

2015
Annual
Report

Commonwealth of Pennsylvania
Nonpoint Source
MANAGEMENT PROGRAM



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION
Office of Water Resources Planning

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I. Executive Summary

Federal Fiscal Year 2015 was productive and encouraging for the Nonpoint Source Management Program in Pennsylvania. During this time the most recent update to the Nonpoint Source Management Plan was approved by our partner, the Environmental Protection Agency. With the final approval of that document, the NPS program will be able to renew its focus on the work designed to address the influx of nonpoint source pollutants across the Commonwealth. The work that went into the update of this plan allowed Pennsylvania to strengthen and re-establish ties with program partners fortifying the complex but necessary partnering web.

Federal Fiscal Year 2015 was a bridge year between publications of the Integrated Report so no new statements can be made regarding the sources of nonpoint source pollution. It is understood, as has been the case for many years, that abandoned mine drainage and agricultural run-off, coupled with poorly managed stormwater remain the largest sources of nutrients, sediments and metals into our water resource.

“...it can be stated that over 17 million pounds per year of nitrogen, 600,000 pounds per year of phosphorus, and 200,000 tons per year of sediment are no longer and will no longer damage the streams, rivers, lakes and reservoirs in Pennsylvania.”

Pennsylvania continues the work of addressing past and present day actions generating nonpoint source pollution for the purpose of improving the quality of the lakes and rivers in this Commonwealth. As a result of the on-going efforts expended in 2015 it can be stated that over 17 million pounds per year of nitrogen, 600,000 pounds per year of phosphorus, and 200,000 tons per year of sediment are no longer and will no longer damage the streams, rivers, lakes and reservoirs in Pennsylvania. Added to that is the understanding that over 19 million pounds of iron, 3 million pounds of aluminum, and 22 million pounds of acidity, on an annual basis, have also been removed or otherwise prevented from entering the waters of the Commonwealth through nonpoint source pollution remediation efforts. These significant load reductions are the result of the collaborative and earnest work of many entities at all levels of government and the private sector serving an interested and committed citizenry. Local groups such as watershed associations, many of whom are guided by Conservation District Watershed Specialists seek out viable projects, implement effective best management practices and educate Pennsylvanians both young and old. Without the care and concern of these individuals, the nonpoint source program could not be the success that it is.

“These significant load reductions are the result of the collaborative and earnest work of many entities at all levels of government and the private sector serving an interested and committed citizenry.”

Within this report, you will read of only a few of the “highlighted” programs which work to make the nonpoint source program successful. While the program number is uncouncted and choosing specific programs to highlight invariably means choosing to not highlight many other necessary and successful programs. In this year’s annual report, you will learn about the Conservation District Watershed Specialist program; a small group of locally employed individuals funded from the Commonwealth’s Growing Greener program whose mission is to organize local communities for the purpose of watershed protection and restoration. You will also learn about some of the work being done within Pennsylvania to address the assault of invasive and aggressive species on native communities. If left unchecked, these non-native species have the potential to render completely unusable the rivers and lakes of Pennsylvania; if there is any doubt regarding that statement, consider the impact a full infestation of Water Chestnut does have on a lake. Further, some discussion is provided on the work of Pennsylvania to construct or otherwise protect forest riparian buffers. Forest riparian buffers are still recognized by the scientific community as one of the most, if not the most significant BMP in terms of ability to protect and restore the surface water resource. Lastly, discussion is provided on a technical assistance program which is the result of a partnership with a non-governmental organization, the nationally recognized Trout Unlimited in association with Pennsylvania’s Growing Greener program and the West Branch Susquehanna River Restoration Coalition. This TAP program was created to provide much needed technical assistance to entities addressing mine-related pollution.

As the highlighted programs section provides information on only a few of the very many programs occurring within Pennsylvania that reduce nonpoint source pollution over the span of many years, the highlighted projects section of this annual report describes only five of hundreds of short-term projects which were either started, completed, or on-going in 2015. The five projects discussed in the 2015 Annual Report emphasize stream restoration focused on satisfaction of Watershed Implementation Plans (WIPs), but also spotlight projects designed to address impairments resulting from the agricultural and resource extraction industries. In each case, the projects selected emphasize the importance of partnering. Without effective and respectful partnering between the levels of government and with the citizens whose lives are most directly impacted by the health of the local water resource, these projects and this program would not have the impact it currently does.

As part of the 2014 update to the nonpoint source management plan, Pennsylvania’s nonpoint source management program instituted a number of qualitative and quantitative goals. Some of these goals were written to establish annual marks or program performance while others were written to establish five year objectives. This report shows that Pennsylvania is meeting over 86% of the established annual, quantitative goals. It is also shown that Pennsylvania is on track to meet 81% of the five-year quantitative objectives. These results are shown in Appendix A and Appendix B of this report.

Further, as much of the nonpoint source management program focuses on the implementation of best management practices to the satisfaction of EPA approved WIPs, it is reported in this Annual Report that significant progress is being made to fully satisfy at least six of the 36 EPA approved WIPs located in Pennsylvania. Goal 5.4 in Appendix A provides additional detail on this topic. Aside from the six WIP watersheds referenced in Goal 5.4, Longs Run, a “WIP-Watershed” was delisted as of the 2014 Integrated Report. It is anticipated that as data collection methods improve, including the continued improvement of the Grants Reporting Tracking System, increased reporting from Watershed Specialists and other program partners and the improved focused realized as a result of the revised management plan, that Pennsylvania will make additional strides in fully implementing WIPs over the next four years.

Vision Statement

Pennsylvania's Nonpoint Source Management Program is a guide to those actively involved with the protection and restoration of the water resource in Pennsylvania as that resource is impacted by nonpoint source pollution. This program is a hub, coordinating and encouraging program partners as they actively engage in watershed restoration and protection. The Nonpoint Source Management Program emphasizes partnering to most effectively address nonpoint source pollution issues impacting Pennsylvania's water resource.

Goals of the Nonpoint Source Program

Goal 1

Improve and protect the Waters of the Commonwealth from nonpoint source pollution associated with abandoned mine drainage and other energy resource extraction activities.

Goal 2

Improve and protect the Waters of the Commonwealth from nonpoint source pollution associated with agricultural activities.

Goal 3

Improve and protect the Waters of the Commonwealth from nonpoint source pollution associated with stormwater run-off, as well as streambank and shoreline degradation.

Goal 4

Verify the efficacy of Pennsylvania's nonpoint source pollution management efforts through enhanced data collection.

Goal 5

Demonstrate Pennsylvania's nonpoint source pollution management efforts through enhanced data dissemination efforts.

III. Major Accomplishments

Statewide Load Reductions

In previous years, Pennsylvania's nonpoint source management program would report on unified load reductions. The information reported would be based on best available information and would include all known sources of BMP implementation information. As the Department continues to improve collaborative efforts with program partners, additional sources of BMP implementation data are expected. Further, as data collection techniques are refined and temporal BMP implementation projects are implemented, such as a mail-based survey of landowners additional information may be included in load reduction modeling. In recent years the Department, in collaboration with Penn State University and others has obtained additional BMP implementation data. That data was used in models previously used by PSU for this report. The results of the model including recently obtained BMP data are included below.

New for FFY 2015 is the separation of modeled load reductions by BMP catalyst. Those BMPs which were constructed as a result of regulatory programs are included in row one. Many regulatory programs were considered, including the National Pollution Discharge Elimination System (NPDES) permitting program, Pennsylvania's Erosion and Sedimentation Control program, and the state's Nutrient Management Act program. Those BMPs which were implemented as a result of voluntary state and federal conservation programs, such as the Dirt, Gravel, and Low Volume Road program, Growing Greener funded projects and the like are included on a second row. The third row represents the load reductions calculated to be attributed to the implementation of conservation tillage and cover crop practices on farms statewide.

	Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)
Regulatory Programs	3,294,634	203,386	25,908.80
State and Federal Conservation Programs	1,449,633	93,514	4,512
Conservation Tillage and Cover Crop Implementation	12,495,480	305,276	255,649

The results below represent load reductions associated with statewide AMD remediation effort as determined through modeling both passive and active AMD remediation facilities. These results are also reported in Appendix A under Goal 1.9 through Goal 1.14.

	Iron (lbs/year)	Aluminum (lbs/year)	Acidity (lbs/year)
Active	1,241,365	208,050	7,791,290
Passive	16,739,588	3,071,817	14,828,452

IV. Highlighted Programs

Conservation District Watershed Specialist

The Conservation District Watershed Specialist (CDWS) Program is amongst the most productive programs in the commonwealth designed to protect and restore the health of our streams, rivers, and lakes. Watershed Specialists are individuals employed by County Conservation Districts and partially funded by DEP with Growing Greener funds. The CDWS position was created in the year 2000. The original purpose of this program was to serve watershed associations and other interested citizens who have questions or concerns regarding the health of waterbodies in their counties. The CDWS program is effective, both financially and environmentally.



The group of individuals pictured above is responsible for collectively receiving \$2.4 million in Growing Greener funds, adding to that \$1.7 million in Conservation District matching funds as well as over \$39.0 million in other grant funds for the purpose of stream restoration, soil conservation, AMD remediation, education and outreach projects implemented throughout all of Pennsylvania.

Financially, the CDWS program reduces overall operating cost to the state by reducing the cost of complaint response, permit issuance and site inspection. Those activities, as part of the Chapter 102 and Chapter 105 would be more expensive at the regional level than they are at the county level. Further, the CDWS program is cost effective for the counties which maintain a Watershed Specialist position, as the Watershed Specialist successfully obtains other grant funds (above and beyond the Growing Greener funds used to partially finance the position) those funds are introduced into local economies through the; Watershed Specialist, watershed association, school or other non-governmental organizations (NGO) actively engaged in water resource protection. This funding would go unused without an individual at the local level focused on writing and managing grant funded projects. Matching funds offered by conservation districts further enhance the cost effective nature of this resource-centric program. Suffice it to say, many groups benefit from the services provided by Watershed Specialists.

In FFY 2015, as part of the DEPs on-going effort to improve data collection from this high-impact high-output program, a partial review of program output was conducted, that review examined the most recent 18 month period of the current grant round. That review found that Departmental reimbursement issued to conservation districts equaled \$2.52 million while Districts cumulatively offered \$1.75 million in match. That's an effective match-rate of 41% greater than double the program required 20%.

Watershed Specialists have a tremendous impact on the water resources of Pennsylvania. Through BMP implementation and pollutant load reduction Watershed Specialists are extremely effective at improving their local waterways.

Between July 2014 and December 2015, as a result of the CDWS program:

- Over 6% of Pennsylvania's stream miles received some level of improvement,
- 44 acres of wetlands constructed or enhanced,
- 265 watershed associations were supported throughout PA,
- 381 buffer acres (291 non-CREP and 90 CREP) were constructed,
- 18,573 trout released,
- \$39.1 million in grant funds awarded to CDWS state-wide,
- \$1.75 million in matching funds contributions were provided by Conservation Districts,
- 1,462 rain barrels collecting an estimated 80,410 gallons of stormwater were constructed,
- 36,029 trees, shrubs, and live stakes were planted,
- 337 tons of trash were removed from our waters and watersheds,
- 37 unique environmental internship programs continued,
- 27 unique summer education programs were provided.

The results listed above reflect state-wide impact resulting from the efforts of the Watershed Specialists. The Watershed Specialists also have significant impact on the health of the Chesapeake Bay. There are 42 Watershed Specialists active in the Chesapeake Bay Watershed. Watershed Specialists in the Bay watershed can be credited with the implementing 304 acres of riparian buffer, releasing 13,944 trout into the tributaries of the Bay, installing or facilitating the installation of 1,095 rain barrels and 77 rain gardens, planting 34,076 trees, live stakes, and shrubs, removing 614,474 lbs of trash and properly disposing of 8,173 tires. Further, Watershed Specialists active in the Bay can be credited with implementing \$30.8 million in grant funded projects in the Bay watershed. Much of that funding is devoted to the implementation of BMPs. The CDWS program reports educating 71,425 students in the Bay Watershed. Lastly, the CDWS program reports there are 165 Watershed Associations or similar citizen-run NGOs actively supported in the Bay Watershed. While a complete list of CDWS activities was not available for this article, looking only at this very limited selection of CDWS activities it can't be denied that this program serves the citizens of the commonwealth well.

Since its inception, in the year 2000, the Watershed Specialist program has grown in both the number of Watershed Specialists active throughout the Commonwealth and in the duties and areas of expertise of the Watershed Specialist.

There are 67 Watershed Specialists throughout the Commonwealth, approximately one in every county. The expertise of each Watershed Specialist varies depending on the unique needs of watersheds located in those counties. Generally speaking, Watershed Specialists are skilled in areas of nonpoint source pollution abatement, water quality monitoring, education and outreach, grant writing, grant management, stream restoration, lake restoration, invasive and aggressive species abatement, and other areas. As this group of local individuals continues to collaborate and influence other local partners, the lakes, rivers, streams and wetlands throughout the Commonwealth will continue to improve.

319 Management Plan- Update Approved!

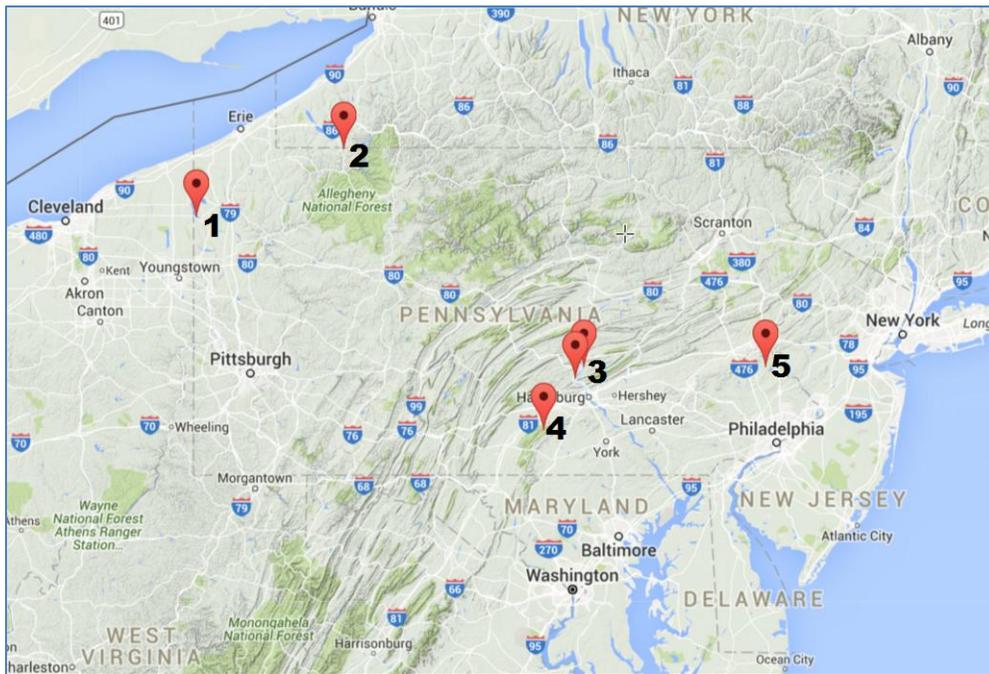
The final version of Pennsylvania's Nonpoint Source Management Plan-2014 Update (Management Plan) was published in the Pennsylvania Bulletin on November 14, 2015. The Management Plan and formal comment response document were made available to the public via the Department's eLibrary on November 13, 2015. The Management Plan represents over two years of collaborative effort between DEP, the EPA, other program partners and the general public. This Management Plan is an update to the 2008 version and represents a change in format and content mandated by recent guidance proffered by EPA. The Management Plan outlines 63 milestones which are being tracked in order to monitor incremental progress in restoring impacted water resources in the state.

Invasive Species

In 2003 the Pennsylvania Department of Agriculture (PDA) and the Department of Environmental Protection (DEP) addressed the need for statewide coordination of invasive species response and control. This was accomplished through the creation of the Governor's Invasive Species Council of Pennsylvania (PISC). The purpose of PISC is to "...minimize the harmful ecological, economic and human health impacts of invasive species through the prevention and management of their introduction, expansion and dispersal into, within and from Pennsylvania." The present PA government agencies and NGOs with voting representation in PISC are: PDA, DEP, Department of Conservation and Natural Resources (DCNR), Department of Transportation (PennDOT), Fish & Boat Commission (FBC), Game Commission (PGC), Department of Health (DOH), Pennsylvania Sea Grant, University of Pennsylvania (UPENN), The Nature Conservancy (TNC), Western Pennsylvania Conservancy (WPC), PA Lake Management Society (PALMS), PennAg Industries Association, PA Forest Products Association, PA Landscape & Nursery Association, The Pennsylvania State University (PSU), and PA Farm Bureau. Each government agency and NGO addresses invasive species topics and issues as they apply to their own unique concerns and roles while PISC serves as the umbrella entity offering harmonization and guidance to all.

An individual employed by DEP serves as the Department's representative to PISC. That individual can coordinate any intra- and inter- agency activities dealing with invasive species. Invasive species concerns are addressed by several programs within DEP. Some programs within the Department which may perform invasive species control include coastal zone management, oil and gas, and programs active in lake, stream, wetland, and riparian buffer assessments. Even Growing Greener Grant applications now have a Healthy Waters special consideration component. The Healthy Waters component addresses support for control of invasive species.

The nonpoint source program has directly supported county conservation districts with funding and/or personnel to work on several projects to survey and remove invasive species. These include efforts aimed at controlling water chestnut (*Trapa natans*) at sites in Bucks, Chester, and Warren counties. DEP has also supported program partners' efforts to survey and monitor hydrilla (*Hydrilla verticillata*) in Crawford and Luzerne counties. DEP recently completed extensive collecting of rusty crayfish (*Orconectes rusticus*) in the Susquehanna and Juniata rivers. Samples collected were used for tissue analysis to determine whether or not a need existed for human consumption advisories. Crayfish are a common food source for many citizens. Through this research it was determined that a consumption advisory was not necessary, but in the interest of ecological integrity, the FBC has since decided to regulate the capture and transport of this edible invasive.



Did you know:
 A full infestation of an invasive species such as the Water Chestnut can render a lake completely unusable as a source of food and recreation.

The map above shows the approximate locations of invasive species research and control referenced in this report. Site 1 is the location of the Pymatuning Reservoir and Black Jack Swamp, Site 2 is PA State Game Lands 282, and the two pins labeled as Site 3 represent Clemson Island in the Susquehanna River and the mouth of the Armstrong Creek. Site 4 is located in Michaux State Forest on Tom's Run and Site 5 is located in Lake Towhee.

Below are a few accounts of PISC partners working together to thwart the spread and impact of invasive species.

Water Chestnut, Lake Towhee, Bucks County

One example of water chestnut removal is the work being done at Lake Towhee, Bucks County. Seven volunteer supported hand pulling events have been coordinated by Buck County Conservation District and DEP. Known as "Paddle with a Purpose", this effort has resulted in 300 citizen volunteers donating a total of more than 2,000 hours. That time and effort lead to the removal of 30 dump truck loads (approximately 150 cubic yards) of wet plant material and seeds. Lake Towhee is owned by Bucks County and is part of the county park system. The county parks department provides a disposal site for the plants at an offsite location where the plants are composted so that neither the seeds nor the composted nutrients can contaminate the lake. The county is presently considering available options for future control of this invasive species.



A water level view of the water chestnut infestation at Lake Towhee. The public access boat launch is in the center background of the photo.

Water Chestnut, Warren County

Audubon Sanctuary, just across the Pennsylvania border in New York, and within the valley of Conewango Creek is the likely source of the water chestnut populations that have been popping up in Warren County. The discovery of water chestnut at the Audubon Sanctuary caught the attention of members in the Conewango Creek Watershed Association. Several members of the group partnering with the Warren County Conservation District acted quickly to limit the spread of this invasive species. Elsewhere in Warren County and around the same time as the Audubon Sanctuary discovery, water chestnut was found at a privately owned pond and at Akeley Swamp, a property in the care of the PGC on State Game Lands 282. The infestations at these two sites were dealt with promptly by hand weeding all plants from the sites. These were the first confirmed occurrences of water chestnut in western Pennsylvania. In a 2014 follow-up visit to Akeley Swamp only 14 water chestnut plants were found and pulled, and in 2015 an additional 25 were found and removed during two searches. In July 2015 a manageable colony of water chestnuts was found on the back channel of Mead Island in the Allegheny River. Volunteers removed all of the plants in that colony and plan to monitor the site next summer and respond as necessary.

Rusty Crayfish, Susquehanna and Juniata Rivers

In 2010 DEP began an ongoing study of rusty crayfish from two Susquehanna River sites and from several sites in Armstrong Creek, a tributary to the Susquehanna River in Dauphin County. Whole crayfish and crayfish tail meat were tested for metals. The purpose of the metal analysis was to determine the extent to which crayfish consumption might contribute metals to the fish that feed on them; a second purpose of the study was to assess the potential human health risk of crayfish consumption. Crayfish are a favored food of many commonwealth citizens. In the years since this study began, thousands of rusty crayfish have been collected from the Susquehanna River from Sunbury to Middletown with McKee's Half-Falls and the Clemson's Island area being the primary collection sites. In 2012 the study was expanded to include the Juniata River because observations indicated that many crayfish in that river were being collected by the public for human consumption. Rusty crayfish were collected at three points in the Raystown Branch of the Juniata River. Tests for

mercury showed the crayfish did not have high levels of mercury in the tail meat. During the four years of research on the Susquehanna and Juniata River, no native crayfish appeared in the collections. In 2015 the FBC banned the sale, barter, possession or transportation of the species and thereby substantially decreasing much of the collecting for consumption by the public.

