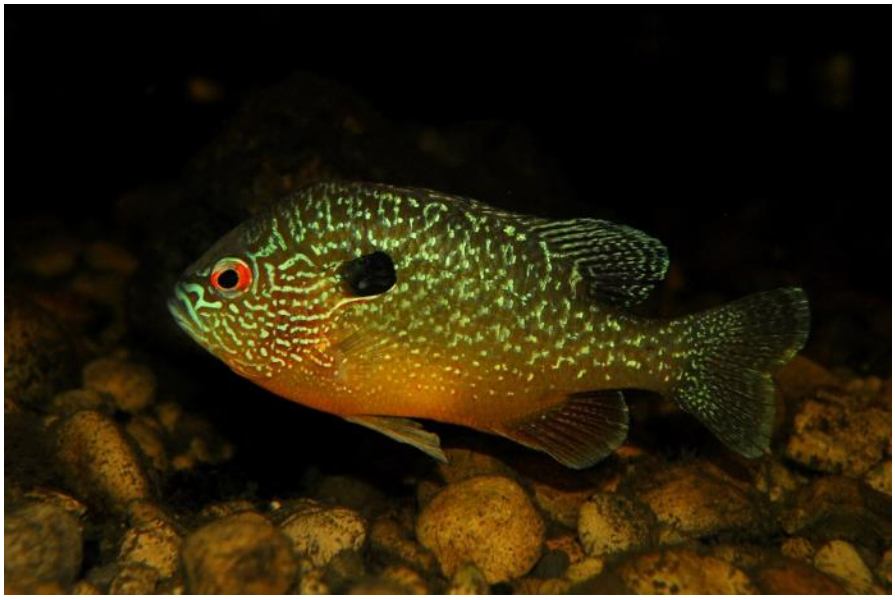
Nonpoint Source Program

Nonpoint Source Management Plan Update



Longear Sunfish
Photo by R.W. Gibson

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Introduction and Overview

Development of an updated Nonpoint Source Management Plan by each state is a requirement of Section 319(h) of the Clean Water Act. The Ohio Nonpoint Source Management Plan is the document that outlines recommended strategies, goals and objectives for controlling nonpoint sources of water quality impairment. Ohio's most recently updated NPS Management Plan was completed in 2005 by a workgroup chartered under the Ohio Water Resources Council. This plan was approved by US EPA Region 5 in 2006. There have been several minor updates to Ohio's management plan since 2008. The following document represents a more significant update based upon accomplishments to date and new institutional arrangements. However, we are not revising the scope or the intent of our plan that was approved in 2006. Unlike previous versions of Ohio's NPS plan the updates in this document do not attempt to present a universal set of Ohio NPS partner strategies. Instead, this updated plan is designed to help focus NPS management activities being implemented by Ohio EPA's Nonpoint Source Management Program during the period FY2014 through FY2018.

In Ohio, the four (4) most common nonpoint source causes of water quality impairment are hydromodification, habitat alteration, nutrients and silt/sediments. The updated plan tackles these high magnitude causes of impairment directly. There are four (4) sections where one can easily comprehend the strategic vision along with the proposed aggressive (yet reasonable) goals and objectives for Ohio's NPS Program for the next five years. These four sections include:

- **1.0-Urban Sediment and Nutrient Reduction Strategies**
- **2.0-Altered Stream and Habitat Restoration Strategies**
- **3.0-Nonpoint Source Reduction Strategies**
- **4.0-High Quality Waters Protection Strategies**

Each of these strategies include goals which are further refined and specified to include objectives and milestones designed to provide meaningful evaluation points as well as a finely honed focus for program activities. An important tool for focusing limited resources on a problem as ubiquitous as nonpoint source pollution is the establishment of measurable milestones—those specific achievements and/or deliverables that we are striving to attain. Like a long journey, each success starts with first one step then another and another until we are able to look back and see not only from where we've been but also more clearly identify measurable improvements.

Progress toward achieving the Environmental measures of Ohio's Nonpoint Source Program will continue to be measured as part of Ohio's NPS Monitoring and Assessment Initiative. For the past five (5) years, Ohio EPA staff conducts all monitoring (physical, chemical, and biological), beginning with baseline monitoring through project completion to determine the effectiveness of §319 (h) and SWIF funded nonpoint source projects. This initiative not only provides cost savings and improved data quality, but also relieves grant recipients of a task which was often difficult for them to do properly. This initiative also serves as a very important tool for measuring the environmental effectiveness of Ohio's Nonpoint Source Management Program. Are NPS-funded projects improving water quality or not? For example, one environmental program measure that Ohio EPA will be using is the number of SP-12 watersheds that have shown improvement and the number SP-10 Success Stories Ohio will submit during the programming period. We will also consistently use the biological water quality monitoring criteria used by Ohio EPA's Ecological Assessment Unit.

In addition to the above referenced measures, Ohio's NPS Program will also deploy a variety of Administrative measures to evaluate Ohio's NPS Program administration and manage including:

1. Timeliness and quality of report submittals to US EPA
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 Region 5 US EPA
    - 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
4. Participation at all required meetings, conferences and other events outlined in the Programmatic Conditions section of Ohio's grant agreement with US EPA.
5. Core Programming-Ohio EPA will implement core program activities in compliance with FY2012 National Program Guidelines.

Also included in Section 5.0 of this updated plan is an inventory of each of the various state and federal program partners. The plan also includes a more detailed identification and summary of the various Ohio EPA NPS program summaries, funding and in some cases very highly program specific objectives.

Ohio is fortunate to have a wide array of NPS Program partners at the local, state and federal levels. We are also very fortunate to have a NPS Program that is tightly integrated with several layers of programs within Ohio EPA's structure. For example, our TMDL program helps us understand what needs to be done and where; our monitoring program performs baseline and post-project effectiveness monitoring that helps to measure environmental improvements resulting from NSP Program activities. We also have integrated Ohio's Lake Erie and Inland Lakes programs in the past year to help broaden our influence and effectiveness. However, these expansions further enhance the need for a strong updated plan to focus program activities.

Throughout the various sections of this updated plan are a series of program measures and performance indicators that will help keep the program on-course, moving forward and making a difference both to Ohio's rivers and streams but also by contributing to an improved quality of life for all Ohioans. The past several years have been very successful and productive for Ohio's Nonpoint Source Program—we expect progress over the next five years to be even more substantial.

Urban Sediment and Nutrient Reduction Strategies

Recommended Practices to Reduce Sediment and Nutrients from Urban Sources

Recommended green stormwater management systems and practices are provided in this section. These practices may be considered for SWIF grant and Section 319(h) grant funding for stormwater management demonstration projects unless implementation is required as part of a permit.

Ohio communities face many challenges with aging stormwater management infrastructure, combined sewer overflows, impervious surfaces and continued pressure to reduce the rate and amount of runoff that is entering Ohio streams from the urban and suburban landscape. A significant challenge facing communities is reducing the impacts of erosion for storm water surges, stream bank failures and issues associated with stream flashiness and flooding. Continued reliance on aging gray infrastructure in many cases will not provide needed water quality improvements.

Ohio is encouraging and communities are embracing "green" infrastructure and Low Impact Development (LID) practices. Holding stormwater on-site and/or creating conduits for stormwater to gently infiltrate into the soil is far more beneficial than piping it through a storm sewer to a receiving stream. The strategies outlined below are designed to help facilitate the installation of green infrastructure with new development and retrofitting gray infrastructure (traditional storm sewers) with green alternatives 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 infiltration, filtration and/or water storage of runoff from impervious surfaces such as roofs, roadways and sidewalks, etc. Communities in Ohio are beginning to retrofit their stormwater infrastructure from the traditional piping of stormwater through sewers to green infrastructure practices such as vegetated bioswales, wetland treatment areas, rain gardens, pervious pavement and other practices. 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 erosion and sediment loss and reducing nutrients and other nonpoint source pollutants in unregulated urban and suburban stormwater from reaching conveyance systems. In addition, due consideration will be given to impacts---both positive and negative that infiltration projects may have on groundwater by coordinating with Ohio EPA's drinking and groundwater program.

1.01: Reduce Stormwater Runoff

Ohio's NPS Management Program has been fortunate to be able to increase grant funding to facilitate the adoption and installation of green stormwater management practices. Evidenced by the more than 170 local applicants for the FYY10 Surface Water Improvement Fund (SWIF) grants, it is clear that there is a great deal of interest in experimenting with some of these practices. Ohio EPA has encouraged the

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

adoption and installation of green stormwater practices at highly visible public facilities such as city halls, parks, government offices, etc. The projects provide great examples for community leaders and decision makers to point to when discussing development possibilities with developers, business owners and others in the community. The primary goal of Ohio's stormwater management strategies is to reduce the amount and the rate with which stormwater is running off our urban and suburban landscape and entering streams.

Goal 1.01.01: Reduce the rate and amount of runoff

Ohio communities have traditionally managed stormwater as something to be piped and flushed from the landscape as fast as possible. As impervious urban areas expand, the resulting "flush" of stormwater has grown to the point where it now is having detrimental effects on many urban and suburban 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. Trapping, retaining and allowing stormwater to infiltrate rather than being flushed into a storm sewer helps dramatically with improving water quality and reducing the rate and amount of runoff.

Many older Ohio cities such as Cleveland, Toledo, Akron, Columbus and Cincinnati have antiquated stormwater management systems that are badly in need of updating. We continue to implement activities designed to encourage local decision makers to increase their use of "green" stormwater management practices such as rain gardens, bio-filtration areas, stormwater treatment trains, green roofs, pervious pavement and others.

Goal 1.01.02: 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 previous developed and/or redeveloped sites. Ohio's SWIF or Section 319(h) grant funds may not be used for green infrastructure projects on new construction areas. Following are some general guidelines that should be considered:

1. Where feasible pipes, curbs and gutters should be replaced with vegetated swales
2. Open/Green space should be located at lower elevations
3. Open space should be used for maximum functional stormwater controls
4. Catch basins should be located in grassy spaces
5. Enhance infiltration capacity by using French drains in open areas
6. Design stormwater systems that maximize infiltration and/or filtering of runoff
7. Use areas beneath parking lots for infiltration and/or detention of runoff
8. Restore soil infiltration capacity by using engineered soils in rain gardens, etc.
9. Incorporate storage areas to accommodate higher volumes from large storm events
10. Ensure groundwater is protected from contamination on redevelopment sites (especially brownfields), so that mobilization of contaminants does not occur due to increased water infiltration.

Recommended green stormwater management systems and practices are listed below. Much of this list is borrowed from the US EPA's "National Menu of Stormwater Best Management Practices."

Stormwater Retention Practices

- **Dry Detention Ponds:** These are basins whose outlets have been designed to retain storm water runoff for a period of time to allow particles and associated pollutants to settle out before discharging to a stream.
- **Wet Ponds:** Wet ponds are traditionally known as stormwater ponds and are designed to treat incoming storm water runoff by allowing particles to settle and algae to take up nutrients. The primary removal mechanism is settling as storm water runoff resides in this pool, and pollutant uptake, particularly of nutrients, also occurs through biological activity in the pond. Historically, wet ponds have been widely used as storm water best management practices. ***In order to qualify for grant funding, wet ponds must be a component of a larger "treatment train" system designed to demonstrate innovative practices or technology.***
- **Storm water wetlands:** These structural practices are a preferred alternative to wet ponds. Storm water runoff flows into wetland area where pollutant removal is achieved through settling and biological uptake. Wetlands are among the most effective storm water practices in terms of pollutant removal and also offer aesthetic and wildlife habitat value. Storm water wetlands are designed specifically for the purpose of treating storm water runoff and therefore, may have less biodiversity than natural wetlands.

Stormwater Infiltration and Filtration Practices

- **Grassed Swales:** The practices may also be known as grassed channel, dry swale, wet swale, bio-filter, or bio-swale. A grassed swale is a practice designed specifically to treat and attenuate storm water runoff for a designed volume of water. Storm water flowing through a swale is "treated" by vegetation that slows the rate of runoff and allows sediment and other NPS pollutants to infiltrate through the soil.
- **Infiltration Basin:** An infiltration basin is a shallow impoundment that is designed to filter storm water and allow it to infiltrate into the soil. This particular practice is designed to have the potential to reduce high levels of NPS pollutants and may also have a beneficial effect on recharging groundwater supplies.
- **Permeable Pavers:** These are interlocking concrete units that reduce stormwater runoff volume, rate and pollutants. Pavers are designed to maintain small openings in the joints between pavers typically comprising 5% to 15% of the surface area. These joints allow stormwater to infiltrate into a layer of aggregate under the surface.
- **Pervious Concrete and Asphalt:** As implied by the names, pervious concrete and pervious asphalt are like traditional concrete and asphalt except they are produced with less sand and/or fines are larger pore spaces between aggregates to allow for the infiltration of storm water into under layers of aggregates. Void spaces may be as high as 35%.
- **Rain Gardens-Bio-Retention:** These practices are designed to provide on-site treatment of storm water runoff. Surface runoff is diverted to a landscaped depression area where pollutants are taken up by

Rain gardens such as this garden in Mill Creek Park are among the most widely known types of green infrastructure.

plants and storm water is allowed to drain through the soils and infiltrate specially engineered soils where it may be collected in a perforated under-drain and returned to the storm water management system minus the NPS pollutants filtered in the process.

- **Filter Strips/Filter Areas:** These are vegetated linear surface areas that are designed to collect and passively treat sheet flow from adjacent areas such as parking lots and other impervious areas. Filter strips are effective at slowing runoff velocities and filtering out sediments and other NPS pollutants such as nutrients, silt, oil, grease etc.

