality indicators, social indicators, and administrative indicators are separated according to total phosphorus, dissolved reactive phosphorus, and total nitrogen -- This chapter is the most detailed example of goals and objectives for load reductions so far.	Chapter 6; beginning on p. 290
2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	4	Individual goal statements for total phosphorus, dissolved reactive phosphorus, and total nitrogen	Chapter 6; beginning on p. 290
3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	2	Accepted TMDLs address pathogens rather than nutrients; TMDL targets for pathogens are not used for this review, however chemical and physical aspects of the watershed have been assessed for TMDL purposes	Throughout
4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	1		
Score	11		
(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	BMPs are prioritized in sub-watersheds according to "critical areas"; BMPs are listed according to reductions expected in total phosphorus, dissolved reactive phosphorus, and total nitrogen	Table 6.1
2. Critical locations or high-priority sites for each management measure are mapped or described	4	Maps and tables with prioritized lists of management requirements	Ch. 5 - tables and maps therein
3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	4	SWAT and STEP-L models	Table 6.1
4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	4	Data are cited for model outputs	Table 6.1
Score	16		
(e) Monitoring component to evaluate the effectiveness of implementation			
Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	2	No detailed monitoring protocol, other than continued monitoring through OEPA, IDEM, and City of Fort Wayne	Table 3.2; p. 100
2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	Milestones are clearly enumerated throughout the document; Not specifically tied to monitoring plan	Throughout
3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	2	Brief mention of monitoring schedule by OEPA	Table 3.2
4. Adaptive management measures are included	1	No mention of adaptive management	
Score	7		
Total Score	69		

APPENDIX B-2

Watershed Plans Outside of Lake Erie

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 1/20/2016 (Updated 2/26/16)

Watershed Plan Title - Date: Cass River Watershed Plan (July 22, 2014)

Watershed Name and Location: Saginaw River and Bay, Michigan

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments / Recommendations	Page and Section
	1. Specific nutrient causes and sources (303(d)) of impairments and/or threats (if applicable) are listed by waterbody segment or area	3	Windshield survey: Sub-watersheds are prioritized by impaired listing and >75% agriculture; agricultural parcels were surveyed for specific practices/pollution sources - resulted in 1,306 sites	Chapter 1
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	2	Nutrients (total phosphorus and total nitrogen) are not currently an impairment, however they are included in the reduction estimates; E coli is the driving impairment	Chapter 1
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	Sources are mapped by 12-digit HUC	Chapter 1
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	Sources of impairment and sub-watersheds were prioritized	Chapter 1
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	Data used in the report and the methods used to estimate sources is reasonable	Chapter 1
	6. Downstream effects and cumulative impacts are discussed	1	Not discussed	Chapter 1
	Score	15		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments / Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc	4	Sub-watersheds are listed with sources and nutrient load reductions needed, including for specific impairment sources (e.g., cropland runoff, livestock access); Though not calculated specifically for E.coli, the known sites where livestock are impacting surface waters have been estimated for nutrient (total phosphorous and total nitrogen) and BOD reductions.	Chapter 7
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	4	Detailed estimates are given by 12-digit HUC and individual sites; sub-watersheds are listed with sources and nutrient load reductions needed, including for specific impairment sources (e.g., cropland runoff, livestock access)	Chapter 7
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Based on the load reduction goals and assumptions for the best management practices, load reductions proposed will meet the goals	Chapter 7
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Data used in the report and the methods used to estimate load reductions is generally reasonable; assumption of 100% effectiveness is likely not realistic	Chapter 7
	Score	14		

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 1/20/2016 (Updated 2/26/16)

Watershed Plan Title - Date: Cass River Watershed Plan (July 22, 2014)

Watershed Name and Location: Saginaw River and Bay, Michigan

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments / Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	Sub-watersheds are listed with criteria for total phosphorus, total nitroge, and bacteria to determine whether they meet reductions, including for specific impairment sources (e.g., cropland runoff, livestock access); Though not calculated specifically for E.coli, the known sites where livestock are impacting surface waters have been estimated for nutrient (total phosphorous and total nitrogen) and BOD reductions.	Chapters 7-9
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	3	Pollutant loading reductions were estimated for nitrogen (N), phosphorus (P), biological oxygen demand (BOD), and sediment for each site utilizing the STEPL Model	Chapters 7-9
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Listed criteria include those incorporated into any TMDLs developed	Chapters 7-9
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	2	Minimal discussion for reviewing progress	Chapters 7-9
	Score	11		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments / Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	Specific management measures are listed for each site and then prioritized	Chapters 7-9
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	4	Implantation priorities are listed for each sub-watershed and coordinates listed for each source area; Project Restoration Scoring matrix was used to prioritize projects based on community support, pollutant source , feasibility and site severity metrics	Chapter 1; Chapter 7
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	4	Comparison for the amount of sediment reduction and the associated cost per benefit for the installation cost for Best Management Practices (BMPs) per ton of sediment reduced and the pounds per year of phosphorous reduction compared to the cost per pound of sediment reduction.	Chapters 7-9
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	3	Data used in the report and the methods used to estimate load reductions is generally reasonable; assumption of 100% effectiveness is likely not realistic	Chapters 7-9
	Score	15		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments / Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	3	Specific sites were identified as priority sites where the monitoring would take place	Chapters 7-9
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	Implementation schedule and milestones are established for each priority, sub-watershed, and management measure; Monitoring is not tied to qualitative measures, mostly quantitative	Chapter 7, Table 7.27
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	3	Evaluation dates are listed for each priority, sub-watershed, and management measure	Chapter 7, Table 7.27
	4. Adaptive management measures are included	2	Discusses annual watershed audit, 5-year plan update	Chapters 7-9
	Score	11		
Total Score		66		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/18/2015 (2/29/16)

Watershed Plan Title - Date: Chesapeake Bay Program (Updated online); Chesapeake Bay TMDL (2010)

Watershed Name and Location: Chesapeake Bay - Maryland & Virginia

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody				
	Review Criteria	Score (1-4)	Comments	Page and Section	Recommendations
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	3	Causes of impairments are listed according to state or district	Online plan	Chesapeake Bay TMDL is a reference for and included in the website, so
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	Causes and loads (total nitrogen and total phosphorus) are listed as loads and percentages on the website, and in detail in the TMDL.	See 2010 TMDL	
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	Causes of impairments are listed according to state or district	Online plan	
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Causes and loads (total nitrogen and total phosphorus) are listed as loads and percentages on the website, and in detail in the TMDL.	Section 9 of TMDL	
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	Large dataset accumulated for TMDL; ChesapeakeData website	See TMDL	
	6. Downstream effects and cumulative impacts are discussed	1	Chesapeake is terminal water body in this system		
	Score	19			
	(b) Estimate of the nutrient load reductions expected from the proposed management measures				
	Review Criteria	Score (1-4)	Comments	Page and Section	Recommendations
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc	4	Load reductions (total nitrogen and total phosphorus) needed to meet water quality standards are presented in TMDL	Section 9 of TMDL	
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	4	Each section of the watershed had its own list of milestones and requirements.	Section 9 of TMDL	
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Load reductions are tracked, seemingly on an annual basis. Detailed list of milestones with clear requirements, timelines, and progress.	Section 9 of TMDL	
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Data from TMDL based on years of monitoring data	See TMDL	
	Score	14			

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/18/2015 (2/29/16)

Watershed Plan Title - Date: Chesapeake Bay Program (Updated online); Chesapeake Bay TMDL (2010)

