

The Annual Report on the implementation of Pennsylvania's Non-Point Source Management program. In keeping with guidance provided by the US EPA, this report discusses: the progress made in achieving goals outlined in the 2008 program update, improvements made in water quality in Pennsylvania with a focus on restoring impaired streams and lakes as well as efforts made by local, other state, and federal agencies to accomplish the goals of this program.

Pennsylvania Non-Point Source Management Program

FFY 2013 Annual Report

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I. Executive Summary

This Annual Report (Report) summarizes the efforts of the Pennsylvania Department of Environmental Protection (Department) and its partnering organizations to; reduce the impacts of non-point source pollution to Waters of the Commonwealth, restore impaired waters and to implement the *Non-Point Source Management Program-2008 Update* (Management Plan). This Report focuses on the work that occurred between October 1, 2012 and September 30, 2013 (FFY 2013), but also reviews work performed in previous Federal Fiscal Years when appropriate. In keeping with guidance provided by the U.S. Environmental Protection Agency (EPA), this Report will discuss: the progress made in achieving goals stated in the Management Plan, Non-Point Source (NPS) Loading Reductions, Water Quality Improvements observed, as well as efforts made by the Department to partner with other entities. Auxiliary information specific to the topic of NPS pollution prevention and management in Pennsylvania is also discussed.

This report outlines some significant Management Plan related program efforts directed towards restoring impaired waters and reducing pollutant load reductions. As described in the report, documented restoration efforts throughout Pennsylvania have restored over 126 impaired stream miles and 1,862 impaired lake acres since the launching of the Management Plan's 2008 update. Also this report documents the delisting of over 443 total miles of streams in Pennsylvania for the timeframe of 2010 to 2012 attributed to a number of factors including natural influences and man-influenced actions.

Documented in the report is the reduction of over 1.0 million pounds of Nitrogen; 43,000 lbs of Phosphorus and 4,900 tons of sediment during fiscal year 2013 through the work implemented under various local, state and federal programs active in Pennsylvania. Also documented in this report is the reduction of over 51,000 lbs of Nitrogen; 11,000 lbs of Phosphorus; 3,700 tons of sediment; 18,000 lbs of iron; 3,800 lbs of Aluminum; 800 lbs of Manganese and 19,000 lbs of acidity reduced through the 319 funded activities that were completed over this past fiscal year alone.

Pennsylvania's Department of Environmental Protection (DEP) continues efforts to access and report on the Best Management Practice (BMP) implementation work implemented by the USDA throughout the state and in our priority restoration watersheds. DEP has encountered various challenges in collecting this BMP data on practices implemented under USDA programs due to the interpreted restrictions put on the disclosure of that information through the provisions of §1619 of the 2008 Farm Bill. DEP recently coordinated with USGS and Penn State to access aggregated data that newly allows reporting on limited BMP implementation data and calculated pollutant load reductions for agricultural activities implemented by the USDA Natural Resources Conservation Service (NRCS). This new data set is incorporated into the BMP and load reduction progress information detailed in Appendix D of this report.

Appendix A of the report outlines 96 different activities that were implemented during FFY2013 to achieve the five core goals of the Management Plan. These activities include: the initiation of 18 new §319 Program watershed restoration projects and 101 new Growing Greener Program watershed restoration and protection projects, the issuance of over 2,300 NPDES permits, conducting over 13,240 NPDES related site inspections and over 2,000 complaint assessments, the administration of 373 CAFO permits on larger animal operations

throughout the state, the oversight and contracting of 163,881 acres of CREP including 24,833 acres of riparian forest buffers, a total of over 5,400 acres of riparian forest buffer planted in the Pennsylvania portion of the Chesapeake Bay watershed alone, the continued implementation of 35 EPA approved WIPs, the initiation of development of a new WIP in Adams County, the initiation of monitoring in the three new NWQI watersheds, the approval of 2.38 million Nitrogen and 155,000 Phosphorus credits under the DEP Nutrient Credit Trading Program, the initiation of the new Energy Works Biopower LLC facility using up to 55,000 tons of layer poultry manure as an energy source, the contracting of over \$21.1 million to Pennsylvania farmers under the NRCS EQIP program and carrying out over 10,840 on-site compliance visits to farms across the 36 county Chesapeake Bay watershed.

The report documents Pennsylvania's efforts to implement the NRCS/EPA joint National Water Quality Initiative. Pennsylvania currently has three, 12 digit HUC scale watersheds that represent the focus area for this new program. In FFY2013, over \$1.3 million was spent on implementing BMPs in the three selected priority watersheds. Some of the major BMPs installed under this new program include streambank fencing, heavy use area protection, waterways, manure storage, water control structures and prescribed grazing.

The report concludes with Appendix F which outlines the expenditures of various state and federal programs addressing nonpoint source pollution sources within Pennsylvania. This appendix outlines 30 different programs implemented throughout the state over the past fiscal year. During FFY2013, state and federal programs spent in excess of \$200.0 million on initiatives to address nonpoint source pollution. This expenditure rate has been quite consistent over the past three years. This financial commitment of the §319 Program and its various nonpoint source control program partners shows a strong commitment by the state to implement the Management Plan objectives and improve the environment for current and future generations.

The EPA's 2013 NPS Program and Grants Guidelines for States and Territories includes criteria that state-level NPS programs are to use in association with online data tracking methods to document success and measure water quality improvements. This Report, in conjunction with the Grants Reporting and Tracking System (GRTS) database and BMP Tracker provide information to meet those criteria.

Pennsylvania, like most other states in the nation, is facing ever-present public funding constraints that act to reduce or redistribute the funding historically used to address nonpoint source pollution concerns. We continue to look for ways to make the most efficient use of public and private sector dollars for addressing nonpoint source pollution.

II. Introduction

Non-point source pollution abatement is a task shared by many entities in the Commonwealth of Pennsylvania. Non-point source pollution is an issue that is far-reaching, impacting many industries, and requiring the attention of all citizens. In Pennsylvania, non-point source pollution originates from six key sources: abandoned mine drainage (AMD), agriculture, silviculture, urban run-off and sewage systems, residential run-off, and atmospheric deposition. To address NPS pollution and to further protect healthy waters from these pollutants, Pennsylvania relies on a number of tools including: monitoring, permitting, inspection, voluntary compliance, and enforcement. These efforts are born out of Federal and State legislation and the regulations drafted under those laws. Restoration efforts originate from education and outreach efforts coupled with

funding primarily provided by Federal and State agencies. These efforts, the projects they produce, and more importantly the real-world reduction of pollutants are generally the result of collaboration between many entities. Universities, non-governmental organizations such as watershed associations, local governments, private industry and certain state and federal agencies all work together to plan, implement and maintain projects that prevent, limit or otherwise reverse the impacts of non-point source pollution. This Report will provide an overview of some of the work that occurred primarily in Federal Fiscal Year 2013 throughout Pennsylvania to address the impacts of non-point source pollution.

III. Summary of Progress

NPS Management Program Plan (2008 update)

Within the Department, the task of implementing Pennsylvania's Management Plan and otherwise tracking the Commonwealth's NPS pollution reduction efforts is assigned to the Bureau of Conservation and Restoration (BCR). The Management Plan is used by BCR to guide the NPS pollution reduction program. The most current edition of this Management Plan was last revised in 2008. An update to that Management Plan is anticipated in 2014, with the final plan update expected to be approved by September 30, 2014. The NPS Management Program homepage on the DEP website, <http://www.dep.state.pa.us>, includes the most current version of the Management Plan.

There are five goals in the current Management Plan. These goals are the focal points of BCR's efforts with respect to non-point source pollution control and abatement. These goals are the foundation by which the accomplishments achieved are included in this report.

The five goals of the Management Plan are listed below in italics, along with a brief description of how these goals are being met. A more detailed list of goal-specific successes is included in Appendix A.

Goal 1

Improve and protect water resources as a result of nonpoint source program implementation efforts. Show water resource improvements by measuring reductions in sediments, nutrients, and metals; or increases in aquatic life use, riparian habitat, wetlands, or public health benefits. By 2012, through combined program efforts, remove 500 miles of streams and 1,600 lake acres that are identified on the State's Integrated List of All Waters as being impaired because of nonpoint sources of pollution.

The first half of this goal, specific to the improvement and protection of the water resource is achieved on a daily basis through BCR's efforts to encourage the implementation of Best Management Practices (BMPs) designed to stabilize stream banks, address AMD pollution, infiltrate stormwater and remove nutrients from lakes and streams. Furthermore, reductions in these non-point source pollutants are also accomplished on a routine basis as is evidenced by the data included in the GRTS and the Watershed Implementation Plan (WIP) Tracker databases. BCR's efforts to quantify the reductions of NPS pollutants is further exemplified by the creation of the BMP Tracker, and by collaboration with other entities also involved with the implementation of NPS-focused BMPs. Regarding the second half of this goal, for the time period 2008 through 2013 over 126 miles of streams and 1,862 lake acres have been restored through the implementation of recorded restoration

projects. A more elaborate description of the activities leading to these restoration achievements will be found throughout this Report.

Goal 2

Coordinate with Conservation Districts, watershed groups, local governments, and others in the development and implementation of 34 watershed implementation plans meeting EPA's Section 319 criteria to protect and restore surface and groundwater quality by 2012.

Currently, 35 approved WIPs are being implemented in Pennsylvania. Surpassing this goal is the result of BCR's efforts to provide annual training and frequent contact with Conservation District Watershed Specialists who in turn provide a tremendous amount of guidance and direction to local watershed associations, sportsman associations and other groups. BCR frequently engages the resources of local governments and other entities as sub-grantees performing projects focused on the mitigation of non-point source pollution.

Goal 3

Improve and develop monitoring efforts to determine how projects and programs improve water quality and/or meet target pollution reductions including Total Maximum Daily Loads (TMDLs).

BCR enlists the services of two prominent institutions, Pennsylvania State University and Villanova University to further the understanding and technology associated with BMP efficacy and implementation tracking. Efforts made by those institutions focus on the improvement in the collection of data associated with BMP efficacy as well as improvements in the understanding of how and to what extent BMPs improve water quality. The BCR and Bureau of Point and Non-Point Source Management (BPM) also conducts or administers various stream and lake monitoring projects including a new initiative to monitor possible stream improvements in our National Water Quality Initiative (NWQI) watersheds.

Goal 4

Encourage development and use of new technologies, tools, and technology transfer practices, to enhance understanding and use of techniques for addressing nonpoint source pollution.

As BCR collaborates with institutions like Pennsylvania State University and Villanova University, developments such as the BMP Tracker tool are realized. Also, a greater level of understanding is gained about the mechanisms which drive BMP efficacy.

Goal 5

Assure implementation of appropriate best management practices to protect, improve and restore water quality by using or enhancing existing financial incentives, technical assistance, education and regulatory programs.

Through grant oversight, BCR assures the design and implementation of effective BMPs focused on the restoration of water quality throughout this Commonwealth. Also, through collaborative efforts with DEP's regional offices and Conservation Districts a vast array of educational, monitoring, implementation and regulatory programs are accomplished.

Watershed Implementation Plan Progress

Thirty-five Section 319 Program WIPs have been prepared, and they have been accepted by the EPA. Two more WIPs are in development or otherwise in the approval phase of the WIP process. A WIP for the Beaverdam Creek Watershed in Adams County is currently in the early stages of development and a WIP for the Quittapahilla Creek Watershed in Lebanon County is in the rewrite and approval process.

Unlike previous years, this report does not discuss the progress made with respect to implementation of each of the 35 Section 319 Program WIPs. Rather, this report will discuss the progress made in implementing eleven specific WIPs. The WIPs selected for discussion represent a reasonable cross section of the work of BCR and others involved with WIP implementation. The WIPs chosen cover projects associated with many non-point sources (AMD, Agriculture, Urban Stormwater Runoff). A summary of the progress being made in each of these watersheds is provided below, and the detailed information regarding these WIPs is attached in Appendix D of this Report.

In addition to the work being accomplished to implement our 35 Section 319 EPA approved WIPs, Pennsylvania continues to focus significant resources to develop and implement the watershed implementation plan focused on restoring the Chesapeake Bay. The final version of the *Pennsylvania's Chesapeake Watershed Implementation Plan - Phase 2* updates on-going activities previously discussed in the Phase 1 implementation plan. A copy of *Pennsylvania's Chesapeake Watershed Implementation Plan - Phase 2* can be found on DEP's website at: [http://files.dep.state.pa.us/Water/Chesapeake%20Bay%20Program/ChesapeakePortalFiles/4-2-2012/Clean%20FINAL%20Phase%202%20WIP%203-30-2012%20\(2\).pdf](http://files.dep.state.pa.us/Water/Chesapeake%20Bay%20Program/ChesapeakePortalFiles/4-2-2012/Clean%20FINAL%20Phase%202%20WIP%203-30-2012%20(2).pdf)

Pennsylvania reports to EPA on the activities associated with the implementation of *Pennsylvania's Chesapeake Watershed Implementation Plan Phase 2*. The 2012 – 2013 milestones are summarized in the publication *Pennsylvania's 2013-2013 Milestone Commitments to Reduce Nitrogen, Phosphorus and Sediment*, which can be found on DEP's website at:

<http://files.dep.state.pa.us/Water/Chesapeake%20Bay%20Program/ChesapeakePortalFiles/7-9-2012/PA%20FINAL%202012-2013%20Milestones.pdf>

For a detailed description of Pennsylvania's 2012-2013 Chesapeake Watershed Implementation Plan programmatic milestones, please see the document titled *January 1, 2012 – December 31, 2013 Pennsylvania Programmatic Two-Year Milestones*, found on DEP's website at:

<http://files.dep.state.pa.us/Water/Chesapeake%20Bay%20Program/ChesapeakePortalFiles/4-2-2012/2012-2013%20FINAL%20PA%20Two%20year%20milestones%20template%20jurisdictions%20programmatic%203-30-12%20-%20Clean.pdf>

Nonpoint Source Program Funding

Federal Clean Water Act Section 319 NPS program funding awarded to PA's NPS Program for FFY2013 was \$4.379 million (a 5.3% reduction from the previous year's allocation and the third consecutive year of allocation reductions). Total Section 319 funding received by the state to date is approximately \$103.6 million. For FFY2013, a total of \$3.931 million was allocated for non-point source BMP implementation, monitoring, and educational activities statewide. A comprehensive breakdown of NPS funding sources from the

Department and partners is found in Appendix F of this Report. The remaining \$0.445 million was allocated for Departmental staffing expenditure associated with NPS program administration.

IV. NPS Loading Reductions

Reductions attributed to Section 319 funded projects

The Grants Reporting and Tracking System (GRTS) is a database used to document load reductions for all Section 319-funded NPS implementation projects. The information input by Pennsylvania in the GRTS system is specific to projects directly funded by Section 319 funds. Projects funded by §319 are a small subset of all the NPS abatement work done throughout the Commonwealth. Improvements resulting from projects not funded by Section 319 are discussed elsewhere in this report.

Nutrient, sediment, and abandoned mine drainage (AMD) related pollutant load reductions attributed to Section 319 funded projects implemented in FFY 2013 are summarized in Table 1 below.

Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)	Iron (lbs/year)	Aluminum (lbs/year)	Manganese (lbs/year)	Acidity (lbs/year)
51,287	11,616	3,781	18,800	3,800	800	19,000

Table 1: Summary of non-point source pollutants removed as a result of §319-funded BMP installation during FFY 2013.

BMP Tracker Results

In FFY 2012 BCR initiated a grant with Penn State to devise practical methods by which additional NPS pollutant load reduction data associated with the BMPs not funded directly by the Section 319 program could be collected. This project examined the availability, usability, and reportability of data from alternate sources within the Commonwealth. The goal of this project was to increase the accuracy of the load reductions reported by BCR by providing a more complete estimate of the NPS pollution load reductions occurring within Pennsylvania. As a result of this Section 319 funded effort, a GIS-based tool, named the “BMP Tracker” was developed to enable DEP staff to compile and organize available BMP implementation data from a number of state and federal sources. A list of partners that provide data used by BCR in the BMP Tracker to generate a more accurate accounting of NPS loading reductions is found in Table 3.

While the BMP Tracker data, in conjunction with GRTS data does provide a more accurate understanding of the load reductions occurring in Pennsylvania funded through the §319 program, many NPS BMPs are being implemented without the involvement of these reporting programs and organizations. Certain regulatory programs such as the National Pollution Discharge Elimination System (NPDES) require, among other things, the management of stormwater. In doing so, BMPs are implemented that address non-point source pollution. Furthermore, Pennsylvania’s Act 167 program (discussed in greater detail elsewhere in this report) requires counties to obtain stormwater management plans. Many municipalities develop ordinances under these plans that require management of stormwater. Further, some members of the agricultural community may elect to implement BMPs that address non-point source pollution, not for that reason or the reason of regulatory obligation, but for the motive of improving their farm. In those cases where state and federal programs are not

involved in the implementation of BMPs, BCR has no mechanism of tracking the implementation of those BMPs or accounting for the effectiveness of those BMPs.

For the reason stated in the preceding paragraph, the data provided in Table 2 below does not fully reflect the true amount of NPS pollutants being removed in Pennsylvania, it only reflects reductions for which there is formal accounting and agency involvement in BMP implementation. BCR continues to establish stronger relationships with partners and continues to seek out additional sources of BMP information. The task of thoroughly tracking BMP installation and BMP effectiveness continues to be a challenge.

Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)
1,091,422.05	43,116.25	4,911.08

Table 2: Total of Nitrogen, Phosphorus, and Sediment load reductions calculated from the combination of §319 funded projects and non-§319 funded projects implemented in FFY 2013.



Photo 1: A constructed wetland treatment system built downstream of Stephen Foster Lake. Facilities like this contribute to the pollutant load reductions reported in Table 2 on the prior page.

Reductions attributed to all collected data

The following programs and/or agencies provided data through the BMP Tracker project for BCRs use in estimating overall NPS load reductions from BMPs implemented over the 2013 fiscal year:

Source	Source Type	Description
AML	State program	DEPs Abandoned Mine Lands Program
§319	Federal program	DEPs administration of §319 funds
CBP	State/Federal program	Chesapeake Bay Program funds administered by DEP
Waterways	State program	Stream restoration activities performed by DEP's Bureau of Dams and Waterways Engineering
DnG	State/local program	Dirt and Gravel Road program administered by DEP and SCC in association with Conservation Districts
GrassRoots	State/Federal program	Federally-funded program implemented by state and local partners focused on NPS pollution and prosperity of grazing operations.
GG	State Program	Growing Greening program administered by DEP.
NASS	Federal program	Cover crop data from USDA's National Agricultural Statistics Service
NMPrg	State program	Non-nutrient management BMPs resulting from PA's nutrient management program (Act 38)
NMAcres	State program	Nutrient management acres resulting from Act 38
NPDES	State program	Urban BMPs reported by permits to DEP's stormwater program
FSA	Federal program	BMPs reported by USDA's Farm Service Administration
NRCS	Federal program	BMPs reported by USDA's NRCS
REAP	State program	BMPs reported by PA SCC's Resource Enhancement and Protection Program
SBFence	State program	Activities reported by State-administered streambank fencing program
UrTree	State program	Urban tree planting reported by Pa DCNR's "TreeVitalize" program
usdaSEPTIC	Federal program	Conversions from septic systems to centralized wastewater treatment systems reported by USDA's Rural Development Program

Table 3: A listing of partners and programs providing data for the BMP Tracker tool. The Source column reflects acronyms used in the model, Source Type reflects the funding source of the program, and the Description provides brief information regarding the source.

Recognizing the inability of the program to record all BMP activities throughout the Commonwealth, Tables 1 and 2 above are underestimates of annualized loading reductions occurring in Pennsylvania.

NRCS/EPA National Water Quality Initiative:

The National Water Quality Initiative (NWQI) was established as a joint initiative between the USDA Natural Resources Conservation Service (NRCS) and the Environmental Protection Agency (EPA) in FY 2012. The goal of this initiative is to address agricultural sources of water pollution including nutrients, sediment, pesticides, and pathogens related to agricultural production, in priority watersheds throughout the country.

Through this initiative, NRCS conservation professionals provide technical assistance and planning tools to help farmers determine which conservation actions will provide the best results to improve water quality on their land. To help install these conservation practices, NRCS provides financial assistance payments to eligible producers through the Environmental Quality Incentives Program (EQIP).

The DEP worked with the NRCS to select appropriate watersheds within Pennsylvania. This prioritization process considered many factors including the stream health, the intensity of agricultural activities in the watershed, the types of agricultural activities taking place, impact on the community, commitment of program partners in the watershed, and readiness of the farmers in the watershed to accelerate environmental activities.

Through this prioritization process, three watersheds in Pennsylvania were selected for this initiative. Those three watersheds are the Upper Kishacoquillas, Upper Maiden and Sacony Creeks (with the Upper Maiden and Sacony Creeks often considered as a single management unit).

In FFY 2013 the NRCS through the NWQI provided over \$1.3 million for the implementation of agricultural BMPs in these three selected priority watersheds. Of the total funding, \$638,000 was allocated to the Upper Kishacoquillas Creek watershed and \$684,000 was divided between the Upper Maiden and the Sacony Creek watersheds. In addition to funding from the NWQI program and various statewide farmer-focused grant programs, the Upper Kishacoquillas Creek watershed is eligible for §319 Program funds as there is an EPA approved WIP for this watershed. The Upper Maiden and Sacony Creek watersheds are authorized to receive grant funds from the new National Fish and Wildlife Fund (NFWF) Delaware River Restoration Program.

Some of the major BMP types that were installed in the Upper Kishacoquillas Creek watershed include: critical area planting, streambank and pasture fencing, heavy use area protection, lined waterways, nutrient management, and waste storage facilities. In the Upper Maiden and Sacony Creek watersheds, major BMP types that were installed include: critical area planting, diversions, fencing, grassed waterways, heavy use area protection, nutrient management, prescribed grazing, roof runoff structures, stream crossings, structures for water control, vegetated treatment areas, waste storage facilities, and windbreak/shelterbelts.

Due to the confidentiality provisions imposed on NRCS activities, the Pennsylvania NRCS office has not provided to BCR the units of the BMPs installed in these watersheds. Without a listing of the BMP units installed, BCR cannot calculate load reductions attributed to this work in these priority watersheds. We continue to communicate with the state NRCS office to obtain this data but to date we have not been authorized to receive this information at the 12-digit HUC scale.

V. Water Quality Improvements

The BCR, the Growing Greener Environmental Stewardship Initiative, and other local, state and federal programs all contribute to the achievement of the goals outlined in the Management Plan including water quality improvement.

After a review of the current condition of the waters of this Commonwealth, this section of this Report will also discuss *improving* waters differentiated from *fully restored* waters. Waters that are primarily NPS impaired and where water quality data shows that the aquatic life or chemistry is significantly improving are identified as “improving waters.” Furthermore, water quality and macro-invertebrate data that document long-term improvements to waters now classified as improving may eventually be relisted in the Integrated List as fully restored. *Relisting* refers to a DEP documented change in aquatic life use for a given water body such that it is moved from an impaired list to an attained list.

For a water body to be included in this Report as either *improving* or *fully restored*, that water body must display at least one of two characteristics; the water body must display either some verifiable documentation showing water quality improvement, or be fully restored and delisted for the aquatic life use designation. Water quality improvements are documented by testing stream (or lake) water chemistry and the return of aquatic species (e.g. macroinvertebrates) to a stream ecosystem.

Prior to discussing the improvements made to Pennsylvania’s waters, it will be necessary to review the current condition of these waters through a brief discussion of the *2012 Pennsylvania Integrated Water Quality Monitoring and Assessment Report* (Integrated List). The Integrated List is a report that combines two previous reporting documents, the 303(d) list and the 305(b) report. The Integrated List is a bi-annual document drafted in accordance with §305(b) and §303(d) of the Clean Water Act. The Integrated List classifies the surface waters of Pennsylvania by level of attainment of designated uses. If those waters are impaired the Integrated List describes both the source and cause of the impairment.

Integrated List of All Waters

An estimated 86,000 miles of streams and rivers and 161,455 acres of lakes are located within the Commonwealth of Pennsylvania. The Bureau of Point and Non-Point Source Management (BPN) is tasked with the responsibility of assessing these waters and determining the extent to which these waters attain or do not attain certain designated uses. Four Designated Use categories are used in the Integrated List. These four categories are:

- Aquatic Life
- Fish Consumption
- Recreation
- Potable Water Supply

The majority of nonpoint source restoration activities are targeted to water bodies that do not currently meet Aquatic Life designated uses.

The Integrated List does include all current water quality assessment program data. Water quality information on the Integrated List is included in several individual lists that show how waters are meeting or not meeting water quality standards. The Integrated List includes the following sub-lists:

- List 1: All Uses Attained
- List 2: At Least One Use Attained
- List 3: Unassessed
- List 4: Impaired for One of More Designated Uses, Not Needing a TMDL
- List 5: Impaired by Pollutants (and Needing a TMDL)

NPS restoration efforts are primarily focused on implementing BMPs to improve the water bodies identified on List 4 and List 5. Protection efforts effect all waters throughout the Commonwealth and are carried out primarily through the use of regulatory programs focused on permitting, inspection, and enforcement of regulations written to address activities that have been shown to have the potential to damage the water resource. While most regulations apply to activities regardless of the watershed in which an activity occurs (e.g. erosion control requirements for new building construction), additional levels of regulatory protection are afforded certain water bodies.

Six sources of nonpoint source pollution continue to affect the Commonwealth's waters. These six sources of impairment are:

- Abandoned mine drainage (AMD)
- Agriculture
- Urban runoff/storm sewers
- Small residential runoff
- Silviculture (Forestry)
- Atmospheric deposition

The most significant non-point sources of pollution to streams with respect to the Aquatic Life Use designation continues to be abandoned mine drainage, agriculture and urban runoff/storm sewers sources. Agricultural and atmospheric deposition (mercury) sources continue to be the two most significant Aquatic Life Use impairments to lakes in the Commonwealth.

Streams

Pennsylvania's Clean Stream Law (1937) was one of the first state laws that directly related to the protection of aquatic resources. Subsequent amendments to the Clean Streams Law consolidated previous versions of that legislation. Those amendments provided more protection to the Commonwealth's surface water resources.

Approximately 16,353 of the 84,571 miles of assessed streams in PA, or about 19%, were determined to be impaired for the Aquatic life designated use as of the publication of the 2012 Integrated List. The 16,353 mile figure includes the Impaired (List 5), Approved TMDL (List 4a) and Compliance (List 4b) categories.

Approximately 67,972 of 84,571 miles of streams in PA, or about 80.4%, support the aquatic life designated use. Table 4 lists the total length of all stream segments assessed and the results of those assessments as of 2012. It is important to keep in mind the bi-annual nature of the Integrated List when referring to these numbers. While assessments continue, accurate reporting of results derived from work that occurred in FFY2013 will not be available until the publication of the 2014 Integrated List.

	Aquatic Life Use	Fish Consumption Use	Recreational Use	Potable Water Supply Use
Stream (miles)				
Assessed	84,571	5,345	2,422	3,357
Supporting	67,972	3,323	1,205	3,194
Impaired	9,801	1,318	1,209	151
Approved TMDL	6,490	704	8	12
Compliance	62	---	---	---
Pollution	2,709	---	---	---

Table 4: Stream miles assessed and results of those assessments. Note that TMDL miles refer to those stream miles that overlap with impaired stream segments; 1,755 miles have both pollution and pollutant problems. Updated numbers reflecting FFY 2013 activities will be available with the publication of the 2014 Integrated List.

The 2012 Integrated list also provides information regarding specific stream segments delisted as of 2012. Table 5 provides a concise listing of stream segments listed as impaired prior to the 2012 Integrated List and are now no longer listed for certain specified sources of impairment. Table 5 indicates over 443 miles of streams were delisted for NPS related sources between the years 2010-2012.

