



**Environmental
Protection
Agency**

Nonpoint Source Program Management Plan



Division of Surface Water
Nonpoint Source Program

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Table of Contents

Introduction and Overview	5
1.0 Rural Nonpoint Source Reduction Strategies	8
Strategies and Management Actions to Reduce Sediment and Nutrient Losses from Rural Lands	8
1.01: Upland Management Strategies	9
1.02: Livestock Management Strategies	13
1.03: Drainage Water Management Strategies	15
1.04: Riparian Management Strategies	17
1.05: Failing Onsite Treatment System Strategies	19
2.0 Altered Stream and Habitat Restoration Strategies	20
Recommended Management Practices to Restore Altered Habitat Conditions	20
2.01: Restore Streams using Natural Channel Design Methods.....	21
2.02: Daylighting Culverted and Severely Modified Streams.....	26
2.03: Strategies for Restoring and Protecting Riparian Habitat	27
2.04: Restoring Natural Flow	31
2.05: Improve Land Use Practices.....	34
3.0 High-Quality Waters Protection Strategies	37
Recommended Management Practices to Protect High Quality Waters	37
3.01: Restore and Protect High Quality In-Stream Habitat.....	38
3.02: Manage Invasive Species	40
3.03: Acquire and Protect High Quality Riparian Areas.....	41
4.0 Urban Stormwater Pollutant Reduction Strategies.....	43
Recommended Practices to Reduce Sediment and Nutrients from Urban Sources.....	43
4.01: Reduce Stormwater Runoff	44
4.02: Passively Treat Stormwater Runoff	47
4.03: Low Impact Development (LID).....	49
4.04: Chloride Reduction	50
5.0 State and Federal Partners	51
5.1 Agencies and Programs with Nonpoint Source Management Programming	51
5.2 Western Lake Erie Basin Partnership.....	52
5.3 Gulf Hypoxia Program	53

6.0 State Programs Associated with Nonpoint Source Management	53
6.1 State of Ohio- H2Ohio Plan	53
6.2 Ohio EPA-Surface Water NPS Assistance Programs.....	54
6.3 Section 319(h) Grants.....	55
6.4 Ohio Nutrient Reduction Strategy	57
6.5 Ohio’s Inland Lakes Program	57
6.6 Protecting Healthy Waters	60
6.7 Ohio’s Watershed Program	61
6.8 Total Maximum Daily Load (TMDL) Program.....	62
6.9 Ohio EPA’s Lake Erie Program.....	63
6.9.1 Remedial Action Plans-Areas of Concern	64
6.9.2 Lake Erie Monitoring.....	65
6.9.3 Lake Erie Monitoring Program Goals, Objectives and Milestones	65
6.10 Ohio’s NPS Project Monitoring and Assessment.....	66
6.11 Ohio’s NPS Project Monitoring and Assessment Goals, Objectives and Milestones.....	67

Introduction and Overview

The Ohio Nonpoint Source Management Program plan (the “plan”) documents Ohio’s strategies, goals and objectives for controlling nonpoint sources of water quality impairment. This plan is updated at least every five years as required by Section 319(h) of the Clean Water Act and replaces the preceding plan adopted in 2020. The plan outlines the priority issues and actions of Ohio EPA’s Nonpoint Source (NPS) Program for addressing water quality impairment over the next five years (FY 2025 through FY 2029) and includes elements of collaboration with other state and federal agencies and partners. Ohio’s Integrated Water Quality Monitoring and Assessment Report (Integrated Report or IR) indicates the general condition of Ohio's waters and identifies waters that are not meeting water quality goals. A spreadsheet identifying waters in Ohio that are use-attaining and those that are impaired is attached to the IR at [2024 IR Spreadsheet of Ohio Data in ATTAINS](#).

Ohio’s leading causes of water quality impairment are sediment, organic enrichment, habitat modification and nutrients. Bacteria and road salt are also contaminants of concern. Bacteria can lead to impaired surface waters and salinization of our state’s waters due to chloride from road salt is an emerging contaminant of concern in Ohio. This plan groups related sources and causes of water quality impairment into the following sections:

- 1.0- Rural Nonpoint Source Reduction
- 2.0-Altered Stream and Habitat Restoration
- 3.0-High Quality Waters Protection
- 4.0- Urban Stormwater Pollutant Reduction

Each section is further organized by impairment reduction goals, specific objectives for these goals and targeted strategic actions or practices (“strategies”) for meeting these goals. Milestones, integral to evaluating, quantifying and measuring successful implementation of these NPS Program objectives, are also included.

Measuring progress toward the environmental goals of Ohio’s Nonpoint Source Program will continue to be the focus of Ohio EPA’s Division of Surface Water’s Monitoring, Modeling and TMDL personnel. Ohio EPA ecological assessment staff conduct nearly all monitoring (physical, chemical, and biological) associated with nonpoint source implementation projects, beginning with baseline monitoring through project completion to determine the effectiveness of Section 319(h) and state funded nonpoint source projects. This approach allows Ohio EPA to maintain a standard of data quality, maintain the implementation focus of subgrant activities under Section 319(h) and assess the success of projects by utilizing this quality data to measure progress towards meeting project milestones. As NPS-funded projects are implemented, biological water quality monitoring criteria as well as other appropriate methods will be used by the Ohio EPA Division of Surface Water’s Ecological Assessment Unit to show improvement. Additionally, the Ohio EPA Ecological Assessment Unit will identify impaired watersheds that have shown improvement and those water resources that can be removed from the 303d list as Success Stories.

Fact sheets on existing Success Stories in Ohio can be found at [Nonpoint Source Success Stories: Ohio | US EPA](#) and include stories from primarily nonpoint source-impaired waterbodies in Ohio where restoration efforts have led to documented water quality improvements meeting the Success Stories criteria, including as of June 2025:

- Baldwin Run
- Big Darby
- Middle Cuyahoga River
- Olentangy River
- Raccoon Creek
- Broken Sword Creek¹

Ohio's NPS Program will utilize the following administrative measures to evaluate Ohio's NPS Program administration and management, including:

1. Timeliness and quality of status report submittals to USEPA (including "EPA Success Stories") to USEPA. The GRTS system will be used as appropriate.
2. Timeliness of federal fund obligation with state program partners and sub-grantees.
3. Grantee interest and competition – to be measured by:
 - Number of applicants per grant cycle
 - Number of projects completed on time
4. Federal Grants Administration:
 - Submittal of draft subgrant work plans to USEPA
 - Timely submittal of Section 319(h) grant application and annual work plan
 - Percentage of grant funds expended effectively
 - GRTS data entry status
 - Timely drawdown of federal funds
5. Participation at all required meetings, conferences and other events outlined in the Programmatic Conditions section of Ohio's grant agreement with USEPA.
6. Implementation of Core Programming-Ohio EPA will implement core program activities in compliance with National Program Guidelines.

Section 5.0 of this plan describes related state and federal program partners. Section 6.0 includes a more detailed identification and summary of the various Ohio EPA NPS Program summaries, funding and in some cases program-specific objectives. This section also provides updates on the H2Ohio initiative partnership with the NPS Program, a collaborative effort to actively meet many NPS and clean water objectives through state funding.

Ohio has many NPS Program partners at the local, state and federal levels. And the NPS Program integrates several programs within Ohio EPA's structure, such as the TMDL program targeting

¹ The Broken Sword Creek success story has been entered into the GRTS but is not yet included on the [Nonpoint Source Success Stories: Ohio | US EPA](#) website.

impaired watersheds; Ohio EPA Division of Surface Water biological and water quality assessment programs providing baseline and post-project effectiveness to document environmental improvements resulting from implementation activities; the Lake Erie and Inland Lakes programs, and watershed surveys that continue to target monitoring, restoration and other activities. This plan describes program measures and performance indicators focused on maintaining progress in the use attainment of Ohio's rivers and streams and that will contribute to improved quality of life for Ohioans. Information summarizing NPS Program partners is further discussed in Sections 5 and 6.

Priority Watersheds – Presented within this management plan are references to *priority watersheds* and associated strategies to address them. The term, *priority watersheds*, is used as a general reference to watersheds selected to be addressed for the specific goal or objective presented and does not represent a designated priority or ranked list. All watersheds in Ohio are priority for protection and for improvement.

1.0 Rural Nonpoint Source Reduction Strategies

Strategies and Management Actions to Reduce Sediment and Nutrient Losses from Rural Lands

Considerable work is still needed to reduce nutrients and sediment loads in runoff from agricultural and other rural areas in Ohio. Nutrient reduction has become increasingly more difficult since the 1980s when algal blooms appeared in water resources. Since then, erosion and sediment management, while necessary, has shown itself to be insufficient alone to fully address the problems present in Ohio's water resources. As dissolved reactive phosphorous in runoff has increased, the complexity of nutrient management has become more difficult and now must be battled on many fronts.



More than 13.6 million acres in Ohio are dedicated to agricultural production. Two million acres are used for hay land and pasture. The remaining 11.6 million acres are used exclusively to grow row crops such as corn and soybeans.

Ohio's nonpoint source management plan will encourage strategies that focus on the major sources of nutrients and the factors influencing their availability and transport to water resources. Targeting sources of nutrients and slowing runoff as well as increasing the interception of nutrients and their utilization in fields are primary approaches. Ohio's approach begins with promoting actions that: focus on reducing fertilizer inputs to crop utilization levels; targeting and accounting for existing soil nutrients and applying fertilizer and manure in ways that minimize runoff of nutrients and increase full utilization. But addressing runoff and drainage in agricultural areas is still needed.

Reducing sediment and nutrient movement through conservation practices that focus on arresting erosion, capturing sediments and applying extra storage and retention in agricultural drainage systems is a major emphasis of Ohio's plan. In some cases, this means altering drainage systems to allow greater storage, nutrient utilization and buffering before tile drainage reaches the channel or stream. While most of Ohio's crop fields have systematic subsurface drainage (efficient at delivering soluble nutrients), practices such as drainage water management, saturated buffers, wetland treatment systems and phosphorous filters have the potential of significantly reducing offsite loading especially during peak periods. Some practices such as drainage water management and saturated buffers allow crops and other areas to more fully utilize nutrients prior to releasing water downstream.

As channelization historically opened large portions of Ohio to productive cropping, it also enabled efficient delivery of sediments and nutrients downstream and lowered the physical integrity and hydrology of Ohio's streams. Many of the ecological services once provided by these streams, including drainage, water recharge and nutrient retention, can be recovered incrementally by increasing floodplain storage and associated nutrient removal along drainage channels. Increasing water storage and treatment in this manner occurs as standard trapezoidal drainage channels are

altered into multi-stage channels. Additional structural and management practices that assimilate existing pollutant loads are needed to round out a comprehensive strategy to reduce the impact of nutrients running from the agricultural landscape and into Ohio's rivers and streams, and lakes. This approach is consistent with USDA-NRCS efforts in the state that emphasizes "a systems approach" to address priority natural resource concerns. Ohio EPA works with state and Federal partner agencies and stakeholder groups to plan according to these principles to encourage producers and land owners to implement a system of practices that will address specific water quality resource concerns and accordingly, incorporate a suite of practices that address the concept for avoiding, controlling, or trapping pollutants, or "ACT." (NRCS Core and Supporting Practices Approved for Support of the NWQI – FY 2013).

Failing onsite treatment systems represent a smaller but still significant source of nutrient impairment for Ohio's water resources. These failing systems do not adequately treat home sewage and result in pollutants and impacts such as elevated nutrients, organic enrichment, ammonia, phosphorous, pathogens such as bacteria and low dissolved oxygen. Ohio's Nonpoint Source Management Plan utilizes state and local cooperation through Ohio EPA, the Ohio Department of Health and local county health departments to enable repairs, upgrades and the installation of adequate systems through loans and grants.

The following includes strategies and objectives for reducing the impacts of nutrients, soil loss and related pollutants to surface waters. The greatest emphasis will be on sediments, particulate nutrients and dissolved nutrients reduction through successful implementation of effective practices in needed watersheds using an accepted design approach. These strategies focus on croplands, livestock operations and home septic treatment systems.

1.01: Upland Management Strategies

Goal 1.01.01—Encourage the use of advanced conservation practice siting tools and whole farm conservation planning in addition to nutrient management planning.

Promote the use of advanced tools such as the Agricultural Conservation Planning Framework (USDA-ARS) and similar tools to allow full consideration of potential conservation practices. Where possible promote consultation for whole farm conservation planning for the same purpose. Due to the size and nature of farming operations (farming operations often contain large amount of rented crop fields) and the reduced staffing of NRCS or SWCD available to provide whole farm planning, there is recognition that tools that identify potential conservation and nutrient reducing practices are increasingly important. Non-adherence to such plans has given way to more specialized plans, such as nutrient management plans and/or grazing plans, which only look at one small component of a farm's overall operation. Although thousands of individual land-owner consultations occur each year in Ohio reduced staffing levels make it very difficult for local NRCS or SWCD personnel to meet with farmers specifically to identify critical areas where specifically targeted best management practices should be deployed. Operations need to be looked at holistically so that all necessary BMPs are installed and working together to prevent nutrient loadings and to maximize nutrient reductions. Critical areas where nutrient losses occur must also be identified so that appropriate conservation measures can be implemented or where appropriate conservation practices can be designed and installed according to a whole farm conservation plan.

Objective 1.01.01(A): Encourage whole farm conservation and comprehensive nutrient management planning so that water quality related resource concerns may be prioritized for agricultural management practice (BMP) selection and implementation.

Successful implementation of this objective is measured by:

- Supporting assistance to facilitate the completion of comprehensive nutrient management, Voluntary Nutrient Management (or whole farm conservation) plans in Ohio’s NPS priority watersheds. In 2024, Ohio had 2.2 million acres enrolled in the H2Ohio Voluntary Nutrient Management Plan program administered by the Ohio Department of Agriculture.
- Provide funding for or support other state and federal funding opportunities to accomplish the completion of at least 100 nutrient management plans annually during the first three programming years.
- Implement the “4-R’s” training program in association with the H2Ohio Program and the Ohio Agribusiness Association.
- NPS Program staff will participate in USDA-sponsored workgroups revising NRCS Field Guide Standards for Nutrient Application, Waste Utilization, Manure Management under NRCS Standard 590—Nutrient Management, and the Ohio Nutrient Management Practice Standard (FOTG-590) and other water quality related discussions.

Goal 1.01.02—Reduce erosion and nutrient and sediment loss to surface waters.

Identifying and prioritizing critical areas on cropland and livestock operations is a critical first step in helping to reduce erosion and the loss of nutrients from the agricultural landscape. A holistic view of the farming operation helps to identify the most effective practices in the most vulnerable areas. A variety of best management practices have been designed and deployed to prevent the loss of soils and/or nutrients from the agricultural landscape. Specific practices that are recommended for achieving measurable soil erosion and nutrient pollutant loss reductions include:

1. ***Grassed Waterways (412):*** Grassed waterways are common in agricultural areas and have been proven to be effective practices for reducing erosion and sediment loss. However, it is imperative that design and installation of these practices be done to enable their full nutrient reduction capabilities to be achieved.
2. ***Treatment Filter Areas (Per Ohio-NRCS FOTG Standard 393):*** Current agricultural drainage practices are designed to remove water quickly from fields through both surface and subsurface drains. Drainage has resulted in significant alterations to the hydrology and in many cases the physical integrity of streams throughout Ohio. For decades, the soil-loss conservation practice of choice for many agricultural producers as well as conservation professionals has been the “grass filter strip.” However, the common “filter strip” practice of placing 30 to 100 foot wide bands of grass vegetation parallel to streams and water ways has historically been installed under the Farm Service Agency Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP) per the NRCS Conservation Cover standard 327 and should not be equated with filter areas designed under NRCS 393 specifications. Conservation Cover installations plant grass only. Treatment Filter Areas are installed in areas where flow concentrates so that such runoff can

successfully be dispersed and passively treated as it flows into and passes through these filter areas. Conservation professionals agree that in Ohio almost all commonly installed filter strips have not been designed to consider contributing watershed size and slope, and do not disperse concentrated flow through the entirety of the installed filter area---according to the FOTG 393 standard. *There is opportunity to improve the effectiveness of the streamside conservation cover (filter strips) by installing appropriately designed treatment areas where field runoff occurs.*

3. **Cover Crops (340):** Cover crops will continue to be a tool used by Ohio programs (ODA cost share and H2Ohio as well NRCS) to assist with managing excess nutrients. In approximately 2008, state and federal agencies began to promote and align funding to increase the usage of the Cover Crop practice standard. Ohio's nonpoint source nutrient reduction strategy encourages the planting of cover crops after harvest as part of long-term conservation crop rotations. Cover crops provide multiple benefits including:

- Increased soil organic matter to improve soil moisture holding capacity
- A living root in the soil most of the year to uptake or scavenge excess nutrients
- Improving microbial communities
- More effective assimilation of nutrients in soils

4. **Minimally Invasive Tillage Practices:** Minimally invasive tillage practices (also known as conservation tillage) such as no-till, strip till and/or mulch tillage are effective tools for reducing soil erosion and therefore retaining nutrients on harvested farm ground. Minimally invasive tillage such as strip till disturbs only 10-15% of the soil surface allowing for improved fertilizer efficiency and less soil erosion than traditional tillage practices. USDA-NRCS practices that encourage minimally invasive tillage include:

- No Till/Strip Tillage (329)
- Mulch Tillage (345)

5. **Retention Devices and Drainage Tile Controls:**

Typical agricultural drainage is designed to quickly remove water from fields with surface and subsurface drains. Enhanced drainage has resulted in significant alterations to the hydrology and physical integrity of streams throughout Ohio. Therefore, efforts to improve water quality also require incorporating additional objectives into the drainage system to better manage the flow of this nutrient rich surface runoff and soil water. Retention structures such as passive treatment wetlands, stormwater ponds and/or other effective water retention structures are encouraged. Several USDA-NRCS eligible best management practices that meet this need include:



Controlled drainage allows farmers to keep nutrient rich water in the tile longer in order to increase crop use. These practices are being encouraged in watersheds with a need for nutrient reduction.

