

Commonwealth of Pennsylvania
Nonpoint Source
MANAGEMENT PROGRAM

2017

Annual Report



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

Office of Water Resources Planning

Table of Contents

I. Executive Summary	3
II. Program Overview	5
Vision Statement	5
Goals of the NPS Program	5
III. Annual Load Reduction Achievements	6
IV. Highlighted Programs	7
The Conservation District Watershed Specialists	7
WPCAMR Quick Response Program	7
CREP	8
Growing Greener	11
V. Highlighted Projects	12
(1308) Gibson-Halstock	12
Habitat on the Schuylkill River	12
(1314) South Branch Plum Creek Phase 2 Construction	14
(1315) Hungry Run Phase 2 Construction	15
(1318) Etna Borough Green Streets Phase 2 Design and Permit	22
Stormwater Basin Planting – Environmental and Educational Benefits	25
iMap Invasives partners with the NPS Program	27
VI. The Future of Nonpoint Source Management in Pennsylvania	28
VII. Appendices	29
Appendix A: Goals, Objectives, and Milestones Tracking Sheet	29
Appendix B: Qualitative Goals, Objectives, and Milestones	30
Appendix C: Description of Goals, Objectives, and Milestones	38
Appendix D: Detailed Progress on Selected WIPs	57
Appendix E: Commonly Used Acronyms	108
Appendix F: Pennsylvania Nonpoint Source Management Program Funding	111

EXECUTIVE SUMMARY

The enclosed report is prepared and submitted to EPA by DEP in accordance with Section 319 grant requirements and in satisfaction of Objective 5.1 of the Nonpoint Source Management Plan, 2014 Update. The information contained herein, unless otherwise specified, will reflect data and activities that occurred during FFY2017. In the enclosed report, Pennsylvania reports for the following information:

- 14,906,363 lbs./year reduction in Nitrogen
- 545,641 lbs./year reduction in Phosphorus
- 243,806 tons/year reduction in Sediment
- 18,341,033 lbs./year reduction in Iron
- 3,198,320 lbs./year reduction in Manganese
- 28,907,359 lbs./year reduction in Acidity

Further, in the enclosed report, discussion is provided on several programs essential to Pennsylvania's ability to reduce NPS pollutant loads. Those programs are: the Conservation District Watershed Specialist (CDWS) program, the Conservation Reserve Enhancement Program (CREP), the Quick Response Program administered by the Western Pennsylvania Coalition of Abandoned Mine Reclamation (WPCAMR), and the Growing Greener program. Growing Greener continues to be the single largest financial contribution in the fight against nonpoint source pollution in Pennsylvania.

Also included in this report is a review of several projects, funded with FFY 2013 Section 319 funds that were recently completed. Those projects are: the Gibson-Halstock in Little Laurel Run, Clearfield County; the South Branch Plum Creek Phase 2 Construction in Indiana County; the Hungry Run Phase 2 Construction project in Mifflin County; and the Etna Borough Green Streets Phase 2 Design and Permit project in Allegheny County. Two points of interest that should be noted here: the Hungry Run is often considered part of the Upper Kish WIP and was also included in the commonwealth's first Alternative-TMDL, a plan that was approved by EPA in FFY 2017, and the project in Etna Borough is the continuation of a Green Infrastructure Master Plan that has been in the implementation phase for several years and has been credited with improving environmental quality and quality of life for the residents of that borough.

Other information is included in this report that the reader is encouraged to explore, this information includes a discussion on a Schuylkill River fish habitat project that was only made possible because of effective AMD mitigation and a discussion on a basin retrofit project in Luzerne County, spearheaded by the Luzerne County Watershed Specialist. Basin retrofits were a popular BMP in the SFY 2016 round of Growing Greener and represent one of the most logical and attainable green infrastructure BMPs a municipality can pursue. Basin retrofits are the epitome of "low hanging fruit" in the world of urban stormwater management.

Lastly, the reader is encouraged to familiarize themselves with the suite of appendices included with this report; especially Appendix A, a landscape format table that shows continued satisfaction of the Objectives established in the Nonpoint Source Management Plan, Appendix B that reviews Objectives of the Management Plan that cannot be discussed with pure data and require a qualitative assessment. Appendix D is a report on a selection of WIPs currently being implemented by Pennsylvania's NPS Management Program; this section reviews the status relative to completion of those reported WIPs. and Lastly Appendix F is a table showing funding sources for NPS mitigation efforts throughout the commonwealth and the fluctuations common in the arena of publicly funded environmental restoration.

In short, the enclosed report satisfies grant requirements, accomplishes a stated objective and reports on the projects, programs, and funding sources that empower Pennsylvania to restore streams and lakes otherwise degraded by nonpoint source pollution.

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.

ANNUAL LOAD REDUCTION ACHIEVEMENTS

	Nitrogen (lbs./year)	Phosphorus (lbs./year)	Sediment (tons/year)
Regulatory Programs	2,273,055.60	148,617.63	4,794.82
State and Federal Conservation Programs	1,773,124.71	115,134.86	2,259.72
Conservation Tillage and Cover Crop Implementation	10,860,183.00	281,888.74	236,751.49
Total:	14,906,363.31	545,641.23	243,806.03

Table 1: Pollutant load reductions derived through modeling the positive impacts implemented BMPs have on watersheds throughout the commonwealth. These load reductions are generally associated with non-AMD related impairments.

	Iron (lbs./year)	Aluminum (lbs./year)	Acidity (lbs./year)
Active	1,104,052	221,117	5,993,629
Passive	17,236,981	2,977,203	22,913,730
Total:	18,341,033	3,198,320	28,907,359

Table 2: Pollutant load reductions associated with AMD remediation work. These load reductions were derived by modeling the positive impacts implemented BMPs have on watersheds throughout the commonwealth.

HIGHLIGHTED PROGRAMS

CONSERVATION DISTRICT WATERSHED SPECIALIST PROGRAM **(A 319 Match Program)**

The Conservation District Watershed Specialist (CDWS) Program was founded circa 2000 on Margaret Mead's premise that "a small group of thoughtful committed citizens can change the world." This program embraced the philosophy that decentralized, local action would drive significant water quality improvements. In the roughly 17 years this program has been in operation, it has indeed shown that maintaining an individual at the local level to motivate and focus a community to action does indeed result in water quality improvement.

The CDWS program underwent some changes in FFY 2016; FFY 2017 represents the first full year since the program reaffirmed its intent to focus efforts at the local watershed scale. Work continues with this program to develop and enhance data collection efforts that, once complete, will more affectively show the full impact this group of County Conservation District employees has on water quality at the local level. While a report of the impact of BMP implementation, education, outreach, monitoring and invasive species removal is not yet available, because of changes made to the program, previous research has shown the individuals involved with this program solicit at least \$10 for every \$1 spent on their position. Further, this program has been shown to result in: over 400 acres of buffer installation, over 5,000 miles of stream restoration, over 40 acres of wetland creation, the construction of over 1,500 rain barrels over 100 rain gardens, the planting of over 36,000 trees and the education of over 12,000 students. Those numbers were collected during FFY 2016 as part of programmatic review. It is anticipated, that continued database and GIS based data collection will enable Pennsylvania to more accurately track the benefits realized from this high-impact locally driven program.

WPCAMR QUICK RESPONSE

Thanks to the initiation of the Growing Greener program back in 1999, there was a large increase in the number of BMP's being constructed by various organizations, many of them watershed groups and conservation districts. It became very apparent early on of the importance of the Operation, Maintenance, and Repair (OM&R) of all the projects groups were installing, including the passive treatment systems. If a problem developed with the BMP, a group could apply for Growing Greener funds (or some other source) but in face of imminent failure, it was not a quick enough way to get funding to make repairs. An OM&R Workgroup, an ad hoc group of experts and practitioners in AMD Remediation, came up with an idea to get money to the organizations quicker. The Quick Response program was then developed.

Western PA Coalition of Abandoned Mine Reclamation (WPCAMR), as project sponsor and administrator, applied to Growing Greener for "Quick Response" funding and was successful in 2006. Groups who need emergency repair funding (both AMD and non-AMD projects) must first contact their local watershed manager with the problem. The manager does a site visit to complete

an assessment and decide if it is eligible. Then one or more cost estimates are obtained and an application is made to PADEP. If it is still deemed eligible the application is passed on to WPCAMR who in turn instructs the group to make repairs. If, after inspection from PADEP, the repairs are satisfactory, the group requests a reimbursement from WPCAMR. This whole process can be completed in as quick as a week or two as compared to months when waiting for a grant to open, apply and wait for approval.

The program has been so successful that WPCAMR recently applied for and was awarded “Quick Response 8” from Growing Greener. In the past four years, 24 projects have been repaired preventing environmental degradation or even more costly repairs if the group was forced to wait on grant programs to get funding. It needs to be stressed that although most of the use is for repairing passive treatment systems, the funding is available for all types of projects if they are Growing Greener eligible.

THE CONSERVATION RESERVE ENHANCEMENT PROGRAM **(CREP)**

The CREP program is an offshoot of the Conservation Reserve Program (CRP), the country's largest private-lands environmental improvement program. Administered by the U.S. Department of Agriculture's Farm Service Agency (FSA), the program is a partnership between farmers, state and federal government, and private groups. By combining CRP resources with state and private programs, CREP provides farmers and other landowners with a sound financial package for conserving and enhancing natural resources.

The CREP project began in Pennsylvania when the state government and several local nongovernmental groups identified an agriculture-related environmental issue of state and national significance. These parties worked with the state's FSA office to develop a project proposal to address specific environmental issues and goals, such as the reduction of nonpoint source pollution in the state's water bodies, and enhancement of wildlife habitat.

CREP contracts require a 10- to 15-year commitment to keep lands out of agricultural production. A federal annual rental rate is offered, plus cost-share of up to 100 percent of the eligible costs to install the practice: 50 percent from FSA and 50 percent from the PA Department of Environmental Protection (DEP). CREP is familiar to farmers because it is similar to CRP that they know well.

To be eligible, lands must have been planted with an agricultural commodity during four out of the six years between 2002 and 2007, and must have been held by the landowner for the last 12 months. Highly erodible lands (HEL) eligible for enrollment meet the following criteria: all pasture, hayland, and cropland within 180 feet of a stream regardless of Erodibility Index (EI) value; all cropland within 1,000 feet of a stream with $EI > 8$ and < 12 ; all cropland further than 1,000 feet from a stream with an EI of greater than 12. The EI is determined by dividing potential erosion (from all sources except gully erosion) by the T value, which is the rate of soil erosion above which long term productivity may be adversely affected.

The PA CREP program is currently active in all watersheds across the state. Delaware River Basin CREP began in 2017 after several years of efforts to get it going. The Delaware River Basin CREP coordinate federal, state and local efforts to address various natural resource issues throughout the project area by seeking to retire 20,000 acres of marginal cropland, pastureland and/or environmentally sensitive land to include: 16,000 acres of HEL practices, 2,000 acres of riparian forest buffers, 1,500 acres of other buffer practices, and 500 acres of wetland restoration. Because CREP is new in the Delaware, information regarding performance is not yet available, however below is a listing of achievements as a result of CREP in the Ohio and Chesapeake basins.

<i>Ohio Basin Achievements of the CREP program in 2017:</i>	<i>Chesapeake Basin Achievements of the CREP program in 2017:</i>
• 44 contracts were approved on 782 acres • 51 acres of forested riparian buffers were installed • 191 acres of native grasses were planted • Pollution prevented from entering the Ohio River Basin – 7,206 tons of sediment – 407,299 pounds of nitrogen – 11,984 pounds of phosphorous	• 606 contracts were approved on 5,379 acres • 1,505 acres of forested riparian buffers were installed • 1,379 acres of native grasses were planted • Pollution prevented from entering the Chesapeake Bay – 55,665 tons of sediment – 2.72 million pounds of nitrogen – 145,944 pounds of phosphorus

To achieve the results listed above, FSA and CREP collaborate with willing landowners to design, implement and maintain specified and approved practices appropriate for lands enrolled in the program. Those practices as well as certain cost share information is provided in Table 3 below.

Federal State and Local partners collaborate to make CREP a success in PA.



Practices by Federal and State Maximum Cost Share Per Acre

CREP PRACTICE	SRR INCENTIVE	COST SHARE		INCENTIVES		
		FSA	PA	SIP	PIP (% of Eligible Costs)	MISC
CP1 – Establishment of Cool Season Grass	(1)	50%	50% up to \$40/acre (5)			
CP2 – Establishment of Native Grasses (Mixed Varieties)	(1)	50%	50% up to \$120/acre (5)			PA Game Commission (3)
CP4D – Permanent Wildlife Habitat	(1)	50%	50% up to \$160/acre (5)			
CP8A – Grassed Waterways	150%	50%	50% up to \$1000/acre (5)	\$100/acre	40%	
CP9 – Shallow Water Area for Wildlife	(1)	50%	N/A	N/A	40%	
CP12 – Wildlife Food Plot	(1)	N/A	N/A			
CP15A – Establishment of Permanent Vegetative Cover: Contour Strips	150%	50%	50% up to \$65/acre (5)	N/A	40%	
CP21 – Filter Strips	150%	50%	50% up to \$70/acre	\$100/acre	40%	
CP22 – Riparian Buffer (Without Fencing)	150%	50%	50% up to \$850/acre (2)	\$100/acre	40%	
CP22 – Riparian Buffer (With Fencing)	150%	50%	50% up to \$1250/acre (2)	\$100/acre	40%	
CP23 – Wetland Restoration	150%	50%	50% up to \$740/acre	\$150/acre	40%	
CP29 – Wildlife Habitat Buffer (without fencing) (4)	150%	50%	None	\$100/acre	40%	
CP29 – Wildlife Habitat Buffer (with fencing) (4)	150%	50%	50% up to \$400/acre (2)	\$100/acre	40%	
CP30 – Wetland Buffer (4)	150%	50%	None	\$100/acre	40%	
CP33 – Habitat Buffer for Upland Birds	150%	50%	50% up to \$65/acre (5)	\$100/acre	40%	

Table 3: A table showing eligible CREP practices and maximum state cost shares amounts per enrolled acre.

THE GROWING GREENER PROGRAM

The Growing Greener program remains the single largest public investment in the protection and restoration of our water resource in Pennsylvania. In FFY 2017, Growing Greener funded 106 projects throughout the commonwealth. Funded projects range in type from nutrient management on agricultural operations to support for watershed associations as they pursue the design, permitting and implantation of BMPs essential to the abatement of polluted runoff. In a press release dated December 7, 2017, Governor Wolf stated “These grant projects represent important opportunities for citizen and community engagement in local water cleanup around the commonwealth. The vitally important roster of local governments and nonprofit organizations who willingly tackle them is a great representation of our spirit of partnership. Their efforts are invaluable investments in our public health, the vitality of our communities, and the quality of our environment in Pennsylvania.”

Unique to the SFY 2016 Growing Greener program; funding devoted to this program was split between projects seeking to improve water quality in the Chesapeake Bay as opposed to those projects proposing to work outside of “the Bay” basin. (Note that while there are many bays, including the Delaware Bay, currently in the world of nonpoint source pollution management in the mid-Atlantic region only the Chesapeake is referred to as *the* Bay). Ultimately, 51 projects were selected for funding in Bay and 55 were outside of the Bay basin. This division resulted in 65.5% of the funding being devoted to the Bay restoration effort with the remainder going to projects outside of the bay. This figure is based on the total of \$20.715 million being devoted to projects not including Section 319, SMCRA or AMD-Set Aside funded projects.



Pennsylvania's \$20million Growing Greener program provides funding to local conservation efforts such as this stream restoration and buffer project in southern Lancaster County.

HIGHLIGHTED PROJECTS

Gibson-Halstock AMD Passive Treatment Construction (#1308)

Little Laurel Run is a tributary of Clearfield Creek in Cambria County. The tributary is mostly forested with evidence of past mining activities causing impairment by abandoned mine drainage (AMD). One of the causes of the AMD pollution in Little Laurel Run, the Gibson-Halstock discharge, is located on lands owned by the PA Game Commission, a willing landowner and partner. Recently, the Clearfield Creek Watershed Association with partners Bender Coal Company, Alder Run Engineering and Earth Shapers LLC constructed a passive treatment system to treat the acidic water with funding from EPA's Nonpoint Source 319 Program.



Photo of the settling pond for the upslope limestone ponds in the Gibson Halstock treatment system.

The Gibson-Halstock surface mine removed the Brookville and Lower Kittanning coal seams prior to 1972, along a strip along the hillside about 5,000 feet long. No reclamation was done. The discharging water flows along the valley between the highwall and the spoil, then flows out through a notch in the spoil, and down slope into Little Laurel Run. As is shown in Table 4, this discharge has an average flow of 94 gal/min with pH 3.4, acidity of 58 mg/L, Fe 2.3 of mg/L, and Al of 4.0 mg/L. The passive treatment system consists of a sediment forebay, two limestone cells and two settling basins. Preliminary water quality exiting has a pH 6.76, iron at 1.2 mg/L, aluminum at 0.33 mg/L and acidity is a negative -21 mg/L with an alkalinity of 32 mg/L.

(12) FINAL August 2, 2018

Therefore, the treated water is now net alkaline, the acidity is buffered and is not negatively affecting the stream.

	Ave Flow (gal/min)	pH	Aluminum (mg/l)	Iron (Fe) (mg/L)	Acidity (mg/l)
Discharge	94	3.4	4.0	2.3	58
Post treatment		6.76	0.33	1.2	-21

Table 4: A table showing measured water quality parameters at the point of discharge and below the treatment system. Results indicate significant water quality improvement.

This project addressed the 5th out of 6 priorities in the watershed. This passive treatment system, along with others upstream, continues to improve Little Laurel Run and water quality sampling has shown a decrease of acidity at the mouth. More work will need done to restore the water quality in the tributary but great strides continue to be made towards this goal.

HABITAT ON THE SCHUYLKILL RIVER

For many years the Schuylkill Headwaters Association in partnership with Schuylkill Conservation District (SCD), USGS, PADEP and many others have been working towards cleaning up the abandoned mine drainage (AMD) that has been affecting the headwaters of the Schuylkill River. With the construction of four passive treatment systems, three of which funded by Section 319 monies, the water in the river has improved tremendously. Water quality at New Philadelphia, downstream of the systems, is now net alkaline providing a much better place for fish to live.



A Log Framed Stone Deflector (left) and a Plunge Pool (right) constructed as part of this volunteer-led habitat improvement project. The installation of these BMPs would have been futile had it not been for the dedicated NPS reduction efforts focused on this watershed years prior.

Since the water is to the point it could support trout, the next step was to improve the habitat for them to live in. Through a partnership of Schuylkill County Trout Unlimited and Schuylkill Conservation District, a trout habitat project was completed at the ballfield in New Philadelphia.

This part of the river is easily accessible and a great opportunity not only to restore a healthy fishery but to also increase recreation on the river.

Some of the structures installed over a 1,310 foot section were log framed stone deflectors, single log vane deflector, log framed cross vanes and random boulders. The project was funded by a Trout Unlimited Embrace-A-Stream grant received by Schuylkill County Trout Unlimited. It was designed and given oversight by the Trout Unlimited Pennsylvania Coldwater Heritage Program's habitat project coordinator. There were many partners involved in the project along with 37 volunteers. Logs for the structures, made of larch trees, were supplied through DCNR's Weiser Forest District. K&S Tree Service delivered the logs as a donation. R.E. Pearson Middleport Quarry provided stone at a reduced rate and New Philadelphia Borough hauled the stone to the site. Both Blythe Township Water Authority and Madonna Enterprise Construction Company provided equipment and operators. More information regarding the water quality improvements resulting from this partner lead effort can be found in Appendix D on page 57. Partners plan to expand on this project and build more structures in 2018.

SOUTH BRANCH PLUM CREEK **PHASE 2 CONSTRUCTION (#1314)**

This series of projects are the second of several phases outlined in the restoration of the South Branch of Plum Creek Watershed Implementation Plan (WIP). By implementing projects on locations identified in the WIP, Indiana County Conservation District (ICCD) is actively working to reduce sediment loading within the watershed to meet Total Maximum Daily Load (TMDL) goals. The TMDL was developed in this watershed by PADEP after stream assessments in 2002 determined the watershed was impaired due to excess sediment and nutrients.

In the second phase of restoration, ICCD primarily focused its efforts on agricultural operations, unpaved road project sites, and areas identified for streambank stabilization. ICCD followed the headwaters-to-mainstem approach, identified in the WIP, with the goal of reducing the amount of sediments entering the stream and increasing storm runoff concentration times with the intent of reducing the hydraulic stress placed on the stream banks.

Most of the agriculture in the South Branch of Plum Creek exists in the Leisure Run, Reddings Run and Goose Run sub watersheds, along with the upper reaches of the mainstem. Large sections of the lower mainstem lack forested buffers and displayed excessive amounts of streambank undercutting and erosion. Much of this problem is due to landowners mowing the riparian areas for aesthetic reasons and cropland.

Pollution Sources and Solutions - Agriculture

One of the major sources of sediment pollution in the watershed is from grazing-related agriculture where cattle have unrestricted access to the stream. In many cases, the most efficient solution to this problem is to install streambank fencing and restrict livestock stream access to stabilize

crossings. In this phase, ICCD worked to improve water quality in the South Branch by implementing agricultural BMPs on livestock and animal operations within the watershed.

ICCD focused mainly on implementation of prescribed grazing plans including fencing, and watering facilities as well as, animal heavy use and manure storage areas, animal trails and walkways, surface structures for water control, and stream crossings.

Most of the BMPs installed were designed to address and minimize heavy use areas and to meet grazing plan BMP recommendations.



A before and after shot of a barnyard and riparian pasture area in the South Branch of Plum Creek watershed.

HUNGRY RUN

PHASE 2 CONSTRUCTION (#1315)

In FFY 2013, a sub-grant was awarded under the Section 319 program from DEP to the Mifflin County Conservation District to implement work designed and permitted under a previous Section 319 grant. This work included streambank restoration and stormwater management BMPs as well as educational features and activities, all of which were designed to reduce NPS loads to Hungry Run and heighten awareness of water quality concerns at the local level. Now, as FFY 2017 ends and FFY 2013 grants are finalized, the results of this grant are being recognized.

