Managing Water Quality

Ohio EPA and other state government departments are directed by the Ohio General Assembly to manage Ohio's water resources. The U.S. Environmental Protection Agency (U.S. EPA) has also delegated to Ohio EPA the responsibility to administer certain federal programs in Ohio.

The functions of various water quality management programs are explained in this section, along with a description of some funding expenditures for water quality activities in Ohio. Some federal government programs are included. Local government programs and decisions (e.g., ordinances, planning and zoning) can have major impacts on water quality, but are not described here.

C1. Program Summary – Surface Water

The goal of Ohio EPA's Division of Surface Water (DSW) is to restore and maintain Ohio's water resources. This goal reflects the national water quality objective as contained in the federal Clean Water Act (CWA), which is "... to restore and maintain the chemical, physical and biological integrity of the Nation's waters"—often referred to as the "fishable/swimmable goal." Fishable/swimmable waters are resources that support stable, balanced populations of aquatic organisms that are ecologically "healthy" and provide safe water to the people of Ohio for public and industrial water supplies and recreation.

DSW has a full time staff of approximately 200 located in Columbus and the five Ohio EPA district offices. The division also employs approximately 50 interns during the summer to assist with biological and chemical water quality surveys. Funding for the division is comprised of federal monies, environmental protection funds generated through solid waste dumping fees and annual discharge fees.

A watershed-based approach to assessments and delivery of services has been a program management objective within DSW for nearly two decades. In 1990, DSW initiated an organized, sequential approach to monitoring and assessment (the "Five-Year Basin Approach") to better coordinate the collection of ambient monitoring data so that information and reports would be available in time to support water quality management activities such as the issuance of National Pollutant Discharge Elimination System (NPDES) permits and periodic revision of the Ohio water quality standards (WQS).

To establish the framework, the State was divided into 25 different areas that were aggregations of subbasins within major river basins. Each of the 25 areas were assigned to one of the five basin years, taking into account the need to appropriately distribute the monitoring workload among Ohio EPA's five district offices. The initial 1990 workload estimates and resource planning indicated that five years would be needed to complete the cycle of monitoring. However, the monitoring program has never been fully funded to meet those resource needs and thus the monitoring cycle takes more than 10 years to complete.

The Five-Year Basin Approach and the core work of the biological and water quality monitoring program have gradually become the Division's assessment component within the Total Maximum Daily Load (TMDL) program. Ohio's TMDL program has been designed to be watershed-focused and to promote integration of other ongoing water program elements on a watershed basis.

Biological and Water Quality Surveys

Ohio EPA routinely conducts biological and water quality surveys, or biosurveys, on a systematic basis throughout the state. A biosurvey is an interdisciplinary monitoring effort coordinated on a reach specific or watershed scale. Such efforts may involve a relatively simple setting focusing on one or two small streams, one or two principal stressors and a handful of sampling sites or a much more complex

effort including entire drainage basins, multiple and overlapping stressors and tens of sites.

Each year Ohio EPA conducts biosurveys in four to six major watersheds in Ohio with an aggregate total of 400 to 450 sampling sites. Biological, chemical and physical habitat monitoring and assessment techniques are employed in biosurveys in order to meet four major objectives:

1. to provide a current and thorough assessment of water quality conditions in watersheds that are scheduled for TMDLs in the near future (1-3 years);
2. to determine the extent to which use designations assigned in the Ohio WQS are either attained or not attained;
3. to determine if use designations assigned to a given water body are appropriate and attainable and recommend designations or changes where needed; and
4. to determine if any changes in key ambient biological, chemical, or physical indicators have taken place over time, particularly before and after the implementation of point source pollution controls or best management practices (BMPs).

The data gathered by a biosurvey is processed, evaluated and synthesized in a biological and water quality report. The findings and conclusions of each biological and water quality study may factor into regulatory actions taken by Ohio EPA and are incorporated into the Ohio WQS (OAC 3745-1), Water Quality Permit Support Documents (WQPSDs), State Water Quality Management Plans, the Ohio Nonpoint Source (NPS) Assessment and the aquatic life beneficial use analysis in the Ohio Integrated Water Quality Report [this report, prepared to meet the requirements of CWA Sections 305(b) and 303(d)] and TMDLs.

Additional information on DSW's water quality monitoring and assessment program is available at the following web site: http://www.epa.ohio.gov/dsw/bioassess/ohstrat.aspx. An index with links to available biological and water quality reports can be found at the following web site: http://www.epa.ohio.gov/dsw/document_index/psdindx.aspx.

Biosolids

Sewage sludge is the solid, semisolid or liquid residue generated during the treatment of domestic sewage in a treatment facility. When treated and processed for beneficial use, sewage sludge becomes biosolids—nutrient-rich organic materials that can be safely recycled and applied as fertilizer. Only biosolids that meet the standards spelled out in the Federal and state rules can be approved for use as a fertilizer. Publicly Owned Treatment Works (POTWs) make the decision whether to recycle the biosolids as a fertilizer, incinerate it or bury it in a landfill.

Ohio EPA received delegation to administer the Biosolids Program (CWA Section 503 Program) in 2005. In March 2000, House Bill (HB) 197 was passed by the Ohio General Assembly to provide the statutory authority for the director of Ohio EPA to seek delegation of the program. HB 197 modified the Ohio Revised Code (ORC) to provide the director of Ohio EPA the authority to adopt, enforce, modify and rescind rules necessary to implement the Biosolids Program. HB 197 also modified the ORC to include an annual sewage sludge fee in order to fund the program. Each dry ton of sewage sludge, treated or disposed in the State of Ohio, is assessed a fee with a cap of $600,000 per year on all monies collected. Shortly after the passage of HB 197, Ohio EPA began drafting rules that became effective in April 2002, as Ohio's Sewage Sludge Rules: Chapter 3745-40 of the Ohio Administrative Code (OAC). The purpose of Chapter 3745-40 of the OAC is to "establish standards applicable to the disposal, use, storage, or treatment of sewage sludge or biosolids, which standards are intended to reasonably protect public

health and the environment, encourage the beneficial use of biosolids and minimize the creation of nuisance odors." The most recent version of OAC 3745-40 became effective in July 2011.

Funded by annual sludge fees, Ohio EPA hired employees to cover sewage sludge management duties in the field and office. These employees perform compliance evaluation inspections at POTWs that beneficially use biosolids. They review annual data submitted by POTWs to ensure compliance with pollutant limits, monitoring and reporting requirements and perform authorization inspections at proposed land application sites. Field reconnaissance inspections are conducted at land application sites to verify compliance with site restrictions and management practices. These employees also review the NPDES permits that regulate sewage sludge generators.

Ohio EPA also funded college interns through the annual sludge fees to track authorized biosolids application sites. The interns developed a Geographic Information System (GIS) project to add authorized biosolids sites to a digital base map. Each authorized biosolids site receives a unique identification number through the GIS program. The GIS project is useful for managing the numerous land application sites and associated data such as cumulative pollutant loadings rates or proximity to source water protection areas for public drinking water supplies.

Combined Sewer Overflow Control Program

Combined sewers were built to collect sanitary and industrial wastewater, as well as storm water runoff and transport these combined waters to a wastewater treatment plant (WWTP). During dry weather, they are designed to transport all flow to the WWTP. When it rains, the volume of storm water and wastewater may exceed the capacity of the combined sewers or of the WWTP. When this happens, the combined sewers are designed to allow a portion of the combined wastewater to overflow into the nearest stream, river or lake. This is a combined sewer overflow (CSO). Ohio has approximately 1141 known CSOs in 89 CSO communities (February 2016), ranging from small, rural villages to large metropolitan areas.

In 1994, U.S. EPA published the national CSO Control Policy. Working from the national policy, Ohio EPA issued its CSO Control Strategy in 1995. The primary goals of Ohio's Strategy are to control CSOs so that they do not significantly contribute to violations of water quality standards or the impairment of designated uses and to minimize the total loading of pollutants discharged during wet weather. Ohio's Strategy addresses several issues that aren't covered by the national policy (for example, sanitary sewer extensions that occur up pipe of CSOs).

In 2000, Congress passed the Wet Weather Water Quality Act, which did two important things; it codified the 1994 national policy by making it part of the CWA and it required that all actions taken to implement CSO controls be consistent with the provisions of the national policy.

Ohio EPA continues to implement CSO controls through provisions included in NPDES permits and using orders and consent agreements when appropriate. The NPDES permits for Ohio's CSO communities require them to implement the nine minimum control measures. Requirements to develop and implement Long Term Control Plans (LTCPs) are also included where appropriate. In 2007, U.S. EPA adopted a new definition for the Water Safe for Swimming Measure, which sets goals to address the water quality and human health impacts of CSOs. The new definition sets a goal of incorporating an implementation schedule of approved projects into an appropriate enforceable mechanism, including a permit or enforcement order, with specific dates and milestones for 91 percent of the nation's CSO communities by September 2015. As of December 2014, 81 of Ohio's 89 CSO communities met this

definition (91 percent), meeting the U.S. EPA's Safe for Swimming Measure goal.

Compliance and Enforcement Program

DSW staff works closely with the regulated community and local health departments to ensure that surface waters of the state are free of pollution. The regulated community with which DSW staff works includes wastewater facilities, both municipal and industrial and small, unsewered communities experiencing problems with unsanitary conditions.

DSW staff provides technical assistance, conducts inspections of WWTPs, reviews operation reports, oversees land application of biosolids and manure from large concentrated animal feeding operations and investigates complaints regarding malfunctioning WWTPs and violations of Ohio's WQS. DSW strives to ensure that permitted facilities comply with their NPDES permits. DSW also assists small communities with inadequate means of wastewater treatment to seek alternatives to help abate pollution to surface waters of the state.

Under the NPDES program, Ohio EPA regulates discharges of pollutants from municipal and industrial WWTPs and sewer collection systems; as well as, storm water discharges from industrial facilities and municipalities. Ohio EPA enforces environmental laws, per ORC 6111 and the OAC, to protect human health and the environment and, when warranted, will seek civil or criminal enforcement action against violators to control illegal discharges of pollutants to waters of the state.

In cases where Ohio EPA is unable to resolve continuing water quality problems, DSW may recommend that enforcement action be taken. The enforcement and compliance staff works with Ohio EPA attorneys, as well as the Attorney General's Office, to resolve these cases. All final enforcement orders are posted on DSW's website.

Concentrated Animal Feeding Operations

On December 14, 2000, Governor Taft signed a bill that started the process of transferring authority to regulate concentrated animal feeding operations (CAFOs) to the Ohio Department of Agriculture (ODA), which now regulates construction and operation of large concentrated animal feeding facilities under their Permit to Install (PTI) and Permit to Operate (PTO) programs. However, PTI authority for sewage treatment and disposal systems at animal feeding facilities and for animal feeding facilities that discharge to POTWs remains with Ohio EPA.

Ohio EPA also retains authority for implementing the NPDES permit program for animal feeding operations until the revised delegation agreement with U.S. EPA that has been submitted by Ohio is approved by U.S. EPA. As a result of federal rule revisions and court decisions, only facilities that meet the definition of a CAFO and actually discharge to surface waters of the state are required to apply to Ohio EPA for an NPDES permit.

The CAFO program at Ohio EPA uses a watershed perspective to prioritize work to some degree. The changes in the federal rule resulting in CAFO NPDES permits being required only when a facility discharges limits our need and ability to prioritize permitting by watersheds. However, the status of the watershed is considered in making decisions about enforcement and compliance activities (e.g., supplemental environmental projects may be preferred over penalties; more technical assistance may be focused on TMDL watersheds).

Credible Data – Volunteer Monitoring Program

The program's authorizing legislation was passed and signed by the governor in 2003. Ohio EPA adopted rules in 2006 (OAC Chapter 3745-4) for the program's operation and revised those rules in 2011. The legislation and the rules are explicit in the desire to not only encourage the collection of water quality data by volunteers, but also to ensure that the data are valid and useful for their intended purpose. In other words, the data should be "credible." The rule package bears the name "Credible Data" because of this important feature and because the enabling legislation was referred to as the credible data bill. Thus, the words "credible data" appear in the terminology applied to voluntary monitoring programs that choose to participate.

As envisioned by the legislation, any person with an interest in water quality should have a means to collect certain types of data useful for various inquiries about the quality of the water resource. Ohio EPA's role is to foster and broadly oversee the collection, analysis and use of data collected by such "volunteer" individuals and organizations. To promote scientific validity, Ohio EPA has established specific requirements to participate in the program and to collect data using approved study plans.

The law and the administrative regulations are the basis for establishing three broad categories or levels of data that will be deemed "credible" for distinctly different purposes. The overall premise is that there must be an increasing level of scientific rigor behind the sampling and analytical work as we progress from Level 1 to Level 2 to Level 3.

Level 1's purpose is primarily to promote public awareness and education about surface waters of the state. Level 1 may be appropriate for educators from Soil and Water Conservation Districts (SWCDs), Park Districts, Health Departments, schools or anyone with an interest in Ohio water quality.

Level 2 was designed with watershed groups in mind and may also be appropriate for SWCDs and Health Departments. Level 2 data can be used to evaluate the effectiveness of pollution controls, to conduct initial screening of water quality conditions and to promote public awareness and education about surface waters of the state. Level 2 groups are often in the position to perform the valuable function of monitoring long-term surface water quality trends in a watershed (where Ohio EPA may not have the resources to frequently revisit a particular area).

Level 3 provides the highest level of scientific rigor and methods are equivalent to those used by Ohio EPA personnel. The law limits the director's use of data collected under the credible data program for certain regulatory applications (for example, setting water quality standards and evaluating attainment of those standards) to verified Level 3 data. In other words, data submitted under this program as Level 1 and Level 2 data cannot be used for those regulatory purposes.

As of September 2015, the Agency has approved over 1,000 Qualified Data Collectors and 140 study plans. Ohio EPA has created a web-based portal for data entry and data access (Credible Data Online Application, http://www.epa.ohio.gov/dsw/credibledata/submission_of_data.aspx), available through Ohio EPA's eBusiness Center.

Inland Lakes Program

Ohio EPA initiated a renewed monitoring effort for inland lakes in 2008. This report assesses three of the four beneficial uses that apply to inland lakes: recreation, public drinking water supply and human health (via fish tissue). Ohio EPA is in the process of updating the water quality standards rules for lakes. Once these rule updates are complete, Ohio EPA expects to include an assessment of the aquatic life use for

lakes as a factor in listing watershed or large river assessment units in future CWA Section 303(d) lists. More information about Ohio EPA's Inland Lakes Program may be found in Section I of this report.