- Structure for Water Control (587)
- Sediment Basin (500)
- Water Harvesting Catchment (636)
- Irrigation Water Management (449)
- Irrigation System (443)
- Water and Sediment Control Basin (638)
- Constructed Wetland (656)
- Wetland Restoration (657)
- Wetlands Creation (658)
- Wetland Enhancement (659)
- Drainage Water Management (554)
- Filter Area (393)

6. ***Manure and fertilizer application limited to levels needed for the crop(s) being grown.*** The application of manure from livestock operations should be focused on utilizing the manure as a nutrient substitute to commercial fertilizer. Relative to typical soil concentrations, manure generally has a high concentration of mobile phosphorus. Manure that is applied in excess amounts, in vulnerable locations, shortly before snowmelt and/or rainfall, may result in very high levels of dissolved phosphorus moving from the field application site and into nearby waterways. Manure released into waterways can result in fish kills and contribute to algae blooms in both streams and lakes. Nutrient inputs, whether from manure or commercial fertilizer sources, should be applied using the following guidelines:

- Develop and implement a nutrient management plan
- Manage fertilizer using the “4Rs” (right source, right time, right place and right rate)
- Use precision nutrient management practices and methods
- Only apply manure and fertilizer based upon up-to-date soil tests
- Eliminate broadcast application of fertilizer unless incorporated immediately

7. ***Continue retirement of marginal and highly vulnerable lands and encourage reenrollment:*** Marginally productive and/or highly vulnerable riparian areas will continue to be encouraged to be retired, and as contracts expire on CREP and CRP buffer areas; these will be encouraged to be reenrolled. The following are recommendations to increase retirement of marginal lands:

- Marginally productive or vulnerable agricultural lands should be enrolled in the Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP) or the Conservation Reserve Enhancement Program (CREP).

Objective 1.01.02(A): Limit the application of livestock manure and fertilizer to those levels that meet agronomic need of the crop(s) being grown. Although this objective seems straightforward, it is a considerable challenge. Recognizing this challenge, successful implementation of this objective is measured by:

- Provide funding for or support other state and federal funding opportunities to accomplish the completion of at least 100 nutrient management plans annually during the first three programming years.
- Implement the “4-R’s” training program in association with the H2Ohio Program and the Ohio Agribusiness Association.
- NPS Program staff will participate in USDA-sponsored workgroups revising NRCS Field Guide Standards for Nutrient Application, Waste Utilization, Manure Management under NRCS Standard 590—Nutrient Management, and the Ohio Nutrient Management Practice Standard (FOTG-590) and other water quality related discussions.

Objective 1.01.02(B): Reduce erosion and sediment loss within Ohio’s NPS Priority Watersheds by implementing agricultural conservation management practices that result in sediment load reductions of more than 4,000 tons/year annually. Working in partnership with USDA, Ohio Department of Agriculture, and local SWCD program personnel, the successful implementation of this objective is measured by:

- Facilitate the targeted installation of agricultural management practices in Ohio’s NPS Priority watersheds that will generate annual sediment load reductions of >4,000 tons of sediment annually throughout the five-year programming period.
- Implement targeted reduction practices in Ohio’s NPS Priority watersheds that result in nitrogen and phosphorus load reductions exceeding 10,000 lbs/year and phosphorus load reduction exceeding 5,000 lbs/year.



Restricting livestock access to streams and waterways is an extremely effective and relatively simple solution to reducing sediment and nutrient losses. This photo shows the wear that cattle accessing the stream have caused.

1.02: Livestock Management Strategies

Goal 1.02.01—Improve manure management practices

The improper management of livestock manure and continued over-application of manure on soils with sufficient or high nutrients (especially phosphorus) is a significant challenge in watersheds that have a high density of livestock. Some of these areas have soil phosphorus levels that could provide adequate fertility for a long period before needing additional nutrient inputs, yet application of manure may continue on some of these same soils. Effective manure management is critical to see water quality improvements and/or measurable reductions in nutrient loadings to Ohio’s streams. Manure management in Ohio should be conducted to conform to the following guidelines:

- Apply manure at rates based on agronomic need
- Applied manure should be incorporated into soils as soon as possible
- Manure should not be applied when precipitation is imminent
- Maintain records of all manure application
- Eliminate manure application in critical areas
- Do not apply manure on snow covered and/or frozen ground

The following approved USDA-NRCS best management practices may be applicable to critical areas:

- Nutrient Management 590
- Waste Storage Facility (313)
- Waste Treatment Lagoon (359)

Objective 1.02.01(A): Manage manure in such ways as to minimize the risk of applied manure running off cropland and into rivers and streams. Successful implementation is measured using a variety of metrics, including:

- Working in partnership with NRCS, Ohio Department of Agriculture, and local SWCDs facilitate the updating of nutrient management plans to identify critical areas where highest risk of manure loss exists.
- Coordinate with NRCS to successfully contract for the installation of 75 waste storage facilities (primarily EQIP) projects during the five-year programming period.

Goal 1.02.02—Manage runoff in livestock production areas

Runoff from livestock feeding areas or other livestock production areas such as feedlots, loafing pads and milking parlors is typically highly nutrient-enriched, often flowing directly into ditches and/or small streams. Runoff management in any areas where large numbers of livestock congregate is extremely important for preventing nutrient loadings to streams and waterways. Managing runoff from livestock congregating areas should be conducted using the following guidelines:

- Clean water should be diverted from manure;
- Manure and other solids should be scraped and stored under roof;
- Runoff from feedlots should be diverted from waterways;
- Appropriate storage should be installed to collect and manage silage leachate and milkhouse parlor wastewater;
- Eliminate uncovered feeding areas.

USDA-NRCS funded best management practices that may be useful in improving the management of runoff from livestock production areas include:

- Waste Storage Facility (313)
- Heavy Use Area Protection (561)
- Livestock Use Area Protection (757)
- Roof Runoff Structure (558)

Objective 1.02.02(A): For the installation of agricultural management practices to improve management of stormwater runoff from livestock production areas such as:

- Provide funding and/or technical assistance same question for the installation of at least five (5 heavy use pads and 2 milk-house parlor wastewater management systems during the five-year reporting period.

Goal 1.02.03—Improve Grazing Practices

Improperly managed grazing is a source of both erosion and nutrient loading into streams and other waterways. As a growing number of farmers enhance their operations by adding livestock, the potential for poorly managed grazing to impact water quality increases. Grazing practices should be developed or improved using the following guidelines:

- Develop and implement a prescribed grazing plan
- Eliminate uncontrolled livestock access to streams
- Improve and properly maintain heavy use and other high traffic areas
- Provide shade and watering sources away from streams

A variety of grazing related best management practices are eligible for cost-share funding under the NRCS-Environmental Quality Improvement Program (EQIP) and when they are strategically installed in critical areas vulnerable to runoff and nutrient loss, they can be effective. These include:

- Prescribed Grazing (528)
- Heavy Use Area Protection (561)
- Spring Development (574)
- Watering Facility (614)
- Water Well (642)
- Livestock Exclusion Fencing (472)

Objective 1.02.03(A): Improve livestock grazing practices to reduce erosion and nutrient loadings into streams and other waterways in watersheds where pasturing of livestock is a major activity such as the Muskingum Watershed. Successful implementation is measured by achievement of the following:

- Provide financial assistance for the installation of more than 6,000 linear feet of livestock exclusion fencing/annually throughout the five-year programming period.
- Provide funding for the installation of at least ten (10) alternative watering systems in association with livestock exclusion fencing.
- Provide funding to facilitate the implementation of prescribed grazing on 250 acres throughout the five-year programming period.

1.03: Drainage Water Management Strategies

Goal 1.03.01—Reduce the rate and amount of runoff and subsurface drainage

Perhaps the single most important action that can be taken to reduce nutrient loadings and impacts on Ohio streams is to reduce the rate and amount of runoff from agricultural production areas. For

decades, grass filter strips (FSA CP-21) have been advocated as important tools to provide a buffering media for sheet flow runoff and cost-share funding has resulted in the installation of many thousands of acres of these practices. Unfortunately, a very small percentage of CP-21 “filter strips” are designed to disperse and filter runoff from each discreet contributing drainage area. Likewise, there is very little actual filtration of surface runoff from contributing cropland because FSA CP-21 filter strips (designed as conservation cover standard FOTG 327) are mostly bypassed by concentrated flow runoff. In addition, a significant percentage (estimated at between 25-75% in any given year, N. Fausey, USDA-ARS personnel communication) of the total drainage from farm fields in Ohio is flowing through subsurface tiles and discharges directly into waterways without ever passing through a filter strip. There is a real need to design and install more effective buffers—filtering areas rather than strips specifically designed to capture, retain or disperse runoff. The challenge is convincing farmers and other landowners that these alternative drainage designs can be installed while still maintaining the overall functionality of the drainage systems and crop yields. Reducing the rate and amount of runoff will require:

- More effective and innovative edge of field buffer areas (e.g. saturated buffers and linear wetland retention areas)
- Cover crop planting as part of a long-term conservation crop rotation
- Water control devices and drainage water management devices that retain nutrient laden waters on surface outlets and subsurface tile outlets

Drainage water management practices, also known as controlled drainage, are an important emerging set of tools for dealing with field runoff and mitigating the impacts of tile drainage. Several NRCS approved practices that help with drainage water management include:

- Drainage Water Management (554)
- Structure for Water Control (587)
- Filter Strips/Areas (393)
- Wetland Creation (658)
- Ponds (378)

Objective 1.03.01(A): Improve edge of field infiltration and drainage water retention. Successful implementation is measured by:

- Providing funding for the installation of controlled drainage systems on at least 500 acres annually throughout the five-year programming period.
- Provide funding for the installation of at least three (3) riparian “filter area” demonstration projects during the five-year programming period.
- Provide funding to protect and/or restore at least twenty (20) acres of riparian wetlands in agricultural settings annually throughout the five-year programming period utilizing EQIP Section 319(h) and H2Ohio funds.

Goal 1.03.02—Increase treatment of field runoff

Runoff from agricultural fields cannot be eliminated, but conservation practices can slow, store and treat runoff prior to reaching streams. For example, runoff from a livestock feeding area should be diverted through infiltration areas and/or wetlands so that nutrients can be assimilated via extended detention and/or vegetative uptake. The following are guidelines and recommendations for increasing the treatment of field runoff:

- Direct concentrated field runoff and drainage through vegetated, wetland and/or infiltration areas.
- Increase the use of fixed bed bioreactors.
- Increase the use of soil amendments such as alum, gypsum or water treatment residuals.

USDA-NRCS eligible practices that will assist landowners with implementing this recommendation include the following:

- Wetlands Restoration (657)
- Grassed Waterway (412), can increase effectiveness with stacked retention features (cascading cells, check-dams)
- Wetlands Creation (658)
- Filter Strips/Areas (393)
- Organic Bioreactors, Phosphorus Removal Systems, Denitrifying Bioreactors (605, 782)
- Saturated Buffers (604)

Objective 1.03.02(A): Improve edge of field passive treatment of stormwater runoff by controlling drainage and routing it through stormwater wetlands, bioreactors and other buffering and treatment systems. Successful implementation is measured by:

- Provide funding for the installation of two (2) fixed bed bioreactors to provide edge of field treatment to agricultural runoff during the five-year programming period.
- Provide funding for the creation of ten (10) acres of riparian wetland drainage water treatment areas during the five-year programming period utilizing EQIP, Section 319(h) and H2Ohio funds.

1.04: Riparian Management Strategies

Goal 1.04.01—Increase riparian wetland retention areas

The buffering capacity of riparian areas has steadily declined as riparian forests and wetlands have shrunk due in part to high crop prices in recent years. The alteration of riparian (and in-stream) habitat is one of the two highest magnitude nonpoint causes of aquatic life use impairment in Ohio. Re-establishing, restoring and enhancing existing riparian wetlands to serve as detention areas for tile discharges and other drainage from agricultural fields is critical to reducing the impact of nutrient laden discharge water. Riparian wetland areas are highly effective at assimilating nutrients through infiltration and/or vegetative uptake. Numerous USDA programs offer generous cost-sharing incentives for increasing and/or restoring riparian wetland areas that meet the needs of an effective

nutrient reduction strategy. The following are practices that will increase effective riparian retention areas:

- Wetlands Creation (658)
- Wetlands Restoration (657)
- Floodplain Connection or Restoration

Objective 1.04.01(A): To demonstrate the effectiveness of riparian wetland retention areas as tools to mitigate the nutrient and sediment impacts of subsurface agricultural tile drainage. Successful implementation is measured by:

- Providing funding for the installation at least two (2) agricultural tile detention wetland demonstration project during the five-year program period utilizing EQIP, Section 319(h) and H2Ohio funds.

Goal 1.04.02—Protect and restore riparian forested acres

Like riparian wetland areas, Ohio’s riparian forests have been in steady decline as agricultural equipment and production has expanded in size. The capacity for a riparian corridor of at least 120 feet wide (the equivalent of the canopy of just **two** mature trees) to store water and assimilate nutrients is considerable. Riparian corridors provide important streamside habitat for wildlife, and important shading to the water, thereby reducing algae blooms and water temperatures. Numerous USDA-NRCS based programs including: the Conservation Reserve Enhancement Program (CREP), Conservation Reserve Program (CRP), EQIP and others provide generous cost-share incentives for the re-establishment and expansion of riparian forests. Program eligible best management practices include:

- Riparian Forest Buffer (391)
- Tree/Shrub Establishment (612)

This strategy needs careful consideration because while the approach of protecting stream banks and riparian areas has obvious water quality benefits the concept carries negative images of unwanted “land use control.” The fact is there are currently many tracts of land where riparian areas are plowed or cultivated up to a channel’s edge. The resulting bank slippage, sediment loss and potential nutrient loadings from such poor land management damages the soil and water resources of the State. Educational efforts targeting landowners and conservation incentive packages are needed to aggressively promote the benefits of “no plow zones”—those riparian areas where cultivating and plowing are carefully restricted along waterways. Farmers should strongly consider enrolling all riparian areas into programs such as CRP or CREP where annual rental payments may help offset the loss of potential income that might result from land retirement.

Objective 1.04.02(A): To provide financial assistance for the acquisition of conservation easements on and restoration of riparian wooded parcels adjacent to high quality streams, preferably in identified critically threatened areas. (See Objective 2.03.01.) Successful completion is measured by:

- Providing funding for the acquisition of conservation easements on more than fifty (50) acres of riparian wooded acres each year during the five-year programming period.

- Provide funding for the planting and restoration of fifty (50) acres of riparian areas each year during the five-year programming period.

Goal 1.04.03—Establish voluntary “no-plow” zones in riparian areas

This strategy needs careful consideration because while the approach of protecting stream banks and riparian areas has obvious water quality benefits the concept carries negative images of unwanted “land use control.” The fact is there are currently many tracts of land where riparian areas are plowed or cultivated up to a channel’s edge. The resulting bank slippage, sediment loss and potential nutrient loadings from such poor land management damages the soil and water resources of the State. Educational efforts targeting landowners and conservation incentive packages are needed to aggressively promote the benefits of “no plow zones”—those riparian areas where cultivating and plowing are carefully restricted along waterways. Farmers should strongly consider enrolling all riparian areas into programs such as CRP or CREP where annual rental payments may help offset the loss of potential income that might result from land retirement.