With respect to protecting groundwater sources of drinking water, it is important to note that proper siting and careful selection bioremediation and phytoremediation techniques are critical components to success.

Virtually all of the practices listed above can be deployed as tools to reduce impervious surface areas around buildings, in parks, parking areas and other traditionally impervious 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:

- **Eliminate Curbs and Gutters:** This practice promotes grass swales as an alternative to curbs and gutters along residential streets and parking areas. Curbs and gutters are designed to quickly convey runoff from the street to the storm drain and ultimately to a local river or stream. They provide little or no removal of storm water pollutants.
- **Green Roofs:** Green roofs are effectively used to reduce storm water runoff from commercial, industrial, and residential buildings. Green roofs effectively capture, absorb, store and then evapo-transpire initial precipitation.
- **Green Parking Areas:** Green parking refers to several techniques and/or practices all working together to reduce the stormwater and runoff contribution of parking lots equal to that of a comparably sized impervious area. This practice may include a collection of tools such as pervious pavers in alternate parking areas, stormwater diversions to wetland treatment areas or bio-filtration areas and others. Other tools may include simply minimizing the size of parking areas and/or using vegetated pavers rather than concrete or asphalt surfaces.

1.02: Passively Treat Stormwater Runoff

Goal 1.02.01: Increase the use of urban stormwater wetland treatment systems

According to US EPA, 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.

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 1.02.02: Protect and restore effective riparian buffers

Riparian areas along urban and suburban streams are in many cases either non-existent or dramatically modified with things like bulkheads, concrete and other impervious materials. Riparian buffers that are currently not modified and in a mostly natural state should be protected from degradation 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 bioengineering methods and/or by using in stream flow diversions such as J-hooks or other structural tools.

Healthy riparian buffer areas, especially those that are heavily 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.

1.03: Low Impact Development (LID)

Goal 1.03.01: 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 means of infiltration, evapotranspiration and reuse of rainwater, LID practices manage water and pollutants at the source and therefore reduce the impact of development on rivers, streams, lakes, coastal waters and ground water.[1]

With Ohio EPA's Surface Water Improvement Fund (SWIF) grants, Great Lakes Restoration Initiative grants from US EPA's Great Lakes National Program Office (GLNPO) and Section 319 grants from US EPA-Region 5 Ohio's nonpoint source program has been very active in encouraging LID projects. Since 2010 more than 60 LID and green stormwater demonstration projects totaling more than $6.5 million have been funded throughout Ohio. With the generous assistance from GLRI, more than 30 projects have been installed in Cuyahoga County alone. 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.

Urban Sediment and Nutrient Reduction Strategic Goals, Objectives and Milestones for Program Years FY14 to FY19:

1.01: Reduce Stormwater Runoff

Goal 1.01.01: Reduce the rate and amount of stormwater runoff

Objective 101.01(A): Develop a consistent process to provide technical and design support and assistance to local governments interested in implementing green stormwater infrastructure.

[1] "Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices, US EPA, December 2007

Objective 1.01.01(B): Provide financial assistance to local governments to facilitate adoption and installation of green infrastructure, LID practices and stormwater management demonstration projects.

Successful implementation will be measured by:

- Awarding four (4) section 319(h) stormwater demonstration project grants per year
- Awarding forty (40) SWIF Stormwater demonstration project grants during the program period
- Implementing a stormwater demonstration initiative using SWIF funds in Hamilton County
- Developing "Regional Stormwater Demonstration Initiative" using SWIF and 319(h) grant funds
- Obtaining FY14 GLRI funding for Stormwater demonstration projects in Cuyahoga County

Objective 1.01.01(C): To support the development and delivery of two (2) green stormwater training programs for local officials.

Objective 1.01.01(D): To identify and implement an urban stormwater demonstration watershed where project funding and green practice installation can be targeted and/or enhanced, and where stormwater rate and amount reductions may be measured.

Goal 1.01.02: Encourage the installation of green stormwater management systems

Objective 1.01.02(A): Provide technical and funding assistance using SWIF and Section 319(h) grants to facilitate the installation of five (5) green parking demonstration areas annually. These systems will deploy at least three (3) green stormwater management practices to passively treat and reduce stormwater runoff from these parking areas.

Objective 1.01.02(B): Provide funding assistance to facilitate the installation of at least four (4) Stormwater demonstration learning laboratory wetlands at Ohio schools. Projects must deploy multiple green stormwater BMP's and/or LID practices, have monitoring capabilities and include a robust on-site educational component for students.

Objective 1.01.02(C): In partnership with county park districts, provide funding assistance to facilitate the installation of demonstration rain gardens and rainwater harvesting systems at ten (10) park district nature centers during the programming period. These projects must include a robust on-site public awareness and/or educational component.

A rain barrel such as this at Shaker Lakes Nature Center can be a very effective tool for informing the public and encouraging green stormwater practices.

Objective 1.01.02(D): Provide financial assistance to facilitate the installation of three (3) green roofs in highly visible and publicly accessible facilities.

Objective 1.01.02(E): Provide technical and/or funding assistance to facilitate the installation of water quality and quantity monitoring systems on at least five (5) stormwater and/or LID demonstration project sites during the programming period.

1.02: Passively Treat Stormwater Runoff

Goal 1.02.01: Expand the use of urban stormwater wetland treatment systems

Objective 1.02.01(A): Provide funding assistance to facilitate the installation and use of urban stormwater wetland treatment systems. Successful implementation will be measured by:

- Awarding grants for the installation of at least one (1) urban/suburban wetland stormwater treatment demonstration project annually throughout the programming period.
- Sponsor and conduct one (1) wetland stormwater treatment workshop by 2016 that includes showcasing grant-funded urban/suburban wetland treatment systems.
- Provide funding assistance to monitor two (2) wetland treatment systems for a period of two years to measure the NPS pollutant load reductions resulting from the systems.

Goal 1.02.02: Protect and restore effective riparian buffers in urban/suburban areas

Objective 1.02.02(A): Provide financial assistance to facilitate the protection of high quality riparian buffers in urban and/or suburban settings. Successful implementation will be 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 program period.
- Award subgrants that will facilitate the restoration of 10 acres annually of modified riparian buffer areas within urban/suburban settings.
- Award a subgrant to facilitate the removal of at least section of bulkhead on an urban stream by June 30, 2016.
- Implement an Urban Waters Initiative in four (4) targeted urban watersheds to develop and implement strategic protection and restoration plans and/or approved TMDLs or endorsed watershed plans that emphasize riparian buffer protection and/or restoration as a key component.
- At least two (2) communities developing setback codes to protect urban riparian areas from undue degradation by “near-stream” development activities.

1.03: Low Impact Development

Goal 1.03.01: Encourage communities to demonstrate the use of LID practices

Objective 1.03.01(A): Provide financial assistance to facilitate the implementation of Low Impact Development demonstration projects. Successful implementation will be measured by:

- Providing subgrants to implement targeted LID demonstration projects in two (2) urban/suburban watersheds during the programming period.
- Providing financial assistance to facilitate the development and implementation of two (2) Low Impact Development workshops in central, northeast and southwest regions of Ohio.

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. Most headwater streams have been channelized and ditched -- all of the riparian trees and shrubs removed and natural flow regimes dramatically altered. In urban areas, streams have been culverted and natural flows have been disrupted by dams, streamside levees, dramatic flashy stormwater runoff and diversions of flow for various purposes. All of 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 rivers like the Middle Cuyahoga River 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 are restoring impaired waters to cold water habitat in some instances. Seriously eroding streambanks are being repaired using bio-engineering methods and riverine habitat is improving-dramatically in some areas, slowly in some others. There is much work still to be done but progress is being made and stream channels are becoming more stable, functional and providing habitat for more fish species.

Small low head dam structures like this one in Alum Creek impound water, disrupt flow and diminish stream habitat and biological communities. Removing these structures is an economical way to restore and undo legacy impacts on in-stream habitat. This dam was removed and the natural flow restored under provision of a section 319 grant.

Project implementers should be mindful of point-sources or upstream critical area influences where stream restoration is recommended to address hydromodification and habitat alteration. More simply, upstream point source influences may be an overpowering influence on water quality conditions. Likewise, stream restoration and in-stream habitat restoration are not likely to be nearly as effective in situations 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

Goal 2.01.01: Restore impaired streams altered aquatic habitats.

Objective 2.01.01(A): Provide financial assistance to local governments, park districts and other local implementers to restore impaired streams within critical areas identified in TMDL studies and/or endorsed watershed action plans.

Stream restoration provides an opportunity to accelerate the recovery of streams that have been channelized or otherwise modified to disrupt in-stream habitat conditions and natural flow conditions. When natural channel design methods are deployed in a stream that has suitable physical conditions, biological communities can often be restored within two or three years. Allowing a stream to passively restore itself may take several decades before measurable biological improvements are observed.

Objective 2.01.01(B): Encourage the use of 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; 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 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.

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. As such, documents describing eligibility for funding will reflect a very low priority for bank armoring projects as described above. 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).

Following are the structural and other cost items that are typically associated with bio-engineered 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—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):** Coffer dams, 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 clearly compliant with conditions of any permit associated with a restoration project.

4) **Rock/Cross Vanes:** Cross-Vanes are grade control structures that decrease near-bank shear stress, flow velocity and stream power and diverts energy to the center of the channel. They also 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.[3] Most stream restoration projects in Ohio's larger streams and rivers typically involve the installation of one or more cross vanes to redirect flow and energy from the banks to the center channel.

Rock Vanes are effective tools for reducing stream energy and flow velocities.

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-ban 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. ("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.

8) **Root Wads:** A root wad is a "root mass or root ball of a tree plus a portion of the trunk". Root wads are 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 are very common component of stream and riparian 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. Fiber Schines
    g. Gabions and Gabions with Willows
    h. Live stakes
    i. Native grasses, shrubs and trees

Natural Channel Design stream restoration projects such as this one in the city of Cuyahoga Falls, Ohio can transform habitat, flow and flooding conditions as well as dramatically improving in-stream and near-stream habitat conditions. This project was completed under provisions of an Ohio EPA SWIF grant. This project also dramatically reduced the amount of silt and sediment by stabilizing and recontouring the severely eroding streambank.

Goal 2.01.02: Manage invasive species

Invasive plant species such as honeysuckle, autumn olive and 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

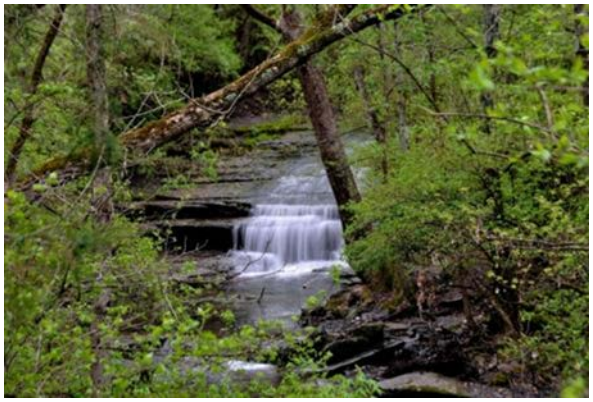
eligible for funding under section 319(h) subgrants and/or Ohio EPA Surface Water Improvement Fund (SWIF) grants. However, we encourage the removal of invasive species whenever possible and will allow costs associated with such activities when removal and/or management is conducted incidental to construction and/or restoration activities. More information about invasive plant species in Ohio may be found at: http://ohiodnr.com/Portals/3/invasive/pdf/OHIO%20INVASIVE%20PLANTS.pdf

Objective 2.01.02(A): Improve and expand financial support for the management and/or removal of invasive plant species in critical areas where invasives are identified as a high magnitude cause of habitat drive impairment. 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 on along all of Ohio's streams is important. However invasive species removal is a very 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 invasives 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 following thirteen (13) plant species are particularly noxious and should be removed or carefully managed when conducting restoration projects:

Common Name
Autumn-olive
Buckthorn, glossy
Buckthorn, European or common
Common reed grass
Garlic mustard
Honeysuckle, amur
Honeysuckle, Japanese
Honeysuckle, Morrow
Honeysuckle, Tatarian
Japanese knotweed
Multiflora rose
Purple loosestrife
Reed canary grass



The riparian area of this high quality tributary to the Olentangy River is completely over-run by Japanese honeysuckle. This is a good example of the type of situation where removing invasive species is critical to protect the high quality of this stream.

Additionally, there are more than 700 species of invasive plants that can be found in Ohio. The above listed thirteen (13) species are those that are especially vigorous and therefore are highly targeted by botanists and other land managers.

The management of invasive animal species such as zebra mussels, gobies, Asiatic carp and others are not included in Ohio's Nonpoint Source Management Plan and will not be a focus of Ohio's NPS Program. Ohio's Division of Wildlife within the Department of Natural Resources has primacy in dealing with invasive wildlife.

This wetland restoration at the Shaker Lakes Nature Center illustrates the dramatic improvement that removing/managing invasive species may bring. Prior to restoration (above L) under provisions of an Ohio EPA and US EPA Great Lakes Restoration Initiative Grant this 7 acre wetland was choked with invasive cattails. Following removal, the wetland recovered itself with sedges, marsh grasses and other native wetland species such as Cardinal Flower and others.

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 SWIF grant funds or 319(h) funds to be used for this activity. Possible exceptions might be when burning is a recommended action for protecting high quality streams.

2.02: Daylighting Culverted and Severely Modified Streams

Many small urban Ohio streams have been diverted to underground culverts. Such streams provide little or no natural functions and for simplicity sake can be considered little more than a storm sewer. Recent projects in several Ohio communities are demonstrating that when culverted buried streams are "day-lighted" and floodplains and historic channels are restored, biological communities will return and inhabit such streams. Day-lighting 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.