White River Crayfish, Blackjack Swamp, Crawford County and Lake Towhee, Bucks County

DEP partnered with DCNR and FBC to conduct a study on the non-native White River Crayfish (*Procambarus acutus*) in and near Blackjack Swamp. Blackjack Swamp is a Natural Area of 725 acres and is part of Pymatuning State Park in Linesville, Mercer County. Specimen identification was verified by the FBC. Several adult and juvenile specimens were also given to the Tom Ridge Environmental Center (TREC) in Erie PA. They have been preserved and added to the TREC Natural History Collections. There is some concern that the White River Crayfish could be disruptive to the natural habitat since they are not native to the area. The Blackjack Swamp crayfish population appears to be well-established, as more than 100 individuals were captured and no other crayfish species was collected in the netting efforts or with three traps deployed overnight in the two-day survey. Action for 2016 is not planned at this time but future return visits to monitor the status is expected.

It is interesting to note that several White River Crayfish were also collected from Lake Towhee, Bucks County in 2014 and 2015. These individuals were fortuitous finds that occurred during the water chestnut removal work. The White River Crayfish population in Lake Towhee has not been studied, however this does appear to be a new record for the waterbody and could indicate an expansion in the range of the species.

Growing Greener - Healthy Waters, Tom's Run; Michaux State Forest, Cumberland County

The Nature Conservancy received a Growing Greener grant for work to be done on Tom's Run, an Exceptional Value native trout stream in Michaux State Forest. DEP and TNC are partnering with DCNR to put together an invasive species removal plan for the project. In addition to being of rich ecological and recreational significance, the Tom's Run site has great historical importance; it was the site of a WWII POW Camp. There are areas where Japanese Stiltgrass, Multiflora Rose, and other invasive weeds are the dominate species and they will be targeted for control as part of the proposed work. The work will continue over the next three years and should be completed in 2018.

Hydrilla, Crawford and Luzerne Counties

Hydrilla (*Hydrilla verticillata*) was recently found in Pymatuning Reservoir, Crawford County and Harvey's Lake, Luzerne County. Pymatuning Reservoir was surveyed during the summer of 2015 by boat crews from several agencies and stakeholder groups. The project is led, organized and coordinated by the Crawford County Conservation District. Hydrilla locations have been mapped for both Pymatuning Reservoir and Harvey's Lake. Planning and strategy development to contain the spread and reduce the population of hydrilla through the use of herbicides at both sites is presently underway. Field work will occur during the plants growing season is projected to take place over the next three years or more if necessary.

That invasive and aggressive species are problematic is undeniable. A full infestation of a plant such as water chestnut can render a water body completely unusable by humans for recreation, potable water, and as a food source. Infestations from other invasive and aggressive species such as rusty crayfish can result in a weakened ecosystem further impacting human use of the water resource for food and recreation. Invasive species movement is, at times a function of natural population dispersal and at times influenced by human activity. Impact from these species, as that impact does render water bodies un-usable, is a form of pollution. Dispersal of this pollutant seldom has one clearly defined source. Though not considered a traditional nonpoint source pollutant like sediment,

nutrients, and certain metals, invasive and aggressive species are, in certain ways, a biological nonpoint source pollutant, one that requires the continued diligence of the nonpoint source program partners.

Riparian Forest Buffers

Riparian forest buffers (RFBs) are essential to the protection and enhancement of water quality in Pennsylvania. Riparian Forest Buffers are complex ecosystems that provide many benefits to both stream and citizen. Riparian forest buffers help provide habitat for stream faunal communities all the while controlling point and nonpoint source pollution. Pollution control occurs by both keeping pollutants out of waterways and increasing the level of instream pollution processing.



Good to know:

DEP Guidance recommends that landowners maintain buffers at a width of 100 feet in most watersheds and 150 feet in “special protection” watersheds.

County Conservation Districts or the Department of Conservation of Natural Resources are excellent first points of contact for citizens interested in protecting their forested riparian buffers.

A forested riparian buffer as seen in the autumn months. This buffer is located in Cook Township, Westmoreland County and plays a vital role in the health of the Loyalhanna Creek Watershed.

Many peer-reviewed, published scientific studies support the statement that riparian forest buffers of sufficient width and composition are the only BMP that can do *all* of the following: reduce flooding by capturing and holding the stormwater runoff of the majority of storms on a PA site in a given year; protect streams, lakes and groundwater from sediment and other pollutants by serving as a barrier between upland activities and the water body; reduce erosion by anchoring streambanks with tree roots; provide shade that cools waters making them better habitat for trout and other aquatic animals; improve the health of the property’s stream by increasing its ability to break down pollutants on the site (or upstream of the site).

Because of the many recognized functions of riparian forest buffers, DEP encourages establishment of buffers through grant programs including Section 319 and Growing Greener. DEP also helped bring the Conservation Reserve Enhancement Program (CREP) to PA in 1999. The CREP program provides funds in the form of cost-sharing for farmers and other landowners who plant buffers from 50 feet to 180 feet in width. DEP encourages conservation easements on established riparian forest buffers through voluntary grant programs in partnership with other organizations. Finally, DEP provides technical guidance that recommends that riparian forest buffers should be a minimum of 100 feet wide in most waters and 150 feet wide in special protection waters.

Riparian Forrest Buffers:

- Reduce flooding,
- Reduce erosion,
- Reduce sedimentation,
- Reduce thermal pollution,
- Break down pollutants.

In FFY 2015 Pennsylvania's Nonpoint Source Program reported facilitating the construction of 1,035 acres of riparian forest buffer.



A lush, green forested riparian buffer located in Utica Borough and Canal Township in Venango County. This buffer is part of the French Creek Watershed.

While many programs and program partners install and maintain riparian forest buffers throughout PA, Pennsylvania's Nonpoint Source Program as a partner with EPA's 319 program has been directly responsible for the funding of the installation of nearly 100 acres of riparian buffers in "WIP watersheds" since FFY 2005. (WIP watersheds are those areas covered by EPA approved Watershed Implementation plans). A few recent examples of RFB's funded through Section 319 projects include: 1508-West Branch Antietam Creek Stream Restoration (4.1 acres), 1316-Buffalo Creek Watershed Agricultural Implementation (5.36 acres), 1214-Upper Kish WIP Implementation Phase III (4.7 acres), 1216-Mill Creek Stream Restoration (6.5 acres), 1120-Mill Creek Stream Restoration Phase III (4.47 acres). More mature examples of Section 319 funded buffer work include 2931-I Barshinger Run Renaissance Initiative (4.5 acres) and 1124- Sweitzer-Springfield Stream Restoration (4.66 acres); both the Barshinger Run project and the Sweitzer-Springfield project are reported in greater detail in this report.



With the help of \$319-funds, NPS Program partners have installed nearly 100 acres of RFB since 2005. \$319-funded projects that included an RFB include:

- West Branch Antietam: 4.1 acres
- Buffalo Creek: 5.36 acres
- Upper Kish Phase III: 4.7 acres
- Mill Creek: 6.5 acres
- Mill Creek Phase III: 4.47 acres
- Barshinger Run: 4.5 acres
- Sweitzer-Springfield: 4.66 acres

Stream restoration project in Lancaster County which includes a young RFB. Tree tubes pictured in the foreground and throughout the project site protect saplings. Over time, these trees will grow into a mature RFB.

Trout Unlimited’s AMD Technical Assistance Program

Since 2005, Trout Unlimited has been providing technical assistance through Growing Greener grants to eligible organizations in support of their ultimate goal to improve streams effected by abandoned mine drainage (AMD). Over 70 groups have taken advantage of this opportunity resulting in over 150 projects since the beginning of the program. This past year alone technical assistance was provided to 26 different groups for 41 projects. This particular assistance program was recognized with a Governor’s Award for Environmental Excellence in 2014.

Any organization interested in assistance through this program should complete the request form available on the West Branch Susquehanna River Restoration Coalition website at: <http://www.wbsrc.org/tag.html>. Applicants can choose from several services including: rapid AMD characterization, rapid AMD watershed snapshot, conceptual design of an AMD treatment system, full design and permitting (limited) for a system, biological survey, existing treatment system evaluation and recommendations, monitoring plan development, watershed restoration plan development, documentation of improving waters and technical capacity building. The cost for each service varies depending on the scope of work for each individual project. These costs are funded through the Growing Greener grant. Trout Unlimited and various other partners provide their expertise to the projects.

V. Highlighted Projects

Barshinger Creek

(Stream Restoration, \$319 Project Number 2931 I)

In 2009 the Department approved a \$211,128 grant for the restoration of a segment of Barshinger Creek near Red Lion, York County. This project occurred on a tract of land known as the Wagman Farm. While the construction of the BMPs concluded in 2013, monitoring is on-going. In December of 2015 the project consultant provided to the permitting agencies a report which represents the third year of monitoring at this location.

The initial goals of this project were to: stabilize the stream channel, reduce sediment pollution, enhance habitat for both aquatic and terrestrial species, construct wetlands and provide flood flow storage. On-going monitoring of the site indicates that the goals of this project are being met. The stream channel stabilization and sediment load reductions are occurring as intended through grade control structures, bank grading and the establishment of wetland habitat as well as upland vegetation in the riparian corridor. Live stake plantings along with other seeding encouraged this outcome. The improvement to terrestrial, wetland, and aquatic habitat is achieved through in-channel structures, grading and riparian plantings. Grading activities also provide for the increased ability of the stream channel and surrounding area to store flood water volume.

Ongoing monitoring of the site indicates that the goals of this project are being met.

As citizen run organizations such as the CCWA continue to benefit from grant funding programs such as the Section 319 Program, projects such as this one will continue to improve local communities and the streams that flow through them.



A restored section of Barshinger Creek meanders through an agricultural meadow. Fence protecting the vegetated riparian buffer is evidenced in the background. It is estimated that the work performed with this grant will result in the annual removal of 650,465 pounds of sediment from Barshinger Run.

Initially, Barshinger Creek was selected by the permittee, Codorus Creek Watershed Association (CCWA), with the understanding that Barshinger Creek is the largest source of sediment pollution to the East Branch of the Codorus Creek. As citizen run organizations such as the CCWA continue to capitalize on grant programs such as the Section 319 program, projects such as this one will continue to improve the community in which they operate.

Sweitzer-Springfield Stream Restoration (Stream Restoration, §319 Project number 1124)

Outside of Glen Rock in York County, work continued on the South Branch of the Codorus Creek. A project funded with Section 319 funds known as the Sweitzer-Springfield project resulted in the construction of Cross Rock Vanes, Log Vanes, J-Hook Rock Vanes, channel shaping and riparian buffer planting. Overall, this project resulted in the improvement of over a half-mile of stream channel.

The completion of this project represents the on-going effort of the Codorus Creek Watershed Association (CCWA) to improve the South Branch Codorus Creek. Work on this project was

performed in association with ARRC, the York County Conservation District (YCCD), DEP, FBC, and the US Army Corps of Engineers (USACOE) as well as other program partners. The total project cost was calculated to be \$180,000; of that, the consultant and program partner ARRC provided a match of \$91,577.78.

A representative from ARRC stated “The project...is a complete success as stream banks show little, if any, signs of significant erosion and have maintained stable shape after several near-bank full events...” It was further stated by ARRC that “This stabilization of the stream banks will lead to significant reductions in sediment loading to the stream, turbidity, and nonpoint source pollution.”

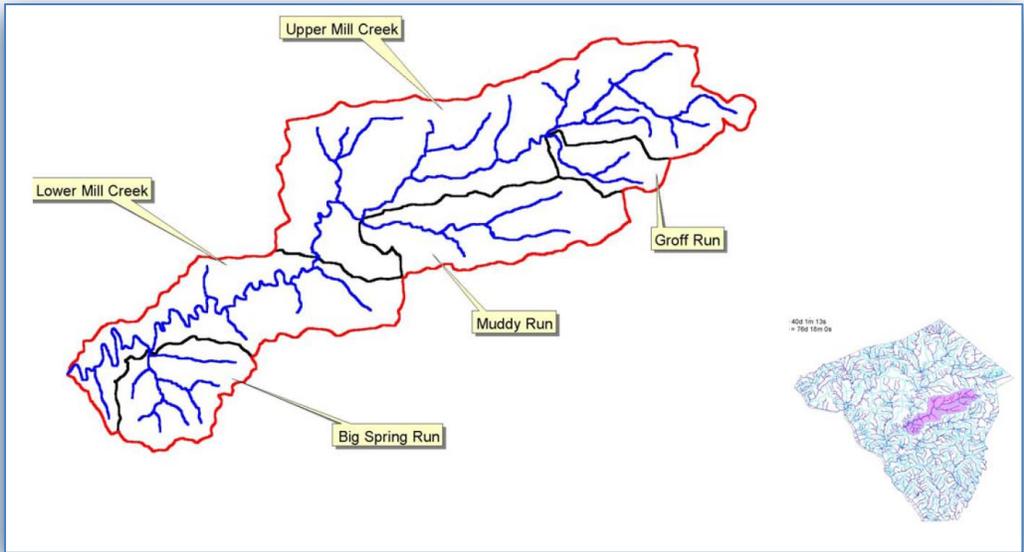
The list of BMPs constructed for this project includes:

- installation of 2 Cross Rock Vanes,
- installation of 818 feet of Toe Wood,
- installation of 6 Log Vanes,
- installation of 11 J-Hook Rock Vanes,
- installation of 2 J-Hook Log Vanes,
- 5,220 feet of bank grading/channel shaping (includes left and right bank),
- approximately 2,900 linear feet of riparian buffer planting, with a minimum width of 35 feet,
- and 1,353.84 tons of rock installed.

The installation of the above mentioned BMPs will improve the overall quality of the water that flows through this area and to other places downstream. It is estimated that the completion of this grant funded project resulted in the removal of 1,520,000 pounds of sediment that would have eventually entered the Susquehanna River and ultimately the Chesapeake Bay. Those modeled load reductions are supported by observations made in the field as part of the on-going monitoring of this project. DEP staff monitor this site for characteristics such as pebble counts (an assessment of substrate that serves as critical habitat for key species in the food web) and habitat scores (an assessment of overall physical health of the stream considering substrate, riparian vegetation, buffers and other factors). Pebble counts were taken in 2011, 2013, 2014, and 2015 and results show an increase in mid-range pebble size and a decrease in the smallest end of the size spectrum. This indicates macroinvertebrates, a key food source for trout and other fish, now have improved habitat and a greater chance at survival. Habitat scores were also calculated during those monitoring years and found to be improving.

Mill Creek IV (Stream Restoration, \$319 Project Number 1216)

The Mill Creek watershed in Lancaster County is one of the Pennsylvania’s Nonpoint Source Program's high priority watersheds for improving water quality. Mill Creek encompasses a 56 square mile drainage area, and well over half of the stream miles are impaired due to nonpoint sources of pollution. Phase IV restoration work focused on three properties in East Lampeter Township along the main stem Mill Creek. This section is impaired due to nutrients and siltation associated with Agriculture and Urban Runoff/Storm sewers, and pathogens associated with Unknown Sources. The project addresses priorities identified in the Mill Creek Watershed Restoration Plan (2005) to employ riparian buffers and stream bank stabilization practices. The project also implements the Act 167 Plan for the Mill Creek. There is no Total Maximum Daily Load (TMDL) goal for nonpoint pollution sources for the Mill Creek main stem.



Map of the Mill Creek watershed and the county location map were taken from the 2006 Mill Creek WIP prepared by the Lancaster County Conservation District.

The Mill Creek watershed covers 56.46 sq. mi. in Lancaster County. Most of the land in that area is used for to agriculture.

Since the approval of this WIP, in 2006, \$614,975 has been dedicated to restoring this creek.



Above is a photo of a well-established 100 foot buffer constructed at the Flory Park site.

Since 2009 several large stream restoration projects have been completed in the watershed, reducing nutrient and sediment loadings to Mill Creek. Phase IV started in the Winter of 2012 with a goal to restore nutrient and siltation-impaired sections of the main stem of the Mill Creek. Two project sites,

one within Flory Park and a second at the Lancaster Mennonite High School (LMHS), were proposed. From 2012 through early 2015, survey/design/permitting, construction, and educational outreach was completed. The partnership was led by the Millcreek Preservation Association (MCPA) and Lancaster County Conservation District and included both township and school property owners as well as the U.S. Fish and Wildlife Service. It worked well.

Work completed includes in-stream habitat and stabilization structures on both sites, re-graded stream banks, and restored riparian buffers. Overall, approximately 0.96 miles (5,050 feet) of stream channel were improved by bank stabilization, improved aquatic habitat, and 35-foot minimum streamside buffer areas. This project is an excellent example of stream restoration. Located in the mid-reaches of the Mill Creek, the work performed here can serve as a demonstration site. Stream bank erosion reductions are estimated to be approximately 618 tons annually. The funding for the project came in the form of a \$221,162 §319 Grant issued in FFY2012 as well as \$17,142 in local In-Kind contributions.

In addition, an existing storm water detention basin on the LMHS site was modified to provide a more functional wetland ecosystem. The Lancaster County Conservation District and the MCPA saw Phase IV as an excellent opportunity to educate citizens about water quality and how one's actions can impact local streams.

<p>Mill Creek Phase IV would not have been possible without the help of many partners, including:</p> <ul style="list-style-type: none"> • Lancaster County Conservation District • East Lampeter Township • Lancaster Mennonite High School • Mill Creek Preservation Association • US FWS • EPA • PA DEP 		<p>Best Management Practices employed as part of this project include:</p> <ul style="list-style-type: none"> • Fish habitat structures • Bank Stabilization • 35 foot (minimum width) vegetated buffer • Stormwater basin retrofit • Educational signage <p>This project produces estimated sediment load reductions of 618 tons/year!</p>
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An educational kiosk constructed at the Lancaster Mennonite Campus as part of Phase IV of the Mill Creek restoration. Kiosks such as this one will encourage future generations of citizen-landowners to practice sustainable stewardship within their communities.

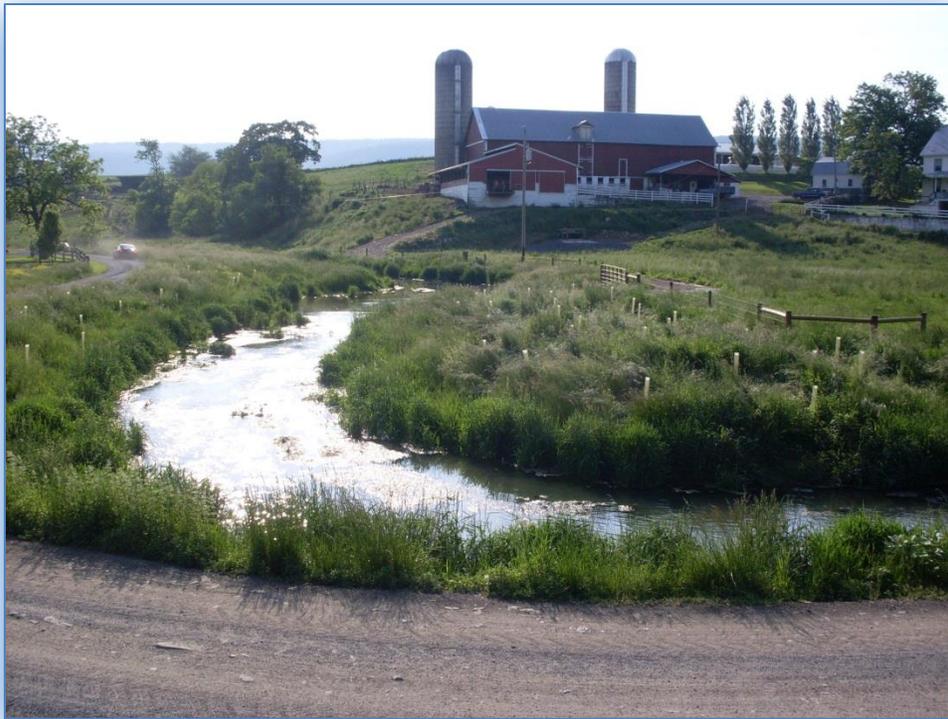
High quality kiosks and signage were installed in high visibility areas on both LMHS and Flory Park sites. Six educational panels on each kiosk were installed to tell a story. *Wading through the Wetlands*, *“Sick” Streams and Streamside Restoration*, *Lancaster County Mills and their Waterways*, *What About Water*, *Invaders!*, and *Mill Creek Preservation Association* inform the public on how responsible actions can improve local water quality. Project construction and post-construction physical monitoring were completed in the Spring of 2015.



Above is a photo of the installed cross vane structure at the Lancaster Mennonite Campus site.

The Kishacoquillas Creek Watershed (Agricultural BMP Implementation, §319 Project number 1214)

The upper reaches of the Kishacoquillas Creek (Kish Creek) watershed in Mifflin County is a high priority watershed as designated by Pennsylvania's nonpoint source management plan. The land use of the upper Kish Creek watershed is primarily agricultural. This project is the fourth Section 319 grant awarded to the Mifflin County Conservation District to address nonpoint source pollution in this watershed, and brings total Section 319 funding to \$1.402 million. This phase of the overall WIP implementation focused on farms along the main stem of the Kish Creek, the Little Kish Creek, and the Soft Run sub-basins. The project worked on priority sites to achieve goals in the upper Kish Creek Watershed Restoration Plan (WIP), completed in 2005. Streams in these areas have been significantly impaired by agricultural sources. Streams were first placed on the 303(d) list in the late 1990's and many reaches are still on Pennsylvania's 2014 Integrated Report of Impaired Waters. A Draft TMDL (2012) was established by the PA DEP and Susquehanna River Basin Commission.



The “Kish” flowing past a vegetated and fenced meadow in Mifflin County.

The vertical white posts are “tree tubes” designed to protect trees as they grow into a healthy, mature, forest riparian buffer.