Objective 1.04.03(A): Demonstrate the effectiveness of voluntary “no-plow” or setback zones along riparian areas. Successful completion is measured by:

- Increase enrollment CRP and CREP by 5% annually during the program period. This includes effective re-enrollment of expiring contracts and effective outreach to reach new participants.

1.05: Failing Onsite Treatment System Strategies

It is estimated that over 30% percent of all household sewage treatment systems (HSTS) in Ohio are experiencing some degree of failure due to poor maintenance or age. The 2012 Ohio Department of Health sponsored study, ***Household Sewage Treatment System Failures in Ohio***, estimated that 39% of HSTSs were failing in Northwest Ohio. Further, the 2018 *Ohio Mass Balance Report* estimated that HSTS contributes between 3 – 13% of the total annual phosphorous load and 1-8% of the annual total nitrogen load (water years 2013 through 2018). Additionally, failing systems often contribute untreated sewage, harmful bacteria and pathogens that cause stream impairment and loss of use.

Goal 1.05.01—Reduce the Number of Failing Onsite Treatment Systems

Ohio EPA will support replacement of failing Household Sewage Treatment Systems (HSTS) with appropriate state and federal funding. Potential funding sources include Ohio’s Water Pollution Control Loan Fund that provides loans and principal forgiveness of loans (supported by federal Clean Water Revolving Funds and state match). Additionally, Ohio will seek other potential sources of funding such as H2Ohio program funds, for assisting, reimbursing or completing repair and replacement of failing systems. This is especially important in situations of low and moderate income. Potential HSTS replacement opportunities will be directed by the Ohio EPA’s Division of Environmental Financial Assistance and the Ohio Water Development Authority.

Failing Household Sewage Treatment Systems found to be a public health nuisance shall be directed to repair their systems according to Ohio Department of Health standards (Ohio Administrative Code

3701-29-06. These standards require minimum setback from streams and water resources, and adequate soil adsorption areas. Ohio Administrative Code 3701-29-06 provides a minimum standard for replacement and new HSTS systems as administered through each local Health Department and their health code.

Objective 1.05.01(A): Facilitate increased replacement of failing household sewage treatment systems (HSTS) in watersheds with high nutrient loading. Where state funds used for this objective, they may be utilized as state match for section 319 (h) funds. Successful completion is measured by:

- \$0.5 million of H2Ohio funding utilized for repair and replacement of failing systems in high priority watersheds.
- Increased number of systems replaced in high-priority watersheds (from all funding sources).

2.0 Altered Stream and Habitat Restoration Strategies

Recommended Management Practices to Restore Altered Habitat Conditions

Hydromodification and the alteration of in-stream channel and habitat conditions are two of the highest magnitude causes of aquatic life use impairment in Ohio streams. Many Ohio streams have been straightened, channelized or have experienced downcutting and impacts from land use change in the watershed as natural flow regimes dramatically altered. In more developed areas, streams and floodplains have been disrupted by dams, streamside levees, dramatic flashy stormwater runoff and diversions of flow for various purposes. These actions have had dramatic effects on Ohio's rivers and streams.

Virtually every TMDL and watershed action plan completed in Ohio identifies the need to restore streams, stabilize seriously eroding streambanks, and reconnect floodplains and remove dams, levees and other structures from stream channels and floodplains. Fortunately, many of these are problems that can be identified in specific critical areas of a watershed and are able to be reversed. Dam removal projects along many Ohio rivers have removed impairments and restored large segments of previously impaired waters. Natural channel design stream restoration projects in tributary streams in watersheds such as the Chagrin River have restored impaired waters to cold water habitat in some instances. Eroding streambanks have been addressed by evaluating more stable channel pattern, profile and dimension and then utilizing bio-engineering methods. As a result, riverine habitat is improving dramatically in some areas. More work is needed, but progress is occurring restoration and natural recovery provides greater stability, function and habitat for aquatic life. Project implementers must



Natural flow has been restored at this cut small low head dam in Big Sandy Run allowing continuity for bedload, flow, habitat and biological communities. This project was enabled by a Section 319(h) grant.

consider upstream influences from critical areas where stream restoration is recommended. Nonpoint influences such as hydromodification and habitat alteration are effective when upstream influences will not over-ride water quality improvements resulting from restoration. Upstream effects may be an overpowering influence on water quality and use attainment and should be considered. Stream restoration and in-stream habitat restoration is not likely to be nearly as effective in a situation where uncontrolled stormwater remains an issue or where point source influences or legacy toxins may be impairing biological and chemical conditions within a stream.

2.01: Restore Streams using Natural Channel Design Methods

Stream restoration provides an opportunity to accelerate the recovery of streams that have been impacted, channelized or otherwise modified in a manner that has disrupted natural channel and flow conditions and in-stream habitat. Natural channel design methods can be used to restore stream and floodplain services. And in an appropriate setting, major impediments to recovery can be removed or with substantial restoration effort biological communities can often be restored within two or three years. Addressing degraded and downcut channels reduces the contribution of sediments from bank erosion and removes decades from the time ordinarily needed for recovery of stream services and biological improvements.

Goal 2.01.01: Restore impaired streams and altered aquatic habitats.

Ohio EPA encourages the use of natural channel design and bioengineering methods and materials (where appropriate) to rehabilitate and/or restore floodplain, streambanks and in-channel riffles and pools.

Channelization, impoundments caused by dams and other obstructions of flow, embedded substrates and other severe impacts to in-stream habitat conditions are a significant cause of biological community impairment. The use of natural channel design methodology, bioengineering methods and materials for the installation of in-stream habitat and flow structures such as riffles, runs and pools; and grade control devices such as J-hooks and other methods can be effective tools for reversing the impacts of hydromodification on biological communities. A primary objective of these methods is to address inherently unstable conditions that can be corrected and to provide a stream form or structures that will be maintained or not degraded in the current watershed conditions. These approaches consider both the stream's water and sediment load in considering in-stream and near-stream structures to improve habitat and flow conditions.

Ohio's Nonpoint Source Program **STRONGLY** discourages bank armoring or the excessive use of stone, concrete and other unnatural hardening agents in stream restoration and/or in stream habitat restoration and strongly encourages considering the dimension, pattern and profile that will support aquatic life and good habitat and be maintained by the watershed. Further, in situations where rock or stone is needed Ohio EPA strongly recommends that natural river rock be used as any kind of in-stream material, whenever possible and whenever appropriate to resolve the specific cause of impairment within identified critical area(s).

The following are the structural and other cost items that are or may be associated with projects designed to restore impaired streams and altered riparian habitats:

- 1) **Project Design:** In-stream and/or riparian projects must be carefully planned and designed. Nearly all projects will require some sort of permitting. And all permits (even nationwide permits) require detailed plans for in-stream and most near-stream work. Most local governments, park districts and other implementers typically contract with outside firms specializing in engineering, environmental compliance and/or design build construction firms for project designs and permitting compliance.
- 2) **Water Management (during construction):** Cofferdams, temporary access roads and other structural items designed to manage water levels during restoration projects are common accessories and costs. Effective water management is critical to minimizing the amount of silt and sediment that may be released during any in-stream or near-stream restoration projects.
- 3) **Excavation/Fill:** Restoring streams and altered riparian habitats nearly always requires earth to be moved, fill to be added as part of rebuilding a streambank etc. Any fill materials should always be clean fill and compliant with conditions of any permit associated with a restoration project.
- 4) **Grade Control Riffles, Rock/Cross Vanes:** These are grade control structures that decrease near-bank shear stress, flow velocity and stream power and diverts energy to the center of the channel. Additional features may improve stream habitat by increasing bank cover, creating holding and refuge cover during high and low flow conditions, providing feeding lanes and creating spawning areas in the tail-out or glide portion of a pool. Many stream restoration projects in Ohio may involve the installation of one or more of these structures.
- 5) **Rock J-Hook Vanes:** These are upstream directed, gently sloping structures comprised of natural materials that may include boulders, river run stone and possibly logs and/or root wads. They are located on the outside of the stream beds where strong down-welling and up-welling currents, high boundary stress and high velocity gradients generate high stress in the near-bank regions. Rock J-hooks are designed to reduce bank erosion by reducing near-bank slope, flow velocity, velocity gradients, stream power and shear stresses.
- 6) **Rock W-Vanes/Weirs:** These structures are similar to cross-vanes in that both sides are vanes directed from the bank full bank upstream toward the bed with similar departure angles. (A “W” as looking downstream from above).
- 7) **Habitat Rocks and Boulders:** Some stream restoration and/or altered in-stream habitat restoration projects do not need highly engineered solutions that will result in improved water quality. Strategically placing river run rocks and large boulders in the stream channel may help to improve aquatic habitat, reduce stream velocity and develop scour zones and pools. Boulders in the channel may also provide fish refuge and ambush areas.



Riffles and other structures were used in the Acacia Reservation Stream Restoration, a Section 319(h) project.

- 8) **Root Wads:** These are typically a root mass or root ball of a tree plus a portion of the trunk used to stabilize a stream bank by deflecting stream flows away from the bank and back out to the main stream channel. They help to create stable undercut bank effects and create direct habitat/cover for fish and other aquatic and some terrestrial animals. Roots wads are often a common component of a stream or altered aquatic habitat restoration project because of their ready availability and low costs.
- 9) **Mud Sills (Habitat):** A mud sill is an overhead cover device that is best suited for lower gradient streams with steep, eroded banks found next to a deep main channel. They provide stream bank stability and create a stable undercut bank effect for fish cover. They can be constructed on a straight stretch of stream or they can follow the contour and outside bend.
- 10) **Tree Revetment:** This is the practice of anchoring logs and fallen trees to the stream bank to stop erosion. Trees will reduce stream energy against the streambank, decreasing erosion and allowing silt and sands to settle with the voids in the tree's branches and/or roots. The deposited materials form a good seed bed in which seeds of riparian trees such as cottonwood, sycamore and box elder can sprout and grow, further stabilizing the stream bank. Tree revetments also provide high quality fish and wildlife habitat. These have been a common component of stream restoration projects.
- 11) **Other items frequently associated with Natural Channel Stream and Habitat Restoration Projects:** The following items are also frequently associated with natural channel design and habitat restoration projects:
 - a. Constructing flood prone bench
 - b. Bank Contouring/Resloping
 - c. Site stabilization
 - d. Brush mattresses and/or bundles
 - e. Fascines (live stake will or other shrub) and Reed Rolls
 - f. Joint planted (vegetation) riprap or gabions (only for width limited areas)
 - g. Live stakes
 - h. Native grasses, shrubs and trees



Natural Channel Design stream restoration like this on Kelsey Creek focuses on restoring natural processes such as restored floodplain access. This restores stream services such as deposition of fine sediments, and sorting bed material to improve habitat, flow and flood conditions as well as dramatically improving in-stream and near-stream habitat conditions. This project was completed under provisions of a Section 319(h) grant. The project also significantly reduced suspended sediments caused by rapidly eroding streambanks.

Objective 2.01.01(A): To provide technical and financial assistance to local implementers for the completion of 5 natural channel design stream restoration projects in critical areas as recommended in an approved TMDL study, a 9-element watershed action plan or other appropriate alternative plan. We anticipate facilitating the completion of twenty-five (25) projects that will restore approximately 12,500 linear feet of stream channel throughout the programming period. Additional performance measures include:

- Through ecological assessment and monitoring, that restores impaired stream segments to full attainment of warmwater habitat status or better.
- To rehabilitate riffles, pools and other in-stream habitat structures in association with four stream restoration projects per year for a total of 20 projects with in-stream habitat structures throughout the programming period.
- Improve floodplain and stream services on at least 12 projects associated with sediment removal, and bed material sorting in order to promote improved habitat and improved channel condition (through the program period).

Goal 2.01.02: Manage invasive species management

Removal and management of invasive species is a specific management practice for priority streams in Ohio's Healthy Waters Initiative. The effective management of invasive species along all of Ohio's streams is important but is a critical tool for protecting (restoring) high quality rivers and streams. Within appropriate guidelines, invasive species removal and management will play a very important role in Ohio's High Quality Waters Initiative as well as supporting stream and altered habitat restoration actions throughout the state. Whenever possible, Ohio will limit invasive removal and/or management on stream restoration projects to invasive species encountered "incidental to

construction”. Healthy Waters projects, however, may include projects where invasive species removal is a critical piece to “protecting and/or restoring” the high-quality conditions of the stream or riparian areas.

The Ohio Invasive Plants Council and the Ohio Department of Natural Resources maintain current lists of invasive species that should be removed or carefully managed during restoration. While there are more than 700 species of invasive plants in Ohio, between 13 and 18 are known as the worst species that are especially vigorous and therefore are highly targeted by botanists and other land managers. Invasive species removal and/or management activities may include using chemical methods, mechanical means such as mowing and/or physical means such as cutting, pulling etc. for eradication. In riparian prairie areas, management actions may also include prescribed burning however, Ohio EPA does not anticipate allowing Section 319(h) funds to be used for this activity. Possible exceptions might be when burning is a recommended action for protecting high quality streams.



Stream and wetland restorations often include significant efforts to control invasive while establishing native species.

Invasive species such as honeysuckle, autumn olive, common reed grass, and cattails can become very dominant in riparian and/or wetland areas and degrade important near-stream habitats. Projects that are designed exclusively to eliminate and/or remove invasive species are not eligible for funding under Section 319(h) subgrants. However, we encourage the removal of invasive species whenever possible and will allow costs associated with such activities when removal and/or management is conducted incidental to construction and/or restoration activities. More information about invasive plant species in Ohio may be found at: [Invasive Species | Ohio Department of Natural Resources](#).

Objective 2.01.02(A): Improve and expand financial support for the management and/or removal of invasive plant species in critical areas where invasive species are identified as a high magnitude cause of habitat impairment. Provide technical and financial assistance to local implementers of stream and wetland restoration for the removal and/or effective management of invasive plant species on section 319(h) projects throughout the programming period.

Objective 2.01.02(B): To facilitate with local implementers the restoration of at least 10 acres of degraded wetlands during the program period by removing and/or effectively managing non-native invasive wetland plant species.

2.02: Daylighting Culverted and Severely Modified Streams

Many small urban Ohio streams have been enclosed in underground culverts. These provide little or no natural functions and are little more than a storm sewer. Projects in several Ohio communities have demonstrated that when buried streams are “day-lighted” and floodplains and historic channels are restored, biological communities will return and inhabit such streams. This also provides the stream with increased opportunities to assimilate nutrients and other nonpoint source pollutants. Improved water quality and habitat conditions usually result when a culverted stream is returned to its natural condition.



This project in Coventry Township near Akron, Ohio daylighted 1,117 feet of culverted streams, leaving natural stream with habitat structure and significant riparian areas planted with native grasses, trees and shrubs.

Goal 2.02.01: Daylight culverted headwater streams.

Opportunities to daylight urban streams in Ohio are limited and when such limited opportunities present themselves, we need to be prepared to act and be responsive to implementers needs. When done correctly, daylighting can bring previously buried streams back to life. This improves habitat as well as providing natural services and additional green and natural spaces in urban areas.

Objective 2.02.01(A): Provide technical assistance.

Provide technical and financial assistance to local governments, park districts and other local implementers to daylight and restore buried and culverted urban streams within critical areas identified in approved TMDLs and/or endorsed 9-element watershed plans. Projects that remove the last or final cause of impairment or are proposed on a high-quality stream will also be considered regardless of watershed planning status. A specific objective is to facilitate the daylighting of at least three (3) culverted urban tributaries during the programming period.

- Include daylighting of culverted streams as eligible activities on Request for Proposals (RFP) for Section 319(h) grants.
- Provide technical and/or financial assistance to facilitate the daylighting of culverted urban streams throughout the 5-year programming period.
- Identify two (2) candidate streams (and implementers) for daylighting in Ohio's scenic river watersheds or other high-quality waters based on impairments identified in approved TMDLs and/or watershed action plans.

2.03: Strategies for Restoring and Protecting Riparian Habitat

Goal 2.03.01: Restore and protect riparian habitat

Riparian areas are vital to the health and well-being of a stream. As riparian areas go, so goes the stream. From a water quality standpoint, riparian areas are very important natural bio-filters and they protect rivers and streams from excessive sedimentation, nutrients and erosion. Riparian areas also provide important habitat for migrating and residential birds, mammals and amphibians and reptiles. Research shows that riparian areas can be important for the assimilation of nutrients from fertilizers washing from upstream crop fields. They also are important for helping to dissipate a stream's erosive energy and a tree-covered riparian zone also provides important shade that helps to keep a stream cool and hospitable to fish and other biota.

Despite previous impacts, riparian areas can be restored. But prevention by setback, zoning codes, conservation easements or fee-simple acquisition is preferable to restoration. Restoration of a degraded riparian area can be accomplished with native shrubs, grasses and trees.