Watershed Name and Location: Chesapeake Bay - Maryland & Virginia

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved				
	Review Criteria	Score (1-4)	Comments	Page and Section	Recommendations
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	4	Detailed lists of milestones with clear requirements, timelines, and progress	Online plan	
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	4	Detailed lists of milestones with clear requirements, timelines, and progress	Online plan	
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	4	Plan is closely associated with Chesapeake Bay TMDL and Watershed Implementation Plans (WIPs)	Online plan	
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	See ChesapeakeStat website	Online plan	
	Score	16			
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions				
	Review Criteria	Score (1-4)	Comments	Page and Section	Recommendations
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	BMPs and WIPs presented in TMDL	Online plan	
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	4	Detailed mapping of subwatersheds and sources of nutrients; relates to BMPs	TMDL tracking website	
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	4	Loads are estimated according	Section 8 (WIP) of TMDL	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	4	Data from TMDL based on years of monitoring data	Online plan	
	Score	16			
	(e) Monitoring component to evaluate the effectiveness of implementation				
	Review Criteria	Score (1-4)	Comments	Page and Section	Recommendations
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	4	Approach for monitoring will continue based on historical monitoring and TMDL; ChesapeakeData website	Section 5 of TMDL	
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	4	Detailed lists of milestones with clear requirements, timelines, and progress	Online plan	
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	4	Frequent reviews of progress toward milestones	Online plan	
	4. Adaptive management measures are included	4	Extensive discussion of adaptive management for the Chesapeake Bay Program; also see ChesapeakeStat website and TMDL	Section 10 of TMDL	
	Score	16			
Total Score		81			

Reviewer Name/Secondary Reviewer: Muriel Kim/Jordan Rofkar

Review Date: Dec. 2015/Jan. 2016 (Updated 2/29/2016)

Watershed Plan Title - Date: East Holland River Subwatershed Plan (2010)

Watershed Name and Location: East Holland River Subwatershed - Lake Simcoe Watershed, Ontario

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments	Page and Section
Pre-Implementation	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	2	<ul style="list-style-type: none"> Key sources of sediment loading are identified but described qualitatively (e.g. bare soil in areas under development, agricultural fields) 	<ul style="list-style-type: none"> Section 4.3.2, p. 83
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	<ul style="list-style-type: none"> The varying levels of stormwater control are quantified for six of the watershed's key urban areas. Quantitative historical total phosphorus concentration data is reported for 1965 - 2008. There is a historical decreasing trend in total phosphorus concentration, but levels still remain above the Provincial Water Quality Objective (PWQO) of 0.03 mg/L. However, this data is based on results from one water quality station, and the phosphorus concentrations are not linked to specific causes or sources. Quantitative data is available for total suspended solids (TSS) throughout the Lake Simcoe basin for the period 2003-2006. The highest reported TSS concentrations within the basin are associated with the two monitoring stations in the East Holland River subwatershed. Total phosphorus loads are quantified by source (crop land, high intensity development, septic systems, etc.). Trends in PWQO exceedences for total phosphorus concentrations in the subwatershed are described and quantified. Annual phosphorus loads for various years are also quantified. The primary source of phosphorus in the subwatershed is identified as being high-intensity development. 	<ul style="list-style-type: none"> Section 4.3.2, p. 76 Section 4.2.4, p. 70-71 Section 4.3.2, p. 81, 87
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	<ul style="list-style-type: none"> Land use distribution (urban, agriculture, etc.) in the subwatershed are quantified as percentage values and are also mapped. Probable sources of total phosphorus from each land use type are identified. Select areas in the subwatershed are regulated under Reg. 179/06, which protects natural features such as wetlands and watercourses and directs development away from hazard lands. The distribution and spatial extents of these regulated areas are illustrated on a map in the subwatershed plan. 	<ul style="list-style-type: none"> Section 1.3.12, p. 16 Section 2.1, p. 27, 28 Section 4.3.2, p. 76
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	<ul style="list-style-type: none"> Total surface area and level of stormwater control is quantified for several key urban areas in the subwatershed. Total phosphorus loads from various types of sources (e.g. crop land, high intensity development, septic systems) in the subwatershed are quantified as kilograms per year. 	<ul style="list-style-type: none"> Section 4.3.2, p. 77 Section 4.3.2, p. 81
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	<ul style="list-style-type: none"> Sources of all information and estimates are cited in text and complete references are provided at the end of the document. 	<ul style="list-style-type: none"> References, p. 274
	6. Downstream effects and cumulative impacts are discussed	3	<ul style="list-style-type: none"> The cumulative impacts of various anthropogenic activities have resulted in the East Holland River subwatershed being one of the most stressed subwatersheds in the Lake Simcoe watershed. The East Holland River subwatershed is recognized as being one of the largest contributors to phosphorus loads in Lake Simcoe. Cumulative effects are discussed at a high level 	<ul style="list-style-type: none"> Executive Summary, p. ii Section 3.1, p. 51
	Score	20		

Reviewer Name/Secondary Reviewer: Muriel Kim/Jordan Rofkar

Review Date: Dec. 2015/Jan. 2016 (Updated 2/29/2016)

Watershed Plan Title - Date: East Holland River Subwatershed Plan (2010)

Watershed Name and Location: East Holland River Subwatershed - Lake Simcoe Watershed, Ontario

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

(b) Estimate of the nutrient load reductions expected from the proposed management measures			
Review Criteria	Score (1-4)	Comments	Page and Section
1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc	3	<ul style="list-style-type: none"> It is estimated that implementation of the 89 identified retrofit opportunities to existing stormwater facilities in the subwatershed may prevent over 26% of the phosphorus in stormwater from entering the river. The percentage phosphorus reductions are also estimated for several specific urban areas. A target load for total phosphorus is quantified for the subwatershed as a whole, at 8,200 kg/yr. 	<ul style="list-style-type: none"> Section 3.4.1, p. 60-61, 63 Section 4.3.2, p. 87
2. Listed nutrient load reduction estimates are linked to each cause and source location or category	4	<ul style="list-style-type: none"> Modelling exercises were conducted in order to estimate future total phosphorus reductions that could potentially be achieved by various existing BMPs. Expected change in phosphorus loading with and without the implementation of BMPs are quantified for different sources in the subwatershed (e.g. crop land, high intensity development, septic systems). 	<ul style="list-style-type: none"> Section 3.1, p. 50 Section 4.3.2, p. 81
3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	2	<ul style="list-style-type: none"> It is acknowledged that even with the full implementation of BMPs, total phosphorus loads in the subwatershed may still increase as a result of population growth and urban expansion. As a result, a more detailed, catchment-level analysis of phosphorus loading and BMP opportunities is being undertaken. 	<ul style="list-style-type: none"> Section 4.3.2, p. 87
4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	4	<ul style="list-style-type: none"> The plan has the benefit of being the most recent in a series of plans going back as early as the 1950s, that have evolved as new knowledge was gained and as conditions in the subwatershed changed. Gaps in information and limitations in the data and assumptions are acknowledged and discussed. 	<ul style="list-style-type: none"> Section 1.2.4, p. 4 Section 4.5, p. 96
Score	13		
(c) Criteria to determine whether or not nutrient load reductions are being achieved			
Review Criteria	Score (1-4)	Comments	Page and Section
1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	2	<ul style="list-style-type: none"> The effectiveness of total phosphorus reductions is determined largely by measuring phosphorus concentrations and through estimates of total phosphorus loading in the subwatershed, rather than through criteria associated with specific causes and sources of impairments and threats. 	<ul style="list-style-type: none"> Section 4.2.2, p. 66
2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	2	<ul style="list-style-type: none"> Criteria include concentrations of phosphorus for comparison against the PWQO of 0.03 mg/L, as well as concentrations of total suspended solids for comparison against the interim Canadian Water Quality Guideline of 30 mg/L. Criteria are not associated with instream physical habitat nor specifically linked to individual causes/sources of nutrient impairments. 	<ul style="list-style-type: none"> Section 4.2.4, p. 71, 73 Section 4.3.2, p. 86-87
3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	4	<ul style="list-style-type: none"> Development of the subwatershed plan was guided by and was made to be consistent with various provincial, regional and local plans, including (but not limited to) the Oak Ridges Moraine Conservation Plan, the LSRCA's Integrated Watershed Management Plan (IWMP), the Lake Simcoe Protection Plan (LSPP), and the Greenbelt Plan. The broad-scale recommendations of the IWMP provided the basis for a number of the recommendations in the East Holland River's Subwatershed Plan. The Plan was developed in the context of other existing legislation and their associated plans and policies, e.g. the Greenbelt Plan, the Endangered Species Act, etc. The Plan lists 12 key stressors to water quality, and identifies whether the existing regulatory framework has applicable policies to address each stressor and whether such policies have legal standing. 	<ul style="list-style-type: none"> Section 1.2.2, p. 2 Section 1.3, p. 5 Section 4.4, p. 88
4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	<ul style="list-style-type: none"> The Subwatershed Plan lists several recommendations for monitoring and reporting on progress and compliance, e.g. annual review of the monitoring network, annual analysis and reporting of water quality results. Several recommendations are made to allow for adjustments to the Plan and management strategies as new information emerges, and to expand the monitoring network. 	<ul style="list-style-type: none"> Section 10.1, p. 261-273
Score	12		