Hungry Run is a relatively small watershed. At roughly eight square miles, the Hungry Run Watershed Implementation Plan (WIP) represents one of the smallest watersheds covered by an EPA-approved WIP in Pennsylvania. Hungry Run is listed in the Integrated Report as impaired for the Aquatic Life Use by Ag-Silts and Ag-Nutrients and can be found on category list 5-Alternative. The nutrient and sediment issues resulting from agriculture, as well as bank degradation resulting from stormwater runoff in the developed portion of this watershed, are the focus of the Hungry Run WIP.

The current Hungry Run WIP was last revised in 2008, since that time, eight Section 319-funded projects have occurred in this watershed. Some of those projects focused only on monitoring and some of those workplans were written to include work for both Hungry Run and the neighboring Upper Kish watershed. Regardless, a noteworthy and focused amount of time, money, and effort has been dedicated to the restoration of this eight-square mile watershed.

Specific to this most recently closed project, the Mifflin County Conservation District in association with other local partners, effectively used Section 319 funds to construct stream restoration, riparian plantings, educational observation platforms and stormwater management BMPs improving 1,340 linear feet of streambank. BMPs employed include: bank grading, mounds, riparian plantings, and rock vanes.

That these BMPs were constructed on multiple privately-owned parcels including one church, two individually-owned parcels, the Burnham Lions Club (which includes a community pool), and the Burnham Borough via an alley easement and their First Avenue Playground. Again, these partnerships show the essential nature of partnering and local involvement that, without which, there would be no success in Pennsylvania's nonpoint source management program.

Project success can be measured in numerous ways. Commonly, success of projects focused on NPS pollution abatement and/or water quality improvement is quantified by modeled pollutant load reductions. Other times, project success is measured by improved water quality as quantified by actual field observations (monitoring data). Yet another method of quantifying project success is through the achievement of goals declared at the onset of the project. This project declared five goals at the start of the project; those goals were:

1. Stabilize highly eroding stream banks.
2. Mitigate overland stormwater that is compounding bank erosion and contributing pollutants.
3. Install new and improve existing riparian buffers to stabilize banks and filter nutrients and sediment.
4. Provide adequate in-stream fish habitat.
5. Construct educational station(s) to educate the public about the project and the benefits of the installed practices to promote reducing non-point source pollution.

This project is undeniably successful. Monitoring data shows the water quality at this site improving (see the map below). Further, modeled pollutant loads indicate a reduction in pollution

because of this project (see Figure 2 below) and lastly, the project accomplished each of its stated goals.

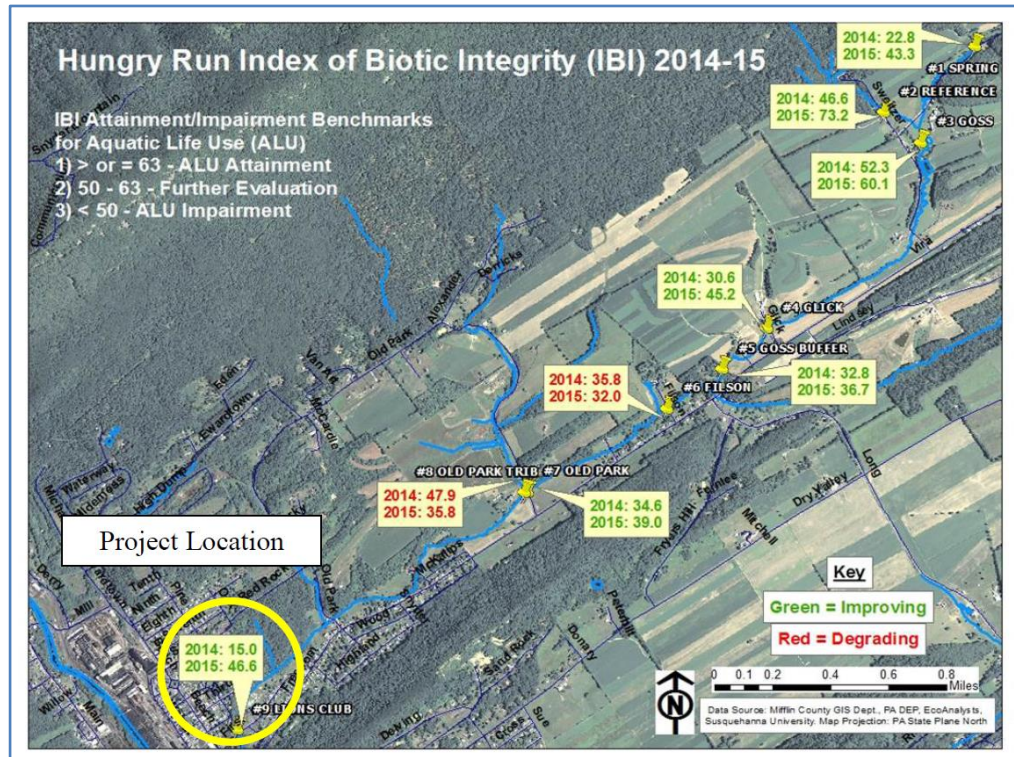


Figure 1: A map showing sample locations and results throughout the Hungry Run watershed.

Regarding modeled pollutant load reductions. The figure below shows the anticipated load reductions calculated through modeling:

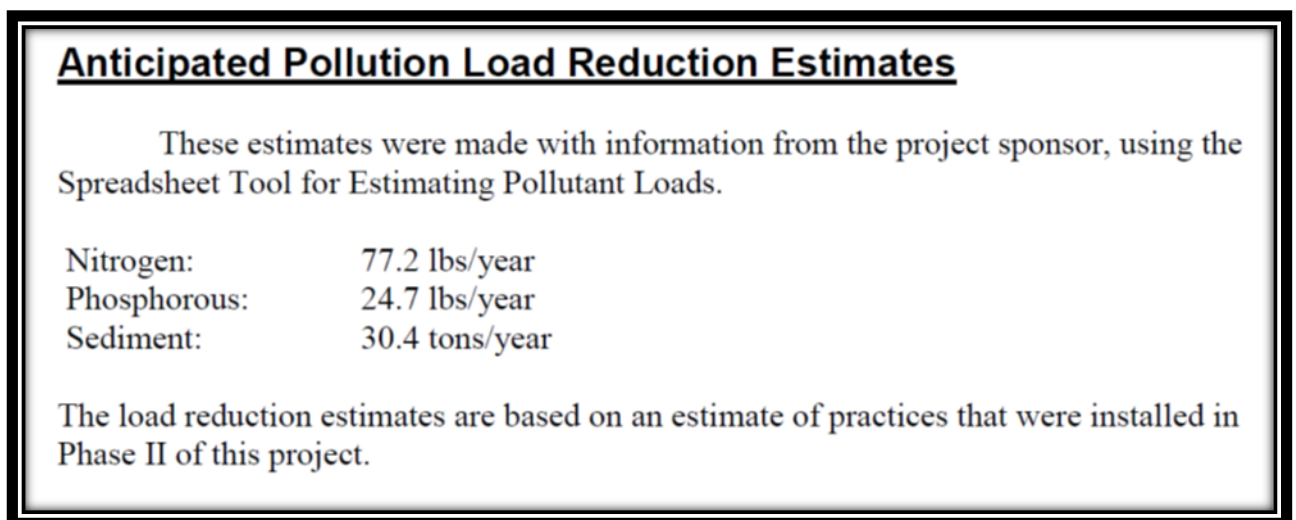


Figure 2: Anticipated load reduction estimates associated with Project 1315.

Further, it can be stated that modeled pollutant load reductions contributed to achieving overall load reduction objectives as set forth by an existing TMDL and the more recently drafted Alt-TMDL. Table 5 displays modeled load reductions associated with the BMPs constructed as part of this grant and the amount those load reductions contribute to achieving those overall goals.

Pollutant	TMDL Target	Load Reduction Estimates for project 1315	% of Target achieved by Project 1315
Nitrogen (lbs/year)	34,374	77.2	0.22
Phosphorus (lbs/year)	4,313	24.7	0.57
Sediment (tons/year)	2,633	30.4	1.15

Table 5: A table showing modeled load reductions resulting from BMPs constructed under Project 1315 and the extent to which this project contributed to the achievement of existing TMDL goals in terms of percent of total TMDL goal.

Regarding the accomplishment of the five stated goals:

1. Stabilize highly eroding stream banks.

Banks were stabilized using bank grading and in-stream structures such as mud-sills and rock vanes. Further, this goal was accomplished using riparian vegetation and stormwater management BMPs. Figure 3 below provides a list of activities resulting from this project that supported the goal of streambank stabilization.

Streambank Stabilization - 600 feet of stream bank re-sloping, followed by erosion matting placement, seeding, and native plant establishment - 115 feet of stream bank rock armored along Burnham Lions Club building. No other feasible option was available due to physical constraints and degree of erosion that had already taken place - Three rock cross vanes (directs water flow away from banks) - One modified log mud sill (stabilizes bank) - Three environmental education viewing platforms (base of structures stabilize bank) - Installation of erosion (prevention) matting - Native plant establishment and maintenance in buffer (including caging) - Tree plantings and maintenance in buffer - Native grass and wildflower seeding

Figure 3: A list of streambank stabilization activities associated with Project 1315.



A photo of stabilized streambank resulting from project 1314.

2. Mitigate overland stormwater that is compounding bank erosion and contributing pollutants.

Program partners accomplished this goal through the implementation of stormwater management BMPs on private property. These BMPs included an underground stormwater infiltration system and other improvements designed to more holistically address stormwater issues originating from the site. Figure 4 below details stormwater improvements resulting from this project.

Stormwater Mitigation System	
-	80'x 45' x 4' (14,400 cu. ft.) underground stormwater infiltration system
-	120'x 90' (10,800 sq. ft.) parking lot regraded to divert stormwater into infiltration system
-	Two inlet grates

Figure 4: A list of stormwater management work performed as a result of project 1315.

3. Install new and improve existing riparian buffers to stabilize banks and filter nutrients and sediment.

This goal was accomplished through planting of native plants along the riparian areas of Hungry Run. This planting occurred on locally-owned property and would not have been possible without the cooperation of the landowners involved. Figure 5 below details some of the riparian focused work that occurred during this project.

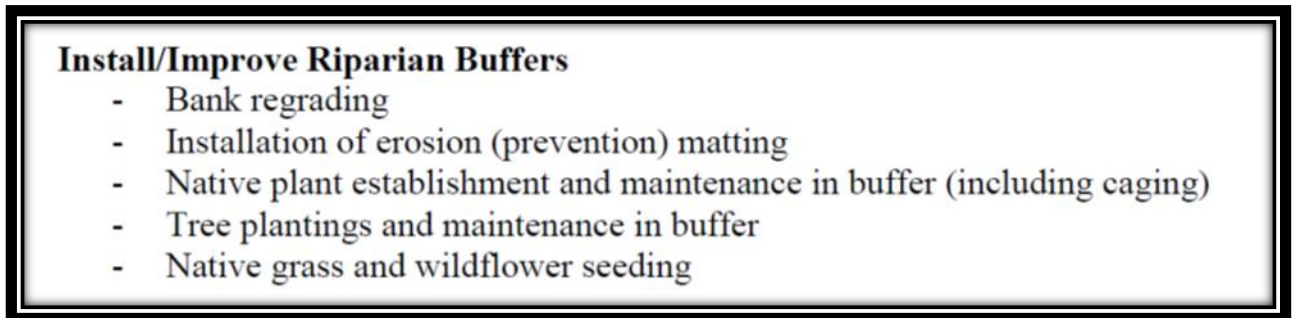


Figure 5: A list of Riparian Buffer work performed as a result of project 1315.



Riparian Buffer Work completed during Project 1315.

4. Provide adequate in-stream fish habitat.

This goal was accomplished through the installation of instream BMPs such as mud-sills and rock vanes. The photo below shows a mud-sill that was installed as part of this project.



A photo of a mudsill constructed for fish habitat and other benefits as part of project 1315.

5. Construct educational station(s) that will educate the public about the project and the benefits of the installed practices to promote their reduction on non-point source pollution.

This goal was accomplished by installing platforms which are used by teachers to better educate students in a field setting. This goal was further accomplished as educational programs were provided to students.. The photo below shows one of the platforms constructed as part of this grant. Platforms such as these provide a place for educators and students to gather, observe, and discuss stream ecology and many other environmental science topics.



A photo of a platform constructed as part of Project 1315; this platform enhances experiential and environmental education activities.

As stated, project 1315, is a success. This project accomplished each of the goals it set out to accomplish, provided modeled load reductions and through monitoring is showing that water quality is improving. This project, as one of eight in this eight-square mile watershed is contributing to the improvement, and eventual delisting, of Hungry Run.

ETNA GREEN STREETS **PHASE 2 CONSTRUCTION (# 1318)**

Construction of Phase 2 (Etna Green Master Plan Phase 1 GSI Site 196) was completed in 2017. The second phase involves reconstruction of the south side of Butler Street between Winschel and Freeport Streets as well as the reconstruction of the south side of Freeport Street between Butler Street and Cherry Alley. This phase includes planting areas with nine street trees; 2,470 cubic feet of underground storage in two locations that infiltrate collected runoff; a reconstructed street section with 1800 square feet of pervious pavers; and a “Rain Park”. It also includes treatment of collected runoff using a proprietary bio-filtration system and a “green” inlet with a stormwater treatment insert.

The Freeport Street rain park is designed to manage runoff from the sidewalk and roofs along Freeport Street representing a total tributary area of approximately 9,300 square feet. Of this total area approximately 7,300 square feet is impervious surface. The rain park itself is approximately 1,900 square feet in area with perennial plantings. It uses a high rate proprietary infiltration media to treat and retain entrained solids in collected/conveyed runoff in advance of storage. The facility has 842 cubic feet of subsurface storage and is designed to infiltrate the runoff from a 1.25 inches rainfall event over a 72-hour period. The facility has an overflow pipe that directs excessive RO volume to a nearby catch basin on the corner of Cherry Alley and Freeport Street.



A photo of a street in Etna Borough, recently benefitting from green infrastructure improvements.

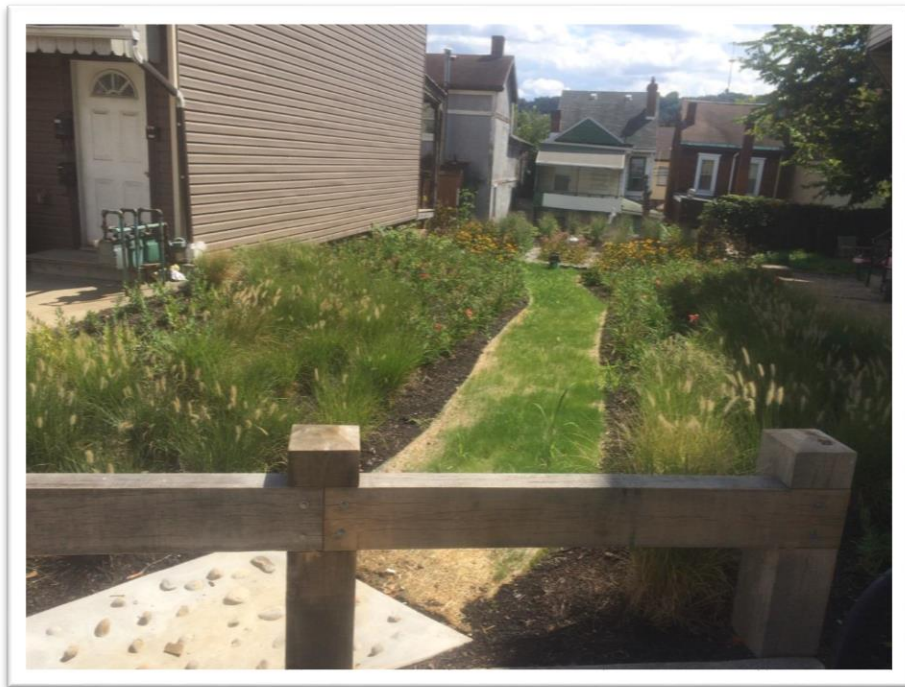
The Love Street Facility is designed to manage runoff from the sidewalk and roofs along Butler Street and Praeger Street conveyed by new piping systems as well as roof runoff from adjacent buildings and other contributing areas tributary to the street such as yards and gravel parking areas. The facility has a total tributary area of approximately 20,900 square feet. The Love Street facility is designed to infiltrate 1,629 cubic feet of collected runoff stored in modular storm water storage units (MSSUs) installed under 1,800 feet of pervious pavers. To install the facility, it was necessary to re-route the existing sewer. The facility has an overflow pipe that directs excess RO volume to a new manhole on Praeger Street.

By its nature, the Green Streetscape creates a strong linkage between transportation considerations and the Etna urban context. The Phase 2 of the project therefore includes other improvements and traffic calming/safety features: 554 feet of realigned curbing to create bump-outs, 6,280 square feet of new concrete sidewalk, 660 feet of 12" wide decorative ADA compliant grate and trench, tree grates, six new curb ramps and a new inlet to accommodate parking area drainage.



A photo of a sidewalk in Etna Borough with an artistic and decorative stormwater management/infiltration BMP.

The project removes runoff from roof, sidewalk and other impervious areas from the combined sewer system and routes it through new conveyances for subsurface storage and infiltration. Based on the completed project, the Phase 2 project will manage runoff from a 0.65-acre area of which 0.425 acres is impervious. This translates into an estimated average of 0.5 MG of runoff managed annually.



A photo of side yard/green infrastructure implemented in Etna Borough.

STORMWATER BASIN PLANTING **ENVIRONMENTAL AND EDUCATIONAL BENEFITS**

Multiple goals can be achieved on nonpoint source water quality enhancement by using earlier installed stormwater detention basins as growing vegetated habitats. The earlier styles of detention basins were intended for use in attenuating the stormwater peak runoff to minimize probability of flood impacts. The present basins were not designed with consideration for contaminant runoff or thermal water quality.

The Dallas School District in Luzerne County, PA was approached to change the way the stormwater management facilities were maintained to improve the environmental benefits on-site and downstream. Earlier maintenance included the use of mowing equipment on steep dangerous slopes and saturated soils within the basins creating problems for facilities managers, equipment and equipment operators. The Luzerne Conservation District's Watershed Specialist, John Levitsky recommended a change in operations to allow vegetation to grow along with planting of woody vegetation to create water quality enhancements. The change creates many opportunities for water quality, wildlife, fisheries downstream, education and the general environment.



Figure 6: An aerial photo showing the stormwater basin under mowed conditions.

Ending mowing and planting stormwater basins creates multiple environmental and educational opportunities including:

- 1) Nutrient and sediment runoff retention on site.
- 2) Reduced thermal pollution from runoff in summer reaching cold water fishery streams.
- 3) Increased groundwater absorption from tap root systems growing in hard pan soils.
- 4) Increased evapotranspiration of stormwater flow during growing seasons.

- 5) Increased carbon uptake in tree and shrub growth within a mowed landscape.
- 6) Reduced fuel use on mowing equipment with a reduced carbon footprint.
- 7) Reduced negative impacts to mowing equipment, dangerous operations on side banks and impacts to equipment becoming stuck in wet soils.
- 8) Improved botany, biology, water cycle and water quality education on the school's campus.
- 9) Increased habitat for diverse flora and fauna with observation areas for students.
- 10) Proper vegetation selection creates an increase in landscape appeal.
- 11) Increased pollinator habitat presence.
- 12) The Biology teacher's assistance brought students to help in planting one basin to become better stewards of the environment surrounding the school district

With nonpoint source contaminant reduction concerns being of concern in the Chesapeake Bay watershed, the Dallas School campus is helping to work towards water quality improvement goals within the Susquehanna River basin. As vegetation is established, water quality leaving the basin will improve with time. Non-Section 319 funding is secured to plant the remaining stormwater basins and will occur in spring, 2018. As part of the MS4 requirements of the receiving municipality, the runoff water quality from the school campus will be enhanced as part of the municipal plan to reduce contaminants.

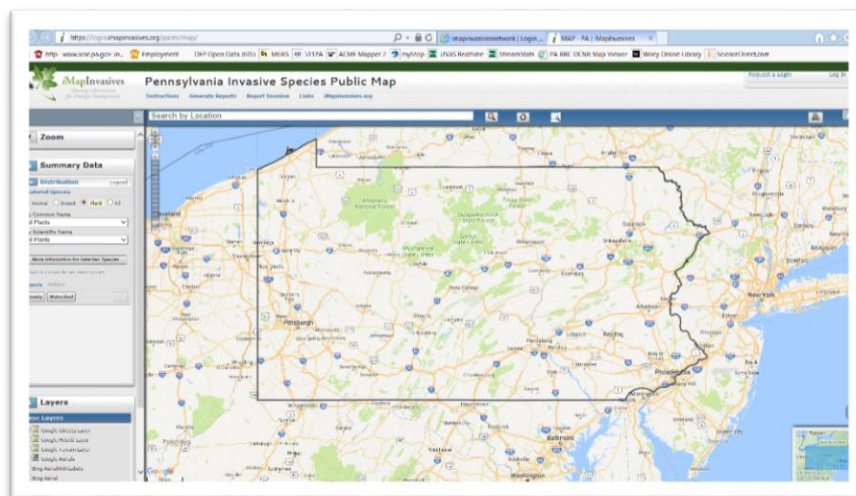


Figure 7: The same basin as shown in Figure 6 only after "no mow" work and other retrofit activities had been completed.