Objective 2.03.01(A): Provide financial assistance for the acquisition of conservation easements on riparian parcels adjacent to identified high quality streams, preferably in critically threatened areas identified in approved TMDLs and watershed action plans.

- Provide technical and financial assistance for the acquisition of conservation easements on more than 50 acres each year during the 5-year program period.
- Facilitate the fee-simple acquisition of 50+ acres of high-quality riparian habitat per year. Section 319(h) grants may not be used to acquire properties so alternative funding sources such as Clean Ohio and the WRRSP programs will need to be identified.
- To obtain donated conservation easements (used as match) on at least 50% of the Section 319(h) funded stream and/or wetland restoration sites.

Goal 2.03.02: Address the cause of severely eroding stream banks

Severely eroding stream banks are important source of silt, sediment and the nutrients attached to soils and are responsible for degraded riparian habitat and in-stream habitat. A stream reestablished in equilibrium with its flow condition will have a normalized amount of erosion and deposition that will be able to maintain better habitat. Often streams have experienced watershed changes, shortening of length or other impacts that exacerbate erosion. Sometimes property and utilities have been placed in areas such as the meander belt of a watercourse that may increase the chance of being subject to impacts from stream erosion. A stabilized stream bank helps a stream maintain the natural

course of its channel and prevents the loss of property and/or damage to utilities, roads, buildings, or other facilities located adjacent to a watercourse.²

Consistent with Ohio’s previously stated priorities, unstable streambanks should be address within a natural channel design approach that considers historical impacts as well as the best potential stream condition that would maintain the stream in equilibrium. Bank stabilization projects planned without



Severely eroding streambanks can be significant contributor of fine sediments to streams and may be addressed in a manner that works with nature and stream dynamics. This Chagrin River project in Hunting Valley addressed the inherent instability of outside bend through Section 319(h) funding.

consideration of stream condition or working with natural stream dynamics will not be funded. The primary aim of the NPS program is to bring water resources into attainment of water quality standards and to address threats to high-quality water resources. This is accomplished through implementation of conservation practices and projects that are identified in TMDL studies and 9-element nonpoint source implementation strategies. Ohio EPA strongly discourages (and will not provide financial assistance) for any project that is primarily a streambank “armoring” project. These types of projects typically involve stabilizing a streambank by the installation of riprap, stone, retaining walls or other bank “hardening” practices.

Section 319(h) funding may only be used for bio-engineered streambank stabilization projects and those projects that deploy a “softer” or “green” methodology that is much less dependent on stone, riprap or other stream bank hardening methods. Implementers proposing streambank stabilization projects must identify measures taken upstream from the stabilization site to ensure that the root cause for the bank’s instability has been addressed.

Objective 2.03.02(A): Provide technical and financial assistance for the facilitation of projects to restore severely eroding stream banks in critical areas identified in approved TMDLs, watershed action plans and other appropriate alternative watershed-based plans. Such projects should include:

- Funding for three (3) streambank stabilization projects annually throughout the 5-year programming period. These should include the following:
 - 5 streambank stabilization projects in high quality waters totaling >1,500 linear feet

- 5 urban streambank stabilization projects totaling 1,500 linear feet.
- 5 smaller streambank stabilization projects on tributary streams and/or small rural streams totaling 600 linear feet.
- Implementation of one (1) streambank stabilization project that demonstrates innovative technologies such as vegetated “rip-rap” or other green methods.
- Provide sufficient monitoring of at least three (3) streambank stabilization project so that we can ascertain a more accurate load reduction that can be expected from such projects. This may involve identifying and/or developing alternative models for calculating load reductions associated with streambank stabilization.

Goal 2.03.03: Restore vernal pools and other riparian wetlands

Vernal pools are a type of riparian wetland that provide critical habitat for amphibians such as toads, wood frogs and salamanders as well as a whole array of other organisms such as fairy shrimp, and other macroinvertebrates that are uniquely adapted to these small seasonal wetland areas. Vernal pools fill with snow melt and spring rains and provide important spawning areas for their inhabitants. By summer, these pools are dried up.

From a water quality standpoint, vernal pools provide important storage capacity that slows the first slug of NPS pollutants from snow melt and stormwater. These areas also provide infiltration opportunities to reduce the rate and amount of runoff. Their protection and restoration are very important tools for protecting and improving riparian habitat.

Objective 2.03.03(A): Provide technical and financial assistance to facilitate the restoration of vernal pools and riparian wetland areas in identified critical areas adjacent to high quality streams. Such projects should include:

- Funding for projects that restore and/or protect vernal pools and riparian wetland areas adjacent to high quality streams. These projects should include:
 - Three (3) vernal pool restoration projects that restore approximately 10 acres of vernal pools along designated high-quality streams throughout the program period.
 - Three (3) large riparian wetland projects that restore more than 50 acres of riparian wetlands during the program period.
 - Acquisition of conservation easements (or fee simple land acquisition using funds other than 319(h) subgrants) to protect more than 5 acres of vernal pool and/or riparian wetland restoration projects.

Objective 2.03.03(B): Provide technical and financial assistance to facilitate the monitoring and ecological assessment of vernal pools and riparian wetland areas in identified critical areas adjacent to designated high quality streams. Initiative shall include:

- Improve monitoring of vernal pools and riparian wetlands to measure and validate NPS pollutant load reductions that such areas produce.

- Encourage the development of a volunteer vernal pool and/or riparian monitoring program for identified critical vernal pools and riparian wetland areas adjacent to high quality streams as part of Ohio’s Healthy Waters Initiative.
- Develop a geo-referenced map of identified vernal pools and riparian wetland areas along at least one designated high-quality Ohio stream.

Goal 2.03.04: Increase native shrub and tree plantings in riparian areas

Riparian restoration and protection projects nearly always include some component of shrub or tree plantings. Ohio requires that any riparian plantings funded with nonpoint source grant funds (such as Section 319(h)), may ONLY use native grasses, shrubs and trees. Invasive plant species have been a serious problem along Ohio streams. As a result, Ohio EPA advocates only native hardwood tree species and native shrubs at stream’s edge, as well as native grasses further back from the stream.



A healthy wooded riparian corridor is crucial for the health of a river or stream. Trees provide shade, shelter and cover for wildlife and are the foundation of the food web within a river ecosystem. Leaves and other detritus that fall into a stream provide an appropriate source of food and energy for the aquatic macroinvertebrates that fish eat.

Objective 2.03.04(A): To provide financial assistance to facilitate the restoration of riparian shrub and hardwood tree cover in critical areas identified in approved TMDLs and/or 9-element watershed action plans, with an emphasis on designated high-quality waters. This assistance opportunity is provided as follows:

- Provide grant funding to local implementers to restore native riparian shrub and tree cover. The following projects anticipated to be completed during the 5-year program period include:
 - Section 319(h) Subgrant Funding will restore 50 acres per year of degraded riparian areas with plantings of native grasses, shrubs and hardwood trees.
 - Request for Proposals (RFPs) continue to guide applicants proposing to restore streambanks, riparian areas or any projects causing riparian impacts to limit activities for establishment of only native grasses, shrubs and hardwood tree species in their restoration proposals. Deliverables will be reflected in the Request for Proposals.

2.04: Restoring Natural Flow

Goal 2.04.01: Restore and Protect Natural Flow Conditions

Streams have been damned, diked, leveed, diverted and piped since Ohio was settled. Most of these dams and other structures have outlived their intended use and, in many cases, are in serious disrepair. In all cases, low-head dams and other structures that alter the natural flow of a river are a source of danger for recreational users and a significant nonpoint source cause of aquatic life use impairment. Fortunately, rivers have demonstrated that when natural flow conditions are restored, full attainment of aquatic life use and water quality standards can be met. Natural flow conditions also dramatically improve a stream's assimilative capacity for processing and reducing the impacts from nonpoint source pollutants that are being transported by the stream. For these reasons, Ohio strongly supports and encourages the removal of flow altering structures from rivers and streams.

The State of Ohio has removed over 35 dams throughout the state, with at least 10 more expected to be removed within the next few years. Ohio EPA and ODNR collaborate on the dam removal projects that have included large and small dams. In nearly every instance, impaired stream reaches were restored to full attainment of their designated aquatic life use following dam removal.



Dam removal projects in Ohio have restored miles of previously impaired streams. For example, removal of the Munroe Falls and City of Kent dams on the Middle Cuyahoga Rivers restored several miles of impaired stream segments. Photos show conditions following removal.

Objective 2.04.01(A): Provide financial assistance to restore and/or protect natural flow conditions within critical areas identified in TMDL studies and/or endorsed watershed action plans.

- Provide technical and financial assistance via Section 319(h) grant RFP's each year during the 5-year program period.

Objective 2.04.01(B): Remove and/or modify dams and levees in critical areas identified within approved TMDL studies and/or endorsed 9-element watershed action plans. In streams where such projects can be demonstrated to remove significant impairments and restore aquatic life use, dam and levee removal shall be facilitated regardless of watershed planning status. Prioritize streams where removal of structures will remove sources of significant impairments and restore designated aquatic life use within 3-years of removal.

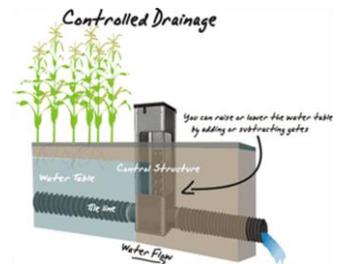
- Provide technical and financial assistance with Section 319(h), WRRSP and other programs each year during the 5-year program period for the following dam, levee and/or dike removal projects:
 - Two (2) dam removal and/or modification projects
 - One (1) levee and/or dike removal and/or modification projects
 - Five (5) natural channel stream restoration projects

Objective 2.04.01(C): Provide financial assistance to demonstrate how to reduce flashy flows by installing streamside retention/controlled discharge systems. Provide technical and financial assistance to facilitate completion of the following streamside retention and/or controlled discharge demonstration projects each year during the 5-year program period:

- One (1) streamside wetland retention and/or passive stormwater treatment system
- Twenty-five (25) controlled drainage demonstration projects
- Five (5) vegetated bioswales and/or other green retention and infiltration systems

Whether dealing with discharges from agricultural landscapes or within urban areas, restoring natural flow conditions must include systems for slowing the rapid movement of stormwater from impervious areas or drainage tiles or storm sewers. Implementing projects to reduce water quantity and improve water quality are two important strategies for protecting and restoring natural flow conditions. Much of Ohio’s landscape has been altered and engineered for more efficient drainage rather than water quality or other natural watercourse services. Therefore, identifying demonstration projects that can illustrate the value of slowing and/or retaining stormwater flows is important for reducing the negative impacts of flashy flows in Ohio’s streams.

Successful implementation will require engaging select implementers in both agricultural and urban watersheds to implement stormwater flow-controlled drainage and wetland retention demonstration projects. For example, in agricultural areas encouraging the installation of controlled drainage structures is a key objective. Currently the Ohio Department of Agriculture’s Division of Soil & Water Resources has a significant initiative underway in northwest Ohio to provide cost-share assistance to install these devices. Ohio EPA will need to identify and encourage one or more municipal or other urban based implementers to install stormwater demonstration wetlands and/or green water retention areas.



Stormwater wetlands (L) and controlled drainage (A) are key strategies.

Objective 2.04.01(D): Convert maintained agricultural ditches to two-stage channels.

Much of Ohio's rural landscape has been modified over time with the addition of subsurface drainage in all but the southeastern areas of the state. Systematic drainage (tiling), channelization of headwater tributaries, ditch construction and maintenance of channels have been occurring since the 1850's and much of Ohio's agricultural landscape has been engineered to drain as efficiently as possible. When wetland areas or small streams were transformed into drainage channels, water flowed more freely and faster to downstream areas and thus became more effective transporters of water and the loads of sediment, nutrients and any other nonpoint source pollutants to receiving streams. The initial change and subsequent maintenance associated with effective drainage can be very detrimental to riparian, stream and wetland habitat conditions. For instance, as a result of dipping and clearing of a channel, habitat areas are disturbed as woody vegetation is cleared from riparian areas and narrower coarser graveled flow areas are disturbed with depositional areas in the channel.

Developments in alternatives to traditional ditching are show promise in areas of Ohio where conversion of traditional ditches to two-stage channels has being demonstrated. Demonstration projects being implemented by organizations such as the Nature Conservancy (Western Lake Erie), US Army Corps of Engineers (Blanchard), The Ohio State University and the Ohio Department of Agriculture are showing that two-stage channels are an alternative to traditional ditch maintenance where the establishment of a bench or small flood plain allows for increased assimilation of nonpoint source pollutants such as sediments and nutrients such as nitrogen and phosphorus.

Two-stage channels with a larger overall cross-sectional area provide detention benefits and some of the benefits of riparian wetland retention areas although not retaining water as long as wetlands. Increased storage capacity in the 2-stage channel's broader floodplains also reduces the stage of flows and may result in reduced bank erosion and slower discharge of NPS contaminated runoff such as sediment and nutrients.



Channelized ditches such as shown above provide very limited or no aquatic/riparian habitat and very little NPS pollution assimilation. These channels are designed to effectively move water away and through from the landscape.



In addition to drainage, the two-stage channel above has additional functions such as pollution assimilation and improved habitat. It is a preferred alternative to traditional ditches. These are most easily sited in smaller watersheds where earth work is limited.

The objective for the 5-year program period includes:

- Provide technical and financial assistance to facilitate the conversion of three maintained agricultural ditches during the 5-year program period.
- Sponsor and/or conduct one (1) monitoring research project that measures the nonpoint source pollutant load reductions realized when converting traditional ditches into 2-stage channels.
- Work with Ohio USDA-NRCS to help develop limited state guidelines for allowing 2-stage channel conversions that are funded under the Environmental Quality Improvement Program (EQIP). We especially want to limit such projects to ditches that are currently under traditional ditch maintenance since 2-stage channel conversion is NOT appropriate for ANY natural streams.

Objective 2.04.01(E): Reconnect streams to floodplains and restore floodplain functions

Dikes and levees are often built to protect land from flooding or to allow for development on floodplains. Unfortunately, these structures are often built close to streams and restrict frequently used areas from floodwater. Natural floodplains act as a sink to assimilate and process nonpoint source pollution such as sediments, nitrogen and phosphorus. Without access to these critical areas, streams simply transmit NPS pollution downstream, depositing it into the next available nutrient sinks such as lakes or larger rivers. The results have been very harmful as evidenced in the western Lake Erie basin, Grand Lake St. Marys and several other Ohio inland lakes.

Ohio's nonpoint source program advocates the removal, set-back or modification of levees, dikes and other structures that inhibit the stream's access to floodplain. Access to a natural floodplain allows floodwaters to be released downstream after some storage, infiltration and passive settling and treatment by vegetation that removes nutrients and sediments. The resulting water quality improvement is also accompanied by higher quality riparian habitat. Removing levees, dikes and other structures identified in critical areas in approved TMDL studies and/or watershed action plans is a priority of Ohio's program and is crucial to restoring natural flow conditions in Ohio streams.

The objective for the 5-year program period includes:

- Provide financial assistance to facilitate the local implementation of three (3) floodplain restoration/reconnection projects during the 5-year program period.
- Develop an effective means to calculate NPS pollutant load reductions realized from floodplain restoration/reconnection projects.

2.05: Improve Land Use Practices

Ohio enjoys an abundance of natural resources and considerable resulting land use diversity. There are more than 26 million acres in the state with about 52% in agricultural land use, 27% forested, and 14% in developed urban and suburban areas.³ More than 13 million acres of agricultural lands include

³ Ohio Legislative Services Commission

approximately 2 million acres in pasture and hay land and more than 11 million acres in cultivated cropland. Much of Ohio's agricultural lands are engineered to be drained using subsurface tile systems. Nearly all of Ohio's developed areas have sanitary sewers and/or have well developed but typically antiquated stormwater management systems.

Historic impacts to headwater streams in agricultural areas of Ohio include channelization, removal of riparian woody vegetation, and routine "maintenance" to remove snags, log piles and other in-stream habitat. In urban areas, many headwater streams have been buried in culverts, contained in concrete channels and generally impacted by flashy stormwater runoff from many acres of impervious surface areas. Land use changes must be improved if we are to see a restoration of higher quality near stream riparian habitat and in-stream natural flow conditions.

Goal 2.05.01—Encourage riparian setback and development standards and codes

Ohio tools for riparian setbacks and development regulation belongs largely to local government, with most land use zoning and planning happening locally and regionally. As a result, local implementers and watershed advocates must work with local elected and administrative officials to encourage the development of codes that require riparian setbacks. For example, Ohio's Scenic Rivers program encourages riparian setbacks that are 120' wide (the canopy width of two mature trees).