Reviewer Name/Secondary Reviewer: Muriel Kim/Jordan Rofkar

Review Date: Dec. 2015/Jan. 2016 (Updated 2/29/2016)

Watershed Plan Title - Date: East Holland River Subwatershed Plan (2010)

Watershed Name and Location: East Holland River Subwatershed - Lake Simcoe Watershed, Ontario

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
Review Criteria	Score (1-4)	Comments	Page and Section
1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	<ul style="list-style-type: none"> • Thorough qualitative descriptions are provided of the different types of BMPs that are or could be used to reduce water quality impacts. • Different BMPs are proposed for different land use types (agricultural, urban, etc.) • Recommendations for reducing total phosphorus loading are provided, but are generally high-level and non-prescriptive (e.g. encourage the creation of a working group to develop ways of implementing phosphorus reduction measures). 	<ul style="list-style-type: none"> • Section 3, p. 50-65 • Section 4.3.2, p. 76 • Section 10.1, p. 261
2. Critical locations or high-priority sites for each management measure are mapped or described	2	• Areas with and without stormwater retrofit opportunities are mapped. However, critical locations and high-priority sites for other individual BMPs are not specifically identified.	• Section 3.4.1, p. 62
3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	2	• Modelling results indicate that with the full implementation of all recommended BMPs, phosphorus loading will be reduced by up to 28% (from 41.5 to 37.2 T/yr). The watershed plan does not specify the estimated contribution of each BMP to this reduction.	• Section 4.3.2, p. 87
4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	4	<ul style="list-style-type: none"> • Criteria for monitoring water quality are based on provincial and federal guidelines. • Nutrient reductions are estimated using watershed models; general descriptions of the models, inputs and results are provided. 	<ul style="list-style-type: none"> • Section 4.3.2, p. 80 • Section 4.2.4, p. 71, 73 • Section 4.3.2, p. 86-87
Score	11		
(e) Monitoring component to evaluate the effectiveness of implementation			
Review Criteria	Score (1-4)	Comments	Page and Section
1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	2	<ul style="list-style-type: none"> • Recommendations for monitoring are made at a high level, e.g. continuing the maintenance of the existing monitoring network and considering its expansion in order to capture potential future changes in land use. • Recommendations are made to expand the list of water quality parameters to be monitored, but procedures for data collection and review are not provided. 	• Section 10.1, p. 261-273
2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	• Recommendations for monitoring are made at a high level and are non-prescriptive.	• Section 10.1, p. 261-273
3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	3	• The plan recommends that the existing monitoring network maintained by the Lake Simcoe Region Conservation Authority (LSRCA) be reviewed annually.	• Section 4.6.5, p. 104
4. Adaptive management measures are included	2	• A general recommendation is made to allow for the implementation of special projects to address emerging trends.	• Section 4.6.5, p. 104
Score	10		
Total Score	66		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/29/2015 (Updated 2/29/2016)

Watershed Plan Title - Date: Comprehensive Everglades Restoration Plan (1999)

Watershed Name and Location: Everglades - Florida

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Impairments listed by subwatershed -- The plan is over 4000 pages long; most of it is appendices and supporting documentation; Restoration progress is maintained on evergladesrestoration.gov	Section 5.3
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	Nutrient concentrations (total phosphorus, nitrate/nitrite, ammonia) are listed in appendices	Appendix H
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	Nutrient concentrations (total phosphorus, nitrate/nitrite, ammonia) in subwatersheds are listed in appendices	Appendix H
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	Tables of water quality data (including nutrients listed above) in subwatersheds	Appendix H
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	Large dataset based on decades of water quality and biological monitoring; Maps and information from 1800s	Appendix H
	6. Downstream effects and cumulative impacts are discussed	4	Impacts throughout the Everglades and into estuaries in southern Florida	Throughout
	Score	21		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	1	Nutrient loads needed to address impairments are not listed	
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	1	Nutrient loads needed to address impairments are not listed	
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Reductions in total phosphorus, nitrate/nitrite, and ammonia are expected to achieve water quality goals based on planning process	Throughout
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	4	Multiple sources of data, published during the 1990s, are cited	Appendix H
	Score	9		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/29/2015 (Updated 2/29/2016)

Watershed Plan Title - Date: Comprehensive Everglades Restoration Plan (1999)

Watershed Name and Location: Everglades - Florida

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	General descriptions of monitoring criteria; Because the plan encompasses a large area, goals will be specific to each region - Lake Okeechobee, estuaries, etc.	Section 9.5
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	3	Lack of numerical criteria; narrative water quality and habitat criteria	Throughout
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Total phosphorus TMDL for Lake Okeechobee	References throughout
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	Adaptive assessment procedures include the iterative use of models, research, and monitoring to revise ongoing management	Section 5.6.5; Section 9.5
	Score	13		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	Very specific management measures in appendices and timeline	Appendix M
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	4	Specific locations are described in the appendices	Section 10
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	2	Some loading (concentration) reductions are included throughout the text	Throughout; Section 10
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	2	Plan is based on a large dataset, but data used for management are not listed explicitly	Throughout; Section 10
	Score	12		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	4	Detailed plan for establishing monitoring protocols and sites	Section 9.5
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	General criteria are identified without specific milestones	Section 9.5
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	2	Plan for monitoring lacks a specific or detailed monitoring schedule	Section 9.5
	4. Adaptive management measures are included	4	Continuous monitoring and changes to plans; natural systems, hydrology, water quality and physical processes; Adaptive assessment of ongoing projects	Section 5.6.5; Section 9.5
	Score	13		
Total Score		68		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/15/2016 (Updated 2/29/16)

Watershed Plan Title - Date: Gulf Hypoxia Action Plan (2001 & 2008)

Watershed Name and Location: Gulf of Mexico

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	1	Not specified. The 2008 plan is an update of the 2001 plan with successes and failures and recommendations moving forward. These plans are user-friendly, but are missing some of the details found in other plans.	
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	1	Not specified. Although some sections of the plan do not score well, data for causes, sources, and nutrient loads must exist elsewhere.	p. 21 (2008)
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	The Gulf watershed is extremely large, so sources are delineated according to major Mississippi River sub-basins.	p. 15 & 16 (2008)
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Total nitrogen and total phosphorus loads are quantified by percentages from each sub-basin	p. 16 & 17 (2008)
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	Data are not typically cited, but do appear reasonable and are presented simply to the reader	Throughout
	6. Downstream effects and cumulative impacts are discussed	4	Plan is based around eliminating the hypoxic zone in the Gulf	Throughout
	Score	16		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc	3	40% total nitrogen load reduction is necessary to return to pre-1970 conditions	p. 8 (2001)
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	1	Not specified	
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Model simulations indicate 40% reduction in total nitrogen is necessary to address immediate threat of hypoxia	p. 8 (2001)
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Data appear reasonable but are not cited	p. 8 (2001)
	Score	10		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 1/15/2016 (Updated 2/29/16)

Watershed Plan Title - Date: Gulf Hypoxia Action Plan (2001 & 2008)