Lake Erie Program

Ohio EPA's DSW participates in many Lake Erie and Great Lakes related issues and efforts. The key program areas are implementation of Remedial Action Plans (RAPs) under the Areas of Concern Program and implementation of the binational Lake Erie Lake-wide Action and Management Plan (LAMP). Restoration of Areas of Concern (AOCs) and implementation of the Lake Erie LAMP are focused on reducing the loadings of pollutants and restoring all beneficial uses to these waterbodies. Both programs are described in the Great Lakes Water Quality Agreement (GLWQA) between Canada and the United States and are mandated under the Great Lakes Critical Programs Act amendment to the CWA. The GLWQA was most recently revised in 2012 and the Agency is directly involved in implementing the new goals and requirements contained in the agreement.

Ohio EPA also conducts routine monitoring of Lake Erie (within Ohio's jurisdiction) and is responsible for reporting the Lake's condition and identifying impaired waters under the CWA. Ohio EPA initiated a *Comprehensive Lake Erie Nearshore Monitoring Program* in 2011 with the assistance of a Great Lakes Restoration Initiative (GLRI) grant to develop and implement a comprehensive monitoring program. Ohio's long-term monitoring program includes an assessment of water and sediment quality in the western and central basins at fixed ambient stations located in shoreline (bays) and nearshore areas. Biological monitoring includes tracking of burrowing mayfly[1] populations and calculation of fish index scores at select shoreline locations. The hypoxia/anoxia phenomenon in the Central Basin is also monitored with a series of transects that connect fixed ambient stations to the open waters. Periodic intensive surveys in bays, harbors and estuaries are also done.

This monitoring effort supports Annex 2 in the GLWQA, which calls for development of nearshore monitoring to support an integrated nearshore framework. Annex 4 of the GLWQA addresses nutrients and Ohio EPA's monitoring may also support assessment of the lake ecosystem objectives identified in the agreement. Monitoring will directly support the agency's CWA evaluation of the Lake Erie Assessment Units in the bi-annual Integrated Report (IR). Additionally, long-term monitoring will provide the data needed to evaluate water quality trends, assess the effectiveness of remedial and nutrient reduction programs, measure compliance with jurisdictional regulatory programs, identify emerging problems and support AOC delisting.

Initiated in 2012, Ohio EPA expanded monitoring efforts to support the Lake Erie Charter Boat captain monitoring initiative. This unique public-private partnership engaged a key stakeholder that is directly impacted by the recent harmful algal blooms and declining water quality conditions on the lake. Ohio EPA has continued to provide funding to Ohio State University's (OSU) Stone Lab to manage the project and conduct sample analyses from the Charter Boat sampling initiative.

The Lake Erie Program works with many different Division and Agency programs to fulfill current program obligations. Due to the diverse nature of Lake Erie issues there are often activities that fall outside of the three primary components of the program (i.e., AOCs, Monitoring and LAMP) and meaningful engagement with other programs is essential.

[1] As an indicator organism, the status of mayfly populations can be used to evaluate long term changes in water and sediment quality (Krieger et al, 2004).

Areas of Concern (Remedial Action Plans)

Areas of Concern (AOCs) were initially identified in the early 1980s as the most environmentally degraded areas along Ohio's Lake Erie coast. Annex 1 of the GLWQA calls for restoration of beneficial uses that have become impaired due to local conditions at AOCs through development and implementation of RAPs. In many ways these beneficial use impairments (BUIs) reflect the same general goals as represented in the Ohio WQS, but many have targets that differ from the WQS criteria. The BUIs include: 1) restrictions on fish and wildlife consumption; 2) tainting of fish and wildlife flavor; 3) degradation of fish and wildlife populations; 4) fish tumors or other deformities; 5) bird or animal deformities or reproductive problems; 6) degradation of benthos; 7) restrictions on dredging; 8) eutrophication or undesirable algae; 9) restrictions on drinking water or taste and odor problems; 10) beach closings; 11) degradation of aesthetics; 12) added costs to agriculture and industry; 13) degradation of phytoplankton and zooplankton populations; and 14) loss of fish and wildlife habitat.

One way to track progress in AOCs is to measure how close the areas are to achieving restoration (delisting) targets. Restoration targets have been determined for each of the beneficial uses and the monitoring programs needed to evaluate the targets are now being designed and implemented. In 2014, Ohio EPA developed a new AOC Program Framework and updated the "Delisting Guidance and Restoration Targets for Ohio Areas of Concern." The new Framework and Guidance provide clarity for how the state and local AOC Advisory Committees will work together to implement the needed management actions and remove BUIs and delist the AOC. The guidance also assists in tracking progress toward achieving the stated delisting goals under the Great Lakes Regional Collaboration (GLRC) and the associated Great Lakes Initiative Action Plan.

Ohio EPA and our AOC partners have successfully leveraged funding under the GLRI and from other sources to complete assessments and implement effective restoration projects in the state's four AOCs. Figure C-1 displays the AOCs and major tributaries to Lake Erie; a description of each AOC follows.

Ashtabula River AOC

A series of successful dredging projects in 2006-2007 and 2012-2013 under the Great Lakes Legacy Act (GLLA) Program, the GLRI and other recent dredging by the U.S. Army Corps of Engineers (Corps) were critical actions needed to begin removal of BUIs in this AOC. Remediation of the contaminated sediments is necessary to remove BUIs for restrictions on dredging, degradation of benthos, fish tumors and fish consumption restrictions. To address the fish population and habitat related BUIs, Ohio EPA completed a large habitat restoration project on the 5 ½ Slip in 2012 and a sediment and restoration GLLA project in 2014 in the North Slip at Jacks Marine. In 2014 a significant milestone was reached with the completion of all management actions. The river is rapidly rebounding and in April 2014, three BUIs (fish consumption; fish and wildlife populations; and fish and wildlife habitats) were formally removed. There are now only three BUIs remaining in this AOC. Verification monitoring is needed to assess the effects of remediation and restoration activities including evaluation of the benthos community; fish tumors and other deformities; and characterization of current sediment quality. Once monitoring indicates that the river has responded as anticipated and restoration targets have been achieved, the Ashtabula River will be delisted as an AOC.

Black River AOC

There are nine BUIs in this AOC with one (fish tumors) listed as in recovery and two others ready for removal. U.S. EPA funded development of the Lower Black River Ecological Restoration Master Plan in 2009 and numerous restoration projects and characterization studies identified in the plan have been completed. In July 2015, the AOC was formally re-sized to include just the lower portions of the Black

River mainstem watershed and the French Creek watershed (East and West Braches are now excluded). Also in July 2015, U.S. EPA accepted a list from Ohio EPA and the Local Advisory Committee identifying the remaining management actions. Ohio EPA is working with U.S. EPA and the Black River AOC Advisory Committee and local implementers to complete the remaining projects. Progress in this AOC is accelerating and the local AOC Advisory Committee and partners are committed and energized to remove the remaining BUIs within the next few years.

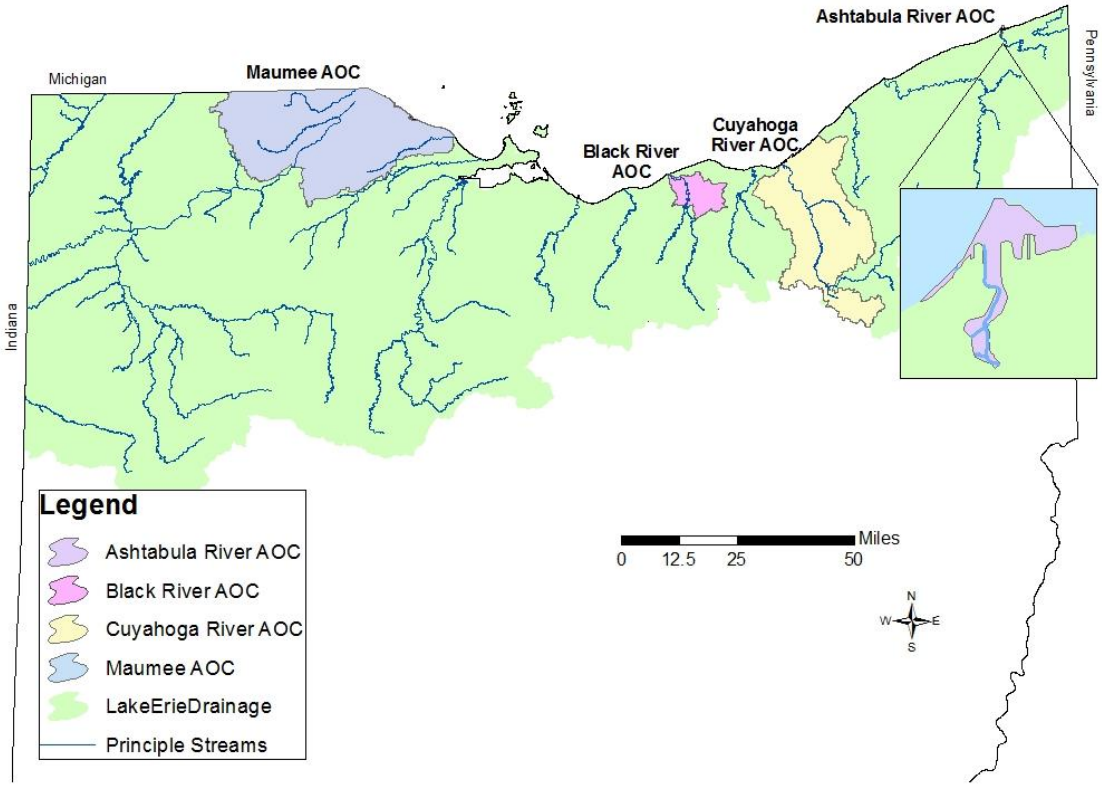

Figure C-1. Ohio Lake Erie AOCs and major Lake Erie tributaries.

Cuyahoga River AOC

There are nine BUIs in the Cuyahoga River AOC. The entire mainstem is achieving delisting targets for biological populations except in the Rt. 82/Brecksville dam pool, the Gorge Dam pool and in the navigation channel. Addressing the contaminated sediments is a top priority and a significant number of actions are currently underway. The final Environmental Impact Statement (EIS) report for the Route 82 Dam should be finalized later in 2016 with dam removal to follow and other projects are underway to improve habitat in the Cuyahoga River navigation channel. GLLA sediment characterizations studies are now final for the Old Channel and Gorge dam sediments and a feasibility study was completed for the Gorge Dam in September 2015 to determine the costs and steps needed to manage the impounded sediment and to remove the dam. The Cleveland Port Authority is developing a plan to address the Old River Channel sediments in 2016. In 2014-2015, Ohio EPA worked with the local facilitating organization to re-establish the Local Advisory Committee. New leadership has been appointed and the committee and sub-committees are formed. Ohio EPA also received a 2014 GLRI grant for strategic implementation planning within the AOC and this project will continue into 2016 and provide a foundation for the habitat restoration plan for the Cuyahoga AOC. Ohio EPA is working with the local AOC group to identify restoration needs, identify priority management actions and implement those projects.

Maumee River AOC
The Maumee AOC is Ohio's largest and most complicated AOC. Contaminated sediments, nonpoint sources, nutrient loads and habitat loss are all major issues. The Maumee River watershed is a major contributor to the impaired water quality of the western basin which is a priority concern under Annex 4 and the Lake Erie LAMP. An important milestone was reached in September 2015 with the removal of the first BUI (BUI12-added costs to agriculture and industry). There are nine BUIs remaining. A GLLA sediment remediation project and Natural Resource Damage Assessment (NRDA) are currently underway on the Ottawa River and other GLLA characterizations on the mainstem are continuing. These assessments are vital in helping Ohio EPA and the local Advisory Committee determine restoration needs and prioritize management actions. In 2014-2015, Ohio EPA worked with the local facilitating organization to re-establish the Local Advisory Committee. New leadership has been appointed and the committee and sub-committees are working to set the path forward. There is a revitalized sense of purpose and focus on delisting and recent assessments of BUI status under the new targets reveal that we are closer to removing several BUIs than previously thought.

Statewide AOC Projects
Ohio EPA revised the 2014 "Delisting Guidance and Restoration Targets for Ohio Areas of Concern." As the Local AOC Advisory Committees implemented the new targets and guidance, a number of corrections and improvements were identified including updating the Black River AOC boundary. The updated guidance (Version 2) was recently finalized in January 2016 and is available online at http://epa.ohio.gov/dsw/lakeerie/index.aspx#125637033-documents.

Lake Erie Lake-wide Action and Management Plan (LAMP, formerly LaMP)
Annex 2 of the GLWQA addresses binational lake-wide management and specifies that the LAMPs for each of the Great Lakes shall document and coordinate the management actions required in the Annex. Specifically, Annex 2 calls for the following management actions:

- establish lake ecosystem objectives;
- assemble, assess and report on existing scientific information;
- identify research, monitor and other priorities to support management actions;
- conduct surveys, inventories, studies and support outreach efforts;
- identify additional action needed to address priority water quality threats;
- develop and implement lake specific binational strategies; and
- by 2015, develop an integrated near shore framework for implementation.

The Lake Erie LAMP also serves as the primary mechanism for coordinating development and implementation of lake-wide habitat and species protection and conservation strategies as required in Annex 7 (Habitat and Species) of the GLWQA. The Lake Erie LAMP was originally intended to focus on reducing loadings of toxic chemical pollutants to the lake but now also includes strategies for addressing NPS pollutants such as nutrient loadings and habitat alterations as well as other issues affecting water quality such as land uses, invasive species and others. The Lake Erie LAMP is a comprehensive framework that outlines the management actions needed to bring Lake Erie back to chemical, physical and biological integrity. Work to restore the AOCs and implement the LAMP program both support the U.S. EPA Strategic Plan objective 2.2 – Protect and Restore Watershed and Aquatic Ecosystems.
Many of the new directives outlined in the 2012 GLWQA will be implemented through the binational LAMP partnership, including the binational nutrient reduction strategy for Lake Erie, the Nearshore monitoring framework and other initiatives. Although the LAMPs are not specifically mentioned in the

GLRC, many of the priorities addressed in the GLRC Strategy report are actions recommended by the LAMP. The Great Lakes Initiative Action Plan more strongly includes the LAMPs and does specifically emphasize the implementation of projects that will address LAMP priorities. It is becoming increasingly evident that local stream water quality targets may not be enough to achieve the restoration and protection of the lake. This requires building a stronger connection between watershed/AOC programs and the lake. Reducing nutrient loads and input from the Maumee River watershed, which have a significant impact on the state of Lake Erie, is a stated priority under the GLRI Action Plan. In fact, the Maumee has been identified as a priority watershed in the most recent GLRI Action Plan.