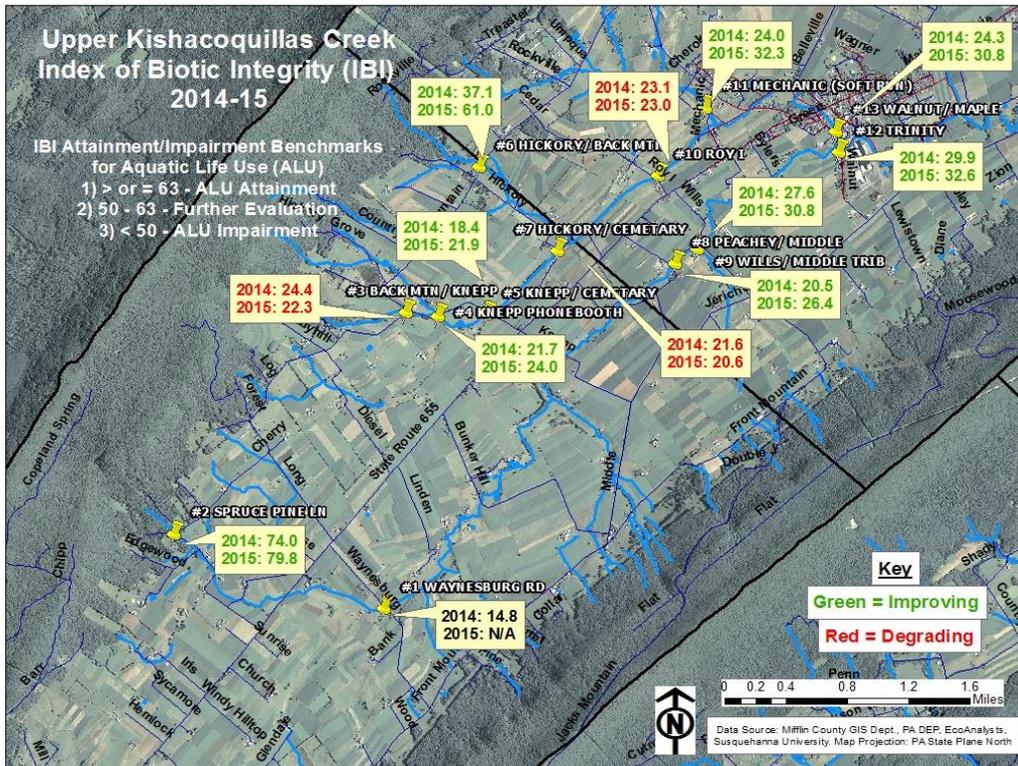
This project started in Winter 2012 and was completed in the Fall of 2015. Three of five projects in the original work plan were completed on the main stem, one in Soft Run, and one in the Little Kish Creek sub-basin. The project in the Soft Run watershed was developed in conjunction with Pennsylvania’s Agricultural Compliance Initiative. Also of note, this project included a large stream bank and channel restoration component. Four landowners in the upper Kish Creek participated. Many agricultural best management practices (BMPs) were installed to address known nutrient and sediment problems identified in the WIP. Significant progress was made in this project to achieve these goals.

Noteworthy is the fact that all farms in the work plan initiated contact with the conservation district for assistance and were willing to install required BMPs on their farms. Farmer interest and cooperation is gaining traction as the USDA-NRCS and conservation district work to improve compliance with conservation and nutrient management planning and watershed restoration. The agricultural community in this area is becoming more active and participating in conservation district led education/outreach efforts.

Work completed focused on barnyards and animal concentration areas along streams, pastures and around buildings. Animal waste storage was improved on four farms. Nutrient management plans were implemented. Riparian forest buffers were planted, stream corridors fenced, crossings installed, and water control structures installed. Approximately 85-90% of the \$455,926 project budget was used for agricultural and riparian restoration BMPs. In-Kind Match exceeded \$30,000. Over 1,300 linear feet of stream restoration was completed. The conservation districts and U.S. Fish and Wildlife Service completed survey/design/permitting and completed construction and project oversight.

Significant nitrogen, phosphorus and sediment load reductions are being achieved in the upper Kish Creek. Current modeling as reported in the Grants Reporting and Tracking System show that 2,858.8

pounds per year of phosphorus, 24,694.1 pounds per year of nitrogen and 801.7 tons per year of sediment have been reduced from this watershed since the inception of the WIP. Farmer participation has increased over the past 10-15 years and as a result water quality is improving overall. Water quality monitoring completed during 2014-15 shows improving Index of Biotic Integrity (IBI) scores on nine of thirteen monitoring sites in the upper Kish Creek watershed. Section 319 funding has and will continue to support monitoring in the upper Kish Creek. Preliminary monitoring results are shown in the Figure below.



Since work first began to fully implement the Upper Kish WIP:

Phosphorus loads have been reduced by **1,698.5 lbs/year;**

Nitrogen loads have been reduced by **18,730.1 lbs/year;**

and **Sediment** loads have been reduced by **130.1 lbs/year.**

This progress is the result of education, outreach, enforcement, and voluntary compliance.

A map showing the location of sampling points and the recent results of sampling data. Results shown in green indicate improving conditions.

Fall Brook An AMD Impaired Trib to the Tioga River

Thirteen miles of the Tioga River are polluted by abandoned mine drainage (AMD). Fall Brook is the first AMD tributary to enter that river and is listed as impaired, on List 4a, in Pennsylvania's Integrated Water Quality Monitoring and Assessment Report (the Integrated List). Fall Brook was first listed in 1996 for metals and again in 1998 for pH due to AMD. A TMDL was completed and approved by EPA in March 2001. Four AMD discharges synergistically result in the majority of the pollution problem in Fall Brook and combined produce an average of 1,022 gallons per minute of polluted water into Fall Brook.

The Tioga County Concerned Citizens Committee, Inc. (TCCCC) has been working diligently for over 15 years to try to restore the Tioga River. With grants from both Section 319 and Growing Greener the TCCCC obtained a design for an active treatment system to treat these discharges. While continuing their efforts to protect this river, the TCCCC was able to secure funding for the

construction of that active treatment system. Unfortunately, while the TCCCC was in the process of seeking funding, they were not able to secure funding for the operation and maintenance of that facility. This lack of funding for operation, maintenance, and repair (O,M,&R) stalled the project. Through an ongoing partnering effort between TCCCC and the Tioga County Conservation District (TCCD), funding was ultimately found from an unexpected partner, Southwestern Energy.



Taken at the discharge point known as "Fall Brook 099," the above photo shows a junction box where AMD polluted water is routed into drainable limestone beds.

The restoration of the Fall Brook would not have been possible without the collaborative efforts of:

- Tioga County Conservation District
- Tioga County Concerned Citizens Committee, Inc.
- Southwestern Energy
- PA DCNR
- Blossburg Municipal Authority
- Trout Unlimited
- PA DEP
- EPA

Southwestern Energy (SWN) has been in the business of energy for more than 80 years. They are the fifth largest producer of natural gas in the United States and they primarily work in natural gas and crude oil exploration, development and production. In 2012 the company started an initiative called Energy Conserving Water (ECH₂O) with the goal of water neutrality, that is, company-wide non-impact in the use of fresh water. Basically for every gallon of water used in their operations, SWN is willing to spend money to replenish the same amount through conservation and innovation.



The wier at deep mine discharge (DFB099), the largest contributor of AMD in Fall Brook. This discharge is now being treated by this passive treatment system.



The above photo shows how water flows through the drainable limestone bed (foreground) and is discharged into a polishing pond (turquoise colored background) at the Fall Brook 099 discharge.

Through Trout Unlimited's Technical Assistance Program (TAP), TCCD along with TCCCC requested an assessment of the original design for active treatment by Hedin Environmental. After looking at water quality, flow and land availability the decision was made to change the nature of the treatment system from active to passive. SWN agreed to pay for construction and to give enough funds to start a trust to pay for O,M,&R. In keeping with the spirit of partnering, DEP provided legal assistance to help set up the trust. The passive treatment system is located on state land managed by DCNR. The Blossburg Municipal Authority agreed to provide the manpower for operating and maintaining the system. The passive treatment system is currently under construction and consists of drainable limestone ponds that will greatly improve two miles of Fall Brook and also three miles of the Tioga River. The extent of AMD remediation realized from this project essentially addresses all AMD impairment from the Fall Brook discharge.

VI. The Future of NPS Management in Pennsylvania

The Department of Environmental Protection in association with the many partners engaged in nonpoint source pollution management in Pennsylvania, have made significant strides over the past decades in reducing pollutant loads, fortifying partnerships, educating citizens and improving the ways in which nonpoint source pollution is addressed. However, the work is far from complete and the commonwealth is rolling out new initiatives to address the challenges it faces.

Pennsylvania is impacted by numerous sources of nonpoint source pollution including agriculture, abandoned mine drainage (AMD), urban stormwater runoff, stream bank degradation, and lakes degradation. While local, state and federal resources are directed to address all of these sources, it is recognized that to restore degraded streams, agriculture and AMD are the two priority sources and require significant focus.

Pennsylvania addresses nonpoint source pollution in the state through a number of restoration programs particularly focusing on agriculture and AMD impacts. Programs addressing nonpoint pollution sources include the Pennsylvania Growing Greener Program, the Section 319 Program, PENNVEST's Nonpoint Source Program, the Chesapeake Bay Program, USDA-NRCS's Environmental Quality Incentives Program, the Watershed Restoration and Protection Program, the AMD Abatement Program under the Commonwealth Financing Authority, and Pennsylvania's Resource Enhancement and Protection Program. These programs alone provided over \$71.06 million dollars for nonpoint source abatement projects across Pennsylvania in fiscal year 2015 alone.

As these programs continue to provide significant funding in the years to come in support of the restoration and protection of streams, lakes and rivers throughout the state, the commonwealth is now embarking on a new comprehensive strategy to meet its obligations in improving the water quality of the Chesapeake Bay Watershed. This new plan developed jointly by the departments of Conservation and Natural Resources, Agriculture and Environmental Protection along with the State Conservation Commission will involve a mix of technical and financial assistance, technology, expanded data gathering, improved program coordination and capacity, and when necessary, stronger enforcement to achieve regulatory compliance.

The Section 319 Program targets funds to 36 high priority, restorable watersheds with approved Watershed Implementation Plans. These EPA approved WIPs detail the efforts needed to restore impaired waters in these select watersheds. The Section 319 program focus will continue to be on targeted, small scale watersheds. This program direction, of focusing support on small-scale, restorable, targeted watersheds is being incorporated into other program initiatives across the state recognizing the opportunity for success using this program model.

For Pennsylvania's nonpoint source management program to succeed, consistent and defined regulatory oversight on newly developing sites and industries is necessary. Pennsylvania intends to continue to implement regulatory programs designed to protect and maintain water quality and designated uses to minimize the potential for creating newly polluted waters.

Lastly, because of the size of Pennsylvania, the amount of the water resource to be restored or protected, and the variety of the activities in the state which can impact the water resource, effective and efficient partnering is a mandatory key-component of nonpoint source pollution control in Pennsylvania. DEP and its nonpoint source program partners will continue to look to create new and strengthen existing partnerships in order to provide for a coordinated and unified effort to control nonpoint source pollution throughout the state.



VII. Appendices

Appx. A: Goals, Objectives, and Milestones Tracking Sheet

Goal	Objective	FFY 2014	FFY2015
		<i>Actual Amount Achieved</i>	<i>Actual Amount Achieved</i>
Improve and protect the Waters of the Commonwealth from non-point source pollution associated with Acid Mine Drainage and other energy resource extraction activities.	1.1 Provide for the operation and maintenance of 46 Pennsylvania-operated AMD treatment systems each year for the next five years.	BCR is providing operation, maintenance, and repair (O,M&R) for 49 systems	BCR is providing operation, maintenance, and repair (O,M&R) for 49 systems
	1.2 Engage in land reclamation projects resulting in the reclamation of 500 acres of abandoned mine lands (AML) each year for the next five years.	626 acres	750 acres
	1.3 Provide funding and other assistance for the installation of four new AMD treatment systems annually for the next 5 years.	5 systems completed in 2014	4 systems completed in 2015
	1.4 Authorize 7 WPCAMR Quick Response projects each year for the next five years.	6 projects	3 projects
	1.5 Plug 40 oil and gas wells each year for the next five years.	51 wells	23 wells
	1.6 Through load-reduction efforts with the installation of four new AMD treatment systems, an additional 10,000 pounds of iron will be reduced from the non-point source pollutant stream each year.	6,935 lbs	62,831 lbs
	1.7 Through load-reduction efforts with the installation of four new AMD treatment systems, an additional 3,000 pounds of aluminum will be reduced from the non-point source pollutant stream each year.	11,096 lbs	12,476 lbs

	1.8 Through load-reduction efforts with the installation of four new AMD treatment systems, an additional 10,000 pounds of acidity will be reduced from the non-point source pollutant stream each year.	127,531 lbs	122,549 lbs
	1.9 Through load-reduction efforts with the current operational passive treatment systems, 1,000,000 pounds of iron will continue to be reduced from the non-point source pollutant stream each year.	16,745,455 lbs With 265 systems	16,739,588 lbs with 271 systems
	1.10 Through load-reduction efforts with the current operational passive treatment systems, 200,000pounds of aluminum will continue to be reduced from the non-point source pollutant stream each year.	3,314,314 lbs With 265 systems	3,071,817 lbs With 271 systems
	1.11 Through load-reduction efforts with the current operational passive treatment systems, 9,000,000pounds of acidity will continue to be reduced from the non-point source pollutant stream each year.	18,086,174 lbs With 265 systems	14,828,452 lbs With 271 systems
	1.12 Through load-reduction efforts with state operated active treatment systems, 750,000 pounds of iron will continue to be reduced from the non-point source pollutant stream each year.	1,369,480 lbs	1,241,365 lbs
	1.13 Through load-reduction efforts with state operated active treatment systems, 150,000 pounds of aluminum will continue to be reduced from the non-point source pollutant stream each year.	265,355 lbs	208,050 lbs
	1.14 Through load-reduction efforts with state operated active treatment systems, 6,500,000 pounds of acidity will continue to be reduced from the non-point source pollutant stream each year.	8,179,650 lbs	7,791,290 lbs

	1.15 Through load-reduction efforts with state operated active and passive treatment systems, 8 billion gallons per year (BGY) of water will be treated reducing non-point source pollutant entering waters of the commonwealth each year.	12.3 BGY	64.9 BGY
Improve and protect the Waters of the Commonwealth from Non-Point Source Pollution associated with Agricultural activities.	2.1 Implement the Targeted Watershed Initiative in 15 agriculturally impaired watersheds within the next five years.	The RAWAPI is being implemented statewide on 6 different targeted watersheds covering a total of 49 acres for the 2014-2015 state fiscal years. All farms in these watersheds are being evaluated for Ag E&S and Manure Management Planning compliance and to ensure that all water quality concerns are addressed on these farms.	See Appendix B
	2.2 Conduct inspections on 350 CAFO operations in the commonwealth within the next five years.	242 inspected operations	268 CAFO operations were inspected by DEP
	2.3 Implement BMPs on 50 agricultural operations per year using state directed funds. These BMPs will be for the mitigation of soil loss and/or wise management of nutrients.	13+ \$319 funded projects 15+ CBP funded projects 18 Growing Greener funded projects	3 \$319 funded projects 54 CBP funded projects 18 Growing Greener funded projects
	2.4 Support the review of 30 Nutrient Credit trade applications annually.	151 Trades (N and P combined) 805,000 N credits traded 85,000 P credits traded	112 Trades (N and P combined) 609,999 N credits traded 56,893 P credits traded
	2.5 Conduct 2,000 agricultural compliance outreach/education visits on farms in the Chesapeake Bay watershed each year until all farms in the Chesapeake Bay watershed have been visited.	4,272 outreach 22,000+ contacts	1,957 outreach 6,999 contacts
	2.6 Provide 6 FTEs under the PACD TAG Grant for designing and installing Ag BMPs.	9 full time engineering and technical positions	7.5 full time equivalents (FTE's) of engineering and technical staff. These FTE's are dedicated to installing NPS BMPs throughout the state, with an emphasis on Ag BMPs.

	2.7 Support a minimum of 35 Chesapeake Bay Program Agricultural Technicians and 4 Agricultural Engineers each year for the next five years.	43 ag techs 6 ag engineers in the Chesapeake Bay watershed	45.25 ag techs 7 ag engineers are funded in the Chesapeake Bay watershed
	2.8 Provide support for the implementation of five innovative environmental technology projects (focused on agriculture) within the next five years.	USDA-NRCS Conservation Innovation Grants (CIG): 2013: 5 CIG Grants 2014: 1 CIG Grant	USDA-NRCS Conservation Innovation Grants (CIG): 2015: 1 PA award 1 National award
	2.9 Support the certification of 600 certified manure haulers within the commonwealth annually.	569 certified haulers	666 certified manure haulers and brokers certified and supported over the past year
	2.10 Support the certification of 300 certified Nutrient Management Specialists within the commonwealth annually.	306 certified Specialists	299 certified Nutrient Management Specialists
	2.11 Maintain the implementation of approved Act 38 Nutrient Management Plans on 300,000 acres of farmland regulated as CAOs and CAFOs each year for the next five years.	300,000+ acres (CAO and VAO) through 2013	475,117 acres (CAO and VAO) through 2014
	2.12 Establish a baseline number of non-CAO/CAFO farmed-acres under an NMP or MMP by the end of FFY 2015 and increase that number by 5% annually.	Data for this reporting element is not currently available. Program staff continues to discuss how best to collect this information. NMP/MMP training programs for being held for farmers to develop plans. Over the past year 1,088 farms have developed MMPs under this initiative. Given that the average farm size in PA is 130 acres, this would equate to 141,000 acres reported as planned over the past year.	See Appendix B
	2.13 Continue the use of the PA One Stop program such that the number of fields entered into that system increase by 10% each year over the next five years.	60,000+ fields through 2014	80,000+ fields through 2015

<p>Improve and protect the Waters of the Commonwealth from non-point source pollution associated with stormwater run-off, as well as streambank and shoreline degradation.</p>	<p>3.1 Conduct 11,000 inspections under the Chapter 102 and Chapter 105 programs annually for the next five years.</p>	<p>12,082 inspections</p>	<p>7,849 Inspections under the 105 Program 12,853 Inspections under the 102 program</p>
	<p>3.2 Continue to implement the MS4 program through oversight and verification that MS4 communities abide by their permit requirements.</p>	<p>See program summary in text of Annual Report.</p>	<p>See Appendix B</p>
	<p>3.3 Continue to administer the Act 167 program directing counties to obtain and implement county wide stormwater management plans.</p>	<p>This past year a major Act 167 storm water plan was adopted by Chester County and some other Act 167 plans in the City of Philadelphia, Montgomery and Bucks Counties, are moving towards completion. The Northwest Regional office has gotten each of its regional counties (10) to adopt an Act 167 Storm Water Management plans.</p>	<p>See Appendix B</p>
	<p>3.4 Implement 40 new, state-funded stream restoration and/or stormwater management projects annually for the next five years.</p>	<p>30 stream restoration 18 stormwater management 4 buffer</p>	<p>22 Stream 20 Storm 1 Buffer</p>
	<p>3.5 Address 500 new Dirt, Gravel, and Low Volume (DGLV) Road sites each year for the next five years.</p>	<p>167 sites</p>	<p>246 projects \$7,420,000 total expenditure \$30,163 avg. cost/project</p>
	<p>3.6 Support using state managed funds, the completion of 15 miles of stream restoration and/or bank stabilization projects over the next five years.</p>	<p>The FFY2014 version of this appendix is a draft and considered by the DEP to be a trial run. It is the DEP's full intent to establish an annual project using a temporary work force to track the data described in Objective 3.6; that process does not yet exist.</p>	<p>3.1 miles of stream restoration resulting from Growing Greener funded projects completed in 2015.</p>
	<p>3.7 State wide, enroll and maintain 50,000 acres of new land in the CREP program over the next five years.</p>	<p>4,883.7 acres</p>	<p>626 acres Running total of: 5,509.7 acres</p>
	<p>3.8 Plant and protect 5,000 acres of riparian forest buffer for the next five years.</p>	<p>392.1 acres (Forest Riparian Buffer-CREP Program only)</p>	<p>409 acres Running total of: 801.1 acres</p>

	3.9 Through a forest land-owner stewardship program, develop 30 new plans annually which should account for 5,000 new acres of privately owned forest land each year for the next five years.	72 plans 8,500 acres	59 new forest stewardship plans 17,367 acres of privately owned forest land addressed in those plans
	3.10 Plant 10,000 new trees under the TreeVitalize program each year for the next five years.	37,818 trees	23,483 trees
	3.11 Encourage activities within US Forest Service selected priority watersheds identified under the USFS Watershed Condition Framework within the borders of the Allegheny National Forest (ANF) to the extent that these priority watersheds within the ANF are categorized as “Functioning Properly.”	See Program summary in text of Annual Report.	See Appendix B
Demonstrate the efficacy of Pennsylvania's non-point source pollution management efforts through enhanced data collection.	4.1 Establish a process to collect BMP data at the state, watershed and sub-watershed level.	Pennsylvania collects and documents BMP data from select programs such as the 319 NPS Program. Practices installed under non-included programs are not fully integrated into a statewide BMP tracking database. The NPS program in PA is working with partner programs in the state to research the development of a BMP tracking database to collect all BMP reporting data into one system. A universal BMP tracking system being designed by PSU is currently under assessment and testing.	See Appendix B
	4.2 Further develop and maintain PA One Stop to allow the NPS Program to collect the number of fields and acres planned through the use of this tool and to spatially summarize data by watershed.	PAOneStop can document # farm fields planned; 60,000+ through 2014.	80,000+ fields. Acres planned can be tracked. Data can be summarized by HUC-12 watersheds.
	4.3 Continue to develop and improve our Reclaimed Abandoned Mine Land Inventory System (RAMLIS) GIS Tool.	Version 14 completed	Version 15 completed