Watershed Name and Location: Gulf of Mexico

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	Intermediate goals for size of the hypoxic zone, based on total nitrogen and total phosphorus loading to the Mississippi River/Atchafalaya River watershed	Throughout
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	3	Numeric and narrative economic, environmental, and programmatic indicators of implementation success	p. 27 (2001)
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	2	TMDLs are implemented throughout the Mississippi watershed; built into the framework for reducing hypoxia; TMDL criteria are not specified	p. 17 (2001)
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	Plan was reviewed and revised in 2008	2008 revision
	Score	12		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	2	General management strategies are discussed without specific BMPs	Throughout
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	2	Locations are only specified in terms of major river sub-basins	Throughout
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Not specified	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	1	BMP data are not presented	
	Score	6		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	2	Monitoring protocols are not specified for such a large watershed; responsible parties and general monitoring goals are indicated	Beginning on p. 44 (2008)
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	Milestones are reviewed in the 2008 plan	Throughout
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	2	Brief mention of monitoring procedures, but details are not provided	
	4. Adaptive management measures are included	3	The 2001 plan includes a discussion of the requirements for a robust adaptive management program; plan lacks specifics about how this program will be accomplished; The 2008 plan discusses success and failure of the plan	p. 19 (2008)
	Score	10		
Total Score		54		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/17/2015 (Updated 2/26/2016)

Lake Champlain Basin Program (2010; regularly updated); Opportunities for Action: An Evolving Plan for the Future of the Lake Champlain Basin

Watershed Plan Title - Date:

Watershed Name and Location: Lake Champlain - Vermont/New York

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Map of sources and loadings. The LCBP plan goes hand-in-hand with the Lake Champlain total phosphorus TMDL. A TMDL for Vermont was first submitted to EPA in 2002, but was rejected. Revisions are underway and a draft was released in 2015.	See 2015 TMDL Figure 4
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	Map of sources and total phosphorus loadings	See 2015 TMDL
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Map of sources and total phosphorus loadings	See 2015 TMDL
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Percentage of total phosphorus load contributed by each source	Chapter 4
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	One goal of the plan is to create a unified dataset from many partners; specific data are presented in the 2015 TMDL	Action 2.2 (online)
	6. Downstream effects and cumulative impacts are discussed	1	Effects downstream of the lake itself are not discussed	
	Score	21		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	4	Total phosphorus load reductions are listed by concentration	See 2015 TMDL
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	4	Total phosphorus load reduction scenarios modeled using various lake segments in TMDL report	See 2015 TMDL
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	4	2002 TMDL rejection by EPA was due to concerns that nutrient reduction goals would not be met by suggested BMPs. Current TMDL and plan improve BMPs and reduction goals.	See 2015 TMDL & throughout online plan
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	4	Many datasets that form the basis of this plan; data are presented in the 2015 total phosphorus TMDL	See 2015 TMDL
	Score	16		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/17/2015 (Updated 2/26/2016)

Watershed Plan Title - Date: Lake Champlain Basin Program (2010; regularly updated); Opportunities for Action: An Evolving Plan for the Future of the Lake Champlain Basin

Watershed Name and Location: Lake Champlain - Vermont/New York

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	Benchmarks are implied and linked to causes of phosphorus impairment	Chapter 4 (online)
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	3	Criteria are based on narrative descriptions	Chapter 4 (online)
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Total phosphorus TMDL for Lake Champlain	See 2015 TMDL
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	Regular online revisions to the plan; updated TMDL	Throughout
	Score	13		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	BMPs are specified and correlated to impairments	Chapter 4 (online)
	2. Critical locations or high-priority sites for each management measure are mapped or described	3	Critical areas that contribute phosphorus to the basin are being identified as part of the plan	Action 4.6 (online)
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Not specified	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	2	Lacking data for phosphorus load reductions	Throughout
	Score	9		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Post-Implementation	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	4	Monitoring program is based on 2015 total phosphorus TMDL; also includes a citizen monitoring group	See 2015 TMDL
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	4	Monitoring program is based on 2015 total phosphorus TMDL	See 2015 TMDL
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	4	Monitoring program is based on 2015 total phosphorus TMDL	See 2015 TMDL
	4. Adaptive management measures are included	4	Monitoring is meant to support adaptive management process; Coordinated adaptive management plan for phosphorus	Action 2.1 & Action 4.7 (online)
	Score	16		
	Total Score	75		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/16/2015 (Updated 2/26/2016)

Watershed Plan Title - Date: Basin Management Action Plan for the Implementation of Total Maximum Daily Loads for Total Phosphorus by the Florida Department of Environmental Protection in

Watershed Name and Location: Lake Okeechobee - Florida

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Sources of total phosphorus and nitrogen are listed and mapped according to sub-watersheds of the larger lake watershed	Section 3.1 (p. 23-28)
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	This document was prepared as a TMDL with a management plan	Chapter 4
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Sources of total phosphorus and nitrogen are listed and mapped according to sub-watersheds	Section 3.1 (p. 23-28)
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Total phosphorus and nitrogen loadings are listed for each sub-watershed	Table 13 (p. 35)
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	20+ year history of water quality data from the watershed	Throughout
	6. Downstream effects and cumulative impacts are discussed	2	Many mentions of downstream attenuation throughout the plan	p. 4, 14, 15, 38, 62
	Score	22		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	1	Current loadings and BMPs without mention of reductions needed to address impairment	
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	3	Attenuation rates are estimated (using WAM) for sub-watersheds	p. 30
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	2	Unclear whether these attenuation rates will completely address threats, but the plan assumes they will	p. 30
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Data were collected over two decades; WAM model	p. 30
	Score	9		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/16/2015 (Updated 2/26/2016)

Watershed Plan Title - Date: Basin Management Action Plan for the Implementation of Total Maximum Daily Loads for Total Phosphorus by the Florida Department of Environmental Protection in

Watershed Name and Location: Lake Okeechobee - Florida

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	3	List of expected outcomes for BMPs	Section 3.2 (p. 28)
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	3	Narrative description of expected outcomes without specific numeric criteria	p. 28
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Plan includes a TMDL for total phosphorus in the Lake Okeechobee basin	Throughout
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	Adaptive management plans include procedures to determine whether additional strategies are needed, and determining when plan components require revision	Section 6.2 (p. 72)
	Score	13		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	Descriptions of many possible and recommended management strategies	Chapter 5 (p. 36)
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	3	High priority, high loading sites are mentioned	p. 34
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	4	Total phosphorus load reductions listed by management strategy	Table 24 (p. 66)
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	4	Data from monitoring of current projects	Table 24 (p. 66)
	Score	15		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	4	Monitoring has been ongoing for over 20 years; plans for data management and storage	p. 73
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	Monitoring parameters; No specific milestones	
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	4	Monitoring schedule and locations are noted in the plan	Section 6.3 (p. 73)
	4. Adaptive management measures are included	4	Annual meetings among stakeholders to discuss implementation, consider new info, and determine corrective actions	Section 6.2 (p. 72)
	Score	15		
Total Score		74		

Reviewer Name/Secondary Reviewer: Muriel Kim/Jordan Rofkar

Review Date: Jan. 2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Lake Simcoe Protection Plan (2009)