Culverted streams such as this tributary stream to Rose Run in New Albany Ohio (L) can be restored as demonstrated here. (R)

Goal 2.02.01: Daylight culverted headwater streams.

Objective 2.02.01(A) Provide technical and financial assistance to local governments, park districts and other local implementers to day-light and restore buried and culverted urban streams within critical areas identified in approved TMDL's 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.

Opportunities to day light urban streams in Ohio are somewhat limited. So when such limited opportunities present themselves, we need to be prepared to act and to be responsive to the implementers' needs. When done correctly, day lighting can bring previously buried streams back to life. This improves habitat as well as providing green and natural spaces in otherwise urban areas.

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 are important for the assimilation of nutrients derived from fertilizers washing from nearby 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.

When impacted by agriculture, tree-cutting, earth moving or other activities, riparian areas can be restored. Riparian restoration is best avoided altogether by preventing such riparian areas from ever being degraded. This can be effectively accomplished with such practices as streamside set-backs or zoning codes, conservation easements that restrict certain activities, fee-simple land acquisition. However, once impacted, riparian restoration is best accomplished using only native shrubs, grasses and trees.

Goal 2.03.02: Stabilize severely eroding stream banks

Stabilizing severely eroding stream banks is an important strategy that can reduce silt, sediment and the nutrients attached to soils, as well as improving riparian habitat and in-stream habitat conditions. 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]

[2] Michigan Department of Environmental Quality Fact Sheet-SBS-1, September, 1997.

Consistent with Ohio's previously stated priorities, streambank stabilization projects will be identified within critical areas as noted in approved TMDL studies and 9-element watershed action plans. 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 rip-rap, stone, retaining walls or other bank "hardening" practices.

Section 319(h) and SWIF grant 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, rip-rap or other stream bank hardening methods. Implementers proposing streambank stabilization projects must identify measures taken upstream from the stabilization site to insure that the root cause for the bank's instability has been addressed.

Severely eroding streambanks can be small … such as this site (L) on Little Beaver Creek or they can be very large—such as the project (R) completed in the city of Springdale under provisions of project #11(h)EPA-09.

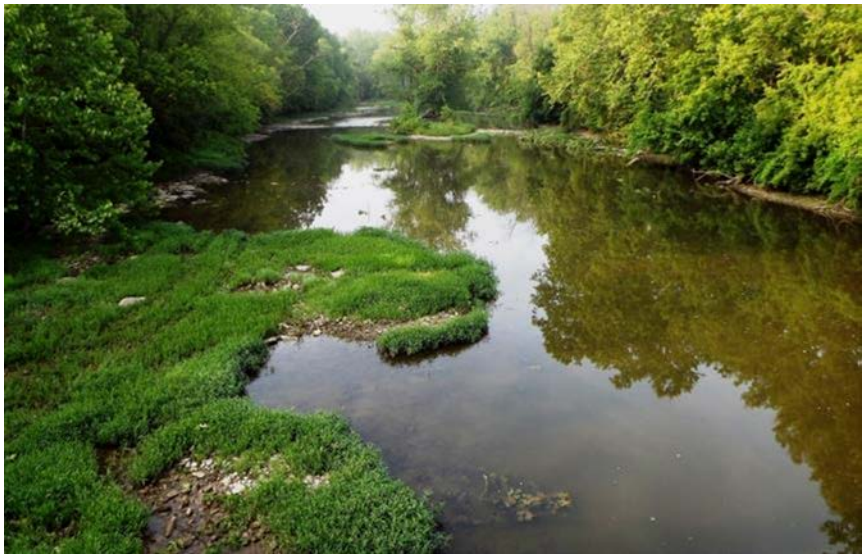
Goal 2.03.03: Restore vernal pools and other riparian wetlands

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 predator-less 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 storm water. 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.

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, which generally require lower inputs of nutrients and waters to become well-established. Ohio requires that any riparian plantings funded with nonpoint source grant funds (such as section 319(h) or SWIF grants), 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 beneficial 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 foodstuff for the aquatic macroinvertebrates that fish and other aquatic critters eat.

2.04: Restoring Natural Flow

Goal 2.04.01: Restore and Protect Natural Flow Conditions

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.

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 may be in serious disrepair. In all cases, lowhead 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, such as in the Middle Cuyahoga River, that 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.

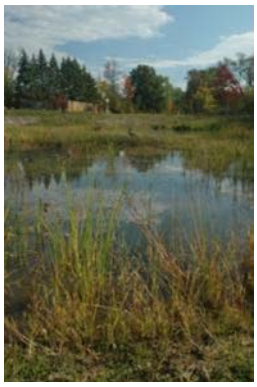
Objective 2.04.01(B): Remove and/or modify dams and levees in critical areas identified within approved TMDL studies and/or endorsed 9-element watershed action plans. *In streams where such projects can be demonstrated to remove significant impairments and restore aquatic life use, dam and levee removal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

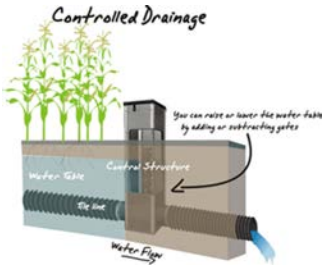
Since 2003, Ohio EPA provided funding assistance for the removal of more than a dozen dams throughout Ohio. These projects included large and small dams and in nearly every instance impaired stream reaches were restored to full attainment of their designated aquatic life use.

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

Objective 2.04.01(C): Provide financial assistance to demonstrate how to reduce flashy flows by installing streamside retention/controlled discharge 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. So much of Ohio's landscape is engineered to be drained quickly—identifying demonstration projects that can illustrate the value of slowing and/or retaining stormwater flows will be important for reducing the negative impacts of flashy flows in Ohio's streams.





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

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 will be one key objective. Currently ODNR'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.*

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

Ohio's rural landscape has been modified over the decades with the addition of subsurface drainage tiles having been installed in most agricultural lands in all but the southeastern areas of the state. Combined with the channelization of headwater tributaries and ditch construction and maintenance practices that have been ongoing since the early 1900's and Ohio's agricultural landscape has been heavily engineered to drain water quickly. When a small stream is transformed into a drainage

ditch, water flows freely and quite quickly down drainage to the receiving streams – often carrying with it high loads of sediment and nutrients such as nitrogen and phosphorus. Ditch maintenance also can be very detrimental to riparian habitat conditions as a result of the "dipping and clearing" of the channel as well as clearing of woody vegetation from riparian areas.

Recent developments in alternatives to traditional ditching are showing some promise in areas of the Midwest where conversion of traditional ditches to two-stage channels is being demonstrated. Demonstration projects being implemented by organizations such as the Nature Conservancy (Western Lake Erie), US Army Corps of Engineers (Blanchard) and Ohio State University and the Department of Natural Resources are showing that two-stage channels are a superior alternative to traditional ditch maintenance. Fundamental to this process is the establishment of a "bench or small flood plain" that allows for increased assimilation of nonpoint source pollutants such as sediments and nutrients such as nitrogen and phosphorus.

Two-stage channels act somewhat like riparian wetland retention areas although they do not retain water like wetlands – neither do they "treat" runoff as well as wetlands. Increased storage capacity in the 2-stage channel's broader floodplains allows for a slightly slower discharge of NPS contaminated runoff such as sediment and nutrients.

Channelized ditches such as shown above provide little or no aquatic and/or riparian habitat and very little NPS pollution assimilation. These ditches are designed to simply move water as fast as possible from the landscape.

Two-stage channels such as this (above) one on Ohio State University are a preferred alternative to traditional ditching. The 2nd "stage" or bench provides some pollution assimilation that is not typically provided by traditional ditches.

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

Dikes and levees are often built to provide protection from flooding or to allow for development on floodplain lands. Unfortunately, these structures are often built close to streams and restrict floodwater access to the natural floodplain. It is in these floodplain areas where streams assimilate and process nonpoint source pollution such as sediments, nitrogen and phosphorus. Without access to these critical areas streams simply carry NPS pollution downstream – usually deposited into nutrient "sinks" such as lakes or larger rivers. The results can be very harmful as evidenced in the western Lake Erie basin, Grand Lake St. Mary and several other Ohio inland lakes.

Ohio's nonpoint source program advocates the removal or modification of levees, dikes and other structures that inhibit the stream's access to the natural floodplain. Access to its natural

floodplain allows floodwaters to be "stored" and released downstream more gently, infiltrated and/or passively "treated" by vegetation that helps to uptake nutrients and trap 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.

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 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 is a state that has long enjoyed its "Home Rule". Land use planning and zoning are tools that are only available to local governments—the state has no authority to directly impose limitations on land use.[4] 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. This is the width of the canopy of only two mature trees.

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

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 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.

[3] Ohio Legislative Services Commission

[4] Floodplain regulations are not considered in this context. Floodplain regulation is typically handled by local governments.

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. It is necessary to increase educational efforts and outreach, including the establishment of more robust partnerships with agricultural entities (e.g., USDA-NRCS, USDA-FSA, Soil and Water Conservation Districts, and OSU Extension), that targets landowners with conservation incentives packages designed to aggressively promote the benefits of "no-mow" and "no-plow" zones—those riparian areas where cultivating and plowing are carefully limited along waterways. Farmers should 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). 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—areas where little or no "maintenance" is conducted. Townships roads and lanes that run along rivers should also be encouraged to be allowed to revert to natural conditions.

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 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 such as Cleveland, Toledo, Akron, Columbus and Cincinnati have antiquated stormwater management systems that are in need of retrofitting with practices that encourage infiltration or retention. Through programs such as the Surface Water Improvement Fund (SWIF) grants and/or 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 rain gardens, bio-filtration areas, stormwater treatment trains, green roofs, pervious pavement and others. Recommended practices are included in section 1.0 of this document.

Stream and Altered Habitat Restoration Strategic Goals, Objectives and Milestones for Program Years FY14 to FY19:

2.01: Stream Restoration and Protection

Goal 2.01.01 – Increase restoration of impaired streams and altered aquatic habitats.

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, 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:

- Identify through effectiveness monitoring 1 stream restoration project per year 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.

Goal 2.01.02 – Improve Invasives Species Management.

Objective 2.01.02(A): Provide technical and financial assistance to local implementers for the removal and/or effective management of invasive plant species on at least 350 acres per year throughout the programming period. The aggregate total will be more than 1,750 acres throughout the 5-year period.

Objective 2.01.02(B): To facilitate with local implementers the restoration of at least 50 acres of wetlands per year by removing and/or effectively managing non-native invasive wetland plant species. Throughout the program period more than 250 acres of wetlands will be restored in critical areas where habitat is identified as a high magnitude cause of aquatic life use impairment.

2.02: Daylighting Culverted Streams

Goal 2.02.01 – Daylight culverted streams

Objective 2.02.01(A): 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) and Surface Water Improvement Fund (SWIF) 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: Riparian Habitat

Goal 2.03.01—Restore and protect Riparian Habitat

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) and SWIF 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) or SWIF funded stream and/or wetland restoration sites.

Goal 2.03.02 – Stabilize eroding Streambanks using Bio-Engineering Methods

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 TMDL's, 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 one (1) streambank stabilization project so that we can ascertain a more accurate load reduction that can be expected from such projects. This may involve the collection of ample additional data that allows for development of alternative models for calculating load reductions associated with streambank stabilization.

Goal 2.03.03 – Restore vernal pools and other riparian wetlands

Objective 2.03.02(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 project 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

Objective 2.03.04: 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 will be provided as follows:

- Grant funding will be provided to local implementers for the purpose of restoring native riparian shrub and tree cover. Following projects will be completed during the 5-year program period:
    - Section 319(h) Subgrant Funding will restore 50 acres per year of degraded riparian areas with plantings of native grasses, shrubs and hardwood trees.
    - Surface Water Improvement Fund (SWIF) will facilitate the restoration of 60 acres of degraded riparian areas with plantings of native grasses, shrubs and hardwood trees throughout the reporting period.
    - Beginning in FY15 grant Request for Proposals (RFPs) any applicant proposing to restore streambanks, riparian areas or any projects causing riparian impacts will be limited to using only native grasses, shrubs and hardwood tree species in their restoration activities.

2.04: Restoration of Natural Flow

Goal 2.04.01 – Restore and Protect Natural Flow Conditions.

Objective 2.02.01(A): Increase 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) and SWIF 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 in TMDLs and watershed action plans. Priorities will be in 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 in section 319(h), SWIF, 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): Mitigate flashy stream flows with 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 storm water treatment system
    - Twenty-five (25) controlled drainage demonstration projects
    - Five (5) vegetated bioswales and/or other green retention and infiltration systems

Objective 2.04.01(D): Convert maintained agricultural ditches to 2-stage channels.

- Develop stringent yet clear, program and grant guidelines under which 2-stage channels are eligible for Ohio EPA based grant funding during FY2014.
- 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). Eligible projects are limited 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

- 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: Local Land Use Practices

Goal 2.05.01 – Encourage riparian setback and development standards and codes

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 completion of a model riparian setback code that can be of value to local municipalities by 12/31/14.

- Evaluate the feasibility of effectively implementing water quality improvement projects in watersheds with Balanced Growth Plans and/or general stormwater management permits and/or plans by 12/31/14.

Goal 2.05.02 – Establish voluntary "no-mow" zones

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 five (5) local park districts to implement "no-mow" riparian zones

Objective 2.05.03 – Encourage the installation of green stormwater management systems

Objective 2.05.0(A): 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. The Green 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 in FY14 for GLRI-SWIF project funding under the Great Lakes Restoration Initiative.