	4.4 Ensure that the Datashed GIS web tool adequately describes available information relating to the approximate 300 AMD Treatment Systems sites that are treating mine discharges across PA, and ensure that access to this information is available to the public.	265 systems are currently in Datashed	271 systems are currently in Datashed
	4.5 Through the implementation and maintenance of the Water Quality Network (WQN), water quality field observations and data collection will occur on 173 monitoring sites each year over the next five years.	1,114 sites	1,057 sites (macros, fish, chem) 935 sites (pathogens) 27 sites (potable) Total: 2,019
	4.6 In addition to other monitoring efforts, the DEP will monitor 20 lakes each year for the next five years.	60 Regional DEP 13 WQN lakes 2 RAWAPI lakes Total: 75 Lakes	18 Regional DEP 13 WQN lakes 23 TSI lakes 5 Conservation Dist. 5 CO DEP (Rec. Use) 20 CO DEP (Fish Tissue) Total: 84
	4.7 Through monitoring and assessment efforts conducted by DEP, 60 miles of streams previously impacted by NPS related causes shall be documented as newly delisted from Category 5 and/or Category 4a in the bi-annual Pennsylvania Integrated Water Quality and Monitoring Report.	198.6 stream miles in 2014	The Integrated Report is published bi-annually. No new information is available at this time.
	4.8 Through monitoring and assessment efforts conducted by DEP, 1,500 lake acres previously impacted by NPS related causes shall be documented as newly delisted from Category 5 or Category 4a over the next five years.	12,301.15 Lake Acres in 2014	The Integrated Report is published bi-annually. No new information is available at this time.
	4.9 Implement grant funded projects designed to determine BMP effectiveness on at least three priority watersheds.	Pennsylvania is currently working in 3 targeted watersheds under the NWQI to monitor chemical and biological stream changes relating to the BMPs implemented in these small watersheds.	See Appendix B

	4.10 Within the next five years, establish a process to input all monitoring data collected by the PA DEP NPS Program into STORET.	Pennsylvania's DEP enters monitoring data into the database known as Sample Information System (SIS). Most, but not yet all, of DEP generated assessment data is downloaded periodically from SIS into STORET. Periodically, select data stored in SIS is uploaded into STORET. While the process of systematically and completely uploading monitoring data into STORET has yet to be developed, the basic infrastructure is in place.	See Appendix B
	4.11 Through state-wide NPS pollutant load-reduction efforts, 850,000 pounds of nitrogen will be reduced from the non-point source pollutant stream each year.	2,875,854.15 lbs	17,239,747 lbs
	4.12 Through state-wide load-reduction efforts, 50,000 pounds of phosphorus will be reduced from the non-point source pollutant stream each year.	145,293.08 lbs	602,176 lbs
	4.13 Through state-wide load-reduction efforts, 15,000 tons of sediment will be reduced from the non-point source pollutant stream each year.	162.51 tons	286,070.3 tons
	4.14 Prevent waterbodies currently not listed as impaired for the aquatic life use designation from being listed as impaired for that designated use through implementation of existing regulatory programs.	See program summary in text of Annual Report.	See Appendix B.
	4.15 Establish a data collection framework by which information regarding the obtainment of nutrient and manure management plans (NMPs/MMPs) on non-CAO/non-CAFO farms is collected and counted in terms of acres covered.	This initiative is being discussed and several options are being assessed for future tracking in our NPS programs. We currently track plans developed through our planning training sessions run at the county level.	See Appendix B

	4.16 DEP will develop a process to collect and report on the amount of biosolids land applied following the water quality criteria established under DEP's Municipal Waste regulations.	Discussions are taking place between the NPS program staff and waste management program staff to determine an efficient process for collecting and reporting this data. Currently the information is not available at the statewide level.	See Appendix B
Demonstrate Pennsylvania's non-point source pollution management efforts through enhanced data dissemination efforts.	5.1 Provide a clear and concise report to the EPA, the general public, regulators, partners and others interested in Pennsylvania's NPS pollution abatement efforts outlining the major accomplishments of Pennsylvania's NPS Program consistent with EPA reporting guidelines.	See above report	See above report.
	5.2 Develop 2 success stories per year.	In FFY 2014 BCR submitted a success story specific to the work performed on Harvey's Lake, that success story is currently in draft form and under review by the EPA.	In FFY 2015 DEP submitted a success story specific to the work performed on Longs Run, that success story is currently in draft form and under review by the EPA.
	5.3 Provide detailed BMP implementation reporting on 10 approved WIPs per year.	10+ per year (2010 to present)	BMP data for 10 WIPs (4 Agricultural; 3 AMD; 3 Urban). BMP data is included in both the GRTS database and WIP Tracker Tool by project advisors as it is provided by §319 project grantees.
	5.4 Implement the identified BMPs expected to restore four sub-watersheds included within §319 approved WIPs by the end of the 2019 Federal Fiscal Year. (Achievement of this goal may be measured against full implementation of the BMPs listed in the select sub-watersheds included in the §319 approved WIPs).	30+ §319 WIPs approved; BMP implementation ongoing.	Longs Run sub-shed delisted (2014). Significant progress has been made in 6 WIPs (Hungry Run; Upper Kish Creek; Steven Foster Lake; Harvey's Lake; Hubler Run; Six Mile Run).

	<p>5.5 Fully implement the BMPs expected to restore three select watersheds supported under Pennsylvania’s Growing Greener Program’s Renaissance Initiative by the end of the 2019 Federal Fiscal Year.</p>	<p>The Growing Greener Program is currently implementing two (2) Renaissance projects to fully implement all the BMPs recognized as necessary to restore select priority stream reaches. These Initiatives are being implemented in the Birch Island Run (Cameron County) and Upper West Branch of Brandywine Creek (Chester County) watersheds. These projects are expected to be completed by October 2019. Additional Renaissance projects are expected to be submitted for funding annually, with high priority sites selected for implementation.</p>	<p>See Appendix B</p>
	<p>5.6 Document farmer compliance with erosion and sedimentation control and manure management regulations in 15 watersheds by the end of the 2019 Federal Fiscal Year.</p>	<p>This work has been initiated under the state’s new RAWAPI program. Currently all the farmers in 6 priority watersheds are being assessed and overseen to ensure E&S and Manure Management compliance.</p>	<p>See Appendix B</p>
	<p>5.7 Report semi-annually on progress on implementing the active Section 319 grant work plans ensuring status reports are current for at least 90% of the active grant projects in the GRTS database.</p>	<p>(2) SAPR / yr. completed. 90+ % current status reports goal.</p>	<p>(2) SAPR / yr. completed. 95% - 100% of the Project status reports are completed.</p>
	<p>5.8 Complete Watershed Plan Tracker (WPT) data entry by the end of 2017. DEP will continue to input current information in the WPT throughout the five year life of this Plan to ensure accuracy of data.</p>	<p>30+ active WIPs are updated in WPT to include both GRTS and non-319 project data.</p>	<p>36 WIPs approved as of 12/2015. 35 of 36 are ‘complete’ in WPT. Both §319, non-319 funded BMP data is included in WPT.</p>

Appx. B: Qualitative Goals, Objectives, and Milestones

While most of the milestones listed in Appendix A and taken from the 2014 NPS Management Plan are quantitative in nature and easily reported in tabular form, several of the milestones are more qualitative, requiring a brief discussion of the on-going effort to accomplish the stated goals and objectives. Below is a listing of and information about those qualitative milestones established in the Management Plan.

Goal 2: Improve and protect the waters of the commonwealth from nonpoint source pollution associated with agricultural activities.

Goal 2.1, The RAWAPI Initiative

The RAWAPI is being implemented statewide on 6 different targeted watersheds covering 147 farms. All farms in these watersheds have been evaluated for Ag E&S and Manure Management Planning compliance and to ensure that all water quality concerns are addressed on these farms. \$3.6 million has been allocated to these 6 watersheds to support full environmental compliance by all farms in these watersheds. The RAWAPI program is being reevaluated by the current state administration with the expectation that this agricultural compliance initiative will be revised to better address environmental concerns coming from the ag industry.

Goal 2.12, VAO baseline number

Data for this reporting element is currently being developed. Program staff continues to work with our program partners to determine how best to collect this information. NMP/MMP training programs for being held for farmers to develop plans. Over the past year an additional 420 farms have developed MMPs under this initiative, covering an additional 29,347 acres. That is an increase of 20.5% from the initial amount of acres planned under this program. Also, PA DEP has developed, with the involvement of the agricultural community, a BMP reporting process (survey) which will include the reporting of MMPs and NMPs. This new data collection process will begin in the spring of 2016.

Goal 3: Improve and protect the waters of the commonwealth from nonpoint source pollution associated with stormwater run-off, as well as streambank and shoreline degradation.

Goal 3.2, The MS4 Program

While Municipal Separate Storm Sewer System (MS4) Communities are regulated under the NPDES program and as such are technically considered point sources, much of the work designed to address pollution from MS4 communities overlaps the technology and techniques used to address other nonpoint source pollution; specifically, stormwater management in urban environments. As such, while not technically nonpoint source pollution, the work of DEP and other program partners throughout the Commonwealth warrants some mention in this NPS Annual Report. FFY2015 was an interesting year for MS4 communities. A grant was offered from EPA through DEP to MS4 communities in the Chesapeake Bay watershed to encourage the implementation of stormwater management BMPs, the permit, PAG-13 focusing on Small MS4 communities was posted for public comment and is in the process of revision and DEP began work on designation criteria for small MS4 communities. It was also noticed by the citizens of the Commonwealth and reported in a number of local papers that EPA continued its enforcement efforts of this CWA program, a push that began on or around 2010.

As the above mentioned, newly established grant program focused on Bay MS4s is still in its first year of implementation, little data is available for discussion. It can be stated that 42 applications were received by DEP and are currently undergoing a technical review and rating process. The most common types of BMPs for which funding is requested are raingardens, trees (urban planting and riparian buffers) and basin retrofits. Applications came from the southcentral, northeast and northcentral DEP regional offices. The 42 applications are now under review. It is anticipated that a recommended list of projects to be awarded will be provided for the DEP Secretary's consideration early in 2016.

Goal 3.3, The Act 167

Of the 67 counties in Pennsylvania (Philadelphia included) 28 have adopted county wide Act 167 plans and 53 have begun or otherwise adopted some level of watershed specific Act 167 planning.

Goal 3.11, USFS Watershed Condition Framework

The Allegheny National Forest (ANF) is the only national forest in Pennsylvania. The US Department of Agriculture (USDA) Forest Service manages this 512,000 acre national forest. Within that forest, the Forest Service has identified 42 watersheds and 1,500 miles of cold water streams. These streams are home to certain species of interest such as the Eastern Brook Trout, Hellbender, certain threatened or endangered mussels and others. To continue the effort to protect, maintain, reclaim and restore the water resource in this forest, the Forest Service has prepared and finalized a Watershed Restoration Action Plan for the Bear Creek watershed and anticipates finalizing a similar plan in the Sugar Run watershed. These action plans are similar to Watershed Implementation Plans (WIPs) implemented by other Section 319 program partners.

Goal 4: Verify the efficacy of Pennsylvania's nonpoint source pollution management efforts through enhanced data collection.

Goal 4.1, Statewide BMP data tracking process

Pennsylvania collects and documents BMP data from select programs such as the 319 NPS Program. Practices installed under programs not administered by the state are not currently integrated into a statewide BMP tracking database. The PA DEP is working with their partnering agencies and organizations to research the development of a BMP tracking database to collect all BMP reporting data into one system. A universal BMP tracking system being designed by PSU is currently under development. Also some private sector BMP tracking programs are being assessed. PA DEP will begin a new agricultural BMP data collection effort in the next fiscal year using a web based farm survey process.

Goal 4.9, BMP Efficacy Assessment

Pennsylvania continues its work in 3 targeted watersheds under the NWQI to monitor chemical and biological stream changes relating to the BMPs implemented in these small watersheds. Also DEP is monitoring chemical and biological stream changes in 6 additional small agricultural compliance watersheds to assess the effects of complete BMP implementation on a small watershed.

Goal 4.10, STORET

Pennsylvania's DEP enters monitoring data into the database known as Sample Information System (SIS). Periodically, select data stored in SIS is uploaded into STORET. While the process of

systematically and completely uploading monitoring data into STORET has yet to be developed, the basic infrastructure is in place.

Goal 4.14, Protection through Regulation

Protection of the water resource does not always fit neatly into a uniform category or process. The work performed by DEP and program partners to protect, maintain, reclaim, and restore the waters of the Commonwealth is a prime example of that. While some work focuses on nonpoint source pollution, other work must focus on point source pollution. And while some work focuses on collaboration and partnerships, such as the issuance of grants, education, outreach, and monitoring, some work must be performed unilaterally. One example of unilateral water resource protection is the work of regulatory enforcement.

The Department has at its disposal a number of regulatory tools with which nonpoint source pollution and other forms of pollution can be mitigated. Most notably, under the Clean Streams Law and regulations found in Title 25 of the PA Code, DEP operates a Chapter 102 Program which regulates earth disturbance and stormwater management. Further, under the Dam Safety and Encroachment Act the Department operates the Chapter 105 Program which regulates encroachments and obstructions. Under the Nutrient and Odor Management Act the State Conservation Commission operates certain aspects of the nutrient management regulations designed to better manage the amount and location of nutrients which could potentially enter and impair the water resource. These regulations and several others work in concert to protect the water resource.

	FFY 2015	FFY 2014	FFY 2013	FFY 2012	FFY 2011
NPDES General Permits (Stormwater)	1,833	2,182	1,983	1,573	1,498
NPDES Individual Permits (Stormwater)	301	298	277	292	288
Site Inspections	12,903	12,092	12,493	14,142	13,804
Complaint Response	1,794	1,784	1,995	2,330	2,279
NMPs (CAO)*		937	825	1,140	1,071
CAFOs (total in PA)	378	362	371	362	363
Volunteer Operations*		993	1,020	1,837	1,871
Chapter 105 Technical Assistance Contacts	6,815	6,823	7,404		
Total No. of GP's Issued	1,301	1,160	1,290		
Chapter 105 Complaint Response	412	363	413		
Chapter 105 Total Inspections	738	629	717		

The table above reflects regulatory activity including permit issuance and site inspection under the Chapter 102, 105 and Nutrient Management programs. These programs, either directly or indirectly, curtail nonpoint source pollution by regulating activities known to result in discharges of sediments and nutrients.

*As a result of a lag-time in reporting, activities performed during one federal fiscal year will not be available until the following year's Annual Report.

Goal 4.15, Data Collection Framework

The DEP is tracking plans developed through our planning training sessions run at the county level, acres of plans on farms importing manure from CAOs and CAFOs, and acres planned under the past DEP targeted watershed initiative. The DEP is initiating a new program to collect plan development

data using a farmer survey tool that will be administered by Penn State. Initial data collection under this new farmer survey process is expected to be completed in the summer of 2016.

Goal 4.16, Biosolid application tracking

Discussions are taking place between the NPS program staff and waste management program staff to determine an efficient process for collecting and reporting this data. Preliminary data collection has indicated that during the past 20 years, DEP has permitted approximately 1,500 sites for the land application of biosolids. There are currently more than 700 active permitted sites.

Goal 5: Demonstrate Pennsylvania's nonpoint source pollution management efforts through enhanced data dissemination efforts.

Goal 5.5, Growing Greener Renaissance Initiative

The Growing Greener Program is currently implementing three (3) Renaissance projects to fully implement all the BMPs recognized as necessary to restore select priority stream reaches. These Initiatives are being implemented in the Birch Island Run (Cameron County), the Upper West Branch of Brandywine Creek (Chester County), and Sharitz Run (Chester County) watersheds. These projects are expected to be completed by October 2019. Additional Renaissance projects are likely to be submitted for funding annually, with high priority sites selected for implementation.

Goal 5.6, Watershed wide compliance with Ag E&S Planning requirements

This work is being partially carried out under the state's past targeted watershed program. All the farmers in 6 priority watersheds have been assessed for environmental compliance and are being monitored to ensure that all non-compliance issues are fully addressed by July of 2017. The DEP will be initiating a revised agricultural compliance program in 2016 to further on the state's efforts to ensure compliance with state E&S and Manure Management regulations and to record these compliance assessments.

Appx. C: Description of Goals, Objectives, and Milestones

Pennsylvania's Nonpoint Source Pollution Management Plan relies on the water quality protection and restoration efforts of DEP and an existing, robust and effective network of agencies, non-profit entities, schools, and citizens. The NPS Management Plan, which began an update process in FFY2013 and was finalized in FFY2015, uses reasonable milestones and interactive resource management techniques to maintain designated uses where the water resource is currently unimpaired and to restore impaired waters where the water resource is damaged by NPS pollution.

This Plan establishes environmental and programmatic indicators of success. The environmental results are measured by water quality improvements, NPS pollution load reductions and other observed improvements to the biotic community. Programmatic indicators are measured by work products and productivity calculated through outcomes-tracking. This plan establishes over 40 objectives that can be quantified or measured and progress on reaching the goals established in these objectives is evaluated in this annual report. The objectives of this Plan address NPS pollution across Pennsylvania and are supportive of the goals established in the Pennsylvania Watershed Implementation Plan for the Chesapeake Bay (Bay WIP).

Quantification of certain activities, such as public education, awareness and action, is more vague and challenging; those activities are considered by Pennsylvania to be absolutely critical in the success of this plan.

Goal 1: Improve and protect the waters of the commonwealth from nonpoint source pollution associated with abandoned mine drainage (AMD) and other energy resource extraction activities.

Objectives and Strategies to meet Goal 1:

1.1 Provide for the operation and maintenance of 46 Pennsylvania-operated AMD treatment systems each year for the next five years.

A significant number of AMD treatment facilities exist within the bounds of the commonwealth. While many of these facilities are owned and operated by local government entities, NGO's and private entities the commonwealth of Pennsylvania does own and operate a significant number of such facilities. To accomplish the above stated objective, Pennsylvania will continue to own, operate and maintain these facilities. To that end, funding necessary to perform O&M will continue to be provided using the AMD Set-Aside funds. Further the necessary personnel to operate these facilities will be maintained and training will be provided to these state employees as well as to others involved with the O&M of other, non-state owned AMD treatment facilities.

1.2 Engage in land reclamation projects resulting in the reclamation of 500 acres of abandoned mine lands (AML) each year for the next five years.

Land reclamation is the best way to reduce and even permanently control AMD by preventing the formation of the contaminated water. This can remove the need for passive or active treatment. Bureau of Abandoned Mine Drainage (BAMR) uses funding from the Title IV of the Surface Mine Control and Reclamation Act of 1977 (SMCRA) to reclaim priority sites. The Bureau of District Mining Operations (BDMO) has programs to encourage active mine operators to re-mine and reclaim where possible. They do this through Government Financed Construction Contracts, Re-mining permits and Bond Forfeiture Reclamation. Growing Greener, Section 319 Nonpoint Source and CFA grants can also be used for reclamation activities.

1.3 Provide funding and other assistance for the installation of four new AMD treatment systems annually for the next 5 years.

Watershed groups, counties, municipalities, county conservation districts and other non-profit conservation minded groups can obtain funding from Growing Greener, Section 319 Nonpoint Source, CFA and PennVest to build new systems on AMD sites. The same entities can apply for SMCRA Bond forfeiture grants for sites that are defined as “ABS Legacy Sites.” If a specific project is located in a Qualified Hydrologic Unit then the entity can apply for AMD Set-Aside funds. Also the Bureau of Conservation and Restoration; Watershed Restoration Division, will use some of this funding for construction of treatment systems. Every year EPCAMR and WPCAMR provide a conference for both government and non-profits groups to exchange ideas on the best treatment options.

1.4 Authorize 7 WPCAMR Quick Response projects each year for the next five years.

WPCAMR will continue to apply for Growing Greener funds to operate the Quick Response program. They will continue to partner with other entities that can provide match funds for the projects. The Bureau of Conservation and Restoration, Division of Watershed Restoration will continue to serve as advisor to the Quick Response program.

1.5 Plug 40 oil and gas wells each year for the next five years.

Abandoned wells that do not have a responsible party to take care of them are addressed by the Well Plugging Program administered by the Office of Oil and Gas Management.

1.6 Through load-reduction efforts with the installation of four new AMD treatment systems, an additional 10,000 pounds of iron will be reduced from the non-point source pollutant stream each year.

The reduction of iron from the waters of the commonwealth is a collaborative effort from all entities engaged in the abatement of AMD. DEP in association with the Department of Interior's Office of Surface Mine Reclamation and Watershed groups, county conservation districts, conservation groups and other non-profit and for profit groups will continue to partner to remove iron as a pollutant from the water resource. Financial assistance will come from Growing Greener, Section 319 Nonpoint Source, CFA, PennVest and SMCRA funding sources. Watershed Implementation Plans, Watershed Restoration Plans, Qualified Hydrologic Unit Plans, and other plans will be followed so priorities can be addressed.

1.7 Through load-reduction efforts with the installation of four new AMD treatment systems, an additional 3,000 pounds of aluminum will be reduced from the non-point source pollutant stream each year.

The reduction of aluminum from the waters of the commonwealth is a collaborative effort from all entities engaged in the abatement of AMD. DEP in association with the Department of Interior's Office of Surface Mine Reclamation and watershed groups, county conservation districts, conservation groups and other non-profit and for profit groups will continue to partner to remove aluminum as a pollutant from the water resource. Financial assistance will come from Growing Greener, Section 319 Nonpoint Source, CFA, PennVest and SMCRA funding sources. Watershed Implementation Plans, Watershed Restoration Plans, Qualified Hydrologic Unit Plans, and other plans will be followed so priorities can be addressed.

1.8 Through load-reduction efforts with the installation of four new AMD treatment systems, an additional 10,000 pounds of acidity will be reduced from the non-point source pollutant stream each year.

The reduction of acidity from the waters of the commonwealth is a collaborative effort from all entities engaged in the abatement of AMD. DEP in association with the Department of Interior's Office of Surface Mine Reclamation and Watershed groups, county conservation districts, conservation groups and other non-profit and for profit groups will continue to partner to remove acidity as a pollutant from the water resource. Financial assistance will come from Growing Greener, Section 319 Nonpoint Source, CFA, PennVest and SMCRA funding sources. Watershed Implementation Plans, Watershed Restoration Plans, Qualified Hydrologic Unit Plans, and other plans will be followed so priorities can be addressed.

1.9 Through load-reduction efforts with the current operational passive treatment systems, 1,000,000 pounds of iron will continue to be reduced from the non-point source pollutant stream each year.