Improvements of vegetative cover were noted quickly with the avoidance of mowing vegetation. As the new plantings of silky dogwood, pin oak, elderberry, flowering dogwood, serviceberry and other species become established, water quality, wildlife use, and vegetation composition improvements will continue.

iMAP INVASIVES INCLUDES SECTION 319 WATRSHEDS GIS LAYER

It's been said that invasive species are the spill that never self-abates. It is an interesting concept. A spill of oil will eventually dissipate, a spill of certain solids will eventually dissolve. A discharge of gaseous pollutants will diffuse in the atmosphere, but an infestation of invasive species simply grows, expands and drastically alters an ecosystem at times until the collapse of that ecosystem. This is perhaps most evident in lakes infested with water chestnut, an invasive species that has been known to completely cover entire lake surfaces rendering lakes, not just unusable, but unidentifiable. As such, the effort to identify and control certain invasive and aggressive species is essential to the maintenance and protection of certain designated uses of the water resource. In FFY 2017, at the request of DEP's NPS program, program partners with the Western Pennsylvania Conservancy graciously agreed to include a Section 319 WIP watershed layer on the iMap Invasives tool. The iMapInvasives is a web-based GIS that allows users an opportunity to view locations of invasive species in any area of interest in Pennsylvania and other areas. Further, this tool engages citizen scientists and encourages those citizens to identify and report on the location of invasive species. By adding a 319 WIP watershed layer to this tool, it is hoped that citizens, interested in water resource protection through the abatement of invasive species, will take the opportunity to learn about other assaults on water quality. It is also hoped that program partners at the local level will seize this opportunity to use invasive species as the rally point to motivate other citizens and volunteers; encouraging those volunteers to address invasive species and subsequent to that effort, seek to address less obvious and equally harmful pollution sources such as stormwater volume, bank erosion, degraded riparian corridors, soil loss and other similar issues.. Pennsylvania's NPS program is very excited by this partnership and the potential that could be realized by this collaborative effort.



Citizens can log into iMapinvasives and report on or learn about invasive species in their area at: <https://www.imapinvasives.org/pennsylvania/login>

THE FUTURE OF NONPOINT SOURCE MANAGEMENT IN PENNSYLVANIA

Pennsylvania's nonpoint source pollution management program is built on a foundation of collaboration and local empowerment. Partnering is the word most often used to describe the essential activities of pulling resources, sharing information, finding common ground and achieving varied goals. It should be expected that this foundation will continue to be fortified through continued and enhanced collaboration between federal state and local partners. It should be understood that "local" here does not merely refer to local governments such as counties, county conservation districts, non-county municipalities though they are and will continue to be amongst our most successful partners. But no, local in this sense refers also to citizen lead organizations such as watershed associations, sportsman's associations, community environmental councils and even individual citizens. Without the willing and heart-felt participation of individual citizens, as citizen-scientists and landowners, little would be accomplished in the fight against polluted runoff.

Along with a continued emphasis on partnering, Pennsylvania expects to enhance its Nonpoint Source Management Program in the coming years. Expect a renewed and critical examination of existing Watershed Implementation Plans; currently there are 36 EPA-approved WIPs in Pennsylvania though only an estimated half to three-quarters of them receive frequent attention. Pennsylvania expects to vet the list of approved WIPs in the near term, letting go of those that no longer serve a purpose and focusing efforts on those where greater levels of achievement and success have been realized. Further, expect to see a push to draft new WIPs with an emphasis on smaller, manageably-sized watersheds where success (as defined by water quality improvements) can be achieved in short order. With a renewed focus on WIP completion and success, Pennsylvania intends to diminish the number of impaired stream miles and lake acres found in our Integrated Report. It is expected that this will be a challenge. The fight against nonpoint source pollution is not a simple one. The "enemy" is nearly omnipresent and the challenges created by a densely populated and economically active land remain for generations after they are created. Regardless, the work to address stormwater volume and rate, streambank degradation, soil loss due to plowing and tilling, pollutant discharges from abandoned mines and other such nonpoint source pollutants will continue, on a local and focused scale with an emphasis on real-world water quality improvements.



Only through landowner cooperation, capable local partners and consistent state and federal funding will the restoration of Pennsylvania's water resource be achieved.

Appendices

Appendix A: Goals, Objectives, and Milestones Tracking Sheet

In 2013, DEP began the process of updating its Nonpoint Source Management Plan. The NPS Management Plan is a booklet describing the work performed throughout Pennsylvania by many program partners addressing issues caused by nonpoint source pollution. As requested by EPA guidance, the NPS Management Plan contains several key sections and components, with clearly stated goals and the objectives and milestones found to be essential to accomplish those goals. In FFY 2014, the NPS Management Plan was finalized and in that finalized document there are five broad goals with each goal containing enumerated objectives and milestones. Those goals, objectives and milestones are clearly stated in a matrix found in Appendix A of the Plan, likewise, those goals objectives and milestones are found in a similar matrix in Appendix A and in other recent NPS Program Annual Reports. The matrix format and largely quantifiable nature of the milestones of Pennsylvania's NPS Management Program provide for convenient classification of progress made by the NPS Management Program and our many program partners.

For formatting reasons, this year's Annual Report Appendix A is found as a separate document. Also note, Appendix B of this Annual Report contains information regarding progress on achieving the objectives of Pennsylvania's Nonpoint Source Management Plan that are more qualitative in nature.

Appendix B: Qualitative Goals, Objectives, and Milestones

Objective 2.1, The RAWAPI Initiative

The RAWAPI was being implemented statewide in six different targeted watersheds covering a total of 154 farms during FFY 2016. In FFY 2017, because of mission completion in the original watersheds as well as surplus funds remaining in certain contracts, three of the six counties participating in this unique and experimental program have expanded their original area of operation. This includes, in most cases, one additional watershed directly adjacent to the original watershed. The expansion will provide participating counties an opportunity to visit, inspect and assist farms in a small scale targeted watershed with the intent of achieving 100% voluntary compliance.

Objective 2.4 Nutrient Credit Trading

Nutrient Trading Program data reported before Compliance Year (CY) 2016 included the complete nutrient trading program, both point and nonpoint sources. Starting in CY 2016, data reported will differentiate credits generated and traded from point sources (PS) versus nonpoint sources (NPS).

In CY 2017, DEP reviewed nine NPS generator credit certification requests and 36 NPS generator credit verification requests. Ten of 82 total credit registration requests (trades) involved NPS-generated credits. 20,410 of the 272,399 Total Nitrogen (TN) credits registered (traded) were NPS-generated credits. 2,969 of the 35,143 Total Phosphorus (TP) credits registered (traded) were NPS-generated credits.

The term “trade application” used in Goal 2.4 is not consistent with the terminology currently used in the program. The goal of 30 “trade applications” will most likely be modified to better reflect current program terminology and activity (relating to certification, verification and registration of nutrient trading credits) during the anticipated 2019 NPS Management Plan update process.

Objective 2.5 Ag compliance education/outreach visits

FFY 2017 marks a transition in Pennsylvania's ag-outreach efforts in the Chesapeake Bay watershed. While, in the previous three years, DEP and cooperating partners conducted education and outreach visits in FFY 2017 DEP and partners began conducting inspections. The gross accomplishments of this inspection effort included:

- 2,080 small farms (non-CAFOs) were inspected under the CB Ag Inspection Program.
 - 1,572 farms were inspected by Conservation Districts.
 - 508 farms were inspected by DEP regional offices.
- 743 farms were inspected under the Act 38 Nutrient Management Program.
- Total of 393,426 acres were inspected within PA's Bay Watershed.

Also, during this time it was found that:

- 65% of farms met planning requirements if they were required to have a complete Manure Management Plan upon initial inspection.
- 63% of farms met planning requirements if they were required to have a complete Ag E&S Plan upon initial inspection.

Further, as part of DEP's continued effort to work with the agricultural community living in the Bay watershed to protect and restore the Bay, the ***Compliance, Enforcement, and Inspection Standard Operating Procedure (SOP) for Non-CAFO Farms*** (BCW-INSP-019) was reviewed/revised and continues to be integrated in DEP's Bureau of Clean Water operations. Other program developments include:

Initial Ag Inspection SOP developed to support initial ag inspection effort outlined in "reboot" strategy. Final SOP completed May 2016. SOP was revised in June 2017 as per feedback from EPA and Conservation District and DEP Regional Office staff. http://files.dep.state.pa.us/Water/ChesapeakeBayOffice/Final_SOP_Chesapeake_Bay_Agricultural_Inspection_Program.pdf

Revised Ag Inspection form to be used with the Chesapeake Bay Initial Ag Inspections in September 2017. (3830-FM-BCW0524)

Developed new form to be used to collect Ag BMP data in September 2017. (3830-FM-BCW0524a)

PracticeKeeper (PK) software roll-out to all Districts occurred in Summer 2017. The Ag Inspection Module was developed in Summer – Fall 2017. This module will be used to assist in the tracking and reporting of inspections, inspection outputs, and BMP data collection. Two webinar trainings were held in October and November 2017, with Conservation Districts commencing the use of the PracticeKeeper geodatabase for the Bay Ag Inspections in November 2017.

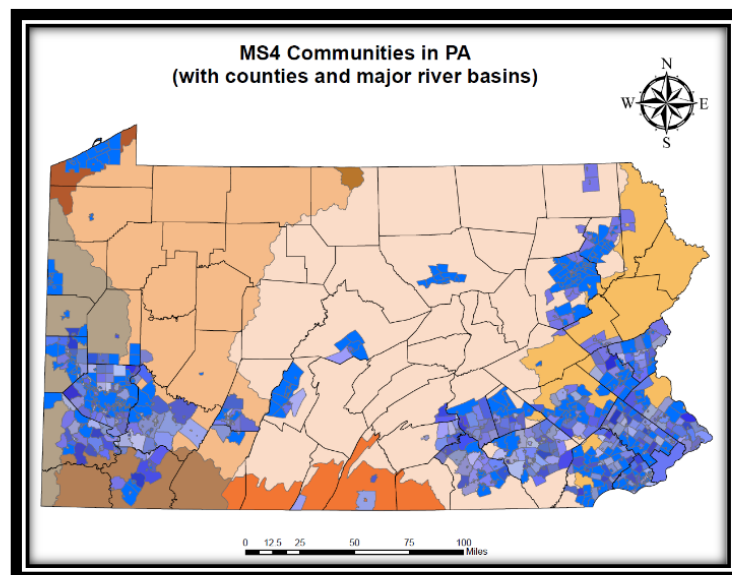
Tablets/laptops were purchased for participating Conservation Districts for inspections/data collection. Tablets have also been purchased for DEP Regional Office staff for inspections/data collection.

Objective 2.12 Baseline of VAO Planned Acres

Data for this reporting element is currently being developed. Program staff continues to work with program partners to determine how best to collect this information. Efforts associated with this objective overlap other programs and initiatives within Pennsylvania. Historically, a program was in place in Centre County that enabled farmers, through a minimal cost share of \$50, to obtain E&S and/or MMPs as needed. This program, funded through a Growing Greener grant, assisted 184 total farms and resulted in the following: 168 MMP's, 162 Ag E&S Plans, 25,678 crop acres, 4,073 pasture acres and accounted for 10,912 AEU's. More recently, Pennsylvania enacted a plan writing program available to all farms in the Chesapeake Bay. These plan writing efforts will assist the NPS program and DEP in tracking Volunteer Animal Operation (VAO) Planned Acres.

Objective 3.2, The MS4 Program

While Municipal Separate Storm Sewer System (MS4) Communities are regulated under the NPDES program and as such are generally 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 MS4 communities are for regulatory purposes, point sources, the work performed to address stormwater management in these communities addresses nonpoint source pollution and is worth mentioning in this annual report.

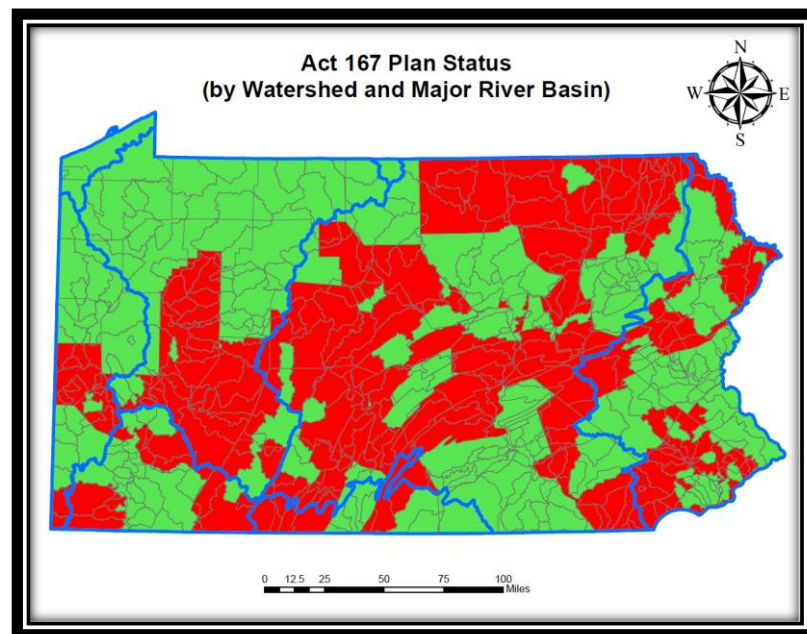


The map above shows major river basins has shaded regions as well as county borders and MS-4 communities as the patchwork of blue polygons. Note, the overwhelming majority of MS-4 communities are located in the Ohio, Allegheny, Monongahela, and Delaware river basins. A relatively significant portion of the Lake Erie basin is also regulated as an MS-4 community.

As is required, Pennsylvania's NPS Program does not allow the use of Section 319 sub-grants to benefit communities seeking MS4 compliance. Pennsylvania does encourage those communities to make use of the Growing Greener grants program to fund the design, permitting and implementation of BMPs necessary to address stormwater related issues. MS4 communities are found in each of the six DEP regions as well as every major river basin within Pennsylvania.

Objective 3.3, The Act 167

Act 167 of 1978, the Stormwater Management Act, remains in effect. Pennsylvania continues to encourage county governments to obtain county-wide stormwater management plans and to use those plans as the foundation for model ordinances that may be adopted by municipalities. As poorly managed stormwater remains a legacy issue resulting in the continued degradation of countless miles of stream channels, the purposeful management of run-off is essential in the fight against nonpoint source pollution.



The above map shows watersheds where Act 167 plans have been developed (in green) and watersheds where Act 167 plans have yet to be developed (in red). Also, major river basin borders are shown in blue and county boundaries in light grey. This data is current as of FFY 2017.

Objective 3.11, USFS Watershed Condition Framework

The Allegheny National Forest (ANF) is the only national forest in Pennsylvania. The U.S. Department of Agriculture Forest Service (USFS) 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 (WRAP) 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. The

USFS reports the Bear Creek WRAP was finalized on 10/28/2011 and estimate complete implementation of that plan on 9/1/2018. Further, the USFS reports implementation of the Bear Creek WRAP will be the result of completing 13 essential projects at an estimated cost of \$807,000.

Objective 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. Pennsylvania DEP is working with their partnering agencies and organizations to research the development of a GIS-based BMP data collection system. Further, a portion of DEP's information technology group is enhancing the use of GIS throughout many programs within the Department. Currently, the Department intends to continue exploring and enhancing the use of GIS and web-based GIS applications to further develop a unified understanding of on-the-ground conservation efforts.

Objective 4.9, BMP Efficacy Assessment

Pennsylvania continues its work in three targeted watersheds under the NWQI to monitor chemical and biological stream changes relating to the BMPs implemented in these small watersheds. Two of these watersheds are located in Berks County and the third is in Mifflin County. Also, DEP is monitoring chemical and biological stream changes in six additional small agricultural compliance watersheds to assess the effects of complete BMP implementation on a small watershed.

Objective 4.10 STORET

Part of DEP's monitoring data that is entered into SIS is downloaded periodically into STORET. PA DEP sent one person from the PA Nonpoint Source 319 program to attend a training held in early spring. Additional training is needed for Pennsylvania to achieve consistent proficiency with the use of this database. Pennsylvania will continue to work towards this goal in 2018.

Objective 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 certain regulatory tools with which nonpoint source pollution can be mitigated. Most notably, under the Clean Streams Law, 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. These regulations and several others work in concert to protect the water resource.

	FFY 2017	FFY 2016	FFY 2015	FFY 2014	FFY 2013
NPDES General Permits (Stormwater)	1,563	1,629	1,833	2,182	1,983
NPDES Individual Permits (Stormwater)	268	277	301	298	277
Site Inspections	13,208	13,342	12,903	12,092	12,493
Complaint Response	1,906	2,116	1,794	1,784	1,995
NMPs (CAO)*	1,044	979	962	937	825
CAFOs (total in PA)*	429	396	378	362	371
Volunteer Operations*	803	966	972	993	1,020
Chapter 105 Technical Assistance Contacts	8,697	8,543	6,815	6,823	7,404
Total No. of GP's Issued	1,851	1,478	1,301	1,160	1,290
Chapter 105 Complaint Response	583	497	412	363	413
Chapter 105 Total Inspections	830	951	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.

*Information reported under these items is current through September 30, 2017.

Objective 4.15, Nutrient Management Planning Data Collection Framework

Pennsylvania's DEP initiated a program to collect planning and implementation data using a farmer survey tool that was administered by Penn State University. This survey effort focused on the collection of volunteer planning and BMP implementation data. A report discussing the results of this survey effort was provided to DEP in December 2016. Also, DEP initiated a farm compliance initiative to assess the development and implementation of various farm plans required under state environmental regulations, including nutrient and manure management plans. This compliance initiative became fully operational on October 1, 2016. In the first full quarter of this operation 496 inspections were conducted.

Objective 4.16, Biosolid Application Tracking

As of the close of FFY 2016 the Biosolids program within DEP is housed under the Bureau of Clean Water. Under this program the Department regulates, through permitting and permittee generated reporting, the generation and distribution of biosolids. Permittees submit reports regarding distribution or use of biosolids to regional DEP offices. To date, a unified method of collecting this data on a state-wide scale has yet to be developed. It is recognized that GIS technology would make the collection and management of this data a more reasonable task. It is further understood that EPA may be developing a tool that Pennsylvania may have access to that would render electronic data tracking specific to biosolids generation and/or application more accessible.

<http://www.dep.pa.gov/Business/Water/CleanWater/WastewaterMgmt/Biosolids/Pages/default.aspx>

Objective 5.4, Sub-Watershed Restoration in §319 WIP watersheds

Objective 5.4 is an on-going, five-year goal that establishes the intent to restore four sub-watersheds within §319 approved WIP watersheds by the end of FFY 2019. Goal 5.4 was established in FFY 2014. Since that time, significant progress has been documented in the Mill Creek (Lancaster Co.), Hungry Run and Upper Kish Creek (Mifflin Co.), and Buffalo Creek (Union Co.) watersheds. Long's Run was delisted in 2014. Hungry Run, Upper Kish Creek, Steven Foster Lake, Harveys Lake, Hubler Run, and Six Mile Run WIPs have made good BMP implementation progress and are showing signs of improving water quality. In pursuit of this Objective, DEP's NPS program intends to continue its focus on sub-watershed prioritization within existing WIPs. This has already been done in Shupe Run, a tributary to Jacobs Creek, Westmoreland County. This tactic will likely be employed throughout the commonwealth in association with other tactics to ensure that funding is used in the most effective means possible.

Objective 5.5, Growing Greener Renaissance Initiative

The Growing Greener Program is currently implementing two (2) Renaissance projects. Renaissance watersheds are selected watersheds where Growing Greener funding is devoted for the full implementation of all BMPs determined to be necessary to restore selected streams. These Initiatives are being implemented in the **Birch Island Run (Cameron County)** and **Sharitz Run (Chester County)** Watersheds. No new Renaissance projects were awarded in 2017 but future projects are anticipated.

Objective 5.6, Ag Planning Compliance in 15 watersheds

As the Regional Agricultural Watershed Assessment Planning Initiative (RAWAPI) was in its last full year during FFY 2017, DEP pursued additional compliance initiatives relative to planning requirements on agricultural operations. During FFY 2017, the RAWAPI saw the expansion in area of operation on three of six of the original watersheds. Also, one county requested additional funding to complete BMP implementation in the originally selected watershed. It is expected that FFY 2018 will be the final year for the RAWAPI project.

In FFY 2017, DEP continued other inspection and compliance efforts throughout the commonwealth. While discussed thoroughly in the "Agricultural Inspections, July 1, 2016 through June 30, 2017" annual report completed by the Bureau of Clean Water, a brief overview of those programs follows.

Pennsylvania maintains several programs that address compliance on agriculture. These programs are handled mostly through delegation between DEP and Conservation Districts. These programs include: the Chesapeake Bay Agriculture Inspection Program (CBAIP), the NPDES Concentrated Animal Feeding Operation (CAFO) program, the Act 38 Nutrient Management Program, and the Resource Enhancement and Protection (REAP) tax credit program. Combined, these programs resulted in the inspection of 2,823 farms representing 393,426 inspected acres.

Appendix. 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 FFY 2013 and was finalized in FFY 2015, 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 OM&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 DEPs 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 U.S. 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 Datashed 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 Datashed 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 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 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.