Watershed Name and Location: Lake Simcoe Watershed, Ontario

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	2	<ul style="list-style-type: none"> Excessive phosphorus is identified as the most significant cause of water quality impairment in Lake Simcoe and its tributaries. The Plan identifies tributaries that are known to exceed Provincial Water Quality Objectives for phosphorus, although the exceedances are not quantified. 	<ul style="list-style-type: none"> Chapter 4, p. 23, 26
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/percentages, or via other quantifiable method	2	<ul style="list-style-type: none"> Water quality issues are identified but are generally described qualitatively and at a high level, e.g. a degradation of water quality due to excessive input of total phosphorus. Causes and sources of nutrient impairments and threats are described in only very general terms (e.g. urban, rural and recreational activities). 	<ul style="list-style-type: none"> Chapter 1, p. 3 Chapter 4, p. 23
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	<ul style="list-style-type: none"> The main sources of phosphorus are identified by type of land cover or facility (e.g. atmosphere, streams, septic), but not by geographical areas. A conceptual diagram of phosphorus sources is provided. 	Chapter 4, p. 24
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	<ul style="list-style-type: none"> Total phosphorus contributions of various sources into Lake Simcoe are quantified as average tons of phosphorus per year and as a percentage of contributions. 	Chapter 4, p. 24
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	<ul style="list-style-type: none"> Sources for quantitative data are reported. The Plan builds upon the knowledge gained from past studies and management strategies for improving water quality in Lake Simcoe. These past studies and strategies are described and cited. 	<ul style="list-style-type: none"> Chapter 2, p. 12 - 15 Chapter 4, p. 24
	6. Downstream effects and cumulative impacts are discussed	2	<ul style="list-style-type: none"> The Plan includes a high-level description of the cumulative impacts of nutrient loading and other causes of water quality impairment, e.g. low dissolved oxygen levels and resulting impacts to fisheries. 	Chapter 1, p. 3
	Score	16		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc	3	<ul style="list-style-type: none"> A key water quality target for Lake Simcoe is to bring dissolved oxygen levels up to the target of 7 mg/L. Current models estimate that this would require reducing total phosphorus loadings to 44 tonnes per year, down from a current average of 72 tonnes per year. 	Chapter 4, p. 25
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	1	<ul style="list-style-type: none"> The necessary reduction of phosphorus loads down to 44 tonnes per year represents an estimate from the entire Lake Simcoe watershed. The estimate is not broken down by cause, source location or category. 	Chapter 4, p. 25
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	2	<ul style="list-style-type: none"> The reduction of total phosphorus loading down to 44 tonnes per year is expected to help Lake Simcoe reach the target for minimum dissolved oxygen levels (7 mg/L). It is not specified whether the targeted reduction of total phosphorus loading will achieve other water quality criteria (e.g. the Provincial Water Quality Objective of 0.03 mg/L for phosphorus). Necessary load reductions for other types of nutrients (e.g. nitrogen-based) are not specified. 	Chapter 4, p. 25
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	4	<ul style="list-style-type: none"> Sources for quantitative data are reported. The Plan builds upon the knowledge gained from past studies and management strategies for improving water quality in Lake Simcoe. These past studies and strategies are described and cited. 	<ul style="list-style-type: none"> Chapter 1, p. 3 Chapter 4, p. 25
	Score	10		

Reviewer Name/Secondary Reviewer: Muriel Kim/Jordan Rofkar

Review Date: Jan. 2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Lake Simcoe Protection Plan (2009)

Watershed Name and Location: Lake Simcoe Watershed, Ontario

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	2	• Criteria for measuring total phosphorus load reductions are not explicitly identified in the Plan. However, the Plan includes policies directing the applicable government bodies to develop subwatershed evaluations, water quality targets and management strategies that are applicable and appropriate to the subwatershed in question.	• Chapter 8, p. 72
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	2	• Criteria for measuring total phosphorus load reductions are not explicitly identified in the Plan. However, the Plan includes policies directing the applicable government bodies to develop subwatershed evaluations, water quality targets and management strategies that are applicable and appropriate to the subwatershed in question.	• Chapter 8, p. 72
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	4	• The development of the Plan was the direct result of the <i>Lake Simcoe Protection Act</i> being passed in 2008. • Where available, Provincial Water Quality Objectives were incorporated into the policies and management strategies of the Plan.	• Chapter 1, p. 4 • Chapter 4, p. 26
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	• It is recognized that management of the watershed is a long-term undertaking, and therefore strategies are expected to evolve over time. • The model for calculating target phosphorus loads is to be validated and improved over time.	• Chapter 1, p. 6 • Chapter 3, p. 18
	Score	12		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	• The Plan established policies for select key sources of phosphorus, such as sewage treatment plants, stormwater works, agriculture, etc. Several policies also outline what development projects may or may not take place along Lake Simcoe's shorelines. Separate sets of policies were developed for different land cover types, such as natural shorelines, urban/rural settlement areas, aggregate operations, etc. • With the exception of those that are categorized as "Strategic Actions", the Plan's policies are legally enforceable under the <i>Lake Simcoe Protection Act</i> . • The Plan establishes the requirement to develop a phosphorus reduction strategy, in which specific actions for addressing sources of phosphorus loading are to be developed. The Plan is not intended to be overly prescriptive as to the strategy's content, and therefore specific management measures are not specified.	• Chapter 1, p. 7 - 9 • Chapter 4, p. 27 - 33 • Chapter 6, p. 46 - 55 • Chapter 8, p. 77
	2. Critical locations or high-priority sites for each management measure are mapped or described	3	• The Plan identifies critical locations for protection, where limitations and/or restrictions are placed on development; these include vegetation protection zones, key natural heritage features, key hydrologic features, etc. However, the critical locations generally apply to all management measures, rather than each measure having its own list of critical locations.	• Chapter 6, p. 46 - 55
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	• Specific management measures are not identified within the Plan itself, but would be expected from the phosphorus reduction strategy and subwatershed management strategies that are to be developed as a result of the Plan.	• Chapter 8, p. 72
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	4	• The Plan builds upon the knowledge gained from past studies and management strategies for improving water quality in Lake Simcoe. These past studies and strategies are described and cited.	• Chapter 2, p. 12 - 15
	Score	11		

Reviewer Name/Secondary Reviewer: Muriel Kim/Jordan Rofkar

Review Date: Jan. 2016 (Updated 2/29/2016)

Watershed Plan Title - Date: Lake Simcoe Protection Plan (2009)

Watershed Name and Location: Lake Simcoe Watershed, Ontario

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Post-Implementation	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	2	<ul style="list-style-type: none">• The Plan includes a requirement to develop and implement an enhanced scientific water quality monitoring program that builds upon a previous program (the Lake Simcoe Environmental Management Strategy). The policy lists the minimum requirements that the program must meet.• The Plan makes recommendations for scientific research projects that should be conducted within the Lake Simcoe watershed, and suggests topics that should be researched.• The Plan avoids being overly prescriptive with regards to procedures and protocols. Rather, it directs the applicable governmental bodies to develop procedures and protocols that are specific to a given subwatershed.	<ul style="list-style-type: none">• Chapter 4, p. 32 - 33• Chapter 8, p. 72
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	<ul style="list-style-type: none">• As with procedures and protocols, the Plan avoids being overly prescriptive with regards to monitoring nutrient load reductions and management strategies, as these are to be developed at the subwatershed scale.	<ul style="list-style-type: none">• Chapter 8, p. 72
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	4	<ul style="list-style-type: none">• Periodic progress reports on the Plan are mandated under the <i>Lake Simcoe Protection Plan</i>.• A number of the Plan's policies set target dates for implementation.• Progress reports are to be produced at least once every five years. Regulator meetings are to be held every two years to share new information and knowledge and coordinate monitoring and research activities.	<ul style="list-style-type: none">• Chapter 1, p. 9• Chapter 4, p. 28• Chapter 8, p. 74, 78
	4. Adaptive management measures are included	4	<ul style="list-style-type: none">• The Plan adopts an adaptive management approach, setting guidelines for ongoing scientific research and monitoring, as well as allowing for the review and evaluation of the effectiveness of the Plan's policies and targets. The Plan is to be amended if necessary.	<ul style="list-style-type: none">• Chapter 8, p. 77, 84
	Score	12		
Total Score		61		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/14/2015 (Updated 2/25/2016)

Watershed Plan Title - Date: Total Maximum Daily Load and Watershed Management Plan for Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay (2012)