- Implement a stormwater demonstration initiative in Hamilton County (Cincinnati area) during 2014 using Surface Water Improvement Funds to match Section 319(h) subgrant funding to local governments to facilitate the installation of ten (10) green stormwater demonstration projects.
- Award four (4) section 319(h) stormwater demonstration grants per year throughout the programming period and continue to award more than forty (40) Surface Water Improvement stormwater demonstration project grants during the reporting period.
- Provide grants (or contracted service) assistance for the development and implementation of two (2) green stormwater management training sessions for local stormwater management and watershed staff.
- Develop a "Regional Stormwater Demonstration Initiative" funded by a combination of Surface Water Improvement Funds and 319(h) grant funds during FY14. This initiative would be housed in a local watershed organization and be designed to assist local governments within their region with design, implementation and monitoring of green stormwater demonstration projects.

Ohio NPS Management Plan Update Section 3.0

Nonpoint Source Reduction Strategies

Strategies and Management Actions to Reduce Silt, Sediment and Nutrient Losses from Agricultural Lands

Considerable improvements are needed for on-the-ground conservation practices that specifically focus on silt, sediment and nutrient reduction and water quality protection and improvement. In addition to traditional goals such as reducing erosion, it is quickly becoming apparent that a concerted effort is needed to improve drainage water management. The increased percentage of cropland that is receiving systematic subsurface drainage is causing significant alterations to the physical integrity and hydrology of Ohio's streams and could potentially pose a contamination threat to Ohio's groundwater. Management practices that improve a stream's capacity to assimilate existing pollutant loads also are needed to round out a comprehensive strategy for reducing the impact of nutrients running of the agricultural landscape and into Ohio's rivers and streams, and ultimately our lakes.

More than 13.6 million acres in Ohio are dedicated to agricultural production. 2 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.

This section includes strategies and objectives for reducing the impacts of both nutrient and soil loss to surface waters because similar practices may reduce the impacts of both nutrients and soil loss concurrently. These strategies are consistent to those included in the Ohio Nutrient Reduction Strategy, June 28, 2013 which can be accessed at: http://epa.ohio.gov/Portals/35/wqs/ONRS_final_jun13.pdf. Key to successful implementation and realizing the full potential pollutant reduction is installing the right practice in the right place (with particular focus on critical areas), using an appropriate design. In addition, strategies to reduce nutrient loss can also have positive impacts to protect groundwater.

Sediment and nutrient losses need to be reduced from cropland sites as well as livestock operations. Following are specific examples of management practices that are recommended for reducing sediment and nutrient losses from both cropland and livestock operations:

3.01: Upland Management Strategies

Goal 3.01.01—Encourage whole farm conservation planning.

Whole farm conservation planning and 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 maximize nutrient reductions. Critical locations 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.

Goal 3.01.02—Reduce erosion and nutrient and sediment loss to surface waters.

Identify 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.*

The use of cover crops to help reduce nutrient loss from agricultural lands is once again becoming more widespread. In this photo cover crops are being aerial-seeded in Holmes County Ohio.

3. ***Cover Crops (340):*** A resurgence in the use of cover crops as a tool for managing excessive nutrients began in 2008 and has been increasing throughout the agricultural community. Ohio's nonpoint source nutrient reduction strategy encourages the planting of cover crops post-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:*** 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 physical integrity of streams throughout Ohio. *Any effort to reduce erosion and improve water quality requires a commitment to better manage the flow of this nutrient rich surface runoff and drainage water. Retention structures such as passive treatment wetlands, storm water ponds and/or other effective water retention structures are encouraged*. Several USDA-NRCS eligible best management practices that meet this need include:

   - Structure for Water Control (587)
   - Sediment Basin (500)
   - Water and Sediment Control Basin (638)
   - Constructed Wetland (656)
   - Wetland Restoration (657)
   - Wetlands Creation (658)
   - Blind Inlet (620)
   - Wetland Enhancement (659)
   - Drainage Water Management (554)
   - Filter Area (393)

Controlled drainage practices such as illustrated above provide farmers with more control over drain tiles to retain water in the tile longer. The use of these devices has been increasing through Ohio, especially in the Lake Erie watershed.

6. ***Manure and fertilizer application limited to only those 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 releases 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 to ensure plant nutrients and soil amendments are properly managed according to proper amounts, rates, locations, placement method and timing
- 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. ***Increase the retirement of marginal and highly vulnerable lands:*** Challenging economic conditions in recent years have contributed to continuing production on lands that are marginally productive and/or highly vulnerable riparian areas. With increased risk to flooding and high levels of nutrient loss the retirement of these vulnerable lands should become a priority. Land rental rates and cost-share amounts provided by USDA either through programs such as the Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP) and others typically are not competitive enough to provide a true incentive for land retirement. These programs and associated land rental rates need to be re-evaluated and updated to reflect levels that encourage and provide meaningful incentive for marginal land retirement to increase. 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).
    - Environmental Quality Improvement Program (EQIP) should be revised to allow cost-share funding for retired lands to be converted to appropriate hydraulic buffers such as riparian plantings, wetlands and/or drainage retention or filter areas.
    - Consideration to prioritize retirement of land within Wellhead Protection Areas.

3.02: Livestock Management Strategies

Goal 3.02.01—Improve manure management practices

The improper management of livestock manure and continued over application of manure on soils that are saturated with nutrients (esp. phosphorus) is a significant challenge in watersheds that have a high density of livestock. Soils in some of these types of watersheds have soil phosphorus levels that could provide adequate fertility for decades before needing additional phosphorus inputs—yet each year some of these same soils continue to receive manure applications. Effective manure management is critical if we are to see water quality improvements and/or measurable reductions in nutrient loadings to our 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

Approved USDA-NRCS best management practices when applied to strategic critical areas that may help to improve manure management include:

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

Goal 3.02.02—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 diverted from manure
- Manure and other solids should be scraped and stored under roof
- Runoff from feedlots should be diverted from waterways
- For the installation of appropriate storage to manage silage and milk house parlor wastewater
- Eliminate uncovered feeding areas

USDA-NRCS 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)

Goal 3.02.03—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
- 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)

3.03: Drainage Water Management Strategies

Goal 3.03.01—Reduce the rate and amount of runoff

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 sub-surface tiles and discharges directly into waterways without ever passing through a filter strip. There is an important need for improvements in the design and installation of edge-of-field buffers so they are more environmentally effective at reducing rate and volume of runoff and treatment. As an example, this includes installing filtering *areas* rather than strips that are 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 edge of field buffer areas
- Water control devices that retain nutrient laden waters in subsurface drain tiles
- Cover crop planting as part of a long-term conservation crop rotation
- Drainage water management devices on surface and subsurface tile drain 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)
- Discharge Ponds

Goal 3.03.02—Increase treatment of field runoff: It is neither practical nor likely that runoff from agricultural fields can be prevented or eliminated. What is more practical and encouraged is to install practices that increase passive treatment of runoff prior to its discharge into 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. Following are guidelines and recommendations for increasing the treatment of field runoff:

- Direct concentrated field runoff and drainage through 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)
- Wetlands Creation (658)
- Filter Strips/Areas (393)
- Organic Bioreactors (NRCS standards are currently being prepared)
- Saturated Buffers (MN interim standard 739)

Where infiltration practices could impact groundwater within Wellhead Protection Areas, due caution in cooperation with Ohio's drinking and groundwater program will be used to determine if the practice is advisable or not.

3.04: Riparian Management Strategies

Goal 3.04.01—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 update. 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.

Goal 3.04.02—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, important shading to the water thereby reducing algae blooms and water temperatures. USDA-Farm Service Agency (FSA) based programs such as Conservation Reserve Enhancement Program (CREP); the Conservation Reserve Program (CRP); USDA-NRCS' Environmental Quality Incentives Program (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)

Goal 3.04.03—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 the stream'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. Where eligible, 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.

Nonpoint Source Reduction Strategic Goals, Objectives and Milestones for Program Year FY14 to FY19

3.01: Upland Management Strategies

Goal 3.01.01—Encourage whole farm conservation planning.

Objective 3.01.01(A): Encourage whole farm conservation planning so that water quality related resource concerns may be prioritized for agricultural management practice (BMP) selection and implementation.

Successful implementation of this objective will be measured by:

- Provide assistance to facilitate the completion of 150 whole farm conservation (or comprehensive nutrient management) plans in Ohio's NPS priority watersheds.

Goal 3.01.02—Reduce erosion and sediment loss.

Objective 3.01.02(A): 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, ODNR and local SWCD program personnel successful implementation of this objective will be measured by:

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.

- 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 program period.

- Implement targeted nutrient reduction practices in Ohio's NPS Priority watersheds that result in nitrogen load reductions exceeding 10,000 lbs/year and phosphorus load reductions exceeding 5,000 lbs/year.

Goal 3.01.02—Reduce nutrient loss.

Objective 3.01.02(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 straight forward, it will actually be a considerable challenge. Recognizing this challenge, successful implementation of this objective will be measured by:

- Provide funding and/or encourage the successful completion of at least 100 nutrient management plans annually during the first three programming years.
- Implement "4-R's" training program in association with the ODNR's "Clean Lakes Initiative".
- NPS Program staff participation on all applicable USDA-sponsored workgroups revising NRCS Field Guide Standards for Nutrient Application, Waste Utilization, Manure Management under NRCS Standard 590—Nutrient Management, and other water quality related discussions.

Goal 3.01.03: Increase the retirement of marginal and highly vulnerable croplands.

Objective 3.01.04(A): Retire marginal and vulnerable croplands. Successful implementation will be measured by:

- Cropland acreage enrolled in USDA's CRP program in Ohio increases annually. The past two or three years, acreage coming out of CRP has exceeded the amount of new acres enrolled. This measure is designed to encourage reversing that trend.

- Work with Ohio Farm Service Agency (FSA) to discuss options for revising CRP and CREP programs to provide additional cost-share to landowners with enrolled CRP acres to allow CRP lands to be converted to appropriate hydraulic buffers such as riparian plantings, wetlands and/or drain tile retention areas.

    - To provide funding for one (1) project to demonstrate conversion of idle cropland into an effective hydraulic buffer through riparian plantings, wetlands and/or drain tile retention area.

3.02: Livestock Management Strategies

Goal 3.02.01—Improve manure management practices

Objective 3.02.01(A): Manage manure in such ways as to minimize the risk of applied manure running off cropland and into rivers and streams. Successful implementation will be measured using a variety of metrics, including:

- Working in partnership with NRCS, ODNR and local SWCDs facilitate the updating of nutrient management plans to identify critical areas where highest risk of manure loss exists.

- Provide grant funding and/or coordinate with NRCS to successfully contract for the installation of 75 waste storage facilities through EQIP, GLRI or Section 319 grant projects during the program period.

Goal 3.02.02: Effectively manage stormwater runoff from livestock production areas

Objective 3.02.02(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 for the installation of at least ten (10) heavy use pads during the five-year reporting period.
- Provide funding for the installation of five (5) milk-house parlor wastewater management systems during the program period.

Goal 3.02.03: Improve livestock grazing practices

Objective 3.02.03(A): Improve livestock grazing practices to reduce erosion and nutrient loadings into streams and other waterways. Successful implementation will be measured by achievement of the following:

- Provide financial assistant for the installation of more than 6,000 linear feet of livestock exclusion fencing/annually throughout the program 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 program period.

3.03: Drainage Water Management Strategies

Goal 3.03.01—Reduce the rate and amount of runoff

Objective 3.03.01(A): Improve edge of field infiltration and drainage water retention. Successful implementation will be measured by:

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

Goal 3.03.02—Increase passive treatment of field runoff

Objective 3.03.02(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 will be measured by:

- Provide funding for the installation of two (2) fixed bed bioreactors to provide edge of field treatment to agricultural runoff during the program period.
- Provide funding for the demonstration of soil amendments such as alum, gypsum or water treatment residuals as a nutrient reduction tool.
- Provide funding for the creation of ten (10) acres of riparian wetland drainage water treatment areas during the program period.
- Provide funding for the demonstration of blind inlets and saturated buffers on two (2) farms within the Blanchard River Watershed,

3.04: Riparian Management Strategies

Goal 3.04.01—Increase riparian wetland retention areas

Objective 3.04.01(A): To demonstrate the effective of riparian wetland retention areas as tools to mitigate the nutrient and sediment impacts of subsurface agricultural tile drainage. Successful implementation will be measured by:

- Providing funding for the installation at least one (1) agricultural tile detention wetland demonstration project during the program period.

Goal 3.04.02—Protect and restore riparian forested acres

Objective 3.04.02(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. (Please cross reference objectives under Objective 2.03.01) Successful completion will be measured by:

- Providing funding for the acquisition of conservation easements on more than fifty (50) acres of riparian wooded acres each year during the program period.
- Provide funding for the planting and restoration of fifty (50) acres of riparian areas each year during the program period.
- To increase the number of acres of riparian conservation easements and/or riparian restoration by 5% over the previous year's amount.

Goal 3.04.03—Establish voluntary "no-plow" zones in riparian areas

Objective 3.04.03(A): Demonstrate the effectiveness of voluntary "no-plow" or setback zones along riparian areas. Successful completion will be measured by:

- Increasing the number of acres being enrolled in CRP or CREP by 5% over previous year totals and enrolling more acres each year during the program period than the number of acres being taken out of CRP or CREP.

Ohio NPS Management Plan Update Section 4.0

High Quality Waters Protection Strategies

Recommended Management Practices to Protect High Quality Waters

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 rapid conversion of countryside 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.

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 also recognized that restoring impaired waters accomplishes little if it is done at the expense of allowing high quality waters to decline. 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 insure that high quality streams are being protected from decline, and where management intervention is needed, to restore degraded sections of high quality streams.