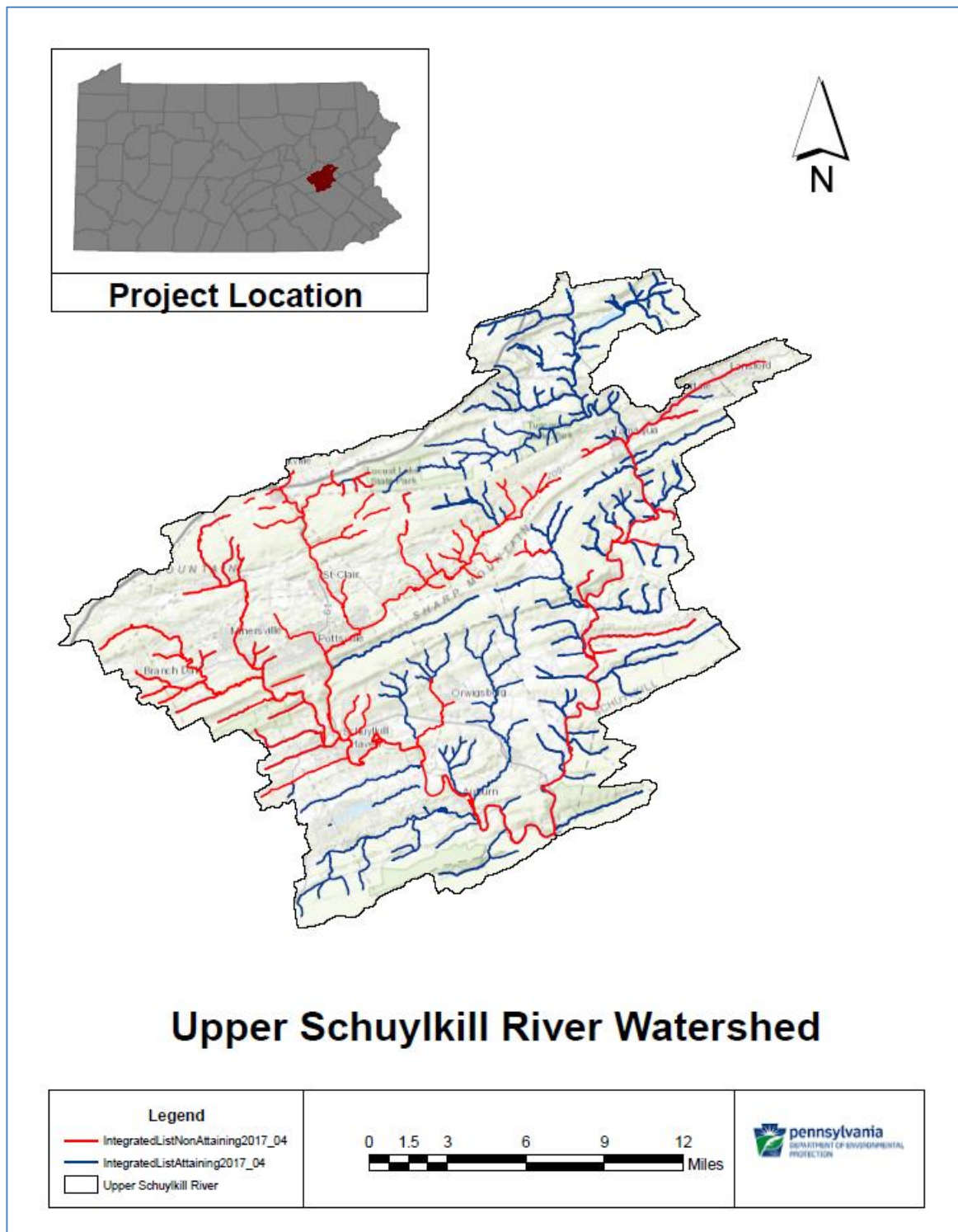
Pennsylvania will continue to report semi-annually (due dates January 31st and July 31st) on the progress the commonwealth is making in implementing the active projects within the approved §319 grant work plans. The program staff at DEP will continue to input the required project reports into the GRTS 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.

APPENDIX D: DETAILED PROGRESS ON SELECTED WIPs

AMD WIPs



The headwaters of the Schuylkill River can be found in eastern Schuylkill County near Tuscarora, Pennsylvania. The upper section of the watershed considered here is 264 sq. mile and is largely forested with some agricultural land. Most of the farms are found in the southern and eastern areas of the watershed. There are several urbanized areas and most of the development can be found in the southern portion of Schuylkill County. Unfortunately scars from mining make up much of the landscape in the watershed affecting the river and many of the tributaries. Impaired by metals are 11.17 miles of Mill Creek, 5.62 miles of Muddy Branch, 9.02 miles of West Branch Schuylkill River, 9.43 miles of Panther Creek, 2.03 miles of Wabash Creek, and 34.32 miles of Schuylkill River. Also 31.47 miles of the Little Schuylkill River is impaired by low pH and metals.

The area the Upper Schuylkill River Watershed Implementation Plan addresses consists of the headwater point down to the confluence of the main stem with the Little Schuylkill River watershed in Port Clinton. The plan was completed in May 2005 to address the upper reaches of the Schuylkill River watershed that are largely impacted by abandoned mine drainage discharges. The AMD discharges contribute large amounts of metals (iron, aluminum and manganese) and acidity to the streams. A TMDL focusing on the metals in the Schuylkill River was not approved until 2007.

There are currently several watershed restoration and outreach projects happening in the Upper Schuylkill River Watershed. The Big Creek Limestone Sanding project is an effort to raise and sustain the pH of Big Creek to return it to a viable cold-water fishery that can support aquatic life. The project was funded by a Schuylkill River Restoration Fund grant. Schuylkill Headwaters Association (SHA) and the Schuylkill Conservation District (SCD) are currently working with a teacher and several students from Blue Mountain High School to design and implement a comprehensive watershed study on the Big Creek Watershed. The students plan to go out once a month and take water quality samples and flow measurements at different sampling locations, and then in spring and fall take macroinvertebrate samples and eventually perform a fish survey to document the changes in the watershed following limestone dosing.

SHA also received a Schuylkill River Restoration Fund grant for limestone sand to be placed in two different streams, Dyer Run and West Creek. This project will be carried out very similar to the Big Creek project and will improve the pH of both streams back to a level where they can support aquatic life.

The Schuylkill Conservation District was awarded a Growing Greener grant in 2016 for the Mill Creek AMD Watershed Restoration Plan Development project. SCD is working with SHA and USGS to develop a restoration plan for the watershed that will meet the requirements of a Qualified Hydrologic Unit Plan which would then allow for funding from the Set-Aside program to be used for AMD treatment system

construction, maintenance and upgrades. Some funds to work on this project was from 2011 Section 319 grant (#1107C).

The SCD and SHA have partnered, along with Schuylkill County Trout Unlimited (SCTU) to continue a habitat improvement project along the main stem of the Schuylkill River near New Philadelphia. This project, to be completed in 2018, will build on a previous effort completed in 2016 (See Highlighted Projects) where 19 instream habitat and stream bank stabilization structures were installed along 1,100 linear feet of the river. This project will be funded by contributions from SHA, SCTU, and in-kind help from SCD. Also, as a part of this activity, SHA will partner again with Schuylkill TU to do a fish rodeo by stocking trout in the project area. This will also serve as a public relations event.

Schuylkill Acts & Impacts (SAI) will continue in June 2018, making this the 5th continuous year of the trip. SAI is an 8-day, 7-night educational expedition for high school students living in the 5 main counties of the Schuylkill River Watershed – Schuylkill, Berks, Montgomery, Chester, and Philadelphia. Throughout the week, students study different land use activities, such as mining, agriculture, and urban development, and investigate the water quality impacts of these activities. Students take daily water quality samples and record their results, with a whole watershed analysis occurring at the end of the trip. Students tour different related facilities, hear presentations from field professionals, and get to experience some recreational fun in the form of camping and kayaking throughout the week. SAI is a partnership between SHA, the Fairmount Water Works, Stroud Water Research Center, and Take It Outdoors Adventures.

Monitoring has been occurring in some of the upper sections to monitor improvements as passive treatment systems have been installed. Sample points used correspond with the points used in the development of the TMDL so that changes in quality could be detected.

Site	Timeframe	pH	Acidity	Alkalinity	Iron	Aluminum	Manganese
S1 - Headwaters	2002-2003	5.94	47.68	9.75	0.65	1.1	1.01
	2017	6.75	-4.3	11.6	0.37	0.42	0.5
S2A – Near Mary D	2002-2003	4.8	ND	1.69	1.79	1.07	1.24
	2017	6.74	-6.0	15.3	0.56	0.26	0.55
SRM – at Middleport	2002-2003	6.58	17.28	17.16	0.64	ND	0.94
	2017	7.13	-2.2	10.5	0.4	0.45	0.8
SRNP-at New Philadelphia	2002-2003	6.48	21.0	16.85	1.85	ND	1.05
	2017	7.34	-5.5	11.1	0.67	0.28	0.89

Table USR-1: A table listing water chemistry results measured during the listed monitoring years. Note the following abbreviations as they correspond to listed Site locations.

ND-Not Determined

*S1 – Upstream of Bell Colliery Treatment system

*S2A – Downstream of Bell Colliery but upstream of Mary D Treatment systems

*SRM – Downstream of above mentioned treatment systems and Big Creek tributary

*SRNP – Downstream of SRM and Silver Creek Treatment system

The Table USR-2 below shows the Section 319 projects that have been funded from 1999 to present. The four-digit number in the left column references the Section 319 project number and can be correlated to information found in the web-based Grants Reporting and Tracking System (GRTS). The lower portion of the table lists projects funded through Pennsylvania's Growing Greener program from 1999 to present, the number in the left column references the state fiscal year from which the funds were awarded. Supporting these federal and state funded projects are the projects completed by program partners with other funds not shown here.

Upper Schuylkill River WIP Section 319 Project List (1999 to present)	
1713	Otto Discharge AMD Restoration Phase II Design
1608	Reevesdale #2 AMD Restoration Project Phase II - Optimization
1310	Schuylkill River Floodplain Restoration (DP)
1107C	Updating AMD WIPs as Qualified Hydrologic Units: Little Schuylkill River and Mill Creek
1115	West Branch Schuylkill River AMD Remediation Phase II (DP)
1114	Bell Colliery AMD Restoration, Phase III
1014	Mary D Borehole AMD Remediation (design, permit and construction)
2913	Schuylkill Action Network Support
2728	Silver Creek Mine Tunnel AMD Treatment System
2421	Pine Forest AMD Discharge Limestone Drain Treatment
2416	Reevesdale South Dip Tunnel Limestone Drain System
2321	Otto Discharge AMD Aerobic Treatment System
2215	Bell Colliery AMD Discharge Treatment System
2114	Little Schuylkill River Watershed Assessment
9925	Schuylkill River Riparian Restoration
9940	Upper Schuylkill River Tributaries Assessment
Upper Schuylkill River WIP Growing Greener Project List (1999 to present)	
2013	West Creek Flow Loss Assessment and Remediation Plan
2012	Oak Hill Boreholes Restoration Project Feasibility Study
2011	Sharp Mountain Reclamation Project Phase VIII
2010	Sharp Mountain Reclamation Project Phase VII
2009	Sharp Mountain Reclamation Project Phase VI
2008	Implementation of the Pine Knot AMD Watershed Study priority Projects – West Branch Phase I
2007	Upper Schuylkill/Pine Knot Hydrological Monitoring and Modeling
2006	Sharp Mountain Reclamation Project Phase V
2004	Remediation of Sources to the Pine Knot -Oak Hill AMD Discharge Tunnel
2003	Tremont II Construction
2001	Wetlands Located on the West Branch of the Schuylkill River
2001	Discharge Flow Weir
1999	Sharp Mountain Reclamation Project
1999	Glen Dower/oak Hill Boreholes Acid Mine Drainage

Table USR2: Section 319 and Growing Greener projects dedicated to the restoration of the Upper Schuylkill River since 1999.

The Upper Schuylkill River Metals TMDL was not approved until 2007 but that information is used to set the goals in the Watershed Tracker tool located in GRTS and are in the tables that follow. Progress is being made but there is still more to do.



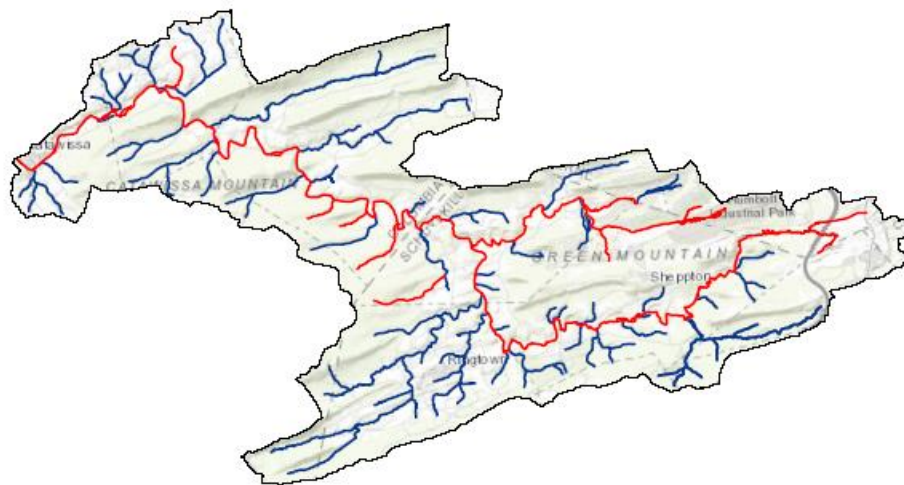
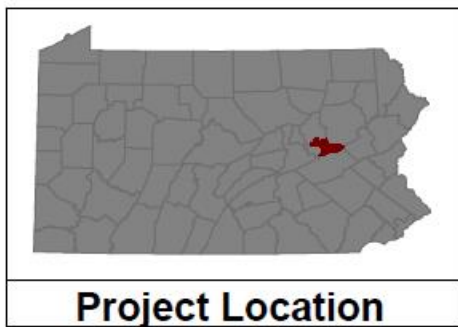
Figure USR: 1 Silver Creek Passive Treatment System found in the headwaters of the Schuylkill River.

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented
Schuylkill River - Headwaters	Constructed Wetland Aerobic	4	2	50
	Limestone Leach Bed/Pond	2	2	100
	Passive Treatment	1	0	0
	Sediment Basin	1	0	0
Mill Creek	Anoxic Limestone Drain	2	2	100
	Constructed Wetland Aerobic	1	0	0
	Land Reconstruction, Abandoned Mined Land (acres)	432	432	100
	Stream Channel Restoration (stream bed)	2	0	0
Muddy Branch	Constructed Wetland Aerobic	1	1	100
	Land Reconstruction, Abandoned Mined Land	1	0	0
West Branch	Land Reconstruction, Abandoned Mined Land (acres)	274	252	92
	Limestone Doser	1	0	0
	Passive treatment System	1	0	0
Wabash Creek	Anoxic Limestone Drain	2	1	50
	Pond - Construction	1	0	0
	Vertical Flow Treatment System	1	0	0
Panther Creek	Oxic Limestone Drain	2	1	50

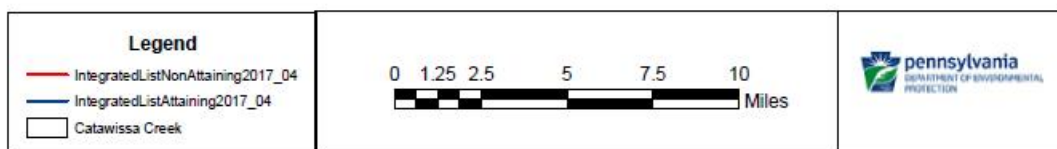
Table USR-3: A table listing BMP goals by sub-watershed and the extent to which those goals have been achieved.

Sub Watershed	Pollutant ID	Target Load Reduction (lbs./day)	Load Reduction Achieved (lbs./day)	% Load Reduction Achieved
Schuylkill River - Headwaters	Acidity	10,582.00	137.80	1.3
	Metals (Aluminum)	104.10	16.50	15.9
	Metals (Iron)	935.60	224.30	24
	Metals (Manganese)	153.43	8.70	5.7
Mill Creek	Acidity	10,539.00	0	0
	Metals (Aluminum)	227.40	30.70	13.5
	Metals (Iron)	919.60	538.10	59
	Metals (Manganese)	158.00	152.90	97
Muddy Branch	Acidity	587.40	82.20	14
	Metals (Aluminum)	190.50	3.80	2
	Metals (Iron)	619.10	38.40	6.2
	Metals (Manganese)	131.90	0.00	0
West Branch	Acidity	2,916.20	0	0
	Metals (Aluminum)	354.70	0	0
	Metals (Iron)	2,295.00	0	0
	Metals (Manganese)	1,201.70	0	0
Wabash Creek	Acidity	757.30	0.00	0
	Metals (Aluminum)	72.70	9.97	13.7
	Metals (Iron)	47.80	52.00	100
	Metals (Manganese)	23.10	5.80	25
Panther Creek	Acidity	0.00	0	0
	Metals (Aluminum)	39.80	0	0
	Metals (Iron)	42.60	0	0
	Metals (Manganese)	65.30	0	0

Table USR-4: A table listing target load reductions by subwatershed and the extent to which those load reductions have been achieved.



Catawissa Creek Watershed



Catawissa Creek is a largely forested watershed found in northern Schuylkill County. There is very little development and agriculture in the watershed. The major pollution source is from abandoned mine drainage (AMD) mostly due from discharges exiting five deep mine tunnels. The amount of stream miles impaired are quite extensive in the 153-sq. mile watershed. Impaired by metals are 44.5 miles of Catawissa Creek, 11 miles of Tomhicken Creek, and 3.4 miles of Sugarloaf Creek.

A TMDL was approved in May 2003 and the Catawissa Creek Watershed Implementation Plan (WIP) was completed in 2005 which identified load reduction goals related to AMD for acidity, iron and aluminum to meet water quality objectives. The Catawissa Creek Restoration Association and partner the Schuylkill Conservation District has targeted high priority AMD discharges such as, Oneida #1, Oneida #3 and Audenreid Tunnel with the construction of passive treatment projects. The most recent project is a retrofit of the Oneida #3 system (#1409) which is located on the Tomhicken Creek. This project will allow easier and safer maintenance while increasing the performance.

Besides the retrofit project, maintenance of the existing treatment systems is the focus of the Schuylkill Conservation District and Catawissa Creek Restoration Association. The Schuylkill Conservation District is also working with PA DEP BAMR Set-Aside Program staff to develop a Restoration Plan for the watershed that will meet the requirements of a Qualified Hydrologic Unit Plan. This would then allow for funding from the Set-Aside program to be used for AMD treatment system construction, maintenance and upgrades. This funding source could be critical in updating the Audenreid passive treatment system to improve its ability to treat the water exiting this deep mine.

Monitoring has been occurring in the Catawissa Creek watershed to monitor improvements in the watershed due to the construction of passive treatment systems. These are shown in the table below. Sample points were chosen from the TMDL so water quality could be compared to detect changes. The largest improvement has been in the Tomhicken Creek which shows an increase in pH from 6.0 to 7.1 and instead of being net acidic it now has net alkaline conditions.

Site	Timeframe	pH	Acidity	Alkalinity	Iron	Aluminum	Manganese
CC6 Catawissa Creek	1997-2002	4.5	33.26	0.41	0.25	3.62	1.05
	2017	4.71	18.5	0	0.18	2.68	0.83
CC8 Catawissa Creek	1997-2002	4.96	16.77	2.78	1.51	1.97	0.85
	2017	5.6	2.8	0.9	0.09	1.11	0.41
TC1 Tomhicken Creek	1997-2002	6.0	10.92	6.04	0.15	0.42	0.17
	2017	7.1	-9.4	11.8	0.12	0.21	0.1
CC9 Catawissa Creek	1997-2002	4.94	23.88	2.16	0.1	1.3	0.53
	2017	5.64	0.47	2.93	0.09	0.71	0.32

Table C-1: A table showing water chemistry results as measured during specified monitoring years. Note the following Site abbreviations as listed above:

*CC6 – Downstream of Audenreid Passive Treatment System

*CC8 – Downstream of CC6 and Little Catawissa Creek (unimpaired) but upstream of Tomhicken Creek

*TC1 – Mouth of Tomhicken Creek

*CC9 – Downstream of Tomhicken Creek

The table below shows the Section 319 funded projects that have been funded from 1999 to present. The four-digit number in the left column references the Section 319 project number and can be correlated to information found in the web-based Grants Reporting and Tracking System (GRTS). The lower portion of the table lists projects funded through Pennsylvania's Growing Greener program from 1999 to present, the number in the left column references the state fiscal year from which the funds were awarded. Supporting these federal and state funded projects are the projects completed by program partners with other funds not shown here.

Catawissa Creek WIP Section 319 Project List (1999 to present)	
1409	Oneida #3 AMD Treatment System Optimization
2717	Oneida #3 Mine Tunnel Discharge Remediation Project
2619	Audenreid Mine Tunnel AMD Treatment – Limestone Supplement
2545A	Catawissa Creek Audenreid Tunnel AMD Remediation
2417	Design – Audenreid Mine Tunnel Discharge AMD Remediation
2155	Design – Oneida #3 AMD Treatment System
9917	AMD Abatement of the Oneida #1 Tunnel Discharge
Catawissa Creek WIP Growing Greener Project List (1999 to present)	
1999	Abandoned Mine Drainage Abatement of the Oneida #1 Mine Tunnel

Table C-2: A listing of Section 319 and Growing Greener projects dedicated to the restoration of the Catawissa since 1999.

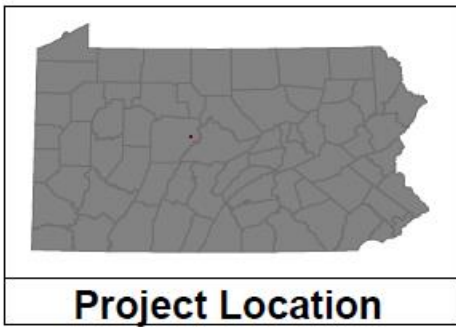
The next few tables address the goals in the Watershed Tracker located in GRTS. Goals were set from information found in the Watershed Implementation Plan and TMDL. Progress has been made but more work is left to be done.

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented
Audenreid Discharge	Limestone Leach Bed/Pond	3	3	100
Catawissa Tunnel Discharge	Passive Treatment	1	0	0
Green Mt. Tunnel Discharge	Passive Treatment	1	0	0
Oneida #3 Discharge	Limestone Leach Bed/Pond	1	1	100

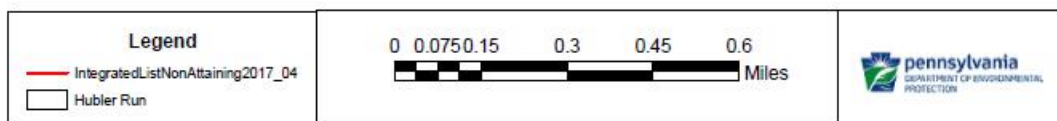
Table C-3: A table listing BMP implementation goals by sub-watershed and the extent to which those goals have been achieved.