HUC Watershed	Name of Stream	Year First Listed	Pollutants of Concern	Miles
02040103	Red Shale Brook	2004	Siltation	1.2
02040103	Wallenpaupack Creek & UNT	2004	Siltation	1.2
02040103	West Branch Wallenpaupack Creek	2004	Siltation	0.4
02040106	Lehigh River	1996	Metals	27
02040203	Goose Run	2002	Nutrients, Organic Enrichment/Low D.O.	8.3
02040203	Little Sacony Creek	2004	Siltation	1.8
02040203	Tulpehocken Creek	2002	PCB	13.8
02050104	Camp Brook	2002	Nutrients	2.2
0205107	Big Wapwallopen Creek & UNTs	2002	Organic Enrichment / Low D.O.	96.9
0205107	Bow Creek	2002	Organic Enrichment / Low D.O.	96.9
0205107	Fishing Creek	2002	Mercury	9.2

HUC Watershed (cont.)	Name of Stream (cont.)	Year First Listed	Pollutants of Concern (cont.)	Miles (cont.)
0205107	Little Nescopeck Creek & certain UNTs	2002	Organic Enrichment / Low D.O.	96.9
02050201	Bear Run	1996	Metals	3.1
02050204	Fishing Creek	1998	Organic Enrichment /Low D.O.	1.8
02050205	Otter Run	1996	Metals	1.2
02050206	Elk Creek	2002	Siltation	3.7
02050206	Hoagland Branch	2002	Flow Alterations, Siltation	10.8
02050206	Long Run	2004	pH	7.3
02050206	Loyalsock Creek 11126	1996	Metals, pH	2.4
02050206	Loyalsock Creek 11127	2002	Metals, pH	7.1
02050206	Santee Creek & UNTs	2002	pH	6.7
02050301	Mitchell Run & UNT	2002	pH	9.8
02050302	Bald Eagle Creek	1996	Thermal Modifications	4.6
02050306	UNT of Codorus Creek	2004	Unknown Toxicity, Water/Flow Variability	3.2
02050306	UNT to Codorus Creek	2004	Unknown Toxicity, Water/Flow Variability	1.6
02050306	Conewago Creek	2008	Mercury	7.2
02050306	Pierceville Run	2002	Flow Alterations, Siltation	N/A
05010001	Dolly Brook	2006	Siltation	1.9
05010003	Burford Run	2006	Nutrients, Suspended Solids	3.6
05010006	Brewer Run 11981	2006	Siltation	5.6
05010006	Brewer Run 7694	1996	Metals	3.6
05010007	Dixon Run	2006	Metals	0.8
05010007	Muddy Run 12423	2006	Siltation	0.8
05010007	Muddy Run 12426	2006	Siltation	0.8
Total				443.4

Table 5: A listing of streams or stream segments reclassified as of the 2012 Integrated List. This table states the HUC-8 watershed, stream name, year the stream segment was first listed as impaired, sources of impairment that have been addressed and the length of the stream segment in question.

Lakes

The greatest nonpoint source pollution related challenges in lake management are to: prevent nonpoint source pollution, maintain/restore riparian habitat, and identify and permit in-lake BMPs. Stakeholder involvement is also critical and can also be a challenge.

Approximately 1,500 lakes and reservoirs covering approximately 161,455 acres exist in Pennsylvania. Of the 1,500 lakes and reservoirs, about 380 (25%) are open to the public. Further, approximately 150 (10%) lakes are located in Pennsylvania's State Parks. Lakes are a significant part of the water resource in Pennsylvania,

economically, recreationally, and for other civil and social reasons. Recreational activities such as boating, fishing, and swimming are integral to a lake community. Good lake water quality is essential for lake communities to maintain vitality and for all citizens to have reasonable use of lakes. Attainment of designated uses such as Aquatic Life, Recreation, Potable Water Supply and Fish Consumption are all important in protecting this significant water resource.

Lake restoration projects have been funded through §319 of the Clean Water Act since 1995. Lake restoration and assessment work has also been funded through Pennsylvania’s Growing Greener Initiative since its inception in 1999. The EPA's §106 Assessment Program, Natural Resources Conservation Service (NRCS) PL566 program, Chesapeake Bay Program, and PENNVEST have also supported lake restoration in Pennsylvania.

Approximately 1,862 acres of lakes that were listed as impaired on the 2008 Integrated List were meeting their assigned uses on the 2012 Integrated List. These reclassifications occurred as a result of reassessments that were completed on lakes, some of which were targeted for restoration work and BMP implementation.

As of the publication of the 2012 Integrated List, 80,525 acres of Commonwealth lakes were assessed for Aquatic Life designated uses. About 37,331 of the 80,525 lake acres assessed, or 46%, are designated as impaired for Aquatic Life. About 43,194 lake acres assessed, or 54%, are supporting Aquatic Life designated use. Table 6 provides a more detailed listing of the lake acres assessed as of the 2012 integrated list and the amount of lakes in terms of acres that are impaired for various uses. As stated previously, the work to assess and, relist lakes continued since the publication of the 2012 Integrated List. An accurate listing of lake acres assessed during FFY2013 will be available as part of the 2014 Integrated List.

	Aquatic Life Use	Fish Consumption Use	Recreational Use	Potable Water Supply Use
Lake (acres)				
Assessed	80,525	74,835	81,959	58,013
Supporting (Lists 1 and 2)	43,194	28,765	76,836	57,941
Impaired (List 5)	5,420	40,405	5,123	12
Impaired (List 4c)	20,544	---	---	---
Approved TMDL (List 4a)	11,366*	5,664	---	---

Table 6: A summary of use support status for lake assessments. This table summarizes the acres of lakes that have been reclassified in the 2012 Integrated List of All Waters.

*Lake Jean (248 acres) is now attaining use for pH and is no longer included in the TMDL total category. Dutch Fork Lake (87 acres) has a completed TMDL but was breached, so it is no longer impaired. However, the PA FBC is currently working on reconstruction of this impoundment. Presque Isle Bay with Lake Erie is included in the Fish Consumption and Recreational Use category totals. The remainder of Lake Erie is not included in the Fish Consumption and Recreational Use category totals.

Ten lakes were relisted in the 2012 Integrated List. Those ten lakes are given in Table 7 below. Table 7 also shows the former and current listings of each lake, the original listing date, along with acres and other information.

NHD Reach Code	Name of Lake (County)	List Change	Listing Date	Acres
02050107001748	Elmhurst Reservoir (Lackawanna)	4c to 2	2002	174
02050306002293	Lake Redman (York)	4c to 2	2006	252.5
02040101001467	Duck Harbor Pond (Wayne)	5 to 1	2006	210.2
02050107001824	Lake Jean (Luzerne, Sullivan)	5 to 2	1996	248.2
02050302002569	Greenwood Lake (Huntingdon)	5 to 2	2008	5.21
02050306002248	Pinchot Lake (York)	5 to 2	2008	357.64
02040103001075	Promised Land Upper (Pike)	4c to remove pH	2002	468.2
02050306002286	Muddy Run Reservoir (Lancaster)	5 to 2	2002	98
02040103001011	White Deer Lake (Pike)	5 to 4c	2006	48.1
Total Acres:				1,862.1

Table 7: A listing of specific lakes or lake areas that have been reclassified as of the 2012 Integrated List. This table states both the former and current list in which a given lake will be found, the size of the lake and the year each lake was listed.

Restored Waters

The BCR tracks efforts made to address NPS pollution and the extent to which those efforts result in the restoration of impaired waters. Activities tracking provides validation of success in achieving the five goals stated in the Management Plan and guidance of future work. As water bodies show improved health through the efforts of BCR and others, these waters may at some point be described as *fully restored*. Fully restored waters are previously impaired water bodies or sections of water bodies where impacts resulting from specific NPS pollutants have been sufficiently addressed such that the chemical, physical and biological conditions of those water bodies indicate that the waterbody is now attaining its designated uses. Included in this section of this Report is a table listing those waters that have obtained *fully restored* status in 2012. Table 8, the Fully Restored Waters table includes high priority 2012 nonpoint source related delistings.

HUC Watershed	Name of Stream	Year First Listed	Pollutants of Concern	Miles
02040101	UNT North Branch Calkins Creek	2006	Nutrients, Siltation	11.2
02040106	Swabia Creek	1998/2010	Siltation, Other Habitat Alterations	3.2
02040106	UNT to Swabia Creek	1998	Siltation	1.0
05010007	Cherry Run	2006	Siltation	4.5
Total:				19.9

Table 8: A list of priority streams on which focused restoration activities have occurred. These streams were previously listed as impaired and are now attaining designated uses as of the publication of the 2012 Integrated List. A Watershed Success Story will be derived from this list.

Success Stories

Watershed Success Stories highlight watersheds that, through ongoing efforts, have transformed from being *impaired* to no longer impaired. The purpose of this Report is not to recount in detail each success story achieved by the Department and its partners, but to list high priority restored waters from which select waters will be chosen to develop into EPA approved success stories. More detailed information on these successes can be found on the on the DEPs website under "Water", "Bureau of Conservation and Restoration", "Non-Point Source Management", "Success Stories."

The following is an abbreviated summary of the success story submitted over the past fiscal year:

Reclamation of Abandoned Mine Lands Improves the Lehigh River

Metals and acidity in runoff from abandoned surface mines and discharges from abandoned deep mines impaired Pennsylvania's Lehigh River and some of its tributaries, prompting the Pennsylvania Department of Environmental Protection (PADEP) to add 25.1 miles of watershed streams to the state's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002. Project partners reclaimed numerous Abandoned Mine Lands (AML) totaling 297.9 acres treated. Water quality improved downstream of the reclamation sites, allowing PADEP to remove a 14.7-mile-long segment of the Lehigh River from the list of impaired waters in 2012.

Improving Waters Stories

Pennsylvania's NPS Management Program continues to publicize stories related to watershed restoration projects, long-term monitoring efforts, and local watershed improvements. More attention will be given to these watershed restoration efforts through the publication of *Improving Waters Stories*. The BCR prepares an annual report on improving waters. In addition to listing improving stream segments, the report also contains the *Improving Waters* stories. These stories are used to document waters that are progressing toward restoration

but haven't quite reached the level for re-listing. They are also used to inspire volunteerism. In that capacity, Improving Waters Stories are a vital part of the NPS Programs mission and a vital part of BCR's partnering efforts.

Significant watershed restoration efforts were made within each of the watersheds included in this report. In most cases, water quality monitoring data is included along with the narrative of the story to assist the reader in understanding the types of data that are being collected. The data provided supports the statement that water quality conditions are improving in each of these watersheds.

Continued improvement in these waters may eventually result in a reassessment of those stream reaches and ultimately the re-listing of the stream. In some cases, a water body may be delisted for one of several pollutant sources or causes. In the long term, an Improving Waters Story may be expanded into a more comprehensive Watershed Success Story if a water body is fully removed from the impaired waters list. Below, two specific improving waters are highlighted to demonstrate the process and reality of improving waters.

Kettle Creek

The Kettle Creek watershed is located in the Deep Valley Section of the Appalachian Plateau physiographic province in north central Pennsylvania. The main stem of Kettle Creek traverses nearly 43 miles beginning in southwestern Tioga County, flowing through Potter County, and then emptying into the West Branch Susquehanna River in northwestern Clinton County. At approximately 244 square miles, 92% of the watershed lies within state forest and state park lands, and more than 350 stream miles contain wild trout fisheries, most of which are designated as Class A wild trout streams. Although more than half of the Kettle Creek watershed is classified as Exceptional Value for water quality, abandoned mine drainage (AMD) historically polluted over six miles of the lower main stem of Kettle Creek and another eight miles of streams in the Two Mile Run sub-watershed.

The good news is that, as a result of the partnership between Trout Unlimited and the Kettle Creek Watershed Association, with support and funding from the DEP, National Fish and Wildlife Service (NFWS), Richard King Mellon Foundation, and many other agencies and funding entities, AMD-impaired streams are recovering. Since 1996, when the DEP first began monitoring AMD in the lower Kettle Creek watershed, more than \$6 million has been spent to assess, plan, and implement AMD abatement projects. These efforts include several detailed state-of-the-art remote sensing technology and hydrogeological assessments, land reclamation, and passive treatment systems.

One of the most important findings that resulted from the airborne remote sensing technology and hydrogeological assessments was the identification of conditions that could result in a catastrophic mine blowout of up to 36 million gallons of severely contaminated AMD. To address this mine blowout potential, funding from the Growing Greener Program was obtained to reestablish flow from the collapsed mine drains in order to reduce the buildup of water to dangerous levels within the deep mine complex. The project, which was completed in January 2011, has worked very well as evidenced in the spring of 2011 when flows from the deep mine were more than five times greater than previously measured flows and the mine pool remained one foot lower than previous maximum mine pool levels measured.

The first passive treatment system was constructed by the DEP to address AMD that pollutes Middle Branch, a tributary to Two Mile Run. Since the system's rehabilitation by Trout Unlimited and the Kettle Creek

Watershed Association in 2007 as funded by the Growing Greener Program, Trout Unlimited has been documenting the stream's recovery with recolonization of macroinvertebrates beginning in 2008, followed with the return of native brook trout in 2010. Today the historically polluted 2.1 mile section of Middle Branch contains a thriving, naturally reproducing population of native brook trout. The DEP is currently monitoring Middle Branch in consideration for delisting.

Most recently, the Swamp Area Passive Treatment System (Photo 1) was completed in October 2012 to address severe AMD flows (average pH of 3.1 and flow of 45 gpm, 522 mg/L as CaCO₃ acidity, 80 mg/L iron, and 41 mg/L aluminum) in the headwaters of Two Mile Run. Two Mile Run is a Class A native brook trout stream upstream of this AMD. This passive system – which utilizes vertical flow ponds, a drainable limestone bed, settling ponds, and a wetland – was designed to remove up to 650 pounds per day of acidity under high flows, which represents the 95th percentile loading from the site. The passive system was designed and constructed following the successful reclamation of 56 acres of abandoned mine lands, which resulted in reducing the overall generation of AMD, as well as decreasing the acidity and metals loading in the remaining flows of AMD.



Photo 2: The Swamp Area Passive Treatment System.

The Robbins Hollow Headwaters Passive Treatment System Complex – which is comprised of five smaller passive systems that consist of vertical flow ponds, oxic limestone beds, an anoxic limestone drain, and settling ponds – went online in 2004 and continues to successfully address AMD that pollutes Robbins Hollow, a tributary to Two Mile Run. The completion of two final passive treatment systems in early summer of 2013 that will address AMD in Robbins Hollow, will wrap up the effort to remediate all the AMD within the Two Mile Run watershed that can be collected and treated. Trout Unlimited expects that within the next year or two

native brook trout will once again inhabit the entire stretch of Two Mile Run, up to its confluence with Huling Branch, which has been devoid of aquatic life for decades.

The final step to restoration in the Two Mile Run watershed, which will lead to recovery of the lower Kettle Creek main stem and improvements to the West Branch Susquehanna River, is land reclamation. The majority of AMD that impacts Huling Branch, a tributary to Two Mile Run, and the lower reaches of Two Mile Run, cannot be collected and treated because it flows subsurface and enters the streams as base flow. Also, this AMD contains some of the most severe AMD found anywhere in the Commonwealth for which passive treatment is not currently an option and active treatment is not an option to the remote location of the site. Therefore, land reclamation is the only viable solution to preventing infiltration of surface water and reducing the overall generation of AMD. It is likely that AMD will persist even after the land reclamation is completed; however, the chemistry and flow should be improved and reduced enough that passive treatment technology could be successfully utilized to treat the remaining AMD. At the time of this report, the DEP Bureau of Abandoned Mine Reclamation (BAMR) is pursuing land reclamation on nearly 100 acres, which will eventually be followed by additional reclamation on more than 700 acres of abandoned mine lands in the Huling Branch sub-watershed of Two Mile Run.

West Branch-Susquehanna

The West Branch Susquehanna River watershed spans 6,978 square miles in north central and central Pennsylvania. The majority of the mountainous area is comprised of dense forests, with approximately 10% of the land used for agriculture. Nearly half the watershed, or more than 1.7 million acres, contains state forest, state game, and state park lands. However, unregulated coal mining between the late 1700s and 1970s resulted in more than 1,200 stream miles polluted with abandoned mine drainage (AMD) – which is just over 20% of all the AMD-impaired waterways across the Commonwealth – and more than 40,000 acres of unreclaimed and scarred mine lands.

Over the past couple decades, watershed organizations, County Conservation Districts, state agencies, and other groups have focused efforts on the restoration of numerous streams throughout the West Branch Susquehanna River watershed. Beginning in 2000, remediation efforts received a tremendous boost from the Growing Greener Program, which helped to leverage additional funds from other grant programs. Recognizing that no comprehensive documentation existed to quantify the results from the dozens of projects that had been completed and the more than \$70 million that had been invested in AMD remediation across the watershed over the last couple of decades, Trout Unlimited developed the West Branch Susquehanna Recovery Benchmark Project in 2009. In partnership with the PA Department of Environmental Protection, PA Fish and Boat Commission, Susquehanna River Basin Commission, and members of the West Branch Susquehanna Restoration Coalition, Trout Unlimited and its partners collected water quality and benthic macroinvertebrate samples, measured streamflows, conducted habitat surveys and assessed fish populations over a five-month period in 2009.

Results from the 2009 West Branch Susquehanna Recovery Benchmark Project indicated significantly better water quality and biological conditions compared to historical conditions. These improvements were attributed to a combination of factors that primarily include a gradually diminishing amount of pyrite available for oxidation, remaining and reclamation activities, better permitting for mining projects, and passive and active treatment projects.

With respect to water quality, significant improvements were documented for both the West Branch Susquehanna River and its AMD-impaired tributaries. Figure 1 compares a predominantly acidic river according to data in the early 1970s to a near net alkaline condition in 2009. Also, all twelve sites sampled from the headwaters downstream to Lock Haven met DEP Chapter 93 water quality criteria for iron, aluminum, manganese, pH, sulfate, and dissolved solids. For the AMD-impaired tributaries between Curwensville and Renovo, pH improved on 85%, acidity concentrations decreased on 79%, iron concentrations decreased on 68%, and aluminum concentrations decreased on 92% of the tributaries. While large tributaries such as Moshannon Creek and Kettle Creek still contribute acidity to the West Branch Susquehanna River, the amount of acidity contributed has greatly reduced over the years. However, Clearfield Creek, once one of the main contributors of acidity to the river, is no longer a source of acidity to the river as it was found to be net alkaline in 2009. Since the 2009 study, Trout Unlimited has continued to sample water quality along the river and reports that conditions remain similar or better as compared to water quality conditions documented in 2009.

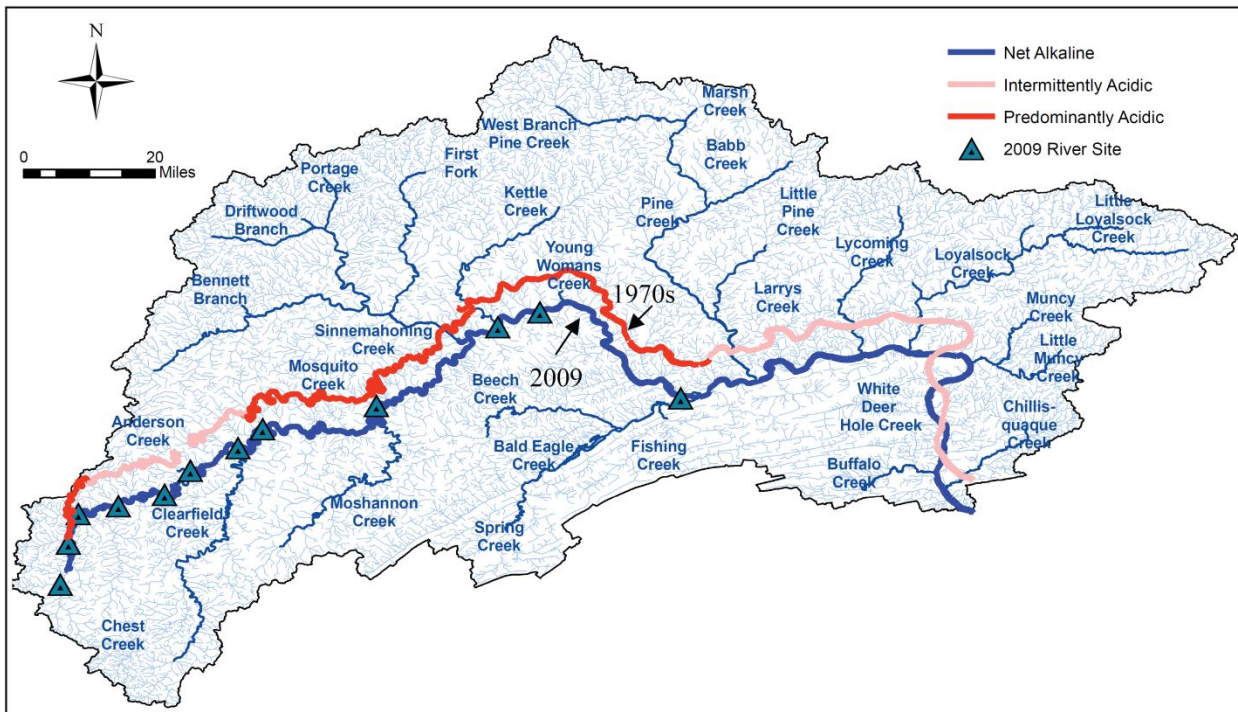


Figure 1: A depiction of change from 1970's acidic conditions to 2009 net-alkaline conditions on the West Branch of the Susquehanna River.

Fish surveys were conducted by the PA Fish and Boat Commission at nine sites on the river from the headwaters downstream to Hyner as part of the 2009 study. The surveys documented that fish species diversity from the headwaters downstream to Clearfield either increased or remained similar when compared to previous surveys. Surveys on the river from Clearfield downstream to Hyner showed a two-fold to five-fold increase in fish diversity, with the largest improvement at the Hyner site where fish species diversity increased from three species found in 1998 to 16 species found in 2009 – a 433% increase. The Hyner site also showed the most significant increase in total fish catch with a more than 3,000% increase from 1998 to 2009. Multiple age classes were also documented for most species at all river sites, including many juveniles, which suggests that successful reproduction is occurring.

Nevertheless, although water quality is improving for many of the tributaries and for the river itself, AMD is still quite prevalent throughout the watershed. For instance, nearly 60% of the AMD-impaired tributaries between Curwensville and Renovo contained aluminum concentrations higher than DEP Chapter 93 water quality criteria, 50% of the tributaries had iron concentrations exceeding the water quality criteria, and about 60% had a pH of less than six. Also, the majority of sites sampled for benthic macroinvertebrates reflect water quality conditions that are still impaired with AMD, so although significant improvements have been documented and considerable recovery has been already been achieved, a lot of work remains to be done in order for the historically AMD-impaired sections of the West Branch Susquehanna River to reach its full potential.

VI. Federal Partner Involvement

Agencies

The Federal Government maintains a significant presence in the Commonwealth of Pennsylvania. Various branches of Federal government operate in the Commonwealth and provide a variety of services. Military installations such as the Letterkenny Army Depot, the Army War College, and the Navy Ships Parts Control Center are examples of the Federal presence in Pennsylvania, each of which are part of the Department of Defense (DOD). The United States Department of Agriculture (USDA) operates extensively in Pennsylvania under the flag of several different branches; the Natural Resource Conservation Service (NRCS) and the Forest Service (USFS) are two examples of USDA involvement in PA. The Department of Interior (DOI) has a presence in the Commonwealth, notably for the purpose of this report, as the Office of Surface Mine Reclamation (OSM) and the National Park Service (USNPS). The work of OSM also directly relates to the objectives of BCR in that the work of OSM relates to AMD reclamation.

Work performed by these Federal agencies, either collaboratively with the Department, other entities, or independently does have a significant impact on the health of the waters of the Commonwealth. Traditionally, the Department attempts to collaborate with the NRCS, OSM, and other Federal entities whose work is directly related to the work of BCR. Any information collected from Federal agencies by the Department that directly relates to pollutant load reductions is accounted for in the BMP Tracker tool discussed previously.

Land

Pennsylvania contains over 46,000 square miles. The Federal government, all Departments combined, own about 1,159 square miles. The amount of land owned by the Federal Government in PA is considerably less (less than 2.5% of PA) than the amount owned by the Federal government in other states, however the location of those land holdings and the activities performed by the Federal government make their presence significant. Most of the land (in terms of acres) owned by the Federal agencies in Pennsylvania is contained in the only National Forest located in Pennsylvania and that is the Allegheny National Forest (ANF). Table 9 lists the size of national forest in PA.

Agency	Name/Location of Property	Size (Acres)
US Forest Service	Allegheny National Forest	513,280

Table 9: A listing of national forests within the borders of the Commonwealth of Pennsylvania.

The USNPS is the second largest Federal landholder in PA. National Park sites, including battlefields and other historic sites, account for over 206,000 acres of land. While many of these sites are in fact historic sites, a few are natural areas and most contain water resources. A listing of DOI land found within Pennsylvania can be found in Table 10.

Agency	Name of Property	Size (Acres)
National Park Service	Upper Delaware Scenic & Recreational River	86,000
	Steamtown National Historic Site	62
	Appalachian National Scenic Trail	557
	Delaware Water Gap National Recreation Area	109,056
	Hopewell Furnace National Historic Site	848
	Valley Forge National Historical Park	3,500
	Gettysburg National Military Park	5,985
	Flight 93 National Memorial	1,500
	Potomac Heritage National Scenic Trail	2012
	Fort Necessity National Battlefield	903
	Friendship Hill National Historic Site	560
	Allegheny Portage Railroad National Historic Site	1,296
	Johnstown Flood National Memorial	164
Total:		212,443

Table 10: A listing of the amount of Department of Interior land located in the borders of the Commonwealth of Pennsylvania.

As shown in Table 11, the DOD is also a notable landowner in Pennsylvania. The Department of the Army and the Department of the Navy combined own over 21,000 acres of land. Many of these military installations contain or are adjacent to water resources and all of which contain some level of developed area.



Photo 3: The Delaware Water Gap is one of many land holdings managed by the USNPS in PA. Places such as these are managed for multiple uses and with a concern for the protection of natural resources such as streams and lakes. Undeniably, the protection of wild spaces supports statewide efforts in the abatement of NPS pollution.

Agency	Name of Property	Size (Acres)
US Army	Charles E. Kelly Support Facility	145
	Tobyhanna Army Depot	1,296
	Letterkenny Army Depot	18,000
	Carlisle Barracks/Army War College	213
	New Cumberland Defense Depot	851
US Navy	Navy SPCC	806
US Army Corps	Allegheny Reservoir	21,180
	Aylesworth Creek Lake	4
	Beltzville Lake	949
	Blue Marsh Lake	1,150
	Conemaugh River Lake	800
	Cowanesque Lake	1,085
	Crooked Creek Lake	2,664
	Curwensville Lake	790
	East Branch Clarion River Lake	1,554
	Foster Joseph Sayers Dam	1,730
	Francis E. Walter Dam	80
	Kettle Creek Lake	167
	Loyalhanna Lake	3,280
	Mahoning Creek Lake	2,370
	Prompton Lake	290
	Raystown Lake	8,300
	Shenango River Lake	11,090
	Tioga-Hammond Lakes	1,138
	Tionesta Lake	2,770
	Union City Dam	2,290
Woodcock Creek Lake	775	
Youghiogheny River Lake	3,566	
Total:		89,333

Table 11: A list of Department of Defense land located in the borders of the Commonwealth of Pennsylvania.

Each of the sites found in Tables 8, 9, and 10 could potentially serve as project locations in which NPS pollutants could be addressed. Though BCR does not commonly interact with the DOD or National Parks Service, entities associated with BCR such as Conservation Districts do collaborate with the ANF. Also, other bureaus within the DEP interact with portions of the DOD.

Activities

Given the diverse nature of the Federal agencies in the Commonwealth, the activities in which the federal government is involved is also broad. The NRCS provides technical services including survey and design work, education and outreach efforts, and landowner assistance. Military installations conduct a wide range of military specific services that involve everything from logistics and supply management to combat training, officer education and repair of mechanical and electronic equipment. Other entities such as the Nation Park Service are involved with land management and conservation efforts, and public education and outreach.

Regardless of the specified purpose of the federal entity, each of these agencies own land and the associated infrastructure that go along with land ownership (i.e. storm sewer systems, roadways, buildings, etc.). As landowners, each of these entities could be involved with NPS pollution management. In fact, some of these agencies, most notably the NRCS and the USNPS, do regularly engage in NPS management.

Information accessible to the BCR regarding federal agency activities that result in NPS pollution load reductions is outlined and documented in detail within Attached “A” of this report. The funding provided by our federal partners for the remediation of NPS pollution is outlined in Attachment “F” of this report. Attachment “F” indicates that the federal programs working within Pennsylvania have allocated over \$139.7 million towards NPS work within the state for the 2013 fiscal year.

Appendices

Appendix A: Pennsylvania NPS Management Program Plan Accomplishments, FFY 2013

Background

The Management Plan includes five long-term goals. These goals were developed during the writing of the 2008 Update. They are largely reflective of the goals found in the U.S. Environmental Protection Agency's National Strategic Plan for watershed restoration which was published in September 2003.

Goal 1

Improve and protect water resources as a result of nonpoint source program implementation efforts. Show water resource improvements by measuring reductions in sediments, nutrients and metals or increases in aquatic life use, riparian habitat, wetlands, or public health benefits. By 2012, through combined program efforts, remove 500 miles of streams and 1,600 lake acres that are identified on the State's Integrated List of All Waters as being impaired because of nonpoint sources of pollution.