NPS and beach health issues listed in the GLRC and the GLRI plans are important issues for both the AOCs and the Lake Erie LAMP. Programs such as the CWA Section 319, the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000, CSO Long-term Control Plans, NRCS-supported agricultural BMP programs and many others are existing efforts that RAP and LAMP partners must coordinate with to expedite restoration. Since January 2014, Ohio EPA's Lake Erie program has been managed alongside the NPS program, which has strengthened coordination between the two programs.

For both the AOCs and the LAMP, it is imperative to keep the local communities and stakeholders engaged. In Ohio's AOCs, the local communities and partners have played a significant role in obtaining the resources for implementation, providing matching funds and serving as the local sponsor. A reliable, long-term source of funding is essential to continue to fund the administration and outreach costs associated with local coordinator leadership efforts. Public outreach efforts are also needed to better connect the decisions and projects in the watersheds to the environmental condition of the lake.

National Pollutant Discharge Elimination System (NPDES) Permits

To protect Ohio's water resources, Ohio EPA issues NPDES permits. These permits authorize the discharge of substances at levels that meet the more stringent of technology or water quality based effluent limits and establish other conditions related to issues such as CSOs, pretreatment and sludge disposal. This is an overview of the process for issuing individual NPDES permits. The series of steps for a particular permit may vary somewhat depending on the size, nature and complexity of the discharge.

The first step in developing an NPDES permit is acquisition of chemical, physical and biological data from the field and laboratory. In-stream chemical data are collected to determine the effect of the discharge on receiving water and sediment quality. Biological data are collected to determine if the discharge is having an impact on the fish and macroinvertebrate organisms that live in the receiving water. Effluent chemical data are also obtained to establish an accurate portrayal of current discharge conditions. In-stream chemical data and stream physical data, such as cross section measurements and flow, are necessary for conducting water quality modeling.

As part of developing effluent limits and monitoring requirements, the water quality standards that apply to the receiving water are determined and federal effluent guidelines are consulted for applicability. Permit conditions are developed to protect the designated use and associated chemical criteria of the receiving stream as well as any applicable technology requirements. Permits are also based on the applicable regulatory requirements to address issues such as new or expanded discharges, CSOs, sludge disposal and industrial pretreatment programs.

In places where a TMDL is in place, or under development, permit limits will also be developed to ensure they do not conflict with the TMDL. Permits may include schedules of compliance to meet the TMDL based limits. Permit writers are included on the TMDL teams and work with permittees and the TMDL

team on permit language necessary to implement the TMDL. This helps ensure there are no gaps between the TMDL results and the permit limits that are imposed.

Nonpoint Source (NPS) Program

The framework for Ohio's NPS Program is provided in Ohio's "Nonpoint Source Management Plan." The updated NPS Management Plan, which outlines strategies and objectives for Ohio's NPS program through 2018, was forwarded to U.S. EPA Region 5 on December 31, 2013. The updated plan includes a description of Ohio's NPS grant funding sources which include: Section 319(h) grants and Ohio's Surface Water Improvement Fund (SWIF). The NPS Management Plan (NSMP) also includes a listing of state, federal and local partners—those on whom we rely to best implement the strategies outlined in the updated plan.

The NSMP plan provides four sections where one can easily understand the strategic vision along with aggressive (yet reasonable) goals and objectives of Ohio's NPS Program over the next five years. These sections include:

1. Urban Sediment and Nutrient Reduction Strategies—including recommended practices
2. Altered Stream and Habitat Restoration Strategies—including recommended practices
3. NPS Reduction Strategies—including practices and management actions to reduce silt, sediment and nutrient losses from agricultural lands
4. High Quality Waters Protection Strategies

Ohio's NPS Program currently is administering various GLRI grants, including:

- The Lake Erie Nutrient Reduction Demonstration Project – Loss Creek, Sandusky River watershed (Crawford County, Ohio), which expanded into Brandywine/Broken Sword watershed and focuses on agricultural conservation and storm water runoff;
- The Lake Erie Watersheds Nutrient Reduction Project, Phase 2 – Loss Creek, Brandywine/Broken Sword Creeks, Indian Run-Broken Sword Creek, Headwaters Sycamore Creek and Greasy Run-Sycamore Creek watersheds (Crawford County, Ohio) with focus on agricultural conservation projects;
- Lye Creek, Blanchard River watershed (Hancock County, Ohio), which has expanded into Eagle Creek watershed and focuses on agricultural conservation practices, riparian restoration and storm water demonstration projects;
- Powell Creek, Auglaize River watershed (Defiance and Putnam counties, Ohio), which focuses primarily on agricultural conservation practices and some home sewage treatment system work; and
- Maumee River Sediment and Nutrient Reduction Initiative, which includes eight unique subgrants in locations throughout the Maumee watershed in Ohio for projects such as stream restoration, wetland restoration, riparian restoration, an innovative agricultural runoff and reuse project, an innovative channel and drainage water management project and urban storm water bio-retention.

Ohio's NPS Program has recently wrapped up Cuyahoga County and Lucas County (county-specific) Storm water Demonstration grants, where matching SWIF dollars helped to leverage approximately 22 projects in the past several years.

Ohio's NPS program also oversees several other important programs and initiatives. The Ohio Inland

Lakes program is designed to access, evaluate and protect or restore Ohio's inland lakes. The updated NPS Management Plan includes five-year goals and objectives for the Inland Lakes Program. The Ohio NPS program oversees the Healthy Waters Initiative, which implements activities based upon the findings of TMDL reports and action items provided in endorsed watershed action plans. The Ohio NPS program oversees the Ohio Watershed Program. Fifteen years after it was established, the Ohio Watershed Program is in a state of transition. Ohio's Watershed Program is now much more focused on implementing practices identified in TMDLs and endorsed watershed action plans and tracking progress.

Ohio's NPS program is now also overseeing Ohio's Lake Erie Program. This program tracks implementation of RAPs on Lake Erie tributaries designated as "Areas of Concern," supports Lake Erie shoreline monitoring and participates in the development and implementation of the LAMP, a document that outlines and helps coordinate management actions to protect and restore Lake Erie. The updated NPS Management Plan includes five-year goals and objectives for Ohio's Lake Erie Program. The most current version of Ohio's NPS Management Plan is available at: http://www.epa.ohio.gov/Portals/35/nps/NPS_Mgmt_Plan.pdf.

Most of Ohio's population is located in urban areas and, likewise, are located near major rivers that are impacted by hydromodification, riparian corridor losses and inputs from storm sewer. Ohio's NPS Program is committed to partner with communities; to provide leadership and funding for communities; and to use a well-defined hierarchy that prioritizes projects, so that high magnitude causes of impairment are eliminated and impaired streams segments in urban areas are incrementally restored.

Progress toward achievement of Ohio's Section 319(h) grants program goals will continue to be measured as part of Ohio's NPS Monitoring and Assessment Initiative. For the past eight years, Ohio EPA staff has conducted all monitoring (physical, chemical and biological), beginning with baseline monitoring through project completion to determine the effectiveness of Section 319 (h) and SWIF funded NPS projects. This initiative not only provides cost savings and improved data quality, but also relieves grant recipients of a task which was often difficult for them to do properly. This initiative also serves as a very important environmental measure: are NPS-funded projects improving water quality or not?

Pretreatment

The State of Ohio received authorization to administer the Pretreatment Program on July 27, 1983. Ohio EPA has approved 126 municipal pretreatment programs and continues to provide pretreatment training and guidance. Many of these programs, such as Cincinnati's Metropolitan Sewer District and Cleveland's Northeast Ohio Regional Sewer District, are national leaders and are regarded as very strong pretreatment programs.

A goal of Ohio EPA's Pretreatment Program is to permit 100 percent of significant industrial users (SIUs) with control mechanisms to implement applicable pretreatment standards and requirements. Ohio EPA's permit framework is designed to ensure that all SIUs within the state, regardless of the POTW's pretreatment program approval status, are issued permits. Those SIUs in approved pretreatment program POTWs are identified by industrial user surveys. As of June 2015, there are 1,274 SIUs discharging to POTWs with approved programs and 133 (known) SIUs that discharge into pretreatment POTWs without approved pretreatment programs have control mechanisms for a total of 1,407 known SIUs in Ohio.

A highlight of Ohio's pretreatment program is the strong indirect discharge permit (IDP) program. The IDP program permits, monitors, inspects and provides enforcement to the SIUs that discharge into pretreatment POTWs without approved pretreatment programs. By this program, Ohio EPA prevents toxic discharges to these smaller POTWs and thereby reduces the potential of severe environmental harm from these facilities.

Section 208 Plans and State Water Quality Management Plan

Ohio EPA oversees the State Water Quality Management (WQM) Plan. The State WQM plan is a requirement of CWA Section 303 and must include nine discrete elements:

1. TMDLs
2. Effluent limits
3. Municipal and industrial waste treatment
4. NPS management and control
5. Management agencies
6. Implementation measures
7. Dredge and fill program
8. Basin plans
9. Ground water

The State WQM plan is an encyclopedia of information used to plot and direct actions that abate pollution and preserve clean water. A wide variety of issues is addressed and framed within the context of applicable laws and regulations. For some issues and locales, information about local communities may be covered in the plan. Other issues are covered only at a statewide level. Many of the topics or issues overlap with planning requirements of CWA Section 208 (items 3-9 above). The State WQM plan includes, through references to separate documents, all 208 plans in the State.

Local governments typically conduct planning to meet the sewage disposal needs of the community. Ohio EPA has established guidelines for planning that are useful in the context of Section 208 and the State WQM plan. Local governments that follow these guidelines are more likely to have the results of their planning work incorporated into the State 208 plan prepared by Ohio EPA. The Areawide Planning Agencies have established their own operating protocols, committees and processes to involve local governments in shaping their 208 plans.

Under Section 208 of the federal CWA, States may designate regional planning agencies to prepare, maintain and implement water quality management plans. All six Areawide Planning Agencies were able to update their 208 plans in 2011, because of increased funding through the American Recovery and Reinvestment Act of 2009 (ARRA) and the State's biennium budget. Additional updates occur on an ongoing basis. The most recent 208 Plan amendments were approved by U.S. EPA on April 8, 2016.

Section 401 Water Quality Certifications

The CWA requires anyone who wishes to discharge dredged or fill material into the waters of the United States, regardless of whether on private or public property, to obtain a CWA Section 404 permit from the Corps and a CWA Section 401 Water Quality Certification (WQC) from the state. Ohio EPA is responsible for administering the CWA Section 401 WQC process in Ohio.

Rules governing the 401 review process are currently found in OAC 3745-1-05 (Stream Antidegradation), 3745-1-50 through 54 (Wetland Water Quality Standards) and 3745-32-01 through 7 (Section 401 WQCs).

Under Ohio's Antidegradation Review, the director may authorize the lowering of water quality resulting from the discharge of dredged or fill material only after determining that the lowering of water quality will not result in the violation of state water quality standards. This is achieved through 1) conducting an alternatives analysis; 2) intergovernmental coordination with other state and federal resource agencies; and 3) a public involvement process.

Applicants must develop three alternatives for each development: preferred, minimal degradation and non-degradation alternatives. The alternatives analysis is intended to walk applicants through a deliberate process to avoid and minimize impacts to aquatic resources while still achieving the project's purpose and need. Applicants must provide compensatory mitigation for any unavoidable impacts to streams and/or wetlands. The program emphasizes evaluation of physical habitat and bio-criteria to determine potential impacts to water quality and to evaluate potential mitigation sites.

Ohio EPA strongly encourages applicants to engage in pre-application coordination early in the development phase to help identify high quality resources, discuss potential alternatives and identify mitigation obligations. Under state law, the 401 application must contain 10 specific items in order for the technical review to begin. When the application is formally considered complete, Ohio EPA has 180 days to conduct its technical review and either approve or deny the project. An applicant may withdraw the application. All projects are subject to minimum 30-day public comment period. Controversial projects may also require a public hearing.

Nationwide permits (NWPs) are general permits issued by the Corps for certain types of projects that are similar in nature and cause minimal degradation to surface waters of the State. There are currently 49 NWPs. Ohio EPA certified many of the NWPs on March 30, 2012, and April 19, 2012 (subject to conditions). The NWPs must be renewed every five years.

401 staff are assigned a specific region of the state based on Ohio EPA districts. In addition, Ohio EPA has staff dedicated specifically to the review of coal mining and Ohio Department of Transportation (ODOT) projects, as well as the review of stream and wetland mitigation project compliance. Additional staff is dedicated to wetland research in support of the 401 WQC program.

Semi-Public Disposal System Inspection Contracts (HB 110)

Annually, Ohio EPA issues hundreds of permits for the installation and operation of small, commercial/industrial wastewater treatment and/or disposal systems. These may be onsite soil dissipation systems or discharging systems under the NPDES permit program for the treatment and disposal of sewage generated within the operation. To date, there are thousands of these small systems operating in Ohio. These "semi-public" systems may include apartment complexes, small businesses, industrial parks, etc. and, by definition, are basically any system that treats sewage from human activities up to a capacity of 25,000 gallons per day. Because of the magnitude and resources available, many of these systems have the potential of going without regular inspections to determine if they are complying with state rules, laws and regulations and ultimately protecting water quality.

As an aid to support this program, the Ohio General Assembly created Ohio EPA's HB110 Program. The program is a contractual partnership between local health districts and Ohio EPA, whereby local health districts (LHDs) conduct, on behalf of the Agency, inspection and enforcement services for commercial sanitary waste treatment/disposal systems discharging between 0-25,000 gallons per day (semi-publics).

Ohio EPA operates the HB110 Program to better protect the public health and welfare and to protect

the environment. Ohio EPA believes that because of the proximity, the multitude of facilities, and the availability of resources, oversight of operations for sanitary waste disposal at semi-publics may best be accomplished locally by qualified personnel.

To offset costs of local oversight, State law (ORC 3709.085) authorizes LHDs to charge fees for inspection services to be paid by semi-publics.

Inspection Program
In accordance with Ohio EPA's HB110 contracts, LHDs regularly inspect sanitary facilities at semi-publics for compliance with Ohio's water pollution control laws and regulations. Investigations of complaints regarding waste disposal by semi-publics are also accomplished locally.

Ohio EPA also consults with LHDs on the approval of plans and issuance of PTIs for semi-publics. Installation inspections may be performed locally to ensure compliance with Ohio EPA's PTI conditions.

Enforcement Activities
In coordination with Ohio EPA, LHDs may notify entities of noncompliance with Ohio's water pollution control regulations. LHDs are also instrumental in identifying semi-publics installed without PTIs, of which Ohio EPA may not be aware.

Where noncompliance notification and informal requests fail to correct violations, entities may be referred to Ohio EPA for enforcement or the County Prosecutor may bring an action under local nuisance ordinances. All discharges of pollutants in a location where they cause pollution of waters of the state that are unpermitted or in excess of permitted amounts are statutory nuisances under Revised Code 6111.04.