The continued reduction of iron from the waters of the commonwealth is a collaborative effort from all entities engaged in the abatement of AMD. DEP in association with the Department of Interior's Office of Surface Mine Reclamation and watershed groups, county conservation districts, conservation groups and other non-profit and for profit groups will continue to provide Operation, Maintenance and Replacement (OM&R) activities to continue to remove iron as a pollutant from the water resource. Financial assistance for OM&R will come from Growing Greener, Section 319 Nonpoint Source, CFA, PennVest, and SMCRA funding sources.

1.10 Through load-reduction efforts with the current operational passive treatment systems, 200,000 pounds of aluminum will continue to be reduced from the non-point source pollutant stream each year.

The continued reduction of aluminum from the waters of the commonwealth is a collaborative effort from all entities engaged in the abatement of AMD. DEP in association with the Department of Interior's Office of Surface Mine Reclamation and watershed groups, county conservation districts, conservation groups and other non-profit and for profit groups will continue to provide OM&R activities to continue to remove aluminum as a pollutant from the water resource. Financial assistance for OM&R will come from Growing Greener, Section 319 Nonpoint Source, CFA, PennVest, and SMCRA funding sources.

1.11 Through load-reduction efforts with the current operational passive treatment systems, 9,000,000 pounds of acidity will continue to be reduced from the non-point source pollutant stream each year.

The continued reduction of acidity from the waters of the commonwealth is a collaborative effort from all entities engaged in the abatement of AMD. DEP in association with the Department of Interior's Office of Surface Mine Reclamation and Watershed groups, county conservation districts, conservation groups and other non-profit and for profit groups will continue to provide OM&R activities to continue to remove acidity as a pollutant from the water resource. Financial assistance for OM&R will come from Growing Greener, Section 319 Nonpoint Source, CFA, PennVest, and SMCRA funding sources.

1.12 Through load-reduction efforts with state operated active treatment systems, 750,000 pounds of iron will continue to be reduced from the non-point source pollutant stream each year.

DEP's, Bureau of Conservation and Restoration, is responsible for active treatments plants that are providing the continued reduction of iron from the waters of the commonwealth. AMD Set-Aside funds will be used to provide OM&R activities to continue to remove iron as a pollutant from the water resource.

1.13 Through load-reduction efforts with state operated active treatment systems, 150,000 pounds of aluminum will continue to be reduced from the non-point source pollutant stream each year.

DEP's, Bureau of Conservation and Restoration, is responsible for active treatments plants that are providing the continued reduction of aluminum from the waters of the commonwealth. AMD Set-Aside funds will be used to provide O,M&R activities to continue to remove iron as a pollutant from the water resource.

1.14 Through load-reduction efforts with state operated active treatment systems, 6,500,000 pounds of acidity will continue to be reduced from the non-point source pollutant stream each year.

DEP's, Bureau of Conservation and Restoration, is responsible for active treatments plants that are providing the continued reduction of acidity from the waters of the commonwealth. AMD Set-Aside funds will be used to provide OM&R activities to continue to remove acidity as a pollutant from the water resource.

1.15 Through load-reduction efforts with state operated active and passive treatment systems, 8 billion gallons per year (BGY) of water will be treated reducing non-point source pollutant entering waters of the commonwealth each year.

DEP's, Bureau of Conservation and Restoration, is responsible for active treatments plants and 46 passive treatment systems that are treating 8 BGY of AMD affected water. AMD Set-Aside funds will be used to provide OM&R activities to continue to treat the water.

Goal 2: Improve and protect the waters of the commonwealth from nonpoint source pollution associated with agricultural activities.

Objectives and strategies to Meet Goal 2:

2.1 Implement the Regional Agricultural Watershed Assessment Program in 15 ag-impaired watersheds within the next 5 years.

As Pennsylvania continues to develop and implement a strategy of targeted watershed compliance, 15 watersheds throughout the state will be selected for targeted compliance work. This work will involve the performance of compliance inspections on each farm in the targeted watershed with the intent of identifying significant negative environmental impacts and addressing those impacts through voluntary compliance or, if necessary, through enforcement of existing regulations.

2.2 Conduct inspections on 350 CAFO operations in the commonwealth within the next five years.

DEP's existing organizational structure provides for the implementation of the portion of the National Pollution Discharge Elimination System (NPDES) aimed at limiting discharges from point sources identified as CAFOs. In the process of implementing this program, each CAFO operator will be encouraged to continue to perform routine self-inspections and submit reports documenting the findings of those self-inspections.

2.3 Implement BMPs on 50 agricultural operations per year using state directed funds. These BMPs will be for the mitigation of soil loss and/or wise management of nutrients.

A myriad of programs and partners are actively engaged in the performance of resource conservation work on farms in the commonwealth of Pennsylvania. To accomplish the above stated Objective, DEP, SCC, PACD, CDs, and certain watershed associations will partner to provide technical and financial assistance to farmers to perform work such as barnyard stabilization, streambank stabilization, the installation of manure storage facilities, the installation of other conservation practices (waterways, terraces and the like).

2.4 Support the review of 30 Nutrient Credit trade applications annually.

A Nutrient Credit Trading Program continues in Pennsylvania. This program continues to be an alternative means for members of the agricultural program to obtain funding once they have achieved a base-line of compliance with erosion control and nutrient management regulations on their property.

2.5 Conduct 2,000 agricultural compliance outreach/education visits on farms in the Chesapeake Bay Watershed each year until all farms in the Chesapeake Bay watershed have been visited.

Pennsylvania, through a collaborative effort between the DEP and the CDs will continue to engage 100 farmers per county with the intent of providing education and encouragement for those farm operators to enter into voluntary compliance with existing state and federal regulations regarding erosion control and nutrient management. These 100 visits are separate from other CAFO inspections or inspections conducted for other purposes and will simply serve as an education and outreach effort, not as a compliance and enforcement effort.

2.6 Provide 6 FTEs under the PACD TAG Grant for designing and installing Ag BMPs.

The PACD Engineering Technical Assistance Grant (TAG) program, in conjunction with NRCS technical assistance funding, was started in 2001 and has since been providing engineering technical assistance to members of the conservation community including watershed organizations, county conservation districts, 501(c) 3 non-profit organizations, municipalities, and educational institutions. The purpose of this grant is to provide high level engineering technical assistance to our conservation partners such as conservation districts, RC&Ds, watershed organizations, and other conservation partners to develop or implement a watershed assessment, watershed restoration plan, watershed protection plan, conservation plan or comprehensive nutrient management plan.

2.7 Support a minimum of 35 Chesapeake Bay Program Agricultural Technicians and Four Agricultural Engineers in the Chesapeake Bay watershed each year for the next five years.

Technicians and engineers embedded in Conservation District offices perform a variety of necessary and effective work to limit soil loss and the improper use of nutrients on farms. Pennsylvania, through the continued implementation of the Chesapeake Bay Program will continue to support, over the next five years, these technicians and engineers.

2.8 Provide support for the implementation of five innovative environmental technology projects (focused on agriculture) within the next five years.

Pennsylvania recognizes the significant progress we can make in addressing NPS pollution through the use and encouragement of innovative technologies and practices. To that end, we facilitate discussions and encourage and support where possible the implementation of these types of activities throughout the commonwealth. Funding reductions to state programs in the recent past have slowed down the rate of implementation of these innovative technologies but with the assistance of private funding sources and the federal Conservation Innovation Grants program, several projects a year continue to be implemented to address some of our more difficult issues such as localized and regional nutrient imbalances.

2.9 Support the certification of 600 certified manure haulers within the commonwealth annually.

Created under the Commercial Manure Hauler and Broker Certification Act, (Act 49, 3 P.S. § § 2010.1-2010.12) the Commercial Manure Hauler and Broker Certification Program requires all owners and employees of a commercial manure hauler or broker business that commercially haul, land-apply, or broker manure in Pennsylvania to hold a valid certificate issued by the Pennsylvania Department of Agriculture (PDA) in order to provide their services in Pennsylvania. The intent of this regulatory program is to ensure that manure generated by agricultural operations is transported and applied in an environmentally safe manner. Commercial manure haulers or brokers handling or applying manure on behalf of agricultural operations in Pennsylvania must do so according to state environmental laws and this certification program ensures that these commercial haulers and brokers are fully aware of and can follow the state's nutrient management, erosion control and related environmental and road usage laws.

2.10 Support the certification of 300 certified Nutrient Management Specialists within the commonwealth annually.

Created under the Nutrient Management and Odor Management Act, (Act 38), 3 Pa. C.S.A. § § 501-522, the Nutrient Management Program, administered by the State Conservation Commission (Commission), requires certain agricultural operations to develop a nutrient management plan following nutrient management planning criteria established under Act 38. Act 38 requires that a trained and certified Nutrient Management Specialist develop the nutrient management plan in order to ensure that farm specific nutrient management plans written for farms falling under Act 38 are completed in compliance with state environmental laws. The PDA is mandated under Act 38 to administer the nutrient management certification program. The requirements for the Nutrient Management Certification Program are created by regulation establishing nutrient management specialist categories (commercial, public, and individual); training and examination requirements and planning requirements that demonstrate a person's competency in developing or reviewing nutrient management plans.

2.11 Maintain the implementation of approved Act 38 Nutrient Management Plans on 300,000 acres of farmland regulated as CAOs and CAFOs each year for the next five years.

Pennsylvania's Nutrient Management Law and CAFO program requires high density and larger animal operations in the state to develop and implement an approved nutrient management plan. This required planning integrates the selected manure, fertilizer, and green manure crop management options into a nutrient management plan that has a one to three year lifespan. The plan developed according to state regulations involves inventorying farm conditions and operations, and allocating nutrient sources to the fields based on farmer specifications, field conditions, operational feasibilities and regulatory criteria. Required plan implementation represents the day-to-day activities carried out by the farmer to execute the decisions made in the plan. Conservation districts and DEP assess the farmers' actions to implement the plan and direct the farmer to make necessary changes in order to meet state required nutrient management laws. The number of acres covered under these approved plans does not change significantly from year to year as the acres farmed by CAOs and CAFOs in the state have stayed relatively stable over time.

2.12 Establish a baseline number of non-CAO/non-CAFO farmed-acres under an NMP or MMP by the end of FFY 2015 and increase the number of farm acres by 5% annually.

In association with the Program's goal of establishing a framework to track NMPs and MMPs developed for farms not regulated as CAOs or CAFOs, Pennsylvania, through the DEP, will track and establish a baseline number of acres covered under an NMP or MMP that are not already accounted for in the state's CAO and CAFO tracking efforts. Once this baseline number is established, the DEP will support outreach and compliance related activities expected to result in a 5% annual increase in the number of non-CAO/non-CAFO farm acres under an NMP or MMP.

2.13 Continue to encourage the use of the PA One Stop program such that the number of fields entered into that system increase by 10% each year over the next five years.

PA One Stop is a progressive effort occurring in Pennsylvania and represents a collaboration between SCC, PDA, DEP and Penn State University. This project provides conservation and nutrient management planning opportunities to farm operators through the World Wide Web. Farmers, and other interested individuals can log onto PA One Stop and enter the necessary information to create their own Ag E&S Plan or Manure Management Plan. Pennsylvania intends to see the use of this on-line tool increase incrementally by 10% each year for the next five years. This objective will be accomplished through continued education and outreach efforts performed by many partners (including PSU, DEP, SCC, CDs, and NRCS).

Goal 3: Improve and protect the waters of the commonwealth from nonpoint source pollution associated with stormwater run-off, as well as streambank and shoreline degradation.

Objectives and strategies to accomplish Goal 3:

3.1 Conduct 11,000 site inspections under the Chapter 102 and Chapter 105 programs annually for the next five years.

Pennsylvania, through the implementation of the Chapter 102 and Chapter 105 programs, will conduct 11,000 inspections on earth disturbance sites each year for the next five years. These inspections may be carried out by employees of delegated County Conservation Districts. These inspections may be routine partial inspections, follow-up inspections, response to complaints received by DEP or delegated conservation districts and performed to ensure that activities regulated by Chapter 102 and Chapter 105 are being conducted in accordance with those regulations and in a manner that minimizes NPS pollution impacts to the waters of the commonwealth.

3.2 Continue to implement the MS4 program through oversight and verification that MS4 communities abide by their permit requirements.

Municipal Separate Storm Sewer Systems (MS4s) are stormwater conveyance systems comprised of roads, ditches, pipes, and other means of conveyance which have been designed or otherwise do engage in the transport and discharge of stormwater. Municipalities which own MS4s may be required to obtain a permit or permit waiver. The Bureau of Point and Non-point Source Management in DEP is responsible for the oversight of this program. As such, annual review of reports submitted by MS4s is conducted. Further inspections are conducted by DEP's regional offices to determine whether or not a municipality categorized as an MS4 is meeting its permit requirements. The link below will provide additional information on this program.

http://www.portal.state.pa.us/portal/server.pt/community/municipal_stormwater/21380

3.3 Continue to administer the Act 167 program directing counties to obtain and implement county wide stormwater management plans.

Act 167 requires counties to prepare and adopt a watershed based stormwater management plan for each watershed within its boundaries. The responsibility for implementing this program is placed on the Bureau of Point and Non-Point Source Management, who then coordinates with DEP regional offices for enforcement of this legislation. Over the past five years significant progress was made at achieving compliance with this legislation in the Northwest Regional Office (NWRO). Further, a web-based flowchart tool (www.paiwrp.com) was developed by the York County Planning Commission which may be used by counties engaged in the process of Act 167 planning. DEP will, over the course of the next five years, continue to work with county governments to achieve additional compliance. The link below will provide additional information on this program.

http://www.portal.state.pa.us/portal/server.pt/community/act_167/21378

3.4 Implement 40 new, state-funded stream restoration and/or stormwater management projects annually for the next five years.

Stream restoration projects are implemented by a number of partners. Commonly, projects are the result of a collaborative effort between private citizens, NGOs such as local watershed associations, state government entities, federal entities, and educational institutions. Pennsylvania will strive to implement 40 new stream-restoration projects per year for the next five years through the dissemination of funds and partnering. Pennsylvania will encourage these projects through E&O efforts, permitting, collaboration with CDs, implementation of WIPs, and other such efforts.

3.5 Address 500 new DGLV Road sites each year for the next five years.

Through the continued implementation of the Dirt, Gravel, and Low Volume Roads program, which includes partnering with local government entities, County Conservation Districts, and DEP Pennsylvania will continue to address NPS pollution originating from dirt, gravel, and low volume roads. This program includes a significant education and outreach program (e.g. ESM Training), technological developments (e.g. use of DSA and other such materials) as well as on-the-ground implementation of certain maintenance-focused BMPs.

3.6 Support, using state managed funds, the completion of 15 miles of stream restoration and/or bank stabilization projects over the next five years.

Pennsylvania will leverage through the partnering-web a significant amount of funds for the purpose of streambank stabilization and stream restoration projects. Many partners are involved with stream improvement projects. Such partners include: Fish and Boat Commission, DCNR, numerous Watershed Associations, NGOs, the DEP, County Conservation Districts, CFA, local government entities, and others. State and federal grant programs are frequently the source of funding for stream restoration projects. Grant funds are multiplied through match-contributions. Streambank stabilization and stream restoration projects leverage financial assistance and technical assistance while providing pollutant load reductions, local community improvements, educational opportunities, and outreach efforts.

3.7 Statewide, enroll 50,000 acres of new land in the CREP program over next five years.

The Conservation Reserve Enhancement Program (CREP) is a program requiring the involvement of local, state and federal partners. This program involves the leveraging of Federal funds and the coordination between NRCS, County Conservation Districts, DEP and a willingness on the part of private land owners. Through the continued and potentially increased implementation of this program, Pennsylvania will protect and restore water quality through the construction of riparian buffers.

3.8 Plant and protect 5,000 acres of riparian forest buffer over the next five years.

Through the implementation of the CREP program and similar support programs, Pennsylvania will strive to construct 1,000 acres of new riparian forest buffer each year for the next five years. Further, through the implementation of these programs, many existing and unaccounted forested riparian acres will be preserved.

3.9 Through a forest land-owner stewardship program, develop 30 new plans annually addressing approximately 5,000 new acres of privately owned forest land each year for the next five years.

Pennsylvania, through the efforts of the DCNR will continue to implement a forest stewardship program aimed at conservation-minded forest resource management. This program will work with private landowners and encourage those land owners to obtain and implement forest stewardship plans.

3.10 Plant 10,000 new trees under the TreeVitalize program each year for the next five years.

TreeVitalize continues to be an active and vital program in Pennsylvania's plan to address non-point source pollution. Through the efforts of those involved with this program thousands of trees will be planted near streams and creeks providing shade and mitigation of thermal pollution while decreasing stormwater volume and the destabilization of stream banks.

3.11 Encourage NPS pollution control activities within US Forest Service selected priority watersheds identified under the USFS Watershed Condition Framework within the borders of the Allegheny National Forest (ANF) to the extent that these priority “Functioning at Risk” watersheds within the ANF may be re-categorized as “Functioning Properly.”

The USFS Watershed Condition Framework identified two “Functioning at Risk” watersheds within the ANF as priority watersheds for restoration. Those watersheds are the Sugar Run (predominantly McKean County) and Bear Creek (predominantly Elk County). The NPS issues of concern include habitat fragmentation due to passage barriers (culvert crossings), lack of sufficient large wood in streams, non-native plants, water quality including acidic pH levels, and sedimentation from stream crossings and potentially other sources.

Goal 4: Verify the efficacy of Pennsylvania's nonpoint source pollution management efforts through enhanced data collection.

Objectives and strategies to Accomplish Goal 4:

4.1 Establish a process to collect BMP data at the state, watershed and sub-watershed level.

Pennsylvania’s Nonpoint Source Program has struggled in collecting comprehensive data identifying the nonpoint source related BMPs that are being implemented across the commonwealth. This problem is especially true as we look to collect data at the sub-watershed level where the water quality results of stream and lake restoration work can be realized in a shorter timeframe. This effort will include working with our local, state and federal partners to develop processes and mechanisms that can be used to collect and report this data to better demonstrate the progress Pennsylvania is making in addressing nonpoint source stream and lake impairments.

4.2 Further develop and maintain PA One Stop to allow the NPS Program to collect the number of acres planned through the use of this tool and to spatially summarize data by watershed.

The PA One Stop planning tool is proving to be a valuable resource to help the agricultural community recognize resource concerns on farms and BMPs that could be used to address those concerns. This tool will be relied upon by individuals in the agricultural community to help meet regulatory compliance with Pennsylvania’s Erosion and Sedimentation Control regulations and Manure Management regulations. Tracking the progress of the implementation of the use of this planning tool will support the commonwealth’s efforts to demonstrate industry compliance with these environmental regulations.

4.3 Continue to develop and improve our Reclaimed Abandoned Mine Land Inventory System (RAMLIS) GIS Tool.

Every year a new version of RAMLIS will be developed and released by EPCAMR. All GIS data is refreshed annually and the most recent version of GIS is used. Also the Abandoned Mine Land Inventory Sites (AMLIS) will be updated by Pennsylvania DEP Bureau of Mining and Reclamation to be used in the updated version.

4.4 Ensure that the Dashed GIS web tool adequately describes available information relating to the approximate 300 AMD Treatment Systems sites that are treating mine discharges across Pennsylvania and ensure that access to this information is available to the public.

DEP will continue to work with the site's administrator, which at this time is Stream Restoration Inc., to ensure the site is continually functional. DEP will continue to share sampling results with the public and will encourage watershed groups to input data. Through a recent policy revision, it is now a requirement for all groups that construct passive treatment systems using Growing Greener funds to submit an AMD Treatment System Form that will be sent to the Dashed administrator for input into the system.

4.5 Through the implementation and maintenance of the Water Quality Monitoring Network (WQN), water quality field observations and data collection will occur on 173 monitoring sites each year over the next five years.

Tasked with assessing the water quality of Pennsylvania's 86,000 stream miles every other year, DEP will maintain the Water Quality Network (WQN). The WQN is a network of monitoring sites focused on biology, pathogens, chemistry or physical habitat characteristics. The WQN is composed of approximately 173 sites. To further bolster the monitoring and data collection efforts of Pennsylvania, DEP contracts with the SRBC and the USGS to collect water chemistry data as part of the Water Quality Network monitoring. In total, over 1,100 sites are monitored annually.

4.6 In addition to other monitoring efforts, the DEP will monitor 20 lakes each year for the next five years.

Monitoring is an activity that is performed by many NPS Program partners in Pennsylvania such as the Senior Environmental Corps, schools, conservation districts, private businesses, and state and federally funded grantees. Further, state agencies other than DEP also perform monitoring. Given the variety of entities involved with monitoring, the variety of monitoring schedules and differences in purpose and techniques it is more reasonable for the DEP to track monitoring performed by DEP only while still acknowledging and, when appropriate engaging in bi-lateral sharing of data produced from the other entities carrying out monitoring efforts. DEP monitoring sites are selected to best assess water resources across the commonwealth recognizing our limited staffing and funding available for this activity. The data obtained helps direct resource protection and restoration efforts and is used to support the development of the bi-annual Pennsylvania Integrated Water Quality and Monitoring Report.

4.7 Through monitoring and assessment efforts conducted by the DEP, 60 miles of streams previously impacted by NPS related causes shall be documented as newly delisted from Category 5 and/or Category 4a in the bi-annual Pennsylvania Integrated Water Quality and Monitoring Report.

Pennsylvania's NPS program partners throughout the commonwealth implement restoration initiatives throughout Pennsylvania in order to improve water quality and restore our impaired stream reaches. DEP is informed by staff at the county conservation districts and many of our other NPS Program partners when they have observed conditions or performed preliminary testing that leads them to believe that the particular stream reach is no longer impaired or is significantly improved. At that time, and as resources permit, DEP dispatches biologists out to those sites to determine the impairment or attainment status of the stream reach and provide any updated stream quality information for inclusion in the next publication of the Pennsylvania Integrated Water Quality and Monitoring Report.

4.8 Through monitoring and assessment efforts conducted by the DEP, 1,500 lake acres previously impacted by NPS related causes shall be documented as newly delisted from Category 5 or Category 4a over the next five years.