Goal 2

Coordinate with county Conservation Districts, watershed groups, local governments, and others in the development and implementation of 34 watershed implementation plans (WIPs) meeting EPA's Section 319 criteria to protect and restore surface and groundwater quality by 2012.

Goal 3

Improve and develop monitoring efforts to determine how projects and programs improve water quality and/or meet target pollution reductions including TMDLs.

Goal 4

Encourage development and use of new technologies, tools, and technology transfer practices, to enhance understanding and use of techniques for addressing nonpoint source pollution.

Goal 5

Assure implementation of appropriate best management practices to protect, improve and restore water quality by using or enhancing the existing financial incentives, technical assistance, education and regulatory programs.

Major initiatives for meeting the five long term goals

The five goals established in the Management Plan are addressed below; a summary of the current progress in meeting those goals as well as some of the more relevant activities underway or completed to address these goals is also discussed.

Goal 1:

Improve and protect water resources as a result of nonpoint source program implementation efforts. Show water resource improvements by measuring reductions in sediments, nutrients and metals or increases in aquatic life use, riparian habitat, wetlands, or public health benefits. By 2012, through combined program efforts, remove 500 miles of streams and 1,600 lake acres that are identified on the State's Integrated List of All Waters as being impaired because of nonpoint sources of pollution.

Accomplishments to date:

Pennsylvania has been very active in implementing nonpoint source programs in an effort to reach this very ambitious goal. Since 2008 and as of the publication of the 2012 Pennsylvania Integrated Water Quality Monitoring and Assessment Report (Integrated List), the Department documented the implementation of NPS remediation practices resulted in relisting **126 miles of stream**. Of those 126 miles, 19.9 new miles were added for FFY 2013 as detailed in the "*Fully Restored Waters*" table (Table 8) of this report. Also, as of the 2012 Integrated List publication date, the Department documented **1,862 lake acres** that were impaired, but are now are attaining the aquatic life use as shown in the Integrated List. We are pleased to have eclipsed our lake goal, and to have reached our 100th mile of stream restoration. These are significant accomplishments of our integrated nonpoint source programs.

The four stream and river segments that we have detailed for FFY 2013 in Table 8 of this report include: UNT North Branch Calkins Creek (11.2 miles), Suabia Creek (3.2 miles), UNT Suabia Creek (1.0 miles), and Cherry Run (4.5 miles). It should be noted that these restored waters are included in the Department's 2012 Integrated List report but were not credited in the 2012 NPS Annual Report.

Pennsylvania has not met its 2012 goal of 500 miles of streams removed from the Integrated List; however, it should be noted that we have been very active, as summarized below, in working in nonpoint source impaired streams. We continue to focus the major portion of our Section 319 grant funds in the nonpoint source impaired watersheds having approved WIPs. Funding from our partnering programs have been supporting, in part, our efforts to implement practices identified in our approved WIPs, but their funding also goes outside of our WIP areas, addressing other impaired stream reaches and in some cases protecting important stream reaches that are not designated as impaired. Funding reductions over the past several years in the various federal and state grant programs, including the §319 program have reduced our ability to meet these most ambitious goals. Over the past four years our §319 funding level has been reduced 23.3%. In the past five years, the Commonwealth's Growing Greener funding source has fluctuated greatly, reduced at one point by more than 29%. These severe funding reductions over the various program implementation years have significantly impacted our ability to meet the goals established in the 2008 revision of our Management Plan.

It should also be stressed that studies show significant lag time from when an agricultural BMP is installed on upslope fields, and when those resultant water quality improvements can be detected in the stream. This lag time may be greater than 10 years. It is reasonable to state that the numerous improvements we are making in agricultural watersheds to address nutrient related impairments may not be seen for more than a decade after the practice has been installed.

Finally, there is also a lag time between the initial observation of improvements on a stream, and the time that the collection of data needed to document those improvements can be made. This lag time is impacted by the time it takes to locate and schedule personnel, fund data collection projects and actually perform the field work. This lag time again makes it harder to reach the delisting goals established in the 2008 revision to the Management Plan.

Below is a summary of some of the more significant activities we continue to implement in order to help remove stream miles and lake acres from the Integrated List (Impaired Waters List):

- Pennsylvania entered into 18 agreements with various watershed restoration groups, totaling over \$3.46 million of \$319 federal funds, to implement watershed protection/restoration projects in federal fiscal year 2013. These projects address identified needs outlined in the EPA approved \$319 WIPs developed for the areas where practices will be implemented. These projects address pollutant loadings relating to abandoned mine drainage (AMD), agricultural runoff, hydromodification and stormwater and urban runoff.
- In state fiscal year 2013, Pennsylvania entered into Growing Greener watershed restoration/protection grants with 101 various entities, providing over \$18.26 million in state funds to implement Nonpoint Source restoration efforts intended to protect and improve surface water and linked groundwater water resources within Pennsylvania, with an emphasis on restoring impaired waters.
- In the past year, Conservation Districts and DEP Regional offices issued 1,935 NPDES General Permits, and 367 NPDES Individual Permits relating to Erosion and Sedimentation Control and stormwater discharge associated with construction activities. They also conducted 13,245 site inspections and responded to 2,045 complaints.
- Pennsylvania's Nutrient Management Program tracks Nutrient Management Plan (NMP) implementation for Concentrated Animal Operations (CAOs), Confined Animal Feeding Operations (CAFOs) and volunteer Act 38 operations. NMPs are being implemented on 1,140 CAOs through 2013. To date, 373 permitted CAFO's in Pennsylvania are implementing approved NMPs as well as following their CAFO permit obligations. In addition to the CAOs and CAFOs (which are required by Act 38 to obtain NMPs), there are 1,797 operations classified as *Volunteer*. Volunteer operations are not required by law to develop an approved NMP, but choose to obtain an approved NMP. These volunteer operations have also chosen to allow routine, periodic inspections of their facilities to better protect the environment.
- The total CREP enrollment for the Susquehanna, Potomac, Ohio Rivers and Lake Erie basins stands at 163,881 acres through the end of 2013 with an authorized acreage limitation of 259,746 acres. Through PA CREP landowners have planted 24,833 acres of riparian forest buffers and 29,826 acres of native grasses. A Delaware River basin CREP that will have the potential to add 20,000 acres of conservation practices and bring the statewide goal to 279,746 acres is proposed and moving forward.
- During FFY13, The PA Chesapeake Bay Implementation Grant (CBIG) distributed \$3,453,126 to 37 Conservation Districts in the Chesapeake Bay drainage basin. Of the total amount, \$2,716,345 (79%) funded technical and engineering assistance by employing 43 Bay Program technicians and 6 Bay

Program engineers. The remaining \$736,781 (21%) funded special projects identified through county implementation plans (CIP). These CIPs address and prioritize the multiple environmental concerns of the county and outline how the District's efforts will coordinate with the Department's Watershed Implementation Plan.

- The current CBIG grant will fund the installation of 16,000 acres of no-till planting, 36,000 acres of cover crop, and 20 miles of streambank stabilization, as well as many other nonpoint source BMP's.
- Pennsylvania's Chesapeake Bay Program Watershed Implementation Plan, or CB-WIP, calls for the continuance of existing programs that have proven effective. The Chesapeake Bay Program is looking to expand this effort by improving the capacity to track those efforts. The Chesapeake Bay Program seeks to increase in efficacy by implementing new programs that take advantage of advanced and innovative technologies such as manure treatment technologies and by enhancing common sense compliance efforts such as the Core 4 practices for agricultural operations, particularly for nonpoint sources such as agriculture and stormwater runoff from development.
- The Goal set in 2002 to restore 500 miles of forested riparian buffers by the end of 2010 has been met. To date, a total of 5,243 miles of forested riparian buffers have been added in PA's Chesapeake Bay Watershed. More than 6,669 miles of forested riparian buffers have been added statewide. During 2013, 137 miles were added in the Chesapeake Bay Watershed, and an additional 70 miles of buffers were planted in other drainages across the state. Of the 207 new buffer miles, at least 6 miles were protected through new conservation easements and 1 mile was protected through new ordinances.
- Landowner enrollment in the Forest Stewardship Program (FSP) and the NRCS CAP 106 Forest Management Plan program continues to increase; 36 new plans were written between October 2012 and September 2013 covering 6,496 acres. Over 557,000 acres of privately owned forest land are covered by stewardship plans.
- The study entitled *Long-term seasonal trends of nitrogen, phosphorus, and suspended sediment load from the non-tidal Susquehanna River Basin to Chesapeake Bay* carried out through a collaborative effort of the Johns Hopkins University, Department of Geology and Environmental Engineering, and the University of Maine, School of Marine Sciences provides insights on the health of the Susquehanna River as it discharges from Pennsylvania. This study stated that "annual and decadal-scale trends of nutrient and sediment load generally followed similar patterns in all four seasons, implying that changes in watershed function and land use had similar impacts on nutrient and sediment load at all times of the year. Above the reservoir system, the combined loads from the Marietta and Conestoga Stations indicate general trends of N, P, and SS reduction in the Susquehanna River Basin, which can most likely be attributed to a suite of management actions on point, agricultural and stormwater sources." This study indicates the level of success we are having in reducing nutrient and sediment loads to the extent that they can even be observed at a very large watershed scale.
- The PA Dirt and Gravel Roads Program (DGRP) continues to be very active throughout the Commonwealth. Our most recent data, which includes data up through the end of 2012, represents the 15th year of the program. The DGRP has funded the improvement of over 2,275 worksites. In calendar year 2012, over 185 new worksites were improved at a program cost of \$2.5 million. These projects are implemented to improve water quality and enhance aquatic habitat in the streams adjacent to dirt and gravel roads. Funding for this program over this past year has been significantly increased (going from \$5.0 million per year to \$35.0 million per year) in order to allow for many more environmental improvement projects to be implemented over the coming years.

- Information relating to removal of dams in Pennsylvania is maintained at the American Rivers website at: <http://www.americanrivers.org/site/PageServer?pagename=AR7>. American Rivers reported that during 2012 (the most recent year with a completed report) 11 in-stream dams were removed in Pennsylvania enhancing aquatic habitat and restoring these streams to their natural flow characteristics.
- Pennsylvania is very active in its lakes programs. Pennsylvania recently turned the corner on lake improvements, we currently have more acres of lakes that are meeting their designated use than acres of lakes that are impaired. As was reported in the 2012 Integrated List, since the prior assessment the number of acres listed under List 1 (meets all uses) more than doubled. In 2009 it was found that 3,002 lake acres were listed on List 1, in 2011 that area increased to 6,432 acres. The next Integrated List will not be available until 2014.
- Six Growing Greener grants, seven §319 NPS grants, four Surface Mining Conservation and Reclamation grants, and two AMD Set-Aside grants were awarded for AMD related projects in 2013. BAMR completed 39 projects, 24 of which were surface reclamation and 15 other reclamation projects such as mine subsidence control and deep mine reclamation. BAMR also reclaimed 494 acres. The Department's Bureau of Oil and Gas plugged 42 abandoned wells.
- The Western Pennsylvania Coalition on Abandoned Mine Reclamation (WPCAMR) continues to administer the Growing Greener funded "Quick Response" program to provide emergency funding for treatment system repair. WPCAMR authorized 11 projects in 2013 and reimbursed 8 of those 11 projects. The total amount of Quick Response funding distributed by WPCAMR for those 8 projects was \$102,555. Three projects were authorized late in the year and aren't completed yet.

Goal 2

Coordinate with county Conservation Districts, watershed groups, local governments, and others in the development and implementation of 34 watershed implementation plans (WIPs) meeting EPA's Section 319 criteria to protect and restore surface and groundwater quality by 2012.

Accomplishments to date:

Pennsylvania currently has 35 EPA-approved Watershed Implementation Plans (WIPs). The total area covered by these 35 WIPs is approximately 1.24 million acres. This represents roughly 4.3% of the total 28.6 million acres of all land in Pennsylvania. Since 19% of PA stream miles are impaired, we will assume for the sake of this discussion that approximately 19% of PA land area is within impaired watersheds. This equals about 5.43 million acres of land (19% of 28.6 million acres) that lie within impaired watersheds. These WIPs cover approximately 1.24 million acres, representing approximately 23% of the impaired watershed acres in the Commonwealth of PA.

We have one additional WIP (Quittapahilla Creek) which has been reviewed by EPA and discussion is underway between the Department and the watershed group to determine if that watershed group will be able to address the EPA comments on the plan. The watershed group has made revisions, but those changes continue to fall short of the WIP requirements.

Development for one new WIP began over the past year for the 7.2 square mile Beaverdam Creek watershed in Adams County. All 21.9 stream miles in this watershed are impaired for aquatic life due to agricultural activities.

Pennsylvania decided not to direct any new Section 319 program funds into the development of additional §319 WIPs recognizing the extensive work yet to be accomplished in our currently approved WIPs. If we were to encourage the expansion of WIP-covered acreage in the Commonwealth, we would be further reducing the funding available to our currently active WIP watersheds. By doing so, further minimizing our hopes to obtain lake and stream delistings in these areas.

Pennsylvania continues to focus its Section 319 program implementation funding to those areas with approved Section 319 approved WIPs. We believe this is an appropriate action to take in order to provide the highest probability of documenting water quality success using such a limited funding pool. It should be noted that not only do we direct our §319 implementation funding to these areas, but we attempt to work with our program partners throughout the Commonwealth to encourage them to target their funding in these watershed areas as well.

Despite the fact the Department is not providing funds for the development of new WIPs, there are various watershed groups and locally based environmental resource protection organizations that continue to develop WIPs on their own. Maintaining a focus on improving impaired waters, these local non-government organizations recognize the financial and pragmatic benefits associated with access to §319 funding as well as watershed based planning.

- To date, Pennsylvania has received EPA approval for 35 Watershed Implementation Plans (WIPs) covering approximately 1.24 million acres over parts of 30 counties.
- One additional WIP (Quittapahilla Creek, Lebanon County) was submitted to the Department, and eventually to EPA, by the Quittapahilla Creek Watershed Association (QCWA) for review and approval. Comments were developed and provided by EPA and those comments are currently being considered by the QCWA. One of the major issues with this draft WIP is that it was developed using a watershed modeling process that is inconsistent with the modeling process used in the TMDL. It is the Department's expectation and recommendation that the watershed group wait until a revised TMDL is released. After the issuance of a revised TMDL, the QCWA should rewrite the WIP to be consistent with the information in that revised TMDL.
- One additional WIP (Beaverdam Creek Watershed, Adams County) began development in 2013, funded by a \$31,500 grant from Pennsylvania's Growing Greener program. Once that WIP is drafted, it will be reviewed by DEP and EPA for eventual approval by EPA for inclusion in Pennsylvania's §319 program. The Adams County Conservation District is developing this WIP.
- Conservation groups are using the various §319 WIPs and other AMD Restoration plans as planning tools to remediate AMD.
- SRBC and EPCAMR completed the Anthracite Region Mine Drainage Remediation Strategy, which guides SRBC mine drainage activities in the four Anthracite Coal Fields.
- Completed the Lower Lackawanna River Watershed Restoration and Assessment Plan (LLR-WRAP). This plan makes a series of informed recommendations for AMD and AML reclamation and reuse, economic development, transportation improvements, flood protection, and natural resource conservation and recreation. These recommendations are offered for consideration by local residents, property owners, business interests and municipal, county, state, and federal governments.

Goal 3

Improve and develop monitoring efforts to determine how projects and programs improve water quality and/or meet target pollution reductions including TMDLs.

Accomplishments to date:

Pennsylvania continues to provide extensive efforts to assess the over 86,000 miles of streams and over 1,500 lakes and reservoirs in Pennsylvania. Furthermore, Pennsylvania strives to accelerate this effort in areas where evidence of improvements to water quality are observed. Pennsylvania's §319 grant provides funding to the Department's staff who then assist in the collection of stream data to develop TMDLs. Among other things, TMDLs support and direct the stream restoration work to performed on impaired water bodies. The Department recognizes the importance of stream and lake monitoring for the role that activity plays in tracking accomplishments achieved by in-stream and in-lake projects. Unfortunately, funding for these activities are often diminished in order to support additional on-the-ground projects.

Pennsylvania's §319 and Growing Greener programs now require all grantees to provide to DEP, along with their final report, an assessment of the load reductions that can be attributed to the implementation of their project. This provides a critical step forward in our efforts to monitor load reductions attributed to all §319 and Growing Greener funded grants.

Through a data collection and analysis process developed for the Department by Penn State, we have assessed available statewide NPS practice implementation data from our many NPS program partners who funded these efforts throughout the past year. **The result of this effort is the documentation of over 1.091 million lbs of Nitrogen, 43,116 lbs of Phosphorus, and 4,911 tons of sediment reduced through the implementation of over 1,592 NPS Best Management Practices throughout the Commonwealth** by the wide range of public programs and organizations from which Penn State is able to obtain data (see Table 3). It should be noted that there are many NPS remediation practices implemented without the help of these reporting programs and organizations, so this number falls well short of the full extent of NPS work being implemented in the state over the given year.

Pennsylvania initiated an *improving waters* effort where we actively canvas our county-based Watershed Specialists and our watershed associations at the local level for their input on where they are seeing signs of improving water quality in impaired stream reaches. Improving waters observations that show significant progress in improving an impaired stream reach or lake are then transferred to our DEP stream and lake assessment staff who then conduct formal on-site assessment and documentation. The Department has enhanced the Conservation District Watershed Specialist reporting process to obtain more input from the Watershed Specialists in this effort.

- Pre- and post-implementation water quality and BMP monitoring is being completed in agriculturally impaired watersheds including the Mill Creek (Lancaster County), Conewago Creek and the Conowingo Creek. Several BMP implementation projects have been completed in these three watersheds for which monitoring is required to meet permit conditions. In addition, County Conservation Districts are working with local organizations to conduct water quality monitoring at designated stations. Results to date suggest that improvements in water quality, benthic conditions, macroinvertebrate populations and fish populations are being achieved at several project sites in the Mill Creek (Lancaster), Conewago Creek (Dauphin, Lancaster, Lebanon) and Conowingo Creek (Lancaster). Section 319 funding has been

used in part to complete restoration work in these three watersheds. The EPA-developed WIP Tracker Tool is being used to document progress in these three and other WIPs in the Commonwealth. WIP, BMP and load reduction tracking are ongoing (see Tables 1 and 2).

- Section III (Summary of Progress) and Appendix D of this report include the detailed tracking information for the following 11 WIP covered watersheds: Blacks Creek-Butler County, Deer Creek-Clearfield County, Shoup Run-Huntingdon County, Six Mile/Sandy Run/Longs Run-Bedford County, Little Laurel Run-Cambria County, Buffalo Creek-Union County, Codorus Creek-Adams/York County, Conewago Creek-Dauphin et al County, Conowingo Creek-Lancaster County, Mill Creek-Lancaster County, and Mill Creek/Stephen Foster Lake-Bradford County.
- The Department monitors the South Branch of the Codorus Creek, Grainery Road, assessing macroinvertebrates, habitat and pebble counts, in order to determine improvements associated with the implementation of the §319 stream restoration project. The Department also monitors water quality, habitat and flow on the Mill Creek in Bradford County for improvements associated with the implementation of CREP projects. Both of these two DEP priority watersheds have WIPs. Although the South Branch Codorus Creek indices for habitat and macroinvertebrates fluctuate due to instability upstream, the Grainery Road stream restoration project has resulted in bank stability within the reach leading to reductions in erosion and sedimentation. Mill Creek has numerous CREP buffer plantings leading to 6.8 miles of riparian buffers along the creek. Water quality has improved as has stream bank stability and the macroinvertebrate community. Overall, the phosphorus entering Stephen Foster Lake from the Mill Creek watershed has been reduced.
- DEP is also monitoring water quality and flow in the Catawissa Creek, Swatara Creek, Shoup Run and Six Mile Run and Sandy Run watersheds which are WIP watersheds being treated to address AMD pollution. The sampling in the Catawissa watershed has shown improvement in Tomhicken Creek but water quality in Catawissa has not improved due to the Audenreid treatment facility not functioning as designed. The Swatara Creek is stabilized with no new projects recently implemented, although the creek's headwaters are showing poor water quality. Shoup Run is also stable and further improvements will only come with projects on Hartman Run and the Dudley discharge. Six Mile and Sandy Run show steady improvement moving downstream as projects are constructed.
- All Growing Greener and §319 project agreements obligate the grantee to provide pollutant load reduction figures attributed to the project being funded using these funds. This information can then be collected by program staff to input into the WIP Tracker Tool tracking system.
- This year Pennsylvania entered into Section 319-funded agreements with Mifflin County Conservation District and Berks County Conservation District to monitoring the three 12-digit HUC watersheds participating in the NRCS/EPA National Water Quality Initiative (NWQI see page 9 of this Report for more detail). Monitoring will begin in the 2013-2014 winter/spring seasons. The initial agreement with these subgrantees provides for 2 years of monitoring work with the expectation to amend those projects over time to allow for at least 5 years of monitoring on these agriculturally dominated watersheds.
- In July 2009, due to budget constraints, DEP began limiting its direct technical and financial support for volunteer monitors. Currently we can only support volunteer monitoring for specifically identified projects that result in the generation of quality assured data related to DEP's highest priorities. Projects related to DEP's priorities include monitoring sections of streams to assess impacts from stream restoration projects, best management practices and abandoned mine land reclamation projects, which are supported by §319 Non-point Source Program or DEP monies. Select Conservation Reserve Enhancement Program (CREP) activities are also being monitored to assess the effectiveness of these practices.
- Requests from volunteer monitors for services previously provided by DEP such as routine technical assistance and training on preparation and implementation of a locally driven monitoring plans are being

directed to the Consortium for Scientific Assistance to Watersheds (CSAW) or Nature Abounds. The Consortium, a group of service providers, is funded through a state Growing Greener grant; Nature Abounds also has a Growing Greener grant to support the Pennsylvania Senior Environment Corps PA SEC program and volunteer monitoring. These groups are providing requested monitoring assistance efforts where they have a sufficient number of volunteers to provide the local assistance.

- An additional 6,000 lake acres were assessed in 2010-11 (most recent data available). Over 80,000 lake acres have been assessed in Pa as of the date of the publication of the last Integrated List. In next year's report we will be able to summarize the extent of newly assessed lake acres that will go into the future 2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report.
- Partnerships forged to accomplish statewide lake assessments include those with: the Department of Conservation of Natural Resources, the County Conservation Districts, the Pennsylvania Lake Management Society (PALMS), the Consortium for Scientific Assistance to Watersheds (CSAW), and private citizens.
- The Department's switch to the National Hydrography Data Layer (NHD) and electronic data storage and retrieval systems based on GIS (SLIMS, ICE, eFacts, eMap, and WAVE) in 2006 allows for efficient data sharing, both internally and with the public. The ICE system will undergo further improvements and is slated to be internet accessible in the near future.
- Most TMDL lakes are being tracked using protocols designed to detect water quality improvements as soon as they are achieved:
 1. Stephen Foster Lake (Bradford County) has been intensely monitored since BMP implementation began in 2004, utilizing §319 funding. Monthly in-lake and tributary water quality grab samples and flow data are collected from April through October. The loading and comparative data analyses are compiled through consultant services, and also within DEP. To date, improvements of in-lake total phosphorus and chlorophyll have been noted, and the Trophic State Index (TSI) has improved. Also, as of 2009 data, the watershed loadings of both total phosphorus (TP) and total suspended solids (TSS) have met the targeted TMDL. It should be noted that three new BMP's were installed in 2011 that were targeting in-lake nutrients: 1) two 250sq.ft artificial floating wetland islands in the forebay, 2) a lake-wide alum treatment, and 3) a below-dam wetland treatment system to collect and treat nutrient-laden hypolimnetic waters pulled from the lake. The wetland allows for continuous withdrawal of high nutrient-content lake waters, reducing what is available in the lake to feed detrimental algal blooms. The wetland allows for the treatment of these polluted waters before it reenters Mill Creek.
 2. Lake Luxembourg (Bucks County) has been sampled almost annually since the TMDL was completed in 1999. BMPs in that rapidly developing watershed now focus on wetland enhancements and stormwater retrofits rather than agriculture. Current and new §319 grants address further stormwater BMP implementation.
 3. Harveys Lake (Luzerne County) has been monitored for stormwater mitigation, as that is the main focus of BMP implementation. As of our most recently available data, the Lake's total phosphorus loadings have been reduced by more than 45%.
 4. Lake Wallenpaupack continues to be monitored monthly by the local watershed management district, and a consultant has recently been hired to statistically analyze their data with regard to the TMDL. Significant BMP implementation continues in the watershed. Monitoring data is being reviewed for possible delisting in 2014.

5. Other TMDL lakes sampled on an intermittent basis include Pinchot Lake (York County), Lake Nockamixon (Bucks County), and Conneaut Lake (Crawford County). These lakes do not have restoration grants associated with them at this time. Conneaut Lake has implemented several Growing Greener and §319 NPS grants targeting stormwater controls and stakeholder education. Conneaut Lake is seeking funds for an updated WIP in order to readdress their priority needs and organize their stakeholders.

- Stream Restoration Inc. (SRI), EPCAMR and WPCAMR partnered to maintain Datashed.org (Datashed 2.0). SRI agreed to perform operation, maintenance and repair activities on this product and to build upon this inventory of Pa passive systems. WPCAMR, EPCAMR, PA DEP, SRI and volunteers completed another round of water sampling events of the passive treatment systems in PA.
- EPCAMR continued AMD sampling handbook updates and dissemination via the web. EPCAMR continues to seek funding for a sampling equipment inventory to aide in water sampling throughout the region. EPCAMR conducts AMD Sampling Protocol Certification trainings for Conservation District Watershed Specialists, watershed group members, AmeriCorps VISTAS, volunteers and interns as needed.
- EPCAMR continues to update the Reclaimed Abandoned Mine Lands Inventory (RAMLIS) GIS Tool CDs. Version 12 is now available. This database shows AML Priority 1, 2 and 3 lands statewide with information on PA DEP BAMR's plans for reclamation. AMD Treatment Systems from Datashed 2.0 are also included in this tool.
- Representatives of the Codorus Creek Watershed Association (CCWA) have continued post construction monitoring of Natural Stream Channel Design (NSCD) projects consistent with the monitoring obligations in the permits they received for these projects. The NSCD projects in the watershed are holding up well even under multiple out-of-bank events. Macroinvertebrates tend to be slow to rebound and there's seasonal and temporal flux. Streambed composition tends to improve over time (i.e., less silt). The CCWA has observed trout occupying restored stream channels within hours of completion.
- EPCAMR uses RAMLIS to produce custom mapping of mine waste piles for Anthracite Region Independent Power Producers Association (ARIPPA) member plants.

Goal 4

Encourage development and use of new technologies, tools, and technology transfer practices, to enhance understanding and use of techniques for addressing nonpoint source pollution.

Accomplishments to date:

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 these types of activities throughout the Commonwealth. Funding limitations from the state and private sector in the recent past hindered the implementation of some very promising projects but several significant projects are still moving forward.

We are encouraged to see the implementation of innovative technologies on several of our larger farms in PA. To address a number of issues including nutrient imbalance in various regions of the state, these new

technologies are being implemented on farms throughout Pennsylvania. These innovations are providing encouraging results, addressing the regional nutrient imbalance issue.