Sub Watershed	Pollutant ID	Target Load Reduction (lbs./day)	Load Reduction Achieved (lbs./day)	% Load Reduction Achieved
Audenreid Discharge	Acidity	6,869.10	3,366.00	49
	Aluminum	767.40	229.00	30
	Iron	14.20	15.80	100
	Manganese	170.20	29.00	17
Catawissa Tunnel Discharge	Acidity	113.50	0	0
	Aluminum	6.00	0	0
	Iron	2.90	0	0
	Manganese	0.00	0	0
Green Mt. Tunnel Discharge	Acidity	310.00	0	0
	Aluminum	31.70	0	0
	Iron	2.50	0	0
	Manganese	0.30	0	0
Oneida #3 Discharge	Acidity	491.90	233.80	48
	Aluminum	36.00	11.90	33
	Manganese	15.00	4.10	27

Table C-4: A table listing load reduction goals by subwatershed and the extent to which those goals have been achieved.



Hubler Run Watershed



Hubler Run is a tributary to Alder Run in the West Branch Susquehanna River basin in Clearfield County. Hubler Run is a small forested watershed covering 1.05 square miles. There are a few farms located in the watershed. Previously mined areas can be found which causes the pollution in Hubler Run. Acidity, iron, aluminum and manganese are the pollutants of concern.

In the 1990's interest was shown in the watershed by West Branch Sportsmen's Club, Central Counties Concerned Sportsmen and Headwaters RC&D and a passive treatment system was constructed. Then a TMDL was approved for Alder Run in 2006 which included points in the Hubler Run watershed addressing the abandoned mine drainage (AMD) pollutants. The Watershed Implementation Plan for Hubler Run was developed following the TMDL approval and was completed in August 2007.

Pollutant loadings have been reduced through the implementation of the WIP using Section 319 funding. The Emigh Run/Lakeside Watershed Association addressed the 3 highest priority projects. Systems consisting of anoxic limestone drains, limestone beds and a vertical flow wetland have been working well treating the top three priorities sites in Hubler Run. Currently, the activities that have been occurring in the watershed are operation and maintenance on those systems.

Water quality at the mouth of the stream has been showing improvement to the point it was recommended for reassessment. While the stream was not removed from impaired list it was put on a list as "one to watch". The table below shows the water quality improvement.

Site	Timeframe	pH	Acidity	Alkalinity	Iron	Aluminum	Manganese
HR 1	2003-2004	4.9	41.7	7.5	0	1.5	3.4
	2016-2017	6.3	-0.6	4.8	0.17	0.12	0.55

Table H-1: A table showing water chemistry results measured during certain monitoring years. Note the following abbreviation and sample location description:

*HR1 – Hubler Run at mouth

In the table below are the Section 319 grants that have been awarded in this watershed. The four- digit number in the left column references the Section 319 project number and can be correlated to information found in the web-based Grants Reporting and Tracking System (GRTS).

Hubler Run WIP Section 319 Projects List (1999 to Present)	
1013	Hubler Run 3 AMD (DPC)
2815	Hubler Run 3 AMD Treatment System Study (design)
2723B	Hubler Run II AMD Passive Treatment System
2617	Hubler Run II AMD Passive Treatment System
2630 I	Hubler Run I AMD Treatment System Rehabilitation
2517	Hubler Run I AMD Treatment System Rehabilitation
2028	Hubler Run AMD Abatement Phase II
9962	Hubler Run AMD Abatement

Table H-2: A table listing Section 319 funded projects dedicated to the restoration of the Hubler Run since 1999.

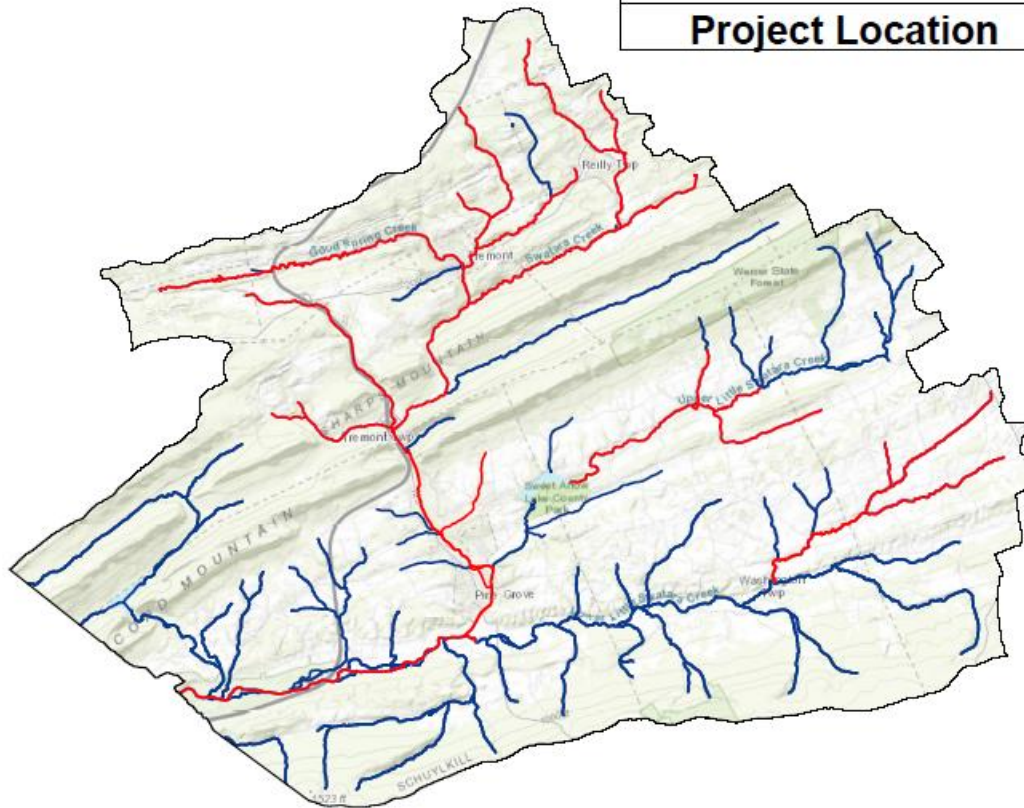
The next few tables address the goals in the Watershed Tracker located in GRTS. BMP goals were set from information found in the Watershed Implementation Plan which addresses the TMDL required load reductions. Target load reductions came from the TMDL.

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented
Hubler Run HR2	Limestone Open Channel	1	0	0
Hubler Run HR3	Anoxic Limestone Drain	3	6	100
	Limestone Leach Bed/Pond	3	3	100
	Vertical Flow Treatment System	1	1	100

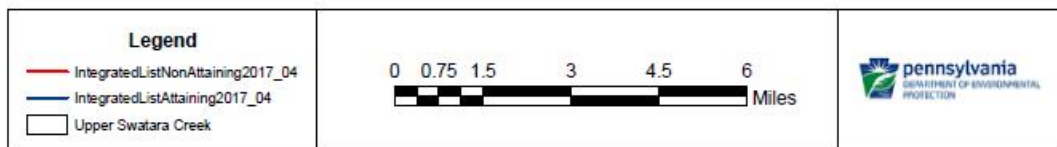
Table H-3: A table listing BMP implementation goals by subwatershed and the extent to which those goals have been achieved.

Sub Watershed	Pollutant ID	Target Load Reduction (lbs./day)	Load Reduction Achieved (lbs./day)	% Load Reduction Achieved
Hubler Run HR2	Acidity	7.90	0	0
	Metals (Aluminum)	1.00	0	0
	Metals (Iron)	1.40	0	0
	Metals (Manganese)	0.10	0	0
Hubler Run HR3	Acidity	299.90	222.37	74
	Metals (Aluminum)	13.10	22.67	100
	Metals (Iron)	21	4.04	19
	Metals (Manganese)	23.80	1.04	4

Table H-4: A table listing pollutant load reduction goals and the extent to which those goals have been achieved.



Upper Swatara Creek Watershed



Swatara Creek begins in southwestern Schuylkill County and flows through Berks, Lebanon and Dauphin Counties until it reaches the Susquehanna River. The portion of the watershed that the Upper Swatara Creek Watershed Implementation Plan focuses on is the watershed upstream of the town Ravine, Schuylkill County. This portion of the watershed is 43 square miles. Most of the watershed is forested but there are some mining areas and small amounts of urban. The upper stretches of Swatara Creek watershed are largely impaired by abandoned mine drainage (AMD) discharges from surface and deep mining operations. Many tributaries are also severely impacted from AMD sources which contribute high levels of iron, aluminum and manganese and runoff from abandoned coal mines. Nearly 34 miles of upper Swatara Creek and tributaries are impaired by these sources. A TMDL was approved in 1999 and the Upper Swatara Creek Watershed Implementation Plan was completed by the Schuylkill County Conservation District and finalized in May 2006.

Many projects have been completed using Section 319 funding. The most recent was prompted by a major decrease in water quality and the disappearance of fish at the mouth of Lorberry Creek. The Schuylkill County Conservation District was awarded a Nonpoint Source Section 319 (#1507) grant to look at an older treatment system and retrofit it to increase its capabilities for treatment.

There are various other watershed restoration projects in addition to those funded by the Section 319 program occurring now in the Swatara Creek Watershed. The Good Spring Creek Floodplain Restoration Project was envisioned to deal with a nearly 500,000 cubic yard coal waste bank that sits on a 40-acre site along Good Spring Creek. The idea was to remove the pile and create a more natural sinuous 4,600 feet long stream channel and construct nearly 18 acres of floodplain/wetlands. Project design was initially funded by a Nonpoint Source Section 319 grant (#1307) and the first phase of construction is funded through several sources: two Growing Greener Grants and a commonwealth Financing Authority - Watershed Restoration & Protection Program Grant all of which were awarded to the Schuylkill Conservation District.

The second floodplain restoration project is within Pine Grove Borough and was originally designed under a 2013 Growing Greener Grant. The Swatara Creek Floodplain Restoration Project design is to restore 18 acres of floodplain, create 7.7 new acres of wetlands, create 7.6 acres of riparian zone and wetland transitional zone naturalization and stabilize 400 feet of streambank resulting in increases in wildlife habitat and reduce impacts of flooding within Pine Grove Borough. The construction portion of the first phase of the project was funded through a Growing Greener Grant (2017) awarded to the Schuylkill

Conservation District and a Department of Community and Economic Development CDBG-Disaster Recovery Program Grant awarded to the County of Schuylkill.

A few smaller projects the Schuylkill Conservation District is also implementing is a PA DEP BAMR AMD Set-Aside Program Grant, monitoring 16 stream sampling points and eight AMD discharge sampling points to assess the status of remaining AMD impacts and guide future AMD remediation and AML reclamation efforts. Also, the Schuylkill Conservation District and Northern Swatara Creek Watershed Association have partnered to complete a streambank stabilization/fish habitat improvement projects in the Upper Little Swatara Creek to reduce sedimentation. This project builds on two previous projects completed in 2012 and 2016. Funding sources for these projects were an anonymous source, the Northern Swatara Creek Watershed Association, the Schuylkill Chapter Trout Unlimited and the Conservation Fund.

Monitoring has been occurring in some of the upper sections of Swatara Creek to gage improvements or catch any problems with declining water quality over the years. Sample points used corresponded with the ones used in the National Monitoring project so changes in quality could be detected.

Site	Timeframe	pH	Acidity	Alkalinity	Iron	Aluminum	Manganese
Swatara at Ravine	2011	7.2	-1.8	7.8	0.56	0.15	0.5
	2017	6.99	-2.75	16.3	0.653	<0.5	0.327
Lorberry Creek	2011	6.1	6.6	1.2	1.94	0.44	1.04
	2017	6.6	2.2	12.4	2.019	<0.5	0.747
Good Spring Creek	2011	7.0	-11.2	17.8	2.38	0.16	0.88
	2017	7.08	-8.7	21.7	1.394	<0.5	0.51
Middle Creek	2011	6.6	0.8	11.8	2.07	0.63	0.89
	2017	7.04	-9.5	22.0	0.645	<0.5	0.414
Swatara Creek near Headwaters	2011	4.94	9.8	0	0.44	0.88	0.62
	2014	4.61	28	0.1	0.23	0.59	0.80

Table US-1: A table showing water chemistry results as measured during the specified monitoring years. Note the following ample Site descriptions as they correspond to the sites listed in the table:

**Ravine – most downstream point in Upper Swatara Creek WIP*

**Lorberry Creek – sample taken at mouth*

**Good Spring Creek – Upstream of the mouth Middle Creek*

**Middle Creek – Near mouth*

**Headwaters near Newtown*

The table below shows the Section 319 funded projects that have been funded from 1996 to present. The four-digit number in the left column references the Section 319 project number and can be correlated to information found in the web-based Grants Reporting and Tracking System (GRTS). The lower portion of the table lists projects funded through Pennsylvania's Growing Greener program from 1999 to present, the number in the left column references the state fiscal year from which the funds were awarded. Supporting these federal and state funded projects are the projects completed by program partners with other funds not shown here.

Upper Swatara Creek WIP Section 319 Project List (1996 to present)	
1507	Lorberry AMD Treatment System Rehabilitation
1307	Donaldson Culm Bank and Good Spring Creek Restoration
1027B	Watershed Implementation Plan Mini-grants - Upper Swatara Creek (monitoring)
2709	Swatara Creek National Monitoring Program
2611	Swatara Creek National Monitoring Program
2511	Swatara Creek National Monitoring Program
2415	Swatara Creek National Monitoring Program
2514	Tracey Airhole AMD Discharge Remediation
2313	Swatara Creek National Monitoring Program
2320	Swatara Creek Limestone Drains
2327	Swatara Creek Watershed Restoration
2212	Swatara Creek National Monitoring Program
2221	Little Swatara Creek Watershed Restoration
2112	Swatara Creek National Monitoring Program
2119	Swatara Creek AMD Remediation
2125	Little Swatara Creek Riparian Buffer and Streambank Fencing
2126	Swatara Creek Watershed Restoration
2016	Swatara Creek National Monitoring Program
9932	Swatara Creek National Monitoring Program
9814	Swatara Creek Watershed AMD Remediation
9930	Swatara Creek National Monitoring Program
9621	Swatara Creek Watershed Initiative
Upper Swatara Creek WIP Growing Greener Project List (1999 to present)	
2016	Swatara Creek Floodplain Restoration Phase I Construction
2016	Good Spring Creek Floodplain Restoration Phase I
2015	Mill Creek AMD Watershed Restoration Plan Development
2015	Good Spring Creek Floodplain Restoration Phase I
2013	Swatara Creek Floodplain Restoration Phase I
1999	Swatara Creek AMD Enhancement Project

Table US-2: A list of Section 319 and Growing Greener projects dedicated to the restoration of the Upper Swatara since 1999.

As stated before, the upper portions of Swatara Creek were part of the National Monitoring Program for many years. Much of the data from that work is used to set the goals for the watershed. These are in the Watershed Tracker tool located in GRTS. The tables below show the progress made towards those goals.

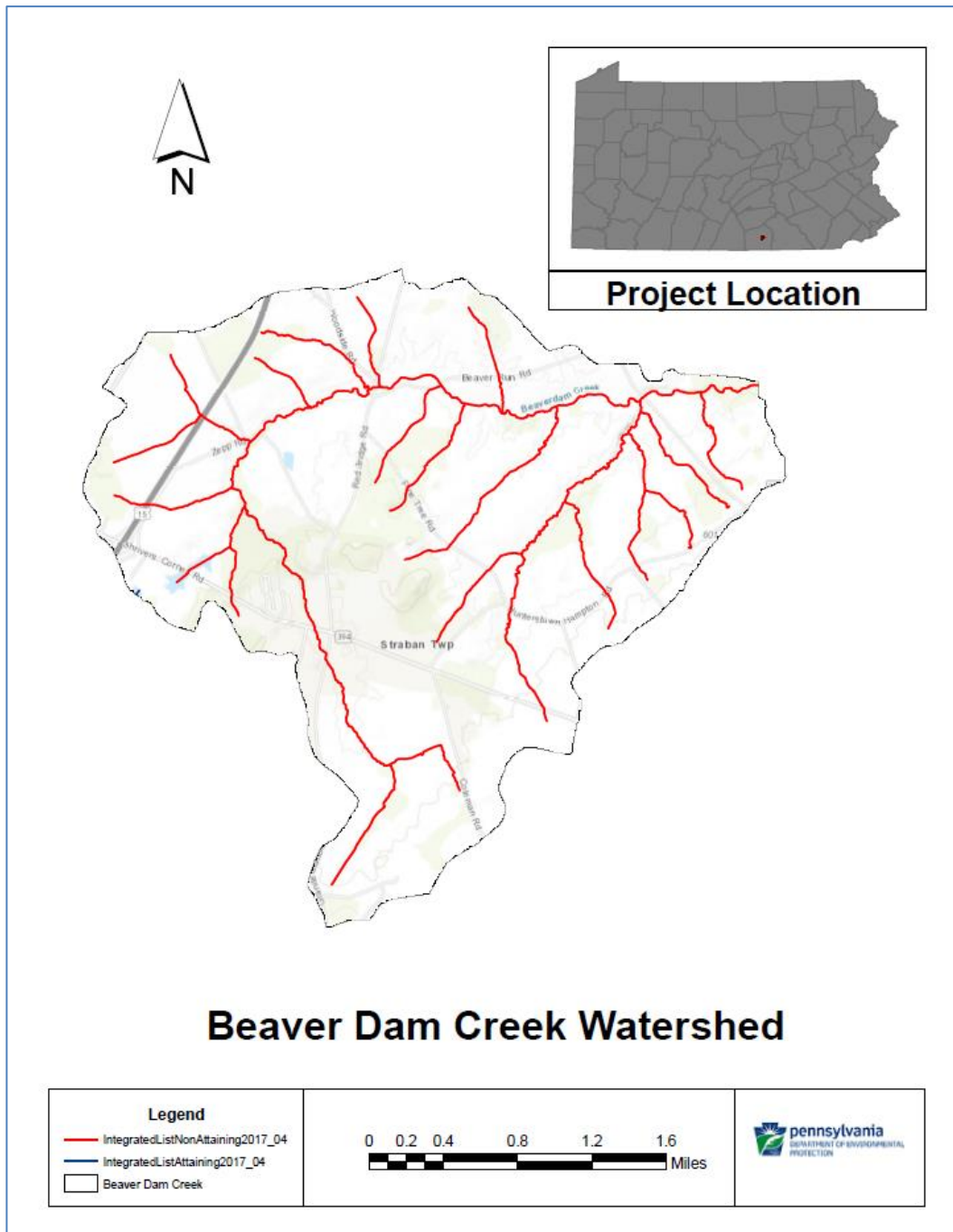
Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented
Headwater Site C2	Anoxic Limestone Drain	1	1	100
	Land Reclamation (acres)	75	75	100
	Limestone Open Channel	1	1	100
	Passive Treatment	3	3	100
Good Spring Site D1	Anoxic Limestone Drain	1	0	0
	Constructed Wetland Aerobic	5	2	40
	Land Reclamation (acres)	381	381	100
	Limestone Sanding	1	1	100
	Anoxic Limestone Drain	1	0	0
Lorberry Site E2-3	Anoxic Limestone Drain	1	0	0
	Constructed Wetland Aerobic	3	2	67
	Limestone Sanding	1	1	100
	Passive Treatment	1	1	100
Lower Rausch Site E3-2	Constructed Wetland Aerobic	2	1	50
	Limestone Leach Bed/Pond	1	1	100
Swatara Site D2 – near Ravine	Land Reclamation (acres)	53	53	100

Table US-3: A table listing BMP implementation goals and the extent to which those goals have been achieved.

Sub Watershed	Pollutant ID	Target Load Reduction (lbs./day)	Load Reduction Achieved (lbs./day)	% Load Reduction Achieved
Headwater Site C2	Acidity	1,305.00	728.00	56
	Aluminum	3.00	37.00	100
	Iron	199.00	163.00	82
	Manganese	27.00	38.00	100
Good Spring Site D1	Acidity	366.00	0.00	0
	Aluminum	0.00	7.00	100
	Iron	0.00	231.40	100
	Manganese	0.00	21.00	100
Lorberry Site E2-3	Acidity	1,439.00	803.00	56
	Aluminum	3.00	40.00	100
	Iron	219.00	179.00	82
	Manganese	30.00	42.00	100
Lower Rausch Site E3-2	Acidity	373.00	60.00	16
	Aluminum	0.00	4.3	100
	Iron	18.00	25.40	100
	Manganese	14.50	17.40	100
Swatara Site D2 – near Ravine	Acidity	160,972.00	88,507.00	55
	Aluminum	15,633.00	16,333.00	100
	Iron	39,364.00	18,774.00	48
	Manganese	1,056.00	2,253.00	100

Table US-4: A table listing pollutant load reduction goals and the extent to which those goals have been achieved.

NON-AMD WIPs



Beaverdam Creek is one of Pennsylvania’s newest WIP watersheds. Dated December of 2014, this WIP was prepared as a partnership between the Adams County Conservation District (ACCD), Rettew and DEP. A TMDL was developed for this watershed in 2011. The Beaverdam Creek watershed represents approximately 22 miles of stream and a surface area of 7.2 square miles. The land use in this watershed is predominantly agriculture (62%) with other land uses including forest, low density development, wetlands, and some fallow lands. As stated in the WIP, “Biological surveys conducted in June of 2006 indicated impairment within the Beaverdam Creek Watershed is due to siltation caused by agriculture. Therefore, conservation measures and best management practices (BMPs) that address sediment introduction and channel erosion are of the utmost importance when considering restoration of Beaverdam Creek.” While the TMDL calls for a 13.7% reduction of sediments (equitable to 176,632 lbs./year of sediment), the WIP if fully implemented, should yield a 30.4% reduction in annual sediment loading. The WIP proposes to accomplish the prescribed sediment load reductions through the implementation of essential BMPs such as: grazing land management, terraces and diversions, forest buffer installation, stream fencing and streambank stabilization.