Pennsylvania's NPS program partners throughout the commonwealth implement restoration initiatives in order to improve water quality and restore our impaired lakes. DEP is informed by staff at the county conservation districts and many of our other NPS Program partners when they have observed conditions or performed preliminary testing that leads them to believe that the particular lake is no longer impaired or is significantly improved. At that time, and as resources permit, DEP will dispatch biologists out to those sites to determine the impairment or attainment status of the lake and provide any updated lake quality information for inclusion in the next publication of the Pennsylvania Integrated Water Quality and Monitoring Report.

4.9 Implement grant funded projects designed to determine BMP effectiveness on at least three priority watersheds.

Pennsylvania has committed support, using EPA provided NPS program funds, to a new effort to monitor stream segments expected to be impacted by BMPs implemented under the USDA National Water Quality Initiative (NWQI). This effort allows the commonwealth to measure the effectiveness of practices installed in these watershed areas. In addition, DEP is carrying out other monitoring efforts on additional areas expected to be improved by the implementation of water quality related BMPs, such as riparian buffers, in order to document the improvements associated with the implementation of these practices.

4.10 Within the next five years, establish a process to input all monitoring data collected by the PA DEP NPS Program into STORET.

STORET is short for STORage and RETrieval Data Warehouse. STORET is an on-line database maintained by the EPA for the purpose of storing and sharing water quality, biological, and physical data. STORET can be used by state environmental agencies, federal agencies, universities and private citizens. Pennsylvania's NPS program collects data relating to water quality on important and priority streams and lakes throughout the commonwealth. State program staff will enter that information into STORET in order to provide reasonable access to that information.

4.11 Through state-wide NPS pollutant load-reduction efforts, 850,000 pounds of nitrogen will be reduced from the non-point source pollutant stream each year.

The NPS program initiated an effort in 2013 to collect statewide aggregated BMP data annually from over 15 state and federal programs supporting the implementation of BMPs throughout the commonwealth. Through the assistance of Penn State a process was developed to calculation expected nutrient savings that can be attributed to the implemented BMPs reported to us annually. This process is expected to show that Pennsylvania is newly removing an additional 1,000,000lbs of nitrogen a year from streams and lakes within the commonwealth. Recognizing the inability of the program staff to collect all BMP activities implemented throughout the commonwealth, these estimates are recognized as under reporting the annualized loading reductions occurring in Pennsylvania.

4.12 Through state-wide load-reduction efforts, 50,000 pounds of phosphorus will be reduced from the non-point source pollutant stream each year.

The NPS program initiated an effort in 2013 to collect statewide aggregated BMP data annually from over 15 state and federal programs supporting the implementation of BMPs throughout the commonwealth. Through the assistance of Penn State a process was developed to calculate expected nutrient savings that can be attributed to the implemented BMPs reported to us annually. This process is expected to show that Pennsylvania is newly removing an additional 50,000 pounds of phosphorus a year from streams and lakes within the commonwealth. Recognizing the inability of the program staff to collect all BMP activities implemented throughout the commonwealth, these estimates are recognized as under reporting the annualized loading reductions occurring in Pennsylvania.

4.13 Through statewide load-reduction efforts, 15,000 tons of sediment will be reduced from the non-point source pollutant stream each year.

The NPS program initiated an effort in 2013 to collect statewide aggregated BMP data annually from over 15 state and federal programs supporting the implementation of BMPs throughout the commonwealth. Through the assistance of Penn State a process was developed to calculate expected sediment load reductions that can be attributed to the implemented BMPs reported to us annually. This process is expected to show that Pennsylvania is newly removing an additional 15,000 tons of sediment a year from streams and lakes within the commonwealth. Recognizing the inability of the program staff to collect all BMP activities implemented throughout the commonwealth, these estimates are recognized as under-reporting the annualized loading reductions occurring in Pennsylvania.

4.14 Prevent waterbodies currently not listed as impaired for the aquatic life use designation from being listed as impaired for that designated use through implementation of existing regulatory programs.

Pennsylvania has rigorous and comprehensive regulatory programs addressing activities known to produce nonpoint source pollution. These programs address activities such as resource extraction, earth moving, post construction stormwater, agricultural activities and construction activities adjacent to, or within streams. These regulations are enhanced on our identified special protection waters. These regulatory programs are continually being refined to better address the changing nature of the industries associated with these activities. The DEP has implemented initiatives including the Targeted Watershed Initiative to ensure that regulated communities are aware of their statutory obligations and are following through as required.

4.15 Establish a data collection framework by which information regarding the obtainment of nutrient and manure management plans (NMPs/MMPs) on non-CAO/non-CAFO farms is collected and counted in terms of acres covered or farms planned.

Currently, Pennsylvania requires all livestock farms and farms using manure as a nutrient source, to obtain either an NMP or MMP depending on certain specific factors of the agricultural operation. This includes farms that do not fall into the category of a CAO or CAFO. At the time of the development of this management plan, there is no process available to collect data on the number of farms or acres of these non-CAO/non-CAFO farms covered under these plans. Pennsylvania, through the efforts of DEP, will strive to create a system by which the acres covered by these non-CAO/non-CAFO nutrient or manure management plans (and other similar plans) will be tracked.

4.16 DEP will develop a process to collect and report on the amount of biosolids land applied following the water quality criteria established under DEP’s Municipal Waste regulations.

Pennsylvania, through the efforts of the Bureau of Point and Non-point Source Management will continue to implement a regulatory program (including permitting and inspections) which will regulate the safe land-application of biosolids. Where applicable, DEP attempts to maximize the beneficial use of sewage sludge by land application pursuant to DEP’s Bureau of Waste Management Municipal Waste regulations. There currently is no consistent process to collect and report on the amount of biosolids applied statewide to the land under the state’s general permitting requirements. Efforts will be taken by DEP to establish a consistent process to collect and report on this information.

Goal 5: Demonstrate Pennsylvania’s nonpoint source pollution management efforts through enhanced data dissemination efforts.

Objectives and strategies to accomplish Goal 5:

5.1 Annually provide a clear and concise report to the EPA, the general public, regulators, partners and others interested in Pennsylvania’s NPS pollution abatement efforts outlining the major accomplishments of Pennsylvania’s NPS Program consistent with EPA reporting guidelines.

By July 1 of each year, DEP will, with the assistance of many NPS program partners, prepare an annual report describing the reported major accomplishments of the NPS Program in Pennsylvania. This report will include a brief description of restored and improved waters and will provide a brief summary of information contained in the most recent Integrated List. It is understood that the NPS Program annual report will not be comprehensive. The amount of BMPs constructed and other projects implemented in Pennsylvania is too great. Further, to truly account for every NPS related activity that occurs in one fiscal year a greater level of partnering between DEP and other program partners will need to be developed (see goal 4.1). Regardless, this annual report will include all load reductions accounted for as well as certain notable efforts to address and mitigate NPS pollutants.

5.2 Develop 2 “Success Stories” per year.

Pennsylvania DEP, watershed associations, county conservation districts, and other partners, will focus on describing in detail to EPA guidance specification, activities that took place in at least two watersheds each year that have achieved “restored” or “significantly improved” status as a result of NPS pollutant load reduction and resource protection and restoration efforts. These “Success Stories” will be reported on annually in the Annual Report and separately to EPA consistent with EPA guidance relating to reporting success stories.

5.3 Provide detailed BMP implementation reporting on ten approved WIPs per year.

Each year, as part of the Annual Report, the DEP will provide a detailed report on the progress of achieving implementation of at least ten of the 35 WIPs currently approved by EPA in Pennsylvania.

5.4 Implement the identified BMPs expected to restore four sub-watersheds included within §319 approved WIPs by the end of the 2019 Federal Fiscal Year. (Achievement of this goal may be measured against full implementation of the BMPs listed in the select sub-watersheds included in §319 approved WIPs).

Throughout the next five years DEP will continue to collaborate with partnering entities focused on the implementation of BMPs included in §319 WIPs. DEP will prioritize these four select sub-watersheds and track progress with respect to the completion of the BMPs included in the WIPs developed for these areas with the intent of implementing the identified BMPs by the end of FFY 2019.

5.5 Fully implement the BMPs expected to restore three select watersheds supported under Pennsylvania's Growing Greener Program's Renaissance Initiative by the end of the 2019 Federal Fiscal Year.

DEP will continue to implement the Renaissance Initiative under the commonwealth's Growing Greener grant program. This initiative provides a commitment by the commonwealth to support the full implementation of BMPs necessary to restore identified watersheds within a relatively short timeframe. Through this program, over the next five years, the DEP will support the implementation of the BMPs that have been determined necessary to restore three watersheds.

5.6 Document farmer compliance with agricultural erosion and sedimentation control and manure management regulations in 15 watersheds by the end of the 2019 Federal Fiscal Year.

As DEP continues to collaborate with the agricultural community and the various partners engaged in resource conservation on agricultural operations, DEP will verify or otherwise ensure that every farm in 15 select priority watersheds throughout the commonwealth are operating in compliance with the commonwealth's erosion and sedimentation control and nutrient management regulations, as these regulations pertain to agricultural operations.

5.7 Report semi-annually on progress on implementing the active Section 319 grant work plans ensuring status reports are current for at least 90% of the active grant projects in the GRTS database.

Pennsylvania will continue to report semi-annually (due dates January 31st and July 31st) on the progress the commonwealth is making in implementing the active projects within the approved §319 grant work plans. The program staff at DEP will continue to input the required project reports into the GRTS database system to allow for easy access and monitoring of the program activities by our EPA Section 319 Program Project Officer and other interested parties.

5.8 Complete Watershed Plan Tracker (WPT) data entry for all active WIPs by the end of 2017. The DEP will continue to input current information in the WPT throughout the five year life of this Plan to ensure accuracy of data.

Pennsylvania continues to be a leader in working with EPA Region 3 staff to fully populate the Watershed Plan Tracker tool developed by EPA. DEP program staff have worked with EPA Region 3 staff and a contracted agent to support the full implementation of this tool intended to track progress in meeting the goals of the EPA approved Watershed Implementation Plans and TMDLs. DEP will continue to dedicate staff to support this effort and participate in regional and national meetings associated with this effort.

Appx. D: The Big Ten

The Department of Environmental Protection has traditionally reported on approximately one third of the WIP watersheds located within the borders of the Commonwealth in this Annual Report. While ten watersheds is not exactly one third (there are 35 WIP watersheds in PA), reporting on ten watersheds annually provides Pennsylvania an opportunity to highlight the work being done and progress being made in a reasonable amount of these watersheds. To minimize any sort of bias that might exist in reporting of this nature, the DEP strives to report on these watersheds in sequence and with relative equality between watersheds impacted by abandoned mine drainage and those impacted by other forms of NPS pollution.

Every year, the DEP's Nonpoint Source Pollution Management Program, selects ten watersheds from the now 36 WIP watersheds to be highlighted in this Annual Report. These watersheds, the "Big Ten" watersheds, represent an accurate and complete cross section of the Section 319 funded work that is performed in Pennsylvania. New for this year is the deviation from random selection of the watersheds on which to report and the implementation of a pre-selected roster. This method will ensure that every active WIP will be included in the Annual Report at least once every three years.

While in the process of creating the roster from which this section of the Annual Report will be composed, consideration was given to the type of land use found in the watershed, the dominant sources of pollution and pollutant types found in the watersheds as well as the geographic location of the watersheds. As always, it was the goal of DEP, for the purposes of this report, to represent the six different DEP regions and to provide a detailed glimpse at the work performed to abate NPS pollutants originating from Abandoned Mine Drainage, Urban Stormwater, and Agriculture as well as resource specific work such as stream and lake restoration. This year's Big Ten includes: The South Sandy Creek, Anderson Creek, Conewago Creek, Hartshorn Creek, Middle Spring Creek, Hungry Run, North Branch Nesheminy/Lake Galena, and Pine Creek (Westmoreland County).

South Sandy Creek, Venango County, NWRO

The South Sandy Creek is an AMD impaired watershed located in Venango and Mercer Counties. The primary causes of impairment are high metals and acidity (pH) loadings from past mining practices. The South Sandy Creek WIP was completed for the South Sandy Creek Watershed Association in February 2009 with funding from the Coldwater Heritage Partnership. At the time of the drafting of this annual report, no TMDL has been drafted for the South Sandy Creek.

Williams Run (South Sandy Creek)

Site	Timeframe	pH	Acidity	Alkalinity	Iron	Aluminum	Manganese
WR1	2001-2006	4.9	37.42	7.21	0.32	1.13	1.21
	2012-2014	5.3	11.0	5.4	0.3	0.657	0.828

This is the site at the mouth of Williams Run. Most of work group has done to this point has been in Williams Run

The South Sandy Watershed Association (SSWA) has been implementing their WIP since it was written. The Bureau of Abandoned Mine Reclamation (BAMR) reclaimed 39 acres in "the Woods" problem area of the watershed. The watershed association also received a Growing Greener grant and funding from Office of Surface Mining (OSM) and built a limestone bed to treat the discharge in

this same area. As part of their on-going efforts, the SSWA is currently working on a project to address yet another AMD discharge. The SSWA received money from the Eastern Brook Trout Joint Venture to complete drilling which was necessary to determine the source of the abandoned mine drainage. Once that information was obtained, the SSWA was able to properly plan to address the discharge. The SSWA is currently working on the reclamation of the area with funding from a Section 319 grant.

The SSWA is also involved in education and outreach. They produce a newsletter about the watershed. They have also held tire and battery recycling days. They use these events as an educational day with various displays and walks in the watershed. Further, the SSWA also has a water quality sampling program in cooperation with DEP.

Below is a table listing subwatersheds in the South Sandy Creek watershed. This table also lists the quantity of specific BMPs called for in the South Sandy Creek WIP and the quantity constructed to date as reported to DEP for the purposes of preparing this report. The last column indicates in terms of percent, the extent to which the WIP is implemented.

South Sandy Creek – BMP Goals and Accomplishments

Sub Watershed	BMP/Action	Goal Amount (units)	Implemented Amount (units)	% Action Implemented
South Sandy	Anoxic Limestone Drain	1	0	0
	Land Reclamation (acres)	210	0	0
Williams Run	Constructed Wetland Anaerobic	1	0	0
	Limestone Leach Bed/Pond	1	1	100
	Vertical Flow Treatment System	2	0	0
	Land Reclamation (acres)	54	39	72

Below is a table which lists the subwatersheds found in the South Sandy Creek WIP, pollutants of concern, target load reductions, the load reductions achieved, and, in terms of percent the extent to which pollutant load reduction goals have been met based on the BMPs reported to DEP for the purposes of preparing this report.

South Sandy Creek - Water Quality Trend Data

Sub Watershed	Pollutant ID	Target Load Reduction (lbs/day)	Load Reduction Achieved (lbs/day)	% Load Reduction Achieved
South Sandy	Metals (Al)	24.4	0	0
	Metals (Fe)	46.26	0	0
	Metals (Mn)	5.23	0	0
Williams Run	Acidity	0	89.1	100
	Metals (Al)	52.35	7.5	14
	Metals (Fe)	5.05	2.7	53
	Metals (Mn)	50.52	2.6	5

Anderson Creek, Clearfield County, NCRO

The Anderson Creek is a tale of two different streams. The upper portion is mostly forested with little disturbance. The DuBois Reservoir, the drinking water source for the City of DuBois and some other surrounding communities, can be found in this section. The lower section, starting at Little Anderson Creek, has been greatly disturbed by both clay and coal mining and is impaired by AMD discharges. A TMDL was developed for this watershed and addresses high metals and acidity (pH) loadings. That TMDL was completed in 2005. The Anderson Creek WIP, completed in 2006, concentrates on the part of the watershed that is listed as impaired by AMD.

The Anderson Creek Watershed Association (ACWA) along with Pike Township, the Clearfield County Conservation District (CCCD) and Western PA Conservancy, has slowly begun the work of restoring the watershed. This partnership has completed the construction of an anoxic limestone drain and various, small, land reclamation projects. An example of these reclamation projects is the work put forth by a local Boy Scout troop. At the Korb reclamation area, the ACWA along with that local Boy Scout troop planted 1,045 trees. The ACWA also received a Dominion Watershed Mini Grant for outreach, water sampling and equipment. With that funding, the group purchased: a canopy, chairs, table, and display. Further, they were also able to update their brochure and can now be seen at numerous educational events using the purchased equipment. A water sampling program was also established which makes use of equipment bought with this grant.

Most recently, using some Section 319 funding, the ACWA worked with the Moshannon District Mining office on a land reclamation project in the Bilger Run Watershed. The ACWA also obtained a design for treatment systems which will address discharges in this area and the group hopes soon to apply for grant funds to build a passive treatment system. Anderson Creek was also chosen to receive some Section 319 funding to acquire extra information needed to meet the qualifications of a Qualified Hydrologic Unit (QHU). A watershed must be in a QHU to receive SMCRA Set-aside funds from the Abandoned Mine Land Program under OSM. Hopefully, in time, Anderson Creek will be one of them.

Below is a table listing subwatersheds in the Anderson Creek watershed. This table also lists the quantity of specific BMPs called for in the Anderson Creek WIP and the quantity constructed to date. The last column indicates in terms of percent, the extent to which the WIP is implemented.

Bilger Run (Anderson Creek)

Site	Timeframe	pH	Acidity	Alkalinity	Iron	Aluminum	Manganese
BR 2	1986-2000	3.99	45.59	4.54	0.87	1.73	6.51
Bilger Run	2014-2015	5.13	15.04	1.36	0.13	0.36	1.61

Anderson Creek – BMP Goals and Accomplishments Table

Sub Watershed	BMP/Action	Goal Amount (units)	Implemented Amount (units)	% Action Implemented
Anderson Creek	Vertical Flow Treatment System	3	0	0
	Land Reclamation (acres)	N/A	8	N/A
Bilger Run	Anoxic Limestone Drain	2	1	50
	Vertical Flow Treatment System	2	0	0
	Land Reclamation (acres)	N/A	38	N/A
Kratzer Run	Limestone Leach Bed	2	0	0
	Pond	1	0	0
Little Anderson	Anoxic Limestone Drain	1	0	0
	Limestone Doser	1	0	0
	Vertical Flow Treatment System	3	0	0
	Land Reclamation	N/A	80.7	N/A

Below is a table which lists the subwatersheds found in the Anderson Creek WIP, pollutants of concern, target load reductions, the load reductions achieved, and, in terms of percent the extent to which pollutant load reduction goals have been met based on the BMPs reported to DEP for the purposes of preparing this report.

Anderson Creek – Water Quality Trend Data

Sub Watershed	Pollutant ID	TMDL Load Reduction (lbs/day)	Load Reduction Achieved (lbs/day)	% Load Reduction Achieved
Anderson Creek	Acidity	351.96	26.2	7
	Metals (Al)	27.14	2.2	8
	Metals (Fe)	21.2	2.2	10
	Metals (Mn)	1.7	0	0
Bilger Run	Acidity	157.52	14.98	10
	Metals (Al)	10.99	1	9
	Metals (Fe)	25.5	1	4
	Metals (Mn)	26.3	1.67	6
Kratzer Run	Acidity	126.2	0	0
	Metals (Al)	14.1	0	0
	Metals (Fe)	8.1	0	0
	Metals (Mn)	2.6	0	0
Little Anderson	Acidity	1456.4	16.7	1
	Metals (Al)	119.2	1.4	1
	Metals (Fe)	144.6	1.2	1
	Metals (Mn)	51.4	1.5	3

Conewago Creek, Dauphin, Lancaster, Lebanon Counties, SCRO

Following the approval of the Conewago Creek WIP the Dauphin County Conservation District in partnership at times with both the Lancaster CCD and Lebanon CCD began pursuing grant funds to design and ultimately implement BMPs to the satisfaction of the WIP. Such projects for BMP design and implementation include: Conewago Phases I, II, and III. The Hershey Meadows stream restoration project was also completed with a \$319 grant to the Tri-County Conewago Creek Association. This implementation project was listed as the highest priority project identified by the WIP. To date, the total of \$319 funds provided to grantees since the WIP was approved in 2006 is \$789,215.00. In 2009, the Penn State Agriculture and Environment Center received a \$750,000 National Fish and Wildlife Foundation (NFWF) grant to establish the Conewago Creek Initiative. In 2010, USDA designated the Conewago Creek as Pennsylvania's "Showcase Watershed," which provided increased, targeted financial and technical assistance to the watershed.

The county conservation districts have conducted farm surveys in the Conewago Creek watershed to determine how many farms had conservation plans at the time of the survey; the Districts then placed a priority on conservation planning on those farms found lacking. Sixty three new conservation plans were written through 2013. With the completion of that plan writing effort, it can be said that 98% of farms in the Conewago Creek watershed have conservation plans. In 2013, several data sources were analyzed to determine the amount of agricultural BMPs implemented in the watershed. The estimate found that approximately 14,602 acres of practices were installed. Such practices include cover crops, conservation tillage and forest riparian buffers. Further, that estimate found that approximately 152,548 linear feet of linear-type practices including fencing, terraces and stream bank restoration had been constructed, and about 60 unique or "each" type practices such as stream crossings, waste storage facilities, and off-stream watering facilities had been installed.

The WIP as originally drafted focused on and assessed lands used for agriculture. That focus excluded a significant portion of the watershed. Realizing the limited nature of the original WIP, two additional assessments focusing on urban lands were completed. As a result of that broadened focus, an additional 48 priority projects for restoration were identified.

In 2010, a "Vision for the Conewago" was created over a three month process by more than 100 members of the community to develop concise, local goals for the Conewago restoration. Landowner surveys were also conducted to assess the attitudes, beliefs, behaviors, and knowledge of clean water within the watershed while also creating greater awareness of the Initiative. Over 3,340 children living in the Conewago and neighboring watersheds have been engaged through the Penn State Extension 4-H Conewago Stream Teams program. Educational signs have been installed at trail heads, restoration sites, and watershed boundaries. Over 45 education and outreach events for the community have been held to date to target both farmers and homeowners.