- PA DEP Nutrient Trading Program web site link ‘Nutrient Trading’ provides current information on Pennsylvania’s active and successful Nutrient Trading Program. See the DEP web site www.dep.state.pa.us. Approved proposals and contracts/trades are included on the site.
- DEP’s Bureau of Point and Non-Point Management administers the DEP Nutrient Credit Trading Program. The program continues to certify requests for Nutrient Credits from a variety of Best Management Practices and Manure Treatment Technologies. Over 110 applications for credit verification were approved in 2013, providing DEP verification (acceptance) for 2.38 million Nitrogen credits and 155,676 Phosphorus credits.
- Examples of credits generation include continuous no-till, cover crops and advanced waste water treatment. In addition several proposals have been certified that bring advanced waste water treatment to dairy manure and poultry litter gasification to a large poultry operation. These innovative practices help to increase Pennsylvania’s ability to efficiently utilize agricultural nutrients. Many of these innovative BMP’s are being financed by private dollars. Current demand for credit purchase from waste water treatment plants is modest. However demand is expected to rise in the future.
- Energy Works BioPower LLC in Adams County, partnering with the Hillandale Farms layer operation, received approval for the largest nutrient credit trade of its kind in Pennsylvania. The state certified that the project will generate at least 1.05 million nitrogen credits and 53,853 phosphorus credits annually, thereby reducing at least this level of nutrients to our local and regional streams and rivers. This poultry manure gasification plant began initial operation in 2013. Currently this operation is focused on process and facility modifications to most efficiently gasify the poultry manure coming from this 5 million laying hen operation. This one system has the potential to remove more than 55,000 tons of poultry manure from the region, without the need for excessive transportation costs or environmental issues associated with transporting of the manure. This facility has additional capacity to handle poultry manure from additional operations in the area.
- A CAFO dairy farm in Pennsylvania installed the BION technology to allow the 2,000 head dairy operation to reduce ammonia emissions, nitrogen and phosphorus losses from land application of manure, and to reduce the level of pathogens in the manure applied. The on-farm process uses a bioreactor to process the manure and remove detrimental ammonia emissions as inert nitrogen gas and then an advanced separation system which can extract significant levels of nitrogen and phosphorus from the manure effluent coming from the bioreactor. The state has certified that the project will generate at least 600,000 nitrogen credits annually, reducing at least this level of nutrients to our local and regional streams and rivers.
- A manure incinerator installed through an NRCS CIG grant on an 80,000 broiler operation in PA reduces the volume of the manure by 90% and generates a phosphorus rich product that can be marketed for animal feed or as an ingredient for the fertilizer industry.
- The state tax credits allowable through the PA Resource Enhancement and Protection (REAP) program were maintained for the past year at \$10 million for eligible NPS agricultural practices. In the 7 years that this program has been offered in Pennsylvania, it has supported the incorporation of over 4,310 environmental improvement projects on more than 1,366 farms throughout the Commonwealth. The total cost for these conservation initiatives was over \$132 million. Through 2010 (the latest data we were able to obtain for this report), the REAP program assisted with the reduction of more than 11

million pounds of nitrogen, 859,485 pounds of phosphorus and 438 tons sediment. More information on REAP can be found at www.agriculture.state.pa.us.

- USDA NRCS administered the Conservation Innovation Grants program in 2013 and distributed more than \$1.14 million to support Pennsylvania farmers' efforts to implement innovative practices addressing environmental issues. Project types funded through the CIG grants include: solid and liquid manure injection innovative technologies; employing short-term adaptive management strategies to improve pasture soil health on grazing lands; mitigating and measuring manure gas risks associated with Gypsum bedding at dairy farms; removing weed habitat and improving crop health through the use of permanent weed-competitive plant species and maintenance of beneficial soil organisms; farm adoption in Pennsylvania of nutrient stewardship practices such as the 4Rs; and implementing innovative runoff and streambank practices to reduce nutrient and sediment pollution.
- The PennDOT Smart Transportation Initiative promotes the use of environmentally-sensitive site design techniques including compost filter blankets, filter berms, and/or compost filled filter socks at selected road and highway projects and at stockpile and garage facilities.
- PennDOT compost projects qualify as surface and ground water protection efforts since they implement erosion and sedimentation controls.
- DEP staff continued participation with the Villanova University Urban Stormwater Partnership. Innovative storm water management BMP research continues with Villanova University through a \$319 National Monitoring Program agreement.
- The Keystone Stream Team (KST) has served as a focal point for Natural Stream Channel Design (NSCD) information, education, and outreach. A wealth of information is available and maintained on www.keystonestreamteam.org. Some commonly applied BMPs relating to NSCD can be found in the Natural Stream Channel Design Guidelines, Chapters 6, "Creating the Final Design".
- The KST researched and documented a range of costs for assessment, design and construction of Natural Stream Channel Design (NSCD) projects and posted this information as part of its revised NSCD guidelines housed on its web site at www.keystonestreamteam.org.
- PALMS and the Lake Wallenpaupack Watershed Management District web sites offer educational materials on innovative lake protection and management practices, BMP manuals for free downloading, and other contacts and links for further information.
- The Consortium for Scientific Assistance to Watersheds (CSAW), in partnership with PALMS and Penn State Extension continues to assist lake associations and concerned citizens with watershed and lake management issues providing innovative solutions to continuing problems, and continues to facilitate popular lake and pond workshops. CSAW's mission, brochure, and program are on the web at (<http://pa.water.usgs.gov/csaw/>).
- Vendors submitted requests to market their products as alternate on-lot wastewater treatment technologies in Pennsylvania. There are currently ten vendors that received classification by DEP as an acceptable alternate on-lot sewage treatment system for use in PA. A listing of these approved alternate technologies can be found on the DEP On-lot Alternate Technology Listings web site at http://www.portal.state.pa.us/portal/server.pt/community/sewageanddisposal/10583/onlot_alternate_technology_listings/607632.

- *AMD: an Epic Tale* and *AMD: It's Everyone's Business* are videos distributed via DVD and *AMD Treatment* is a video available online via WPCAMR's Video Diaries. WPCAMR also conducted a video making workshop for watershed groups. The workshop was designed to give volunteer groups the tools to begin publicizing their work via video.
- EPCAMR continued its education programs including AMD/AML tours, stream sampling events with hundreds of middle school students, cleanups and workdays with Vo. Tech. students and volunteers. Tie Dye/Chalk and Teacher Training Workshops and participation in various environmentally themed Festivals were also activities offered by EPCAMR. Several Environmental Education grants were awarded to EPCAMR to support education of youth and adults on AMD/AML issues.
- WPCAMR completed a Growing Greener grant with Hedin Environmental to encourage the reuse of iron oxide from AMD sludge.
- EPCAMR designed and built two Mobile Solar Powered Kilns to dry Iron Oxide and offset some of the power costs to produce the pigment on a small scale. On a sunny day the interior of the kiln can exceed 120° dehydrate iron oxide sludge. Solar panels are also employed to run fans on the kilns to draw out moisture. EPCAMR maintains a brochure and web pages promoting use of iron oxide and has been in contact with firms in the US and China that have been showing interest in harvesting iron oxide on a large scale.

Goal 5

Assure implementation of appropriate best management practices to protect, improve and restore water quality by using or enhancing the existing financial incentives, technical assistance, education and regulatory programs.

Accomplishments to date:

Pennsylvania's NPS program is fortunate to have the cooperation of the full range of related agencies and private sector groups as program partners. The partnerships forged over the years with this program are the basis for our ability to leverage and take full advantage of the various funding sources available for NPS work.

Our program partners at NRCS continue to be the main funding and technical assistance source for the work on farms, coupled with the significant effort provided through the 66 County Conservation Districts. The Chesapeake Bay Foundation has proven to be an excellent partner with our NPS program as well, assisting with getting farmer participation in a number of high priority work areas for the program.

WPCAMR and EPCAMR along with staff from our District Mining Offices and our Bureau of Conservation and Restoration, along with other various technical partners, help to facilitate our efforts to address AMD. The partnership we have been able to foster with the DOI OSM has provided an opportunity for the Commonwealth to complete a number of very important projects that we alone would not have been able to accomplish.

Villanova University has proven to be an excellent partner in the NPS program's efforts to better understand the topic of urban stormwater management and to provide excellent direction to groups looking to implement these types of projects.

Some of our long time partners in supporting efforts to restore stream habitat are the Stroud Water Research Center and the Keystone Stream Team. These groups, as well as our various other private sector professionals that assist groups in accomplishing their goals of restoring stream habitats to support aquatic and terrestrial life, are key to allow Pennsylvania to move forward in bringing damaged streams back into full health.

We have developed a significant number of partnerships over the years to support our more generalized efforts to address NPS management. Some of the main players are the Pennsylvania Association of Conservation Districts (PACD) and the League of Women Voters of Pennsylvania Citizen Education Fund (CEF). These groups do excellent work in helping spread the word about the benefits of NPS management and provide excellent educational and outreach efforts throughout the Commonwealth. In particular, the mini-projects supported by the CEF focuses efforts on informing municipal officials on the importance of stormwater management and efforts they should take to address this issue. Also the Department of Conservation and Natural Resources provides staff to help better manage our public and private lands and to address NPS concerns.

Local watershed groups are vital in the on-the-ground implementation of watershed restoration activities. Through our DEP regional Watershed Managers and the local Watershed Specialists in the Conservation Districts, we are able to partner with all the watershed groups formed throughout Pennsylvania. The Schuylkill Action Network is an excellent example of a regional water protection group that has formed to help encourage the protection and restoration of water resources throughout the Schuylkill River Watershed.

Penn State continues to be a key player in many aspects of our NPS Management Program. With their technical and education delivery expertise and infrastructure, they have played a critical role in moving our program initiatives forward throughout Pennsylvania, including their concentrated efforts in the Conewago watershed.

Most recently we have been able to form a relationship with our State Revolving Fund agency (PENNVEST) to encourage and facilitate their efforts to provide access to these funds to implement NPS protection practices throughout Pennsylvania. This partnership has opened up a significant funding source for this type of work. Since the NPS Program element was opened up in 2009, PENNVEST entered into agreements with NPS applicants to utilize over \$57.3 million in PENNVEST funds (\$30.0 million in loans and \$27.3 million in grants) to implement NPS projects in Pennsylvania. We continue to work with PENNVEST to find ways to support access to this funding source to areas that are in real need of work.

Included with this report is a listing of the financial resources provided by the significant funding programs/organizations within Pennsylvania to address NPS pollution issues (see Appendix F). This listing of funding resources documents the dedication of over \$200 million dollars towards the reduction of NPS pollution within Pennsylvania in 2013 alone.

Pennsylvania has recently undergone a significant regulatory review and revision process updating both our erosion/sedimentation control and our manure management regulations and guidance. These two significant regulatory/guidance revisions set the stage for some of the most significant and long-term nonpoint source reductions seen in Pennsylvania since the inception of our NPS program.

- Our program partners at the USDA, NRCS office continue to provide significant support to the agricultural community in their attempts to address agricultural runoff from their farm sites. The

Pennsylvania NRCS office continues to be an excellent program partner, working with DEP and specifically the NPS section, to obtain our input to help them make the most significant impact with their funding resources. Over the past year, NRCS provided over \$21.1 million to farmers through the EQIP program, another \$9.1 million for farm practices specifically within the Chesapeake Bay watershed area in Pennsylvania, and another \$17.21 million for various other smaller NPS related initiatives within the Commonwealth.

- The revised Pa Nutrient Management Act (Act 38 of 2005) requires CAOs, CAFOs and volunteer agricultural operation (VAO) farms to have a current conservation plan before nutrient management plans are authorized for approval. A significant number of additional farm conservation plans have been developed as a result.
- As of December 31, 2013, there are a total of 1,140 Concentrated Animal Operations (CAOs) with approved nutrient management plans in Pennsylvania, and another 1,797 non-CAOs with approved nutrient management plans. There is over 700,000 acres of land directly covered under these approved plans. Farms implementing these plans are required to update their approved nutrient management plans according to the schedule established in the regulations. Also all farmers with these approved plans are inspected annually to ensure they are following their approved permits and plans.
- As of December 31, 2012, there are a total of 373 Concentrated Animal Feeding Operations (CAFOs) with NPDES CAFO permits, implementing approved nutrient management plans. These farms are required to update their CAFO permits and approved nutrient management plans according to the schedule established in the regulations. Also all farmers with these approved permits and plans are inspected annually to ensure they are following their approved permits and plans.
- The Penn State Interagency Nutrient Management Website serves as the clearinghouse for all information relating to on-farm nutrient and manure management efforts in the Commonwealth, including technical guidance and regulatory obligations.
- The NRCS Conservation Planning and Regulatory Compliance Handbook is a significant element of the PA Tech Guide. The handbook is organized into typical planning and land use topic areas to assist users and planners in making sense of regulations affecting conservation decisions. The initial focus addressed recent changes to DEP's Chapter 102 Erosion & Sediment Control regulations for agricultural plowing and tilling activities and animal heavy use areas. As a handbook, it is designed to incorporate guidance for future changes. Current plans include providing guidance as needed to address the new Manure Management Manual changes, Wetland Regulations, and Erosion and Sediment Control for Timbering Activities.
- Pennsylvania enacted final revisions to the Pa DEP Chapter 102 Erosion and Sedimentation Control regulations in November of 2010. Some of the major changes to this regulation, addressing all earth moving in Pennsylvania including agricultural activities, include: incorporating post construction storm water requirements, incorporating buffer permitting options, and anti-degradation requirements. All program staff were trained on these new requirements. Outreach efforts have been implemented to ensure that the regulated community, including agricultural operations, are made aware of these new requirements. Outreach materials outlining these new requirements, including "barn sheets" describing the erosion and sediment control and manure management requirements have been developed and distributed throughout Pennsylvania. Over 40,000 barn sheets, outlining farmers' environmental requirements were distributed since 2011.
- Pennsylvania released its revised Manure Management Manual in 2011. The effort to revise this manual represents a significant step in Pennsylvania's actions to ensure farmers are following the water protection obligations provided for in Section 91 of Pennsylvania's Clean Streams Law (CSL) regulations. This revised manual provides definitive direction for the agricultural community to follow in the handling, storage and application of manure on their farms. This revised manual provides

guidance relating to: manure application rates addressing both nitrogen and phosphorus, year-round manure application setbacks, winter manure application restrictions, barnyard location and management obligations, manure storage construction and operation/maintenance provisions, and pasture management criteria. Section 91 of Pa's CSL regulations requires farmers are to follow the guidance provided in this manual for the handling, storage and application of their manure, or they are to obtain a permit or approval from DEP if implementing alternative practices. Program staff at the Conservation Districts, NRCS and DEP were trained on the new obligations outlined in the revised manual. These trained trainers are holding local meetings and one-on-one conversations with the farm community to ensure they understand and follow the revised manual. The Department finalized delegation agreements with 55 County Conservation Districts which will obtain their local assistance to ensure that all farmers raising animals are following these new manure handling guidelines.

- Within the Chesapeake Bay watershed, the Department initiated an effort to have Conservation Districts, visit all animal operations in their counties over the next 5 years. These visits will be conducted with the purpose of ensuring that farmers fully understand their new E&S and Manure Management legal requirements and of addressing water quality concerns. As of September 30, 2013, over 10,840 farmers in 36 Pennsylvania counties have received these on-the-farm compliance visits by the Conservation District staff.
- The Department developed an agricultural compliance brochure titled ***Pennsylvania Agricultural Environmental Requirements: Am I in Compliance?***, designed to educate farmers on their legal obligations relating to Erosion Control and Manure Management. This brochure was directly mailed to over 82,000 Pennsylvania farmer addresses on the USDA NASS mailing list in order to ensure the agricultural community is made aware of its legal obligations relating to state and federal laws addressing NPS pollution control.
- DEP completed an agricultural compliance Standard Operating Procedures document for use by the agency's compliance staff to ensure consistent implementation of the newly revised agricultural compliance obligations established through Pennsylvania's Clean Streams Law and the federal Clean Water Act. In addition, a DEP agricultural compliance policies handout is being developed outlining the provisions of this new SOP which includes direction for Conservation Districts. This agricultural compliance policies handout will be distributed to all Conservation Districts to further ensure consistent and active implementation of these agricultural compliance policies statewide.
- DEP has established a new agriculture compliance specialist position in the Southwest region of the state. This area had been historically underserved relating to compliance oversight staff from DEP. This new position, funded by Section 319 monies, was filled in the summer of 2013 and is directed to ensure environmental regulations compliance by the agricultural community in that area; this will help motivate and support Conservation District compliance outreach and technical assistance work. This new position has already performed numerous inspections of agricultural operations and has issued Notices of Violation and other official compliance and enforcement notices to non-compliant operations in the area.
- In 2013 DEP completed a successful agricultural compliance pilot project in the Southcentral Regional office of DEP. This initiative had DEP staff assess every agricultural operation in a selected priority watershed (impaired due to agricultural activities), and work with each of those operators to ensure that they meet agricultural regulatory obligations imposed under the federal Clean Water Act and PA's Clean Stream Law. Beginning in 2014, each of the 6 DEP regions in the state will be directed to implement similar initiatives in priority impaired watersheds within their regions in order to ensure that agricultural operations are complying with environmental regulations.
- In 2012, PENNVEST continued to accept nonpoint source projects in their regular funding rounds of the Clean Water State Revolving Fund. DEP staff assisted in the development, ranking, selection, and

continued revisions to policies and procedures. In calendar year 2013, over \$3.87 million was approved, and \$3.71 million was contracted by PENNVEST to support non-point source projects in the form of either grants or low interest loans. DEP will continue to support PENNVEST in their funding of non-point source projects. In addition DEP will continue to support Conservation Districts in the development of nonpoint source applications to PENNVEST through the implementation of a \$319 grant which funds one staff person at the Pennsylvania Association of Conservation Districts (PACD) to assist Conservation Districts in their efforts to develop eligible nonpoint source applications. DEP continues to work with PENNVEST and the application developer at PACD to find ways to simplify the PENNVEST application process for nonpoint source applicants.

- Act 13 of 2012 establishes the Marcellus Legacy Fund and allocates funds to the Commonwealth Financing Authority (CFA) for implementation of watershed restoration and protection projects under the Watershed Restoration and Protection Program (WRPP) and the Abandoned Mine Drainage Abatement and Treatment Program (AMDATP). The goal these programs is to restore, and maintain restored stream reaches impaired by the uncontrolled discharge of nonpoint source polluted runoff, and ultimately to remove these streams from the Department of Environmental Protection's Impaired Waters list. Under this first year of these programs, the WRPP allocated \$5.7 million and the AMDATP allocated \$5.3 million for the implementation of CFA approved watershed restoration and protection projects.
- The DEP Stormwater Management Program staff developed a Pennsylvania Model Stormwater Management Ordinance to serve as a model ordinance or template for municipalities developing municipal stormwater management ordinances.
- A total of 57 counties have completed at least one watershed-scale Act 167 Stormwater Management Plan and 26 of those counties have adopted a Stormwater Management Plan that covers the entire county. State funding for the preparation and implementation of local Stormwater Management Plans was discontinued by the Pennsylvania State Legislature effective July 1, 2009 due to state budgetary concerns, which hindered the rate of further plan development throughout the state.
- The DEP continues to work with EPA to implement a revised National Pollutant Discharge Elimination System (NPDES) general permit for stormwater discharges from regulated small municipal separate storm sewer systems (MS4s). Following an outreach effort by DEP to municipalities concerning the revised permit, the usage of the updated PAG-13 went into effect March 15, 2013.
- Ongoing DEP initiatives for outreach on NPS lake issues and programs continue as DEP provides speakers and literature resources for conferences such as the Pennsylvania Lake Management Society (PALMS) the premier lake stakeholder workshop in Pennsylvania. The 2013 conference was held on February 20 and 21, the 2014 conference is scheduled for March 19 and 20. The PALMS web site, www.palakes.org, provides information on lake and watershed BMPs, water quality parameters, and other outreach material.
- ARRIPPA, EPCAMR and WPCAMR continue to partner awarding the ARIPPA AMD/AML Reclamation grant where \$5,000 was given to groups in PA for AML/AMD projects. ARIPPA reports that all their member plants combined are producing 1,500MW of power annually while cleaning up waste coal piles and reclaiming abandoned mine land.
- Utilization of AMD in Well Development for Natural Gas White Paper and information is now available from DEP. WPCAMR hosted an AMD for Frack Water Workshop at the PA DEP Ebensburg DMO to bring together watershed group and shale gas industry representatives to talk about the possibilities and obstacles.
- EPCAMR continues to work with the Susquehanna River Basin Commission and others to compile, update, and fill in data gaps on the location of Mine Pools in the Anthracite Coal Fields.

- SRBC continues to promote AMD use with financial incentives in water withdrawal permits when AMD is used or treated and used. Also SRBC has invested in three projects on the West Branch Susquehanna River (Lancashire #15 – construction complete, Hollywood – construction complete and Cresson- still in design) where mitigation of consumptive use or augmentation of low flow conditions can occur.
- ARIPPA member plants continue to burn coal waste and reclaim lands with coal ash.
- As of December 31, 2013, there are 891 certified Sewage Enforcement Officers (SEOs) authorized to perform their work throughout the commonwealth.
- The Pennsylvania State Association of Township Supervisors (PSATS), in cooperation with DEP, maintains a clearinghouse of resources designed to assist Pa municipalities and their SEOs in developing or modifying a local Sewage Management Program.
- With the CHEMSWEEP program, the Pennsylvania Department of Agriculture offers waste pesticide collection and disposal services to farmers and professional pesticide applicators. In 2013, CHEMSWEEP provided a safe disposal outlet for 110,000 pounds of pesticide waste, bringing the program total to over 2.1 million pounds since 1993. Through a joint effort with PA DEP, CHEMSWEEP is available to homeowners through various local Household Hazardous Waste (HHW) collection events. Twelve joint HHW events occurred in 2013, and eleven HHW's are scheduled for 2014. Over 285,000 pounds of homeowner pesticides have been disposed through the PDA/DEP partnership since 2003.
- Pennsylvania has over 270 Act 537 Sewage Management Programs (SMPs) on record, serving at least 390 Pennsylvania municipalities.
- At the end of 2013, there were 941 oil recycling collection stations registered in Pennsylvania. These are promoted on the DEP web site and through communications with citizens and regional and county recycling coordinators.
- In 2013, DCNRs TreeVitalize program expanded the availability of the program. We are now able to offer all municipalities the opportunity to improve their public trees. Municipalities located within Alleghany, Bucks, Chester, Delaware, Montgomery and Philadelphia counties may apply through the Tree Request applications administered by our TreeVitalize partners, PHS and WPC. All other municipalities may apply for a matching community tree planting grant administered by the PA Urban & Community Forestry Council. Nearly 23,000 trees were planted through these partnerships.
- The TreeVitalize Riparian Buffer Reimbursement program partnership planted 4,040 trees. TreeVitalize offers \$1 for every tree planted along a riparian buffer. County Conservation Districts work with local watershed groups on the implementing the planting and submitting for reimbursement.
- TreeVitalize continued to partner with local Central Pennsylvania nurseries to offer homeowners a \$15 off tree coupon. In 2013, the TreeVitalize "Trees Count, Pa!" coupon program planted 598 trees through this partnership. In 2014.
- TreeVitalize has been fortunate to continue the public radio station partnerships in 2013. Three exciting projects were implemented through these partnerships.
 - In October, TreeVitalize and WDIY public radio and planted 600 trees at the Trexler Nature Preserve.
 - In April, TreeVitalize partnered with WITF to plant 200 tree seedlings at the Flight 93 memorial. In total a combined 15,900 trees were planted to reforest the reclaimed mine site.
 - In November, TreeVitalize expanded our unique partnership with the PA Urban & Community Forestry Council, WDIY, Journey through Hallowed Ground and the National Parks Service to

replant 150 trees at Bliss Farm. The 150 trees were planted in remembrance of 150th anniversary of the Battle of Gettysburg and Gettysburg Address.

- An agreement to expand Urban Tree Canopy (UTC) within the Chesapeake Bay Watershed was signed in 2003 by the Chesapeake Executive Council (the Governors of Maryland, Pennsylvania, and Virginia) as part of the Expanded Riparian Forest Buffer Goals. This directive commits each state to partner with at least five communities to set and pursue a specific goal for increased tree canopy in developed areas. PA Urban and Community Forestry Council hired a Chesapeake Bay forester to work with communities through the assessment, planning and implementation processes to reach the UTC goals. As of the end of 2012 (latest information provided), over 100 communities in PA have the tree canopy data which has been utilized in receiving grants for trees, promoting the benefits of trees, and targeting areas where tree planting and preservation are highest priority.
- In 2011 (which is the most recent data available), approximately 62,000 dry tons of biosolids were applied under permit to approximately 6,000 acres of land including both agricultural and mine reclamation lands.
- DEP's Biosolids Program continued to provide the required formal required training for biosolids generators and land appliers in recommended procedures for producing and applying biosolids during 2013.
- The Biosolids Program continued to register haulers of residential septage in an effort to eliminate illegal disposal practices.
- The Biosolids Program also reviewed and processed permit applications for the beneficial use of biosolids and residential septage, conducted inspections of biosolids processing facilities and application sites and took appropriate enforcement action when violations of State regulations were discovered.

Appendix B: Increased Public Awareness

The citizens of Pennsylvania are made aware of NPS pollution issues from a variety of sources. Public education is part of the responsibility of every government entity engaged in natural resource conservation. The DEP partners with agencies such as the PA Department of Conservation and Natural Resources (DCNR) for outreach events such as the Susquehanna Sojourn, an event that is described more fully below. The DCNR is also the partner of several Conservation Districts on a number of stream restoration projects. Furthermore, the FBC has prepared numerous lesson plans, continuing education programs for teachers, and events designed to educate students on the importance of healthy fish habitat. Those lessons do touch on the impact of NPS Pollution. For more information on the FBC's education and outreach efforts, navigate to: <http://fishandboat.com/edind.htm>. The FBC is also a Conservation District partner, working on stream bank and lake shoreline stabilization projects as well. The FBC offers manpower and equipment along with standard specifications and drawings for a number of fish habitat and bank erosion BMPs. More information on the FBC's Habitat Management Division can be found here: <http://fishandboat.com/habitat.htm>.

B.1: The 2013 Susquehanna Sojourn

The 6-day, 97-mile, 2013 Susquehanna Sojourn provided a superb living classroom experience that immersed participants in the heart of the watershed, displaying its beauty as well as its challenges. The associated educational presentations were significantly effective at providing increased public awareness of the magnitude of nonpoint source pollution and of the necessary state and federal programs designed to rectify these pollution sources.

Of the numerous project partners that made this experience possible, the DEP and DCNR provided technical presentations to the 80 sojourn participants about the environmental issues facing the Susquehanna River Watershed and what is being done to address them.

A staff member from PA Bureau of Conservation and Restoration (BCR) was available throughout the sojourn to receive and answer environmental questions and on Day 4, provided a presentation along the banks of the Susquehanna River during a lunchtime break in paddling. This presentation focused on the Total Maximum Daily Load (TMDL) commonly referred to as the pollution diet coming from the West Branch Susquehanna River and also focused on how DEP was working toward attaining the goals outlined in the TMDL.

The West Branch is impaired by metals and acidity from NPS pollution imparted by legacy Abandoned Mine Drainage (AMD), thus the location of the presentation was ideal as white and orange plumes of precipitating metals from AMD discharges were visible with varying intensity and volume along the sojourn. These plumes provided tangible visual aids unmatched in any classroom or report and provoked thorough and focused questions from the audience.



Photo B-1: A photo of some of the participants in the 2013 Susquehanna Sojourn.

The TMDL presentation and follow-up questions segued into a discussion of Success Stories. One such success story included the Bear Run Growing Greener Watershed Renaissance Initiative project. This project is responsible for restoring the water quality and habitat of an entire sub-watershed, this recently enabled native Brook Trout to again thrive in the formerly “dead” but now mostly restored sub-watershed of the West Branch.

The significant environmental successes in the West Branch among others are made possible by the NPS remediation work conducted by environmental professionals alongside concerned citizens and through funding by a variety of sources including Pennsylvania’s Growing Greener and the Federal §319 programs.

For additional information follow this link:

http://www.susquehannagreenway.org/sites/default/files/WestBranchSojourn_2013%20web.pdf

B.2: The Shenango River geoWatershed Trail

The Shenango River geoWatershed Trail (SRGWT) was developed by the Mercer County Conservation District. The grand opening for this trail was held in April of 2012; in the nearly two years of operation, this trail has exposed over 200 citizens to unique geological features in the Shenango watershed. In doing so, this trail has also fostered an appreciation for the water resource in the citizen-explorers who attempt to complete this adventure. This trail encourages citizens to actively experience and appreciate the water resource. Without that base-level appreciation, the work of conservation and restoration will not continue.

The SRGWT is a series of geocache sites, mostly "earthcache" sites where individuals who engage in geocaching can go and experience the natural beauty of geological features. Prior to setting out to find the earthcache, geocachers first have to read about the natural history and the geological importance of the area. This information is provided on each individual earthcache page. Once they have read the information, they must then apply the information to the questions presented. In order to answer the questions for the earthcache, the individual must visit the site and apply the information they read to the site they are visiting. Answers are submitted to the Mercer County Conservation District. If a geocacher successfully locates each site and correctly answers each question, they are eligible to receive recognition for their effort. If the geocacher successfully locates, answers the questions provided, and logs all twelve earthcaches on the SRWT, they are eligible to receive a commemorative Shenango River geoWatershed Coin. The SRWT provides an innovative way of bringing education to life through hands-on, scavenger hunt-type lessons truly engaging the audience with the information at hand and leaving an experience not soon to be forgotten.