Trees provide valuable nonpoint source pollution uptake (such as nutrients), interception of rainfall and help to stabilize the stream banks and stream. The importance of a healthy riparian corridor is critical to improving and/or protecting water quality.

Objective 2.05.01(A): Provide financial assistance for the development and refinement of "model" riparian setback codes and riparian development standards.

Provide technical and financial assistance for the development of riparian setback ordinances by local municipalities.

Goal 2.05.02—Establish voluntary no-mow zones

Protecting riparian areas and especially the native woody growth and tree-lined river corridors has long been a goal of nearly all conservation and natural resource management programs. The Ohio Department of Agriculture through the Farm Services Agency and Natural Resources Conservation Service all provide many millions of dollars each year to agricultural producers to enroll riparian areas into programs such as Environmental Quality Incentive Program, Conservation Reserve Program and others.

The facts are that there are many tracts of land in Ohio where riparian areas are plowed, cultivated and planted right up to stream's edge. The resulting bank slippage, sediment loss and potential nutrient loadings from such poor land management damages the water and soil resources of the state. Educational efforts targeting landowners and conservation incentive packages are needed to aggressively promote the benefits of "no-mow, no-plow" zones—those riparian areas where cultivating and plowing are carefully limited along waterways. Ohio's NPS program will encourage farmers to strongly consider enrolling all erosion prone riparian areas into conservation programs such as the Conservation Reserve Program (CRP), Wetland Reserve Program (WRP) or in limited

instances the Conservation Reserve Enhancement Program (CREP) where annual rent payments from these programs may help offset loss from retiring at-risk riparian lands from production.

Cities and townships often develop riparian areas and/or floodplains for city parks and public recreational areas. While passive development and recreation are good fits for floodplains, riparian areas should include no-mow zones, that is, areas where little or no “maintenance” is conducted.

Objective 2.05.02(A): Provide financial assistance to implement “no-mow” zones in critical areas of priority watersheds as identified in approved TMDLs and/or 9-element watershed action plans. Such projects are designed to achieve the following during the 5-year programming period:

- Two (2) no-mow, no-plow zone demonstration projects implemented in agricultural watersheds
- Acquire conservation easement (purchased and/or donated) on one (1) demonstration site.
- Two (2) no-mow riparian zone projects on golf courses located in priority watersheds
- Successfully encourage 5 local park districts to implement “no-mow” riparian zones

Goal 2.05.03—Encourage the installation of green stormwater systems

Ohio communities have traditionally managed stormwater as something that is piped and flush off the landscape as fast as possible. As impervious urban areas continue to expand this “flush” of stormwater has grown to the point where it now is having detrimental effects on many urban receiving streams. Reducing the rate and amount of runoff is handled in greater detail in other sections of this revision to Ohio’s NPS Management Plan. However, trapping, retaining and allowing stormwater to infiltrate rather than being flushed into a storm sewer helps dramatically with both water quality and water quantity.

Many older Ohio cities have antiquated stormwater management systems that are in need of retrofitting with practices or outlets that allow greater infiltration, and/or more extended detention for purpose of capturing pollutants and curbing flow energy causing bank channel erosion. Through programs such as the Section 319(h) subgrants, Ohio continues to implement activities designed to encourage local decision makers to increase their use of green” stormwater management practices such as bioretention, basin retrofits, stormwater treatment trains, green roofs, pervious pavement and others. Recommended practices are included in section 1.0 of this document.

Objective 2.05.03 (A) – Encourage the installation of green stormwater management systems

Provide technical and financial assistance to local governments and other land-holding implementers to retrofit or install green stormwater BMPs in critical areas and/or highly visible sites. This stormwater initiative will:

- Expand financial assistance for green stormwater demonstration projects by 10% in two of Ohio’s most populated counties (Cuyahoga and Lucas) by applying for GLRI project funding under the Great Lakes Restoration Initiative.

- Award (2) Section 319(h) stormwater retrofit grants per year throughout the programming period.

3.0 High-Quality Waters Protection Strategies

Recommended Management Practices to Protect High Quality Waters

Most of Ohio's nonpoint source management activities are focused on restoring impaired waters and reducing the impacts of nonpoint source pollution on surface water quality. However, it is recognized that restoring impaired waters accomplishes little if it is done at the expense of declining high-quality waters. Ohio EPA will continue to work ambitiously with land conservancies, nature centers and other state agencies such as ODNR's Scenic Rivers Program to help ensure that high quality streams are being protected from decline, and where management intervention is needed, to facilitate restoration of degraded sections of high-quality streams.



Protecting healthy waters from degradation by nonpoint source pollutants such as nutrients and sediment is critical to insuring a healthy Ohio environment. Many of Ohio's highest quality streams are seriously threatened by the conversion of agricultural lands to residential developments. Ohio's Healthy Waters Initiative is designed to help identify and protect high quality waters. It also includes provisions for restoring those areas of high-quality streams in need. The photo above is on a high-quality tributary to the Kokosing State Scenic River near Mount Vernon, Ohio.

Ohio's Healthy Waters Initiative (OHWI) dates to 1968 when Ohio enacted the first state scenic river law in the country. Since then, 16 of the state's highest quality streams have benefited from being

designated a state wild, scenic or recreational river. Although regulatory authorities within Ohio's Scenic River Law (Chapter 1517 of the Ohio Revised Code) are limited, there are provisions that require any publicly funded project within 1000 linear feet of a scenic river to be approved by ODNR.

Rivers that are currently designated under provisions of Chapter 1517 of the Ohio Revised Code as state wild, scenic or recreational rivers (and by Ohio's NPS Program are recognized as high quality waters) are identified as priority high quality watersheds for the sake of NPS Program funding and project assistance. Following is a list of designated state wild, scenic and/or recreational rivers:

- Big and Little Darby Creeks (also a nationally designated scenic river)
- Olentangy River
- Kokosing River
- Mohican River
- Ashtabula River
- Chagrin River
- Conneaut Creek
- Grand River
- Little Beaver Creek
- Upper Cuyahoga River
- Maumee River
- Little Miami River (also designated a national scenic river)
- Pymatuning Creek
- Raccoon Creek
- Sandusky River
- Stillwater River and Greenville Creek

Protection of additional Ohio's high-quality waters is also needed for streams that are in attainment of Exceptional Warmwater Habitat (EWH) or Coldwater Habitat (CWH). Streams that have been identified in Ohio's Integrated Report as meeting these aquatic life use designations shall also be designated as priority high quality waters for the purposes of Ohio's NPS Management support and assistance.

The following are a series of strategies, objectives and recommended actions and practices designed to protect and restore high quality rivers and streams in Ohio:

3.01: Restore and Protect High Quality In-Stream Habitat

Goal 3.01.01 - Provide financial assistance to local governments, park districts and other local implementers to restore impaired segments of high-quality streams

Stream restoration provides an opportunity to accelerate the recovery of high-quality streams in segments that have modified in-stream habitat and natural flow conditions. When natural channel design methods are deployed in a stream possessing appropriate physical characteristics (such as gradient), measurable improvements in biological communities can be observed in less than two (2) years. Higher quality streams may show this improvement even more quickly. This objective and the

management actions that are anticipated are described in more detail in “*Section 2.0-Altered Stream and Habitat Restoration Strategies*” under Objective 2.01.01.

Program and funding limitations are in place on high-quality waters including but not necessarily limited to the following:

- All stream restoration projects must be designed and completed using Natural Channel Design methods and/or bioengineering.
- The use of rock riprap as a streambank stabilization technique is not permitted in state designed wild, scenic and/or recreational rivers per ODNR director’s formal policy. Riprapping will also not be supported by any of Ohio EPA’s implementation funds on all other high-quality waters.
- Ohio NPS Program funding will not be awarded for stream restoration work in areas where point sources are the primary cause of aquatic life use impairment.

Objective 3.01.01(A): Provide assistance to facilitate the development of 9-element plans to help guide implementation activity on Ohio’s state and nationally designated rivers.

- Provide technical and funding assistance to ODNR’s Scenic Rivers Program, local government and watershed groups to complete 9-element plans for one (1) scenic river annually.

Objective 3.01.01(B): Provide financial assistance to local governments, park districts and other local implementers to restore impaired segments of high-quality streams within identified critical areas.

- Fund one project annually that utilizes natural channel design methods to restore approximately 1,600 linear feet of impaired segments in identified critical areas of high-quality waters.
- Fund one (1) project annually that uses bioengineering methods to stabilize 200 linear feet of eroding stream banks in high quality waters.

Goal 3.01.02 - In high quality waters, stream restoration projects must use bioengineering methods and materials (where appropriate) to rehabilitate and/or restore in-channel riffles and pools

Channelization, impoundments caused by dams and other obstructions of flow, embedded substrates and other severe impacts to in-stream habitat conditions are a significant cause of biological community impairment. The use of bioengineering methods and materials for the installation of in-stream habitat and flow structures such as riffles, runs and pools, grade control devices such as J-hooks and other methods can be effective tools for reversing the impacts of hydromodification on biological communities. A primary objective of these methods is to help stabilize conditions both in-stream and near-stream—in addition to improving habitat and flow conditions, they are also effective methods for enhancing the trapping of cobbles, gravel and sediment that may otherwise be transported to downstream receiving waters.

SPECIAL HIGH-QUALITY WATERS NOTE: Ohio’s Nonpoint Source Program will not authorize funding for bank armoring or the excessive use of stone, concrete and/or other unnecessary and unnatural hardening agents in stream restoration and/or in stream habitat restoration. Further, in situations where rock or stone is needed Ohio EPA strongly recommends that natural river rock be used as any

kind of in-stream material, whenever possible and whenever appropriate to resolve the specific cause of impairment within identified critical area(s).

For a complete listing of NPS grant-eligible stream restoration practices, please refer to Section 2.01 dealing with strategies for restoring altered habitats.



Restoring and protecting high quality waters is an important tool for Ohio communities as land use pressures continue on high quality urban and suburban waters. Dam removals such as the IVEX dam project on the Chagrin River (L) can bring rivers back to life. Protecting small streams like Hayden Run (R) in community parks helps to ensure that high quality streams stay high quality streams. Virtually ALL Ohio streams need more vigorous invasive plant management.

3.02: Manage Invasive Species

Uncontrolled invasive species pose a real threat to the health and habitat of Ohio's high-quality rivers and streams. Invasive plant species like honeysuckle, purple loosestrife and others are dominating the understories in riparian areas and invasive fish and mussel species like zebra mussels, round gobies and others are causing ecosystem disruption in Lake Erie. Although projects that ONLY remove/manage invasive species are ineligible for Section 319(h) grant funding, Ohio EPA strongly encourages the management/removal of invasive species when conducted incidental to stream restoration and/or other types of projects.

There are more than 700 non-native "invasive" species in Ohio. The 13 most noxious plant species are listed in Objective 2.01.02 on page 15. Ohio EPA will limit funding for invasive species management only when it is "incidental to construction". However, under Ohio's Healthy Waters Initiative other state funding sources will be sought for projects that are crucial for protecting and/or maintaining high quality conditions within a watershed if this fund's availability improves.

Goal 3.02.01 - Improve and expand financial support for the management and/or removal of invasive plant species in high quality watersheds

The removal and management of invasive species is a project specific management practice for priority streams in Ohio's Healthy Waters Initiative. Invasive species removal may include chemical

methods, mechanical means such as mowing and/or physical means such as cutting, pulling etc. for eradication. Volunteers recruited to assist with invasive species removal are not eligible for payment under NPS grants, however their time may be counted as local match credited with a value consistent to the type of work per hour per volunteer. A sign-in/sign-out log is necessary for volunteer time to be considered for matching credits.

Objective 3.02.01(A): Provide assistance for the effective management and removal of invasive plant species on at least 10 acres of riparian and/or riparian wetland areas annually in critical areas identified on high quality waters.

- Conduct invasive species removal on all stream restoration project incidental to construction.
- Projects that eliminate impairments via the removal of invasive species (such as in a wetland) will receive priority consideration.

3.03: Acquire and Protect High Quality Riparian Areas

One of the single most important things that can be done to improve water quality and to protect and improve high quality streams is to maintain a healthy and undisturbed riparian area. Ohio's scenic rivers program recommends that stream buffers on scenic rivers be maintained at 120 linear feet on each side of the stream, the canopy width of two mature trees. Unfortunately, there are many streams in Ohio that have riparian areas that are much smaller and sometimes consist of little more than a strip of planted grass.

A healthy tree-lined riparian corridor provides important habitat for wildlife, including critical migration pathways for migrating songbirds, prevents erosion and sediment losses into the stream and can make use of excess nutrients that may be running off from the surrounding landscape during rainy periods. The riparian corridor also provides vital shade to the stream, helping to keep waters cool.

Goal 3.03.01 – Increase the protection and restoration of riparian zones along all of Ohio's rivers and streams, but especially along high-quality streams

An important piece of Ohio's Healthy Waters Initiative is to increase the protection and restoration of critical high-quality riparian areas. Their benefits are numerous, and this activity represents a cost-effective tool for improving water quality. Several different methods were implemented including the acquisition of Conservation Easements using Section 319(h) subgrant funding and/or increasing eligibility for Surface Water Improvement Funding to be used for easement acquisition. However, a very critical component of Ohio's HWI was the simple acquisition of riparian areas using state funding sources such as Clean Ohio grants administered by ODNR and the Water Resources Restoration Sponsorship Program (WRRSP) administered by Ohio EPA's Division of Environmental & Financial Assistance (DEFA).

Restoring modified riparian areas will also play an important role in Ohio's NPS programming during the next five years. Nearly all stream restoration projects include a riparian restoration or replanting component. Ohio will continue to encourage the restoration, stabilization and replanting of riparian areas using only native hardwood tree and shrubs species and native grasses.

Riparian areas specifically identified in watershed plans and/or approved TMDL reports as degraded and/or in need of restoration will serve as the highest priority critical areas where funding and management action was encouraged.

Objective 3.03.01(A): To provide funding assistance and support to facilitate the acquisition and/or protection of >350 acres of riparian areas annually along high-quality waters using conservation easements.

1. To encourage the fee-simple acquisition of more than 20 acres per year along high-quality waters for a total of at least 100 acres (during program period) of riparian lands acquired fee simple by local governments, park districts or others. Section 319(h) funds may not be used for land acquisition.
2. To provide financial and technical assistance for the acquisition of more than 20 acres annually or riparian areas along high-quality waters protected under conservation easements.

Goal 3.03.02 – Increase the use of riparian setback codes and/or required permits

Local municipalities and townships in Ohio have the regulatory authority to effectively manage the development and/or building activity on floodplains and in riparian areas. For example, several communities along the Chagrin State Scenic River in northeast Ohio have enacted riparian setback codes to protect riparian areas. Due in part to this type of responsible regulation of land use on riparian areas the Chagrin has one of the most scenic and intact riparian corridors in Ohio. Working with local governmental entities to develop meaningful setbacks is an important strategy that we anticipate was put into practice by several local watershed groups. Ohio's State Scenic Rivers Program also is an active supporter of riparian codes to reduce negative impacts on riparian zones along scenic rivers.

Objective 3.03.02(A): To provide technical (and possibly financial) assistance to facilitate the development and adoption of riparian setback codes and/or rules.

3. To increase local adoption of riparian setback codes and/or rules by 5% during the programming period. This initiative will require:
 - Research and inventory the number of Ohio communities with local riparian codes and/or rules to establish a baseline from to measure progress.
 - With the assistance of a third party, review and update a model riparian ordinance (or identify a good example) for potential use by local government.
4. Encourage Ohio communities to update stormwater and development requirements that utilize the use of Low Impact Development (LID) approaches and practices in all high-quality watersheds.
 - Encourage LID approaches and requirements in at least two (2) watersheds during the programming period.
 - Provide funding assistance for Green Infrastructure or LID demonstration projects in at least two (2) watersheds during the programming period.

Goal 3.03.03 – Encourage communities to require the use of Low Impact Development practices in high quality watersheds

Low Impact Development (LID) is a set of approaches and practices that are designed to reduce runoff of water and pollutants from the site at which they are generated. By means of infiltration, evapotranspiration, and reuse of rainwater, LID techniques manage water and water pollutants at the source and therefore reduce the impact of development on rivers, streams, lakes, coastal waters, and ground water.⁴



Ohio communities are expanding their use of Low Impact Development Practices as effective means to retrofit aging stormwater infrastructure and improving on-site treatment of stormwater. The photos above are from the City of Mentor which installed bioretention and permeable pavers.