Watershed Name and Location: Lower Fox River - Wisconsin

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303(d)) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	27 segments listed as impaired; data presented for individual sampling locations	Table 1
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	Total phosphorus capacity and load allocations from each major source	Section 6 (p. 40)
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Major contributors of total phosphorus are mapped - waste water treatment facilities, MS4s (sewer systems), & concentrated animal feeding operations	Figures 14, 15, & 16 (p. 28, 29, & 30)
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	Loading breakdown of total suspended solids and total phosphorus according to sub-basin	Table 9 & Table 10 (p. 38 & 39)
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	Data appears reasonable and up to date	
	6. Downstream effects and cumulative impacts are discussed	3	Discussion of impacts of excessive phosphorus on Green Bay ecosystem and blooms of blue-green algae	p. 102
	Score	23		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	Goals of load reductions are stated for total phosphorus and total suspended solids	p. 20
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	2	Reductions in total phosphorus are listed with respect to source areas; not related to specific causes	p. 126 and thereafter
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Total phosphorus load reductions based on TMDL	Appendix C
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	4	Data appears reasonable and up to date; Total phosphorus data come from a 2008 TMDL	Appendix C
	Score	12		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/14/2015 (Updated 2/25/2016)

Watershed Plan Title - Date: Total Maximum Daily Load and Watershed Management Plan for Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay (2012)

Watershed Name and Location: Lower Fox River - Wisconsin

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	1	Milestones are not clearly outlined	
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	1	Milestones are not clearly outlined	
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	1	This document combines a TMDL report with the management plan; milestones are not clearly outlined	
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	1	Steps for revising plan are not clearly outlined	
	Score	4		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	2	Some management steps are listed, but are not prioritized	Section 7.1.2. (p. 89)
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	3	Critical areas and sub-basins for phosphorus removal are mapped with land uses	p. 43 and thereafter
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Load reductions are not linked to management measures	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	1	Not included in this document	
	Score	7		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	3	Monitoring framework of WDNR and Oneida Reservation to follow up on TMDL	p. 92
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	1	Milestones are not clearly outlined	
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	2	No clear schedule; Approach appears to be monitor as needed	p. 92
	4. Adaptive management measures are included	2	Briefly mentioned as an option for achieving water quality goals; not specific	p. 88
	Score	8		
Total Score		54		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 11/14/2015 (Updated 2/29/2016)

Watershed Plan Title - Date: Raccoon River Watershed Water Quality Master Plan (2011)

Watershed Name and Location: Raccoon River (IA)

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Watershed has been modeled to show impairments in individual subwatersheds	p. 56, 65
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	Nitrate and total phosphorus loads are given for each subwatershed unit	p. 56, 65
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	Potential sources of impairments are mapped, but not attributed specific loadings	Appendix 7
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	1	Nutrient contributions from each source are not indicated	
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	Data used in modeling appear reasonable; used data for statewide nutrient budget	Appendix 7
	6. Downstream effects and cumulative impacts are discussed	2	Brief mention of downstream impacts to Mississippi River and Gulf of Mexico	p. 17
	Score	17		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	Percent reductions necessary for meeting TMDL are noted for nitrogen and E. coli, but not phosphorus	Water Quality (p. 15)
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	3	Estimates of nitrate/nitrite and total phosphorus reductions in each subwatershed	Appendix 7
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Modeling indicates significant reductions in nitrate/nitrite and total phosphorus, but not as extensive as required by TMDL	Appendix 7
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Data come from a statewide nutrient budget	Appendix 7
	Score	12		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 11/14/2015 (Updated 2/29/2016)

Watershed Plan Title - Date: Raccoon River Watershed Water Quality Master Plan (2011)

Watershed Name and Location: Raccoon River (IA)

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

(c) Criteria to determine whether or not nutrient load reductions are being achieved			
Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	1	There are no specific criteria in the plan	
2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	1	There are no specific criteria in the plan	
3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	1	Although there are TMDLs, there are no criteria in the plan	
4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	2	First recommendation is to create a regional planning organization, presumably to monitor and revise the watershed plan	p. 24
Score	5		
(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
Review Criteria	Score (1-5)	Comments/Recommendations	Page and Section
1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	3	BMPs discussed in modeling section	Appendix 7
2. Critical locations or high-priority sites for each management measure are mapped or described	4	Model results used to prioritize water quality actions; maps highlight areas with highest priority	p. 52, 57, 61, 62
3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	4	Nitrate/nitrite and total phosphorus loads were modeled using SWAT	Appendix 7
4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	4	In-depth description and methodology for SWAT modeling is presented in Appendix 7; SWAT is a widely used system for modeling surface water transport	Appendix 7
Score	15		
(e) Monitoring component to evaluate the effectiveness of implementation			
Review Criteria	Score (1-5)	Comments/Recommendations	Page and Section
1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	2	Plan recommends creating a monitoring guidance document but does not contain specific parameters	p. 75
2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	1	No benchmarks mentioned	
3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	1	No monitoring schedule	
4. Adaptive management measures are included	1	No management measures outlined in plan	
Score	5		
Total Score 54			

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/17/2015 (Updated 2/29/2016)

Watershed Plan Title - Date: South Lake Champlain Tactical Basin Plan (2014)

Watershed Name and Location: South Lake Champlain - Vermont

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303(d)) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	Maps and tables of impairments are listed by sub-watershed; Nutrients are represented by total phosphorus	Table 8 (p. 39)
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	1	Plan is written in general terms, outlining a number of specific threats and sources, but without data in the document; Nutrients are not specified beyond total phosphorus	
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	Maps and tables of impairments are listed by sub-watershed; Nutrients are represented by total phosphorus	Table 8 (p. 39); Figure 7
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	1	Plan is written in general terms, outlining a number of specific threats and sources, but without data in the document.	
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	2	Watershed monitoring is completed by a number of partners; no specific data is presented in this document	p. 11
	6. Downstream effects and cumulative impacts are discussed	2	Downstream impacts are mentioned without specific data or broader impacts to Lake Champlain	Throughout
	Score	14		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	1	Load reductions are not specified	
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	1	Load reductions are not specified	
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	1	Load reductions are not specified	
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	2	Watershed monitoring is completed by a number of partners; no specific data is presented in this document	p. 11
	Score	5		

Reviewer Name/Secondary Reviewer: Jordan Rofkar/Kristin Gardner

Review Date: 12/17/2015 (Updated 2/29/2016)

Watershed Plan Title - Date: South Lake Champlain Tactical Basin Plan (2014)

Watershed Name and Location: South Lake Champlain - Vermont

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	4	Implementation Table lays out objectives of the plan with specific strategies, tasks, status, etc. for each.	p. 61
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	3	Narrative water quality criteria do not contain numerical objectives	p. 61
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	This document is correlated with basin-wide Lake Champlain TMDLs for total phosphorus and mercury	p. 61
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	3	Implementation Table lays out objectives of the plan with specific strategies, tasks, status, etc. for each.	p. 61
	Score	13		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Implementation	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	Stressors affecting each sub-watershed and their priority are listed; Nutrients are mentioned only in general terms; Total phosphorus is the only nutrient specified	Table 8 (p. 39)
	2. Critical locations or high-priority sites for each management measure are mapped or described	4	Stressors affecting each sub-watershed and their priority	Table 8 and Implementation Table
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	No estimates of load reductions are listed	
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	3	No estimates of load reductions are listed, but assumptions are based on in-depth Lake Champlain TMDL	
	Score	12		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
Post-Implementation	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	2	Locations for biological and chemical monitoring have been established; no specific information about procedure, frequency, or changes in schedule due to changing conditions	Figure 4; Implementation Table (p. 61)
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	Monitoring parameters are not clearly outlined	
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	1	Frequency of monitoring is not given in the plan, but might follow procedures and timing from TMDL study	
	4. Adaptive management measures are included	2	Brief mention of adaptive management without any specifics	p. 15
	Score	7		
Total Score		51		

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 1/20/2016 (Updated 2/26/16)

Watershed Plan Title - Date: Phosphorus Total Maximum Daily Loads (TMDLs) Tainter Lake and Lake Menomin Dunn County, Wisconsin (2012)