Ohio's Healthy Waters Initiative (OHWI) dates back 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 benefitted 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)
- Sandusky River
- Stillwater River and Greenville Creek

High quality water bodies are valued public resources because of their ecological and human benefits. Intact aquatic ecosystems provide substantial environmental benefits to long-term, sustainable environmental quality. The biological components of these systems act as a warning system that can indicate potential threats to human health, degradation of aesthetic values, reductions in the quality and quantity of recreational opportunities, and other ecosystem benefits or "services." Some of these other services include reliable and safe supplies of water for human consumption and industrial production, assimilation of human and other waste products, sediment transport, and the purification of both ground and surface waters. The ability of streams and rivers to provide these beneficial services and to act as environmental indicators is reduced whenever their integrity is degraded (Ohio EPA 1996).

Section 6111.12(A)(2) of the Ohio Revised Code specifically requires that the Ohio EPA establish provisions "ensuring that waters of exceptional recreational and ecological value are maintained as high quality resources for future generations." Table 1 explains the classification system to accomplish this directive. Ohio's anti-degradation rule contains 157 stream segments classified as either Outstanding State Resource Waters (OSRW) or Superior High Quality Waters (SHQW). The approximate mileage in each classification is shown in Table 1. All of Ohio's wild and scenic rivers are classified as either OSW or SHQW. The total mileage in both classifications represents less than ten percent of Ohio's principle stream mileage. Under the anti-degradation rule, a portion of the remaining assimilative capacity is reserved for any water body categorized as SHQW or OSW in order to preserve the integrity of Ohio's highest quality streams and discharge permits that would allow any lowering of water quality are subject to a higher review standard.

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.

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

4.01: Restore and Protect High Quality In-Stream Habitat

Goal 4.01.01: 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), measureable 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.

Some program and funding limitations will be 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 with minimal man-made materials and/or rocks.
- The use of rock rip-rap as a streambank stabilization technique is not permitted in state designed wild, scenic and/or recreational rivers per ODNR Director's formal policy. Rip rapping will also not be supported by any of Ohio EPA's implementation funds on all other high quality waters.
- Ohio NPS Program grant funds will be used for stream restoration work only on public lands or lands managed and/or owned by a nonprofit conservation organization that allows public access.
- 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.

Goal 4.01.02: 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.

4.02: 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 and, Ohio SWIF grants, 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 we may elect to provide SWIF funding for projects that are crucial for protecting and/or maintaining high quality conditions within a watershed.

Goal 4.02.01: Improve and expand financial support for the management and/or removal of invasive plant species in high quality watersheds.

Invasive non-native cattails can become dominate in an Ohio wetland very rapidly. Management of this species needs to be completed regularly to maintain the health of Ohio's riparian wetlands.

As part of Ohio's Healthy Waters Initiative 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, but their time may be counted as local match credited @$10/hour per volunteer. A sign in/sign out log is necessary for volunteer time to be considered for matching credits.

In riparian prairie areas, prescribed burning is a management tool for controlling invasive species. However, prescribed burns are not eligible for grant funding.

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 insure that high quality streams stay high quality streams. Virtually ALL Ohio streams need more vigorous invasive plant management.

4.03: 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. This sounds much larger than it is – a 120 foot riparian area is 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 4.03.01 – 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 will be 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 will be the fee 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 and 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 green practices, native hardwood tree and shrub 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 will be encouraged and prioritized.

Goal 4.03.02 – Increase the use of riparian and wetland 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 will be 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.

Goal 4.03.03 – 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. [5] 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. We have encouraged this through all of grants programs, including the Surface Water Improvement Fund grants that have resulted in more than $6.4 million in local grants to implement more than 60 local LID or green storm water demonstration projects. These activities continue to grow and 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.

[5] "Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices", US EPA, December 2007.

Ohio communities are expanding their use of Low Impact Development Practices as effective means to retrofit aging storm water infrastructure and improving on-site treatment of storm water. The photos above are from the Toledo School for the Arts who retrofit their parking lot with a vegetated bioswale and their building with a green roof (R).

High Quality Waters Protection and Restoration Strategic Goals, Objectives and Milestones for Program Years FY14 to FY19:

4.01: Restore and Protect High Quality In-Stream Habitat

Objective 4.01.01(A): To provide assistance to facilitate the development of Strategic Action Plans to help guide implementation activity on all Ohio's state and nationally designated rivers.

- Provide funding assistance to ODNR's Scenic Rivers Program to complete implementation plans for four (4) scenic rivers annually.

Objective 4.01.01(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 four (4) projects annually that use 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.

Objective 4.01.01(C): To fully implement 75% of all recommended NPS strategic implementation actions identified on one identified high quality water during the program period.

- Ohio EPA NPS Program staff shall prepare strategic implementation plan using approved TMDL and/or endorsed 9-element plans during 2014.
- To grant project funds to four (4) (more or less as needed) local implementers to successfully complete recommended actions identified in the Strategic Implementation Plan.

4.02: Improve Invasive Species Management

Objective 4.02.01(A): Provide assistance for the effective management and removal of invasive plant species on at least 75 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.

4.03: Increase Protection & Restoration of Riparian Zones on High Quality Waters

Objective 4.03.01(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.

- To encourage the fee-simple acquisition of more than 100 acres per year along high quality waters for a total of at least 500 acres (during program period) of riparian lands acquired fee simple by local governments, park districts or others. *Section 319 funds may not be used for land acquisition.*
- To provide financial and technical assistance for the acquisition of more than 250 acres annually or riparian areas along high quality waters protected under conservation easements.

Goal 4.03.02: Increase the regulated use of riparian areas

Objective 4.03.01(A): To provide technical (and possibly financial) assistance to facilitate the development and adoption of riparian setback codes and/or rules.

- To increase local adoption of riparian setback codes and/or rules by 5% during the programming period. This initiative will require:
    - 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, draft a model riparian ordinance (or identify a good example) for potential use by local government. (This may be an initiative best suited to be completed by ODNR's Scenic Rivers Program and/or Division of Soil & Water Resources.
- Encourage Ohio communities to require the use of Low Impact Development (LID) Practices in high all high quality watersheds where regulatory permits and oversight are being conducted by Ohio EPA or the Ohio Department of Natural Resources.
    - Encourage LID requirements in at least two (2) watersheds during the programming period.
    - Provide funding assistance for LID demonstration projects in at least two (2) watersheds during the programming period.

Ohio NPS Management Plan Update Section 5.0

State and Federal Partners

Agencies and Programs with Nonpoint Source Management Programming

Solving nonpoint source pollution problems requires a collaboration of multiple local, state and federal agencies, organizations and the general public. Working together with a common focus allows for much broader reach and for all partners to benefit. This plan is designed to help Ohio EPA's multiple programs (and other state and federal programs) dealing either directly or indirectly with nonpoint source pollution issues to work together toward common goals.

We are fortunate in Ohio to have a wide array of Nonpoint Source Management Program partners at the state and federal levels. Although participation levels vary throughout the year and with each project, each of the agencies listed below have a role to play.

US Department of Interior

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

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

Ohio Department of Agriculture

Ohio Department of Health

Ohio Environmental Protection Agency (Statutory Lead State NPS Agency)

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

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 multiple companion programs that work closely with the Nonpoint Source Program and provide valuable assistance such as the Ecological Assistance Unit who provides monitoring assistance for NPS projects, the Modeling and Assessment Unit that provides 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 with several divisions within Ohio's Department of Natural Resources such as the Division of Soil & Water Resources, Parks, Recreation and Natural Areas, Watercraft-Oho Scenic Rivers Program and the Division of Mineral Resources Management. However, Ohio EPA's Nonpoint Source Program staff does the bulk of the heavy lifting when it comes to facilitating local implementation of projects designed to help solve nonpoint source problems and/or restore impaired waters.

NPS Programming is also an effective collaboration among 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, Surface Water Improvement grants (SWIF), Great Lakes Restoration Initiative grants, and several other stand-alone programs that contribute to successfully restoring streams (and lakes) impacted by high magnitude nonpoint source causes of impairment such as hydromodification, habitat alteration, nutrients and silt/sediment.

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

Section 319(h) Grants

Ohio EPA receives an annual allocation 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 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 update.

Ohio's NPS Program supports implementation of multiple statewide water quality initiatives, most notably striving to me 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 by 2020. In turn, these goals help to strategically focus Ohio's NPS program by:

1. Aligning Section 319 grant resources directly to Ohio's water quality goals
2. Improving implementation of approved TMDL and watershed plans
3. Funding projects that eliminate impairments and restore impaired waters
4. Funding projects that demonstrate innovative practices for 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 the primary source of funding assistance for the implementation of local restoration and NPS source reduction projects. During the five year programming period from FY14 through FY19, we anticipate awarding more than 50 local section 319-funded projects totaling more than $15million. These 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
   - Stream bank stabilization, using materials other than rip-rap
   - Converting traditional drainage ditches to over-wide channels
   - Levee/dike removal or modification to reconnect streams to flood plain areas
   - Low-head dam removal and/or modification of larger dams
   - In-stream habitat restoration
   - Other projects that restore natural stream ecology, morphology and flow

2. **Riparian restoration**

- Riparian plantings using native hardwood tree and shrub species
- Riparian wetland restoration
- Invasive species management in riparian forested 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 other uses
- Replanting impacted wetland areas with native plants, tree and shrubs species
- Removal of non-native invasive species wetland areas

4. **Innovative stormwater demonstration projects**

- Retrofitting public commons or parking areas with permeable pavements.
- Installing small scale green roofs on public buildings.
- Installing bio-filtration islands and/or vegetated retention structures
- Installing "treatment trains" that use multiple BMPs to treat storm water
- Constructing storm water treatment wetlands.
- Installing rainwater harvesting and reuse systems on public buildings or facilities.
- Other practices designed to demonstrate innovative management of storm water flows.

**Section 319 grant funding will not be used for projects such as rain gardens, rain barrels or other stormwater management practices conducted on lands owned by private for-profit businesses.*

5. **Highly targeted agricultural nutrient reduction projects**

- All Section 319-funded activity must be targeted to a single HUC-12 watershed
- See Section 2.0 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
- Riparian restoration and stream bank stabilization activities
- Protecting and/or restoring riparian vernal pools and wetlands
- 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

**Section 319 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.
- Alum treatment demonstration projects designed to inactivate nutrients.
- In-stream alum dosing unit demonstration to reduce tributary nutrient loadings.
- Lake water circulators and/or other devices to reduce blue-green algae blooms.
- 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 grant funding may not be used on lakes that do not provide (and allow) ready public access.*

8. Limited scope acid mine drainage and/or abandoned mine land reclamation projects

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

9. Innovative nonpoint source and watershed restoration demonstration projects

Projects that can be shown to demonstrate 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 the majority of Ohio's319 Program activities Ohio EPA retains the opportunity to consider projects on a case by case basis when innovative practices are proposed.

Section 319(h) grant funding will limited to local units of government, park districts and public zoos, land managing state agencies and 501(c)(3) nonprofit conservation agencies with land management responsibilities, soil & 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.

Statewide SWIF Grants

Ohio's Surface Water Improvement Fund (SWIF) was established in 2009 and codified in the Ohio Revised Code in 2012. Since 2010 Ohio EPA has awarded more than $2 million in statewide SWIF funding to implement 35 local stormwater demonstration, wetland restoration and stream restoration projects. SWIF grants provide an important enhancement to Ohio's Nonpoint Source Management Program by greatly expanding the number of NPS Management projects that can be implemented as well as providing Ohio EPA considerably more flexibility in the types of projects that may be funded. The SWIF grants program also contributes to meeting Ohio's water quality goals and assisting local governments with transitioning to contemporary "green infrastructure".

SWIF grants provide important flexibility as well as a critical secondary source of additional nonpoint source project implementation funding *(second only to Section 319(h) grants).* Ohio EPA

awards ALL contributions and payments that are made into the Surface Water Improvement Fund for local implementation projects. No funds are used by Ohio EPA for administration, management or are awarded for local project implementation with no overhead, indirect or related costs. Statewide SWIF funded projects will implement the following types of restoration, stormwater management and/or other activities including:

1. Stream restoration and re-naturalization
2. Riparian restoration and protection
3. Wetland restoration and protection
4. Innovative storm water demonstration
5. Inland lake management and restoration

Pictured above is Kelsey Creek following restoration (above left) completed by the city of Cuyahoga Falls under provisions of #12SWIF-10. Above right shows general conditions of the creek prior to completion of this project.

1. **Stream restoration and re-naturalization**
   - Natural stream channel restoration where site conditions are appropriate
   - Stream bank stabilization, using materials other than rip-rap
   - Converting traditional drainage ditches to over-wide channels
   - Levee/dike removal or modification to reconnect streams to flood plain areas
   - Lowhead dam removal and/or modification of larger dams
   - In-stream habitat restoration
   - Other projects that restore natural stream ecology, morphology and flow
2. **Riparian restoration**
   - Riparian plantings using native hardwood tree and shrub species
   - Riparian wetland restoration
   - Invasive species management in riparian forested areas
   - Acquisition of riparian conservation easements on high quality streams

- Floodplain re-naturalization projects

3. **Innovative stormwater management demonstration projects**

- Retrofitting public commons or parking areas with permeable pavements.
- Installing small scale green roofs on public buildings.
- Installing bio-filtration islands and/or vegetated retention structures
- Installing "treatment trains" that use multiple BMPs to treat storm water
- Constructing storm water treatment wetlands.
- Installing rainwater harvesting and reuse systems on public buildings or facilities.
- Other practices designed to demonstrate innovative management of storm water flows.