Ohio’s Nonpoint Source Program has been vigorously encouraging local municipalities, townships, park districts and other units of local government to expand their use of LID practices. This was previously accomplished through state grant programs, including the now unavailable Surface Water Improvement Fund. Previous efforts resulted in more than \$13 million in local grants to implement over 130 local LID or green stormwater demonstration projects. As funds are made available, Ohio EPA will seek to continue efforts to provide grants to local government for this continued purpose as they represent an important tool for reducing water quantity (flashiness) and improving water quality by treating nonpoint sources of pollutants on-site through infiltration and evaporation.

4.0 Urban Stormwater Pollutant Reduction Strategies

Recommended Practices to Reduce Sediment and Nutrients from Urban Sources

Ohio communities face many traditional water resources challenges related to aging stormwater management infrastructure, combined sewer overflows, older impervious surfaces without adequate stormwater detention and resulting flooding and eroding stream channels. This is expected to be

⁴ “Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices”, USEPA, December 2007.

exacerbated by increased intensity and volume of storm events due to changes in precipitation pattern that project further challenges related to channel downcutting, erosion, bank failures and water quantity issues associated with stream flashiness and flooding. Approaches are needed that address what is being delivered to streams as well as the condition of wetlands, floodplains, streams and rivers.

Pollutants conveyed to surface waters from road and stormwater runoff are an increasing water quality concern in Ohio. Chloride, found in road salt, is a pollutant of particular concern. Over time, concentrations of chloride from runoff can build up in our surface waters, such as lakes. This increase in chloride levels can lead to salinization, disrupting the natural equilibrium of our freshwater ecosystems and potentially becoming toxic to the aquatic life adapted to live in it.

For these reasons, Ohio will continue to encourage the use of green infrastructure and Low Impact Development (LID) practices by local communities. Reducing, slowing, storing and infiltrating stormwater on-site is needed to reduce impacts to receiving streams. The strategies below are designed to help facilitate the installation of green infrastructure with new development and retrofitting gray infrastructure with green alternatives and updated design characteristics that directly reduce the rate and amount of stormwater runoff from Ohio's urban and suburban landscapes.

Green infrastructure includes those practices that are designed to promote ground infiltration, filtration and/or water storage of runoff from impervious surfaces such as roofs, roadways and sidewalks, etc. Some Ohio communities are beginning to retrofit their stormwater infrastructure by adding or promoting green infrastructure practices such as vegetated water courses, wetland treatment areas, bioretention, pervious pavement and other practices. The Ohio Nonpoint Source Program will continue to encourage wider adoption of these practices as important tools for reducing the rate and amount of runoff, minimizing channel erosion and sediment loss and reducing nutrients and other nonpoint source pollutants from stormwater in developed and developing areas.

4.01: Reduce Stormwater Runoff

Ohio's NPS Management Program has previously utilized state grant funding (Surface Water Improvement Fund) to facilitate the installation of green stormwater management practices and will seek to do this as funding becomes available. Section 319(h) funding may be available for these practices if a connection to reducing impairment or protecting high quality waters can be made and it provides a suitable high visibility demonstration project.

Goal 4.01.01: Reduce the rate and amount of runoff

Ohio communities have traditionally managed stormwater as something that be piped and flushed from the landscape as fast as possible. As impervious urban areas expand, stormwater may be managed for peak flows, but increased volume and duration of flow still has detrimental effects on



Above: Pervious pavers and bio-filtration islands at North Olmsted City Hall in northeast Ohio.

receiving streams. Reducing the rate and amount of runoff is crucial to maintaining the integrity of the natural flow regime of urban and suburban rivers and streams. Slowing, detaining and infiltrating stormwater helps dramatically with improving water quality and reducing the rate and amount of runoff. Ohio will continue to implement activities designed to encourage local decision makers to increase their use of greener stormwater management practices such as bioretention areas, stormwater treatment trains, green roofs, pervious pavement and others.

Objective 4.01.01(A): Provide technical and design support and assistance to local governments interested in implementing green stormwater infrastructure.

Objective 4.01.01(B): Provide financial assistance to local governments to facilitate adoption and installation of green infrastructure and stormwater management demonstration projects where it supports reduction of stream impairment and protection of high-quality waters.

Successful implementation is measured by:

5. Awarding two (2) Section 319(h) stormwater demonstration project grants per year
6. Obtaining GLRI funding for stormwater retrofit or demonstration projects in NE Ohio

Goal 4.01.02: Encourage the installation of green stormwater management systems

The approaches listed below are designed to provide general guidance to localized decision makers on green infrastructure and LID initiatives on previously developed and/or redeveloped sites. Section 319(h) grant funds may not be used to comply with stormwater discharge permit requirements on new or redeveloping construction areas. But there may be unique opportunities to demonstrate runoff reduction, more sustainable and stream-erosion prevention practices upstream of degraded or high-quality waters. The following are potential actions for reducing stream erosion, and addressing water quality near the source, reducing downstream erosion and additional stormwater impacts to water resources:

1. Where feasible pipes, curbs and gutters should be replaced with vegetated swales
2. Protect, restore and reestablish accessible (not morphologically entrenched) floodplains along streams.
3. Open space should be used for maximum functional stormwater controls
4. Enhance the function of stormwater drainage by locating, relocating catch basins in vegetated, or enhanced soil-media areas
5. Retrofit stormwater systems to maximize infiltration and/or filtering of runoff
6. Use areas in and beneath parking lots for infiltration and/or detention of runoff
7. Provide additional storage and runoff reduction through the use of green roofs
8. Incorporate storage areas to accommodate higher volumes from large storm events

Recommended green stormwater management systems and practices are listed below and unless implementation is required as part of a permit, these practices may be considered for Section 319(h) grant funding for stormwater management demonstration projects:

1. **Adding Water Quality Features to Older Peak Discharge Basin:** These basins are modified to provide greater detention time, settling of pollutants and control of stormwater energy before it discharges to a stream.
2. **Grassed Swales:** Flow paths like grassed channels or those incorporating water storage in the form of improved soil media or physical check dams allow reduction of each pollution and runoff with each storm event as well as vegetative uptake. This results in sediment and other NPS pollutants being reduced from flows near the source.
3. **Infiltration Basin:** An infiltration basin is a shallow impoundment that is designed to filter stormwater and allow it to infiltrate into the soil. This practice has the potential to reduce NPS pollutants and may also have a beneficial effect on recharging ground water supplies.
4. **Permeable Pavers:** Paving materials designed with significant openings in the joints filter pollutants and allow stormwater to infiltrate into a layer of aggregate under the surface resulting in reduced stormwater runoff volume, rate and pollutants.
5. **Pervious Concrete and Asphalt:** Pervious concrete and pervious asphalt provide a filtering of surface water and allow storage and infiltration of stormwater into underlying aggregates.
6. **Bioretention:** These practices provide on-site storage and treatment of stormwater runoff through enhanced soil media. Even with underdrains, surface runoff diverted to these practices behave more like the predeveloped hydrograph than an untreated area. Additionally, soil media created with low phosphorous sources of compost and additions such as iron filings and an upturned elbow in the underdrain can provide nutrient treatment.
7. **Filter Strips/Filter Areas:** These vegetated linear surface areas are designed to collect and passively treat sheet flow from adjacent areas such as parking lots and other impervious areas and thus slow runoff velocities and filtering out sediments and other NPS pollutants such as nutrients, silt, oil, grease, etc.



This bioretention area, installed in Butler County, illustrates the increased service ability of green infrastructure.

All the practices listed above can be tools to treat and reduce the impact of impervious surface areas around buildings, parking areas and other facilities. In addition, practices like pervious pavers, rain gardens and the other tools listed above, the following are also effective means for reducing the impervious footprints around facilities:

1. **Disconnect Hard Surfaces:** This practice promotes the use of vegetated areas and grass swales as an alternative to curbs and gutters and continuous hard surfaces. It provides an opportunity for runoff to travel across through vegetation rather than from roof to pipe to curbs and gutters to stream systems. Utilizing swales or other vegetative breaks provides some removal of stormwater pollutants and abstraction of stormwater.

2. **Green Roofs:** Green roofs are effectively used to reduce stormwater runoff from commercial, industrial, and residential buildings. Green roofs effectively capture, absorb, store and then evapo-transpire initial precipitation.
3. **Pervious Parking or Green Parking Areas:** Green parking refers to several techniques and/or practices that reduce and better treat stormwater runoff compared to standard pavements. This practice includes tools such as pervious pavers or alternate parking areas that utilize vegetated parking grids in areas such as overflow parking. Other tools may include simply minimizing the size of parking areas.

Objective 4.01.02(A): Provide technical and funding assistance using Section 319(h) grants to facilitate the installation of one green parking demonstration areas in the plan period (5 years). These systems will utilize runoff reducing or higher-level treatment stormwater management practices (e.g. bioretention or pervious pavement) to passively treat and reduce stormwater runoff from these parking areas.

Objective 4.01.02(B): In partnership with county park districts, provide funding assistance to facilitate the installation of bioretention and rainwater harvesting systems at one park district nature center during the programming period. These projects should include a robust on-site public awareness and/or educational component.

Objective 4.01.02(C): Provide financial assistance to facilitate the installation of one green roof in highly visible and publicly accessible facilities.

4.02: Passively Treat Stormwater Runoff

Goal 4.02.01: Increase the use of urban stormwater wetland treatment systems

According to USEPA, wetland treatment systems are among the most effective stormwater management practices designed to remove nonpoint source pollutants such as silt, sediment, nutrients, grease and oils, and others. For example, wetland systems can remove more than 70% of suspended solids and as much as 56% of total phosphorus from urban and suburban stormwater.

Objective 4.02.01(A): Provide funding assistance to facilitate the installation and use of urban stormwater wetland treatment systems. Successful implementation is measured by:

- Award grants for the installation of at least one (1) urban/suburban wetland stormwater treatment demonstration project throughout the programming period.



Urban stormwater wetland treatment systems such as this one installed by the city of Broadview Heights under provisions of an Ohio EPA GLRI-SWIF grant, help to diversify urban and suburban habitat conditions as well as treat stormwater runoff.

Goal 4.02.02: Protect and restore effective riparian buffers

Riparian areas along urban and suburban streams are in many cases either non-existent or dramatically modified. Riparian buffers that are currently not modified and in a mostly natural state should be protected with conservation easements and/or other land use restrictions. Areas that have been modified should be restored using native vegetation at a width that is suitable for passively treating stormwater prior to entering waterways. Streambanks that are severely eroding should be stabilized by using methods that work with natural stream morphological processes rather than hardening inherently unstable channel patterns, dimensions or profiles. Bioengineering methods and/or use of tools that work with stream flow such as J-hooks or other structural tools are encouraged.

Healthy riparian buffer areas, especially flow-accessible floodplains and those that are well vegetated in shrub and/or wooded plants benefit water quality in several ways. They reduce flow rates and amounts through root uptake and soil storage. Riparian buffers also provide sediment trapping benefits, control stream bank erosion and inhibit algae and other nuisance aquatic plant species by providing shade.

Objective 4.02.02(A): Provide financial assistance to facilitate the protection of high-quality riparian buffers in urban and/or suburban settings. Successful implementation is measured by:

- Award subgrants that will facilitate the protection (via conservation easements) of at least 20 acres of high-quality suburban/riparian buffer areas annually during the five-year programming period.
- Award subgrants that will facilitate the restoration of 10 acres annually of modified or degraded riparian buffer areas within urban/suburban settings.

4.03: Low Impact Development (LID)

Goal 4.03.01: Encourage communities to demonstrate the use of LID practices

Low Impact Development (LID) is a set of approaches and practices that are designed to reduce runoff of water and pollutants from the site on which they are generated. By encouraging longer times of concentration, and greater infiltration, evapotranspiration and reuse of rainwater, LID practices reduce the impact of development on rivers, streams, lakes, coastal waters and ground water.⁵



With state funding, Great Lakes Restoration Initiative (GLRI) grants from USEPA's Great Lakes National Program Office, and Section 319(h) grants from USEPA-

Low impact development practices are effective tools for communities to reduce the rate and amount of stormwater runoff by allowing runoff to collect on-site and infiltrate into the soils below. This reduces the "flashiness" of urban streams responding to pulses of stormwater following rain events. The site above is a bioretention area collecting parking lot runoff in the Village of Green Hills, Ohio.

Region 5, Ohio's nonpoint source program has been very active in encouraging LID projects. Since 2010 more than 130 LID and green stormwater management projects totaling more than \$13 million have been funded throughout Ohio. These projects are used as examples to encourage additional participation by other communities, improving water quality by treating nonpoint source pollutants where they are generated and reducing the impact of local development.

Objective 4.03.01(A): Provide financial assistance to facilitate the implementation of disconnecting impervious areas, retrofit of stormwater facilities to add water quality functions or addition of nutrient treatment practices in pre-existing developed areas. Successful implementation is measured by:

- Providing subgrants to implement targeted stormwater projects (disconnected impervious areas, retrofit of stormwater facilities to add water quality functions or the addition of nutrient treatment practices) in two (2) urban/suburban watersheds during the programming period.

⁵ "Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices, USEPA, December 2007

4.04: Chloride Reduction

Goal 4.04.01: Reduce the amount of chloride runoff

All the practices listed in Section 4.0 can be tools to capture and reduce the runoff of chloride from entering waterways. However, Ohio has taken additional steps by focusing on local governments as key stakeholders in the reduction and prevention of chloride runoff, due to the scale of their road salt storage and usage. Starting in 2024 as part of the H2Ohio Rivers Initiative, the state of Ohio began providing chloride reduction grants to local counties, townships, and municipalities to adopt best management practices that reduce salt and deicers contributing to runoff and promote chloride reduction in Ohio water resources.

Objective 4.04.01(A): Reducing road salt exposure to precipitation at storage facilities addresses a critical pathway for chloride runoff in storage facility stormwater. Provide financial assistance to local governments for road salt storage facility improvement projects where it supports reduction of chloride runoff to protect waters. Successful implementation is measured by:

- Fund facility improvement projects throughout Ohio

Objective 4.04.01(B): Reducing the amount of road salt applied to roads and other impervious surfaces is a key preventative management strategy that goes hand-in-hand with reducing and capturing road salt runoff. Provide financial assistance to local governments for road salt equipment upgrade projects where it supports reduction of road salt application. Successful implementation is measured by:

- Fund road salt equipment upgrade projects throughout Ohio

Goal 4.04.02: Promote the Chloride Reduction Program and Best Management Practices that Reduce Chloride Runoff and Road Salt Application

Objective 4.04.02(A): Conduct outreach and educational opportunities that further this goal.

Successful implementation is measured by:

- Communicate training and funding opportunities with interested parties through emails, website updates and collaboration with other state agencies, local governments and organizations.
- Attend at least four events per year to promote the Chloride Reduction Program, such as public relation opportunities that highlight a grant recipient's upgrades or at relevant events throughout the state, such as Calibration Cruise-Ins.

5.0 State and Federal Partners

5.1 Agencies and Programs with Nonpoint Source Management Programming

Listed below are Ohio's significant state and federal partners in nonpoint source management.

US Department of Interior

- Fish and Wildlife Service
- National Park Service
- Office of Surface Mining
- US Geological Survey

US Department of Agriculture

- US Forest Service
- Farm Services Agency
- Natural Resources Conservation Service
- Agricultural Research Service

US Environmental Protection Agency (Statutory Lead Federal NPS Agency)

- Region 5 – Chicago TMDL and NPS Program Staff
- Headquarters – Nonpoint Source Branch

Ohio Department of Natural Resources

- Division of Watercraft-Scenic Rivers Program
- Division of Wildlife
- Division of Parks & Recreation
- Ohio Coastal Management Program
- Division of Water Resources
- Division of Floodplain Management

Ohio Department of Agriculture

- Division of Soil & Water Conservation

Ohio Department of Health

Ohio Emergency Management Agency

Ohio Environmental Protection Agency (Statutory Lead State NPS Agency)

- Division of Surface Water
 - Total Maximum Daily Load Study Program
 - Nonpoint Source Program Management Section
 - Ecological Assessment Unit
- Division of Drinking and Groundwater
- Division of Environmental and Financial Assistance

- Ohio EPA District Offices
- Ohio Lake Erie Commission

5.2 Western Lake Erie Basin Partnership

Ohio is included as a partner in the Western Lake Erie Basin Partnership. The partnership is a long-standing collaboration of federal, state, and local government agencies; academia; and non-governmental organizations from the tri-state western Lake Erie watershed. The watershed encompasses 7 million acres in Ohio, Michigan and Indiana. When initially formed in 2006, the group's focus was sediment and erosion control. In recent years the partnership has shifted its focus to nutrient reduction and addressing harmful algal blooms in western Lake Erie.