Watershed Name and Location: Tainter Lake/Red Cedar, Wisconsin

Score Key

1 Absent	Item is not discussed
2 Minimal	Includes some information but significant additional information/data is needed on the item
3 Good	Includes an acceptable amount information and addresses the item
4 Excellent	A significant amount of current, applicable, and/or exceptional information/data is presented on the item

Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	3	Sources and causes are listed for total phosphorus; discussion of HABs is included	Introduction, pg 5
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	3	Sources for total phosphorus are listed as percentages of the total load	Introduction, pg 5
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	2	Tainter Lake and Lake Menomin are hypereutrophic and experience severe summer algae blooms and very poor water clarity; Sources mapped by general category and land use type	Introduction, pg 8-10
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	3	Nutrient contribution for total phosphorus is listed by land use	Background
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	3	Sources are well-cited	Background
	6. Downstream effects and cumulative impacts are discussed	1	Not discussed	NA
	Score	15		
	(b) Estimate of the nutrient load reductions expected from the proposed management measures			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc.	3	BATHTUB modeling was used to estimate the required load reductions	p 22
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	2	Reductions are tied to land uses (forest, cropland) and they do not go into more detail	p 22
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	Load reductions are based on modeling	p 22
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	Water quality models used in this TMDL include a tributary flow and loading model and a flowage trophic response model. The U.S. ArmyCorps of Engineers (USACE) FLUX model was used to estimate phosphorus loads and the USACE BATHTUB model was used to predict flowage response	Modeling
	Score	11		

Reviewer Name/Secondary Reviewer: Kristin Gardner/Jordan Rofkar

Review Date: 1/20/2016 (Updated 2/26/16)

Watershed Plan Title - Date: Phosphorus Total Maximum Daily Loads (TMDLs) Tainter Lake and Lake Menomin Dunn County, Wisconsin (2012)

Watershed Name and Location: Tainter Lake/Red Cedar, Wisconsin

Score Key

- | | |
|-------------|---|
| 1 Absent | Item is not discussed |
| 2 Minimal | Includes some information but significant additional information/data is needed on the item |
| 3 Good | Includes an acceptable amount information and addresses the item |
| 4 Excellent | A significant amount of current, applicable, and/or exceptional information/data is presented on the item |

Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved			
	Review Criteria	Score (1-4)	Comments/Recommendations	Page and Section
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	2	Numeric criterion for total phosphorus, chlorophyll-a, secchi depth, and percent time > 30 ug/L Chl-a is listed, but not for specific causes, only point and nonpoint	p 14
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	2	Numeric criterion is listed but not for specific causes, only point and nonpoint; Tainter Lake and Lake Menomin have excessive algal blooms that cause objectionable odors and limit recreational use. These lakes are not currently meeting applicable narrative water quality criterion	p 14
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	3	Report is a TMDL for total phosphorus	Throughout
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	1	Not discussed	NA
	Score	8		
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions			
	Review Criteria	Score (1-5)	Comments/Recommendations	Page and Section
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	2	General BMPs are listed to reduce the total phosphorus load, but they are not tied to sources or provide load reduction estimates	Management Strategies for Nonpoint Sources
Post-Implementation	2. Critical locations or high-priority sites for each management measure are mapped or described	1	Not discussed	NA
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	Not discussed	NA
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	2	Little data is cited and no load reduction estimates are provided	Management Strategies for Nonpoint Sources
	Score	6		
	(e) Monitoring component to evaluate the effectiveness of implementation			
	Review Criteria	Score (1-5)	Comments/Recommendations	Page and Section
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	2	General paragraph on monitoring is included, no detail given	p 27
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	2	General paragraph on monitoring is included, no detail given	p 27
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	2	General paragraph on monitoring is included, no detail given	p 27
	4. Adaptive management measures are included	1	Not discussed in detail	p 27
	Score	7		
Total Score		47		

Recommendations/Notes:

The Red Cedar River Water Quality Partnership submitted a comprehensive watershed plan to the Wisconsin Department of Natural Resources and the US Environmental Protection Agency for approval in August of 2015. The Plan, titled "A River Runs Through Us: A Water Quality Strategy for the Land and Waters of the Red Cedar River Basin", is a ten-year plan to address water quality issues in the Basin, focusing on the problems of phosphorus pollution and the subsequent algal blooms that it causes. Review of the plan by WDNR and US EPA should take place in early 2016, and once approved, the Plan will be made public

APPENDIX C

Summarized Scoring of Watershed Management Plans

APPENDIX C-1

Lake Erie Watershed Plans

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE C-1

WATERSHED PLANS
INSIDE LAKE ERIE DRAINAGE BASIN
WATERSHED SCORING SUMMARY

Watershed HUC/Name		Portage River	River Raisin	Middle Cuyahoga	Upper Maumee	The Outlet / Lye Creek	Combined Downriver	St Marys River	Sandusky River	Maumee AOC	Clinton River	Honey Creek	Huron Chain of Lakes	Grand River	Chagrin River	Lower St. Joseph	Huron & Vermillion Rivers	Thames River	St. Clair River & Lake St. Clair	Old Woman Creek
Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody																			
	Review Criteria	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	4	4	4	4	2	4	4	1	4	4	2	3	2	3	1	2	3	1	2
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	3	4	4	3	3	1	3	1	4	3	3	3	3	3	2	4	1	1
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	4	4	4	4	2	4	4	3	4	4	3	3	3	3	1	4	3	4	1
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	4	4	4	3	3	3	4	1	4	2	3	3	3	1	4	3	1	1
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	3	4	3	4	3	3	4	4	3	3	3	4	3	1	4	4	1	2
	6. Downstream effects and cumulative impacts are discussed	4	3	2	2	4	1	2	4	3	1	2	1	3	1	2	1	2	2	3
	Score (Max = 24)	24	21	22	21	18	18	17	19	17	20	15	16	18	16	9	17	19	10	10
	(b) Estimate of the nutrient load reductions expected from the proposed management measures																			
	Review Criteria	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc	4	3	4	4	2	4	3	3	3	2	3	3	2	3	4	3	2	1	2
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	4	3	4	4	3	2	3	3	3	3	2	3	1	1	1	3	2	1	1
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	4	3	4	3	3	3	3	3	2	2	2	2	2	2	3	3	1	1	2
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	4	3	3	3	3	3	3	2	4	2	3	3	2	3	2	4	2	1	1
	Score (Max = 16)	16	12	15	14	11	12	12	11	12	9	10	11	7	9	10	13	7	4	6

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE C-1

WATERSHED PLANS
INSIDE LAKE ERIE DRAINAGE BASIN
WATERSHED SCORING SUMMARY

Watershed HUC/Name		Portage River	River Raisin	Middle Cuyahoga	Upper Maumee	The Outlet / Lye Creek	Combined Downriver	St Marys River	Sandusky River	Maumee AOC	Clinton River	Honey Creek	Huron Chain of Lakes	Grand River	Chagrin River	Lower St. Joseph	Huron & Vermillion Rivers	Thames River	St. Clair River & Lake St. Clair	Old Woman Creek
Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved																			
	Review Criteria	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	4	3	4	4	4	3	3	2	2	2	3	3	2	3	4	1	1	2	1
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	4	3	4	4	4	3	2	2	2	1	3	2	2	3	4	1	1	2	1
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	4	3	4	2	3	3	3	3	2	1	3	3	1	3	1	1	1	2	2
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	4	3	1	4	2	3	2	2	1	2	1	3	2	1	1	1	2	3
	Score (Max = 16)	16	13	15	11	15	11	11	9	8	5	11	9	8	11	10	4	4	8	7
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions																			
	Review Criteria	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	4	4	4	3	4	3	3	3	3	3	3	2	4	2	2	2	2	2
	2. Critical locations or high-priority sites for each management measure are mapped or described	3	4	4	4	2	4	4	3	3	3	1	3	2	1	3	2	1	1	1
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	1	4	3	4	4	4	3	3	1	3	2	3	2	1	1	1	1	1	1
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	1	4	2	4	4	3	3	2	1	4	2	3	3	3	1	2	1	1	1
	Score (Max = 16)	9	16	13	16	13	15	13	11	8	13	8	12	9	9	7	7	5	5	5