To date, few Section 319 projects have been completed in this watershed (see table below). One project was included in the FFY 2017 grant to include sediment BMP work on several farms in this watershed. Project 1726 proposes to construct certain sediment focused BMPs on several farms in the upper portion of the Beaverdam Creek watershed. Projects such as this one will contribute to reduced sediment loadings and increase the health of the stream.

Beaver Dam Creek WIP Section 319 Projects List (2000 to Present)	
1726	Ag BMPs in Beaverdam Creek

Table BD-1: *A table listing all known Section 319 projects funded in the Beaverdam Creek watershed since the year 2000.*

Regardless of Section 319 funding, the ACCD in partnership with the Natural Resource Conservation Service (NRCS) have been actively working with the community in this area for some time. Table BD-2 below shows the achievement of the goal amount for the Long-Term No-Till practice as well as noteworthy achievement of Riparian Forest Buffer and Streambank and Shoreline Protection.

BMP	Goal Amount	Implemented Amount	Units	% Achieved
Long Term No-Till	350	350	ac	100
Prescribed Grazing	39	0	ac	0
Riparian Forest Buffer	14,256	2,830	ft.	20
Stream Exclusion with Grazing Land Management	8,448	0	ft.	0
Streambank and Shoreline Protection	5,808	5,024	ft.	87
Terraces, Diversions and Waterways	378	0	ac	0

Table BD-2: A table listing all known BMPs implemented in the Beaverdam Creek watershed.

Further, Table BD-3 below indicates a respectable start to the achievement of sediment load reductions. It should be stated that the numbers reported in Table BD-3 below are reported in terms of percent and not in pounds per year or tons per year of sediment reduced. This decision was made necessary as the modeling methods used to derive the goals varied significantly from the modeling methods used to determine current success.

Pollutant ID	TMDL Required Load Reduction	Target Load Reduction	Goal Year	Reduction Achieved (total) (2016)	Units	% Achieved
Sediment-Siltation	13.7%	30.4%		8.6%		28.3%
Phosphorus						
Nitrogen						

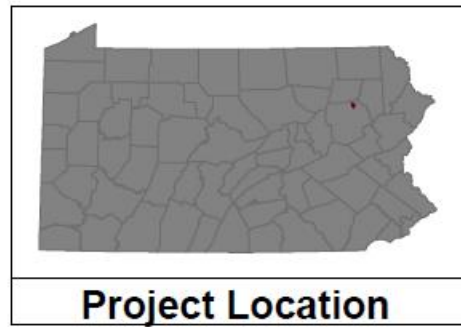
Table BD-3: A table listing TMDL and WIP target load reductions as well as reductions achieved to date in terms of percent of goal.

Further, in the interest of temporal efficiency and to accommodate recent NPS Program staffing changes that resulted in the loss of modeling capability, modeling for this WIP watershed was performed for the entire watershed and not on a sub-watershed scale. Choosing a larger watershed dilutes BMP impact and results in an underestimate of progress achieved. Another example of current modeling challenges can be seen in Table BD-4 below. Modeled load reductions were produced for project 1726, the current and only Section 319 funded project in this WIP watershed. Those load reductions were produced using Wikiwatershed, a web-based and user friendly model developed by Stroud and others. While this model is user friendly, it currently offers a limited BMP suite from which to choose and reports results in metric. While conversions can be made, with each computation and with each assumption a certain level of accuracy is lost. Regardless, to the best of current technical ability and as reported in the Project 1726 workplan, estimated pollutant load reductions are reported below in Table BD-4. While reviewing these numbers, the reader is encouraged to remember that it is not the purpose of this report to report on Project 1726, but rather the work being performed throughout the Beaverdam Creek watershed. DEP

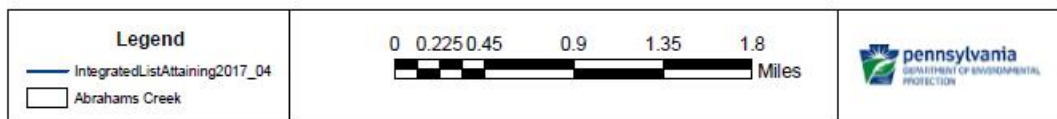
anticipates honing modeling capabilities in the near term as well as continued collaboration with program partners in Adams county and, as such, the Department anticipates a greater level of consistency and accuracy of load reduction reporting as well as actual on the ground implementation of the WIP over the next few years. Suffice it to say, regardless of current programmatic challenges, the NPS Program anticipates that continued efforts by all partners involved will produce success in this watershed over time.

Site	Landuse	Sediment (kg)	N (kg)	P (kg)
Kammerer				
	Cropland	9,305.70	32.80	13.10
	Subsurface flow	0.00	0.00	0.30
Spangler				
	Cropland	7,179.00	27.00	10.50
	Subsurface flow	0.00	0.00	0.30
Martin				
	Cropland	9,068.40	23.20	11.80
	Low-Density Mixed	23.30	0.60	0.10
	Medium-Density Mixed	39.30	0.70	0.10
	Farm Animals	0.00	2.00	0.40
	Subsurface Flow	0.00	0.00	0.30
Totals:		25,615.70	86.30	36.90

Table BD-4: A table listing modeled load reduction results provided by the Wikiwatershed model and included in the Project 1726 workplan.



Frances Slocum Lake Abrahams Creek Watershed



Francis Slocum Lake is a 165-acre impoundment in Kingston Township, Luzerne County. It is part of Francis Slocum Lake State Park that is maintained by the Pennsylvania Department of Conservation and Natural Resources (DCNR). Prior to WIP development, the lake was becoming hyper-eutrophic resulting in; massive algal blooms, poor water clarity, and depleted oxygen concentrations. To combat this diminishing water quality, the Luzerne County Conservation District (LCCD) in partnership with PA DCNR requested funding to complete a Watershed Implementation Plan (WIP) for the lake and the accompanying Abrahams Creek watershed through the Section 319 Nonpoint Source Program. The Frances Slocum Lake/Abrahams Watershed Implementation Plan, that covers 6 sq. miles, was completed in 2010.

The Abrahams Creek watershed as it drains to Frances Slocum lake, at the time the WIP was developed, consisted mostly of forested lands with a mix of agricultural and rural residential land use. As such (and supported by monitoring) phosphorus, nitrogen and suspended solids (sediments) were the pollutants of concern. The source of these pollutants was determined to be a few active farms, on-lot septic systems and internal release by in-lake sediments. Pollutant budgets were determined for phosphorus, nitrogen and sediments using the unit areal loading approach since a TMDL had not been developed for the lake or Abrahams Creek. Goals were set in the WIP using this approach. Note that additional discussion regarding land use will be offered later in this report.

Program partners implementing this WIP have focused on various in-lake management practices, as well as wastewater and agriculture related issues. Regarding the in-lake work, in the past few years a bathymetric assessment of the lake was completed to identify and prioritize near-shore areas for future dredging. Data collection efforts were used to develop a full aeration system design and to aid in determining a polyaluminum chloride dosing rate for the deep-water nutrient inactivation treatment. Two solar-based Floating Wetland Islands were deployed.

Table FS-1 below provides a list of Section 319 and Growing Greener funded projects that have been awarded in this watershed. The upper part of this table is specific to Section 319 funded projects. In that portion of the table, the four-digit number in the left column references the Section 319 project number and can be correlated to information found in the web-based Grants Reporting and Tracking System (GRTS). The lower portion of the table lists projects funded through Pennsylvania's Growing Greener program from 1999 to present, the number in the left column references the state fiscal year from which the funds were awarded. Supporting the projects listed in Table FS-1 are an uncounted number of local projects completed by program partners with other funds.

Francis Slocum Lake WIP Section 319 Projects List (2006 to Present)	
1620	Abrahams Creek / Frances Slocum Lake Ag BMPs (design and construction)
1512	Francis Slocum Lake Restoration (study-construction)
2629	Francis Slocum Lake/Abrahams Creek Watershed Assessment
Francis Slocum Lake WIP Growing Greener Project List (1999 to Present)	
2009	Abrahams Creek Riparian Buffer Restoration and Stream Rehabilitation
2008	Abrahams Creek Watershed Assessment

Table FS-1: A table listing known 319 projects funded since 2006 and Growing Greener projects funded since 1999.

Table FS-2 below address the goals of the WIP as listed in the Watershed Tracker located of GRTS and known progress in achieving the stated BMP goals.

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented
Francis Slocum Lake/Abrahams Creek	Alternative Water Source	1	0	0
	Fence (ft.)	0	0	0
	Floating Wetland Islands	0	2	>100%
	Livestock Stream Crossing	1	0	0
	Riparian Forest Buffer (ac)	1.2	0	0
	Road Ditch Creation/Improvements (ft.)	1,500	0	0
	Stream Exclusion with Grazing Land Management (ft.)	1,000	0	0
	Streambank & Shoreline Protection (ft.)	2,800	0	0

Table FS-2: A table listing BMP implementation goals as established in the WIP and the known progress in terms of percent in achieving those goals.

Pollutant reduction goals, shown in Table FS-3 below were calculated using the Mapshed model. Noteworthy progress has been made in achieving these goals with both phosphorus and sediment goals surpassing the 50% mark and nitrogen nearing the 50% mark. Some concern regarding the results of the modeling might be raised given that activity reported in Table FS-2 indicates little BMP implementation has been completed while modeled load reductions in Table FS-3 below shows significant pollutant load reductions. A review of the modeling methods used to produce these results was conducted. This review: verified that the BMPs included in the model run were limited to the two FWIs; verified that land use changes were addressed in the model, and verified that a tested and proven modeling technique involving the combined use of Wikiwatershed and Mapshed was employed. Note that Wikiwatershed incorporates

the most current and up to date land use data available and Mapshed offers a robust BMP suite with proven and accepted efficiencies attributed to those BMPs. As such, combining these two models is a valid technique used within the Department for various activities.

Sub Watershed	Pollutant ID	Target Load Reduction	Load Reduction Achieved	% Load Reduction Achieved
Francis Slocum Lake/Abrahams Creek	Nitrogen (lbs./yr.)	57,831.5	25,380	44
	Phosphorus (lbs./yr.)	8,515.3	4,862.3	57
	Sediment Siltation (tons/yr.)	945.1	503.6	53

Table FS-3: A table listing TMDL and WIP target load reductions as well as reductions achieved to date in terms of percent of goal.

As indicated earlier in the article, the Abrahams Creek/Frances Slocum WIP was approved in 2010. As such, land use data provided in the WIP and modeling relying on that land use data would have reflected land use in 2010 or shortly before. Table FS-4 provides a comparison of land use as reported in the WIP and land use data provided by a recent Wikiwatershed model run. To graphically show the change in landuse, Figure FS1 is included below.

	Water (%)	Open space (undeveloped) (%)	Developed (%)	Forest (%)	Wetland (%)	Ag (%)
2010	6.4	1.6	3.3	53.4	0.2	35
2016	5.1	0	6.2	48.1	5.1	32.9
Change	(1.3)	(1.6)	2.9	(5.3)	4.9	(2.1)

Table FS-4: A table showing land use in the watershed as reported in the WIP (2010), land use as reported in a 2018 Wikiwatershed model run, and the change between the two years.

It can be seen in Table FS-4 that between from the drafting of the WIP (circa 2010) to present day the amount of water, open space, forest, and ag lands all decreased. Relative to modeling results it is likely the decrease in ag lands in conjunction with the increase in developed lands would have the greatest impact on a decrease in sediment and nutrient pollution. This decrease in ag lands can also be seen in Figure FS1 where an obvious patch of ag lands on the peninsula of the lake was converted to various forms of developed land. The change in wetlands is also notable and likely to have a significant impact on nutrient reductions. The increase in wetlands can also be seen sporadically throughout Figure FS 1 with a

noticeable increase in wetlands on the fringes of the open water located in the watershed. A separate area of wetland increase, converting mostly ag and perhaps some forest to wetlands can be seen due west of the central urbanized area. While it is well beyond the scope of this report to investigate that increase of wetlands, it is possible this wetland increase can be attributed to increased accuracy in data collection by NRCS, legitimate conversion of prior converted lands back to wetlands or some other wetland construction project. If a WIP update were to occur or if future discussion amongst program partners and stakeholders were to occur, this would likely be a worthwhile topic of conversation.

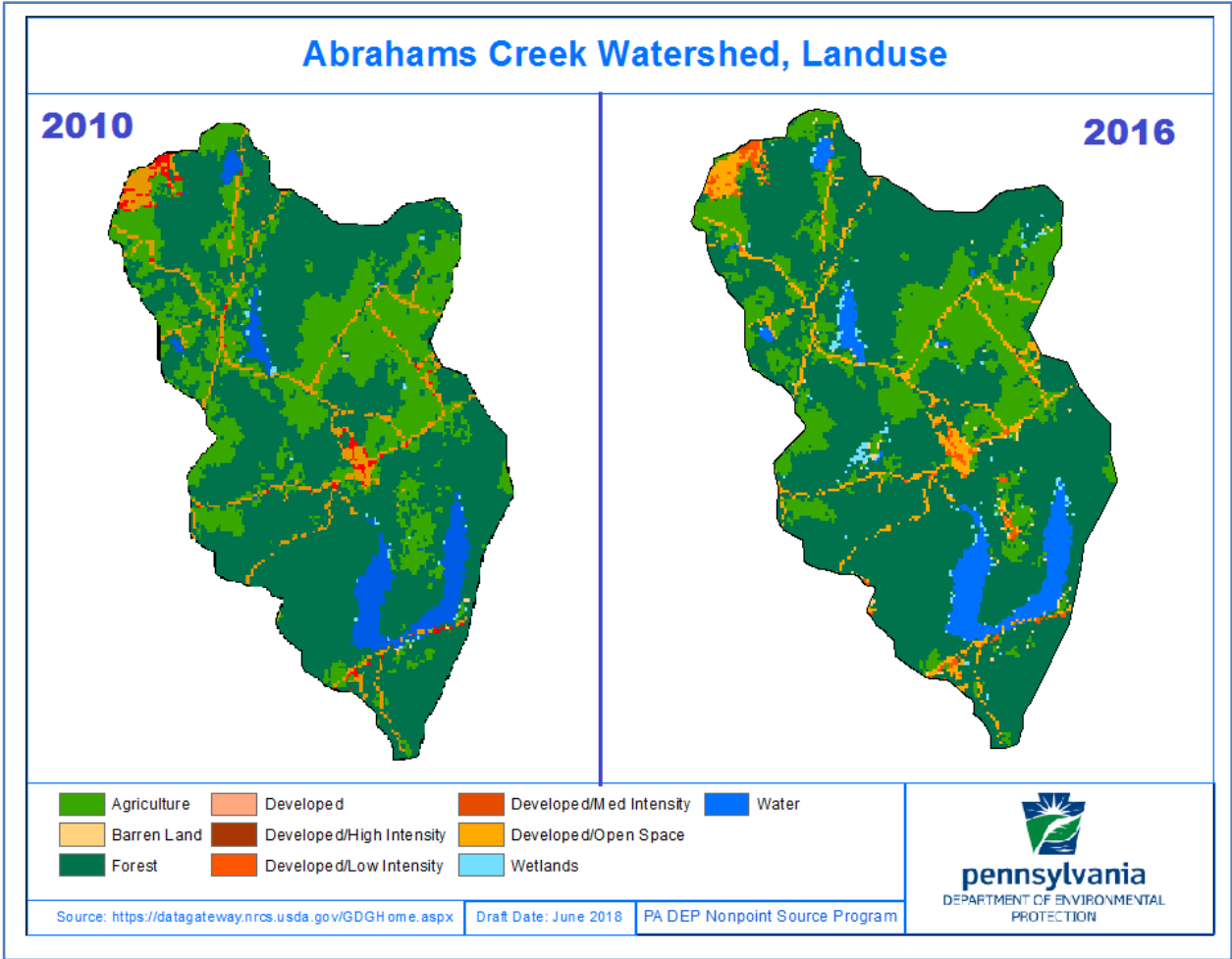


Figure FS 1: A side by side comparison of land use data obtained from NRCS for 2010, the year the Frances Slocum Abrahams Creek WIP was approved and 2016, the most recent dataset available.

Table FS-3 above displays pollutant load reductions in terms of pounds per year and tons per year as indicated, Table FS-5 below shows modeled pollutant load reductions in terms of percent of stated goal. The figures reported in Table FS-5 below were derived by comparing stated goals in the WIP in terms of percent with modeled load reductions achieved.

Pollutant ID	TMDL Required Load Reduction	Target Load Reduction	Goal Year	Reduction Achieved (total) (2016)	Units	% Achieved
Sediment-Siltation	51.8%	51.8%		53.3%		100% +
Phosphorus	49.4%	49.4%		56.6%		100% +
Nitrogen						

Table FS-5: A table listing TMDL and WIP target load reductions as well as reductions achieved to date in terms of percent of goal.

The modeling used to derive the load reductions reported in Table FS-4 were performed using a combined Mapshed and Wikiwatershed approach; these model runs were performed looking at the watershed as a whole rather than breaking the watershed down into smaller sub-watersheds. It is encouraging to note that, in terms of percent, the desired load reductions have been achieved. Despite Table FS-5 indicating the desired load reductions in terms of percent have been achieved, it is not yet accurate to state that implementation of this WIP is complete or that the goals of this WIP have been met. As indicated in Table FS-3 above, additional gross-weight load reductions should be pursued. Further, the land use changes shown in Figure FS 1 and Table FS-4 are intriguing when viewed in light of discussion in this WIP regarding the nature of the agricultural lands in this watershed. Perhaps it is most reasonable to state that: continued monitoring is necessary to validate modeled load reductions; also, given those notable land use changes, a WIP update may be in order. The Department anticipates having conversations, both internally as well as with program partners in the near future to better plan for the protection and restoration of Frances Slocum Lake.



Project Location

West Branch Antietam Creek Watershed



Legend

- IntegratedListNonAttaining2017_04
- IntegratedListAttaining2017_04
- Southern Branch Antietam Creek
- West Southern Branch Antietam Creek
- East Southern Branch Antietam Creek
- North Branch Antietam Creek
- North Western Branch Antietam Creek

0 0.5 1 2 3 4 Miles



The WIP currently being implemented in the West Branch of the Antietam Creek, a tributary to the Potomac River in Franklin County, was prepared in April of 2008. At the time the WIP was developed a TMDL had not been completed for this watershed. Regardless, the WIP does include target load reductions to include a 29% reduction in sediment loading, a 12% reduction in Nitrogen loading and a 22% reduction in Phosphorus loading. This WIP covers approximately 22.46 miles of degraded stream with a total of 62.44 total stream miles and a watershed area of 41.4 square miles. While the land use in this watershed is mostly rural and agricultural, two small population centers do exist within the watershed. The boroughs of Mount Alto and Waynesboro can be found in this watershed. Mount Alto is home to a Penn State satellite campus with many programs including forestry. Public lands also exist within this watershed including a small portion of Michaux State Forest, the only state forest in South Central Pennsylvania.

Regardless of the boroughs and forested lands, approximately 76.1% of the watershed is used for agriculture. As such, the WIP focuses on the implementation of agricultural BMPs to address water quality concerns existing in this watershed. The ag BMPs on which this WIP focus are broadly categorized in the WIP as: soil conservation, pastureland management, nutrient management, and riparian corridor management. A total of 173 projects are proposed in this WIP. Total completion is estimated to take 24 years with a cost of \$12.7 million dollars.

The table below shows the Section 319 funded projects that have been funded from 2000 to present. The four-digit number in the left column references the Section 319 project number and can be correlated to information found in the web-based Grants Reporting and Tracking System (GRTS). The lower portion of the table lists projects funded through Pennsylvania's Growing Greener program from 2000 to present, the number in the left column references the state fiscal year from which the funds were awarded. Supporting these federal and state funded projects are the projects completed by program partners with other funds and in some cases work completed by private landowners with their own funds. While the full implementation of this WIP will likely take a considerable amount of time, partnering and focus will lead to success.

Antietam Creek WIP Section 319 Projects List (2000 to Present)	
1508	West Branch Antietam Creek Stream Restoration (DPC)
1215	West Branch Antietam Creek Agricultural BMPs (DPC)
2931O	West Branch Antietam Creek Agricultural BMPs Addendum #1 (DPC)
2727C	West Branch Antietam Creek Watershed Plan Development
2223	West Branch Antietam Creek Watershed Restoration
Antietam Creek WIP Growing Greener Projects List (2000 to Present)	
2000	Antietam Creek Agricultural Demonstration
2003	Antietam Creek Watershed Startup/Support Grant

Table AC-1: A table showing all known Section 319 and Growing Greener projects completed in the Antietam Creek WIP watershed since the year 2000.