**Surface Water Improvement Fund (SWIF) grant funding may not be used for projects such as rain gardens, rain barrels or other stormwater management practices conducted on lands owned by private for-profit businesses.*

4. **Wetland restoration**

- Restoring historical wetland areas that have been converted other uses
- Replanting impacted wetland areas with native plants, tree and shrubs species
- Removal of non-native invasive species wetland areas

5. **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
- 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

**Surface Water Improvement Fund (SWIF) grant funding may not be used for any kind of land acquisition.*

6. **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.
- Alum treatment demonstration projects designed to inactivate nutrients.
- In-stream alum dosing unit demonstration to reduce tributary nutrient loadings.
- Lake water circulators and/or other devices to reduce blue-green algae blooms.
- 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.

**Surface Water Improvement Fund (SWIF) grant funding may not be used on lakes that do not provide (and allow) ready public access.*

Statewide SWIF grants provide an important alternative to Section 391(h) grant funding. As a state sourced fund, no local match is required which provides opportunities for many Ohio communities and implementers who otherwise might not be able to participate. The Surface Water Improvement Fund Grants Program is primarily geared toward assisting local government with demonstrating green infrastructure practices such as stormwater infiltration, passive treatment systems, and urban stream and wetland restoration projects

Cuyahoga Co. GLRI-SWIF Grants

Ohio EPA has been very fortunate to apply for and receive two Great Lakes Restoration Initiative grants from the US EPA to supplement state SWIF grant funding for stormwater and other water quality projects concentrated in Cuyahoga County, Ohio. Cuyahoga County is Ohio's most populous county with more than 1.2 million residents with an aging stormwater infrastructure and highly modified urban tributaries to Lake Erie. The Cuyahoga County GLRI-SWIF grants program provides Ohio communities and local park districts with important financial assistance for stream and wetland restoration projects as well as green infrastructure retrofits.

The first Cuyahoga County GLRI-SWIF grant was awarded in FY10 and resulted in 13 different local projects being completed. The Great Lakes Restoration Initiative grant (GLRI) also allowed Ohio EPA to leverage an additional $1 million in federal funding to enhance the $1.5 million in state SWIF funds. The strong interest and program successes resulting from the FY10 Cuyahoga County GLRI-SWIF grant positioned Ohio EPA to submit a second Cuyahoga County successful GLRI grant application in FY12. The two GLRI grants (FY10 and FY12) allowed Ohio EPA to leverage and add nearly $2 million in federal funds to bolster the $3 million that was available in state SWIF funds. As a result, more than 30 stream and wetland restoration nonpoint source management, and stormwater demonstration projects will have been installed in Cuyahoga County since 2010.

Retrofitting antiquate “gray” infrastructure with “green” practices such as this pervious pavement at the city of Mayfield Heights City Hall is just one way that the GLRI-SWIF partnership helps Ohio’s local governments.

Lucas Co. Stormwater Demonstration GLRI Grant

Successful implementation of the Cleveland GLRI grants prompted Ohio's NPS Program to expand the model to Lucas County, home to Ohio's 4th largest city (Toledo) and more than 400,000 Ohioans. Like other Ohio communities, Toledo is experiencing the challenges of aging stormwater infrastructure and high modified urban streams. The Lucas County GLRI-SWIF grants provide important financial assistance to help Lucas County communities with retrofitting crumbling gray infrastructure with green demonstration practices.

Although the availability of this source of funding may be limited, it is never-the-less an important tool to begin the process of acquainting northwest Ohio communities in Lucas County to green stormwater management practices and Low Impact Development (LID) principles and practices. This $749,839 GLRI and SWIF funded initiative will result in the installation of 9 local demonstration projects using green stormwater practices.

Ohio's Inland Lakes Program

Ohio's Inland Lakes Program is designed to assess, evaluate and protect or restore our inland lakes. Ohio EPA currently has resources to monitor as many as 16 lakes per year with a priority emphasis on public drinking water supplies and heavily used recreational lakes. Our 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

The recent appearance of cyanobacteria blooms in Grand Lake St. Mary has heightened Ohioan's concerns with inland lake water quality.

Inland lakes in Ohio are heavily impacted by nonpoint sources of pollution. In many watersheds, lakes are the final repository for sediment and nutrients being carried in watershed runoff. Nutrients accumulate in lake sediments and contribute to algal blooms when sediment bound phosphorus is released and made bio-available in the lake water column.

In response to many of these concerns, Ohio's Inland Lake Program was linked with Ohio's Nonpoint Source Program in July, 2013. This move reflects Ohio's commitment to take a more assertive role in identifying nonpoint source water quality concerns in Ohio lakes and taking the action necessary to restore their beneficial uses.

Ohio's Inland Lakes Program is implemented primarily by Ohio EPA's District Office water quality staff with central office coordination occurring in the NPS program in Columbus. Water quality analysis is completed by Ohio EPA's Division of Environmental Services. An outside contracted lab is used for most phytoplankton identification and enumeration. This ongoing initiative is a part of Ohio's commitment to continue to analyze the conditions of our inland lakes and any water quality issues and concerns that may be occurring in some recreational and drinking water supply reservoirs. The Inland

Lakes Program in collaboration with the Ohio Harmful Algae Bloom Task Force also coordinates Ohio's policy and response to harmful algal blooms in recreational and drinking water supply lakes.

Following are Inland Lake Management Actions that may be funded with either Section 319(h) or SWIF grants:

- Phase 1 Diagnostic-Feasibility Clean Lakes Studies
- Lakeshore stabilization BMPs to reduce sediment loadings.
- Channel aeration to address anoxic conditions and eliminate fish kills.
- Alum treatment demonstration projects designed to inactivate nutrients.
- In-stream alum dosing unit demonstration to reduce tributary nutrient loadings.
- Lake water circulators and/or other devices to reduce blue-green algae blooms.
- Upstream fore bays 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 actual 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 and habitat conditions in Ohio's inland lakes.

Objective #IL-01: Conduct comprehensive water quality monitoring on Ohio's Inland Lakes. Successful implementation will be 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 and habitat monitoring on at least eight (8) inland lakes annually throughout the program period.
- A total of at least forty (40) inland lakes assessed during the period 2014 through 2019.
- Developing and conducting inland lake monitoring training each spring for participating district water quality staff and central office program staff to insure consistency.
- Installing and maintaining automated YSI data sondes on Grand Lake St. Mary and Buckeye Lake during the 2014 and 2015 monitoring seasons. This ongoing initiative will be evaluated for continuation following the 2015 monitoring season.
- Maintaining the www.livelakedata.com website to include water quality data collected on the YSI data sondes units in Buckeye Lake and Grand Lake St. Mary.

Goal #IL-02: Develop and implement a Buckeye Lake Restoration Project Plan

Objective #IL-02: In partnership with US EPA, Buckeye Lake State Park, Buckeye Lake for Tomorrow, and Tetratech, Ohio EPA will facilitate the completion of a Buckeye Lake Restoration Project Plan. Successful implementation will be measured by:

- Completion of a Buckeye Lake mass balance model.
- Completion of a draft Buckeye Lake Nutrient Reduction and Restoration Plan by Tetratech, Inc.
- Review and comment by ODNR, the public and others of draft Restoration Plan
- Finalization of plan and formal adoption by BLT, ODNR and Ohio EPA.
- Implementation of at least two Inland Lake Restoration projects during the programming period.

Goal #IL-03: Manage harmful algal bloom information

Objective #IL-03: In partnership with the Ohio Departments of Health and Natural Resources, to implement a responsible harmful algal bloom monitoring and advisory program. Successful implementation will be measured by:

- Conducting annual reviews of the state of Ohio's HAB response protocol by the inter-agency HAB workgroup consisting of members of the Departments of Health, Natural Resources and Environmental Protection Agency.
- Implementing a cooperative HAB response agreement throughout the 2014 recreation season (and annually thereafter) with the US Army Corps of Engineers on Corps-owned lakes where both ODNR and ACOE manage recreational and/or public visitor facilities.
- Maintaining and updating (on an ongoing basis) the Ohio HAB web page hosted by the Ohio EPA's Division of Surface Water.
- Conducting annual HAB training for Ohio State Park and Ohio EPA Division of Surface Water monitoring staff.
- Collaborating with Ohio EPA's PIC to update HAB fact sheets and other publications for widespread distribution.

Goal #IL-04: Provide financial assistance to facilitate inland lake restoration and protection

Objective #IL-04: To provide financial assistance to local implementers for inland lake management, restoration and/or protection projects. Successful implementation will be measured by:

- Implementing a small inland lake specific Request for Proposals using SWIF funding to enhance local implementation of inland lake restoration and/or protection projects.
- Providing section 319(h) funding to implement inland lakes protection/restoration projects at two (2) inland lakes during the programming period.
- Providing two (2) Surface Water Improvement Fund (SWIF) grants for the implementation of inland lake restoration and/or protection projects.
- Facilitating the implementation of at least two (2) inland lake protection projects on high quality inland lakes during the programming period.

Healthy Waters Initiative

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 enhancement to Ohio's NPS Program. Restoring impaired waterways accomplishes little if we allow our highest quality waters to decline. In response, Ohio EPA is developing a more robust Healthy Waters Initiative.

Restoring impaired waters will continue to be the core mission of Ohio's nonpoint program. However, protecting high quality will take on added significance during the next five years.

Concurrently, US EPA has been developing a Healthy Waters Initiative for the past several years. Although Ohio's HWI will achieve many of the same purposes, we are implementing our program activities based upon the findings in Ohio's approved TMDL's and endorsed watershed action plans. We also will identify high quality waters in our FY13 Integrated Report. The IR is a valuable resource that provides a status for each watershed in the state.

Ohio's Healthy Waters Initiative (OHWI) will provide the fundamental framework from which 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 OHWI may be found in Section 4.0 of this NPS Management Plan update.

The kinds of Healthy Waters projects that are likely to be funded using section 319(h) and SWIF grants 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 Program funds and 319(h) grant funding will not be used for land acquisition.*

Ohio's Watershed Program

Ohio's watershed program is in transition. Since 2000, the state of Ohio has supported the establishment of local watershed groups and the employment of local watershed coordinators. Their core mission has been to develop 9-element watershed action plans. EPA has identified nine (9) key elements that are critical for achieving improvements in water quality. Likewise, Ohio requires that these nine elements be addressed in state-endorsed watershed plans in order to be funded with incremental Clean Water Act §319 funds. Since its inception, Ohio EPA has provided 319(h) grant funding to the Ohio Department of Natural Resources to manage the Watershed Coordinator Grant Program. The results are that more than 50 state-endorsed 9-element watershed action plans have been completed. When they have been prepared consistent with TMDL studies these plans may provide an understanding of the nonpoint source problems that are plaguing a particular watershed. Watershed plans may be helpful in identifying critical areas and assist with the targeting of implementation actions.

Whether a watershed plan is prepared by a local group or by Ohio EPA as a Total Maximum Daily Load Study (TMDL), watershed based planning 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. Watershed planning provides several benefits including:

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

As previously indicated, Ohio's Watershed Program is in transition. Where once watershed planning was the critical program emphasis, after an investment of more than $4 million in 319(h) grant funds since 2001, implementing the recommended actions within watershed plans and TMDL studies is today's top priority. Implementation is second to none others. Hydromodification, habitat alteration, silt/sediments and nutrients are the highest magnitude cause of aquatic life use impairment in Ohio. Addressing these nonpoint source issues with effective projects and programs must be the focus of attention if we are to see water quality improvement statewide.

Watershed planning is an important tool for connecting resources to known problems.

Ohio's program is a model for successfully developing watershed groups and 9-element watershed action plans. We are committed to moving forward with the watershed coordinator program and are providing nearly all of the financial support for ODNR 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 watershed action plans covering 55 watersheds and conditionally endorsed plans covering 11 additional watersheds. Planning activities are being completed on 4 other watersheds. Additionally, TMDLs have been completed and approved on more than 50 large

river units. A complete listing of Ohio watersheds with completed and endorsed watershed action plans and approved TMDLs may be found in Ohio EPA's FY13 Nonpoint Source Program Annual Report.

During the next five years Ohio's Watershed Program will be focused on tracking implementation of TMDLs and endorsed watershed action plans. We also will be working closely with watershed groups and others to identify 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 we are currently evaluating for watershed plan and TMDL implementation assistance include:

- Integrating NPS load reduction targets from approved TMDL's so that the load reduction component becomes a measurable milestone that can be tracked and incorporated into Ohio's NPS Program Annual Report.
- Establishing two regional demonstration watershed support centers in which established, successful watershed groups work to provide technical assistance to surrounding communities, watershed groups and other implementers. At this time we are evaluating the feasibility of establishing demonstration watershed support centers in northeast Ohio and southeast Ohio.
- Providing financial and technical assistance to facilitate the development and implementation of Strategic Action Plans by ODNR's Scenic Rivers Coordinators to enhance the protection and restoration of Ohio's designated Scenic Rivers, which by definition are high quality waters.
- Improving implementation and removal of NPS-based beneficial use impairments in Ohio Areas of Concern. This ecosystem (watershed) based programming is conducted under Ohio EPA's Lake Erie Program housed within the Ohio Nonpoint Source Program. Ohio EPA's Lake Erie Program will be undergoing a systematic review and upgrade during the next year.
- Continued 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's Lake Erie Program

The Ohio EPA Division of Surface Water participates in several of the many Lake Erie and Great Lakes related initiatives that are being implemented by US EPA, USDA-NRCS, ODNR, USGS and other local, state and federal partners. In addition to Ohio's NPS Program there are two Lake Erie specific program areas that will play an important role moving forward in Ohio's Nonpoint Source Management Program. These include 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. All of 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 will be directly involved in facilitating the implementation of the new goals and requirements contained in this most recent agreement.