Training Program
Ohio EPA intends to provide periodic training for LHDs. Training programs will focus on sanitary waste disposal for Semi-Public facilities, technical assistance, inspection issues and enforcement case development.

Summary
The HB110 Program is a unique opportunity for Ohio EPA and LHDs to assist one another in achieving the mutual goal of protecting public health and welfare. Through responsible regulation of Semi-Public facilities, the local community will benefit from decreased health risks and the State as a whole will benefit from improvements in water quality. Ohio EPA welcomes the participation of all LHDs.

Storm Water Permit Program
Ohio EPA implements the federal regulations for storm water dischargers. Dischargers currently covered include certain municipalities (Phases I and II of the program) with separate storm sewer systems (MS4s) and those facilities that meet the definition of industrial activity, including construction, in the federal regulations.

In 1992, Ohio EPA issued two NPDES general storm water permits: one for construction activity and the other for all remaining categories of industrial activity. The strategy was to permit the majority of storm water dischargers with these baseline general permits (33 USC Section 1342; OAC Chapter 3745-38). It is estimated that over 38,000 storm water discharges have been granted general permit coverage since that time.

The industrial permit has been renewed four times. The construction permit was renewed in April 2013, for the third time and addresses large and small constructions sites. The application form is one-page and called a Notice of Intent (NOI). Ohio EPA responds to NOIs with approval letters for coverage under one of the general permits or, in limited instances, instructions to apply for an individual permit.

After the baseline general permits were issued, Ohio EPA directed its efforts towards further permitting, compliance and enforcement activities, education and technical assistance. Inspections and complaint investigations for compliance and enforcement have been handled at the district level as resources allow. BMPs and pollution prevention has been the major thrust of education and technical assistance activities.

On the municipal side of permitting, five large and medium municipalities in Ohio submitted applications between November 1991 and November 1993. A work group was formed with the cities to draft acceptable permit language for the municipal permits. BMPs included in a citywide storm water management plan were the primary focus of the permits. The cities of Dayton, Toledo and Akron received their original permits in 1997. Exceptions for Cleveland and Cincinnati were also processed[2]. Columbus received its initial permit in 2000. Permits for Columbus, Toledo and Akron have been renewed twice. Dayton's permit has been renewed three times.

Additional categories of discharges, both public and privately owned, were included in Phase II. U.S. EPA issued Phase II regulations in December of 1999. The Phase II storm water regulations required a general permit for small MS4s be issued by December of 2002 and required applications by March of 2003. Ohio EPA issued two general permits for small MS4s during 2002. One is a baseline permit and the second is for MS4s in rapidly developing watersheds. This latter permit accelerated construction and post-construction measures to protect surface waters from the impacts of high density land use development. Federal regulations allowed small MS4s to apply for individual NPDES permits in lieu of general permit coverage. No small MS4 within Ohio chose the individual permit option. The third generation of the Small MS4 general permit was renewed on September 11, 2014.

On the construction side of permitting, Ohio EPA has begun to develop and issue watershed specific construction permits if recommended by a TMDL. On September 12, 2006, Ohio EPA issued a watershed specific construction permit for the Big Darby Creek watershed and this permit was renewed on October 1, 2012. On January 23, 2009, Ohio EPA issued a watershed specific construction permit for portions of the Olentangy River watershed and this permit was renewed on June 2, 2014. These permits contain conditions/requirements that differ from the standard construction permit and each other. Ohio EPA anticipates developing additional watershed specific permits when recommended by TMDLs.

Total Maximum Daily Load (TMDL) Program

The TMDL program identifies and restores polluted waters. TMDLs can be viewed simply as problem solving: investigate the problem, decide on a solution, implement the solution and check back to make

[2] Phase I federal storm water regulations required permit coverage for municipal separate storm sewer systems (MS4s), which had a MS4 service population of 100,000 or more to obtain NPDES permits. Cleveland and Cincinnati were able to demonstrate that their MS4 service population was less than 100,000 people due to large areas of these cities being served by combined sewers. These two cities were permitted under Phase II of the small MS4 general permit in March 2003. Cleveland and Cincinnati currently have coverage under the third generation Small MS4 general permit.

sure the solution worked. By integrating programs and aligning resources, Ohio is pursuing TMDLs as a powerful tool to develop watershed-specific prescriptions to improve impaired waters.

Ohio uses three key enhancements to the basic federal TMDL requirements to increase the chances that real, measurable improvements in Ohio's water resources will result:

- an initial, in-depth watershed assessment to obtain recent data for analysis of problems and discussion of alternatives;
- implementation actions identified as part of the TMDL with follow-through in permitting and incentive programs such as 319 and loan funds; and
- involving others – citizens, landowners, officials, natural resource professionals – in the process.

In particular, involving others is critical to restoring waters. Working watershed by watershed, Ohio EPA meets with citizens and landowners to explain the findings of our water quality studies and to identify workable solutions to the problems Ohio EPA has found. Ohio EPA includes other agencies that can improve water resources either by exercising their authority in new ways or through relationships they have already established with critical decision makers. After solutions are identified and recommendations are made, Ohio EPA follows through with meetings with consultants, elected officials and others to ensure that projects continue to completion.

Recent Developments in the TMDL Program
On March 24, 2015, the Supreme Court of Ohio determined that "A TMDL established by Ohio EPA pursuant to the Clean Water Act is a rule that is subject to the requirements of R.C. Chapter 119, the Ohio Administrative Procedure Act. Ohio EPA must follow the rulemaking procedure in R.C. Chapter 119 before submitting a TMDL to U.S. EPA for its approval and before the TMDL may be implemented in an NPDES permit" (*Fairfield Cty. Bd. of Commrs. v. Nally,* 143 Ohio St.3d 93, 2015-Ohio-991 available online at http://www.supremecourt.ohio.gov/rod/docs/pdf/0/2015/2015-Ohio-991.pdf).

Prior to the ruling, TMDLs had been approved by U.S. EPA in approximately 75 percent of Ohio's WAUs, as shown in the "Ohio TMDL Program Progress" map in Section K of this report. By the end of 2015, more than 60 TMDL projects had been approved by U.S. EPA and nearly 40 others are currently being developed. Because none of Ohio EPA's TMDLs have been adopted as rules under Chapter 119 of the Revised Code, the effect of the Supreme Court's ruling is arguably invalidation of all the previously approved TMDLs[3] and requires the development of a new process for finalizing any future TMDLs. Ohio EPA is evaluating alternatives for addressing both past and future TMDLs and expects to have a process in place before the next IR is released.

All of the TMDLs are available on Ohio EPA's website at http://www.epa.ohio.gov/dsw/tmdl/index.aspx.

Water Quality Standards (WQS) Program
Ohio's water quality is constantly threatened by many different sources and types of pollution. Under the CWA, every state must adopt water quality standards to protect, maintain and improve the quality of the nation's surface waters. These standards represent a level of water quality that will support the goal of "swimmable/fishable" waters. Water quality standards are ambient standards as opposed to

[3] The approved projects included two federal TMDLs completed by U.S. EPA Region 5: Wabash River (05120101 101 and 040) and Mahoning River (05030103 050 and 080). Those TMDLs were not impacted by the Supreme Court decision.

discharge-type standards. These ambient standards, through a process of back calculation procedures known as TMDLs or wasteload allocations (WLA) form the basis of water quality- based permit limitations that regulate the discharge of pollutants into surface waters of the state under the NPDES permit program. The key components of Ohio's WQS (OAC Chapter 3745-1) are described below.

Beneficial use designations describe existing or potential uses of water bodies. They take into consideration the use and value of water for public water supplies, protection and propagation of aquatic life, recreation in and on the water, agricultural, industrial and other purposes. Ohio EPA assigns beneficial use designations to water bodies in the state. There may be more than one use designation assigned to a water body. Examples of beneficial use designations include: public water supply, primary contact recreation and aquatic life uses (warmwater habitat, exceptional warmwater habitat, etc.).

Numeric criteria are estimations of concentrations of chemicals and degree of aquatic life toxicity allowable in a water body without adversely impacting its beneficial uses. Although numeric criteria are applied to water bodies, they primarily are used to regulate dischargers through NPDES permits. To ensure protection of those beneficial uses, Ohio EPA determines maximum acceptable concentrations for over 100 chemicals.

Narrative criteria are general water quality criteria that apply to all surface waters. These criteria state that all waters shall be free from sludge, floating debris, oil and scum, color and odor producing materials, substances that are harmful to human, animal or aquatic life and nutrients in concentrations that may cause algal blooms. Much of Ohio EPA's present strategy regarding water quality based permitting is based upon the narrative free from, "no toxics in toxic amounts." Ohio EPA developed its strategy based on an evaluation of the potential for significant toxic impacts within the receiving waters. Other components of this evaluation are the biological survey program and the biological criteria used to judge aquatic life use attainment.

Biological criteria are based on aquatic community characteristics that are measured both structurally and functionally. These criteria are used to evaluate the attainment of aquatic life uses. The data collected in these assessments are used to characterize aquatic life impairment and to help diagnose the cause of this impairment. The principal biological evaluation tools used by Ohio EPA are the Index of Biotic Integrity (IBI), the Modified Index of well-being (MIwb) and the Invertebrate Community Index (ICI). These three indices are based on species richness, trophic composition, diversity, presence of pollution-tolerant individuals or species, abundance of biomass and the presence of diseased or abnormal organisms. The IBI and the MIwb apply to fish; the ICI applies to macroinvertebrates. Ohio EPA uses the results of sampling reference sites to set minimum criteria index scores for use designations in water quality standards.

Antidegradation policy aims to keep clean waters cleaner than the applicable chemical criteria set by the standards wherever possible. The policy is adopted in rule (OAC 3745-1-05) and describes the conditions under which lowering water quality may be authorized under a discharge permit from Ohio EPA. Existing beneficial uses must be maintained and protected. Water quality better than that needed to protect existing beneficial uses must be maintained unless lower quality is deemed necessary to allow important economic or social development (existing beneficial uses must still be protected).

Public participation is mandated and encouraged in all administrative rule makings including the WQS. Any interested individuals are afforded an opportunity to participate in the process of developing water quality standards. Ohio EPA reviews and, as appropriate, revises water quality standards at least once

every three years. When water quality standards revisions are proposed, the public is notified of these revisions. A public hearing is held to gather input and comments.

Wetland Bioassessment Program

Numerous grants from U.S. EPA over many years have funded work that is advancing the science of wetland assessment methodologies in Ohio. Published work includes an amphibian index of biotic integrity (AmphIBI) for wetlands, a vegetation index of biotic integrity (VIBI) for wetlands and a comparison of natural and mitigation (constructed) wetlands. More recently, reports on an assessment analysis of the association between streams and wetland condition and functions in the Big Run Scioto River watershed, incorporating wetland information with data from other surface water resources to develop a TMDL analysis of a central Ohio watershed and the development of a GIS tool to identify potential vernal pool habitat restoration areas have been made available on DSW's web page: http://www.epa.ohio.gov/dsw/401/ecology.aspx.

DSW recently finalized a report from a U.S. EPA grant to assess the ecological condition of 50 randomly selected natural wetlands across Ohio to generate a "scorecard" of wetland condition. This grant "intensifies" data collected as part of U.S. EPA's National Wetland Condition Assessment conducted across the United States in 2011. Also in progress is a detailed study to improve mitigation success in Ohio, which will include a publicly-accessible GIS website for selecting sites with a high likelihood of achieving ecological success; the creation of a simple soil health assessment tool to better identify sites that may require remediation due to historical soil disturbances; and a survey of reference condition riparian habitats to develop specific ecological performance goals for riparian vegetation restoration projects.

DSW has also recently streamlined its VIBI procedure to simplify data collection, analysis and interpretation, with the goal of enhancing the utility of this assessment as a monitoring tool for wetland restoration projects. The modified procedure, called the VIBI-Floristic Quality (VIBI-FQ), is beginning to be used to monitor compensatory mitigation, 319 grants and contaminated clean-up sites, which have required the establishment of wetland habitat. The initial results have been extremely encouraging.

Wetland Protection Program

Ohio's Wetland Water Quality Standards (OAC 3745-1-50 to -54) contain definitions, beneficial use designations, narrative criteria and antidegradation provisions that guide Ohio EPA's review of projects in which applicants are seeking authorization to discharge dredged or fill material into wetlands. OAC 3745-1-53 gives all wetlands the "wetland" designated beneficial aquatic life use. However, wetlands are further defined as Category 1, 2 or 3 based on the wetland's relative functions and values, sensitivity to disturbance, rarity and potential to be adequately compensated for by wetland mitigation.

Category 1, 2 and 3 wetlands demonstrate minimal, moderate and superior wetland functions, respectively. Category 1 wetlands are typified by low species diversity, a predominance of non-native species, no significant habitat or wildlife use and limited potential to achieve beneficial wetland functions. Category 2 wetlands may be typified by wetlands dominated by native species but generally without the presence of, or habitat for, rare, threatened or endangered species, as well as wetlands that are degraded but have a reasonable potential for reestablishing lost wetland functions. Category 3 wetlands typically possess high levels of diversity, a high proportion of native species, high functional values and may contain the presence of, or habitat for rare, threatened and endangered species. Wetlands that are scarce, either regionally or statewide, form a subcategory of Category 3 wetlands for which, when allowable, only short-term disturbances may be authorized.

The rigor of the antidegradation review conducted under OAC 3745-1-50 through -54 is based on the category of the wetland(s) proposed to be impacted. Category 1 wetlands are classified as Limited Quality Waters and may be impacted after examining avoidance and minimization measures and determining that no significant impacts to water quality will result from the impacts. Category 2 and 3 wetlands are classified as General High Quality Waters and may be impacted only after a formal examination of alternatives and a determination that the lowering of water quality is necessary to accommodate social and economic development. In addition, an applicant must demonstrate that "public need" is achieved in order to receive authorization to impact Category 3 wetlands. Compensatory mitigation ratios are based on wetland category, vegetation class and proximity of the mitigation to the impact site.

C2. Program Summary – Environmental and Financial Assistance

The Division of Environmental and Financial Assistance (DEFA) provides incentive financing; supports the development of effective projects; and encourages environmentally proactive behaviors through two main programs: the Ohio Water Pollution Control Loan Fund (WPCLF) and the Water Supply Revolving Loan Account (WSRLA).

Water Pollution Control Loan Fund
In calendar year 2014, the WPCLF financed a number of municipal wastewater treatment needs, as well as NPS pollution control needs, as enumerated below. Through this program, $358,978,319 in financing was provided for 103 projects, of which 90 projects were for municipal point sources and 13 projects assisted NPS controls.