Monitoring in the Conewago Creek watershed continues. Without this constant effort, results from the implementation of BMPs, education, and outreach would be misunderstood. The current monitoring effort includes: baseflow water quality sampling (11 stations), intensive discharge measurements to establish stable rates at (2 stations), bimonthly flow measurements (8 stations), biennial flow measurements (1 station), Stream Habitat Assessment (13 stations), macroinvertebrate assessment (13 stations), fish assessment (3 stations), stormflow water quality sampling (2 stations), baseflow and stormflow water quality sampling and intensive discharge measurements (2 USGS gauging stations).

Macroinvertebrate surveys were taken from 2009 to 2010 and again in 2013. The IBI scores at all sites increased; some scores increased almost by 50%. Surveys will be completed again in 2016. Preliminary assessments of the data collected by the USGS gage stations show a slight watershed wide decrease in nitrogen. Fish surveys conducted in 2012 revealed double the number of fish species present at the Hershey Meadows location following its restoration compared to the survey results of 2007. The 2015 survey had similar results to the 2012 survey.

Below is a table listing the quantity of specific BMPs specified in the Conewago Creek WIP and the known quantity of that BMP constructed to date. The last column indicates in terms of percent, the extent to which the WIP is implemented as reported to DEP for the purposes of preparing this report.

BMP/Action	Goal Amount	Implemented Amount	Unit	% Action Implemented
Cover Crop	810.00	0.00	AC	0
Grazing Planned Systems	962.00	46.20	AC	5
Stream Exclusion with Grazing Land Management	52,272.00	14,688.00	FT	28
Stream Channel Stabilization	16,368.00	4,840.00	FT	30
Riparian Forest Buffer	112.00	34.90	AC	31
Streambank & Shoreline Protection	32,736.00	10,736.00	FT	33
Nutrient Management	3,187.00	1,089.70	AC	34
Stripcropping	1,842.00	644.00	AC	35
Conservation Tillage	1,105.00	1,207.00	AC	109
Terrace	884.00	12,525.00	FT	1417
Animal Trails and Walkways	no goal established	4,799.00	FT	N/A
Conservation Plan	no goal established	1,449.00	AC	N/A
Diversion	no goal established	2,663.00	FT	N/A
Grassed Waterway	no goal established	1,271.19	AC	N/A
Heavy Use Area Protection	no goal established	0.37	AC	N/A
Pasture & Hayland Planting	no goal established	5.90	AC	N/A
Riparian Buffers - Vegetative	no goal established	1.90	AC	N/A
Sediment Basin	no goal established	1.00	UNITS	N/A
Stream Habitat Improvement and Management	no goal established	3,370.00	FT	N/A
Vegetative Buffer Strips	no goal established	0.92	AC	N/A
Waste Storage Facility	no goal established	2.00	UNITS	N/A
Wetland Restoration	no goal established	15.53	AC	N/A

Below is a table which lists the pollutants of concern, target load reductions, the load reductions achieved, and, in terms of percent, the extent to which pollutant load reduction goals have been met based on the BMPs reported to DEP for the purposes of preparing this report.

Pollutant ID	Unit	TMDL Load Reduction	Load Reduction Achieved	% Load Reduction Achieved-TMDL
Nitrogen	LBS/YR		22,107.70	
Phosphorus	LBS/YR	5,893.00	2,343.40	40
Sedimentation-Siltation	TONS/YR	1,497.00	1,035.50	69

Hartshorn Run, Clearfield County, NCRO

Hartshorn Run is a small tributary to the West Branch of the Susquehanna River, and is located in Clearfield County. A TMDL was approved in April 2004 and the Hartshorn Run Watershed Implementation Plan was completed in 2010. The Clearfield County Conservation District (CCCD) finished a design and permitting project on two separate discharges. A series of constructed wetlands, a limestone pond and a settling pond was designed to treat the HAR 05 discharge. It was decided that the water quality of the HAR 07 discharge was too severe to treat passively so an active pebble lime dosing system was designed. Permits for both have been secured for the systems and in the future the District with their partners will apply for funding for construction. Therefore there are no load reductions to report at this point even though work has been completed toward the WIP.

The Allegheny Mountain Chapter of Trout Unlimited became a partner with the CCCD for the project mentioned above. . They will provide volunteer time for routine operation and maintenance once the systems are constructed. The Chapter has also agreed to act as permittee for the project. The CCCD installed an educational sign on the Clearfield-Curwensville Rails to Trails near the mouth of Hartshorn Run. Many people use this trail on a daily basis so it is a great opportunity to educate people on the watershed.

Below is a table listing subwatersheds in the Anderson Creek watershed. This table also lists the quantity of specific BMPs called for in the Anderson Creek WIP and the quantity constructed to date. The last column indicates in terms of percent, the extent to which the WIP is implemented as reported to DEP for the purposes of preparing this report.

Sub Watershed	BMP/Action	Goal Amount (units)	Implemented Amount (units)	% Action Implemented
Hartshorn 3	Limestone Sanding	1	0	0
Hartshorn 4	Constructed Wetland Anaerobic	1	0	0
	Limestone Doser	1	0	0

Below is a table which lists the subwatersheds found in the Anderson Creek WIP, pollutants of concern, target load reductions, the load reductions achieved, and, in terms of percent the extent to which pollutant load reduction goals have been met based on the BMPs reported to DEP for the purposes of preparing this report.

Sub Watershed	Pollutant ID	TMDL Load Reduction (lbs/day)	Load Reduction Achieved (lbs/day)	% Load Reduction Achieved
Hartshorn 3	Acidity	88.7	0	0
Hartshorn 4	Acidity	874.1	0	0
	Metals (Al)	46.6	0	0
	Metals (Mn)	11	0	0

Core Creek/ Lake Luxembourg, Bucks County, SERO

Core Creek, located in Bucks County, Pennsylvania is a tributary of Neshaminy Creek approximately 13.5 miles upstream of the Neshaminy Creek's confluence with the Delaware River. Under Public Law 566 funding, the 174-acre impoundment known as Lake Luxembourg was created in 1977 to provide local communities with a multi-purpose reservoir. Lake Luxembourg is the focal point of Core Creek Park, one of Bucks County's most visited Parks. As of 2002, approximately 170,800 people visited the park and approximately 95,000 people live in the three municipalities located within the Core Creek watershed (Census Bureau, 2000). Lake Luxembourg is owned by the County and managed by the Bucks County Parks Department.

The Core Creek watershed is located in HUC 02040201 (Crosswicks – Neshaminy, New Jersey, Pennsylvania). The Lake Luxembourg's watershed encompasses 6,033 acres (9.42 sq. mi); land use is currently mainly residential and disturbed (34.85%), agriculture (29.3%), forested (18.9%), urban (15.8%) and wetland/lake (1.1%). In the past 10 to 15 years, the land use in the Core Creek watershed experienced a major shift from agriculture to urban and suburban uses.

As a result of excessively high rates of sedimentation from highly erodible soils in the watershed, the lake reached its 100-yr sediment capacity in just 9 years. Lake Luxembourg was plagued by high turbidity and frequent algal blooms. This lake was listed as Impaired for Aquatic Life Use in the mid-1990's after which the DEP developed Total Maximum Daily Loads (TMDLs) for total phosphorus (TP) and total suspended solids (TSS). That TMDL was finalized in 1999. Currently, both Lake Luxembourg and Core Creek are listed on Sublist 4a of the 2014 Integrated Report. Also, the Core Creek / Lake Luxembourg watershed is part of the Neshaminy Creek watershed, which also has a TMDL for TSS.

The Core Creek / Lake Luxembourg watershed is a priority watershed within Pennsylvania's Nonpoint Source Management program; a Section 319 Watershed Implementation Plan was approved for this watershed in 2005. A number of studies and projects have been conducted to the satisfaction of that WIP and even prior to the approval of that WIP to address the water quality problems in Lake Luxembourg. Work to improve water quality in Lake Luxembourg has been on-going for over 20 years. These studies and projects are summarized below:

- **Phase I Diagnostic / Feasibility Clean Lakes Study (1993).** This study identified the types and sources of pollution loads to the lake and developed a restoration and management plan for restoration/mitigation.
- **First §319 Non-Point Source Implementation Project (1998).** This grant focused on the implementation of Best Management Practices (BMPs) designed to reduce the pollutant loads associated with agricultural lands in the watershed.
- **Second §319 Non-Point Source Implementation Project (2002).** This grant focused on the implementation of shoreline and streambank BMPs to reduce pollutant loads entering Lake Luxembourg. The grant also developed a proactive and successful educational program involving students from the FDR Middle School, Bristol PA. Students from the Neshaminy Middle School, Langhorne, PA participated in planting the shoreline vegetation along approximately 1,000 feet of the northwest shoreline of Lake Luxembourg in spring of 2001.

- **Revision of the TP and TSS TMDL (2004).** The TP and TSS TMDL for the Lake Luxembourg / Core Creek watershed was revised in 2004 with the ArcView Generalized Watershed Loading Function (AVGWLF) model. In addition, its counterpart, the Pollution Reduction Impact Tool (PRedICT) model, was also run to create various BMP scenarios to aid in the development of a revised restoration plan. Based on the TMDL, as well as some adjustments made to the targeted TP loads (based on the lake's Trophic State Index), the targeted reductions were identified as 23% for the TSS load and 24% for the TP load.
- **Revised Restoration / Management Plan (2005).** In response to the revised TMDL for the Lake Luxembourg / Core Creek watershed, the Bucks County Conservation District (BCCD) and Princeton Hydro revised the Restoration / Management Plan. This revised Plan developed a list of site-specific, proposed watershed projects, designed to attain the targeted TP and TSS pollutant endpoints as outlined in the revised TMDL.
- **Third §319 NPS Implementation Project (2008).** This implementation project implemented some of the watershed control measures highlighted in the revised Restoration / Management Plan, including the installation of several stormwater devices known as small-scale Manufactured Treatment Devices (MTDs), the stabilization of an additional 800 linear feet of shoreline along Lake Luxembourg, and the design and creation of a pocket wetland to mitigate stormwater pollution runoff from entering the lake.
- **Fourth §319 NPS Implementation Project (2014).** The Bucks County Conservation District is in the process of completing a series of stormwater / watershed projects to further reduce the TP and TSS loads entering Lake Luxembourg. This includes the design and retrofitting of four existing detention basins to function as dry extended (water quality) detention basins, as per the *Pennsylvania Stormwater Best Management Practices Manual* (2006), to enhance their ability to remove these pollutants. The project also includes the stabilization of approximately 1,000 linear feet of shoreline along the southwestern side of the lake and the development of permit-grade bathymetric data on the lake's Conservation Pool (upper lake above the bridge).

A major project planned for the near future is the design and permitting to modify the existing 17 acre Conservation Pool, which is basically a settling basin immediately up gradient of the main lake. It will be designed to function as a large, regional wetland treatment BMP, with the potential to substantially reduce the TP and TSS loads targeted for reduction under the TMDLs (Lake Luxembourg / Core Creek TMDL for TP and TSS and the Neshaminy Creek watershed TMDL for TSS) (Priority Activity #1). Additionally, the project would implement restoration activities to address the impairments listed on the 2016 Draft PA Integrated Monitoring and Assessment Report, which include urban runoff/storm sewers (nutrients and TSS) and agriculture (nutrients and TSS) (Priority Activity #2). In addition, the conservation district will be developing updates to the 2005 EPA approved WIP developed for the Core Creek / Lake Luxembourg watershed.

Once the regional wetland project is completed, only 17 lbs of TP will need to be removed for complete TMDL compliance, and the TSS portion of the TMDL will be in complete compliance. Thus, future concerns and actions relative to Lake Luxembourg will focus on the long-term maintenance of all of the implemented BMPs, with an emphasis on the Conservation Pool.

Below is a table that lists the quantity of specific BMPs called for in the Core Creek WIP and the quantity constructed to date as reported to the DEP for the purpose of drafting this report. The last column indicates in terms of percent, the extent to which the WIP is implemented as reported to DEP for the purposes of preparing this report.

BMP/Action	Goal Amount	Implemented Amount	Unit	% Action Implemented
Infiltration Basin	574.00	0.04	AC	>10
Wetland Creation	3,600.00	0.34	AC	>10
Streambank & Shoreline Protection	13,200.00	2,000.00	FT	15
Riparian Forest Buffer	4.80	0.80	AC	17
Diversion	no goal established	430.00	FT	N/A
Filter Strip	no goal established	4,500.00	SQUARE FEET	N/A
Grassed Waterway	no goal established	885.00	FT	N/A
Heavy Use Area Protection	no goal established	0.20	AC	N/A
Nutrient Management	no goal established	6.00	AC	N/A
Roof Runoff Management	no goal established	280.00	FT	N/A
Stream Exclusion with Grazing Land Management	no goal established	4,420.00	FT	N/A
Structure for Water Control	no goal established	4.00	UNITS	N/A
Subsurface Drain	no goal established	3,850.00	FT	N/A
Waste Storage Facility	no goal established	1.00	UNITS	N/A

Below is a table which lists the pollutants of concern, target load reductions, the load reductions achieved, and, in terms of percent the extent to which pollutant load reduction goals have been met based on the BMPs reported to DEP for the purposes of preparing this report.

Pollutant ID	Unit of Measure	TMDL Load Reduction Goal	Load Reduction Achieved*	% Load Reduction Achieved-TMDL
Nitrogen	LBS/YR	**	214.30	
Phosphorus	LBS/YR	725.00	10.60	1
Sedimentation-Siltation	TONS/YR	430.00	21.70	5

*These numbers represent the 'Run with all BMPs' from the MapShed modeling results.

**There is no TMDL goal for Nitrogen.

Harvey's Lake, Luzerne County, NERO

Harvey's Lake is a 632 acre natural lake in Luzerne County. This lake was placed on the Integrated List of Impaired Waters shortly after a particularly bad algae bloom caused the cancellation of a triathlon which was to be held in and around Harvey's Lake. Algae blooms and bacteria problems were an ongoing and known problem. Harvey's Lake Borough and their Environmental Action Committee (EAC) actively sought funds to address the problem. Some twenty years later the initiative of concerned citizens and local government has resulted in the significant improvement of this community centerpiece.

The local community, having partnered with DEP and EPA utilized some \$1.9M in federal and state grants to implement: urban-type stormwater BMPs, streambank stabilizations, floating artificial wetland islands, and educational initiatives. Ongoing assessments of both in-lake conditions and stormwater events are monitored in order to understand the efficacy of the work. The various practices installed have targeted the reduction of incoming pollutants and have vastly improved the lake's water quality

Our waterbodies exist in a dynamic environment and sometimes unfortunately so. Hydrilla, a highly invasive and destructive aquatic plant, was found in Harvey's Lake in 2014 near the public boat launch. Surveys by experts estimate about 40 acres of shoreline are infested, all in the northern portion of the lake. Fortunately, the invasion was discovered rather early and the Harvey's Lake community was already actively seeking grants to treat this invasive as soon as next year. However, a few large lakes in PA, notably Glendale Lake and Lake Arthur, did not report their early invasions of Hydrilla and are now facing a 90% coverage to the shorelines. Infestations of that magnitude are very expensive, if not impossible to treat. If the Harvey's Lake infestation is allowed to spread, the lake could very well be placed back on the Impaired List for Aquatic Life/ Habitat issues.

The various practices installed targeted the reduction of incoming total phosphorus (TP) and vastly improved the lake's water quality. The TP load was quantified in the 1990's to be about 1,000 lbs/yr. The estimated load has been reduced by over 120 lbs/yr as called for in the TMDL. More telling is the improvement in water quality. The Trophic State Index (TSI) for TP in Harvey's Lake was about 50 (eutrophic) twenty years ago; it is now consistently between 30 and 40 (mesotrophic levels) since 2010. As a result, water quality improvements were documented. These water quality improvements resulted in Harvey's Lake attaining the Aquatic Life Use as defined in DEP's Water Quality Standards (Chapter 93). Harvey's Lake was delisted in the 2014 Integrated Report. This is certainly one of Pennsylvania's best examples of documented improvements under the 319 Program!

Below is a table listing the quantity of specific BMPs called for in the Harvey's Lake WIP and the quantity constructed to date. The last column indicates in terms of percent, the extent to which the WIP is implemented as reported to DEP for the purposes of preparing this report.

BMP/Action	Goal Amount	Implemented Amount	Unit	% Action Implemented
Access Road	2.00	0.00	UNITS	0
Baffle Boxes	5.00	5.00	UNITS	100
Road Ditch Creation/ Improvements	6.00	0.00	UNITS	0
Storm Water Wet Detention/Chemical Treatment System	12.00	31.00	UNITS	258
Streambank & Shoreline Protection	500.00	300.00	FT	60
Watershed Management Plan	1.00	1.00	UNITS	100
Wetland Enhancement	4.00	4.00	UNITS	100

Below is a table which lists the pollutants of concern, target load reductions, the load reductions achieved, and, in terms of percent the extent to which pollutant load reduction goals have been met based on the BMPs reported to DEP for the purposes of preparing this report.

Pollutant ID	Unit of Measure	TMDL Load Reduction Goal	Load Reduction Achieved	% Load Reduction Achieved-TMDL
Phosphorus	LBS/YR	230.00	122.70	53

Middle Spring Creek, Cumberland and Franklin Counties, SCRO

Independent improvements and cultural nuances resulted in shifting priorities and project output in the Middle Spring Creek watershed. The work completed for the Middle Spring Creek, Gum Run and Mains Run WIP originally intended to focus on agricultural operations located in this watershed. The first implementation grant awarded to program partners in this watershed targeted nine properties in the upper reaches of the watershed. Each of those nine sites were agricultural operations. The intended work dealt mostly with the construction of fencing and buffers, but also recommended some field practices like waterways and diversions. In the lapse of time from the approval of the WIP until the first phase of WIP implementation, that phase being field verification of existing conditions, the amount of practices implemented by landowners increased, some farmers installed fencing or small buffers on their own. In other cases, farms no longer had animals. Local program partners met with every landowner on the original nine sites listed in the grant workplan. The overall attitude of the residents was favorable to BMP implementation, but the citizens were not willing to accept “government” money. (A common and on-going challenge with the funding of conservation practices on farms operated by the “Plain Sect” is that members of such communities are hesitant or in some cases forbidden by religious conviction from accepting government funding). Many of the farmers took it upon themselves to make management changes based on the recommendations in the WIP. Other farmers contacted NRCS for conservation plan assistance. So even though there was an increase in BMP implementation, little money was spent through the grant and the specifics of BMP implementation cannot be determined. Information regarding BMPs financed privately by landowners and/or by the NRCS is not made available to the DEP by NRCS. Never the less, the condition of the watershed has improved.

In response to the local agricultural communities unwillingness to accept funding for BMP implementation, local program partners shifted the focus of their efforts from agricultural sources of nonpoint source pollution to urban/suburban nonpoint source pollution sources. Urban sites are identified in the WIP. The later part of FFY 2015 was devoted to the assessment and planning for BMP implementation at each of the urban sites listed in the WIP. A preliminary BMP recommendation was given for each urban site. Pending approval, this effort will be continued in the next implementation grant which is currently being reviewed. This will focus on survey and BMP design work of urban sites identified in the WIP.

It is speculative to suggest that increased activity in this watershed as a result of the approved WIP was the catalyst for landowner initiated and self-funded BMP implementation, but it is possible that increased education and outreach activities in preparation for WIP implementation was the driving force behind those improvements. That voluntary implementation from the agricultural community has allowed local partners to shift focus from agricultural sources of nonpoint source pollution to urban sources is another benefit. A third benefit to the Middle Spring Creek watershed as a result of this WIP is the increased communication between local government and higher education for the purpose of unified monitoring. Through meeting with the Middle Spring Watershed Association, Shippensburg University professors and ALLARM at Dickinson College, monitoring resources were pooled and monitoring activities were streamlined. Shippensburg University modified their monitoring activities based on locations of WIP sites to capture water quality changes in areas where BMP’s were proposed. Additionally, this communication brought additional attention on monitoring macroinvertebrates as well. A significant amount of data has already been collected and awaiting analysis. In the interim, local partners and citizens have stated that the Middle Spring Creek is healthier than it was five years ago.

Below is a table listing the quantity of certain BMPs called for in the Middle Spring WIP and the quantity constructed to date. The last column indicates in terms of percent, the extent to which the WIP is implemented as reported to DEP for the purposes of preparing this report. Note that this does not represent the complete list of BMPs specified in the WIP and may not represent the complete list of BMPs actually constructed in this watershed.

BMP/Action	Unit	Goal Amount	Implemented Amount	% Action Implemented
Grassed Waterway	AC	47.00	0.00	0
Riparian Forest Buffer	FT	5,372.00	4,754.00	88
Stream Exclusion with Grazing Land Management	FT	2,189.00	0.00	0
Streambank & Shoreline Protection	FT	400.00	0.00	0

Below is a table which lists the pollutants of concern, target load reductions, the load reductions achieved, and, in terms of percent the extent to which pollutant load reduction goals have been met based on the BMPs reported to DEP for the purposes of preparing this report.

Pollutant ID	Unit	Target Load Reduction Amount	Load Reduction Achieved	% Load Reduction Achieved
Sedimentation-Siltation	TONS/YR	133.00	70.60	53

Hungry Run, Mifflin, SCRO

The Hungry Run Watershed is located in Mifflin County, Pennsylvania, serving as a tributary to the Kishacoquillas Creek. This eight square mile watershed is characterized as agriculturally-dominated, with approximately 30% in active production, while 60% of the watershed is forested, leaving the remaining 10% encompassed in urban (residential) development. A Watershed Implementation Plan (WIP) for the watershed was approved in 2008.

The Hungry Run WIP acknowledged 26 farmers in the watershed. Among those, the District has confidently identified eight active farms with resource concerns. To date, four of these farms have been thoroughly addressed through the implementation of BMPs. Another three of the eight identified farms are listed for BMP implementation on the District's current §319 grant. Since approval of the WIP in 2008, no significant land use changes have occurred. As a result, the prescribed BMPs listed in the WIP have not been fundamentally altered from the initial assessment.

Highlighting some of the accomplishments in this watershed, the District has assisted farms to implement a total of 21,680 square feet of roofed structures in areas of high animal concentrations, significantly reducing runoff pollutants. Other notable accomplishments in the watershed include the installation of 3,260 contiguous linear feet of streambank fencing along the main stem of Hungry Run and 2,908 linear feet along an unnamed tributary. Collectively, these fencing projects protect approximately 3.25 acres of riparian buffer.