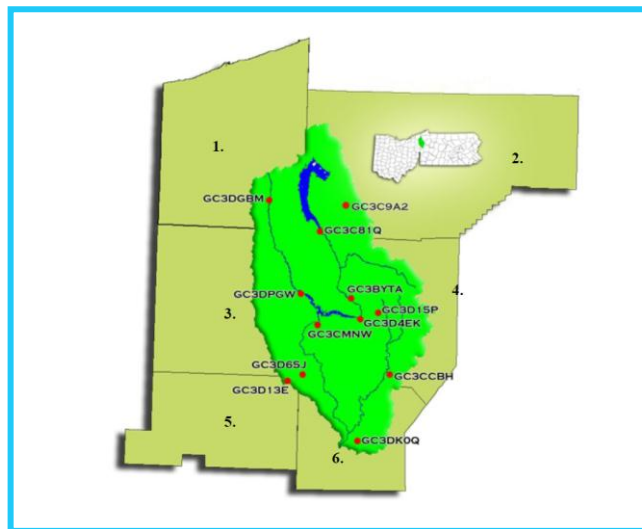


Figure B-1: A location map depicting the Shenango River geoWatershed trail, the counties in which this watershed and trail are located and the approximate location of the earthcache sites.

This geoWatershed Trail covers six counties in PA and Ohio and was only possible through the collaborative efforts of several local, state and federal entities including: the Crawford County Conservation District, Pymatuning State Park, Lawrence County Conservation District, the US Army Corps of Engineers, and the PA Game Commission. For more information on the Shenango geoWatershed Trail, navigate to:

<http://www.mercercountycd.com/misc.aspx?title=SRWT%20Overview&m=2>

B.3: Educational Materials

Over the past few years the §319 program funded several projects that involved the creation of written materials. These materials are handed out to citizens who are either concerned about nonpoint source pollution or are involved in some sort of regulated activity that may result in nonpoint source pollution. Interestingly, some of these materials were used during the Soft Run Targeted Watershed Compliance Initiative discussed below. There are numerous NPS education projects initiated by the League Of Women Voters of Pennsylvania Citizens Education Fund (CEF) and the Pennsylvania Association of Conservation Districts (PACD) annually that are funded by Section 319. Below are the links to their respective websites:

<http://wren.palwv.org/2013-14WRENProjects.html>

<http://pacd.org/education/nps-section-319-education-office/2008-09-nonpoint-source-pollution-mini-grant-projects/>

Of special note for this past year is that PACD, through their NPS education project funded with §319 funds, developed a much needed NPS display with associated “rack cards.” Rack cards are tall and narrow handouts that can fit neatly in a display rack. A unique rack card was developed for four of the more common NPS pollution sources found in Pa. There is a separate rack card for agricultural runoff, stream restoration, urban runoff, and abandoned mine drainage. Also to support these hard copy educational materials, the project created a new, one-stop NPS website to provide citizens with information and a better understanding of NPS pollution. This website also provides information on some of the many programs in existence designed to address NPS pollution. This website can be found at: <http://www.nonpointsourcepa.org>. This website provides more detailed information relating to various NPS pollution control strategies and programs than what can be provided on the display and associated rack cards. This website is listed on both the display and rack cards to allow those viewing or receiving these hard copy educational materials to have a reference site to continue learning about how they can address these individual pollution sources.

Funding Sources and Solutions to Address Agricultural Nonpoint Source (NPS) Pollution in PA



Barnyard improvement project to curb surface water runoff and nutrient pollution to nearby waterways.

Agriculture Nonpoint Source (NPS) Pollution

Farm fertilizers and manure, when used improperly, can significantly harm fish and other wildlife in and around our streams, lakes and rivers. For example, excess nitrogen applied to fields can be flushed through the soil by rainwater into local groundwater including well water used for private and public drinking water supplies. Agricultural sources are the leading cause of NPS impaired water bodies in PA according to the PA Department of Environmental Protection's (DEP) 2012 Integrated List of All Waters. Approximately 5,700 miles of streams in PA are impaired for aquatic life, recreation and water supply uses due to agricultural activities.

For more information about additional funding sources to address agricultural runoff as well as other areas of NPS including abandoned mine drainage, urban runoff and stream restoration, visit www.NonpointSourcePA.org.

Figure B-2: An example of one of the rack cards produced by PACD funded by §319 funds to further the public's awareness of NPS pollution and solutions to the problems that NPS pollution causes.

Appendix C: Supporting and Collaborative Programs

C.1: Targeted Watershed Compliance Initiative

In FFY 2013 the Waterways and Wetlands program of the DEP implemented a pilot of a compliance effort focused on agricultural operations in a specific watershed. This Targeted Watershed Compliance Initiative (TWCI) involved the use of EPA-funded positions (two inspectors) tasked with visiting and conducting unannounced inspections on every identified farm in a given watershed. The chosen watershed was the Soft Run Watershed, a sub-watershed of the Kishoquoquillas Watershed, a watershed with a §319 WIP. The Soft Run was chosen for the pilot of the TWCI for several reasons; it is listed as impaired by agriculture, it was determined to be a manageable size in terms of acres and in terms of number of farms, it is located in an area that was eligible for §319 funding and it has received attention from the local County Conservation District for several years. Throughout the course of this pilot, 19 farms were inspected resulting in the determination that six farms were sources of significant negative environmental degradation. Each of those six farms eventually obtained the requisite plans and will be expected to implement BMPs to address the identified resource concerns.

C. 2: Act 167 Program

Pennsylvania's Act 167 program is active throughout the Commonwealth. This program works with counties and municipalities to verify that those local governments are complying with Act 167 of 1978 (pertaining to Stormwater Management Planning). In the Northwest Region of the DEP it is reported that all 12 counties in that region now have county-adopted and DEP approved Stormwater Management Plans. Further, 382 of 390 municipalities in that region have adopted and implemented stormwater management ordinances. Of the eight non-compliant municipalities, six are under an Administrative Order, one municipality is under a Consent Order and Agreement and the final municipality is working toward voluntary compliance with this requirement. Through compliance with Act 167, Pennsylvania's municipalities will continue to address NPS pollution associated with stormwater, including the discharge of pollutants from urban areas, roadways and even stream bank erosion exacerbated by increased runoff volume.

C.3: PA FBC Work influencing Nonpoint Source Pollution

The Fish and Boat Commission engages in a number of activities and programs that directly or indirectly address nonpoint source pollution. While the focus of the FBC is directed at habitat protection and restoration for the purpose of managing the Commonwealth's game and non-game fish, in working to best manage those fish populations, NPS pollution is addressed.

The FBC engages two parts of its "Division of Environmental Services" to handle a range of tasks including: permit reviews, legal reviews, complaint response and civil or criminal case investigation and litigation. The FBC views these two parts as one part proactive and one part reactive. The Division of Environmental Services is broken down organizationally into four sections: Aquatic Resource Section, Natural Diversity Section, Watershed Analysis Section, and the Natural Gas Section. The DEP works most closely with the Aquatic Resources Section and the Natural Gas Section. The Aquatic Resource Section is focused on the review of

certain mining and AMD permits as well as the use of the water resource with respect to quantity. The Natural Gas Section focuses its efforts on encroachments of streams and wetlands associated with natural gas exploration and extraction. These efforts work to preserve, not only the fish species found in the water resource, but also the recreational use of those waters.

The FBC also engages in education and outreach efforts which further the public's understanding and concern for NPS pollution issues. The FBC offers ready-made lesson plans, fact sheets, brochures, and programs that can be used by educators, FBC employees, or others to educate students and the general public on a wide range of topics, including NPS pollution. Fact sheets such as *The Effects of Flood & Mud on Fish* and *Stream Killers* focus on sediments and AMD respectively. Videos have also been made that address those and other issues. Beyond prepared written and video material, the FBC offers training for teachers, programs such as Trout in the Class Room, and other related topics.

Perhaps the work the FBC does that most directly addresses NPS pollution issues in PA is the work performed by their Division of Habitat Management (DHM). That division engages in the installation of habitat structures in lakes and ponds and the installation of stream bank stabilization structures in streams (and associated in-stream habitat structures), as well as works with landowners, sportsman's associations and other groups to do the same. The FBC is structured to provide funds in the way of grants as well as technical assistance, which include standard drawings and details for the installation of these habitat structures. While in the process of providing cover for game and non-game fish, the FBC also engages in water quality issues as well, addressing NPS pollution for the betterment of fish populations and the increased use by citizens. In the 2012 annual report, the DHM reported it worked on 92 unique stream projects including the completion of 73 construction projects and improving 8.69 miles of stream. For more information on specific projects the FBC has been involved with, please go to: <http://fishandboat.com/habitat.htm>.

Appendix D: Spotlight on Select Watershed Implementation Plans

Of the 34 WIPs approved and actively being implemented, eleven were chosen for closer examination in this Report. For the purpose of this Report, these WIPs are divided into two categories; those that focus on AMD reclamation work and those that are not AMD-focused. Each WIP specific section is organized in three parts: first, a summary table displaying the quantity of pollutant load reductions for the specified pollutants by project, second a short paragraph describing the project or projects associated with that WIP and lastly a detailed table that provides sub-watershed and BMP-specific information where available. In some cases a graph or other figure is provided to more clearly display the load reductions calculated.

Abandoned Mine Drainage WIPs Completed and Being Implemented- FFY2013 Tracking

Blacks Creek – Butler County

§319 Grant /Project Numbers (Project Completion Date for closed projects)	Pollutant Load Reductions (pounds/day)			
	Acidity	Fe	Al	Mn
2005 / 2524 (09-30-2008)	21	22	0	2
2006 / 2630H (12-31-2008) See 2005/2524	n/a	n/a	n/a	n/a
2008 / 2832E (09-30-2012) See 2009 / 2915	n/a	n/a	n/a	n/a
2009 / 2915 (09-30-2012)	321	63	22	27
Totals	342	85	22	29

Table D-1: A table listing pollutant load reductions by project as pounds per day for certain NPS pollutants associated with AMD in the Blacks Creek watershed.

Implementation Progress:

The Blacks Creek is tributary to the Slippery Rock Creek in northern Butler County and southern Venango County. It is impaired by AMD sources of pollution including high metals and acidity (pH) loadings. A TMDL for metals and acidity impairments was completed in January 2005. The Blacks Creek Restoration Plan followed TMDL completion, and was written and completed in April 2007. The Plan includes the priority remediation sites in the watershed. The Slippery Rock Creek Watershed Coalition, Butler County Conservation District and PA DEP are the primary partners involved with implementing the Plan. Several construction projects have been completed to target the highest priority AMD discharge sites.

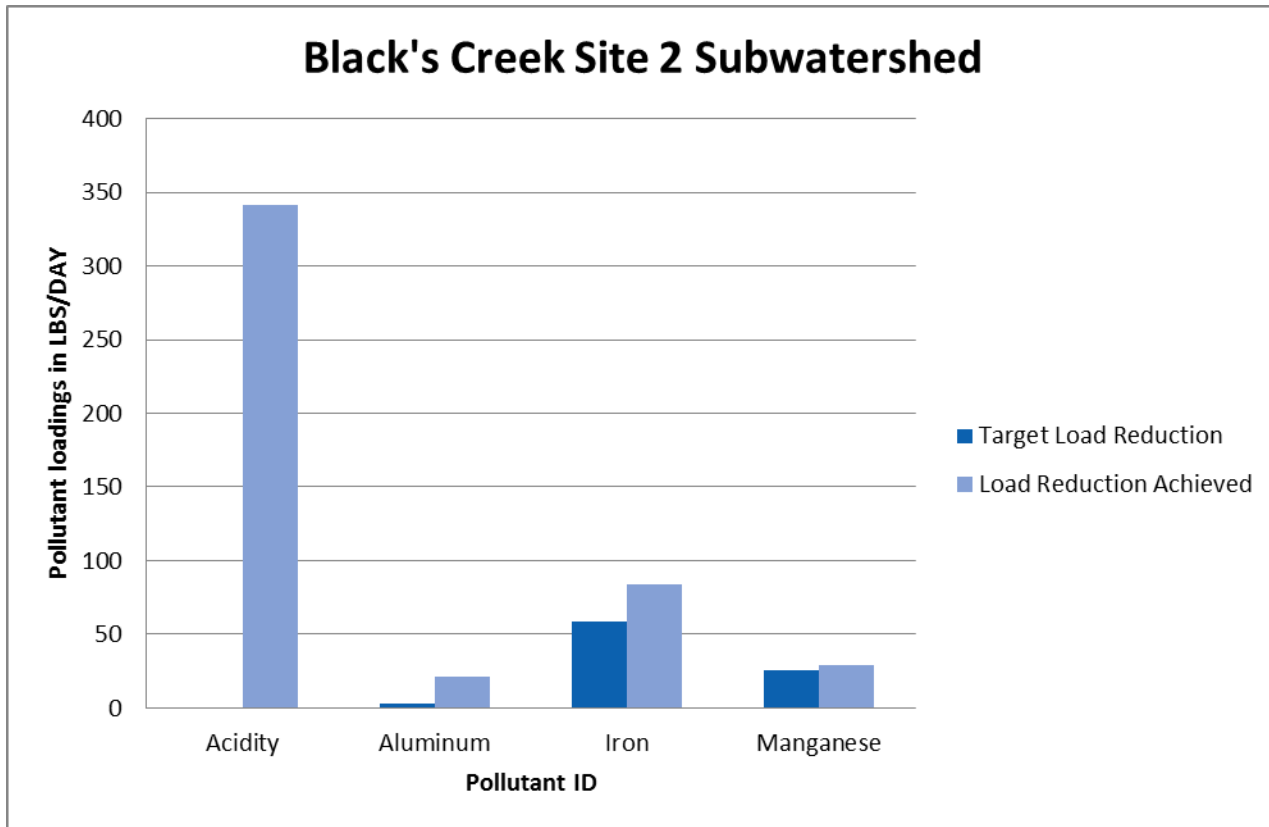


Figure D-1: A graphical representation of implemented pollutant load reductions as compared to target load reductions resulting from projects implemented at Site 2 of Black’s Creek.

Summary of Water quality Data for Blacks Creek

Site	Timeframe	pH	Acidity (mg/L)	Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Manganese (mg/L)
PA Black’s Creek 1	2006-2009	7.4	-73.7	89.7	2.6	0.27	1.76
	2012	7.87	-84.8	103.3	0.32	0.03	0.39
PA Black’s Creek 2	2006-2010	6.64	-47.5	79.6	5.8	0.83	3.6
	2012	7.63	-70.8	86.9	0.9	0	0.94

Table D-2: Water quality data for the time periods 2006-09 and 2012 for two sites within Blacks Creek watershed.

Black's Creek Watershed Tracker

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented	Pollutant ID	Target Load Reduction Amount (lbs/day)	Load Reduction Achieved (lbs/day)	% Load Reduction Achieved
PA Blacks Creek 1	Aggregated BMP Load Reductions				Metals (Iron)	19.1	19.1	100
					Metals (Manganese)	28.70	1.3	4.5
	Constructed Wetland Aerobic	1	1	100				
PA Blacks Creek 2	Aggregated BMP Load Reductions				Acidity	0.00	341.2	100
					Metals (Aluminum)	3.00	21.60	100
					Metals (Iron)	59.00	84.10	100
					Metals (Manganese)	25.50	28.7	100
	Constructed Wetland Aerobic	1	1	100				
	Constructed Wetland Anaerobic	2	0	0				
	Land Reclamation, Toxic Discharge Control	1	1	100				
	Limestone Leach Bed/Pond	2	2	100				
	Vertical Flow Treatment System	2	2	100				
Wetland Creation	1	1	100					
PA Blacks Creek 6	Aggregated BMP Load Reductions				Acidity	25.50	0	0
					Metals (Aluminum)	2.60	0	0
					Metals (Manganese)	2.80	0	0
	Constructed Wetland Aerobic	3	0	0				
	Constructed Wetland Anaerobic	2	0	0				

Table D-2: A detailed listing of pollutant load reductions calculated for NPS Pollutants listed by sub-watershed in the Black's Creek watershed.

Deer Creek – Clearfield County

§319 Grant/Project # (Project Completion Date for closed projects)	Pollutant Load Reductions (pounds/day)			
	Acidity	Aluminum	Iron	Manganese
2012/11 (Open) Design and permit only	n/a	n/a	n/a	n/a
Totals	0	0	0	0

Table D-3: A table listing pollutant load reductions by project as pounds per day for certain NPS pollutants associated with AMD in the Deer Creek Watershed. Pollutant load reductions have not yet been calculated for this site, the work performed in this watershed is design/permitting work.

Implementation Progress:

Deer Creek is a tributary to the West Branch of the Susquehanna River, and is located in Clearfield County. A TMDL was prepared for Deer Creek and was approved in 2005. The TMDL requires load reductions in iron, aluminum, manganese and acidity. The Deer Creek Watershed Implementation Plan was completed in 2011 and a project for design and permitting has started since then. This project will be focused on one of the 16 priority AMD discharge points within Deer Creek. It is expected that funding for treatment system implementation will follow.

Deer Creek Watershed Tracker

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented	Pollutant ID	Target Load Reduction	Load Reduction Achieved	% Load Reduction Achieved
						(lbs/day)	(lbs/day)	
DEER 1.0	Aggregated BMP Load Reductions				Acidity	1,279.90	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	90.20	0	0
	Aggregated BMP Load Reductions				Metals (Manganese)	143.40	0	0
	Land Reconstruction, Abandoned Mined Land	1	0	0				
	Vertical Flow Treatment System	2	0	0				
DEER 4.0	Aggregated BMP Load Reductions				Acidity	2,285.80	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	68.70	0	0
	Aggregated BMP Load Reductions				Metals (Iron)	93.40	0	0
	Passive Treatment	1	0	0				
DEER 7.0	Aggregated BMP Load Reductions	No TMDL Needed						
	Limestone Sanding	1	0	0				
	Passive Treatment	2	0	0				
TRDC 3.0	Aggregated BMP Load Reductions				Acidity	69.50	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	7.30	0	0
	Aggregated BMP Load Reductions				Metals (Iron)	0.50	0	0
	Aggregated BMP Load Reductions				Metals (Manganese)	7.00	0	0
	Limestone Open Channel	1	0	0				
TRDC 4.0	Aggregated BMP Load Reductions				Acidity	981.90	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	43.20	0	0
	Aggregated BMP Load Reductions				Metals (Iron)	101.90	0	0
	Aggregated BMP Load Reductions				Metals (Manganese)	98.20	0	0
	Land Reclamation	3	0	0				
	Limestone Doser	1	0	0				
	Vertical Flow Treatment System	4	0	0				

Sub Watershed (cont.)	BMP/Action (cont.)	Goal Amount (Units) (cont.)	Implemented Amount (Units) (cont.)	% Action Implemented (cont.)	Pollutant ID	Target Load Reduction (lbs/day) (cont.)	Load Reduction Achieved (lbs/day) (cont.)	% Load Reduction Achieved (cont.)
TRDC 7.0	Aggregated BMP Load Reductions				Acidity	358.40	0	0
	Passive Treatment	1	0	0				
TRDC 7.2	Aggregated BMP Load Reductions				Acidity	70.40	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	3.30	0	0
	Aggregated BMP Load Reductions				Metals (Iron)	5.90	0	0
	Aggregated BMP Load Reductions				Metals (Manganese)	8.60	0	0
	Passive Treatment	1	0	0				

Table D-4: A detailed table listing pollutant load reductions by sub-watershed in the Deer Creek Watershed.

Shoup Run – Huntingdon County

§319 Grant/ Project #s (Completed Projects)	Pollutant Load Reductions (pounds/day)			
	Acidity	Fe	Al	Mn
2002 / 17 (03-08-2004)	183	2	20	3
2004 / 19 (09-30-2007)	144	1	11	4
2005 / 18 (09-30-2008)	6	0	1	0
2005 / 19 (09-30-2008)	27	0	3	0
2005 / 21 (09-30-2008) No data available	n/a	n/a	n/a	n/a
2006 / 18 (03-31-2010)	94	0	1	1
2007 / 13 (09-30-2010)	39	0	5	1
2011/ 13 (Open) Plan Development only	n/a	n/a	n/a	n/a
2011/ 7B (Open) QHU Development	n/a	n/a	n/a	n/a
2013/09 (Open) Design and Permitting only	n/a	n/a	n/a	n/a
Totals	493	3	41	9

Table D-5: A summary table listing pollutant load reductions calculated and resulting from work performed in the Shoup Run watershed in FFY 2013.

Implementation Progress:

The Shoup Run watershed is listed on the state’s impaired streams list because it is impacted by high levels of metals and acidity. The TMDL for Shoup Run was completed in February 2001, along with TMDLs for several other small nearby watersheds, and was approved by the EPA in April 2001. The TMDL set load reduction goals for several AMD pollutants, including aluminum and acidity. The Shoup Run Watershed Restoration Plan (the WIP) was completed in 2005. Several §319-funded AMD remediation projects have implemented in the watershed to date. AMD remediation projects have been successful so far in addressing the TMDL and WIP pollutant reduction goals by reducing significant amounts of aluminum and acidity loadings in Shoup Run. Miller Run, a tributary of Shoup’s Run, is no longer impaired by AMD discharges. Some additional projects include one which will update the WIP and one to acquire extra information needed to meet the qualifications of a Qualified Hydrologic Unit for Set-aside funds. The newest project is for design and permitting on a discharge that is still affecting a tributary to Shoup Run.

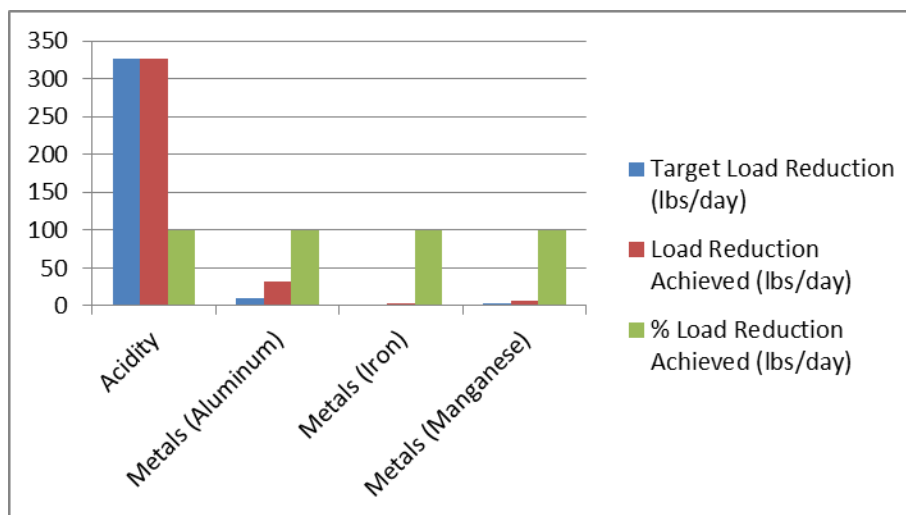


Figure D-2: A graphical representation of the Miller Run sub-watershed in the Shoup Run watershed. Notice that in the case of each pollutant, at least 100% of the target load reductions was achieved.

Summary of Water quality Data for Shoup Run

Site	Timeframe	pH	Acidity (mg/L)	Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Manganese (mg/L)
PA Shoup Run	1999-2006	4.97	30.4	-2.7	0.12	2.13	1.29
	2011-2014	6.47	-7.0	9.4	0.08	0.50	0.50
PA Hartman Run	1999-2006	3.9	40.7	0	1.1	0.86	1.75
	2011-2014	6.1	-0.3	12.5	0.96	0.18	0.46
PA Miller Run	1999-2006	6.01	7.2	10.6	0.11	0.82	0.36
	2011-2014	6.48	-21.0	11.8	0.05	0.18	0.15
SR8A (upstream of the Dudley)	1999-2006	5.1	36.8	2.7	0.26	1.95	0.83
	2011-2014	6.6	-12.0	12.2	0.08	0.64	0.28

Table D-2: Water quality data for the time periods 1999-2006 and 2011-14 for four sites within Shoup Run watershed.

Shoup Run Watershed Tracker

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented	Pollutant ID	Target Load Reduction	Load Reduction Achieved	% Load Reduction Achieved
						(lbs/day)	(lbs/day)	(lbs/day)
PA Dudley	Aggregated BMP Load Reductions				Metals (Aluminum)	129.60	0	0
					Metals (Manganese)	88.40	0	0
	Limestone Doser	1	0	0				
PA Hartman Run	Aggregated BMP Load Reductions				Acidity	94.00	94.20	100
					Metals (Aluminum)	1.20	0.63	53
					Metals (Iron)	0.30	0.10	33
					Metals (Manganese)	3.60	1.19	33
	Anoxic Limestone Drain	1	0	0				
	Limestone Sanding	1	1	100				
PA Miller Run	Aggregated BMP Load Reductions				Acidity	327.00	326.70	100
					Metals (Aluminum)	10.30	31.39	100
					Metals (Iron)	0.00	2.48	100
					Metals (Manganese)	2.60	6.49	100
	Limestone Leach Bed/Pond	3	3	100				
	Road Ditch Improvements	2	2	100				
PA Shoups Run	Aggregated BMP Load Reductions				Acidity	0	72.83	100
					Metals (Aluminum)	198.30	8.65	4
					Metals (Iron)	6.30	0	0
					Metals (Manganese)	129.20	0.87	1
	Limestone Leach Bed/Pond	4	4	100				

Table D-6: A detailed listing of pollutant load reductions calculated for NPS pollutants listed by sub-watershed in the Shoups Run watershed.

Six Mile Run/Sandy Run/Longs Run – Bedford County

§319 Grant/Project #s (Project Completion Date)	Pollutant Load Reductions (pounds/day)			
	Acidity	Fe	Al	Mn
2004 / 20 (09-30-2006)	143	67	5	0
2005 / 12 (09-30-2008)	0	1	0	0
2005 / 13 (09-30-2008)	18	1	2	0
2006 / 12 (09-30-2008) Design and permitting only.	n/a	n/a	n/a	n/a
2006 / 13 (09-30-2009)	122	3	8	0
2006 / 14 (09-30-2009) Design and permitting only.	n/a	n/a	n/a	n/a
2006 / 15 (09-30-2008)	22	1	2	0
2006 / 16 (09-30-2008) Design and permitting only.	n/a	n/a	n/a	n/a
2006 / 30A (12-31-2009) Design and permitting only.	n/a	n/a	n/a	n/a
2006 / 30B (09-30-2009) Design and permitting only.	n/a	n/a	n/a	n/a
2007 / 10 (09-30-2009)	63	9	5	1
2007 / 11 (01-21-2011) Discontinued project	n/a	n/a	n/a	n/a
2007 / 12 (09-30-2009)	15	3	2	1
2008 / 10 (06-06-2011)	161	33	13	0
2008 / 11 (10-31-2011)	162	12	12	0
2008 / 12 (09-30-2011) Design only.	n/a	n/a	n/a	n/a
2009 / 14 (Ongoing) Design and permitting only.	n/a	n/a	n/a	n/a
2010 / 09 (Ongoing)	0	0	0	0
2010 / 10 (Ongoing)	0	0	0	0
2012/07 (Ongoing) Design and Permitting only	n/a	n/a	n/a	n/a
2012/08 (Ongoing)	0	0	0	0
2013/11(Ongoing)	0	0	0	0
2013/12 (Ongoing) Design and Permitting only	n/a	n/a	n/a	n/a
Totals	706	130	49	2

Table D-7: A table listing pollutant load reductions by project as pounds per day for certain NPS pollutants associated with AMD in the Six Mile Run, Sandy Ru and Long’s Run watersheds.

Implementation Progress:

The Sandy Run/Longs Run TMDL was approved in 2003 and the Six Mile Run TMDL was approved in 2006. The Six Mile Run, Sandy Run and Long Run Restoration Plan (WIP) was completed in 2005 and amended in 2007. These watersheds are impacted by AMD pollutants which include high levels of iron, aluminum and acidity. Significant AMD remediation project implementation has occurred in the Six Mile Run, Sandy Run and Longs Run watersheds since WIP completion. TMDL load reduction goals for both the Longs and Sandy Run TMDL (metals and pH) and the Six Mile Run TMDL (metals and pH) are starting to be met through these projects. Several ongoing projects are either in the design stage or in the beginning stage of actual remediation work.