The WPCLF financed implementation of 90 municipal wastewater treatment projects costing $346,119,366. These projects directly addressed sources of impairment for Ohio water resources. 36 of these 90 loans (totaling $54,962,701) were made to communities with a service population of fewer than 5,000 people.

During calendar year 2014, a total of $12,858,953 was awarded for 13 NPS pollution control projects. The Water Resource Restoration Sponsor Program (WRRSP) financed seven projects for $12,522,953 to protect and restore stream and wetland aquatic habitats. Additionally, the WPCLF awarded six direct (principal forgiveness) loans totaling $336,000 for the correction of failing home sewage treatment systems to economically distressed individuals.

Water Supply Revolving Loan Account
The Water Supply Revolving Loan Account focuses on drinking water supplies. In SFY 2014, the fund made 40 loans totaling $47,816,507, which included $17,007,955 to economically disadvantaged communities.

C3. Program Summary – Drinking and Ground Waters

The mission of Ohio EPA's Division of Drinking and Ground Waters (DDAGW) is to "protect human health by characterizing and protecting ground water quality and ensuring that Ohio's public water systems provide adequate supplies of safe water." The division has several programs in place to achieve this mission.

Drinking Water Program
Every Ohioan relies on a safe source of drinking water. DDAGW's Drinking Water Program has jurisdiction over 5,000 public water systems that are required to ensure a safe and adequate supply of drinking water to over 11 million Ohioans.

The Drinking Water Program's functions include overseeing the design and construction of drinking water treatment facilities through plan approval; conducting sanitary survey inspections; administering an operator certification program and a drinking water revolving loan fund; managing compliance monitoring for bacteriological and chemical contaminants; working with public water systems to implement corrective actions when significant deficiencies are identified; developing state rules and guidance for implementing new federal drinking water regulations; and sharing public water system information with the public on the division's web site. Significant interdivision and interagency efforts are being expended to assist public water systems and implement Ohio's Public Water System Harmful Algal Bloom Response Strategy. In 2016, a new section was created in DDAGW to manage and implement both the public water system and recreational HAB response.

Ground Water Program
DDAGW's Ground Water Program maintains a statewide ambient ground water quality monitoring program; shares ground water quality data on the division web site; conducts ground water quality investigations; provides technical support to other Ohio EPA programs by providing technical expertise on local hydrogeology and ground water quality; and protects ground water resources through the regulation of waste fluid disposal in its Underground Injection Program for Class I, IV and V wells.

Source Water Protection Program
Several programs are in place or are being implemented to help protect Ohio's water resources. The Source Water Assessment and Protection Program protects aquifers and surface water bodies that are used by public water systems. A public water supply beneficial use assessment methodology has been developed in conjunction with DSW and it is being implemented.

C4. Program Summary – Environmental Services

For Ohio EPA to protect public health and the environment, Agency staff depends on scientific data to make well-informed decisions. The Division of Environmental Services (DES), Ohio EPA's laboratory, provides most of this data. DES analyzes environmental samples for more than 300 parameters. The laboratory provides chemical and microbiological analyses of drinking, surface and ground water; wastewater effluent; sediment; soil; sludge; manure; air filters and air canisters; and fish tissue.

DES processes approximately 10,000 samples annually, generating approximately 139,500 inorganic and 91,000 organic data points. DES also is responsible for administrating U.S EPA's Discharge Monitoring Report-Quality Assurance Study Program, inspects drinking water and wastewater laboratories and provides technical assistance to Ohio EPA divisions as well as state and local agencies.

C5. Cooperation among State Agencies and Departments

Ohio Water Resources Council
The Ohio Water Resources Council (OWRC), established in statute in 2001, is a forum for policy development, collaboration and coordination for one of Ohio's most important natural resources –

water. The OWRC membership is comprised of an Executive Assistant to the Governor and the directors of the following nine state agencies and commissions:

- Ohio Environmental Protection Agency
- Ohio Department of Natural Resources
- Ohio Department of Health
- Ohio Water Development Authority
- Ohio Public Works Commission
- Ohio Department of Transportation
- Public Utilities Commission of Ohio
- Ohio Department of Agriculture
- Ohio Department of Development

Members of the OWRC meet regularly to work on initiatives and projects that will advance Ohio's strategic goals for water resource management. Two groups assist the OWRC in pursuing its goals. The State Agency Coordinating Group, consisting of staff from the member agencies and the executive director of the Ohio Lake Erie Commission, serves Council members in support and research roles. The Advisory Group, including 20 members appointed by the OWRC and eight technical members representing a variety of stakeholder groups, advise the Council and participate in work groups to develop recommendations on water resource issues. Additional information is available online at http://epa.ohio.gov/dsw/owrc.aspx.

The continued collection of long-term water resources data, effective management of the data and easy access to data and information have been identified as a strategic issue in the OWRC Strategic Action Plan for many years. In 2012, the State Agency Coordinating Group created the Water Quality Monitoring Steering Committee – a small, action oriented group charged with enhancing the effectiveness and use of surface and ground water quality data collected in Ohio. The Committee is composed of ground water and surface water technical or management staff from five state agencies (Agriculture, Health, Natural Resources, Transportation and Environmental Protection) and USGS. Ohio EPA's DSW is the designated lead for the committee.

The first priority identified, and being actively pursued, is to better share and disseminate surface water quality data collected by state agencies. A pilot project with ODNR's Divisions of Oil and Gas and Mineral Resources is underway that would enable sending their surface water quality data to U.S. EPA's STORET database so it would be available through a federally maintained web portal. Once that is accomplished, other Divisions of ODNR (e.g. Wildlife) may be approached to continue this effort. Future plans include developing similar protocols for groundwater data and compliance data and eventually branching out to other significant water quality and quantity data collectors in the state.

Ohio Lake Erie Commission

The Ohio Lake Erie Commission is comprised of the directors of Ohio EPA and the Ohio departments of natural resources, transportation, development, health and agriculture and up to five additional members appointed by the governor. The role of the Commission is to preserve Lake Erie's natural resources, to protect the quality of its waters and ecosystem and to promote economic development of the region. The Commission administers Ohio's Lake Erie Protection Fund, which was established to finance research and implementation projects aimed at protecting, preserving and restoring Lake Erie and its watershed. Since its inception in 1993, the Commission has awarded over 12 million dollars for projects that focus on an array of issues critical to the effective management of Lake Erie and further

the goals of the *Lake Erie Protection and Restoration Plan*. The Fund is supported through tax-deductible donation or purchase of a Lake Erie license plate, which displays the Marblehead Lighthouse or the Lake Erie life preserver. Additional information is available online at http://lakeerie.ohio.gov/.

C6. Funding Sources for Pollution Controls

It is beyond the means of this report to place a dollar value on the environmental improvements gained to date. However, Ohio EPA has documented the recovery of numerous major river segments including the Cuyahoga River, Licking River, Paint Creek and Scioto River. The most successful restoration efforts in Ohio have been those that have combined one or more funding sources to reach water resource goals. Different funding sources are directed towards many different facets of water resource management, so there is always a challenge to pursue and coordinate the different programs at one time. Such coordination takes time and administrative effort to be successful.

There are several funding sources for water quality improvement projects in Ohio. Funding for wastewater and drinking water infrastructure improvement projects is available through Ohio EPA (WPCLF and WSRLA), the Ohio Water Development Authority (OWDA), Ohio Public Works Commission (OPWC), U.S. Department of Agriculture (USDA) Rural Development and the Community Development Block Grant (CDBG) program. An Ohio EPA publication titled, "State and Federal Funding for Drinking Water and Wastewater Systems" details some of these funding sources.

There is also funding available for preservation, conservation and restoration projects that directly benefit water quality. These include the Clean Ohio Fund, Section 319 Grants Program, Surface Water Improvements Fund (SWIF), GLRI, Conservation Reserve Program (CRP) and Ohio EPA's WRRSP. Additional funds from the federal government, as well as the investment in water pollution control measures made by municipal and county governments and the private sector, are the reason for dramatic improvements in water quality in Ohio since the inception of the federal CWA in 1972.

A summary of funding sources, amounts and trends is presented here. The summary is not exhaustive. Efforts have been made to include funding sources not traditionally associated strictly with water quality improvement, but that nevertheless have the potential to positively impact Ohio's water resources.

Clean Ohio Fund

Although not tied directly to measures of water resource improvement, a major Ohio bond fund provides funds for projects that should positively impact water quality in the state. The Clean Ohio Fund, created in November 2000, provides $400 million over four years for "Brownfield" environmental cleanup projects and "Greenfield" open space and conservation preservation projects. Placed before Ohio's voters as Issue 2 in 2008, the ballot initiative was overwhelmingly approved in all 88 counties, which extended the Fund with another $400 million bond program. The Fund consists of four competitive funding programs, as described below.

Table C-1. Descriptions of Clean Ohio Fund programs.

Clean Ohio Program	Purpose	Administered by	Funding/year
Clean Ohio Green Space Conservation Program	funds preservation of open spaces, sensitive ecological areas and stream corridors	Ohio Public Works Commission	$37,500,000
Clean Ohio Agricultural Easement Purchase Program	supports the permanent preservation of Ohio's most valuable farmland through the purchase of development rights	Department of Agriculture	$6,250,000
The Clean Ohio Trails Fund	improve outdoor recreational opportunities by funding trails for outdoor pursuits of all kinds	Ohio Department of Natural Resources	$6,250,000
The Clean Ohio Revitalization Fund	cleanup of polluted properties so that they can be restored to productive uses	Ohio Department of Development and Ohio EPA	$50,000,000

More information about Clean Ohio Fund can be found at https://development.ohio.gov/cleanohio/; information about the Clean Ohio Trails Fund can be found at http://realestate.ohiodnr.gov/outdoor-recreation-facility-grants.

Ohio Water Development Authority

OWDA offers financial assistance for a number of project types, either alone or in conjunction with a state agency (including Ohio EPA). In addition to solid waste, brownfields and emergency programs, OWDA oversees the Fresh Water Program. The Fresh Water Program is a market-based rate program that mirrors the below-market financing available through the WSRLA and the WPCLF (see below). The OWDA 2014 annual report provides an overall summary of loan expenditures for all State of Ohio water and wastewater programs in 2014 (OWDA 2015). More information about OWDA can be found at http://www.owda.org/owda0001.asp?PgID=homepage.

Table C-2. OWDA loans administered during calendar years 2013 - 2014.

	2014		2013		
Project Type	Number	Amount (mil $)	Number	Amount (mil $)	% of 2013
Planning					
Water	28	7.1	25	7.8	90.9
Wastewater	55	37.6	36	53.3	70.5
Subtotal	83	44.7	61	61.1	73.6
Construction					
Water	80	135.7	81	175.6	77.3
Wastewater	80	414.2	99	360.0	115.1
Subtotal	160	549.9	180	535.6	103.4
Total	243	594.7	241	596.7	100.4

Water Supply Revolving Loan Account Fund

The Ohio Water Supply Revolving Loan Account (WSRLA) provides an opportunity for mutually beneficial partnerships between Ohio EPA and Ohio's public water systems to assure a safe and adequate supply of

drinking water for all the citizens of Ohio. This is accomplished primarily by providing below-market interest rates for compliance related improvements to community (public) water systems and non-profit non-community public water systems. Additionally, the WSRLA can provide technical assistance to public water systems in a variety of areas from the planning, design and construction of improvements to enhancing the technical, managerial and financial capacity of these systems.

The WSRLA is administered by Ohio EPA's DDAGW and DEFA. Certain financial management services are also provided by OWDA. More information about WSRLA can be found at http://www.epa.ohio.gov/defa/EnvironmentalandFinancialAssistance.aspx.

Water Pollution Control Loan Fund

Municipal wastewater treatment improvements—sewage treatment facilities, interceptor sewers, sewage collection systems and storm sewer separation projects—and nonpoint pollution control projects are eligible for financing under the WPCLF. This state revolving fund, jointly administered by Ohio EPA and OWDA, was established in 1989 to replace the Construction Grants Program.
Construction loans from the WPCLF are available at a number of interest rates: a standard rate, which is below market rates; a small community interest rate, which is below the standard interest rate; and 1 percent and 0 percent interest rate loans for hardship communities.
Planning and design loans are available at a short-term interest rate. Applications for WPCLF loans are made to Ohio EPA's Division of Environmental and Financial Assistance. Eligible activities include:

- improvements to and/or expansions of wastewater treatment facilities
- improvement or replacement of on-lot wastewater treatment systems
- brownfield/contaminated site remediation
- agricultural runoff control and BMPs
- urban storm water runoff
- septage receiving facilities
- landfill closure
- septic system improvement
- development of BMPs
- forestry BMPs

More information about WPCLF can be found at http://epa.ohio.gov/defa/ofa.aspx#169558732-water-pollution-control-loan-fund-wpclf--wastewater-collection-and-treatment.

Water Resource Restoration Sponsor Program (WRRSP)

A satellite program of the WPCLF is the Water Resource Restoration Sponsor Program (WRRSP). The WRRSP was developed by Ohio EPA and has been a part of the WPCLF since 2000. The intent of the WRRSP is to address a limited and under-assisted category of water resource needs in Ohio through direct WPCLF loans. The goal of the WRRSP is to counter the loss of ecological function and biological diversity that jeopardize the health of Ohio's water resources. The program achieves this goal by providing funds, through WPCLF loans, to finance implementation of projects that protect or restore water resources, by ensuring either maintenance or attainment of warmwater habitat or higher designated aquatic life uses under Ohio's water quality standards.

Since its inception, over $160 million has been awarded for water resource restoration and protection through the WRRSP.

Section 319 Grants Program
Ohio EPA receives federal CWA Section 319(h) funding to implement a statewide NPS program, including offering grants to implement local projects to reduce the impacts of nonpoint sources of pollution. Annual funding for local sub grant awards typically averages $3 million. Section 319(h) grants are awarded for projects such as low-head dam removal, natural stream channel reconstruction, urban storm water infrastructure retrofits, wetland restoration or other projects designed to restore impaired waters. Projects identified in watersheds with TMDLs and/or with endorsed watershed action plans that are aimed at eliminating identified sources of impairment or restoring impaired waters are most likely to receive funding. Other eligible activities include lake management projects and demonstration projects focused on agricultural BMPs that are not typically funded under Farm Bill programs. Nearly all successful grant applications are from watersheds that have either completed an endorsed local watershed action plan or in watersheds where TMDL studies have been completed.

More information about the Section 319 Grants Program can be found at http://epa.ohio.gov/dsw/nps/index.aspx#120843256-for-additional-information.