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE C-1

WATERSHED PLANS
INSIDE LAKE ERIE DRAINAGE BASIN
WATERSHED SCORING SUMMARY

Watershed HUC/Name		Portage River	River Raisin	Middle Cuyahoga	Upper Maumee	The Outlet / Lye Creek	Combined Downriver	St Marys River	Sandusky River	Maumee AOC	Clinton River	Honey Creek	Huron Chain of Lakes	Grand River	Chagrin River	Lower St. Joseph	Huron & Vermillion Rivers	Thames River	St. Clair River & Lake St. Clair	Old Woman Creek
Post-Implementation	(e) Monitoring component to evaluate the effectiveness of implementation																			
	Review Criteria	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	3	4	2	2	4	3	3	3	4	3	3	1	2	1	3	1	2	4	4
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	3	4	2	2	3	3	2	1	2	3	2	2	2	1	3	1	1	2	1
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	3	4	1	2	3	3	4	2	4	1	2	1	3	1	3	1	1	4	3
	4. Adaptive management measures are included	2	2	1	1	1	2	2	2	1	1	1	1	1	1	2	1	1	2	1
	Score (Max = 16)	11	14	6	7	11	11	11	8	11	8	8	5	8	4	11	4	5	12	9
Total Score (Max Score = 88)		76	76	71	69	68	67	64	58	56	55	52	53	50	49	47	45	40	39	37

- Score Key
- 1. Absent - Item is not discussed
 - 2. Minimal - Includes some information but significant additional information/data is needed on the item
 - 3. Good - Includes an acceptable amount information and addresses the item
 - 4. Excellent - A significant amount of current, applicable, and/or exceptional information/data is presented on the item

APPENDIX C-2

Watershed Plans Outside of Lake Erie

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE C-2
WATERSHED PLANS
OUTSIDE LAKE ERIE DRAINAGE BASIN
WATERSHED SCORING SUMMARY

Watershed HUC/Name		Chesapeake Bay	Lake Champlain	Lake Okeechobee	Everglades	East Holland River	Cass River (Saginaw Bay)	Lake Simcoe	Raccoon River (IA)	Lower Fox River (WI)	Golf Hypoxia	South Lake Champlain	Tainter Lake/Red Cedar River (WI)
Pre-Implementation	(a) Identification of the nutrient causes and sources of impairment or threats to the waterbody												
	Review Criteria	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)
	1. Specific nutrient causes and sources (303[d]) of impairments and/or threats (if applicable) are listed by waterbody segment or area	3	4	4	4	2	3	2	4	4	1	4	3
	2. Causes of nutrient impairment (or threats) are listed as loads, WQC exceedance amounts/ percentages, or via other quantifiable method	4	4	4	3	4	2	2	4	4	1	1	3
	3. Sources of nutrient impairments/threats (if applicable) are mapped or identified by area, category/subcategory, facility type, etc.	3	4	4	3	4	3	3	3	4	3	4	2
	4. Nutrient contributions from each source location or category is quantified by load, percentage, priority, or other method	4	4	4	3	3	3	3	1	4	4	1	3
	5. Estimates, assumptions, or data used in the analysis is presented or cited and appears reasonable	4	4	4	4	4	3	4	3	4	3	2	3
	6. Downstream effects and cumulative impacts are discussed	1	1	2	4	3	1	2	2	3	4	2	1
	Score (Max = 24)	19	21	22	21	20	15	16	17	23	16	14	15
	(b) Estimate of the nutrient load reductions expected from the proposed management measures												
	Review Criteria	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)
	1. Nutrient load reductions needed to address each impairment and threat (if applicable) are listed, and are quantified by weight, concentration, percentage reduction needed, etc	4	4	1	1	3	4	3	3	3	3	1	3
	2. Listed nutrient load reduction estimates are linked to each cause and source location or category	4	4	3	1	4	4	1	3	2	1	1	2
	3. Load reductions will achieve water quality criteria, address threats (if applicable), or achieve other goals	3	4	2	3	2	3	2	3	3	3	1	3
	4. Estimates, assumptions, or data used in the analysis are presented or cited and appear reasonable	3	4	3	4	4	3	4	3	4	3	2	3
	Score (Max = 16)	14	16	9	9	13	14	10	12	12	10	5	11

INTERNATIONAL JOINT COMMISSION - GREAT LAKES WATERSHED MANAGEMENT

TABLE C-2

WATERSHED PLANS
OUTSIDE LAKE ERIE DRAINAGE BASIN
WATERSHED SCORING SUMMARY

Watershed HUC/Name		Chesapeake Bay	Lake Champlain	Lake Okeechobee	Everglades	East Holland River	Cass River (Saginaw Bay)	Lake Simcoe	Raccoon River (IA)	Lower Fox River (WI)	Golf Hypoxia	South Lake Champlain	Tainter Lake/Red Cedar River (WI)
Implementation	(c) Criteria to determine whether or not nutrient load reductions are being achieved												
	Review Criteria	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)
	1. Criteria are identified that are linked to the causes and/or sources of impairments/threats (if applicable)	4	3	3	3	2	3	2	1	1	3	4	2
	2. The listed criteria include numeric and/or narrative water quality criteria, instream physical habitat assessment criteria, or other criteria linked to the causes/sources	4	3	3	3	2	3	2	1	1	3	3	2
	3. U.S. plans: Listed criteria include those incorporated into any TMDLs developed or to be developed for waterbodies addressed by the plan Canadian plans: Listed criteria include those under regulatory consideration of the Lake Simcoe Protection Act, the Nutrient Management Act, or the Fisheries and Oceans Act	4	3	3	3	4	3	4	1	1	2	3	3
	4. Provisions for reviewing progress and revising the plan or any TMDLs involved are addressed	4	4	4	4	4	2	4	2	1	4	3	1
	Score (Max = 16)	16	13	13	13	12	11	12	5	4	12	13	8
	(d) Description of the management measures needed to achieve the proposed nutrient load reductions												
	Review Criteria	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)
	1. Management measures needed to address each cause and source of pollution or impairment (or threat) are listed, described, and prioritized	4	3	4	4	3	4	3	3	2	2	4	2
	2. Critical locations or high-priority sites for each management measure are mapped or described	4	3	3	4	2	4	3	4	3	2	4	1
	3. Load reductions linked to each management measure are listed and quantified via reasonable estimates	4	1	4	2	2	4	1	4	1	1	1	1
	4. Estimates, assumptions, or data used in the analysis is presented or cited and appear reasonable	4	2	4	2	4	3	4	4	1	1	3	2
	Score (Max = 16)	16	9	15	12	11	15	11	15	7	6	12	6
Post-Implementation	(e) Monitoring component to evaluate the effectiveness of implementation												
	Review Criteria	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)	Score (1-4)
	1. An approach for establishing monitoring sites or procedures and relevant parameters is provided, or procedures for acquiring and reviewing other monitoring data is described	4	4	4	4	2	3	2	2	3	2	2	2
	2. Monitoring parameters include the criteria identified in (d) and milestones, benchmarks, phases, or steps	4	4	3	3	3	3	2	1	1	3	2	2
	3. Frequency of monitoring or schedules for assessing implementation progress is included in the plan	4	4	4	2	3	3	4	1	2	2	1	2
	4. Adaptive management measures are included	4	4	4	4	2	2	4	1	2	3	2	1
	Score (Max = 16)	16	16	15	13	10	11	12	5	8	10	7	7
Total Score (Max Score = 88)		81	75	74	68	66	66	61	54	54	54	51	47

Score Key

1. Absent - Item is not discussed
2. Minimal - Includes some information but significant additional information/data is needed on the item
3. Good - Includes an acceptable amount information and addresses the item
4. Excellent - A significant amount of current, applicable, and/or exceptional information/data is presented on the item