Remedial Action Plans-Areas of Concern

The Ohio Areas of Concern (AOCs) were initially 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 have become impaired due to local conditions at AOCs through development and implementation of Remedial Actions Plans (RAPs). In many ways these BUIs reflect the same general goals as represented in the Ohio water quality standards (WQS) but many have targets that differ from the WQS criteria. The BUIs include:

1. Restrictions on fish and wildlife consumption
2. Tainting of fish and wildlife flavor
3. Degradation of fish and wildlife populations
4. Fish tumors or other deformities
5. Bird or animal deformities or reproductive problems
6. Degradation of benthos
7. Restrictions on dredging
8. Eutrophication or undesirable algae
9. Restrictions on drinking water or taste and odor problems
10. Beach closings
11. Degradation of aesthetics
12. Added costs to agriculture and industry
13. Degradation of phytoplankton and zooplankton populations
14. Loss of fish and wildlife habitat.

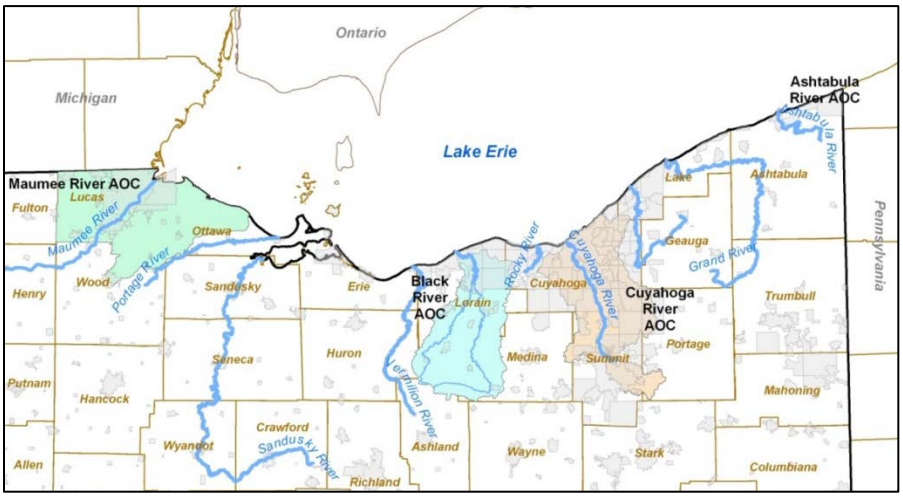
7 of the 13 beneficial use impairments (BUI's) identified are directly related to nonpoint source pollutants and/or impairments.

Efforts to restore the AOCs require an ecosystem wide and comprehensive approach including remediation and habitat restoration as well as compliance with environmental regulations. Completion of the assessments identifying the actions needed to restore that ecosystems in the AOC's has taken years and was completed with the assistance of many partners from the state, federal and local governments as well as citizens, industries, businesses, special interest groups and researchers.

Contaminated sediments resulting from previous industrial activity in Ohio's Areas of Concern are contribute to fish tumors and other deformities among bottom dwelling fish like this bullhead.

Ohio has been 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. Figure 1 displays the AOCs and major tributaries to Lake Erie.

Figure 1: Lake Erie areas of concern and major Lake Erie tributaries



Lake Erie Nearshore Monitoring

Ohio EPA initiated a *Comprehensive Lake Erie Nearshore Monitoring Program* in 2011 with the assistance of a Great Lakes Restoration Initiative (GLRI) to develop and implement a comprehensive nearshore monitoring program. This project builds on the 2010 U.S. EPA National Coastal Condition Assessment framework by adding ambient sites and additional parameters, including plankton and also focusing on harbors, bays and estuaries, as well as evaluating biological communities at various trophic levels. The three-year monitoring design will provide the baseline data needed to characterize conditions in the dynamic nearshore areas and ultimately lead to a more effective long-term monitoring design.

Lake Erie Monitoring 2013

This monitoring effort ties into Annex 2 of the GLWQA, which calls for development of nearshore monitoring to support an integrated nearshore framework. Annex 4 of the GLWQA addresses nutrients and OEPA'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, assess the effectiveness of remedial and nutrient reduction programs, measure compliance with jurisdictional regulatory programs, identify emerging problems and support implements of RAPs.

Ohio EPA's Lake Erie Program is housed within the Nonpoint Source Program due (in part) to the ongoing issues with NPS related impairments in Lake Erie during the past few years. The work plan for the Lake Erie Program is developed separately from the NPS Program since the RAP focus tends to focus more closely on legacy point source pollutants. However, there is a great deal of overlap between the work being done by the Lake Erie Program staff and NPS Program.

Lake Erie Lakewide Action and Management Plan (LAMP)

Annex 2 of the GLWQA addresses lakewide management and specifies that the Lakewide Action and Management Plans (LAMP) for each of the Great Lakes shall document and coordinate the management actions required in the Annex. Specifically, Annex 2 calls for the following management actions;

- Establishing Lake ecosystem objectives
- Assembling, assessing and reporting on existing scientific information
- Identifying research, monitoring and other priorities to support management actions
- Conducting surveys, inventories, studies and supporting outreach efforts
- Identifying additional action needed to address priority water quality threats
- Developing and implementing lake specific binational strategies
- By 2015, developing an integrated near shore framework for implementation

The Lake Erie LaMP also serves as the primary mechanism for coordinating development and implementation of lakewide habitat and species protection and conservation strategies as required in Annex 7 (Habitat and Species) of the GLWQA. The Lake Erie LaMP was originally intended to focus on reducing loadings of toxic chemical pollutants to the lake but now also includes strategies for addressing nonpoint source pollutants such as nutrients loadings and habitat alteration as well as other issues affecting water quality such as land uses, invasive species, and others. The Lake Erie LAMP is a comprehensive framework outlining the management actions needed to bring Lake Erie back to chemical, physical and biological integrity.

The Lake Erie LaMP is a comprehensive plan for restoring the chemical, physical and biological integrity of Lake Erie. Prevention of pollutants is critical as is protecting high quality wetland and other habitat along the coastal areas of the Lake.

Remedial Action Plan—AOC Program Goals, Objectives and Milestones

Goal LE#1.01: Improve state, federal and local coordination, communication and effectiveness

Objective LE#1.01(A): Develop clear guidance outlining roles, responsibilities and core missions among local RAP groups, Ohio EPA District RAP staff, and central office Ohio EPA Lake Erie staff. Successful implementation will be measured by completion of an updated Lake Erie Program Management Plan.

Objective LE#1.01(B): Review and revise current RAP Support grants so that grant reporting and administration is more efficient and effective, project activities are focused on watershed specific critical needs and RAP activities and projects are effectively leading towards delisting of BUI's.

- Develop revised local RAP capacity funding strategy for 2015 and beyond

- Increase implementation that results in environmental improvements and removes BUI's

Objective LE#1.01(C): Eliminate redundancy among OEPA Lake Erie program and other state agencies. Successful implementation will be measured by completion of a Lake Erie "Program" audit that examines and evaluates "who is doing what on Lake Erie" that is incorporated into an updated Lake Erie Program Management Plan.

Objective LE#1-01(D): Participate as agency representative on applicable US EPA AOC workgroups and other state, federal or local task forces that are convened to specifically address a critical issues identified in the Lake Erie Program's Management Plan.

Goal LE#1.02: Develop finalized Ohio Delisting Guidance and Restoration Targets for Ohio's AOC's

Objective LE#1-02(A): Develop finalized delisting guidance and restoration targets for each of Ohio's Area of Concerns. Successful implementation will be measured by the following:

- Completion of draft delisting guidance and restoration target report by 2/1/14
- Review and comments completed by US EPA and local RAP organizations by 3/1/14
- Final delisting guidance and restoration targets report submitted and approved by 4/1/14

Objective LE#1.02(B): Provide technical assistance to local RAP organizations with the development and adoption of state restoration targets as indicated in the finalized delisting guidance report.

Goal LE#1.03: Remove Beneficial Use Impairments and Delist Areas of Concern

Objective LE#1.03(A): Identify baseline status of all current BUI's against finalized revised state restoration targets and the critical project paths needed to attain restoration targets. Successful implementation will be measured by:

- Completing AOC-specific BUI baseline reports for each of Ohio's Areas of Concern during 2014
- Completing habitat restoration plans for the Cuyahoga, Black and Maumee Rivers
- Identify critical path projects and potential implementers needed for AOC restoration
- Develop timeline and funding scenarios for implementing critical paths on each AOC
- Implement monitoring and critical projects implementation tracking system
- Conduct environmental monitoring when project implementation is sufficient to delist BUI's.

Lake Erie Monitoring Program Goals, Objectives and Milestones

Goal LE#2.01: Develop and implement long-term monitoring plan for Ohio's waters of Lake Erie

Objective LE#2.01(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 will be measured by:

- Developing a clearly articulated monitoring strategy by 12/31/14 that includes processes by which monitoring priorities are identified and how data will be integrated into either lake or land management intervention and investment.
- Continue working in partnership with the Lake Erie charter boat captains in performing volunteer water quality monitoring during monitoring/fishing seasons throughout the program 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#2.01(B): Participate on related LAMP and Annex 2 workgroups developing a Lake Erie lakewide monitoring framework.

Objective LE#2.01(C): Participate in the 2014 cooperative science and monitoring initiative on Lake Erie. (Part of the 5-year rotational intensive monitoring program across the Great Lakes.

Objective LE#2.01(D): Identify lake monitoring costs and needs and obtain funding to implement the Lake Erie Long-Term Monitoring Strategy developed under Objective LE#2.01(A). Successful implementation will be measured by:

- Identifying appropriate existing and potential sources of funding Lake Erie Monitoring Strategy
- Submitting applications/proposals for funding implementation of the Lake Monitoring Strategy
- Incorporating uncovered costs in the Lake Erie program budget submittal each biennium

Goal LE#2.02: Share monitoring data in a timely manner and communicate results

Objective LE#2.02(A): Prepare a Lake Erie Program annual report and publish the document online for easy public and partner access to Lake Erie monitoring data collected during that program year. This report will also provide updates on progress made toward attaining the objectives outlined in this revised management plan. Successful implementation will be measured by:

- Completion and submittal of a Lake Erie Program annual report by September 15th each year during the program period. This report will also be included into Ohio's Nonpoint Source Program Annual Report each year.
- Participation in the Lake Erie Millennium network and other appropriate data sharing groups

Lake Erie Management Plan Goals, Objectives and Milestones

Goal 2.01: Provide leadership as an agency representative on the Lake Erie LAMP

Objective #LE3.01(A): Participate as agency representative on all LAMP workgroup conference calls and attendance at annual face-to-face meetings and workshops.

Objective #LE3.01(B): Assist with the development and production of an annual LAMP report.

Goal 2.02: Provide input and advice on Lake Erie related management efforts

Objective #LE3.02(A): Assist by providing data that is needed for the Lake Erie Quality Index which is a work product of the Lake Erie Commission.

Objective #LE3.02(B): Participate in the biannual State of the Lakes Ecosystem Conference (SOLEC).

Ohio's NPS Monitoring and Assessment Initiative

Ohio EPA conducts all effectiveness monitoring for Section 319(h) and SWIF 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. Follow-up monitoring is conducted during the third year of each project and only after the project has been completed. 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 initiative has multiple benefits beyond obvious cost-savings and improved data quality. Local project managers are happy to be relieved of monitoring responsibilities and now are able to focus more intently on successful project implementation. Another significant benefit is that Ohio EPA's biologists are much more engaged and aware of Ohio's section 319 programming efforts. NPS Program staff now routinely involves Ecological Assessment staff in the review and funding of section 319(h) subgrant applications, which enables them to advise with more accuracy the water quality improvement potential for each funded project. Their involvement also insures familiarity with the nature of a project which enables the biologists to shape their monitoring plans more appropriately.

Ohio's NPS Monitoring and Assessment Initiative has been particularly successful in both measuring Section 319 and SWIF project effectiveness, but also for integrating and engaging Ohio EPA's monitoring staff in the nonpoint source programming. This initiative has been successfully implemented for the past five monitoring seasons and has proven to be an extremely cost-effective tool for evaluating the water quality effectiveness of Ohio EPA grant-funded nonpoint source projects. Baseline subgrant project data has been collected for the FY08, FY09, FY10 and FY11 section 319 grant cycles. Follow up monitoring on select projects began with the FY11 and FY12 monitoring seasons. The Ecological Assessment Unit staff (EAU) prepares an Annual NPS Project Monitoring Report that details the results of their NPS project monitoring efforts. As a result, we have been able to identify measurable improvements in a number of streams where NPS projects were completed such as Alum Creek, Stillwater River, Middle Cuyahoga River, Big Darby Creek, the Chagrin and Olentangy Rivers and others. These annual reports are made available to the public and Ohio NPS Program partners on Ohio EPA's website.

Ohio's NPS Monitoring Initiative is also linked to Ohio's statewide water quality monitoring program due to the use of identical criteria, methodology and processes. Ohio's statewide water quality monitoring program visits watersheds on a rotational basis, collecting data, measuring water chemistry, and biological conditions. These measures are then applied to a stream's designated aquatic life use and a determination of attainment is made. A summary of Ohio's aquatic life use attainment is included in Ohio's biennial Integrated Report. The most recent Integrated Report was completed for FY12 and is currently out for public comment and stakeholder review. Section 319(h) subgrant funds are focused on those Ohio watersheds that are identified as suffering impairment in the Integrated Report.