Federal Farm Bill Funding in Ohio
Among funding sources from the federal government, those conservation programs connected to the "Agricultural Act of 2014" legislation are notable. Administered by USDA, several programs provide cost share, technical assistance and economic incentives to install and/or implement NPS pollution management practices. The 2014 Farm Bill included significant changes in programs such as:

- consolidation of conservation programs for flexibility, accountability and adaptability at the local level;
- linkage of basic conservation practices to crop insurance premium subsidy for highly erodible lands and wetlands; and
- building upon previous successful partnerships and encouraging agricultural producers and partners to design conservation projects that focus on and address regional priorities.

Ohio EPA works closely with Ohio Natural Resources Conservation Service (NRCS) on several water quality related landscape initiatives including: GLRI, the National Water Quality Initiative (NWQI) and the Mississippi River Basin Initiative (MRBI). Ohio EPA has assisted with selecting priority watersheds and practices in these initiatives and provides water quality monitoring.

Set-aside types of programs, such as the Conservation Reserve Program (CRP) and the Conservation Reserve Enhancement Program (CREP), are the most popular of available conservation programs available in Ohio. Targeted acreage through these programs is intended to be environmentally sensitive for land that can have a particularly deleterious impact on natural resources when farmed. Examples include highly erodible land, land near waterways, land that was formerly wetland and lands that can serve as habitat critical to declining wildlife populations. It is a potential concern that once contracts expire on the marginal or environmentally sensitive lands, those acres may revert back to agricultural production.

Conservation Reserve Enhancement Program
The CREP is a federal-state conservation partnership program that is intended to remove environmentally sensitive cropland from production and to convert it to native grasses, trees and other vegetation. The CREP uses financial incentives to encourage farmers and ranchers to enroll in contracts of 10 to 15 years. In return, participants are incentivized annually 150 to 175 percent of crop rental

rates, depending on the type of vegetation planted. Ohio is one of two states in the nation to have three CREP watersheds. Most existing CRP and CREP land retirement program acres involve stream-side grass strips not specifically designed to treat agricultural runoff generated from contributing cropland acreage. There are opportunities to further expand acreage under these programs to include practices that better reduce rate and amount of agricultural runoff. These practices include filter area, wooded riparian corridors and/or wetlands designed to trap, retain, intercept, distribute, store and/or treat runoff from cropland.

Environmental Quality Incentives Program
The Environmental Quality Incentives Program (EQIP) is another widely used, well-funded program coming out of the Farm Bill. EQIP is designed to improve management practices and facilities on working farms to achieve environmental quality goals, of which protecting water resources is a high priority. Several specific practices are eligible for funding through EQIP that cover broad categories such as nutrient and pesticide management and storage, manure management and storage, livestock fencing, conservation tillage, cover cropping, conservation crop rotation and drainage water management, among others. Historically, most EQIP-funded practices in Ohio have gone toward installation of tangible items (e.g., fencing, access roads and manure storage units). Recognizing that NPS pollution from agriculture is largely related to management (e.g., crop rotations and tillage management, or fertilizer application timing, method, rate and form), Ohio-NRCS offered incentive payments to farming operations to adopt a suite of management practices, including conservation tillage, nutrient management plan implementation and cover crops.

Conservation Stewardship Program
The Conservation Stewardship Program (CSP) is a voluntary program that encourages producers to improve conservation systems by improving, maintaining managing and undertaking additional conservation activities. NRCS administers this program and provides financial and technical assistance to eligible producers. CSP offers participants two possible types of payments: annual payment for installation and adoption of additional activities and the improvement, maintenance and management of existing activities; and supplemental payment for the adoption of resource-conserving crop rotations. Such rotations are those that reduce erosion, improve soil fertility and tilth and include at least one resource conserving crop (e.g., perennial grass, legume, or grass/legume grown for use as forage, seed for planting or green manure).

More information on the Agricultural Act of 2014 and related programs in Ohio is available at http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/ and http://www.nrcs.usda.gov/wps/portal/nrcs/site/oh/home.

Surface Water Improvement Fund Grants Program
The NPS program continues to administer of the Surface Water Improvement Fund (SWIF) grants program. The SWIF program enhances Ohio EPA's NPS improvement efforts by providing $1 million to $3 million per funding cycle (approximately once every two years) in additional funding for locally implemented nonpoint source, stream restoration and innovative storm water management projects. The initial SWIF cycle in 2010 resulted in awarding a total of $3.45 million to fund 32 individual projects. These grants were provided for projects such as storm water demonstration, stream and wetland restoration, agricultural BMPs and inland lake protection.

SWIF grant funds were also used in fiscal year 2012 to match federal GLRI funds to implement a GLRI SWIF project with specific focus in Cuyahoga County (including Cleveland and its metropolitan area)

where 17 projects were awarded grants totally $2.05 million. This success spawned a similar project: the Lucas County (including Toledo and its metropolitan area) SWIF in 2013.

For fiscal year 2014, Ohio EPA received 68 applications for SWIF grants. Of the applications received, grants totaling $1,966,508 were awarded to 19 recipients statewide (except Lake Erie watershed). In the Lake Erie watershed, $2,195,984 in SWIF grants was awarded to 24 recipients.

More information on the SWIF grants program is available at http://www.epa.state.oh.us/dsw/nps/swif.aspx.

C7. Harmful Algal Blooms Responses and Assessments

Cyanobacteria are photosynthesizing bacteria, commonly called blue-green algae. Some are capable of producing toxins (cyanotoxins) that affect the skin, liver or nervous system. They can also cause water quality deterioration associated with excessive biomass production (such as depleted dissolved oxygen levels, fish kills, taste and odor problems in drinking water and elevated trihalomethane levels). A large bloom of cyanobacteria that causes harmful effects is called a harmful algal bloom (HAB).

Cyanobacteria have the ability to adapt to a wide range of temperatures and water flow regimes, contributing to their common occurrence across Ohio waters. The presence of cyanobacteria is not necessarily a concern, but harmful blooms can form when conditions are favorable for rapid growth. When excess nutrients are present, especially phosphorus, these bacteria can form expansive blooms and produce cyanotoxins at levels of concern for humans and animals.

The harmful effects of these blooms are well documented in scientific literature and recognized by U.S. EPA, Center for Disease Control (CDC) and World Health Organization (WHO) as causing acute and chronic impacts in human and animal populations. U.S. EPA recognizes that HABs are increasing in spatial and temporal prevalence in the U.S. and worldwide and that their highly potent toxins are a significant hazard for human health and ecosystem viability. In early 2015, U.S. EPA issued health advisory levels for two cyanotoxins, microcystins and cylindrospermopsin. Ohio Senate Bill 1 was passed in July 2015 and directed Ohio EPA to implement actions to protect against cyanobacteria in the western basin on Lake Erie and in public water supplies. This legislation led to creation of

Ohio Revised Code 3745.50 authorizing the director to Ohio EPA to serve as the coordinator of harmful algae management and response. Ohio EPA was required to implement actions that manage wastewater and limit nutrient loading and develop and implement protocols and actions to protect against cyanobacteria and public water supplies. Ohio adopted new and revised rules, effective June 1, 2016, to meet these requirements. Cyanotoxins are not currently regulated in recreational waters, however, USEPA is developing national guidance and thresholds that may be issued during the next reporting cycle. In 2016, Ohio EPA created a new Harmful Algal Bloom Section housed in the Division of Drinking and Ground Waters to manage both drinking water and recreational response.

Response to HABs

As incidents of HABs have increased, Ohio's response continues to evolve. The State has annually revised the State of Ohio's Harmful Algal Bloom Response Strategy for Recreational Waters (http://epa.ohio.gov/portals/35/hab/HABResponseStrategy.pdf) and the Public Water System Harmful Algal Bloom Response Strategy. Ohio EPA, ODH and ODNR have continued a close partnership to develop and implement the unified state response strategy. The ohioalgaeinfo.com web site provides background information about HABs; tips for staying safe when visiting public lakes; links to sampling information; and current advisories and contact information for reporting suspected HABs. It also includes historic and current cyanotoxin data for public water supplies and a link to the ODH BeachGuard site, which has information about recreation advisories for both bacteria and algae (http://publicapps.odh.ohio.gov/BeachGuardPublic/Default.aspx).

HAB Recreational Advisories

Advisories are designed to provide information and warnings to protect public health from the potential health impact of cyanotoxins present in HABs. Beginning in 2011, general information signs were placed in areas where HABs have been observed at State Park beaches. These signs encourage beachgoers to be alert for HABs and provide information about their appearance. In addition, the HAB advisory system was changed to a two-level system. A "Recreational Public Health Advisory" (PHA) is posted when toxin levels equal or exceed the established state benchmark criteria. Microcystin is the focus of toxin analysis. When microcystin levels exceed 6 ppb, a PHA is posted. When microcystin levels reach 20 ppb or above then an "Elevated Recreational Public Health Advisory" is posted. Recreational advisory posting and removal protocols are outlined in Ohio's HAB Response Strategy for Recreational Waters. In 2015, the highest level of recreational advisory was a "No Contact Advisory" that required microcystin levels $\geq$ 20 and a confirmed human or animal illness. The numeric thresholds for cyanotoxins in recreational waters remained the same in 2016, but the advisories were changed to "Recreational Public Health Advisory" and "Elevated Recreational Public Health Advisory." The human or animal illness requirement was also removed for the highest advisory (Elevational Public Health Advisory).

In 2013, blooms were reported at eight State Park lakes and three State Park Lake Erie beaches. A bloom was monitored at Buck Creek (C.J. Brown Reservoir) between June 5, 2013, and August 29, 2013, but microcystin levels did not exceed the 6 ppb threshold criteria for recreational waters, so no advisory was posted. In addition, blooms were reported at Lake Alma, Dillon Lake, Madison Lake and Lake Hope State Parks but no advisories were needed. There were four PHAs posted at State Park facilities in 2013. Three of these were for inland lakes (Grand Lake St. Marys, Buckeye Lake and East Fork or Harsha Lake) and one for a beach on Lake Erie as follows:

1. **Grand Lake St. Marys** (PHA posted 5/20/13) – Levels above threshold through 9/24/13 when sampling ceased. The highest microcystin levels were >100 ppb on 5/20/13 and 5/28/13 at Windy Point.

2. **Buckeye Lake** (PHA posted 7/31/13) – Levels above threshold through 10/16/13 when sampling ceased. The highest microcystin level was 220 ppb at Fairfield Beach on 9/4/13.
3. **East Fork** (Harsha Lake) (PHA posted 6/12/13) – Levels above threshold through 7/2/13. The highest microcystin level was 88 ppb on 6/12/13. This is the first time that this lake was posted with a PHA.
4. **Maumee Bay State Park Beach** (PHA posted 6/4/13) – Levels above threshold through 8/5/13. The highest microcystin level was 20 ppb on 6/4/13. Levels then dropped dramatically for most of the summer. Then microcystin spiked at 6.9 on 8/5/13.

Between September 1, 2013, and September 1, 2014, blooms were reported at 12 State Park lakes. Seven other blooms were reported in other waters during this fiscal year. Four of these were in other public lakes; one was in a tributary to the Ohio River; one from Kelleys Island and one from Johnsons Island, Lake Erie.

Table C-3. Bloom reports, PHAs and microcystin levels reported in 2014 (SP = state park).

Table Location	Date	Cyanotoxin
Grand Lake St. Marys	PHA posted 5/20/14	92.8 ppb to >100 ppb microcystins
Jefferson Lake SP	5/28/14	--
Indian Lake SP	6/3/14	Non-detect microcystins
East Fork (Harsha Lake) SP	PHA posted 6/18/14	190 ppb microcystins
Alum Creek SP	6/9/14	Non-detect microcystins
Buckeye Lake SP	PHA posted 6/2/14	57-77 ppb microcystins
Acton Lake- Hueston Woods SP	7/7/14	Non-detect microcystins
Chippewa Lake	7/11/14	--
Lake Alma SP	7/15/14	Non-detect microcystins
Punderson SP	7/15/14	Non-detect microcystins
Boy Scout Camp lake in Clermont County	7/21/14	--
Maumee Bay SP	PHA posted 7/21/14	7.1 ppb microcystins
Lake Hope SP	7/20/14	Non-detect microcystins
Forked Run SP	7/25/14	--
Lake Mac-o-Chee Boy Scout Camp	7/29/14	Non-detect microcystins
Bullskin Creek	8/3/14	--
Mogadore Reservoir, Portage County	8/6/14	--
Kelleys Island	8/22/14	--

Of the State Park beaches with blooms tested for microcystins, seven had non-detectable microcystins. There were four PHAs posted at State Park lakes in 2014: 1) Grand Lake St. Marys (GLSM); 2) Buckeye Lake; 3) East Fork (Harsha Lake); and 4) Maumee Bay State Park beaches. ODH reported no probable cases for human or animal illness associated with cyanotoxin exposure in 2014.

Observations 2011-2014

Ohio collected a considerable amount of microcystin and phytoplankton data for Buckeye Lake and GLSM over the past four years. The data show increasing toxin levels in GLSM over this time period (see graphs below). The graphs of the microcystin data for both Buckeye Lake and GLSM show an undulating pattern in microcystin levels (especially for GLSM) showing a release of toxins followed by a period of reduced toxin production and/or toxin degradation.

The data also show that toxin levels can remain elevated into the winter months; ether because there is less toxin degradation in those months and/or there is additional toxin release. For example, on December 11, 2013, there was still 10.3 ppb microcystin detected at the GLSM drinking water intake.

Microcystin levels at Buckeye Lake were higher in 2013 and 2014 than in 2011 and 2012. The 2013 data show a great deal of fluctuation and a couple spikes in microcystin. On June 9, 2014, just at the start of the recreational season, microcystin was already at 19 ppb at Crystal Beach which was above the PHA level. Microcystin data collected by Ohio EPA Central District Office in the open waters of Buckeye Lake showed microcystin levels were also above the PHA threshold.

Some of the highest toxin levels at Buckeye Lake and GLSM occurred in the early spring around the beginning of the 2014 recreational season. For example, on May 9, 2014, there were >100 ppb microcystin detected at the GLSM drinking water intake. On May 20, there were >100 ppb microcystin at Windy Point beach and Camp Beach at GLSM. On May 27, 2014, there were 144 ppb at GLSM Windy Point Beach. There were also some late peak toxin levels, like at Maumee Bay State Park beach where microcystin levels reached 110 ppb on August 4, 2014.

The highest toxin level reported in recreational waters during this time period was 220 ppb at Fairfield Beach at Buckeye Lake. Close behind was 190 ppb at East Fork Campground Beach on June 18, 2014. PHAs were posted at all the State Park beaches at Buckeye Lake and GLSM throughout the 2014 recreational season; however, the East Fork PHA was removed earlier on July 26, 2014.

Euglena sanguinea was reported for the first time in a channel on the south side of GLSM in early September, 2013, about two miles from the drinking water intake. DDAGW sampled the raw and finished water at the drinking water intake about one week after the bloom was observed. *Euglena* spp. are not cyanobacteria, but are unicellular flagellate protists. This organism is capable of producing the icthyotoxin, euglenophycin, which is extremely toxic to fish and can cause large kills.