Table AC-2 below shows the total quantity of BMPs known to be implemented in the Antietam Creek WIP watershed regardless of funding source. Further, this table shows the extent to which stated BMP goals

BMP	Goal Amount	Implemented Amount	Units	% Achieved
Conservation Plan		723.0	ac	
Grazing Planned Systems	254.0	19.4	ac	7.6
Nutrient Management		280.0	ac	
Riparian Forest Buffer	162.3	25.8	ac	15.9
Stream Channel Stabilization		1,730.0	ft.	
Stream Exclusion with Grazing Land Management	96,762	1,500.0	ft.	1.6
Streambank & Shoreline Protection	99,436	3,095.0	ft.	3.1
Waste Management System		1	ea	

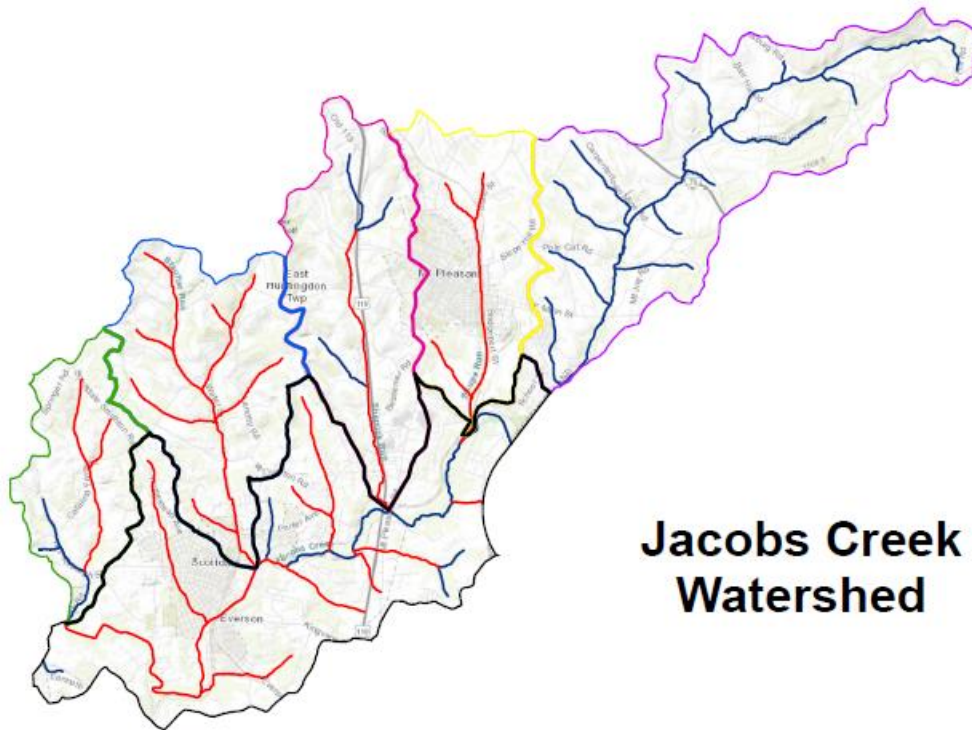
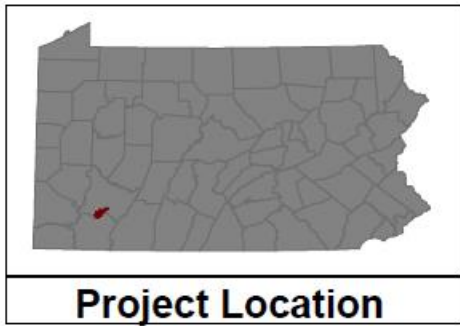
Table AC-2: A table showing all known BMPs implemented in the Antietam Creek WIP watershed and as reported in GRTS.

have been achieved. It is interesting to note that, while only marginal progress has been made at achieving established goals, significant progress has been made in implementing BMPs not originally planned for implementation. Specifically, Conservation Planning and Nutrient Management Planning efforts have been successful in this watershed as has the implementation of Stream Channel Stabilization. Currently, established goals for Stream Exclusion and Streambank Protection appear high. These large goal amounts may indicate that this WIP would be a good candidate for a review and update or re-write soon. Supporting that statement is Table AC-3 below. This table was prepared comparing load reductions recently modeled and converted to percent with those load reduction goals found in the WIP (also converted to percent). It should be noted that the load reduction modeling performed for this report simply looked at the WIP watershed as a whole and did not model individual sub-watersheds. While that method is more efficient in terms of time it is less accurate and may be underestimating actual load reductions achieved.

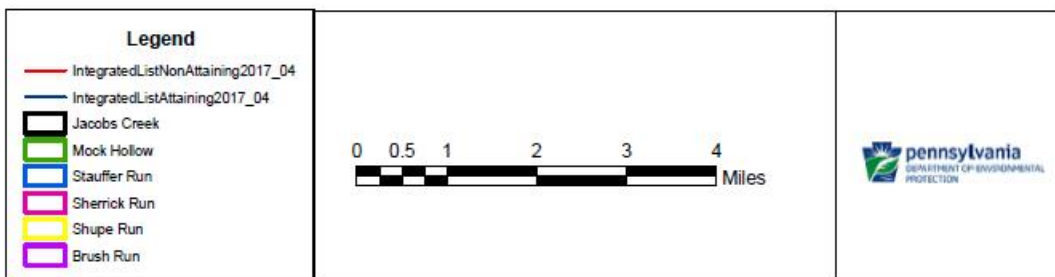
Pollutant ID	TMDL Required Load Reduction	Target Load Reduction	Goal Year	Reduction Achieved (total) (2016)	Units	% Achieved
Sediment-Siltation	50%	50%		4.4%		
Phosphorus	29%	29%		3.6%		
Nitrogen						

Table AC-3: *A table showing pollutant load reductions achieved in terms of percent of stated goal. Load reductions were derived using Mapshed and Wikiwatershed.*

It is likely that not all BMPs constructed in this watershed are known or reported. Further, it is definite that the modeling methods used were chosen for efficiency and not for accuracy. Further work could be done in this watershed to verify the presence of BMPs and, upon completion, a more accurate modeling method could be used to better determine current progress.



Jacobs Creek Watershed



The Watershed Implementation Plan currently being implemented in the Jacobs Creek watershed, a tributary to the Youghiogheny River, was last revised June 2009. This WIP is being primarily implemented by the NPS program partner the Jacobs Creek Watershed Association (JCWA) and local entities who partner with JCWA. JCWA recently indicated a desire to do a partial update or review of this WIP and to construct a web-based interactive map; these projects are not yet complete. Regardless of the status of the WIP, at just under a decade old, the Jacobs Creek WIP is not the oldest WIP being implemented in PA and is one of the most prolific in terms of total grants received and total funds received. Table JC-1 below lists the total Section 319 funded projects awarded to program partners active in the Jacobs Creek watershed since 2008.

The area covered by the Jacobs Creek WIP is 98 square miles. While one of the larger WIPs actively being implemented in Pennsylvania, in recent years, most of the grants awarded to program partners in this area have focused on the implementation of BMPs on Shupe Run, a tributary to the Jacobs Creek that flows through Mount Pleasant Borough. Land use in the Jacobs Creek WIP is primarily forested with pockets of urban and sub-urban development, primarily around Mount Pleasant Borough and Scottdale Borough. Some active agriculture and legacy impacts from coal mining remain and contribute to the nonpoint source degradation to surface waters in this area. The area covered by the Jacobs Creek WIP can be broken down into several smaller sub-watersheds, as eluded to earlier. Those subwatersheds include: Mock Hollow, Shaffer Run, Sherrick Run, Shupe Rune, Brush Run, Anderson Run, and Greenlick Run along with the mainstem of Jacobs Creek. Mock Hollow and Brush Run were not listed as impaired at the time the WIP was written. Sherrick Run contained sever unimpaired tributaries and an impaired mainstem. Stauffer Run and Shupe Run as subwatersheds were listed as impaired for the full length of those streams at the time the WIP was written. As a subwatershed of only 4.01 square miles, Shupe Run is a logical choice on which to focus restoration efforts.

At the time the Jacobs Creek WIP was written there were no TMDLs established for this area. Lacking a TMDL, the JCWA WIP was written to address the three primary sources of NPS pollution present in the area; that is, pollution from: agriculture, urbanization, and past mining practices. That the Jacobs Creek watershed contains these three sources of degradation allow it to serve as a microcosm of Pennsylvania. Routinely, Pennsylvania lists agriculture and abandoned mining as the largest two sources of surface water quality degradation with the ever-expanding suburban environment as a significant third contributor.

Page 21 of the approved WIP provides a map outlining the area of operation and showing the approximate location of projects planned in each of the subwatersheds. Pages subsequent to page 21 provide a closer

outline of each individual sub-watershed and the projects planned for each subwatershed. Figure JC-1 below is an excerpt from the WIP showing the Shupe Run subwatershed and project locations originally planned for this subwatershed. Additional information on the Jacobs Creek Watershed Association and the Jacobs Creek Watershed may be found at JCWA's website at: <http://www.jacobs creek watershed.org/>

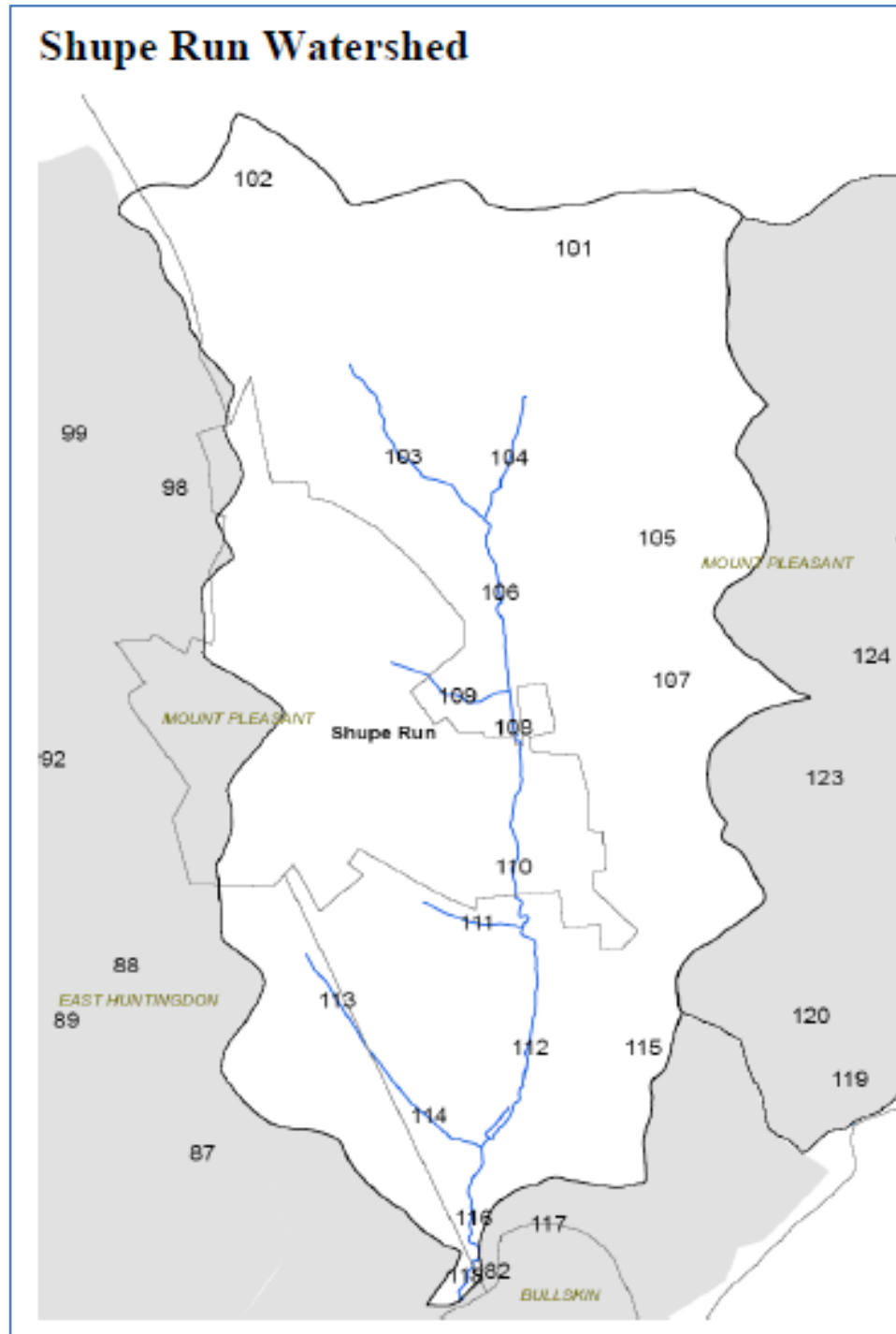


Figure JC-1: A map of the Shupe Run watershed, a sub-watershed of the Jacobs Creek and the current focus of JCWA's Section 319 funded restoration work.

Table JC-1 below lists the Section 319 funded projects implemented by the JCWA since 2008. JCWA has been one of the most if not the most prolific program partner in recent years. The project list below represents \$3.964 million in Section 319 funds dedicated to the restoration of the Jacobs Creek through the JCWA over the past 10 years.

Jacobs Creek Section 319 Funded Projects (2008 to Present)	
1720	Shupe Run Coal and Coke Trail Streambank Erosion Project
1613	Mount Pleasant Plaza Storm Water Retrofit (GI) Project
1614	Mount Pleasant Shop n Save Infrastructure (construction)
1516	Southmoreland HS Stormwater Improvements - Parking Lot Retrofit (construction)
1418	O'Neil Alley Green Infrastructure Retrofit in Scottdale (design)
1419	Mount Pleasant/Shupe Run Stormwater Retrofit Project (construction)
1426	Southmoreland HS - Upper Parking Lot Porus Pavement (construction)
1320	Scottdale Borough Green Streets (construction)
1321	Southmoreland High School Green Infrastructure (DP)
1322	Green Infrastructure Development in Mt. Pleasant (DP)
1222	Mount Pleasant / Shupe Run Stormwater Retrofits (design)
1122	Jacobs Creek Stream Bank Stabilization (design and construction)
1019	Shupe Run Stream Bank Restoration Phase II (DPC)
1020	Scottdale Stormwater Retrofit - Phase II (construction)
1026	Scottdale Green Streets Project (design)
2928	Mt Pleasant Borough Stormwater Retrofit Phase II (DC)
2929	Scottdale Stormwater Retrofit (DC)
2931N	Scottdale Green Streets Project (design)
2931P	Jacobs Creek UNT 2 AMD Reclamation (DC)
2823	Mount Pleasant Borough Stormwater Retrofit Project (DC)

Table JC-1: A table showing each of the Section 319 projects awarded to the JCWA since 1998. JCWA is one of the most prolific watershed associations who partner with the Nonpoint Source Program.

The funds and projects listed in Table JC-1 resulted in the construction of numerous BMPs. Further work performed by other program partners because of activities not directly associated with WIP implementation produce implemented BMPs. Table JC-2 below lists BMP goal amounts as those goals are

BMPs in the Shupe Run Subwatershed	Goal Amount	Implemented Amount	Units	% Achieved
Contour Farming	250.0	0.0	ac	0
Green Roof System	8550.0	0.0	sq. ft.	0
Infiltration basin		1	unit	
Porous Pavement	1,000.0	0.02	ac	0.002
Raingarden / bioretention basin	16.0	3.2	ac	20
Riparian Forest Buffer	13.0	2.0	ac	15
Stream Channel Stabilization		2,000.0	ft.	
Streambank & shoreline protection	4,940.0	2,000.0	ft.	40

Table JC-2: A table showing BMPs known to be implemented in Shupe Run, a sub-watershed of the Jacobs Creek WIP watershed.

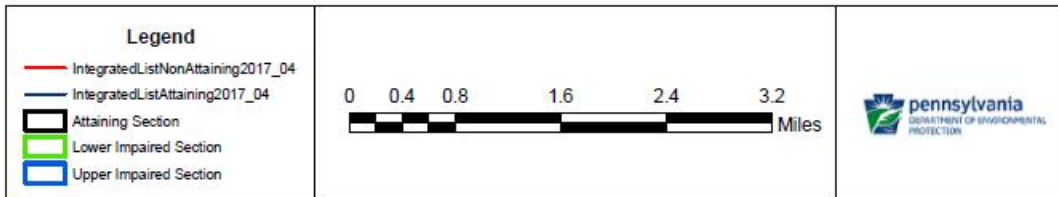
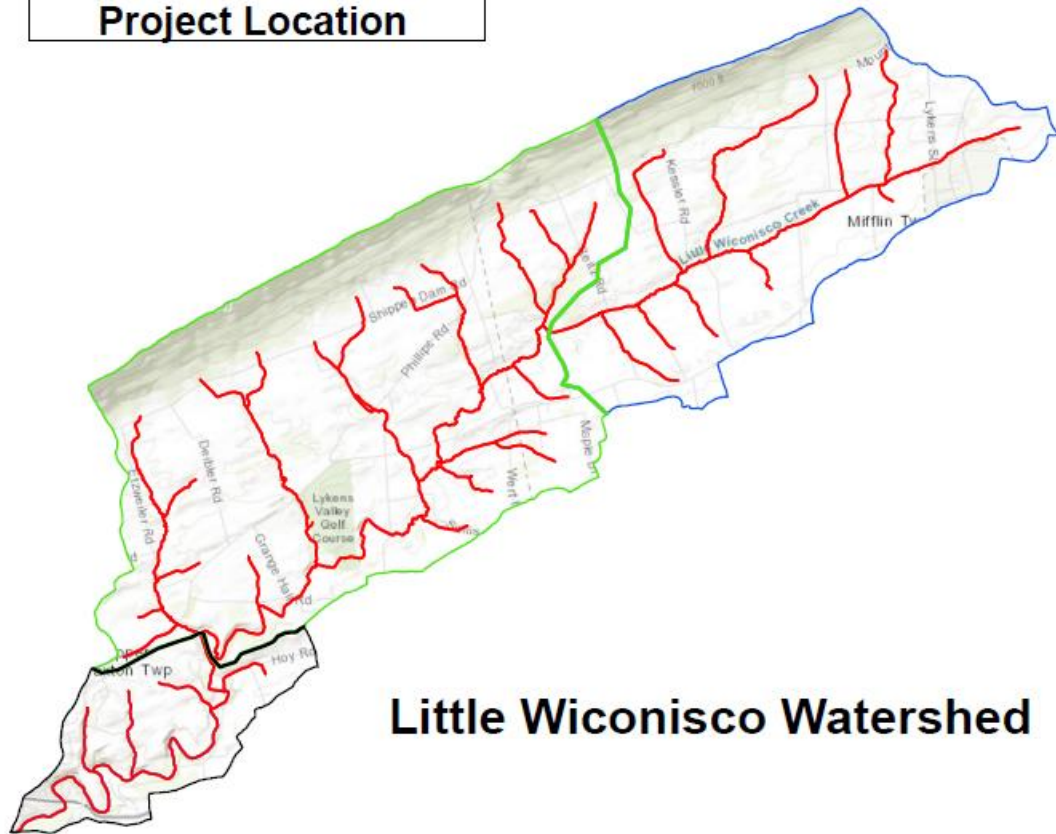
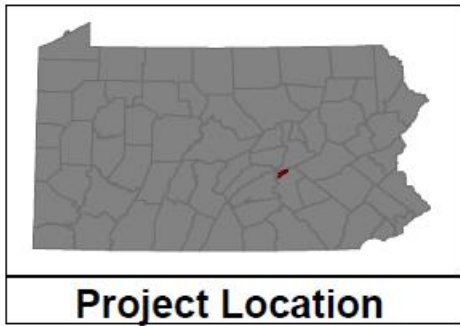
found in the approved WIP. Further, BMPs for which goals have not been established, but where those BMPs are known to be constructed within the WIP watershed are also listed in this table. It should also be noted that Table JC-2 focuses on only those BMPs constructed in the Shupe Run sub-watershed and does not include BMPs in other Jacobs Creek sub-watersheds. The decision was to only focus this year's report on the BMPs in the Shupe Run as that is the current focus for restoration. Looking at Table JC-2 it can be seen that, while many of the planned BMPs have not yet been implemented, program partners have been active at implementing farming practices throughout the sub-watershed. It should also be noted that some additional work is planned for construction under Projects 1613 and 1614 that should produce additional BMP amounts in Table JC-2 once those projects are complete.

Table JC-3 below displays targeted load reductions established by the WIP in terms of percent for the Shupe Run. Further, this table shows achieved load reductions, also in terms of percent and the extent to which the established goal has been met. As discussed elsewhere in Appendix D of this report, load reduction goals are being reported in terms of percent as opposed to quantity or rate of pollutant loads (tons or tons per year) as would typically be the case as there were some technical issues associated with incongruent modeling methods used in the WIP as opposed to that which is currently available to Pennsylvania's Nonpoint Source Program.

Pollutant ID	TMDL Required Load Reduction	Target Load Reduction	Goal Year	Reduction Achieved (total) (2016)	Units	% Achieved
Sediment-Siltation		25%		5.9%		23.6%
Phosphorus		25%		3.0%		12%
Nitrogen						

Table JC-3: A table showing progress in achieving load reduction goals in terms of percent of the goal stated in the WIP.

While the Jacobs Creek Watershed Association, PA's NPS Program, and other program partners continue to make progress in restoring the Shupe Run and the Jacob's Creek, much work remains. The Jacobs Creek WIP was approved in 2009 and will soon be ready for a review and update.



The WIP currently being implemented in the Wiconisco Creek watershed is dated May 2012. As such, this WIP is one of the most recently revised WIPs currently being implemented in Pennsylvania. The Little Wiconisco Creek is noted as the largest subwatershed in the Wiconisco Creek watershed. This subwatershed is located entirely in Dauphin County and flows primarily through rural and agricultural lands. It is calculated that nearly 74% of the land in the Little Wic is devoted to agricultural use with another roughly 12% being devoted to forest. Approximately 8.5% of the land, at the time the WIP was drafted was used for residential purposes. The watershed covered by the Little Wiconisco WIP is roughly 17.5 square miles in size and includes approximately 38.13 miles of stream. The Little Wiconisco Creek watershed can be further divided into three sections: an upper impaired section (5.97 sq mi), a lower impaired section (9.69 sq mi) and an attaining section (1.81 sq mi). In the map on page 94 above, the upper impaired section is outlined in blue, the lower impaired section is outlined in green and the lower attaining section is outlined in black.

As reported in the 2012 WIP, a significant amount of work has been performed in this watershed. Specifically, it is reported that a “vast majority of land in the [Little Wic watershed] is enrolled in Agricultural Security Areas and a significant number of farms, partially or entirely within the watershed are permanently preserved as farmland through the Dauphin County Agricultural Conservation Easement Purchase Program. Further, of the 125 farm tracts located wholly or partially in this watershed, 118 farms were reported to have conservation plans as of the drafting of the WIP. Building on the farm conservation efforts of the Conservation District and NRCS, it is reported in the WIP that, in association with the Section 319 projects reported in Table LW-1 below, a grant from the National Fish and Wildlife Foundation (NFWF) was awarded in 2006 and a Growing Greener grant was awarded in 2011. These grants aided the BMP implementation effort. BMP implementation was further aided by education and outreach efforts. Specifically, it is reported that in 2003 the Conservation District conducted three workshops, two for farmers and one for non-farming landowners. These workshops educated attendees on water quality issues in the Little Wic as well as provided information on BMPs that can be implemented to address water quality concerns. Suffice it say, there is a significant history of work performed in the Little Wic watershed.