Following is a summary of FY13 funded NPS projects and those additional projects that are scheduled to have baseline and (where appropriate) post-implementation project monitoring completed during the 2014 monitoring season:

FY13 Section 319(h) Subgrant Project Monitoring Schedule

The following summaries describe projects that have been awarded FY13 Section 319(h) or 2012 SWIF grant funding and for which pre-implementation monitoring is being conducted during the FY13 monitoring season:

City of Hillard #13(h)EPA-21: Project will restore 1125 linear feet of stream channel in Clover Groff Run in the Big Darby Creek watershed. The existing over-wide linear channel will be restored using natural channels design principles. Approximately 0.73 acres of floodplain wetland will also be created along the restored reach of stream. The site will be preserved permanently via conservation easement (5.59 acres) of which 5.2 acres will be restored with native grass, shrub and tree plantings.

City of Gahanna #13(h)EPA-19: Project will restore 1101 linear feet of highly unstable stream channel in Sycamore Run in the Rock Fork Creek watershed using natural channel design principles. Approximately 0.28 acres of floodplain wetlands will be created within the buffer area of this project. In addition, approximately 0.28 acres of floodplain wetlands will be created within the buffer area of this project. In addition, approximately 2.6 acres of native riparian tree, shrub and grass planting will be provided.

City of Willoughby #13(h)EPA-09: This project will facilitate restoration of 214 linear feet of severely eroding river bank along the Chagrin River and adjacent to the City of Willoughby's Todd Field recreational park. The restoration includes installation of four (4) bend way weirs and stream bank toe stake plantings.

City of Medina #13(h)EPA-16: Approximately 2240 linear feet of stream bank and floodplain areas on Champion Creek as it flows through the city of Medina. Additionally more than 2 acres of riparian areas will be restored by replanting with native shrubs and trees.

Clermont County Engineer #13(h)EPA-08: 600 linear feet of stream channel and more than 300 linear feet of stream bank in O'Bannon Creek will be restored using natural channel restoration techniques. In addition, 0.6 acres of riparian corridor will be replanted with native trees, shrubs and grasses.

City of Cuyahoga Falls #12SWIF-10: Project will restore and stabilize approximately 1000 linear feet of Kelsey Creek. This project is being implemented consistent with recommendations in the draft Cuyahoga River Watershed Action Plan which is currently being review for state endorsement.

Ursuline College #12SWIF-CUY-GLRI-06: An unnamed tributary to the Pepper Creek (tributary to the Chagrin River) has been negatively impacted by channelization, riparian vegetation removal and high stormwater flows. This project will restore 380 linear feet of floodplain by removing spoil piles that were placed in the stream and restore 100 linear feet of stream channel by stabilizing the eroding banks and establishing woody vegetation. This project will also construct more than 2200 square feet of bio-retention areas for stormwater management.

Each of the above listed projects will have pre-implementation baseline monitoring completed during the spring and/or summer of 2013. The project listed below will have post-implementation (follow up) monitoring completed during the 2013 monitoring season.

Cuyahoga County Board of Health #09(h)EPA-07: This project enabled the Cuyahoga County Health Department to improve the water quality and habitat conditions in a tributary to Tinkers Creek and created a living land laboratory for the Hudson School District. The stream restoration project restored more than 2000 linear feet of severely incised and unstable stream channel. The project also resulted in the rehabilitation of 4000 linear feet of stream bank and the reconnection of the stream with its natural floodplain. This project reduced sedimentation and reduced downstream flooding potential by providing storm water storage for more than 2 million gallons of runoff in the wetlands and floodplain that were improved. The project site will be protected in perpetuity as a result of the conservation easement that was placed upon the 6 acre project site.

FY14 Section 319(h) Subgrant Project Monitoring Schedule

The following summaries describe projects that have been awarded FY13 Section 319(h) or 2012 SWIF grant funding and for which pre-implementation monitoring is being conducted during the 2014 monitoring season:

City of Hilliard: FFY14 Section 319(h) grant funding is recommended to restore 1125 linear feet of stream channel in Clover Groff Run in the Big Darby Creek watershed. The existing over-wide linear channel will be restored using natural channel design principles. Approximately 0.73 acres of floodplain wetland will also be created along the restored reach of stream. The site will be preserved permanently via a conservation easement (5.59acres) of which 5.29 acres will be restored with native grass, shrub and tree plantings.

City of Gahanna: FFY14 Section 319(h) grant funding is recommended for restoring 1011 linear feet of unstable stream channel in Sycamore Run in the Rocky Fork Creek watershed using Natural Channel Design principles. Approximately 0.28 acres of floodplain wetlands will be created within buffer area of this project. In addition, approximately 2.6 acres of native riparian tree, shrub and grass plantings will be provided. This project will be preserved via transfer of 3.52 acres of conservation easement to the city of Gahanna. This project is being implemented consistent with the endorsed Rocky Fork Creek Watershed Action Plan & Inventory (January 2010) and the U.S. EPA approved (August 2005) Big Walnut Creek Watershed TMDL.

City of Willoughby: FFY14 Section 319(h) grant funding is recommended to facilitate restoration of 214 linear feet of severely eroding river bank along the Chagrin River and adjacent to the City of Willoughby's Todd Field recreational park. The restoration includes installation of four (4) bend way weirs and streambank toe stabilization. In addition, 0.24 acres of riparian corridor will be restored with wooded vegetation and live stake plantings. This project is being implemented consistent with the endorsed Chagrin River watershed action plan and approved TMDL.

City of Medina: FFY14 Section 319(h) grant funding is recommended to restore and stabilize approximately 2240 linear feet of streambank and floodplain on Champion Creek using bioengineering. In addition, 2.15 acres of riparian area will be restored by removing invasive species and replanting native grasses, trees and shrubs along Champion Creek in the Rocky River watershed. This project is

being implemented consistent with the endorsed Rocky River watershed action plan and approved TMDL.

Northeast Shores Development Corporation (NES): FFY14 Section 319(h) grant funding is recommended to assist the Waterloo Neighborhood, Northeast Shores Development Corporation (a §501-C-3 non-profit) with the installation of stormwater best management practices to demonstrate the value of green infrastructure to the community, contractors and developers. The project will take place near the Waterloo Road Streetscape at the Outdoor Theatre Parking Lot, This property is owned and maintained by the NES non-profit. Practices include the installation of 3400 square feet of pervious pavement and 1600 square of vegetated infiltration area (including trees) alongside the permeable paver parking lot. This project is being implemented consistent with the endorsed Euclid Creek watershed action plan and with the Euclid Creek TMDL which was approved by U.S. EPA in August 2005.

Clermont County Engineer: FFY14 Section 319(h) grant funding is recommended to restore approximately 600 linear feet of stream channel and stabilize 300 linear feet of streambank in O'Bannon Creek using natural channel design and bioengineering techniques. In addition 0.6 acres of riparian corridor will be replanted with native trees, shrubs, and grass. The project site will be protected via conservation easement acquisition. This project is being implemented consistent with the approved Little Miami River TMDL (approved by U.S. EPA in December 2010).

Anderson Township Park District: FFY14 Section 319(h) grant funding is recommended to assist the Anderson Township Park District with the installation of stormwater best management practices to demonstrate the value of green infrastructure to the community, contractors and developers. The project will take place at Clear Creek Park, a multi-use public park owned and operated by the Anderson Township Park District. Practices include the installation of 30,940 square feet (0.71 acres) of pervious pavers and 20,400 square feet (0.47 acres) of bio-filtration islands alongside the permeable paver parking lot. This project is being implemented consistent with the approved Little Miami River TMDL (approved by U.S. EPA in December 2010).

Mercer County Commissioners: FFY14 Section 319(h) grant funding are recommended to assist the Mercer County Commissioners with the expansion of a wetland treatment train complex at the mouth of Prairie Creek, on the south shore of Grand Lake St. Marys. An additional 21.5 acres of wetlands will be constructed and restored. This includes 0.2 acres of forebay to allow for solids deposition. Also, an alum dosing station will be installed to facilitate phosphorus removal from the incoming water. This project is being implemented consistent with recommendations in the Beaver Creek/Grand Lake Saint Marys TMDL (approved by US EPA in 2007) and the Grand lake Saint Marys/Wabash River endorsed watershed action plan.

City of Barberton: FFY14 Section 319(h) grant funding is recommended to assist to assist the City of Barberton with the installation of stormwater best management practices to demonstrate the value of green infrastructure to the community, contractors and developers. The project will take place at the Barberton City Hall. Practices include the re-grading of 1600 square yards of asphalt pavement to direct runoff into proposed of 3500 square feet of pervious pavers, including a sub-drain system to direct parking lot runoff into vegetated parking lot bio-swales (90 cubic yard capacity) for treatment and detention. This project is being implemented consistent with the approved Tuscarawas River TMDL (approved by U.S. EPA in July 2009).

Ohio EPA's Ecological Assessment and Monitoring Program

Ohio EPA's biological assessment and project effectiveness monitoring measures a combination of fish (IBI), macroinvertebrates (ICI) and habitat (QHEI) to determine whether a stream is attaining its designated aquatic life use. Our nonpoint source program is fortunate to have such reliable measures of effectiveness available for measuring the effectiveness of section 319 funded projects.

Finally, project implementation will be monitored by Ohio EPA NPS Program staff to insure completion and when verified, to calculate load reductions using the STEPL model. Strategies to reduce pollutant loads are included as components of US EPA approved Total Maximum Daily Load Studies (TMDLs) and state-endorsed 9-element watershed action plans. As a matter of course NPS pollutant load reductions for completed projects will be tracked, compiled and reported to US EPA in both the Grants Reporting and Tracking System (GRTS) and Ohio's Nonpoint Source Program Annual Report.

Nonpoint Source Monitoring Program Goals, Objectives and Milestones

Goal NPS#1.01: Conduct baseline and post construction monitoring for Ohio's Section 319 and SWIF funded nonpoint source management projects.

Objective LE#2.01(A): Identify Ohio EPA monitoring objectives and needs to fulfill monitoring and reporting responsibilities, measuring project effectiveness, and providing an annual report summarizing results for distribution to multiple state, local and federal partners. Successful implementation will be measured by:

- Preparing a 319-project Monitoring Study Plan that identifies methods and processes for determining baseline conditions for new 319-grant funded projects and for completing post-construction effectiveness monitoring on previously funded projects that are complete.
- Preparing an annual report that provides summaries of all collected water quality data conducted under this initiative by 1/31/15.
- Provide assistance to the NPS Program Staff with identifying and writing up project effectiveness summaries for submission to US EPA Region 5 under the SP-10 and SP-12 federal program measures.

Urban Waters Initiative-Partnering with Purpose

Restoring urban stream habitat and hydrology is a key priority for Ohio's Nonpoint Source Program. This project on Mill Creek in Cincinnati was completed under provisions of Section 319 grant project #09(h)EPA-15 and restored wetland habitat, stream channel and restored the floodplain to full connectivity and function.

Ohio's urban waters initiative is an ongoing commitment made by Ohio's Nonpoint Source Program to enhance and support efforts to protect and restore watersheds that are largely influenced by urbanization, unregulated stormwater runoff and other nonpoint source pollutants that are unique to Ohio's urban landscapes. Nearly every significant city in Ohio was settled along a river. Cleveland and Akron settled on the shores of the Cuyahoga River; Toledo the Maumee; Cincinnati the Ohio River; Dayton the Great Miami and Columbus the Scioto River.

These rivers also share other less desirable characteristics with one another such as hydromodification, destruction of riparian corridors, bulk-heading of river banks, and sediment and nutrients flowing into streams unabated through storm sewers. As a result both habitat loss and hydrology issues have left several of these urban rivers in need of restoration and intervention. Ohio's NPS Program operates using a well-defined hierarchy of priority. Projects that eliminate high magnitude causes of impairment or restore impaired streams are higher importance than projects simply reduce NPS without any measurable changes in aquatic life use attainment. As a result, local governments and watershed groups in urban watersheds are frequent participants in Ohio's Section 319 and Surface Water Improvement Fund (SWIF) grants programs. Several of Ohio's priority urban watersheds are listed below:

1. Middle Cuyahoga River—Dam Removal and Stream Restoration
2. Olentangy River – Dam Removal and Stream Restoration
3. Mill Creek—Habitat restoration

4. Maumee River—Nutrient Reduction projects
5. Chagrin River—Stormwater Demonstration, Stream Restoration and Dam Removals
6. Euclid Creek—Stream Restoration and Wetlands Restoration
7. Rose Run—Stream Restoration
8. Scioto River—Dam Removal and Stream Restoration
9. Clover Groff Run—Stream Restoration

Ohio's Urban Waters Initiative is a component of Ohio's NPS Management Program that is largely funded with existing resources and represents an important part of the breadth of NPS programming that is occurring in Ohio. It also is a piece of Ohio's NPS Program that will likely see growth during the next five years as we broaden our work with green infrastructure, Low Impact Development and urban stream restoration.

Urban Waters Initiative Goals, Objectives and Milestones

Goal Urban#1.01: Increase funding opportunities for NPS projects in Urban Watersheds.

Objective LE#2.01(A): Issue an Urban Waters specific Request for Proposals using available Surface Water Improvement and/or unobligated Section 319 grant funds. Successful implementation will be measured by:

- Issuing an urban-waters specific Request for Grant Proposals (RFP) for targeted nonpoint source management, restoration and/or innovative stormwater management demonstration projects.
- Awarding Surface Water Improvement Fund subgrants for the implementation of six (6) targeted urban waters projects each during 2015 and 2016.
- Linking Urban Waters programming in areas (where appropriate) that include Ohio's Areas of Concern (AOC) and leveraging funding from federal partners such as the Great Lakes National Program Office (GLNPOS), US Fish and Wildlife Service, NOAA and others for NPS management and/or habitat restoration projects in urban watersheds. *Effective implementation will be measured by successfully applying for and receiving federal grant funds for an urban nonpoint source project that will be implemented in one or more of Ohio's Areas of Concern.*