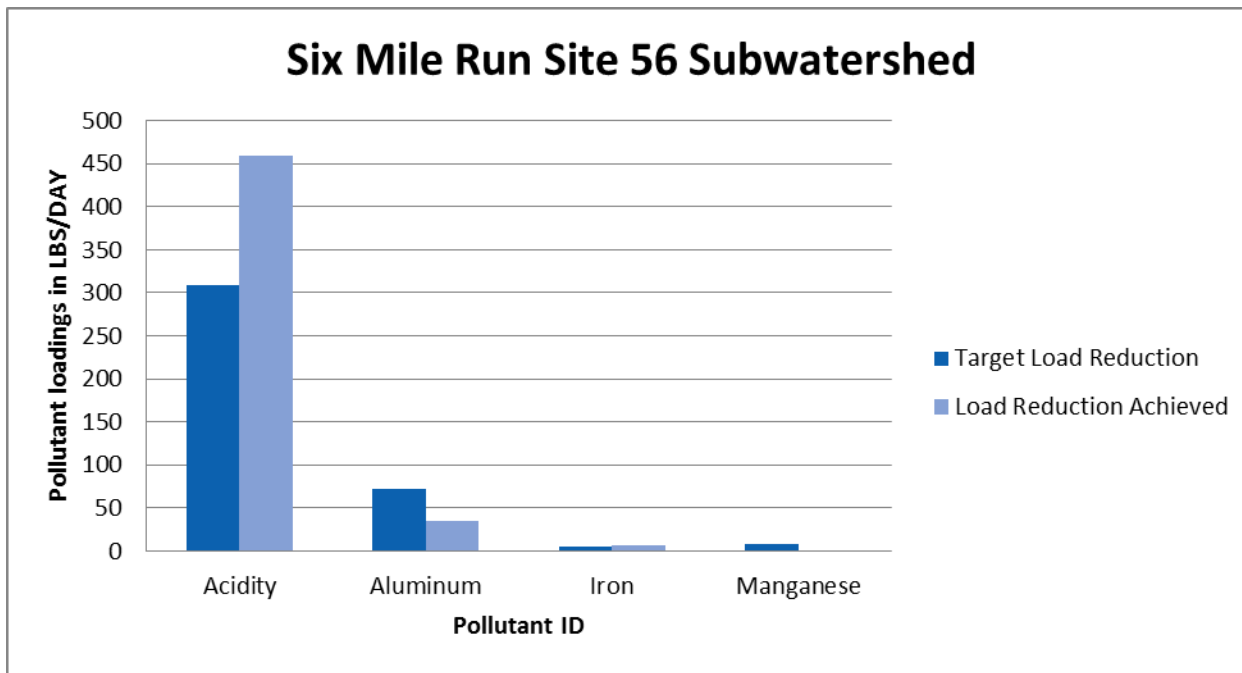


Figure D-3: A graphical representation of pollutant load reductions as compared to target load reductions resulting from projects implemented at Site 56 of Six Mile Run.

Summary of Water quality Data for Six Mile Run

Site	Timeframe	pH	Acidity (mg/L)	Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Manganese (mg/L)
PA Six Mile Run Site 57	2000-2001	5.64	4	2	0.09	0.66	0.18
	2011-2012	6.57	-11.2	13.4	0.11	0.36	0.22
PA Six Mile Run Site 58	2000-2001	4.71	8	1	0.04	0.48	0.18
	2011-2012	6.55	-6.1	8.5	0.1	0.35	0.26
PA Six Mile Run Site 68	2000-2001	4.41	23	1	0.35	2.64	0.62
	2011-2012	7.1	-7.5	13.3	0.3	0.82	0.27
PA Six Mile Run Site 53	2000-2001	4.68	16	1	2.74	2.08	0.62
	2012	7.1	-17.8	14.2	1.13	0.97	0.3

Table D-2: Water quality data for the time periods 2001-01 and 2011-12 for four sites within Six Mile Run watershed.

Six Mile Run Watershed Tracker

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented	Pollutant ID	Target Load Reduction (lbs/day)	Load Reduction Achieved (lbs/day)	% Load Reduction Achieved
PA Six Mile Run Site 50	Aggregated BMP Load Reductions				Acidity	718.9	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	107.70	0	0
	Aggregated BMP Load Reductions				Metals (Iron)	0	0	0
	Aggregated BMP Load Reductions				Metals (Manganese)	28.3	0	0
	Limestone Leach Bed/Pond	2	0	0				
	Vertical Flow Treatment System	6	0	0				
PA Six Mile Run Site 53	Aggregated BMP Load Reductions				Acidity	0	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	0	0	0
	Aggregated BMP Load Reductions				Metals (Iron)	74.2	0	0
	Aggregated BMP Load Reductions				Metals (Manganese)	0	0	0
	Limestone Leach Bed/Pond	1	0	0				
PA Six Mile Run Site 54	Aggregated BMP Load Reductions				Acidity	145.7	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	2.70	0	0
	Aggregated BMP Load Reductions				Metals (Iron)	79.2	0.16	0.2
	Aggregated BMP Load Reductions				Metals (Manganese)	0.00	0	0
	Limestone Leach Bed/Pond	3	2	67				
PA Six Mile Run Site 56	Aggregated BMP Load Reductions				Acidity	308.7	458.73	100
	Aggregated BMP Load Reductions				Metals (Aluminum)	72.7	35.23	48
	Aggregated BMP Load Reductions				Metals (Iron)	4.70	6.46	100
	Aggregated BMP Load Reductions				Metals (Manganese)	7.80	0.00	0
	Limestone Leach Bed/Pond	7.00	7.00	100				
PA Six Mile Run Site 57	Aggregated BMP Load Reductions				Acidity	0.00	17.7	100
	Aggregated BMP Load Reductions				Metals (Aluminum)	4.8	1.63	34
	Aggregated BMP Load Reductions				Metals (Iron)	0.0	0.37	100
	Limestone Leach Bed/Pond	2	2	100				

Table Continued on Next Page

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented	Pollutant ID	Target Load Reduction (lbs/day)	Load Reduction Achieved (lbs/day)	% Load Reduction Achieved
PA Six Mile Run Site 58	Aggregated BMP Load Reductions				Acidity	139.7	14.9	11
	Aggregated BMP Load Reductions				Metals (Aluminum)	2.8	1.80	64
	Aggregated BMP Load Reductions				Metals (Iron)	0.00	2.5	100
	Aggregated BMP Load Reductions				Metals (Manganese)	0.00	0.50	100
	Vertical Flow Treatment System	1	1	100				
PA Six Mile Run Site 59	Aggregated BMP Load Reductions				Acidity	45.2	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	3.00	0	0
	Aggregated BMP Load Reductions				Metals (Manganese)	3.5	0	0
	AMD-Passive Treatment System	1.00	1.00	100				
PA Six Mile Run Site 68	Aggregated BMP Load Reductions				Acidity	886.6	185.40	21
	Aggregated BMP Load Reductions				Metals (Aluminum)	65.9	12.89	20
	Aggregated BMP Load Reductions				Metals (Iron)	0.00	11.57	100
	Aggregated BMP Load Reductions				Metals (Manganese)	2.10	0.18	9
	Vertical Flow Treatment System	1	1	100				
	Limestone Leach Bed/Pond	4	3	75				

Table D-8: A detailed listing of pollutant load reductions calculated for NPS pollutants listed by sub-watershed in the Six Mile Run watershed.

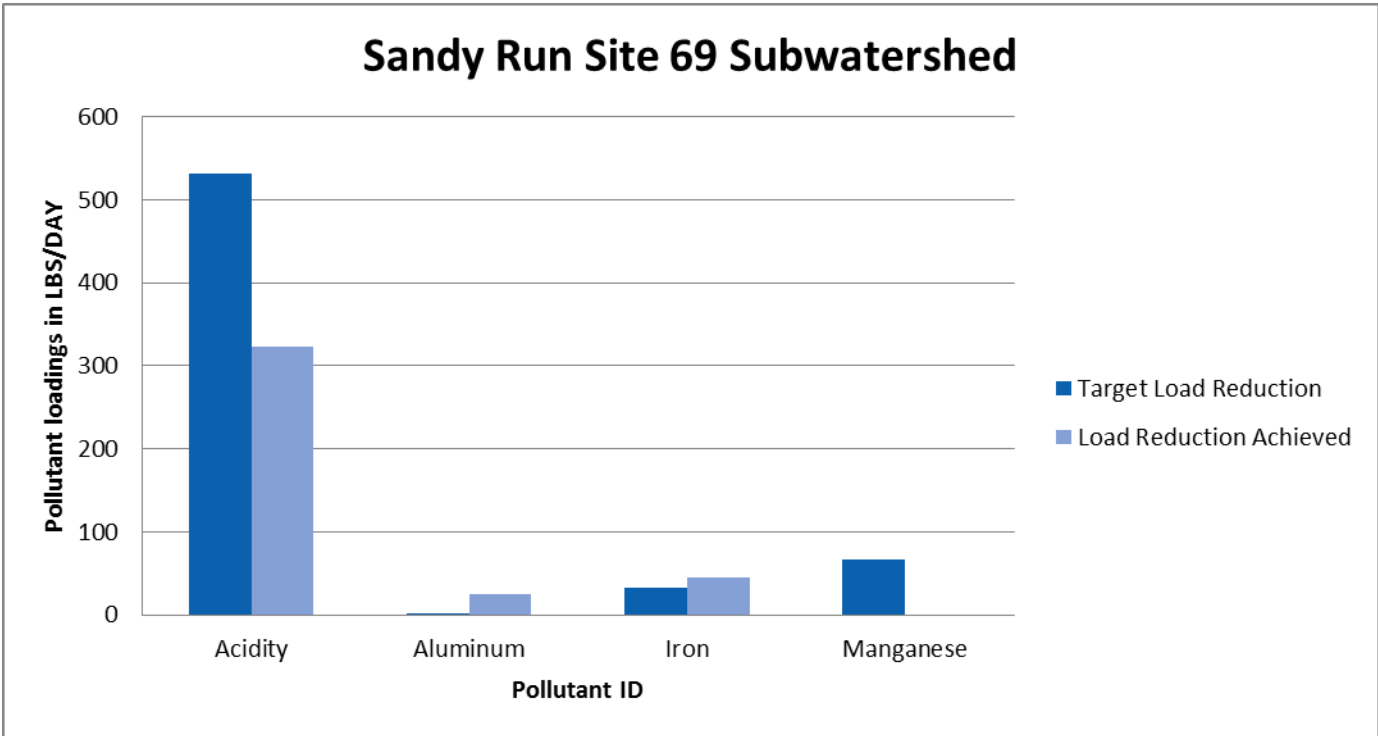


Figure D-4: A graphical representation of pollutant load reductions calculated compared to target load reductions for Site 69 of the Sandy Run watershed.

Sandy Run Watershed Tracker

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented	Pollutant ID	Target Load Reduction	Load Reduction Achieved	% Load Reduction Achieved
						(lbs/day)	(lbs/day)	
PA Sandy Run Site 64	Aggregated BMP Load Reductions				Acidity	2,608.50	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	25.50	0	0
	Aggregated BMP Load Reductions				Metals (Iron)	201.30	0	0
	Aggregated BMP Load Reductions				Metals (Manganese)	246.90	0	0
	Anoxic Limestone Drain	1	0	0				
	Vertical Flow Treatment System	7	0	0				
PA Sandy Run Site 67	Aggregated BMP Load Reductions				Acidity	2,518.50	0	0
	Aggregated BMP Load Reductions				Metals (Aluminum)	20.10	0	0
	Aggregated BMP Load Reductions				Metals (Iron)	193.50	0	0
	Aggregated BMP Load Reductions				Metals (Manganese)	129.20	0	0
	Limestone Open Channel	1	0	0				
PA Sandy Run Site 69	Aggregated BMP Load Reductions				Acidity	531.50	322.90	61
	Aggregated BMP Load Reductions				Metals (Aluminum)	0.80	25.10	100
	Aggregated BMP Load Reductions				Metals (Iron)	33.20	45.00	100
	Aggregated BMP Load Reductions				Metals (Manganese)	66.40	0.00	0
	Anoxic Limestone Drain	2	0	0				
	Vertical Flow Treatment System	9	5	56				

Table D-9: A detailed listing of pollutant load reductions calculated for NPS pollutants listed by sub-watershed in the Sandy Run watershed.

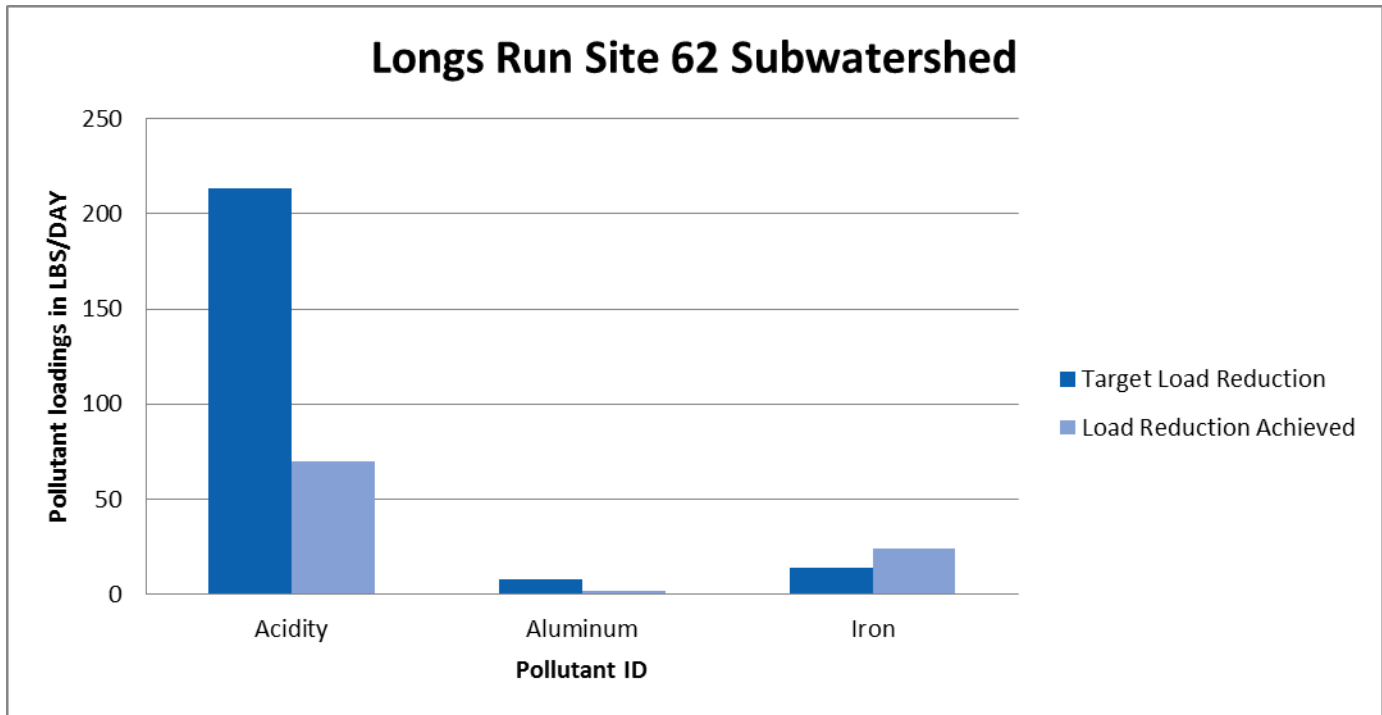


Figure D-5: A graphical representation of pollutant load reductions as compared to target load reductions resulting from projects implemented at Sites 62 of Long Run.

Summary of Water quality Data for Longs Run

Site	Timeframe	pH	Acidity (mg/L)	Alkalinity (mg/L)	Iron (mg/L)	Aluminum (mg/L)	Manganese (mg/L)
PA Longs Run Site 63	2000-2001	5.81	7	4	2.75	0.34	0.58
	2012	6.4	-8.3	13.6	1.47	0.07	0.16

Table D-2: Water quality data for the time periods 2000-01 and 2012 for one site in Longs Run watershed.

Longs Run Watershed Tracker

Sub Watershed	BMP/Action	Goal Amount (Units)	Implemented Amount (Units)	% Action Implemented	Pollutant ID	Target Load Reduction (lbs/day)	Load Reduction Achieved (lbs/day)	% Load Reduction Achieved
PA Longs Run Site 61	Aggregated BMP Load Reductions				Acidity	174.80	26.30	15
	Aggregated BMP Load Reductions				Metals (Aluminum)	8.00	1.40	18
	Aggregated BMP Load Reductions				Metals (Iron)	14.10	4.20	30
	Anoxic Limestone Drain	3	2	67				
	Constructed Wetland Aerobic	2	1	50				
	Limestone Leach Bed/Pond	8	2	25				
	Vertical Flow Treatment System	2	0	0				
PA Longs Run Site 62	Aggregated BMP Load Reductions				Acidity	213.30	69.60	33
	Aggregated BMP Load Reductions				Metals (Aluminum)	8.10	1.60	20
	Aggregated BMP Load Reductions				Metals (Iron)	14.40	24.00	100
	Constructed Wetland Aerobic	1	1	100				
	Vertical Flow Treatment System	1	1	100				
PA Longs Run Site 63	Aggregated BMP Load Reductions				Acidity	0.00	47.80	100
	Aggregated BMP Load Reductions				Metals (Aluminum)	0.00	1.60	100
	Aggregated BMP Load Reductions				Metals (Iron)	31.10	42.00	100
	Anoxic Limestone Drain	1	1	100				
	Constructed Wetland Aerobic	1	1	100				
	Limestone Leach Bed/Pond	2	2	100				

Table D-10: A detailed listing of pollutant load reductions calculated for NPS pollutants listed by sub-watershed in the Long Run watershed.

Little Laurel Run – Cambria County

§319 Grant/Project #s (Project Completion Date)	Pollutant Load Reductions (pounds/day)			
	Acidity	Fe	Al	Mn
2005 / 15 (09-30-2008)	166	30	1	0
2007 / 14 (09-30-2009)	75	6	4	0
2008 / 17 (09-30-2012) Design and Permitting	n/a	n/a	n/a	n/a
2010 / 08 (9-30-2013)	17	1	8	0
2011/ 08 (Ongoing) Design and Permitting	n/a	n/a	n/a	n/a
2011/ 09(Ongoing)	0	0	0	0
2012/ 09(Ongoing)	0	0	0	0
2013/ 08 (Ongoing)	0	0	0	0
Totals	258	37	13	0

Table D-11: A table listing pollutant load reductions by project as pounds per day for certain NPS pollutants associated with AMD in the Little Laurel Run watershed.

Implementation Progress:

The Little Laurel Run is a small tributary to Clearfield Creek in Cambria County. Little Laurel Run is impaired by AMD discharges that contribute high levels of acidity, iron and aluminum to the stream. A TMDL was developed and approved for the larger Clearfield Creek watershed in 2007 but this TMDL does not include the Little Laurel Run sub-watershed. The Little Laurel Run Restoration Plan (WIP) was completed in October 2005. The Plan prescribes BMPs to reduce metals and acidity loading within the watershed. The Clearfield Creek Watershed Association is actively implementing priority remediation work recommended in the Plan. There is great potential to significantly improve water quality in the Little Laurel Run watershed since it is relatively small. Construction projects are being built at the West Ferris Wheel and Gibson-Halstock AMD discharge sites which, once completed will only leave one priority to address in the WIP. Metals and acidity loadings to the watershed will be significantly reduced when these projects are completed.

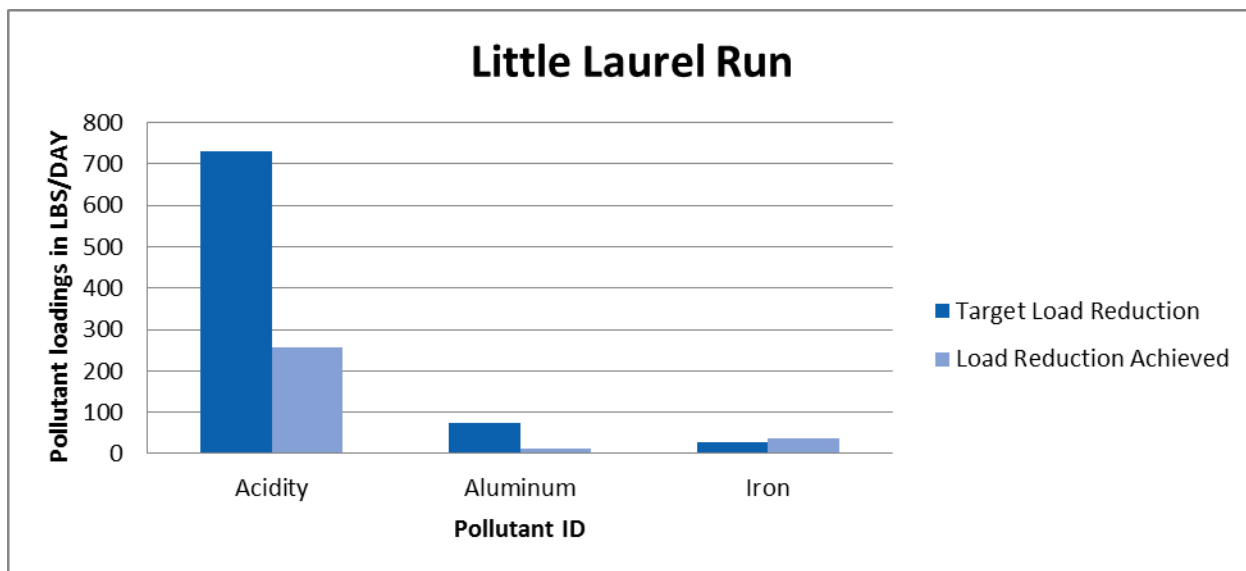


Figure D-6: A graphical representation of pollutant load reductions as compared to target load reductions resulting from projects implemented at Little Laurel Run..

Little Laurel Run Watershed Tracker

Sub Watershed	BMP/Action	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID	Target Load Reduction Amount	Load Reduction Achieved	% Load Reduction Achieved
						(lbs/day)	(lbs/day)	
Little Laurel Run	Aggregated BMP Load Reductions				Acidity	731.00	257.50	35
	Aggregated BMP Load Reductions				Metals (Aluminum)	73.00	13.20	18
	Aggregated BMP Load Reductions				Metals (Iron)	29.00	36.90	100
	Anoxic Limestone Drain	3	0	0				
	Constructed Wetland Aerobic	1	0	0				
	Land Reconstruction, Abandoned Mined Land	30	30	100				
	Limestone Leach Bed/Pond	2	0	0				
	Limestone Open Channel	1	0	0				
	Vertical Flow Treatment System	5	2	40				

Table D-12: A detailed listing of pollutant load reductions calculated for NPS pollutants in the Little Laurel Run watershed.

Non-AMD WIPs Completed and Being Implemented – FFY2013 Tracking

Buffalo Creek – Union County

§319 grant / project # (Project completion date for closed projects)	Pollutant Load Reductions		
	Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
2006 / 07 (12-31-2008) PLAN only	n/a	n/a	n/a
2008 / 20 (09/30/2012)	5,075	1,001	193
2011/ 18 (Open)	7919	954	83.2
2013 / 16 (Open)	0	0	0
Totals	12,994	1,955	276.2

Table D-13: A summary table listing pollutant load reductions calculated for various projects in the Buffalo Creek watershed.

Implementation Progress:

The Buffalo Creek Watershed Implementation Plan (2008) was completed by the Union County Conservation District. The PA DEP developed the Buffalo Creek Tributaries TMDL (2009) following the completion of the Plan. The TMDL addresses phosphorus and sediment loadings that are primarily attributable to agricultural sources. The TMDL included newly listed impaired stream reaches that were included on the 2010 Integrated List; those stream reaches were not part of the original Plan. Thus, the Plan was amended in 2013 to include consistency with the impaired stream reaches included in the TMDL. The UNT19034 tributary has been the focus of BMP work in the watershed to date. The County Conservation District will move on to the Little Buffalo Creek as the next priority sub-watershed. Both the Buffalo Creek Watershed Association and County Conservation District are doing comprehensive water quality monitoring in cooperation with Bucknell University.

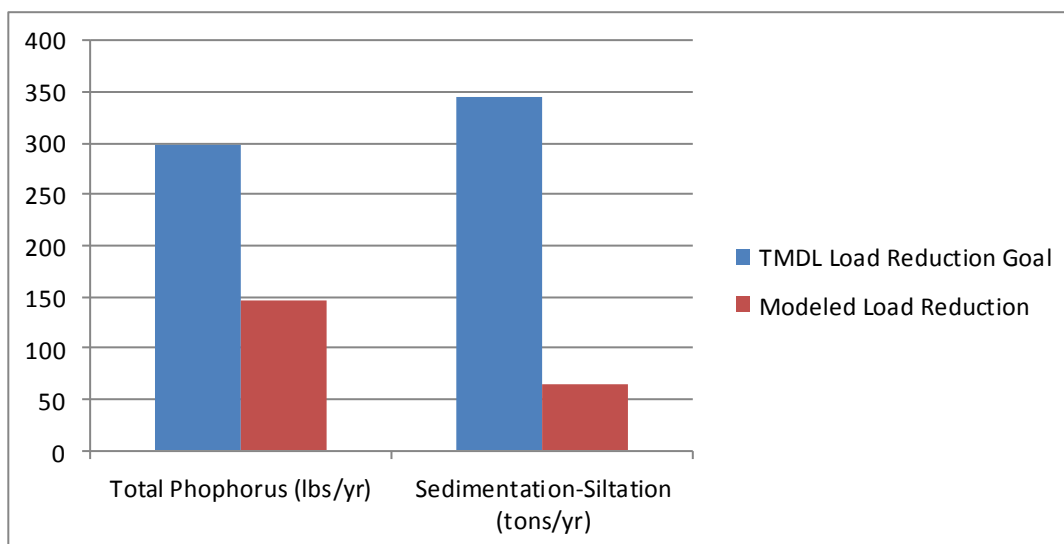


Figure D-7: Take from Subshed PA UNT 19034, a graphical representation of TMDL planned load reductions, modeled load reductions and the amount in terms of percent (%) achieved when comparing the former two categories. Note that there is not a TMDL for total Nitrogen in this sub-watershed and therefore no comparison made

**Buffalo Creek Tracking Tool :Focus on Buffalo Creek UNT19034 Sub-watershed
Load Reductions Achieved compared to TMDL Load Reduction Goals**

Sub Watershed	BMP/Action	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved-TMDL
PA EastBufCr								
	Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)	52.00		
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	44.00		
	Conservation Plan		599.80					
	Conservation Tillage	2,760.00	0.00					
	Cover Crop		703.70					
	Grazing Planned Systems	2,076.00	0.00					
	Nutrient Management	8,288.00	1,084.20	13				
	Riparian Forest Buffer	131.50	0.00	0				
	Stream Channel Stabilization	168,432.00	0.00	0				
	Stream Exclusion with Grazing Land Management	91,872.00	6,900.00	7.5				
PA LittleBufCr								
	Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)			
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)			
	Conservation Plan		883.50					
	Conservation Tillage	1,316.00	658.20	50				
	Cover Crop		774.20					
	Grazing Planned Systems	1,800.00	0.00	0				
	Nutrient Management	2,421.00	0.00	0				
	Nutrient Management		578.40					
	Riparian Forest Buffer	59.00	0.00	0				
	Stream Channel Stabilization	204,336.00	0.00	0				
	Stream Exclusion with Grazing Land Management	73,920.00	0.00	0				
	Stripcropping		270.50					
	Underground Outlet		1.00					
	Underground Outlet		100.00					
PA BeaverRun								
PA BeaverRun	Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)			

Table continued on next page.

Sub Watershed	BMP/Action	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved-TMDL
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	1,006.00		0.00
	Conservation Tillage	1,006.00	0.00	0				
	Nutrient Management	2,438.00	0.00	0				
	Prescribed Grazing	473.00	0.00	0				
	Riparian Forest Buffer	46.00	0.00	0				
	Road Ditch Creation/Improvements	4,752.00	0.00	0				
	Stream Channel Stabilization	38,016.00	0.00	0				
PA CoalRun								
	Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)	0.00		
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	162.00		
	Access Road	2,100.00	0.00	0				
	Barnyard Runoff Management	1.00	0.00	0				
	Conservation Tillage	487.00	39.50	8.1				
	Cover Crop	13.60	0.00	0				
	Fence	2,800.00	0.00	0				
	Grassed Waterway	1.50	0.00	0				
	Livestock Stream Crossing	2.00	0.00	0				
	Nutrient Management	1,885.00	0.00	0				
	Prescribed Grazing	727.00	0.00	0				
	Riparian Forest Buffer	24.00	0.00	0				
	Riparian Herbaceous Cover	800.00	0.00	0				
	Road Ditch Creation/Improvements	16,896.00	0.00	0				
	Stream Channel Stabilization	70,752.00	0.00	0				
PA RapidRun								
	Access Road	390.00	0.00	0				
	Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)	298.00		0.00
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	346.00		0.00
	Conservation Tillage	272.00	0.00	0				
	Cover Crop	7.80	0.00	0				
	Heavy Use Area Protection	0.10	0.00	0				
	Nutrient Management	726.00	0.00	0				
	Prescribed Grazing	362.00	0.00	0				
	Riparian Forest Buffer	21.20	0.00	0				

Table continued on next page.