Little Wiconisco Creek (2000 to Present)	
1317	Little Wiconisco Creek Restoration Phase IV Amended (monitoring only)
1002C	Little Wiconisco Creek Ag E&S /Manure Management Plan Development
2425	Little Wiconisco Creek Restoration Phase I

Table LW-1: A table showing the Section 319 funded projects in the Little Wiconisco Creek WIP watershed since 2000.

Table LW-2 shows that program partners have achieved nearly 60% of the stated goal for Cover Crop implementation and while program partners are only a quarter of the way to achieving the stated Stream Exclusion with Grazing Land Management goal, over 100% of the Grazing Planned Systems goal has been achieved. Reviewing Table LW-2 it should also be noted that a significant amount of BMPs for which no goal exists have been constructed. Specifically, Conservation Tillage, Riparian Forest Buffer, Streambank and Shoreline Protection, and Nutrient Management have all been implemented. Those BMPs specifically have been described by some to be significant in the effort to successfully model pollutant load reductions.

BMP	Goal Amount	Implemented Amount	Units	% Achieved
Conservation Plan		3,088.9	ac	
Conservation Tillage		1,068.7	ac	
Cover Crop	104.0	61.2	ac	58.8
Fence		5,141.0	ft.	
Grazing Planned Systems	900.0	966.0	ac	107.3
Riparian Forest Buffer		8.0	ac	
Streambank & Shoreline Protection		30,278.0	ft.	
Stream Exclusion with Grazing Land Management (ft.)	83,952.0	22,856.0	ft.	27.2
Nutrient Management		2,511.8	ac	
Grassed Waterway		2,144.9	ft.	
Waste Management System		5	ea	

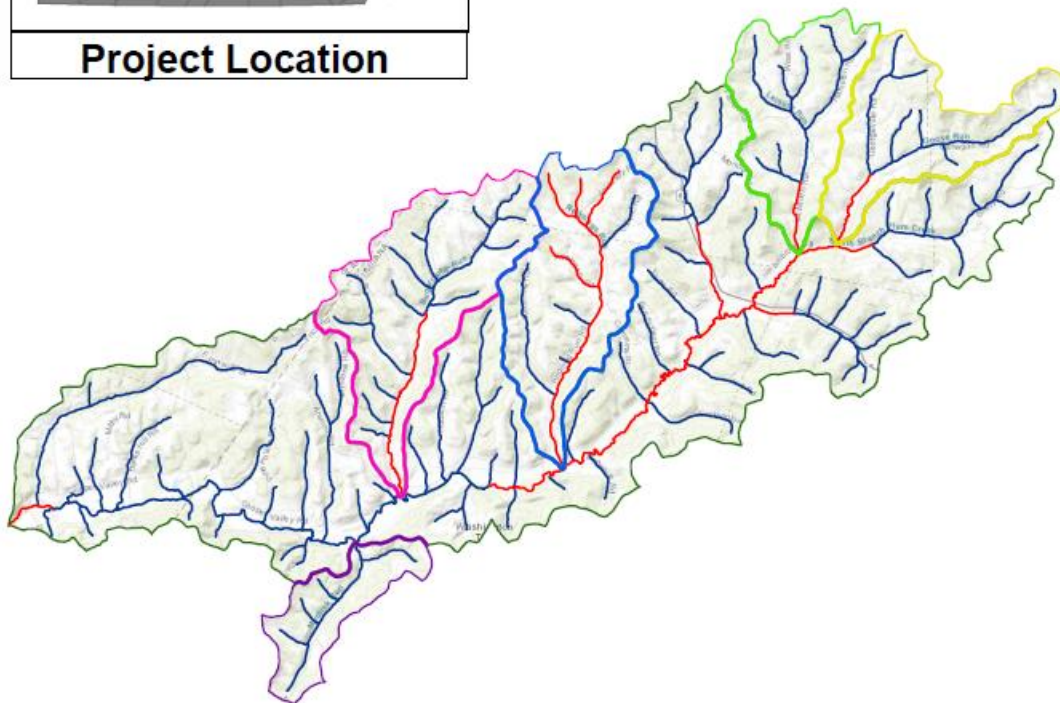
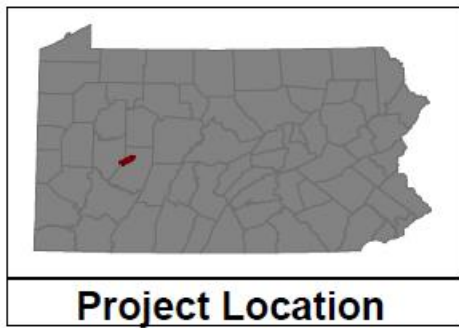
Table LW-2: A table showing planned BMP goals and the extent to which those goals have been achieved.

Table LW-3 below shows the extent to which the stated pollutant load reduction goals have been achieved. It is interesting to note that, while only three Section 319 funded projects have been implemented in this watershed, the work of program partners implemented both WIP specified and non-WIP specified goals has resulted in the achievement of 42% of the stated sediment reduction goal and 50% of the stated phosphorus reduction goal.

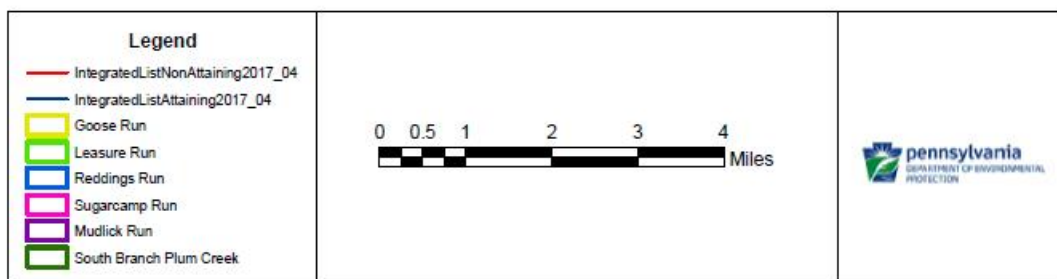
Pollutant ID	TMDL Required Load Reduction	Target Load Reduction	Goal Year	Reduction Achieved (total) (2016)	Units	% Achieved
Sediment-Siltation	16%	48%		20.2%		42.1%
Phosphorus	52%	52%		26.0%		50.0%
Nitrogen						

Table LW-3: A table showing planned load reduction goals and the extent to which those goals have been achieved.

It is likely that more BMPs exist in this watershed than what are reported in GRTS and what are known to those who run models and derive load reductions. As such, additional work should be performed to thoroughly assess the state of BMP implementation in this watershed; subsequently, additional work modeling load reductions in this watershed should be performed. Upon completion, a more informed decision regarding WIP update can be made. Regardless, program partners appear to be doing an above average job implementing BMPs and restoring this creek.



South Branch Plum Creek Watershed



The South Branch of Plum Creek is a tributary to the Crooked Creek, itself a tributary to the Allegheny River. The WIP currently being implemented on this branch of the Plum Creek was last revised in 2012. A tributary to the South Branch Plum Creek is Goose Run, a watershed selected as one of six watersheds in the RAWAPI program discussed throughout this Annual Report.

The South Branch of Plum Creek is approximately 40 square miles in size and as such is a reasonably sized watershed for most restoration efforts. Within that 40 square miles there can be found approximately 103 miles of stream, most of which are found in Armstrong and Indiana Counties. Many subwatersheds exist within this area, the Goose Run (already mentioned) as well as Sugarcamp Run, Reddings Run, and Leisure Run. A TMDL was developed for this area, during the TMDL development, land use was determined to be 45% agriculture, 53% forest and 2% other. As such, agriculture is recognized that the primary contributor to water quality issues in this area.

Table PC-1 below lists the Section 319 funded projects that have occurred in the South Branch Plum Creek since 2000. This table does not list Growing Greener funded projects or the “RAWAPI” funded projects. For a discussion on the RAWAPI program, refer to the 2014 NPS Annual Report. Program partners have been able to make use of the funding associated with the projects listed in Table PC-1 as well as other funding sources. The resulting BMPs associated with all funding sources can be found in Table PC-2 below.

South Branch Plum Creek (2000 to Present)	
1612	South Branch Plum Creek WIP Implementation Phase IV (DC)
1314	South Branch Plum Creek Restoration Phase II (DPC)
1119	South Branch Plum Creek Restoration Phase I (DPC)
2931Q	South Branch Plum Creek Watershed Restoration (DC)
2727B	South Branch Plum Creek Watershed Plan Development

Table PC-1: A table listing the Section 319 funded projects dedicated to work in the South Branch of Plum Creek.

Like many other WIP watersheds, BMPs implemented in the WIP watershed and contributing to the accomplishment of stated load reduction goals are funded through a variety of sources. Unique to the South Branch Plum Creek, most of the known BMPs are also listed in the WIP with a specific goal amount associated with that BMP type. In fact, in Table PC-2, only one BMP is listed as being implemented and yet not having a goal amount. That BMP is Conservation Planning. A further review of Table PC-2 shows that program partners have been successful at implementing targeted BMPs except for Streambank & Shoreline Protection, where less than half a percent of the goal has been met.

BMP	Goal Amount	Implemented Amount	Units	% Achieved
Conservation Plan		404.4	ac	
Nutrient Management	1961	411.0	ac	21.0
Stream Exclusion with Grazing Land Management	31,572	6,980.0	ft.	22.1
Streambank & Shoreline Protection	104,412	225.0	ft.	0.2
Waste Storage Facility	13	2	ea	15.4

Table PC-2: A table showing the known BMPs constructed in the South Branch Plum Creek watershed. These BMPs are listed regardless of funding source.

Further, while program partners have achieved over one fifth of the stated goals for Nutrient Management and Stream Exclusion, as can be seen in Table PC-3, less than 3% of the sediment load reduction goals have been achieved. It is likely this is a result of current modeling methods that involved modeling the entire WIP watershed in one model run as opposed to analyzing individual sub-watersheds. The South Branch Plum Creek is another WIP watershed where several sub-watersheds are sizeable enough to warrant individual attention. In fact, for the RAWAPI project, the Goose Run was singled out for focused compliance and implementation efforts. For a detailed discussion on the work performed in the Goose Run, refer to the 2016 NPS Annual Report.

Pollutant ID	TMDL Required Load Reduction	Target Load Reduction	Goal Year	Reduction Achieved (total) (2016)	Units	% Achieved
Sediment-Siltation	41%	53%		1.4%		2.64%
Phosphorus						
Nitrogen						

Table PC-3: A table showing the extent to which stated pollutant load reduction goals have been achieved.

As discussed briefly above, while Table PC-3 shows minimal progress in achieving pollutant load reduction goals, the modeling methods used were chosen for temporal efficiency as opposed to accuracy. It is hoped that, as Pennsylvania's Nonpoint Source Management Program recovers from recent and debilitating staff changes, a renewed modeling capability will be realized resulting in more trustworthy load reduction estimates.

The Upper Kishacoquillas Creek Watershed (“Upper Kish” for short) has been the recipient of much attention over the past 15 years and even more so in the past year. The Upper Kish is distinguished as being the location and focus of the first alternative TMDL approved by EPA in Pennsylvania. While that Alt-TMDL approval was received in FFY 2017 much work, largely initiated by the Mifflin County Conservation District, has been on-going for quite some time. The WIP currently being implemented in the Upper Kish watershed was written circa 2004 and since that time, as can be seen in Table UKH-1, no less than thirteen Section 319 funded projects have devoted time money and energy to the restoration of this watershed.

The Kish watershed is made up of an agricultural valley bordered by forested hills. There are approximately 58.6 miles of stream in this watershed. Those stream miles collect water as it runs off 30 square miles of land in the ridge and valley province of PA. As stated, land use is primarily agriculture, approximately 60% of the Upper Kish watershed is farmed with another 36% forested. The remaining 4% is split evenly between developed and transitional land.

Upper Kishacoquillas Creek and Hungry Run (2000 to Present)	
1618	NWQI Water Quality Assessments in Upper Kishacoquillas Creek and Hungry Run Watersheds (monitoring)
1522	Kishacoquilla Creek Surface Water Assessment Project
1510	Upper Kishacoquillas Creek WIP Implementation Phase IV (DC)
1227B	Upper Kishacoquillas Creek and Hungry Run Surface Waters Assessment Project
1214	Upper Kishacoquillas Creek WIP Implementation Phase II (DPC)
2832B	Upper Kishacoquillas Creek WIP Implementation Phase II (DC)
2723A	Upper Kishacoquillas Creek Watershed Restoration
2630C	Upper Kishacoquillas Creek Watershed Restoration
2527	Combined with 2526 - Kishacoquillas Creek Watershed Restoration Agricultural BMPs
2526	Kishacoquillas Creek Restoration Agricultural BMPs
2232	Little Kishacoquillas Creek Stream Restoration
2228	Kishacoquillas Creek Watershed Restoration
2224	Little Kishacoquillas Creek Stream Restoration

Table UKH-1: A table showing Section 319 funded projects dedicated to the restoration of the Upper Kish and Hungry Run watersheds since 2000.

The area on which the Upper Kish WIP focused divided the watershed into several smaller subwatershed; these included the: Soft Run, Little Kish, Kings Hollow, and Kish (main stem). Major sources of impairment or “problems” as they were called in the WIP were identified in the WIP as were solutions to those problems. Sediment and nutrient impairments due to agriculture were common throughout the

subwatershed and urban or other habitat modification issues were identified in all but the King's Hollow subwatershed. The WIP established a goal of 50% of BMPs implemented by 2013 and 75% of BMPs implemented by 2020. Further, this WIP provides total implementation cost under several scenarios, the greatest of these being \$4.9 million.

Table UKH-2 below shows the state of progress in meeting BMP implementation goals. Noteworthy is the fact that several of these goals have been exceeded. Conservation Tillage, Cover Crop, and Streambank

BMP	Goal Amount	Implemented Amount	Units	% Achieved
Erosion and Sediment Control, Soft Run		969	ac	
Nutrient Management, Soft Run		1,263	ac	
Access Road, Kish		1,800	ft.	
Animal Trails and Walkways		7,020	sq. ft.	
Barnyard Runoff Management		6.57	ac	
Conservation Crop Rotation	992.00	357	ac	36.0
Conservation Plan		392	ac	
Conservation Tillage	763.00	927	ac	121.5
Contour Farming	458.00	134	ac	29.3
Cover Crop	992.00	1,708	ac	172.2
Diversion		100	ft.	
Erosion and Sediment Control		491	ac	
Heavy Use Area Protection		1.54	ac	
Lined Waterway or Outlet		250	ft.	
Livestock Stream Crossing		22	ea.	
Manure Transfer		2	ea.	
Milking Center Wastewater Treatment System		2	ea.	
Nutrient Management	5,168.00	3,430	ac	66.4
Planned Grazing System		48.5	ac	
Riparian Forest Buffer	220.00	37.03	ac	16.8
Roof Runoff Management		2,643	ft.	
Spring Development		9	ea.	
Stream Channel Stabilization	3,168.00	1,347	ft.	42.5
Stream Exclusion with Grazing Land Management	143,616.00	30,057	ft.	20.9
Streambank & Shoreline Protection	6,336.00	23,172	ft.	365.7
Structure for Water Control		2	ea.	
Underground Outlet		775	ft.	
Waste Management System		9	ea.	
Waste Storage Facility		7	ea.	
Watering Facility		6	ea.	

Table UKH-2: A table showing the known quantities of BMPs in the Upper Kish and Hungry Run watersheds.

& Shoreline Protection goals have all been exceeded. In the case of Cover Crop, the goal has almost been doubled and in the case of Streambank and Shoreline Protection the goal amount has almost been quadrupled. This is especially significant when it is understood that Cover Crop and Conservation Tillage are credited as being among the top five most impactful BMPs relative to the Chesapeake Bay restoration effort.

The hard work associated with BMP implementation that has been occurring in this watershed for many years is paying off. Even while using the “quick and dirty” modeling methods that were employed for this report, it appears, as shown in Table UHK-3 that program partners have achieved over 66% of the stated Sediment load reduction goal and over 40% of the Phosphorus load reduction goal. Some of this modeled success may be the result of greater awareness as to the location of BMPs in this watershed, but much of this success is simply the result of consistent and focused effort over a significant span of time.

Pollutant ID	TMDL Required Load Reduction	Target Load Reduction	Goal Year	Reduction Achieved (total) (2016)	Units	% Achieved
Sediment-Siltation	42.1%	42.1%		28%		66.5%
Phosphorus	62.3%	62.3%		25%		40.1%
Nitrogen						

Table UKH-3: A table showing pollutant load reduction goals and the extent to which those goals are being met.

The implementation of the Upper Kish WIP has primarily been an endeavor of the Mifflin County Conservation District collaborating with DEP, NRCS and other partners. Once again, successes claimed in this watershed champion the notion that focused local efforts are essential to watershed restoration.

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
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 Equivalent
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 F: 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	FFY 2016	FFY 2017
DEP	(\$ millions)	(\$ millions)	(\$ millions)	(\$ millions)	(\$ millions)
Conservation District Watershed Specialists	2.079	2.136	2.178	2.155	2.616
Environment Stewardship and Watershed Protection (Growing Greener):					
Watershed Protection Grants	18.008	17.393	21.225	18.169	20.715
AMD Set-aside Grants	0.406	2.0310	1.193	0.069	0.069
Sub-total	20.493	21.560	24.596	20.393	23.400
DEP					
Chesapeake Bay Implementation Grant; State Fiscal Year Funding (CBIG):					
Technical and Engineering Assistance	2.723	2.925	3.049	-	0.691
Ag Special Projects	1.064	0.666	1.512	1.520	1.436
Stormwater Projects				1.191	1.143
Sub-total	3.787	3.591	4.561	2.711	3.270
DEP					
Chesapeake Bay Regulatory and Accountability Program (CBRAP)					
Bay Techs				2.137	0.569
Engineering				0.571	0.000
Nutrient Mgmt.				0.722	0.632
Sub-total				3.430	1.201
Conservation District Fund Allocation Program (line item plus UGWF monies)	2.506	4.381	4.381	4.476	4.486
Abandoned Mine Reclamation Program Annual Projects	2.605	1.457	0.0	0.0	0.0
PA Infrastructure and Investment Authority (PENNVEST) –grant/loan funds awarded	3.712	6.523	10.593	11.247	4.837
Sub-total	8.823	12.361	14.974	15.723	9.323
PDA					
Dirt, Gravel, and Low Volume Roads Pollution Prevention Program	3.528	26.068	26.068	26.068	26.068
Nutrient Management Fund (Transfer)	2.714	2.714	2.714	2.714	2.714
Conservation District Fund Allocation Program (line item plus UGWF monies)	0.869	2.744	2.744	2.839	2.779
Resource Enhancement and Protection Tax Credits Available	10.000	10.000	10.000	10.000	10.000
Sub-total	17.111	36.312	36.312	36.407	41.561
PUC					
Conservation District Funding from UGWF		3.750	3.750	3.772	3.821
Sub-total		3.750	3.750	3.940	3.821
CFA					
Act 13 NPS Funding (WR and AMD)	10.959	3.147	0.0	2.725	0.0
Sub-total	10.959	3.147	0.0	2.725	0.0
State Funding Sub-total	61.173	80.721	84.193	85.329	82.576

Federal Sources (FFY)	FFY 2013	FFY 2014	FFY 2015	FFY2016	FFY2017
U.S. EPA					
Section 319	4.379	4.672	4.585	4.643	4.802
Sub-total	4.379	4.672	4.585	4.643	4.802
NFWF					
Chesapeake Bay Small Watershed Grant-annual Funding (PA-specific grants)	0.487	0.553	1.075	1.073	1.635
Chesapeake Bay Innovative Nutrient and Sediment Reduction Grant (PA-specific grants)	1.207	1.916	1.899	3.075	4.344
Sub-total	1.694	2.469	2.974	4.148	5.979
U.S.D.A. Natural Resources Conservation Service					
Obligated Funding Levels:					
Agricultural Management Assistance	0.280	1.080	0.36	0.0	0.66
Chesapeake Bay Watershed Initiative (CBWI)	9.100	0.0	0.0	0.0	0.0
Environmental Quality Incentive Program (EQIP)	21.100	21.790	20.100	19.929	24.15
Regional Conservation Partnership Program (RCPP)	0.0	0.0	1.066	5.200	4.21
National Water Quality Initiative (NWQI)	1.323	0.826	0.86	0.0	0.65
Farm and Ranchland Protection Program	3.000	0.0	0.0	0.0	0.0
Agric Cons Easement Program – Ag Land Easements (ACEW)		4.62	0.816	1.082	1.59
Conservation Stewardship Program (new contracts) (CSP)	0.700	0.350	2.92	0.002	1.09
Conservation Stewardship Program (funds obligated to pay on prior year contracts) (CSTP)	6.200	6.180	2.64	5.457	4.91
Grasslands Reserve Program		0.310	0.0	0.0	0.0
Healthy Forests Reserve Program		0.660	0.0	0.0	0.0
Wetlands Reserve Program	4.750	0.0	0.0	0.0	0.0
Agric Cons Easement Program – Wetland Reserve Easements		3.860	2.80	2.403	1.06
Wildlife Habitat Incentive Program	2.280	0.0	0.0	0.0	0.0
Sub-total	47.410	38.850	31.562	34.073	38.320
U.S.D.A. Farm Services Agency					
CREP (Includes Financial Incentives, Cost-Share and Rental Payments).	23.753	21.885	20.484	19.674	18.178
Biomass Crop Assistance Program	0.152	0.013	0.003	0.091	N/A
Grassland Reserve Program	0.618	0.150	0.145	0.334	0.075
Sub-total	24.523	22.048	20.632	20.099	18.395
Office of Surface Mining					
AML Reclamation Funding (Includes AML, Clean Streams Initiative and Watershed Cooperative Agreement Program).	61.735	52.369	44.018	42.982	35.555
Sub-total:	61.735	52.369	44.018	42.982	35.555
Federal Funding Sub-total:	139.741	120.408	103.771	105.945	102.976
Overall Annual Total:	200.914	201.129	187.964	191.274	185.552

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