Watershed-scale monitoring efforts began in 2014, with plans to sustain monitoring on a long-term basis. Specifically, a comprehensive Surface Water Assessment Project (SWAP) is in place to sample nine sites within the watershed, on an annual basis. The project is a multi-tiered approach, encompassing field chemistry, water chemistry, physical habitat assessments, and biological assessments. Although two years of monitoring does not adequately capture trends, a comparison of the data reveals improvement in IBI scores on seven of the nine sampling sites, while two site scores showed slight degradation from 2014 to 2015. The average of all nine sites resulted in an IBI score improvement of 10.39, from year one to year two of monitoring.

Future priorities and areas of focus may include: 1) the headwaters region of the watershed; 2) areas surrounding tributary streams of the watershed; 3) and, the lower third of the watershed, which is strongly influenced by urban development. The District has developed rapport with landowners in the headwaters region and begun discussion toward BMP implementation that is intended to improve this critical region of the watershed. Outreach efforts and further assessment will be employed to develop rapport with landowners and gain greater insight into the condition of land use management and its influence on both the regions surrounding the watershed's tributaries and urban areas.

Below is a table listing the quantity of specific BMPs called for in the Hungry Run WIP and the quantity constructed to date as reported to the DEP for the purpose of drafting this report. The last column indicates in terms of percent, the extent to which the WIP is implemented as reported to DEP for the purposes of preparing this report.

BMP/Action	Unit	Goal Amount	Implemented Amount	% Action Implemented
Diversion	AC	92.00	0.00	0
Residue Management, No-till & Strip Till	AC	800.00	0.00	0
Riparian Forest Buffer	AC	56.80	2.46	4
Barnyard Runoff Management	UNITS	10.00	0.51	5
Stream Exclusion with Grazing Land Management	FT	35,376.00	11,015.00	31
Heavy Use Area Protection	AC	1.30	0.59	45
Nutrient Management	AC	1,209.00	565.00	47
Waste Management System	UNITS	8.00	5.00	63
Waste Storage Facility	UNITS	8.00	6.00	75
Grassed Waterway	FT	400.00	400.00	100
Watershed Management Plan	UNITS	1.00	1.00	100
Animal Trails and Walkways	FT	200.00	1,645.00	823

Below is a table which lists the pollutants of concern, target load reductions, the load reductions achieved, and, in terms of percent the extent to which pollutant load reduction goals have been met based on the BMPs reported to DEP for the purposes of preparing this report.

Pollutant ID	Unit of Measure	TMDL Load Reduction Goal**	Load Reduction Achieved*	% Load Reduction Achieved-TMDL
Nitrogen	LBS/YR		4,868.3	
Phosphorus	LBS/YR	974.00	478.00	77
Sedimentation-Siltation	TONS/YR	875.00	215.50	25

*these numbers represent the 'Run with all BMPs' from MapShed modeling results.

**There is no TMDL goal for Nitrogen.

North Branch Neshaminy/Lake Galena, Bucks County, SERO

Since the completion of the North Branch Neshaminy-Lake Galena Watershed Implementation Plan in late 2010, the Bucks County Conservation District (BCCD) and partners have been making steady progress on implementing best management practices to reduce nonpoint source pollution from nutrients and sediment in this watershed.

After the final revisions to the WIP were approved, one of the first priorities was to share the plan with key partners and members of the watershed community. The annual membership meeting of the North Branch Watershed Association in February 2011 presented the perfect forum; WIP project consultant Aqua Link, Inc. and BCCD presented a detailed description of the development of the plan and the final recommendations to approximately 30 people at Aldie Mansion, home of local conservation non-profit Heritage Conservancy.

BCCD was fortunate to have the opportunity to select from among several priority projects for the first phase of implementation funding in 2010, before the final WIP was approved. In this first implementation round, a series of agricultural best management practices were designed and installed on four farms in the watershed. The series of practices included but were not limited to basin expansion and outlet stabilization, construction of grassed diversions and rock-lined waterways. The practices addressed areas of active gully erosion on pasture or cropland. Landowners were eager to address these resource concerns and appreciated the technical assistance provided by the BCCD and Section 319 funding which made the projects possible. All of the projects were finalized by September 2012; and it is estimated that they collectively reduced the annual load to the North Branch Neshaminy and Lake Galena by 512 tons sediment, 512 lbs. phosphorus and 1,022 lbs. nitrogen.

While the Phase 1 grant was underway, BCCD also applied for funding for BMPs on Lake Galena. In-lake and shoreline improvements were excluded from the WIP due to budget constraints; however, their implementation can have a marked impact on water quality. BCCD applied to the Pennsylvania Lake Management Society mini-grant program to stabilize 2 areas of severely eroding shoreline along the lake. These projects, which were completed in May 2012, stabilized a total of 300 linear feet of shoreline using bioengineering methods, and in addition, established approximately 0.7 acres of shoreline and adjacent upland forested buffers. There was considerable volunteer involvement in the buffer planting and significant interest from the public when BCCD tended to the buffer throughout the following summers.

In 2013, BCCD applied for Phase 2 funding to implement the nutrient management plans of two equine operations in the watershed. Equine facilities can pose significant resource impacts, but are often difficult to fund through NRCS programs which are typically geared toward production agriculture. To date, one of the operations has completed all of the prescribed best management practices, with the exception of an expansion to their riparian buffer to be completed in Fall 2016. BCCD has encountered numerous challenges with the other facility which have added to the cost and time commitment on this project. Despite the setbacks the project is moving ahead and should be completed on schedule by the close of 2016. These projects will provide excellent education and outreach opportunities to reach other equine operations in the county.

Since the WIP was approved, the conservation district has not seen substantial land use changes in the watershed. Efforts will be made to continue WIP implementation in future years. Finally, throughout the 2015 growing season, BCCD (with lab analysis support from the DEP Clean Lakes program) completed water quality monitoring at 2 stations on Lake Galena. Although not all of the

data have been processed to date, preliminary analysis of the nutrient data suggests the lake is still hypereutrophic.

Below is a table listing the quantity of specific BMPs called for in the North Branch Neshaminy Creek WIP and the quantity constructed to date. The last column indicates in terms of percent, the extent to which the WIP is implemented as reported to DEP for the purposes of preparing this report.

BMP/Action	Goal Amount	Implemented Amount	Unit	% Action Implemented
Conservation Tillage	220.00	0.00	AC	0
Contour Farming	15.00	0.00	AC	0
Cover Crop	205.00	0.00	AC	0
Raingarden/ bioretention basin	254.00	0.00	AC	0
Wetland Creation	41.50	0.00	AC	0
Wetland Restoration	2.00	0.00	AC	0
Riparian Forest Buffer	26.00	0.70	AC	3
Streambank & Shoreline Protection	17,424.00	1,575.00	FT	9
Stream Exclusion with Grazing Land Management	2,112.00	560.00	FT	27
Nutrient Management	86.00	25.00	AC	29
Conservation Plan	no goal established	585.10	AC	N/A
Critical Area Planting	no goal established	0.40	AC	N/A
Diversion	no goal established	1,415.00	FT	N/A
Fence	no goal established	5,871.00	FT	N/A
Forest - Land Management	no goal established	18.40	AC	N/A
Grassed Waterway	no goal established	1,010.00	FT	N/A
Heavy Use Area Protection	no goal established	0.07	AC	N/A
Lined Waterway or Outlet	no goal established	745.00	FT	N/A
Mulching	no goal established	0.40	AC	N/A
Pasture & Hayland Planting	no goal established	1.50	AC	N/A
Sediment Basin	no goal established	1.00	UNITS	N/A
Structure for Water Control	no goal established	2.00	UNITS	N/A
Subsurface Drain	no goal established	1,730.00	FT	N/A
Tree/Shrub Establishment	no goal established	0.45	AC	N/A
Waste Storage Facility	no goal established	1.00	UNITS	N/A
Water & Sediment Control Basin	no goal established	1.00	UNITS	N/A

Below is a table which lists the pollutants of concern, target load reductions, the load reductions achieved, and, in terms of percent the extent to which pollutant load reduction goals have been met based on the BMPs reported to DEP for the purposes of preparing this report.

Pollutant ID	Unit of Measure	TMDL Load Reduction Goal	Load Reduction Achieved*	% Load Reduction Achieved-TMDL
Nitrogen	LBS/YR	**	610.10	-
Phosphorus	LBS/YR	1,316.00	117.20	9
Sedimentation-Siltation	TONS/YR	**	104.00	-

*These numbers represent the Sum of 'Run with only USDA BMPs' plus 'Run with only DEP/319 BMPs' from MapShed modeling results, and do not represent the 'Run with all BMPs'.

**There are no TMDL goals for Nitrogen or Sedimentation-Siltation.

Pine Creek, Allegheny County, SWRO

In 2009 a Watershed Implementation Plan (WIP) covering the Pine Creek watershed in northern Allegheny County was approved by the EPA. Pine Creek is a 67.3 sq. mi. watershed located entirely in northern Allegheny County, Pennsylvania. A tributary to the Allegheny River, this watershed encompasses 14 municipalities and 13 sub-watersheds as delineated in the EPA approved WIP of 2009. The average size of those sub-watersheds is 5.2 sq. mi each with the largest sub-watershed, North Fork, covering an area of 10.021 sq. mi. and the smallest, referred to as “Pine 1” covering an area of only 0.429 sq. mi. Since the approval of the 2009 WIP a number of key stakeholders have completed projects limiting the discharge of nonpoint source pollutants into this waterbody.

Currently, Pine Creek and her tributaries can be found on Pennsylvania’s Integrated List of Impaired Waters. Certain sections of the Pine Creek Main Stem, Crouse Run, Fish Run, Gourdhead Run, McCaskin Run, Montour Run, North Fork Pine Creek, and Willow Run can be found on lists 2, 4a, and 5 of the 2014 Integrated Report. Common sources of aquatic life impairment include: Urban Runoff/Storm Sewers (Nutrients), Land Development (Siltation), and Road Runoff (Siltation). Many sections of the Pine Creek watershed are also impaired for the recreational use resulting from pathogens of unknown sources.

Several key stakeholders are actively working to improve Pine Creek, among them include Etna Borough located near the mouth of the Pine Creek Main Stem and the Allegheny County Conservation District (ACCD). The ACCD collaborates with a number of Watershed Associations to encourage the completion of projects in several of the Pine Creek sub-watersheds. Those Watershed Associations include the Allegheny County Watershed Alliance.

State regulatory programs such as the Chapter 102 Program (pertaining to regulated earth disturbance activities) and the Chapter 105 Program (pertaining to encroachments and obstructions) influence and govern activities which may otherwise contribute nonpoint source pollution to Pine Creek. Other active and pertinent programs include the MS4 program the Dirt Gravel and Low Volume Roads (DGLV) Program.

Since the finalization of the Pine Creek WIP in 2009, program partners have reported the completion of 10 projects in the Pine Creek Watershed. These projects vary in type from wetland construction and stream channel stabilization to the construction of urban stormwater BMPs such as rain gardens and porous pavers parking pads. These projects include:

- Fawcett Fields Stream Restoration Project
- Hampton Township Water Treatment Plant Streambank Restoration Project
- North Fork Pine Creek Restoration Project (New Community Church, Pine Twp)
- North Park Lake dredging and ecosystem restoration
- PA Turnpike wetland construction and streambank stabilization
- Etna Borough Green Streetscape
- The Bryant Road Projects (Projects 2,6, and & from Table 4-11 in the WIP)
- Shaler Township Rain Garden

That Pine Creek is a locally appreciated and cared for waterbody is evidenced by the amount of citizen and local entity involvement. The Pine Creek watershed benefits from the work of several Watershed Associations including the Pine Creek Coalition, North Area Environmental Council, Allison Park Sportsmen as well as other NGOs such as the Pennsylvania Environmental Council and Trout Unlimited.

Further evidence of stewardship and improvement can be noted anecdotally in that the Pennsylvania Fish and Boat Commission (FBC) in association with local partners such as the Allegheny County Conservation District engages in trout stocking on the Pine Creek Main Stem. Further, the FBC lists most of the main stem of Pine Creek as *Approved Trout Waters* with certain sections being listed as a *Special Regulation Stream* providing for year-round fishing. Further, North Park Lake is listed as an *Approved, Year-Round Trout Lake*.

Below is a table listing the quantity of specific BMPs called for in the Pine Creek WIP and the quantity reported to DEP as constructed to date. The last column indicates in terms of percent, the extent to which the WIP is implemented as reported to DEP for the purposes of preparing this report.

BMP/Action	Goal Amount	Implemented Amount	Unit	% Action Implemented
Raingarden/bioretenion basin	no goal established	8250	SF	N/A
Storm Water Wet Detention/Chemical Treatment System	no goal established	0	Units	N/A
Stream Channel Stabilization	no goal established	1,495.00	FT	N/A
Streambank & Shoreline Protection	no goal established	2,000.00	FT	N/A
Riparian Forest Buffer	no goal established	0	AC	N/A
Porous Pavement	no goal established	0	AC	N/A
Roof Runoff Management	no goal established	85.19	CY	N/A

Below is a table which lists the pollutants of concern, target load reductions, the load reductions achieved, and, in terms of percent the extent to which pollutant load reduction goals have been met based on the BMPs reported to DEP for the purposes of preparing this report.

Pollutant ID	Unit of Measure	TMDL Load Reduction Goal*	Load Reduction Achieved	% Load Reduction Achieved-TMDL
Nitrogen	LBS/YR	129	250.17	193.93
Phosphorus	LBS/YR	257	50.03	19.47
Sedimentation-Siltation	TONS/YR	1450	84	5.79
Total Suspended Solids	LBS/YR	0	19.72	N/A

*TMDL Load Reduction Goals refer to WIP load reduction goals found for the "PineCr" subwatershed.

Appendix E: Commonly used Acronyms

ACOE	Army Corps of Engineers
AMS	Above Mean Sea-level
AMD	Acid Mine Drainage
AMLIS	Abandoned Mine Land Inventory Sites
ANF	Allegheny National Forest
Assoc.	Association
BAMR	Bureau of Abandoned Mine Reclamation
Bay WIP	The Chesapeake Bay Watershed Implementation Plan (not to be confused with §319 approved WIPs drafted for a very specific 35 watersheds within the commonwealth)
BCR	Bureau of Conservation and Restoration
BDMO	Bureau of District Mining Operations
BGY	billion gallons per year
BMP	Best Management Practice
CAFO	Concentrated Animal Feeding Operation
CAO	Concentrated Animal Operation
CB WIP	See “Bay WIP”
CD	Conservation District
CFA	Commonwealth Finance Authority
Chesapeake Bay WIP	See “Bay WIP”
CREP	Conservation Reserve Enhancement Program
CWA	Clean Water Act
DCNR	(Pennsylvania) Department of Conservation and Natural Resources
DCED	Department of Community and Economic Development
DEP	(Pennsylvania) Department of Environmental Protection
DE	Delaware
DOD	Department of Defense
DOI	Department of Interior
DRBC	Delaware River Basin Commission
EPA	Environmental Protection Agency
EPCAMR	Eastern Pennsylvania Coalition for Abandoned Mine Reclamation
EQIP	Environmental Quality Incentives Program

ESM	Environmentally Sensitive Management
E&S	Erosion and Sedimentation
EV	Exceptional Value
FEMA	Federal Emergency Management Agency
FFY	Federal Fiscal Year
FSA	Farm Service Agency
FTE	Full Time Equivelant
FY	Fiscal Year
GIS	Geographic Information System
GRTS	Grants Reporting and Tracking System
HQ	depending on context; High Quality or Headquarters
ICE	In-stream Comprehensive Evaluation
IPM	Integrated Pest Management
MD	Maryland
MMP	Manure Management Plan
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
Mt.	Mount or Mountain
MS4	Municipal Separate Storm Sewer
NFWF	National Fish and Wildlife Foundation
NFIP	National Flood Insurance Program
NGO	Non-Government Organization
NJ	New Jersey
NMP	Nutrient Management Plan
NOAA	National Ocean and Atmospheric Agency
NOMA	Nutrient and Odor Management Act
NPDES	National Pollution Discharge Elimination System
NPS	Non-point Source
NRCS	National Resource Conservation Service
O&M	Operation and Maintenance
OM&R	Operation, Maintenance, and Replacement
ORSANCO	Ohio River Valley Water Sanitation Commission
OSM	Office of Surface Mining
PA	Pennsylvania

PCSM	Post Construction Stormwater Management
PA SEC	Pennsylvania Senior Environmental Corps
PaFBC	Pennsylvania Fish and Boat Commission
PACD	Pennsylvania Association of Conservation Districts
PDA	Pennsylvania Department of Agriculture
PennDOT	Pennsylvania Department of Transportation
PGC	Pennsylvania Game Commission
PSU	Penn State University
PWRP	Pennsylvania Wetland Reserve Program
RAMLIS	Reclaimed Abandoned Mine Land Inventory System
RAWAPI	Regional Agricultural Watershed Assessment Program Initiative
RBP	Rapid Bioassessment Protocol
RC&D	Resource Conservation and Development
RPI	Restoration Potential Index
SCC	State Conservation Commission
SEOs	Sewage Enforcement Officers
SMCRA	Surface Mine Control and Reclamation Act of 1977
SRBC	Susquehanna River Basin Commission
SSWAP	Statewide Surface Water Assessment Program
STEPL	Spreadsheet Tool for Estimating Pollutant Loads
TU	Trout Unlimited
TMDL	Total Maximum Daily Load
USNPS	United States National Parks Service
USDA	United States Department of Agriculture
USFS	United States Forest Service
USGS	United States Geological Service
VAO	Volunteer Animal Operation
WAs	Watershed Associations
WIP	Watershed Implementation Plan
WPCAMR	Western Pennsylvania Coalition for Abandoned Mine Reclamation
WREN	Water Resources Education Network

Appendix E: Pennsylvania Nonpoint Source Management Program Funding

(All figures pertain to the federal fiscal year unless otherwise noted)

State Sources (FY)	FFY 2013	FFY 2014	FFY 2015
DEP	(\$ millions)	(\$ millions)	(\$ millions)
Conservation District Watershed Specialists	2.079	2.136	2.178
Environment Stewardship and Watershed Protection (Growing Greener):			
Watershed Protection Grants	18.008	17.393	21.225
AMD Set-aside Grants	0.406	2.0310	1.193
Sub-total	20.493	21.560	24.596
DEP			
Chesapeake Bay Implementation Grant; State Fiscal Year Funding:			
Technical and Engineering Assistance	2.723	2.925	3.049
Special Projects	1.064	0.666	1.512
Sub-total	3.787	3.591	4.561
DEP			
Conservation District Fund Allocation Program (line item plus UGWF monies)	2.506	4.381	4.381
Abandoned Mine Reclamation Program Annual Projects	2.605	1.457	0.0
PA Infrastructure and Investment Authority (PENNVEST) –grant/loan funds awarded 2015	3.712	6.523	10.593
Sub-total	8.823	12.361	14.974
PDA			
Dirt and Gravel Roads Pollution Prevention Program	3.528	20.854	20.854
Nutrient Management Fund (Transfer)	2.714	2.714	2.714
Conservation District Fund Allocation Program (line item plus UGWF monies)	0.869	2.744	2.744
Resource Enhancement and Protection Tax Credits Available	10.000	10.000	10.000
Sub-total	17.111	36.312	36.312
PUC			
Conservation District Funding from UGWF		3.750	3.750
Sub-total		3.750	3.750
Commonwealth Financing Authority			
Act 13 NPS Funding (WR and AMD projects)	10.959	3.147	0.0
Sub-total	10.959	3.147	0.0
State Funding Sub-total	61.173	80.721	84.193

Federal Sources (FFY)	FFY 2013	FFY 2014	FFY 2015
U.S. Environmental Protection Agency			
Section 319 Nonpoint Source Management Program	4.379	4.672	4.585
National Fish and Wildlife Foundation			
Chesapeake Bay Small Watershed Grant-annual Funding (PA-specific grants)	0.487	0.553	1.075
Chesapeake Bay Innovative Nutrient and Sediment Reduction Grant (PA-specific grants)	1.207	1.916	1.899
Sub-total	6.073	7.141	7.559
U.S.D.A. Natural Resources Conservation Service Obligated Funding Levels:			
Agricultural Management Assistance	0.280	1.080	0.36
Chesapeake Bay Watershed Initiative	9.100	0.0	0.0
Environmental Quality Incentive Program	21.100	21.790	20.100
Regional Conservation Partnership Program (RCP)	0.0	0.0	1.066
National Water Quality Initiative (NWQI)	1.323	0.826	0.86
Farm and Ranchland Protection Program	3.000	0.0	0.0
Agric Cons Easement Program – Ag Land Easements		4.62	0.816
Conservation Stewardship Program (new contracts)	0.700	0.350	2.92
Conservation Stewardship Program (funds obligated to pay on prior year contracts)	6.200	6.180	2.64
Grasslands Reserve Program		0.310	0.0
Healthy Forests Reserve Program		0.660	0.0
Wetlands Reserve Program	4.750	0.0	0.0
Agric Cons Easement Program – Wetland Reserve Easements		3.860	2.80
Wildlife Habitat Incentive Program	2.280	0.0	0.0
Sub-total	47.410	38.850	31.562
U.S.D.A. Farm Services Agency			
Conservation Reserve Enhancement Program Includes Financial Incentives, Cost-Share and Rental Payments.	23.753	21.885	20.484
Biomass Crop Assistance Program	0.152	0.013	.003
Grassland Reserve Program	0.618	0.150	.145
Sub-total	24.523	22.048	20.632
Office of Surface Mining			
AML Reclamation Funding Includes AML, Clean Streams Initiative and Watershed Cooperative Agreement Program.	61.735	52.369	44.018
Sub-total:	61.735	52.369	44.018
Federal Funding Sub-total	139.741	120.408	103.771
Overall Annual Total	200.914	201.129	187.964

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