The open water samples collected by the Inland Lakes Team showed that high concentrations of potential toxin producing cyanobacteria were not producing cyanotoxins of significance in the open water (see tables in Section I.4.3.1.) *Pseudanabaena* spp., *Aphanocapsa* spp. and *Cylindrospermopsis* spp. were the dominant cyanobacteria in open waters during 2013-2014.

At the present time, Ohio EPA does not list lakes as impaired for recreational use when recreational advisories are posted at public beaches. Addressing water quality impairments in the lake's watershed should eventually reduce nutrient enrichment in lakes and thereby reduce cyanobacteria blooms.

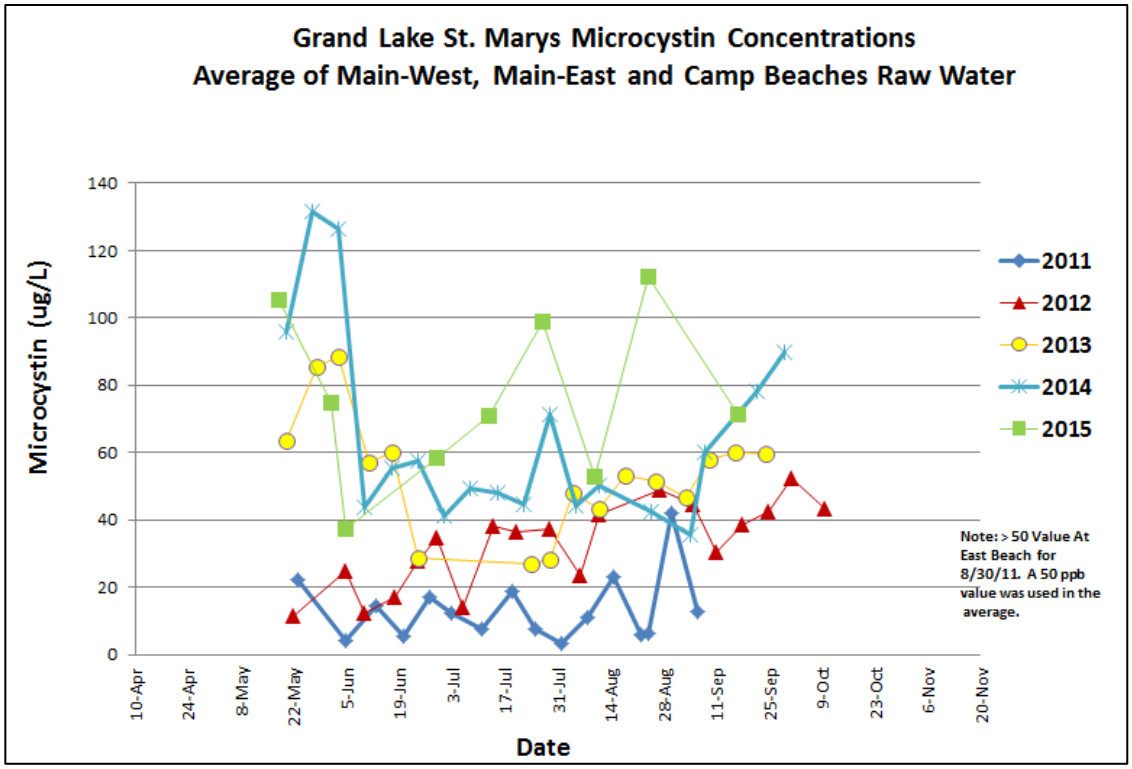

Figure C-2. Microcystin concentration in GLSM during recreational seasons from 2011 to 2015.

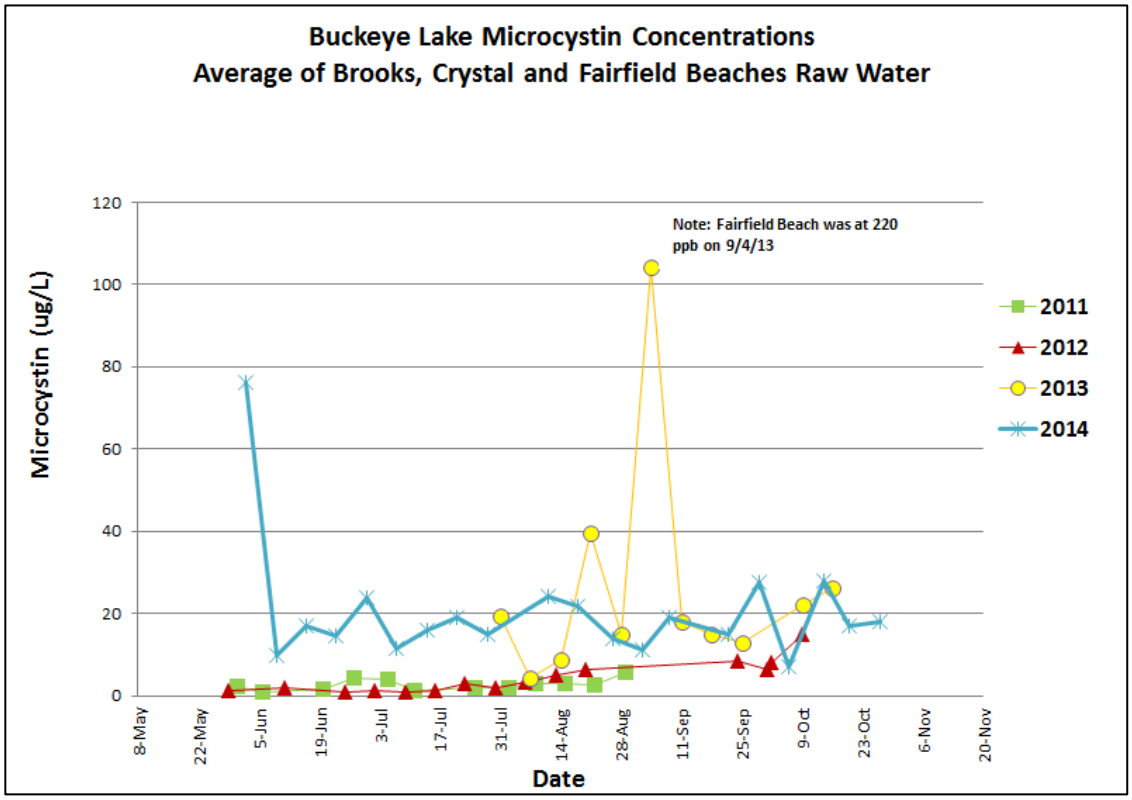

Figure C-3. Microcystin concentration in Buckeye Lake during recreational seasons from 2011 to 2015.

Algal Toxin Monitoring and Phytoplankton Monitoring

Monitoring of HABs has occurred in a variety of ways across the state. The main types of monitoring that have taken place are discussed below. Algal toxin monitoring at public water systems is addressed in Section H.

Algal Toxin and Phytoplankton Monitoring by the Inland Lakes Team

The Inland Lakes Monitoring Program continues to collect phytoplankton and microcystin samples from the lakes sampled each year as part of the routine sampling of lakes in TMDL watersheds. Those samples were collected in open water at established sampling locations. In 2013 and 2014, phytoplankton and microcystin samples were collected three times each year. Sampling locations with cyanobacterial cell counts of 100,000 cells/mL or greater of potential microcystin or cylindrospermopsin producers are identified in Tables C7-2 through C7-5 below.

Table C-4. Open water sampling locations in 2013 with cyanobacterial cell counts of 100,000 cells/mL or greater of potential microcystin producers (*= dominant cyanobacteria. *Aphanizomenon* spp. are not included as a potential microcystin producer since there is some disagreement about this).

Lake	Date	Cyanobacteria Genera	Microcystins
Nettle Lake L-2	5/21/2013	**Pseudanabaena*	Non-detect
Clendening Lake L-1	5/29/2013	*Planktothrix, *Pseudanabaena*	Non-detect
Clendening Lake L-2	5/29/2013	**Pseudanabaena*	Non-detect
Tappan Lake L-1	5/29/2013	**Pseudanabaena*	Non-detect
Tappan Lake L-2	5/29/2013	*Anabaena, Planktothrix, *Pseudanabaena*	Non-detect
Nettle Lake L-1	7/17/2013	*Aphanocapsa, *Pseudanabaena*	--
Hoover Reservoir L-1	7/18/2013	*Anabaena, *Aphanocapsa, Microcystis, Planktothrix, Pseudanabaena*	0.47 ppb
Stonelick Lake L-1	9/10/2013	*Aphanocapsa, *Pseudanabaena, Anabaena*	0.32 ppb
Tappan Lake L-1	10/1/2013	*Anabaenopsis, *Aphanocapsa, Microcystis, Pseudanabaena*	--

Table C-5. Open water sampling locations in 2013 with cyanobacterial cell counts of 100,000 cells/mL or greater of potential cylindrospermopsin producers: (*= dominant cyanobacteria Cylindrospermopsis spp. are known to produce cylindrospermopsin, but this is rarely observed in Ohio).

Lake	Date	Cyanobacteria Genera	Cylindrospermopsin
Hoover Reservoir L-1	7/16/2013	*Anabaena, Aphanizomenon, *Cylindrospermopsis*	Non-detect
Clendening Lake L-1	9/10/2013	*Cylindrospermopsis, Raphidiopsis*	--
Clendening Lake L-2	9/10/2013	**Cylindrospermopsis, *Raphidiopsis, Anabaena*	--
Alum Creek L-1	9/10/2013	*Aphanizomenon, *Aphanocapsa, Pseudanabaena*	--
Piedmont Lake L-1	9/10/2013	*Anabaena, Cylindrospermopsis, *Raphidiopsis*	0.436 PPB
Piedmont Lake L-2	9/10/2013	*Anabaena, *Cylindrospermopsis, Raphidiopsis*	--
Tappan Lake L-1	10/1/2013	**Cylindrospermopsis, Raphidiopsis*	--
Tappan Lake L-2	10/1/2013	**Cylindrospermopsis, Raphidiopsis*	--

Table C-6. Open water sampling locations in 2014 with cyanobacterial cell counts of 100,000 cells/mL or greater of potential microcystin producers: (*= dominant cyanobacteria. Aphanizomenon spp. are not included as a potential microcystin producer since there is some disagreement about this).

Lake	Date	Cyanobacteria Genera	Microcystins
Senecaville Lake L-2	7/17/2014	*Anabaena, Aphanocapsa, *Pseudanabaena*	Non-detect
New Concord Reservoir	7/8/2014	*Aphanizominon/Anabaena*	Non-detect
Winton Lake L-1	7/15/2014 and 9/23/2014	**Aphanocapsa, Pseudanabaena/Anabaena, *Aphanocapsa, Pseudanabaena*	--
Salt Fork Lake L-2	7/16/2014	*Aphanocapsa, Pseudanabaena*	Non-detect
Hoover Reservoir	8/14/2014	*Anabaena, *Aphanocapsa*	0.55 ppb

Table C-7. Open water sampling locations in 2014 with cyanobacterial cell counts of 100,000 cells/mL or greater of potential cylindrospermopsin producers: (*= dominant cyanobacteria Cylindrospermopsis spp. are known to produce cylindrospermopsin, but this is rarely observed in Ohio).

Lake	Date	Cyanobacteria Genera	Cylindrospermopsin
New Concord Reservoir L-1	6/17/2014 and 7/8/2014	**Aphanizomenon*	Non-detect on both dates
Salt Fork Lake L-1	7/16/2014	**Aphanizomenon, Cylindrospermopsis*	Non-detect
Salt Fork Lake L-2	7/16/2014	**Cylindrospermopsis*	Non-detect
Salt Fork Lake L-3	7/16/2014	**Cylindrospermopsis*	Non-detect

Algal Toxin Monitoring – Accumulation in Fish Tissue

Because of the uncertainty associated with freshwater algal toxin analysis in fish tissue and the lack of a reliable, U.S. EPA-approved analytical method for microcystin and other algal toxins in fish tissue, the effect of HABs on human health via fish consumption in freshwater systems cannot be definitively determined at this time.

Ohio EPA has conducted multiple surveys looking for microcystin in fish tissue since 2010, primarily in GLSM and more recently in Lake Erie. In general, a large majority of these samples have not had any detections for microcystin, while a few samples have had microcystin detections at relatively low levels.

Early in this investigation, Ohio EPA, ODNR and Ohio Department of Health chose to place a consumption advisory ("do not eat more than one meal per week") on black crappie in GLSM. This "one meal per week" advisory level is equivalent to Ohio's statewide advisory due to mercury, so anglers following the statewide advisory would also be protected from microcystin in GLSM fish. This species represented the worst-case scenario observed in Ohio's waters. Continued investigation has shown a decline in reported microcystin concentrations in GLSM fish, although it is unclear if this is due to a change in toxin concentrations or improvements in the analytical methods.

As the analytical methods and risk assessment continue to evolve, a strong weight-of-evidence is emerging that algal toxins in Ohio fish tissue present a very low risk to consumers of fish, both in Lake Erie and GLSM. Ohio EPA and ODNR are currently planning to continue annual monitoring of fish in these two waterbodies to ensure the safety of fish in Ohio's waters affected by algal blooms.

Use of Satellite Imagery to Evaluate HABs on Lake Erie and Inland Lakes

NOAA continues to provide processed satellite imagery that identifies cyanobacteria and estimates their abundance based on their unique spectral reflectance. NOAA's experimental Lake Erie forecast system,

which predicts cyanobacteria bloom movement based on a hydrodynamic model of the lake, will go operational the summer of 2016, demonstrating NOAA's continued support for this service. The forecasts are included in the Lake Erie HAB bulletins, which are provided to thousands of subscribers in the state, including state agencies, public water systems, beach managers and the general public. More information on the HAB bulletins is available here: http://www.glerl.noaa.gov/res/Centers/HABS/. A new satellite and sensor that will improve bloom detection capabilities and enable detection of HABs on larger inland lakes was successfully launched in 2016. Ohio is one of three states collaborating with NOAA on application of the new satellite data to inland lakes.

Outreach

Ohio EPA continues to coordinate a workshop at Ohio Sea Grant Stone Laboratory in August of each year. This two-day workshop, "Dealing with Cyanobacteria, Algal Toxin and Taste and Odor Compounds," attracts public water supply operators and water managers from Ohio and other states. Instructors include experts from NOAA, OSU and public water supply operators with experience dealing with HABs. Topics covered include ecology of cyanobacteria, limnology concepts, cyanotoxin impacts, historical outbreaks, cyanobacteria relationship with taste and odor compounds, HAB identification, tracking HABs with satellites, using ELISA to evaluate HAB toxins, cyanobacterial cell and toxins removal options, reservoir and source management, sampling and monitoring demonstrations and update on state HAB initiatives.