The WLEB Charter was agreed to on March 29, 2006, and the signatories agreed to develop a consensus-based Partnership to pursue the following principles:

- The Partnership is committed to collaboration and consensus building – sharing resources and knowledge to link land use to water quality, support ongoing efforts and identify new opportunities to enhance and improve the watershed.
- The Partnership will apply watershed-based solutions to local problems and apply local solutions to watershed problems -inclusively empowering and building the capacity of local watershed groups and supporting ongoing efforts.
- The Partnership is results oriented – it will define the baseline status of the basin, identify and prioritize science based solutions, responsibly support the implementation of innovative and cooperative projects, monitor and evaluate its actions and support an adaptive management approach.
- The Partnership will speak with one voice, promote transparency, encourage participation, be responsive, create awareness, educate and inform.
- The Partnership will provide the structure necessary to coordinate public and private resources across political boundaries to accelerate achievement of environmental goals and support for local conservation initiatives.
- The Leadership Committee for the WLEB Partnership is comprised of senior members of their respective organizations. This group oversees the efforts of an Operational Committee and Coordination Teams in four areas: Project Coordination Team, Outreach/Public Education Coordination Team, Resource Coordination Team, and Research & Data Coordination Team.

The Ohio Lake Erie Commission (OLEC) and the Ohio Department of Agriculture (ODA) have leadership team representation in the partnership. Ohio EPA collaborates with OLEC and ODA, the Ohio Department of Natural Resource (ODNR) and the partnership organizations with the state NPS program.

5.3 Gulf Hypoxia Program

Ohio is a part of the Gulf Hypoxia Program. Both Ohio EPA and the Ohio Department of Agriculture (ODA) have members on the Coordinating Committee for the Hypoxia Task Force. Ohio EPA and ODA have been collaborating on the Gulf Hypoxia Program. Under Ohio's 2022 Ohio Gulf Hypoxia Project Workplan, three new staff were hired, two at ODA and one at Ohio EPA, to collaborate on the GHP. This arrangement will continue to be maintained under the FFY2024 GHP workplan submitted in June 2025 for the project period ending September 30, 2028. The ODA positions are a Nutrient Management Technical Assistant and a Conservation Engineer to help support nutrient reduction within the Ohio River Basin.

These staff provide support to local farms, crop advisors, SWCD's as well as the approval and design of implementation practices and development of Nutrient Management Plan Reviews. The Ohio EPA staff is a fulltime Environmental Specialist to assist with the goals of the Hypoxia Task force and support additional development of nonpoint source implementation strategies. This staff works closely with ODA staff to evaluate the State's Nutrient Reduction Strategy and determine updates and additions needed to address excess nutrients, as well as the areas of greatest importance within the Ohio River Basin. This Ohio EPA/ODA collaboration will continue to provide technical assistance on nutrient-reducing projects within the Ohio River Basin.

6.0 State Programs Associated with Nonpoint Source Management

Listed below are descriptions of programs Ohio's significant state and federal partners in nonpoint source management.

6.1 State of Ohio- H2Ohio Plan

Launched by Governor Mike DeWine in 2019, H2Ohio is a comprehensive water quality initiative that is working to strategically address serious water issues that have been building in Ohio for decades. Such problems include harmful algal blooms on Lake Erie caused by phosphorus runoff from farm fertilizer, failing drinking water, wastewater, and home sewage treatment systems due to aging infrastructure, and lead contamination from old water pipes and fixtures. To date H2Ohio has been funded through the state biennial budget. For additional program details please reference the programs web page as updates are anticipated as the program evolves: h2.ohio.gov/.

Goal H2Ohio-1.01: Support Section 319(h) implementation with wholly state-funded projects

Objective H2Ohio-1.01: Utilize Ohio EPA, ODA and ODNR H2Ohio funded projects as state match to support Section 319(h) funding

- Include planned state-funded wetland restoration/enhancement, stream restoration, drainage water management, conservation channel installation, chloride reduction program, dam removal or alteration, or home septic treatment systems repair and replacement in at least one year's Section 319(h) workplan.

Goal H2Ohio-1.02: Support technical assistance needs through the NPS program

Objective H2Ohio-1.02: Support ODA and other technical assistance in priority watershed areas

- Advocate for adequate technical assistance resources through USDA NRCS, ODA, SWCDs and nonprofit organizations.

Goal H2Ohio-1.03: Continue involvement in H2Ohio planning, implementation and assessment

Objective H2Ohio-1.03: To provide financial assistance to local implementers for inland lake management, restoration and/or protection projects. Successful implementation is measured by:

- Attend multi-agency planning meetings for H2Ohio and continue NPS Program involvement in H2Ohio development and implementation.
- Advocate for adequate technical assistance resources through USDA NRCS, ODA, SWCDs and nonprofit organizations.

6.2 Ohio EPA-Surface Water NPS Assistance Programs

Ohio EPA's Division of Surface Water is Ohio's statutory lead agency for implementation of the state's Nonpoint Source Management Program. Within the Division there are additional programs that work closely with the Nonpoint Source Program and provide valuable assistance such as the Ecological Assistance Unit that monitors state water resources and assistance for NPS projects, the Modeling & Assessment Unit that provides the biennial Ohio Mass Balance Report and technical assistance on special NPS projects, and the Total Maximum Daily Load Unit who provides planning, assessment and helps to focus NPS implementation. Ohio's NPS Management Program also works closely with the Division of Environmental Financial Assistance at Ohio EPA and several divisions within Ohio's Department of Natural Resources such as the Parks, Recreation and Natural Areas, Watercraft-Ohio Scenic Rivers Program, and the Division of Mineral Resources Management. Likewise, Ohio's NPS Management Program also works closely with the Ohio Department of Agriculture, Division of Soil and Water Conservation and the Ohio Lake Erie Commission to plan strategies, funding approaches and programs to reduce nutrient and other nonpoint sources of pollution.

The NPS Program effectively collaborates with multiple units of local, state and federal government, soil and water conservation districts and non-governmental conservation entities such as the Nature Conservancy, Ducks Unlimited and local watershed groups. Implementing Ohio's nonpoint source management program also features a variety of local assistance programs including Ohio's Section 319(h) grants, SWIF grants, GLRI grants, and other programs that contribute to successfully restoring streams (and lakes) impacted by nonpoint source causes of impairment such as hydromodification, habitat alteration, nutrients and silt/sediment.

The following are summaries of the various programs that are managed exclusively by Ohio EPA's Nonpoint Source Program with associated program-specific goals and objectives. *(A more comprehensive collection of NPS strategies, goals and objectives are included in previous sections of this updated NPS management work plan.)*

6.3 Section 319(h) Grants

Ohio EPA receives an annual award of federal Section 319(h) grant funds under provisions of the Clean Water Act. The Division of Surface Water provides primary administration and implementation of Ohio's Section 319(h) Program. Approximately \$3 million annually is awarded by Ohio EPA for the development and implementation of nonpoint source management and stream restoration projects. Fundamental to Ohio's implementation of 319 grants is the approved Ohio Nonpoint Source Management plan and the goals and objectives contained in this NPS Management Plan.

Ohio's NPS Program supports implementation of multiple statewide water quality initiatives, with the overall goal of having 100% of Ohio's large river units and 80% of small watershed units in full attainment of their designated aquatic life use. This goal is intended to be accomplished by:

1. Aligning Section 319(h) grant resources directly to Ohio's water quality goals
2. Facilitating implementation of approved TMDL and 9-element watershed plans
3. Funding projects that reduce and eliminate impairments and restore impaired waters
4. Funding projects demonstrating effective and innovative practices for reducing nonpoint source nutrient pollution and improving water quality
5. Protecting high quality waters from NPS degradation.

The Section 319(h) Grants Program administered by the Ohio EPA Division of Surface Water is one of the primary sources of funding assistance for the implementation of local restoration and NPS source reduction projects. During the five-year programming period from FY25 through FY29, we anticipate awarding more than 70 local Section 319-funded projects totaling more than \$15 million.

Information on these projects will be entered into the U.S. EPA Grants Reporting and Tracking System (GRTS). GRTS will serve as the Nonpoint Source Management Program's primary tool for project reporting, data collection, and records maintenance. Ohio EPA will update GRTS with information on where NPS projects are being implemented, how effective projects are at meeting goals, and highlighting success stories.

The Section 319 projects will implement the following types of restoration and source reduction activities:

1. Stream restoration and re-naturalization
 - Natural stream channel restoration where site conditions are appropriate
 - Addressing incised or laterally unstable streams through natural channel restoration, using materials other than riprap
 - Converting traditional drainage ditches to two-stage or multi-stage channels
 - Levee/dike removal or set-back, and floodplain reconnection or restoration
 - Low-head dam removal and/or modification of larger dams
 - In-stream habitat restoration
 - Other projects that restore natural stream ecology, services, morphology and flow
2. Riparian restoration

- Riparian plantings using native hardwood tree and shrub species or appropriate warm season grasses
 - Riparian wetland restoration
 - Invasive species management in riparian areas
 - Acquisition of riparian conservation easements on high quality streams
 - Floodplain re-naturalization projects
3. Wetland restoration
 - Restoring historical wetland areas that have been converted to other uses
 - Replanting impacted wetland areas with native plants, tree and shrubs species
 - Removal of non-native invasive species in wetland areas
 4. Strategic and innovative stormwater treatment projects for existing developed areas
 - Retrofitting public commons or parking areas with permeable pavements.
 - Installing green roofs on existing public buildings
 - Installing bioretention areas, treatment trains and other SW BMPs
 - Retrofit of pre-water-quality era stormwater basins, and BMPs that increase stormwater quality treatment and reduce impacts on impaired and high-quality water resources
 - Constructing stormwater treatment wetlands
 - Installing rainwater harvesting and reuse systems on public buildings or facilities
 - Retrofitting urbanized small watersheds in order to reduce downstream channel erosion
 - Other practices designed to demonstrate innovative management of stormwater flows
 5. Targeted agricultural nutrient reduction projects
 - Practices must be within an approved HUC-12 9-Element, Acid Mine Drainage Abatement and Treatment or Region 5 approved watershed plan. See section 1.0 for a full listing of practices that may be eligible for funding.
 6. Protection and restoration of high-quality rivers and streams
 - Protecting high-quality riparian areas with conservation easements
 - Restoring and stabilizing riparian and stream bank/channels
 - Protecting and/or restoring riparian vernal pools and wetlands
 - Assisting with local adoption of riparian setback codes and ordinances
 - Planting of riparian area with native shrubs and trees
 - Removing and managing invasive species
 - Installing wetland drain tile treatment wetlands on high quality waters
 - Developing and implementing high quality water education & outreach projects

*Section 319(h) grant funding will not be used for any kind of land acquisition.

7. Inland lake management and restoration projects
 - Phase 1 Diagnostic-Feasibility Clean Lakes Studies
 - Lakeshore stabilization BMPs to reduce sediment loadings
 - Channel aeration to address anoxic conditions and eliminate fish kills
 - Lake water circulators and/or other devices to reduce blue-green algae bloom.

- Upstream forebays or constructed wetlands to capture incoming pollutants
- Monitoring and testing for harmful algal blooms and other pollutants of concern
- Other techniques designed to address identified lake-related concerns

*Section 319(h) grant funding may not be used on lakes that do not provide (and allow) ready public access.

8. Limited scope acid mine drainage (AMD) and/or abandoned mine land (AML) reclamation projects

AMD and AML projects significantly reduce metals, sediment and other NPS pollutant from mining-impaired water bodies when consistent with an approved acid mine drainage abatement (AMD) and treatment plan. *Proposals requesting grant funds for a relatively small project in which Section 319(h) funds provide the majority of support will receive more favorable consideration than a project in which Section 319(h) grant funds are a rather small portion of a much larger project.*

9. Innovative nonpoint source and watershed restoration demonstration projects

Projects demonstrating innovative solutions to nonpoint source pollution problems and/or projects that are likely to result in the restoration of a watershed or segment of a watershed may be considered. While the previously defined activities will form the basis of most Ohio's Section 319(h) Program activities, Ohio EPA will consider projects on a case by case basis when innovative practices are proposed.

Section 319(h) grant funding will be limited to local units of government, park districts and public zoos, land managing state agencies and 501(c)(3) nonprofit conservation organizations with land management responsibilities, soil and water conservation districts and watershed groups when sponsored by a local government. In limited and highly specialized situations nonprofit organizations that do not have land management responsibilities, schools and school districts may be recipients of Section 319(h) grants. However, Ohio EPA prefers to award grant funds to a local government entity who may then subcontract with a school or school district.

6.4 Ohio Nutrient Reduction Strategy

The Ohio Nutrient Reduction Strategy (ONRS) includes several strategies for nutrient reduction from non-point sources throughout the state. The non-point source program supports this ONRS through the funding and implementation of projects that aim to reduce these sources of pollution. Such projects, either via decreased concentrations or increased assimilative capacity, support the State's strategy by decreasing nutrients within waterways from non-point sources of pollution.

6.5 Ohio's Inland Lakes Program

Ohio's Inland Lakes Program assesses and facilitates monitoring, planning, protection or restoration of our inland lakes. Ohio EPA currently monitors a limited number of lakes each year with a priority emphasis on public drinking water supplies and heavily used recreational lakes. Additional monitoring by Ohio's Inland Lakes Program is implemented primarily by Ohio EPA's District Office staff with central office coordination occurring in the NPS program in Columbus. Many Ohio lakes are sources of public water and many are recreational areas with public beaches. Monitoring for

microcystins is required and being performed by public water supplies. The Ohio Department of Natural Resources, Ohio EPA, the Ohio Department of Health and Ohio State University Extension cooperate to monitor, provide advisories and develop strategies regarding recreational waters. Ohio's Inland Lakes Program is designed to achieve the following objectives:

- Track status and trends of lake water quality
- Determine attainment of beneficial use
- Identify causes and sources of impaired uses
- Recommend actions for restoring impaired lakes

Inland lakes in Ohio are heavily impacted by nonpoint sources of pollution as evidenced by the prevalence of eutrophic conditions and harmful algal blooms (HAB). Many inland lakes are a primary repository for sediment and nutrients carried in watershed runoff and nutrients accumulate in lake sediments and contribute to algal blooms when sediment bound phosphorus is released and available in the lake water column. Because many man-made impoundments may be limited in terms of their beneficial use due to their morphology (limited depth for stratification), there is a need for assessing and potentially updating the Ohio's aquatic life and beneficial use standards and methodologies to tailor them to the unique settings of inland lakes. Work to update standards and methods applicable to inland lakes may be funded with Section 319(h).

Additionally, the following Lake Management Actions may also be funded with Section 319(h):

- Phase 1 Diagnostic-Feasibility Clean Lakes Studies.
- Lakeshore stabilization BMPs to reduce sediment loadings.
- Sustainable channel aeration to address anoxic conditions and eliminate fish kills.
- Lake water circulators and/or other devices to reduce blue-green algae blooms.
- Upstream forebays or constructed wetlands designed to capture incoming pollutants and/or sediment.
- Other techniques designed to specifically address identified lake-related recreational, human health, or aquatic health concerns.

Programming for the Inland Lakes Program is coordinated within Ohio EPA's Nonpoint Source Program although much of the field work is completed by water quality staff from Ohio EPA's District Offices. There are several strategic goals and objectives that will focus activities of the Inland Lakes Team including:

Goal #IL-01: Assess water quality in Ohio's inland lakes

Objective #IL-01: Conduct comprehensive water quality monitoring on Ohio's Inland Lakes. Successful implementation is measured by:

- Developing a protocol and criteria for identifying and designating those inland lakes in Ohio that are failing to meet their beneficial uses.
- Completion of water quality monitoring on at least 8 inland lakes annually throughout the five-year programming period.
- A total of at least 40 inland lakes assessed during the period 2014 through 2019.

- Developing and conducting inland lake monitoring training each spring or as needed for district water quality staff and central office program staff to insure consistency.
- Investigate continuous monitoring technology that might be used in assessing water quality continuously and/or remotely.

Goal #IL-02: Provide financial assistance to facilitate inland lake restoration and protection

Objective #IL-02: To provide financial assistance to local implementers for inland lake management, restoration and/or protection projects. Successful implementation is measured by:

- Providing Section 319(h) funding to implement inland lakes protection/restoration projects at two (2) inland lakes during the programming period.

6.6 Protecting Healthy Waters

Ohio is a national leader in protecting healthy waters. Our commitment to protecting high-quality waters goes as far back as 1968 when Ohio enacted the nation's very first scenic rivers law. Since then, 16 rivers in the state have been designated wild, scenic or recreational. Protecting our highest quality waters is a logical aspect of Ohio's NPS Program. Restoring impaired waterways accomplishes little if high-quality waters decline while this occurs. In response, Ohio EPA continues to support the protection of healthy and high-quality water resources based upon the findings in Ohio's approved TMDLs and endorsed watershed action plans. We also will identify high quality waters in our Integrated Reports. This is a valuable resource that provides a status for each watershed in the state.