Sub Watershed	BMP/Action	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved-TMDL
	Stream Crossing	8.00	0.00	0				
	Stream Exclusion with Grazing Land Management	15,840.00	0.00	0				
	Stream Habitat Improvement and Management		200.00					
	Waste Storage Facility	1.00	0.00	0				
PA NoBrBufCr	Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)			
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)			
	Barnyard Runoff Management	1.00	0.00	0				
	Conservation Tillage	238.00	21.70	9.1				
	Heavy Use Area Protection	1.00	0.00	0				
	Nutrient Management	956.00	0.00	0				
	Prescribed Grazing	351.00	0.00	0				
	Riparian Forest Buffer	27.00	0.00	0				
	Stream Channel Stabilization	168,432.00	0.00	0				
	Stream Exclusion with Grazing Land Management	16,368.00	0.00	0				
PA UNT 19034	Aggregated BMP Load Reductions				Total Nitrogen (LBS/YR)		2787	
	Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)	298.00	145.60	48.80
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	346.00	64.50	18.60
	Access Road (Ft)		227.00					
	Animal Trails and Walkways (Ft)		2,760.00					
	Barnyard Runoff Management (Units)	3.00	2.00	67				
	Cover Crop (Ac)	211.00	0.00	0				
	Filter Strip (Ac)		0.46					
	Heavy Use Area Protection (Ac)		0.22					
	Nutrient Management (Ac)	301.00	327.00	>100				
	Prescribed Grazing (Ac)	8.00	70.00	>100				
	Riparian Forest Buffer (Ac)	14.40	4.70	33				
	Stream Crossing (Units)	6.00	6.00	100				
	Stream Exclusion with Grazing Land Management (Ft)	11,160.00	20,510.00	180				
	Streambank & Shoreline Protection (Ft)	245.00	1,210.00	493				
	Waste Management System (Units)	3.00	2.00	67				
	Waste Storage Facility (Units)	1.00	1.00	100				

Table D-14: A detailed listing of pollutant load reductions by BMP in the Buffalo Creek Watershed.

Codorus Creek – Adams and York Counties

§319 grant / project # * (Project Completion Date for closed projects)	Pollutant Load Reductions		
	Nitrogen Lbs/yr	Phosphorus Lbs/yr	Sediment Tons/yr
1999 / 22 (6-30-01) SBCC2	0	0	43
2000 / 39 (9-30-02) EBCC Assessment	n/a	n/a	n/a
2002 / 31 (7-31-05) EBCC	0	0	350
2002 / 33 (9-30-05) SBCC1	0	0	119
2003 / 32 (9-30-06) EBCC Design and Permit	n/a	n/a	n/a
2003 / 33 (9-30-06) SBCC1	0	0	5,300
2004 / 26 (9-30-07) OC Design and Permit	n/a	n/a	n/a
2004 / 28 (9-30-06) SBCC1	0	0	300
2005 / 32 (9-30-06) EBCC Design and Permit	n/a	n/a	n/a
2005 / 42 (9-30-06) S/EBCC Monitoring	n/a	n/a	n/a
2005 / 45B (9-30-07) EBCC	0	0	981
2006 / 30D (9-30-08) SBCC1	3,034	2,016	1,920
2006 / 30E (9-30-09) EBCC	0	0	750
2006 / 30F (9-30-09) OC	0	0	682
2007 / 20 (9-30-09) EBCC	0	0	3,115
2009 / 31I (09-30-13) EBCC	13009	2601	325
2010 / 22 (12-31-12) SBCC2 Results in 2012/ 25	n/a	n/a	n/a
2011 / 24 (Open) SBCC1	0	0	0
2012 / 19 (Open) EBCC	0	0	0
2012 / 25 (Open) SBCC2	97	49	42
Totals	16,140	4,666	13,927

Table D-15: A summary of pollutant load reductions resulting from various projects implemented in the Codorus Creek watershed.

* East Branch Codorus Creek (EBCC); South Branch Codorus Creek Sub-basin 1 (SBCC1); South Branch Codorus Creek Sub-basin 2 (SBCC2); Oil Creek (OC)

Implementation Progress:

The Oil Creek TMDL was developed and completed in March 2003. The South Branch Codorus Creek TMDL was developed and approved in August 2003. The TMDL allocates significant load reductions for both phosphorus and sediment. Following the TMDL development and the implementation of several restoration projects, the Codorus Creek Watershed Implementation Plan (July 2007) was completed by the York County Conservation District. The Codorus Creek is a major source of public drinking water for the City of York and surrounding communities. Restoration work has focused on stream bank and stream channel stabilization and riparian buffer restoration to correct uncontrolled urban and storm water runoff and unrestricted livestock access to streams. The Codorus Creek Watershed Association has taken a lead role in Plan implementation. The County Conservation District and the USDA-NRCS partnership are also working with farmers and landowners to implement projects identified in the WIP, and minimize nutrient and sediment inputs to streams. So far we have completed many projects that have helped to decrease nutrient and sediment loadings particularly in the East and South Branches of the Codorus Creek and in the Oil Creek sub-watershed. Section 319 funds are currently used for work on high priority project sites in the impaired reaches of the East and South Branch sub-watersheds.

Practices implemented in this watershed, both from the §319 program and from the USDA have resulted in the following load reductions in the Codorus Creek Watershed: 4,852 tons/day of sediment, 4,052 lbs/day of Total Phosphorus, and 27, 121 lbs/day of Total Nitrogen.

Stream Quality Observations in South Branch Codorus Creek, Grainary Road

Best management practices for stream restoration were placed on the South Branch Codorus Creek, Grainary Road reach in 2004. The BMPs included cross vein structures and bank stabilization (banks were very eroded and incised before the restoration project took place). The reach has been monitored since 2004 for habitat, pebble counts, and macroinvertebrates. Water chemistry and bacteria sampling was added in 2012. The reach has been in constant flux from activities occurring upstream including another stream restoration site and sediment and erosion impacts. Stream banks are stable and the riparian area has grown into a decent buffer throughout most of this reach. Habitat and the macroinvertebrate community are in constant flux due to upstream inputs including sediment. Pebble counts also show the effect of sediment. Water chemistry has not been collected long enough to draw any conclusions. Overall, major conclusions regarding stream improvement can't be made due to the variable and constantly changing conditions and monitoring will continue.

Conewago Creek – Dauphin, Lancaster and Lebanon Counties

§319 grant / project # (Project Completion Date if completed)	Pollutant Load Reductions		
	Nitrogen Lbs/yr	Phosphorus Lbs/yr	Sediment Tons/yr
2007 / 19 (09-30-11)	3,785	1,052	441
2007 / 21 (06-30-09) Design and Permit only.	n/a	n/a	n/a
2009 / 22 (09-30-13)	1951	368	180
2009 / 31B (09-30-13)	1203	602	708
2010 / 23D (Open)	380	190	224
2012 / 12 (Open)	4440	915	527
Totals	11,759	3,127	2,080

Table D-16: A summary table listing pollutant load reductions resulting from various projects completed in the Conewago Creek Watershed.

Implementation Progress:

The Conewago Creek TMDL (March 2001; June 2006 Revised) identifies phosphorus and sediment as primary causes of impairment. The Tri-County Conewago Creek Association completed the Conewago Creek Restoration Plan (2006) to implement the TMDL. Agricultural and hydro modification sources of impairment are primary, while some urban/stormwater runoff issues also exist. Most land uses in the watershed are agricultural and forested with a much smaller extent of commercial and residential area. The USDA-NRCS and the EPA selected the watershed in 2009-2010 as a ‘showcase’ or priority watershed. National Fish and Wildlife Foundation funding helped watershed partners reach out to the public and work with landowners to install agricultural BMPs and stream restoration projects. Significant load reductions have been made within the Conewago Creek and most notably within the impaired stream reaches in the lower part of the watershed.

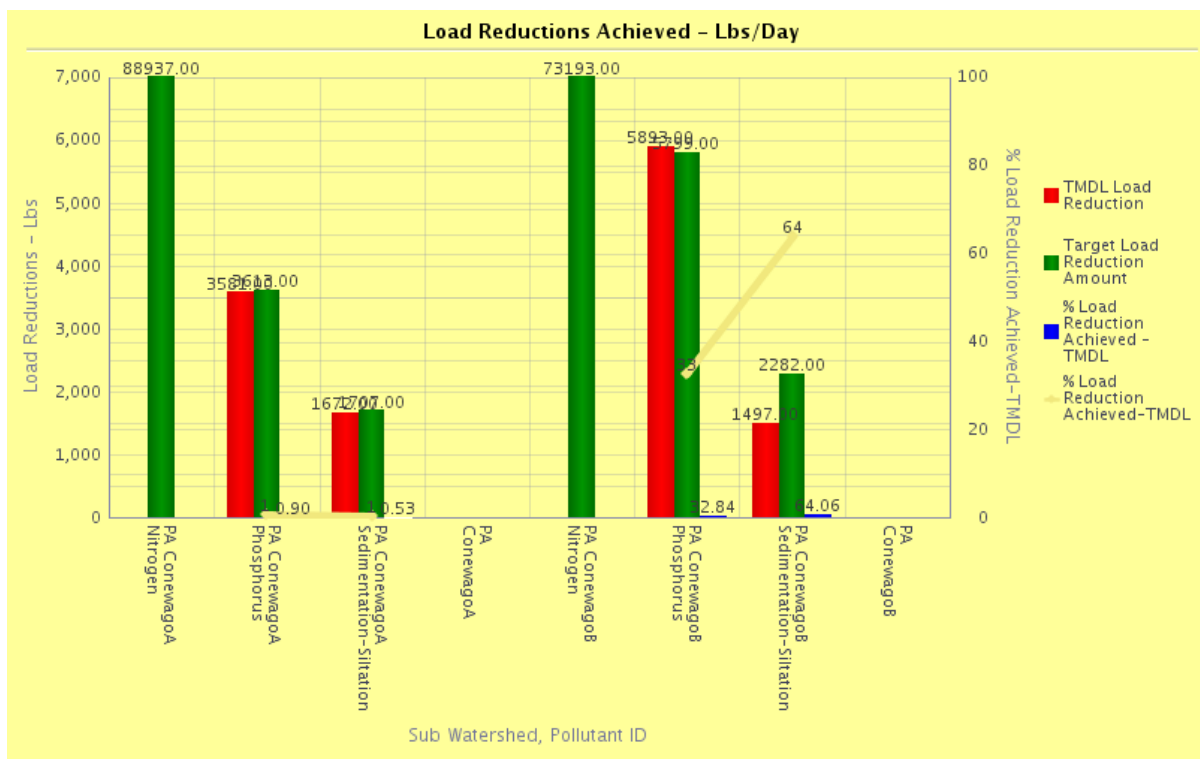
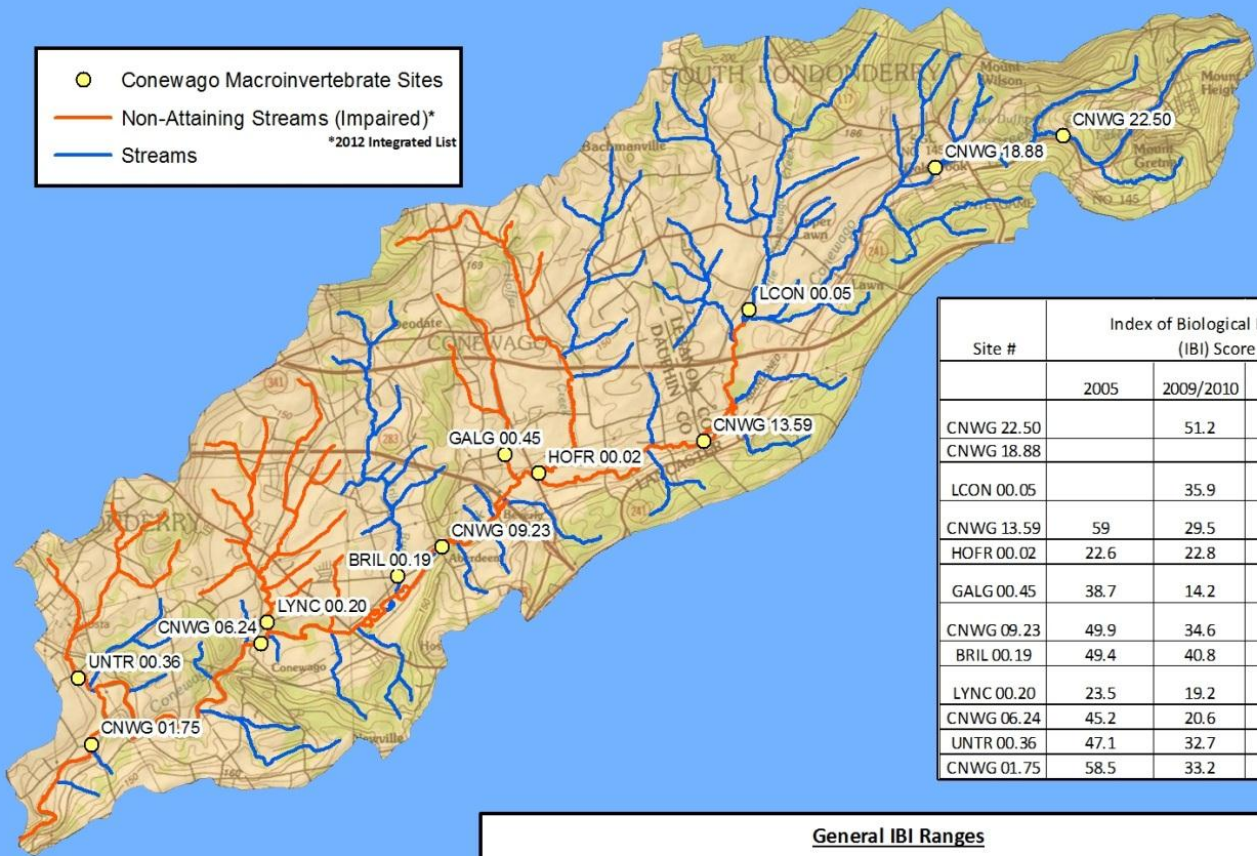


Figure D-8: A comparison of pollutant load reductions achieved in the Conewago Creek watershed as compared to target load reductions (green) and TMDL attributed load reductions (blue).

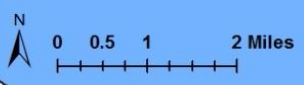
Stream Macroinvertebrate Findings in the Conewago Creek watershed

Conewago Macroinvertebrate Sampling 2005, 2009, and 2013

- Conewago Macroinvertebrate Sites
 - Non-Attaining Streams (Impaired)*
 - Streams
- *2012 Integrated List



Site #	Index of Biological Integrity (IBI) Score		
	2005	2009/2010	2013
CNWG 22.50		51.2	
CNWG 18.88			57.4
LCON 00.05		35.9	34.9
CNWG 13.59	59	29.5	50.0
HOFR 00.02	22.6	22.8	34.7
GALG 00.45	38.7	14.2	26.6
CNWG 09.23	49.9	34.6	43.0
BRIL 00.19	49.4	40.8	48.3
LYNC 00.20	23.5	19.2	21.9
CNWG 06.24	45.2	20.6	49.1
UNTR 00.36	47.1	32.7	35.4
CNWG 01.75	58.5	33.2	52.5



General IBI Ranges

Good (63-100): Balanced community of pollution sensitive and tolerant organisms.

Fair (50-62): Decrease in pollution-sensitive species, unbalanced site with sub-optimal habitat.

Poor (0-49): Degraded site dominated by tolerant organisms - not attaining aquatic life use.

BMP/Action (Units)	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved-TMDL
Conewago Creek Sub-shed A							
Aggregated BMP Load Reductions				Total Nitrogen (LBS/YR)		9,659.00	
Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)	3,581.00	1,011.00	28
Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	1,672.00	761.00	46
Animal Trails and Walkways (Ac)		17.70					
Conservation Cover (Ac)		33.40					
Conservation Crop Rotation (Ac)	735.00	0.00	0				
Conservation Plan (Ac)		1,223.00					
Conservation Tillage (Ac)	802.00	1,172.00	146				
Contour Farming (Ac)	1,069.00	29.80	3				
Cover Crop (Ac)	869.00	109.00	13				
Diversion (Ac)	200.00	0.00	0				
Grassed Waterway (Ac)		186.50					
Grazing Planned Systems (Ac)	48.00	196.40	409				
Nutrient Management (Ac)	6,258.00	996.00	16				
Riparian Forest Buffer (Ac)	107.00	75.71	71				
Stream Channel Stabilization (Ft)	40,128.00	0.00	0				
Stream Exclusion with Grazing Land Management (Ft)	66,528.00	24,902.00	37				
Waste Storage Facility (UNITS)		3.00					
Access Road (Ft)		218.00					
Conewago Creek Sub-shed B							
Aggregated BMP Load Reductions				Total Nitrogen (LBS/YR)		18,149.00	
Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)	5,893.00	1,726.90	29
Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	1,497.00	975.70	65
Animal Trails and Walkways (Ft)		799.00					
Conservation Crop Rotation (Ac)	1,842.00	1,201.00	65				
Conservation Plan (Ac)		1,449.00					
Conservation Tillage (Ac)	1,105.00	1,207.00	109				
Cover Crop (Ac)	810.00	164.50	20				
Critical Area Planting (Ac)		0.46					
Diversion (Ac)	884.00	639.90	72				
Grassed Waterway (Ac)		1,268.50					
Grazing Planned Systems (Ac)	962.00	54.20	6				
Heavy Use Area Protection (Ac)	1.00	0.37	37				
Nutrient Management (Ac)	3,187.00	1,182.00	37				
Riparian Forest Buffer (Ac)	112.00	32.32	29				
Stream Channel Stabilization (Ft)	16,368.00	3,370.00	21				

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BMP/Action (Units)	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved-TMDL
Stream Exclusion with Grazing Land Management (Ft)	52,272.00	14,688.00	28				
Streambank & Shoreline Protection (Ft)	32,736.00	7,796.00	24				
Stripcropping (Ac)	1,842.00	644.00	35				
Terrace (Ft)	0.00	8,825.00					
Waste Storage Facility (Units)		1.00					
Wetland Restoration (Ac)		15.50					

Table D-17: A detailed listing of pollutant load reductions calculated for each specific action or BMP implemented in the Conewago Creek watershed.

Conowingo Creek – Lancaster County

§319 grant / project # (Project Completion Date if completed)	Pollutant Load Reductions		
	Nitrogen Lbs/yr	Phosphorus Lbs/yr	Sediment Tons/yr
2002 / 25 (9-30-04)	536	535	132
2006 / 30K (3-31-10) Design and permit only.	n/a	n/a	n/a
2008 / 21 (09-30-12)	337	169	168
2009 / 31A (09-30-12)	0	750	884
2012 / 13 (06-30-13)	2545	1274	1499
2013 / 23 (Open) Design and permit only.	n/a	n/a	n/a
Totals	3,418	2,728	2,683

Table D-18: A summary of pollutant load reductions calculated for various projects in the Conowingo Creek watershed.

Implementation Progress:

The Conowingo Creek Watershed TMDL was completed and approved in April 2001. The TMDL identifies load reduction goals for both phosphorus and sediment pollutants due to agricultural and other nonpoint sources of pollutants. The Donegal Chapter of Trout Unlimited completed the Conowingo Creek TMDL Implementation Plan (2006). The Plan identifies and prioritizes restoration project sites in the watershed. The majority of these sites involve work on stream bank stabilization and habitat restoration. The Conowingo Creek is included on PA’s 303 (d) list of impaired waters for nutrient and sediment pollutants. The majority of the watershed is comprised of agricultural land uses, which along with residential construction and transportation corridors, have contributed over time to stream channel degradation. The Donegal TU Chapter is working on stream restoration and riparian buffer projects, along with the PA Fish and Boat Commission. Agricultural work in the watershed is being coordinated through the USDA-NRCS and Lancaster County Conservation District. Most NPS Program funding to date have been used to complete high priority stream restoration projects and agricultural BMPs required to maintain landowner compliance with existing PA nutrient management and agricultural requirements.

Conowingo Creek Tracker Tool

Sub Watershed	BMP/Action (Units)	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved-TMDL
PA Conowingo1								
	Aggregated BMP Load Reductions				Phosphorus (LBS/YR)	5,866.00		
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	625.00		
	Conservation Tillage (Ac)	66.00	0.00	0				
	Grazing Planned Systems (Ac)	97.00	0.00	0				
	Riparian Forest Buffer (Ac)	119.00	0.00	0				
	Stream Exclusion with Grazing Land Management (Ft)	77,925.00	0.00	0				
	Streambank & Shoreline Protection (Ft)	63,274.00	0.00	0				
	Wetland Restoration (Ac)	9.00	0.00	0				
PA Conowingo2								
	Aggregated BMP Load Reductions				Phosphorus (LBS/YR)	9,136.00		
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	967.00		
	Access Road (Ft)	2,231.00	0.00	0				
	Conservation Plan (Ac)		482.00					
	Conservation Tillage (Ac)	10.00	580.00	0				
	Cover Crop (Ac)		459.00					
	Grazing Planned Systems (Ac)	11.00	0.00	0				
	Riparian Forest Buffer (Ac)	134.00	0.00	0				
	Stream Exclusion with Grazing Land Management (Ft)	84,941.00	0.00	0				
	Streambank & Shoreline Protection (Ft)	61,526.00	0.00	0				
PA Conowingo3								
	Aggregated BMP Load Reductions				Phosphorus (LBS/YR)	7,210.00		
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	680.00		
	Conservation Tillage (Ac)	140.00	0.00	0				
	Cover Crop (Ac)		748.00					
	Grazing Planned Systems (Ac)	62.00	0.00	0				
	Riparian Forest Buffer (Ac)	86.00	0.00	0				
	Stream Exclusion with Grazing Land Management (Ft)	64,277.00	0.00	0				
	Streambank & Shoreline Protection (Ft)	39,684.00	0.00	0				

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Sub Watershed	BMP/Action (Units)	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved-TMDL
PA Conowingo4								
	Aggregated BMP Load Reductions				Nitrogen (LBS/YR)			
	Aggregated BMP Load Reductions				Phosphorus (LBS/YR)	1,374.00		
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	149.00		
	Riparian Forest Buffer (Ac)	43.00	0.00	0				
	Stream Channel Stabilization (Ft)	7,800.00	459.00	6				
	Stream Exclusion with Grazing Land Management (Ft)	27,804.00	0.00	0				
	Streambank & Shoreline Protection (Ft)	15,800.00	1,385.00	9				
PA Conowingo5								
	Aggregated BMP Load Reductions				Nitrogen (LBS/YR)			
	Aggregated BMP Load Reductions				Phosphorus (LBS/YR)	5,265.00		
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	557.00		
	Grazing Planned Systems (Ac)	65.00	0.00	0				
	Livestock Stream Crossing (Units)	4.00	4.00	100				
	Nutrient Management (Ac)		90.00					
	Riparian Forest Buffer (Ac)	64.00	10.00	16				
	Stream Channel Stabilization (Ft)	19,123.00	5,500.00	29				
	Stream Exclusion with Grazing Land Management (Ft)	39,965.00	5,090.00	13				
	Streambank & Shoreline Protection (Ft)	38,247.00	11,000.00	29				
	Wetland Restoration (Ac)		0.67					
PA Conowingo6								
	Aggregated BMP Load Reductions				Nitrogen (LBS/YR)		1,911.20	
	Aggregated BMP Load Reductions				Phosphorus (LBS/YR)	5,265.00	329.50	6
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	557.40	146.50	26
	Barnyard Runoff Management (Units)		1.00					
	Livestock Stream Crossing (Units)		7.00					
	Riparian Forest Buffer (Ac)	49.00	0.00	0				
	Stream Channel Stabilization (Ft)	6,718.00	9,880.00	>100				
	Stream Exclusion with Grazing Land Management (Ft)	22,407.00	7,110.00	32				
	Streambank & Shoreline Protection (Ft)	13,435.00	19,534.00	>100				

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Sub Watershed	BMP/Action (Units)	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved-TMDL
PA ConowingoAll								
	Aggregated BMP Load Reductions				Total Nitrogen (LBS/YR)		25655.5	
	Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)		4166.1	
	Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)		1927.6	
	Barnyard Runoff Management (Ac)		3.30					
	Conservation Plan (Ac)		1,393.00					
	Conservation Tillage (Ac)		1,687.00					
	Cover Crop (Ac)		2,107.00					
	Diversion (Ac)		6.70					
	Grassed Waterway (Ac)		9.60					
	Nutrient Management (Ac)		1,509.00					
	Riparian Forest Buffer (Ac)		134.10					
	Stripcropping (Ac)		158.00					
	Stream Channel Stabilization (Ft)		15,889.00					
	Stream Exclusion with Grazing Land Management (Ft)		12,200.00					
	Streambank & Shoreline Protection (Ft)		31,919.00					
	Terrace (Ac)		354.00					
	Waste Management System (Units)		10.00					
	Wetland Restoration (Ac)		0.67					

Table D-19: A detailed listing of pollutant load reductions achieved as compared to TMDL load reduction goals in the Conowingo Watershed. The Pa ConowingoAll sub-watershed includes entire Conowingo Creek.

Mill Creek – Lancaster County

§319 grant / project # (Project Completion Date for closed projects)	Pollutant Load Reductions		
	Nitrogen Lbs/yr	Phosphorus Lbs/yr	Sediment tons/yr
1995 / 17 (02-20-98) No information provided.			
1999 / 59 (08-30-00) No information provided.			
2005 / 28 (09-30-08)	15,407	3,845	1,005
2005 / 29 (09-30-08)	864	431	431
2009 / 23 (09-30-11)	0	0	1,262
2010 / 15 (06-30-12)	536	268	315
2011/ 20 (Open)	868	434	684
2012 / 16 (Open)	964	482	567
Totals	18,639	5,460	4,264

Table D-20: A summary table listing pollutant load reductions resulting from various projects in the Mill Creek (Lancaster County) watershed.

Implementation Progress:

The Lancaster County Conservation District completed the Mill Creek Watershed Implementation Plan (2006). The Muddy Run (2001) and UNT to Mill Creek (2004) TMDLs were completed by the PA DEP. There is no TMDL for the main stem of Mill Creek watershed. The County Conservation District has focused most of its efforts on stream restoration projects, while the USDA-NRCS is working agricultural practices. The Mill Creek watershed has been on PA's 303(d) list of impaired waters since 1998 for agricultural sources of nutrients and sediment. The NPS Program, USDA-NRCS and other programs are assisting landowners with projects in the Mill Creek watershed. The Mill Creek Preservation Association is a local watershed group that is working with the Plain Sect community to protect and restore the Mill Creek. Many restoration projects have been constructed and finished in the watershed. These have resulted in significant nutrient and sediment load reductions in the Mill Creek.

Water Quality Observations on Mill Creek watershed

The Section 319 projects conducted within the Mill Creek Watershed of Lancaster County have not only protected over 3 miles of fragile streambanks from eroding away and causing natural resources concerns downstream they have also improved local fisheries through in-stream habitat structures. Working with the U.S. Fish & Wildlife Service and Millcreek Preservation Association the Lancaster County Conservation District has been conducting work within the Mill Cr. watershed and has not only seen improved water quality but an improved fishery for the community. Where the District has conducted 319 NPS projects fish populations have increased in locations by as much as 50% due to additional in-stream cover and improved water quality. On one site along the Mill Cr. fish populations have increased from 35 fish and three different species before work was initiated to 62 fish and 5 species after one year of implemented stream structures, bank regarding, streambank fencing and a riparian buffer and 128 fish and 7 species after two years of these habitat structures being adjacent to the stream. One might not feel fishery aspects are nearly as important as overall water quality but in the close-knit Amish and Mennonite community of the Mill Cr. watershed they view fishery improvements as community lynch pins and something they strive to improve."

BMP/Action (Units)	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved-TMDL
Mill Creek Sub-shed UNT0761							
Aggregated BMP Load Reductions	1.00	1.00		Total Nitrogen (LBS/YR)		2,170.50	
Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)	859.00	378.20	44.02
Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	228.00	121.60	53.30
Conservation Crop Rotation (AC)		163.40					
Conservation Tillage (AC)	585.00	640.00	>100				
Cover Crop (AC)	98.00	258.00	>100				
Livestock Stream Crossing (UNITS)		2.00					
Nutrient Management (AC)	349.00	326.10	93				
Planned Grazing System (AC)	110.00	4.80	5				
Riparian Forest Buffer (AC)	9.10	0.31	3				
Stream Exclusion with Grazing Land Management (FT)	13,728.00	0.00	0				
Streambank & Shoreline Protection (FT)	5,280.00	2,258.00	43				
Stripcropping (AC)	293.00	0.00	0				
Waste Storage Facility (UNITS)		5.00					
Mill Creek Sub-shed mainstem							
Aggregated BMP Load Reductions	1.00	1.00		Total Nitrogen (LBS/YR)	n/a	57,549.30	
Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)	n/a	4,384.40	
Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	n/a	1,946.30	
Barnyard Runoff Management (UNITS)	42.00	20.00	47				
Conservation Crop Rotation (AC)		469.50					
Conservation Plan (AC)		524.00					
Conservation Tillage (AC)	1,656.00	1,269.00	76				
Cover Crop (AC)	1,449.00	684.00	47				
Diversion (AC)		28.70					
Grassed Waterway (AC)	17.00	130.10	>100				
Livestock Stream Crossing (UNITS)		15.00					
Nutrient Management (AC)	3,765.00	1,136.30	30				
Planned Grazing System (AC)	495.00	150.00	30				
Riparian Forest Buffer (AC)	201.00	28.15	14				
Sediment Basin (UNITS)		1.00					
Stream Channel Restoration (Dam removal) (UNITS)		1.00					
Stream Channel Stabilization (FT)	50,688.00	15,300.00	30				

Table continued on next page.