In 2013, presentations were given at the Non-Point Source Conference, OSU and four other HAB-related speaking engagements, including one at Presque-Isle, Pennsylvania at the request of Pennsylvania Sea Grant. In 2014 presentations were given at OSU, the National Academy of Science, the Warren County Health Department conference and Columbus Bar Association.

Addressing HABs at the Source

In addition to carrying out the HAB strategy and revising the strategy as needed, the State of Ohio continues to seek ways to address the root cause of HABs—excessive nutrients that enter the State's waterways. Ohio EPA, in collaboration with ODNR, ODA, OSU and other third party collaborators, has updated the 2013 Ohio Nutrient Reduction Strategy. The 2015 Addendum describes new initiatives and summarizes progress in the more established programs and activities intended to reduce the loss of nutrient to surface and ground waters. All strategy documents are available on-line at this website http://epa.ohio.gov/dsw/wqs/NutrientReduction.aspx.

C8. New 303(d) Vision Implementation in Ohio

In December 2013, U.S. EPA announced a new "Vision" for the CWA Section 303(d) program to provide an updated framework for implementing the responsibilities under the impaired waters program. U.S. EPA recognized that "… there is not a one-size-fits-all approach to restoring and protecting water resources." Under the new Vision, states will be able to develop tailored strategies to implement the 303(d) program in the context of their water quality goals.

The Vision effort grew out of frustration caused by the 1990s-era litigation concerning the pace at which TMDL analyses were being completed. The resulting consent decrees forced many states to produce great *quantities* of TMDLs that many felt did not contain the necessary *quality* to effectively improve water quality. As the decrees were completed, discussion centered on how to produce better TMDLs that could be implemented to bring about measureable improvements in the quality of the nation's

waters.

Fortunately, Ohio was not burdened by a harsh consent decree and was able to carefully consider how to proceed with TMDLs. Fifteen years ago, Ohio EPA developed an approach to TMDLs that already aligns with the spirit of the Vision. The Ohio TMDL program strives to:

- focus on CWA responsibilities across programs;
- build on the state's investments in monitoring, especially biological monitoring;
- use data efficiently, for multiple programs and purposes;
- restore beneficial uses;
- focus on watersheds: maintain rotating basin structure to enable adaptive management; and
- recognize that water quality is impacted by the actions of many and that it will change over time.

Ohio's program grew out of the Agency's water mission, which is rooted in the CWA. Today's new national Vision developed from the same roots, so it should not be surprising that Ohio has been on the Vision path for several years.

Ohio TMDL Program Relative to the Vision Goals

The national Vision contains six goal statements related to prioritization, assessment, protection, alternatives, engagement and integration. While its TMDL program is generally well placed relative to these goals, Ohio expects to continue to improve its program; potentially the biggest opportunities are in the areas of protection and engaging other organizations to help with implementation. The following is a summary of the goals and how Ohio has been addressing each goal to date as detailed in the U.S. EPA document titled, "A Long-Term Vision for Assessment, Restoration and Protection under the Clean Water Act Section 303(d) Program" (U.S. EPA, 2013). https://www.epa.gov/sites/production/files/2015-07/documents/vision_303d_program_dec_2013.pdf.

Prioritization Goal

For the 2016 integrated reporting cycle and beyond, States review, systematically prioritize, and report priority watersheds or waters for restoration and protection in their biennial integrated reports to facilitate State strategic planning for achieving water quality goals.

The intent of the Prioritization Goal is for States to express CWA 303(d) Program priorities in the context of the State's broader, overall water quality goals.

-- U.S. EPA, 2013

Based on the state's established monitoring investment and expertise, Ohio's initial priority (in approximately 2000) was on aquatic life use impairments in streams. This priority led to the development of nutrient, sediment, habitat, dissolved oxygen and related TMDLs. A couple of years later, the agency began to focus on recreation use impairments, which yielded bacteria TMDLs. More recently, work has involved public drinking water use impairments involving nitrate and pesticides TMDLs.

In addition to a focus on restoring uses, other priorities were to begin with headwaters and work downstream. To date, the state has not adopted a geographic priority, choosing instead to work statewide which helps to maintain work balance among district offices. In cases where other agencies

or stakeholders have initiated projects, TMDLs in watersheds has been delayed.

Moving forward, Ohio intends to use the following prioritization framework (**bold** items indicate clarification or change from past practices):

Long Term General Priorities:

- continue to work statewide, using rotating basin scheduling for assessment and listing **but on a more limited basis to allow for increased focus on lakes and protecting downstream uses**
- sharpen focus on Public Water Supply Use
- **Incorporate HAB considerations into priorities (both PDWS use and ultimately Recreation use)**
- concentrate recreation TMDLs on **High-Use** recreation waters
- continue to make mercury and legacy/sediment metals low priority TMDLs as other approaches are anticipated to be more effective

Annual Prioritization of Impaired Waters for TMDL Development:
Ohio will continue to use the Priority Point System in Section J2 of the IR. Points are given for presence and severity of Human Health impairment, Recreation Use impairment, Public Water Supply impairment and Aquatic Life Use impairment. Scores by HUC12 range from 1-16.

In addition, the Agency will consider geographic coverage, severity of the impairments represented by the above scores/points for the entire project area and add the following considerations:

- Social Factors (highly used recreational waters, drinking water supply for significant populations, ongoing/sustained involvement of any local groups or government, etc.)
- Value Added (is a TMDL the most efficient way to achieve improved water quality?)
- Is there an approved watershed action plan – if so how many implemented projects?
- How much regulatory authority exists over sources?
- Is there an alternative way to improve water quality more quickly than a TMDL? (e.g. immediate implementation of an existing plan or projects, or imposing more stringent permit limits to address a localized problem)
- Are there other factors in play? Examples include:
    - Pending enforcement for a discharger (possible 4B option)
    - USACE modeling of reservoir discharge to improve downstream water quality
    - Local or statewide strategy or requirements in place to address a particular issue/pollutant (e.g. new health department rules for HSTS if they are sole/primary source of impairment)

Over time, Ohio will strive to develop a more objective system for weighing the social factors and value added concepts. In each IR, the state plans to provide results of the most recent assessments and prioritization exercise as outlined above; list resulting high priority TMDL projects; and include schedules for those anticipated to be completed in the next two years.

Assessment Goal

By 2020, States identify the extent of healthy and CWA Section 303(d) impaired waters in each State's priority watersheds or waters through site-specific assessment.

The purpose of this Goal is to encourage a comprehensive understanding of the water quality status of at least each State's priority areas.

-- U.S. EPA, 2013

Ohio has maintained a robust biology and chemistry monitoring program for more than 30 years, maintaining consistent protocols and systematically expanding into new water body types. Assessments are based on surveys conducted using a rotating basin approach. The assessments use site-specific data of the highest quality and the status of waters is reported in watershed reports and summarized in biennial IRs that meet the reporting requirements of CWA 305(b) and 303(d). A framework of goals and measures has been in place for several years and reported on biennially in the Ohio IR.

Protection Goal

For the 2016 reporting cycle and beyond, in addition to the traditional TMDL development priorities and schedules for waters in need of restoration, States identify protection planning priorities and approaches along with schedules to help prevent impairments in healthy waters, in a manner consistent with each State's systematic prioritization.

The intent of the Protection Goal is to encourage a more systematic consideration of management actions to prevent impairments in healthy waters (i.e., unimpaired waters) in order to maintain water quality or protect existing uses or high quality waters.

-- U.S. EPA, 2013

Protection of the water resource is built into Ohio's CWA programs in multiple ways. Watershed surveys measure the attainment potential and status for all waters; thus, they identify waters to restore and to protect. Tiered aquatic life uses identify "better than CWA" goals for high-quality streams. About 14 percent of Ohio's streams already have this higher use designation. TMDLs have included protection strategies and "informational TMDLs" to encourage protection of streams currently meeting their designated uses. Ohio also has an active antidegradation process to protect existing uses and plans to update the list of waters afforded higher protection under antidegradation.

Ohio has also issued NPDES permits to protect against water quality impairment and anticipates continuing that approach where warranted. One example is the general construction storm water permits for the Olentangy River and Darby Creek watersheds. Those permits include measures designed to protect the high quality of the streams from development impacts. Other watersheds are being considered for similar actions.

Ohio plans to explore how other types of plans (9 Element Watershed Plans for instance) or regulatory actions could be used more effectively to protect our highest quality waters and/or those that are of high importance for drinking water or recreation.

Alternatives Goal

By 2018, States use alternative approaches, in addition to TMDLs, that incorporate adaptive management and are tailored to specific circumstances where such approaches are better suited to implement priority watershed or water actions that achieve the water quality goals of each state, including identifying and reducing nonpoint sources of pollution.

The purpose of this Goal is to encourage the use of the most effective tool(s) to address water quality protection and restoration efforts.

-- U.S. EPA, 2013

Ohio has been using a number of alternatives to improve water quality. Relying on the biological criteria as the measure for aquatic life attainment means that restoring habitat to build a stream's capacity to process pollutants can be as or more effective than load reduction; Ohio TMDLs have routinely promoted habitat enhancement. After the first few TMDLs recommended dam modifications to enhance capacity, dam modifications were pursued in areas without TMDLs. The state has used CWA Section 319 funds to remove or modify many dams.

In the past, Ohio EPA worked with mining agencies and the Corps to develop a standard alternative for acid mine drainage problems by aligning processes to quantify load reductions, thus meeting the needs of multiple programs with one project. There have also been several instances where NPDES permits have been adjusted to address point source impairments as monitoring identifies them, in advance of completing a TMDL. In other cases, TMDLs have recommended a stressor study to address impairment where the source could not be identified. This follow-up attention increases the chances that the problem may be eliminated or, at a minimum, data will be available for a future TMDL.

Under the new Vision, Ohio EPA also plans to use approaches that are an alternative to a TMDL. These approaches will be designed to address specific impairments caused by pollutants such as phosphorus or perhaps bacteria. Approaches may include developing "9 Element Watershed Plans," revising NPDES permit limits or conditions, funding installation of BMPs, supporting local health departments in implementing new rules for household sewage treatment systems, etc. These approaches will be pursued where there is clear legal authority to do so and circumstances are such that they are likely to result in water quality improvements more efficiently than a TMDL.

Engagement Goal

By 2014, EPA and the States actively engage the public and other stakeholders to improve and protect water quality, as demonstrated by documented, inclusive, transparent, and consistent communication; requesting and sharing feedback on proposed approaches; and enhanced understanding of program objectives.

The purpose of the Engagement Goal is to ensure the CWA 303(d) Program encourages working with stakeholders to educate and facilitate actions that work toward achieving water quality goals.

-- U.S. EPA, 2013

Ohio engages the public and other stakeholders in a number of ways. Ohio EPA maintains an extensive website with information about TMDLs, monitoring and implementation in watersheds across the

state[4].

In addition to the outreach in individual CWA programs, the TMDL program developed a standard TMDL project communication plan to engage the public and government and technical stakeholders within a project area. The plan includes a standard set of meetings, demonstrations, articles, new releases, etc., that are tied to TMDL project milestones.

In recent years, the CWA Section 319 program has strived to reach beyond stakeholders with general interest to focus on local decision makers and groups who have the wherewithal to take action "on the ground" to improve water quality. These include local governments and park districts.

The preparation of the IR (containing the 303(d), or impaired waters, list) is an open process. Several years ago an "incubator" section was added to preview changes that were being contemplated for future listings (e.g., adding new beneficial use analyses, revising methodologies or assessment unit types). The section allows for longer-term feedback for public consideration of changes that can have significant impacts. The IR also includes Ohio EPA's projected monitoring schedule; the draft schedule is frequently changed in response to requests for monitoring from watershed groups, communities or others who are committed to improving their water quality in their area. Ohio will strive to complete the IR every two years so that the process remains dynamic and reliable.

Integration Goal

By 2016, EPA and the States identify and coordinate implementation of key point source and nonpoint source control actions that foster effective integration across CWA programs, other statutory programs (e.g., CERCLA, RCRA, SDWA, CAA), and the water quality efforts of other Federal departments and agencies (e.g., Agriculture, Interior, Commerce) to achieve the water quality goals of each state.

The intent of this Goal is to integrate the CWA Section 303(d) Program with other relevant programs that play a role in influencing water quality, in order to collectively and more effectively achieve the water quality goals of States, Tribes, and Territories.

-- U.S. EPA, 2013

As described earlier, program integration is the foundation of Ohio's TMDL work, including both technical and funding programs. Ohio has adopted the Safe Drinking Water Act into the 303(d) listing process and has completed TMDLs for drinking water impairments. Ohio has directed CWA Section 319 funding to park districts and local governments that can directly implement actions to improve water quality by using TMDLs to identify suitable projects. Ohio EPA has also worked with the U.S. Forest Service, U.S. Army Corps of Engineers and state and federal mining agencies to address common water quality goals and to complete TMDLs and TMDL alternatives.

On a practical level, each TMDL project is completed by a team of Ohio EPA staff that represents many aspects of the clean water programs, including drinking water. The team members include staff from various CWA program areas. At a minimum, these program areas include monitoring and assessment; water quality modeling; NPDES permits; enforcement; water quality standards; and TMDL. Staff from the Agency's Public Water Supply program and Public Interest Center is also part of each team. Ohio EPA

[4] http://epa.ohio.gov/dsw/tmdl/index.aspx

district offices and central office both contribute to the effort. On some projects, local representatives such as active watershed group leaders or Soil and Water Conservation District staff are involved during the study plan phase and throughout the project.

For most projects external input is sought for developing the implementation portion of the TMDL. Most commonly, Soil and Water Conservation Districts and watershed groups are consulted, but permittees or other entities may also be asked for input in the development stage of the implementation plan, depending upon the issues in the watershed. While there is always room for improvement, Ohio EPA does not propose significant changes in the integration aspect over the next few years in terms of our internal coordination. But it should be noted that since the Supreme Court of Ohio determined that TMDLs are subject to the administrative rule making procedures[5], it is anticipated that the future process in Ohio for developing and finalizing TMDLs will include more opportunities for external stakeholders to participate, as well as provide an avenue for affected parties to appeal the final decision.

[5] On March 24, 2015, the Supreme Court of Ohio determined that "A TMDL established by Ohio EPA pursuant to the Clean Water Act is a rule that is subject to the requirements of R.C. Chapter 119, the Ohio Administrative Procedure Act. Ohio EPA must follow the rulemaking procedure in R. C. Chapter 119 before submitting a TMDL to U.S.EPA for its approval, and before the TMDL may be implemented in an NPDES permit."