Restoring impaired waters will continue to be the core mission of Ohio's nonpoint program. However, protecting high quality waters is critical too, and this requires protection of riparian areas as well as targeting restoration to degraded reaches of the water

Ohio's support for protecting high-quality and healthy waters places priority on wild or scenic river designation and those identified as superior or outstanding high-quality waters. Ohio EPA will facilitate the implementation of management practices that are designed to protect high quality segments and/or restore impaired segments of high-quality waters. The strategic approach and specific action items for this may be found in Section 3.0 of this NPS Management Plan.

The kinds of projects that are likely to be funded using Section 319(h) will include more than one of the practices listed below:

- Protection and restoration of high-quality rivers and streams
- Protecting high quality riparian areas with conservation easements
- Riparian restoration and stream bank stabilization activities
- Protecting and/or restoring riparian vernal pools and wetlands
- Protecting and/or restoring in-stream habitat
- Assisting with local adoption of riparian setback codes and ordinances
- Riparian plantings of native shrubs and trees
- Invasive species removal and management
- Installing wetland drain tile treatment wetlands on high quality waters
- Developing and implementing high quality water education & outreach projects

*Ohio NPS and Section 319(h) grant funding will not be used for land acquisition.

6.7 Ohio's Watershed Program

Historically, Ohio's watershed program has supported the establishment of local watershed groups and employment of local watershed coordinators. Since 2014, the core mission has been to develop Nine-Element Nonpoint Source Implementation Strategic Plans (9-element plans). Since its inception, Ohio EPA has provided Section 319(h) grant funding to the Ohio Department of Agriculture to manage the Watershed Coordinator Grant Program. This has resulted in the development of more than 130 state-endorsed 9-element plans to date. These plans provide a summary of the nonpoint source problems that are plaguing a watershed and identify critical areas and specific ready-to-implement projects that can be acted on.

Whether a 9-element plan is prepared by a local group or by Ohio EPA as a Total Maximum Daily Load Study (TMDL) or a 9-element implementation strategy, this is an important piece of Ohio's overall efforts to address nonpoint source pollution. NPS management on the watershed scale is the foundation on which all programming activities are built. And watershed plans provide several benefits including:

- Identifying specific water quality problems in critical areas
- Matching restoration solutions to identified problems.
- Helping to target limited financial resources to environmentally sensible actions

Watershed planning remains a major goal in of Ohio's Nonpoint Source Management Plan. Section 319(h) funds will be targeted to implementation projects highlighted in 9-element plans that are developed. A small portion of section 319(h) funds may be used to upgrade existing watershed plans and to continue the watershed coordinator program. Additional funding resources will be sought to initiate new 9-element watershed planning in high priority areas such as high nutrient contributing watersheds of the Western Lake Erie Basin and the Ohio River Basin. As additional data on nutrient loading becomes available and reduction goals are established or renewed for Lake Erie, the Ohio River Basin and other watershed areas, effort will be made to provide nutrient reduction targets down to the HUC-12 level in 9-element plans. Nine-Element Nonpoint Source Implementation Strategic Planning will increase ready-to-implement projects that lift impaired water resources and protect high quality resources. Implementing the recommended actions within watershed plans and TMDL studies is top priority. Priority effort in Ohio's program is to be spent on implementation towards reducing the leading causes and sources of impairment of water resources. Hydromodification, habitat alteration, silt/sediments and nutrients are the highest magnitude causes of aquatic life use impairment in Ohio. Addressing these and other rising nonpoint source issues with effective projects and programs will be the focus of attention in order to see water quality improvement statewide.

Ohio's program has long assisted in successfully developing watershed groups and 9-element plans. We are committed to moving forward with the watershed coordinator program and are providing financial support for ODA to maintain staff for the program. In the meanwhile, Ohio EPA through the NPS Program is continuing to identify opportunities to advance implementation of nonpoint source projects and restoration of Ohio's NPS impaired waters and protection of our highest quality waters.

As of this date, Ohio has fully endorsed 9-element plans covering 250 watersheds. Planning activities are being completed on additional watersheds. TMDLs have been completed and approved on more than 50 large river units. A complete listing of Ohio watersheds with completed and endorsed 9-element plans and approved TMDLs may be found on Ohio EPA’s webpage as follows:

- Approved 9-element plans: [Approved 9-Element Nonpoint Source Implementation Strategies in Ohio | Ohio Environmental Protection Agency](#)
- Approved TMDLs: [Approved-TMDLs-Map-July2024](#)

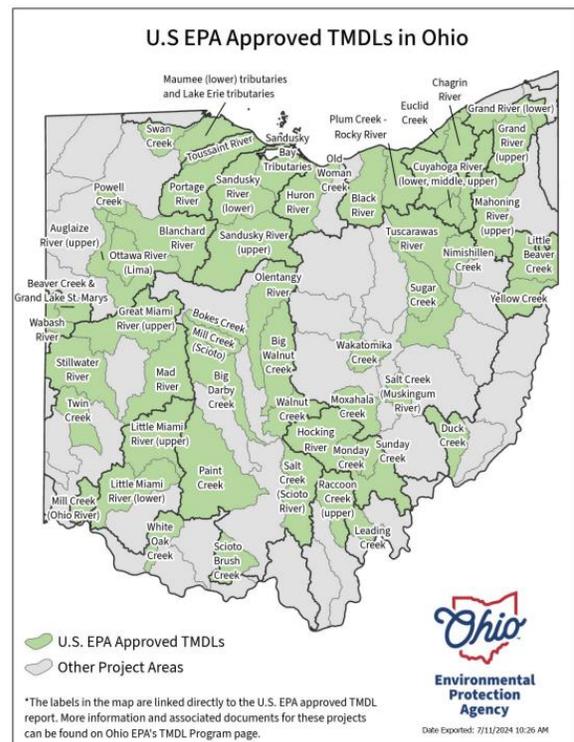
6.8 Total Maximum Daily Load (TMDL) Program

The Nonpoint Source Program will provide significant support through section 319(h) funding to Total Maximum Daily Load (TMDL) development. TMDL work consists of development of watershed/water resource study plans, biological and water quality reports (also known as a technical support document (TSD)), loading analysis plans (LAP), preliminary modeling results, and finally the draft and official TMDL plan. The latter contains a restoration plan for impaired waters. This work also includes other categories of planning and implementation such as alternative 4b plans.

Ohio’s EPA’s Division of Surface Water Modeling and Assessment Section provides monitoring and TMDL modeling for 1538 HUC-12 assessment units; 45 large river assessment units (30 rivers), 4 Lake Erie shoreline and 3 Lake Erie open water assessment areas. Further details on Ohio EPA’s monitoring strategy are available in the agency’s monitoring strategy publicly available here:

dam.assets.ohio.gov/image/upload/epa.ohio.gov/Portals/35/tmdl/Compiled_Monitoring_Strategy_2022.pdf. Revisions to the monitoring strategy are done with an opportunity for public input with and updates will be available on the agencies webpage: epa.ohio.gov/divisions-and-offices/surface-water/reports-data/statewide-biological-and-water-quality-monitoring-and-assessment.

The monitoring strategy provides data that is included in the agencies biennial integrated report, which in part develops the list of Ohio’s impaired waters. Part of that biennial report is a discussion on priority actions for the next two years. The integrated report includes an opportunity for public input and the biennial updates are posted on the agencies webpage here: epa.ohio.gov/divisions-and-offices/surface-water/reports-data/ohio-integrated-water-quality-monitoring-and-assessment-report. Monitoring and TMDL development priorities are included in Section J of the report.



During the next five years, Ohio's Watershed Program will work with agency partners to track implementation of TMDLs and endorsed 9-element plans.

The NPS program will continue to work closely with watershed groups and partner agencies (ODA, NRCS and SWCDs) to identify the best means in which we can improve technical assistance to local governments, park districts and other local large landowners to enhance watershed management activities. Several initiatives that were initiated last period will be continued to some degree regarding 9-element plan and TMDL implementation assistance including:

- Continue support for regional watershed support centers in which established, successful watershed groups work to provide technical assistance to surrounding communities, watershed groups and other implementers. Support has been provided for projects in Southeast and Eastern Ohio through support of the Ohio Department of Natural Resources, Division of Mineral Resource Management. They have partnered with the Ohio University and Rural Action to develop additional plans, and numerous projects to reduce impairment. In Northeast Ohio and the Central Lake Erie Basin Collaborative has been and will likely be supported again in order to increase project development and to provide technical assistance leading to an increase in shovel-ready projects in 9-elements plans and better implementation of projects.
- Continue exploration of approaches for assisting viable watershed groups with sustainability and increasing the local implementation of nonpoint source management projects recommended in TMDLs and endorsed watershed action plans.
- Ohio EPA staff will continue to evaluate additional ecological assessment measures that provide greater identification and quantification of ecological services related to water resources and nonpoint source pollution, attainment of beneficial uses and best potential condition.

6.9 Ohio EPA's Lake Erie Program

Ohio's Nonpoint Source Management Program participates in several Lake Erie and Great Lakes related initiatives implemented by the USEPA, USDA-NRCS, ODNR, USGS, Ohio Lake Erie Commission (OLEC), the Great Lakes Commission (GLC) and other local, state and federal partners. Two Lake Erie specific program areas that continue to play an important role in Ohio's Nonpoint Source Management Program are the implementation of Remedial Action Plans (RAPs) for the Maumee, Black, Cuyahoga and Ashtabula rivers and the continued development and implementation of a lake-wide action and management plan (LAMP) for protecting and restoring Lake Erie. These programming efforts are focused on reducing point and nonpoint source pollutants and restoring all beneficial uses to four rivers and Lake Erie. 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 Clean Water Act. The GLWQA was most recently revised in 2012 and Ohio EPA's NPS Section has been and will continue to help facilitate implementation of relevant goals and requirements contained in this agreement.

6.9.1 Remedial Action Plans-Areas of Concern

Ohio's Areas of Concern (AOCs) (Maumee River Black River, Cuyahoga River and Ashtabula River) were identified in the early 1980s as the most severely degraded rivers and near coastal areas along Ohio's Lake Erie. Annex 1 of the GLWQA calls for restoration of beneficial uses that were impaired due to local conditions at AOCs through development and implementation of Remedial Actions Plans (RAPs). Many Beneficial Use Impairments (BUI) reflect the same general goals as represented in the Ohio water quality standards (WQS) though they may 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. Seven of the 13 beneficial use impairments (BUIs) identified are directly related to nonpoint source pollutants and/or impairments.

Efforts to restore the AOCs require an ecosystem wide and comprehensive approach including remediation and habitat restoration. As Ohio is successful at leveraging funding under the Great Lakes Restoration Initiative (GLRI) and from other funding sources to complete assessment work and implement effective restoration projects in the state's four AOCs, the NPS Management Program will offer technical assistance for this purpose.

6.9.2 Lake Erie Monitoring

Ohio EPA performs comprehensive nearshore and lake sampling in cooperation with the USEPA led National Coastal Condition Assessment (NCCA) monitoring program. This monitoring effort ties into Annex 2 of the GLWQA. Annex 4 of the GLWQA addresses nutrients and Ohio EPA's monitoring will support assessment of the lake ecosystem objectives identified in the agreement. Additionally, long-term monitoring will provide the data needed to evaluate water quality trends, including anoxia, assess the effectiveness of remedial and nutrient reduction programs, measure compliance with jurisdictional regulatory programs, identify emerging problems and support implements of RAPs.

Ohio's assessment and impairment designation for Lake Erie has been the focus of considerable discussion between Ohio EPA, U.S. EPA and local stakeholders. In 2018, Ohio, with the aid of several universities and NOAA, developed a method for assessing the western basin open waters in Ohio for algae blooms. This methodology continues to be employed. Shoreline units are assessed for all four beneficial uses using established methods. All shoreline units except the central basin shoreline are listed as impaired for all four uses.

Lake Erie nearshore sampling has been part of the statewide monitoring program since 2014. The field work is done by Northwest and Northeast districts. There are 17 fixed stations spanning the nearshore waters of Ohio (within a couple miles of shore). Sites in the western basin are sampled more frequently than those in the central basin. Samples are associated with a station and the data is managed in the Division of Surface Water's Ecological Assessment and Analysis Application (EA3). Data summaries on Ohio EPA's webpage and accessible by the public and research institutions. Data is used to report ALU status in the IR. Data collection is also performed in cooperation with the National Coastal Condition Assessment (NCCA), a USEPA led evaluation of the Great Lakes and marine coasts.

6.9.3 Lake Erie Monitoring Program Goals, Objectives and Milestones

Goal LE#1.01: Develop and implement long-term monitoring plan for Ohio's waters of Lake Erie

Objective LE#1.01(A): Identify Ohio EPA monitoring objectives and needs to fulfill monitoring and reporting responsibilities, tracking lake water quality response to remediation projects and eliminating redundancy among multiple state, local and federal partners. Successful implementation is measured by:

- Developing specific Lake Erie aquatic life use designations and appropriate assessment metrics to support the designations. These metrics will be adopted by monitoring carried out by Ohio EPA and other groups. Ohio EPA published a draft of these metrics with the 2024 Integrated Report and plans to proceed with rule making procedures to establish the new use and criteria.
- Continue working in partnership with the Lake Erie charter boat captains in performing volunteer water quality monitoring during monitoring/fishing seasons throughout the five-year programming period.
- Implement a coordinated Lake Erie monitoring plan that includes other Lake Erie states, the Canadian province of Ontario and that includes a standardized data collection and sharing format among all monitoring partners.

Objective LE#1.01(B): Participate on related LAMP and Annex 2 workgroups developing a Lake Erie lake wide monitoring framework.

Goal LE#1.02 Share monitoring data in a timely manner and communicate results

Objective LE#1.02(A): Prepare Lake Erie monitoring results annual reports that are published online for easy public and partner access. Ohio EPA will also work with the Ohio Lake Erie Commission to produce an annual Lake Erie tributary nutrient loading report. This report shows the results of all Lake Erie tributaries with continuous nutrient monitoring. It is accompanied with a spreadsheet that allows users to download the results in a workable format.

Goal 1.03: Provide input and advice on Lake Erie related management efforts

Objective #LE3.02(A): Assist the Ohio Lake Erie Commission with their regular updates of the Lake Erie Protection and Restoration Strategy plan. This includes updates to the and providing data for the Lake Erie Quality Index.

Objective #LE3.02(B): Participate in the Great Lakes Commission Meetings.

6.10 Ohio's NPS Project Monitoring and Assessment

Ohio EPA conducts all effectiveness monitoring for Section 319(h), GLRI and Division of Surface Water funded nonpoint source projects. Baseline project monitoring is scheduled directly with local project managers shortly after grant awards are announced. Ohio EPA biologists arrange access to project sites and sampling for fish, bugs, habitat and general water chemistry is completed. Currently follow-up monitoring is conducted during the third year of each project and only after the project has been completed. During this plan period, the timing of post-project monitoring will be reviewed to maximize measuring best management practice effectiveness. Data is routinely downloaded into appropriate state and federal systems and a preliminary report is completed for each project site and stream segment where monitoring was completed.

This assessment process provides consistency in monitoring, cost-savings and improved data quality. Ohio EPA's Division of Surface Water's Modeling and Assessment staff also assists in the review of Section 319(h) subgrant applications regarding the water quality improvement potential for each proposed project. Their involvement also enables the biologists to shape their monitoring plans more appropriately. The Nonpoint Source Program will utilize and fund Ohio EPA Division of Surface Water Modeling and Assessment staff to prepare and implement study plans for each year's selected 319 and GLRI projects along with implemented projects from previous years selections. This process of engagement in subgrant application review, preparation of Quality Assurance Project Plans (QAPP) and actual monitoring will continue throughout this NPS Management Plan period.

6.11 Ohio's NPS Project Monitoring and Assessment Goals, Objectives and Milestones

Goal EA#1.01 Conduct appropriate effectiveness monitoring of 319 and GLRI subgrant projects and communicate results.

Objective EA#1.01(A): Identify projects and appropriate sampling sites/techniques to conduct monitoring of biology and/or physical habitat. Prepare QAPPs for each of the 2025 to 2029 sampling plans. Consideration should be given to the appropriate metrics and timing of sampling so it most likely reflects the recovered conditions.

Objective EA#1.01(B): Conduct appropriate pre-implementation and post-implementation monitoring of selected subgrant projects using established methodologies.

Objective EA#1.01(C): Prepare a biannual report of monitoring data regarding subgrant projects. These reports shall be posted on the NPS Program website.

Objective EA#1.01(D): Evaluate additional measures of evaluation that may be utilized in TMDL and pre-implementation and post-implementation monitoring of selected subgrant projects.