BMP/Action (Units)	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved-TMDL
Stream Exclusion with Grazing Land Management (FT)	79,728.00	22,670.00	28				
Streambank & Shoreline Protection (FT)	101,376.00	33,983.00	33				
Stripcropping (AC)	1,656.00	177.50	11				
Waste Management System (UNITS)	22.00	11.00	50				
Waste Storage Facility (UNITS)	11.00	6.00	55				
Mill Creek Sub-shed Muddy Run							
Aggregated BMP Load Reductions	1.00	1.00		Total Nitrogen (LBS/YR)		2,756.80	
Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)	11,910.00	877.30	7.36
Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)	1,535.00	216.40	14.09
Barnyard Runoff Management (AC)	20.00	2.90	15				
Conservation Plan (AC)		690.00					
Conservation Tillage (AC)	544.00	884.00	>100				
Cover Crop (AC)	741.00	350.00	47				
Grassed Waterway (AC)	3.10	1.00	32				
Livestock Stream Crossing (UNITS)		3.00					
Nutrient Management (AC)	1,632.00	320.00	20				
Planned Grazing System (AC)	810.00	22.00	3				
Riparian Forest Buffer (AC)	25.00	0.38	2				
Stream Exclusion with Grazing Land Management (FT)	29,040.00	7,971.00	27				
Streambank & Shoreline Protection (FT)	17,952.00	2,800.00	16				
Stripcropping (AC)	1,324.00	42.60	3				
Waste Management System (UNITS)	10.00	13.00	>100				

Table D-21: A detailed listing of pollutant load reductions calculated per BMP or activity in the Mill Creek watershed as compared to target load reductions.

Mill Creek Mainstem sub-shed

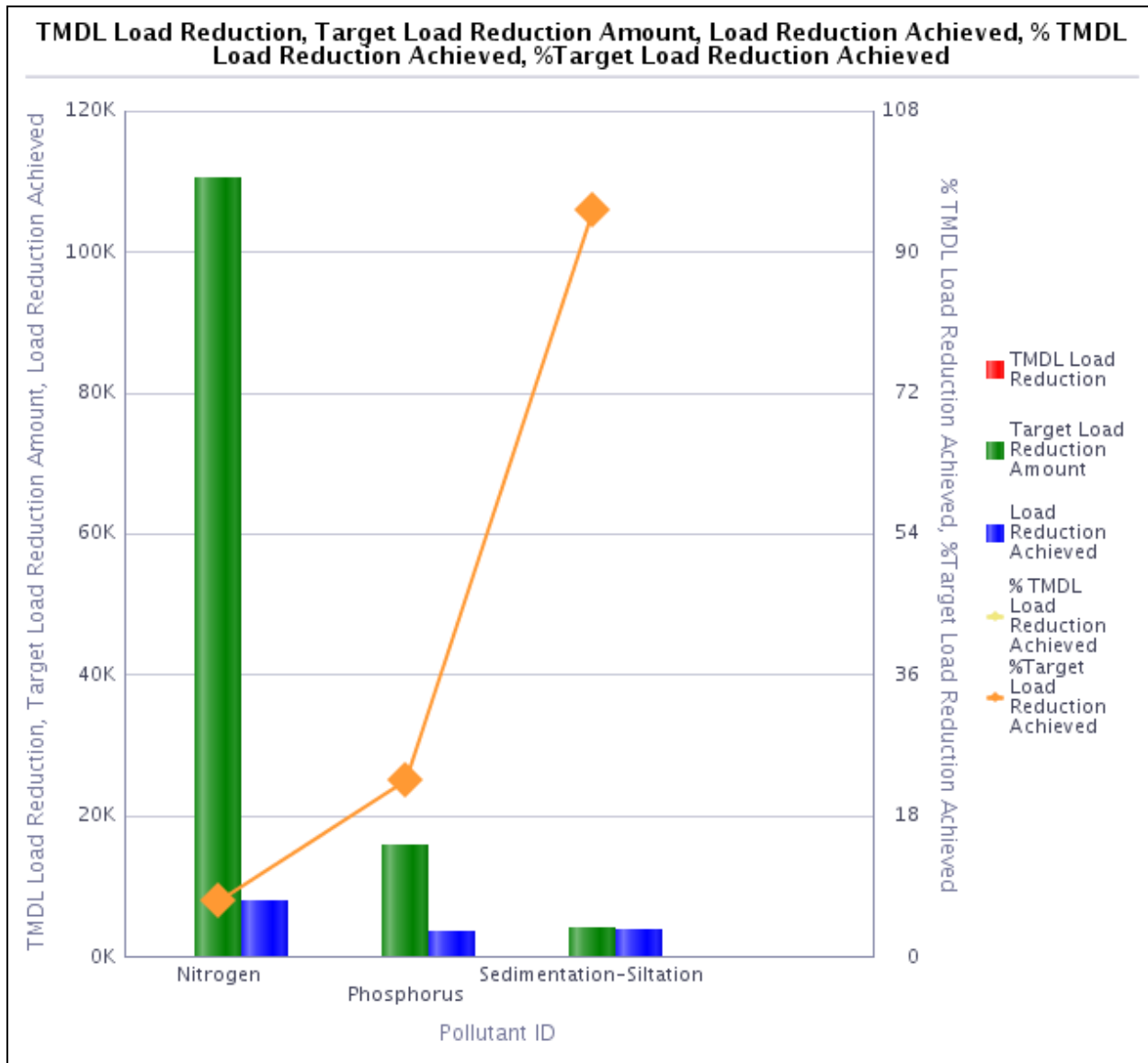


Figure D-9: A comparison of load reductions achieved (blue) as compared to TMDL related load reductions (red) and target load reductions (green) for the Mill Creek (Lancaster County) watershed.

Mill Creek Muddy Run sub-shed

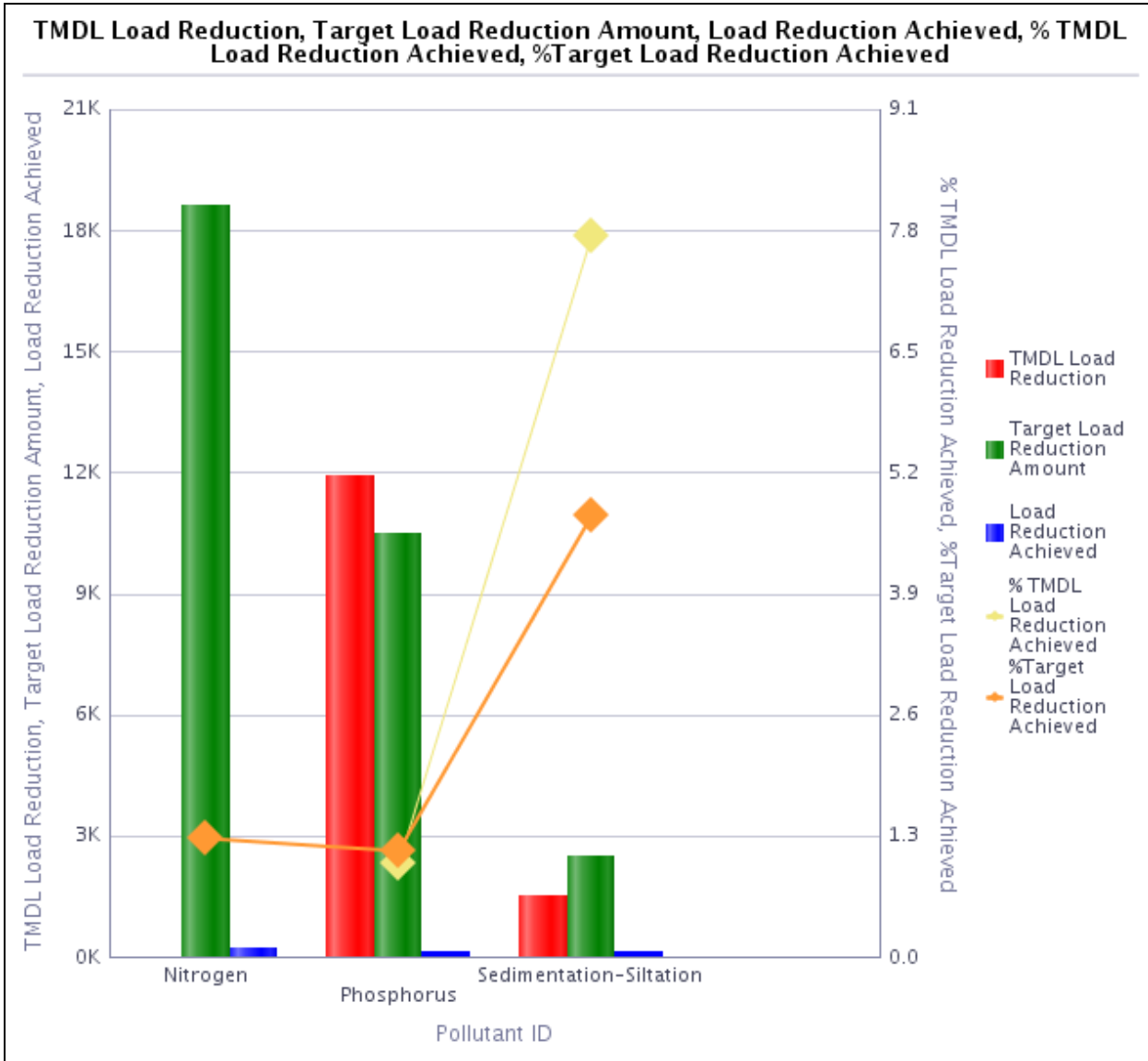


Figure D-10: Load Reductions achieved compared to TMDL and Target (WIP) Load Reduction Goals.

Mill Creek UNT0761 sub-shed

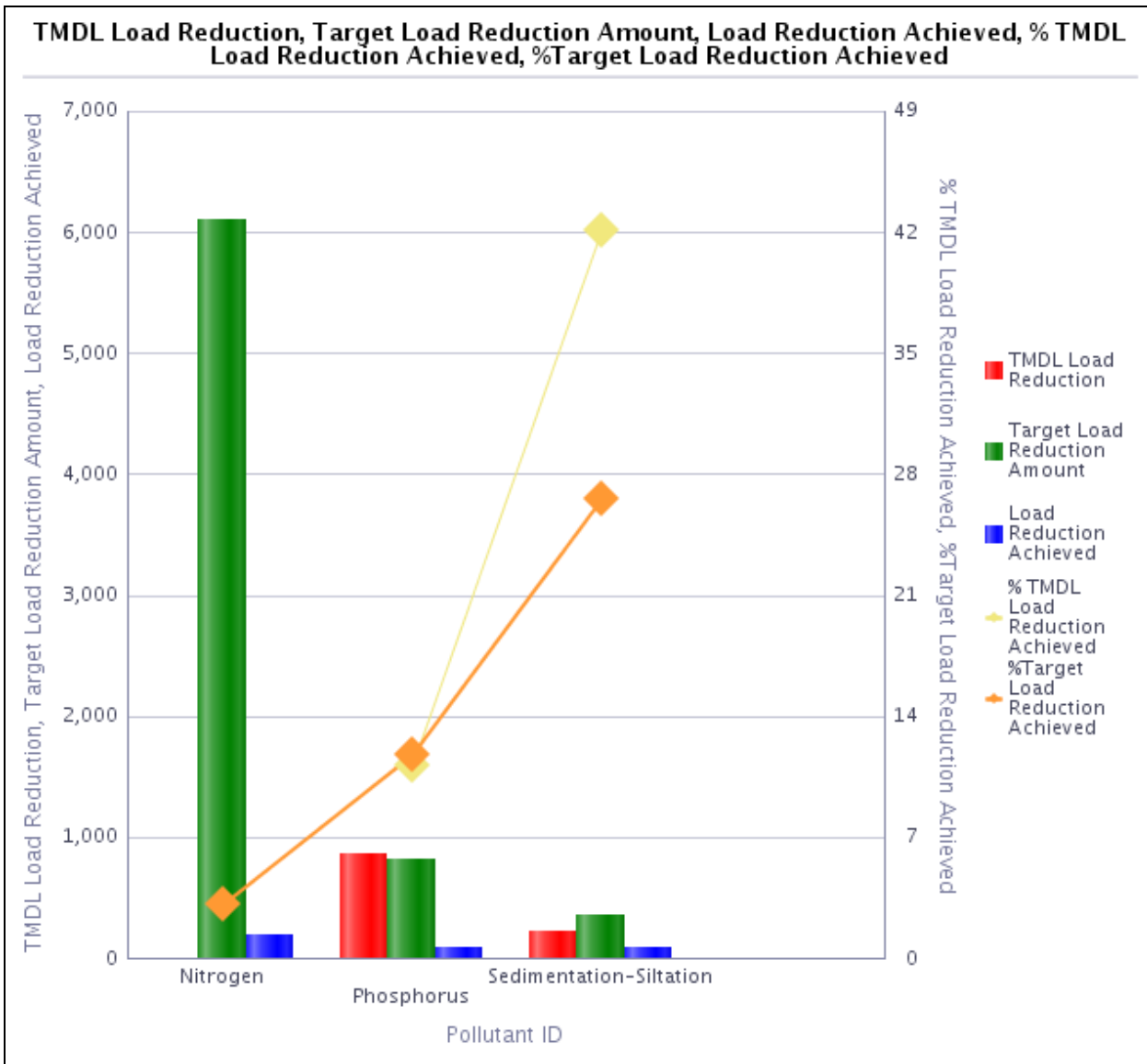


Figure D-11: Load Reductions achieved compared to TMDL and Target (WIP) Load Reduction Goals.

Mill Creek/Stephen Foster Lake – Bradford County

§319 grant / project # (Project Completion Date for completed projects)	Pollutant Load Reductions		
	Nitrogen Lbs/yr	Phosphorus Lbs/yr	Sediment Tons/yr
2001 / 51 (9-30-04)	187,313	72,588	216
2005 / 08 (12-31-05) LAKE ASSESSMENT only.	n/a	n/a	n/a
2006 / 08 (09-30-06) LAKE ASSESSMENT only.	n/a	n/a	n/a
2007 / 07 (12-31-07) LAKE ASSESSMENT only.	n/a	n/a	n/a
2007 / 22 (09-30-11)	0	5	0
2009/31K (09-30 13)	3315	1325	1325
Totals	190,628	73,913	1,541

Table D-22: A summary table listing pollutant load reductions calculated as resulting from the specified projects.

Implementation Progress:

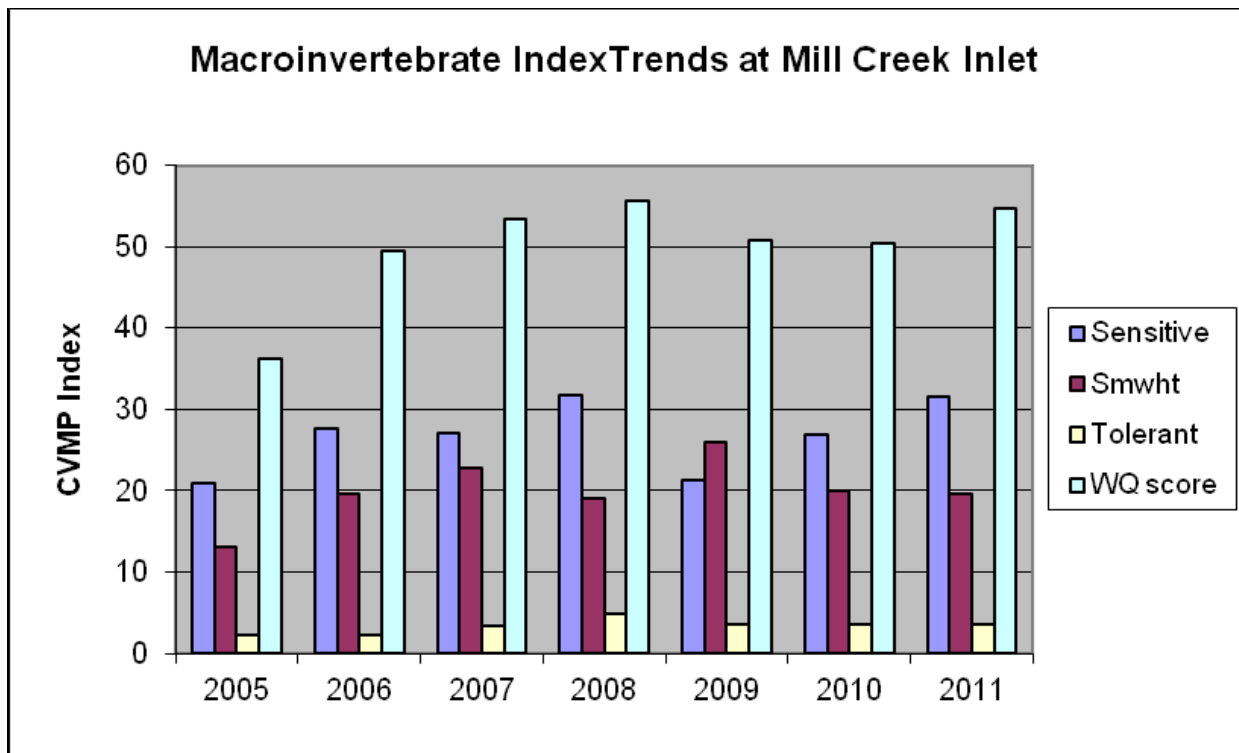
The Bradford County Conservation District completed the Mill Creek Watershed Implementation Plan (WIP) in July 2008. The WIP addresses Stephen Foster Lake in-lake nutrient loading problems and includes load reduction goals for both phosphorus and total suspended solids (TSS). The PA DEP developed the Stephen Foster Lake TMDL (2001).

Stephen Foster Lake is a popular recreational lake in Mount Pisgah State Park. Total suspended solids (TSS) and phosphorus impair the lake. These pollutants originate from upstream sources and from within the lake itself. In-lake sources of phosphorus are a large contributor to impairment. Mill Creek and Stephen Foster Lake have seen restoration ongoing for over 10 years under the leadership of the County Conservation District and the USDA-NRCS. Farmers in the watershed have accomplished significant agricultural BMP implementation since the early 2000's. Section 319 NPS and Growing Greener grants have been providing necessary funds for agricultural BMPs, stream restoration projects, and in-lake management measures to address existing water quality impairments.

Water Quality Observations in Mill Creek – Stephen Foster Lake

Efforts of the stakeholders have resulted in improved water quality conditions in Stephen Foster Lake as well as in Mill Creek. A significant reduction of phosphorus loading to the lake was detected by ongoing sampling of the watershed. A 2010 report completed by Princeton Hydro indicates that the total growing season phosphorus load has been reduced from a 1994 - 1995 average of approximately 3,750 lbs. to a 2005 - 2009 average of approximately 450 lbs.

Biological improvements are also notable at most of the monitored stations. Sensitive types of macroinvertebrates have increased at the lower end of Mill Creek where it flows into the lake (see bar chart below). The water quality rating follows: Good = Total score > 40; Fair = Total score between 20 and 40; Poor = Total score <20. Monitoring during the past 3 years have indicated that the indices have fluctuated but there has been improvement in the total water quality score which was below 40 in 2005 and reached 50 and above in subsequent years.



BMP/Action (Units)	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID (Units)	TMDL Load Reduction Goal	Modeled Load Reduction	% Load Reduction Achieved - TMDL
Aggregated BMP Load Reductions				Total Nitrogen (LBS/YR)		3,457.90	
Aggregated BMP Load Reductions				Total Phosphorus (LBS/YR)	1,341.00	537.70	40
Aggregated BMP Load Reductions				Sedimentation-Siltation (TONS/YR)		444.70	
Access Road (FT)	300.00	600.00	>100				
Barnyard Runoff Management (UNITS)		11.00					
Conservation Tillage (AC)		523.70					
Contour Farming (AC)		67.00					
Cover Crop (AC)		351.00					
Diversion (FT)		4,050.00					
Grazing Planned Systems (AC)		7.90					
Heavy Use Area Protection (UNITS)	12.00	11.00	92				
Livestock Stream Crossing (UNITS)		8.00					
Milking Center Wastewater Treatment System (UNITS)		7.00					
Nutrient Management (AC)		3,566.00					
Riparian Forest Buffer (AC)		243.10					
Spring Development (UNITS)		3.00					
Stream Channel Stabilization (FT)		4,630.00					
Stream Exclusion with Grazing Land Management (FT)		17,713.00					
Streambank & Shoreline Protection (FT)	6,900.00	11,670.00	>100				
Waste Management System (UNITS)	2.00	2.00	100				
Wetland Restoration (AC)		21.70					

Table D-23: A detailed listing of pollutant load reductions achieved for the listed BMPs or actions. Target load reductions are also listed.

Mill Creek and Stephen Foster Lake (Bradford County) Tracker Tool

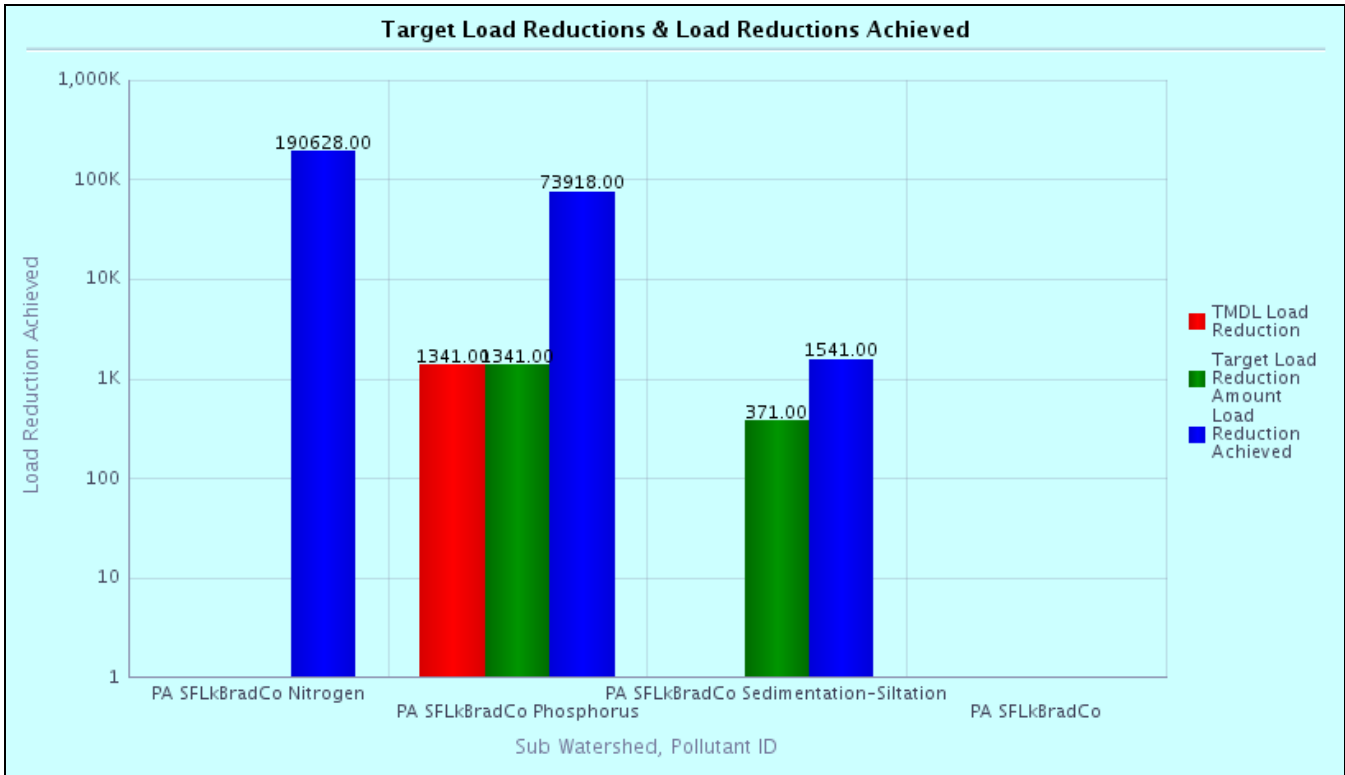


Figure D-12: Load Reductions Achieved compared to TMDL and Target (WIP) Load Reduction Goals.

Appendix E: NPS Program Status

E.1: Pending NPS Management Program Plan Update

In 2008, the Bureau of Conservation and Restoration (BCR) drafted an update to the Department's Nonpoint Source Program (Management Plan). That update provided five goals (listed previously in this report) that were to be the focus of the nonpoint source (NPS) abatement efforts in Pennsylvania. Federal Fiscal Year 2013 marks the final year for the implementation of that edition of the NPS Program. As of the writing of this Report, work has already begun to update the Management Plan. It is anticipated that, prior to the end FFY 2014 a draft version of the Management Plan will be available for review. It is anticipated that the Management Plan will renew and bolster the Commonwealth's efforts to affectively address all pertinent NPS pollution concerns through partnering, education, BMP implementation, and other regulatory avenues.

E.2: Program Challenges

Pennsylvania is a diverse Commonwealth. Four percent of the United States lives in Pennsylvania. Pennsylvania ranks among the highest of states in terms of population and population density. Pennsylvania is home to over 40,000 miles of state-owned roadway and over 86,000 miles of stream. Industry in PA is robust in a number of sectors; agriculture, energy, transportation, and warehousing are some of the most active industries in PA. An undeniable yet manageable side-effect to this combination of prolific roadways, abundant waterways and healthy industries is the constant presence of nonpoint source pollution. While some frustrated or otherwise misguided individuals may argue that a reversion back to "the days of the cavemen" is the only true solution to the pollution side-effect, such comments are defeatist and unrealistic at best. As is seen from the information provided herein, PA continues to find collaborative and mutually beneficial methods to address the non-point source pollution issue while providing a proper environment for healthy communities. In the guidance provided by the EPA regarding the drafting of this Report, it is stated that the states if they choose, may touch on the subject of "Program needs" when reporting on nonpoint source program activities. BCR and all those who collaboratively address NPS pollution in Pennsylvania are actively and affectively addressing non-point source pollution with the human and monetary resources to which they have access. Perhaps, given the size of the task faced by these Conservationists, the greatest challenge is having adequate time, money and manpower to fully address such an pervasive type of pollution.

Appendix F: Pennsylvania Nonpoint Source Management Program Funding

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

State Sources (FY)	FFY 2011	FFY 2012	FFY 2013
DEP	(\$ millions)	(\$ millions)	(\$ millions)
Conservation District Watershed Specialists	1.963	1.963	2.079
Environment Stewardship and Watershed Protection (Growing Greener):			
Watershed Protection Grants	9.720	12.458	18.008
AMD Set-aside Grants	0	0.252	0.406
Sub-total	11.683	14.673	20.493
DEP			
Chesapeake Bay Implementation Grant; State Fiscal Year Funding:			
Technical and Engineering Assistance	2.635	2.715	2.723
Special Projects	0.810	0.737	1.064
Sub-total	3.445	3.452	3.787
DEP			
Conservation District Fund Allocation Program	2.885	2.856	2.506
Dirt and Gravel Roads Pollution Prevention Program	3.528	3.528	3.528
Abandoned Mine Reclamation Program Annual Projects	0.620	0.335	2.605
PA Infrastructure and Investment Authority (PENNVEST) – Accepted Offers	34.029	20.971	3.712
Sub-total	41.062	27.690	12.351
PDA			
Nutrient Management Fund (Transfer)	0.830	0.755	2.714
Conservation District Fund Allocation Program	1.029	1.019	0.869
Resource Enhancement and Protection Tax Credits Available	10.000	10.000	10.000
Sub-total	11.859	11.774	13.583
Commonwealth Financing Authority			
Act 13 NPS Funding (WR and AMD projects)	0	0	10.959
Sub-total	0	0	10.959
State Funding Sub-total	68.049	57.589	61.173

Federal Sources (FFY)			
U.S. Environmental Protection Agency			
Section 319 Nonpoint Source Management Program	5.004	4.609	4.379
National Fish and Wildlife Foundation			
Chesapeake Bay Small Watershed Grant-annual Funding (PA-specific grants)	0.737	0.702	0.487
Chesapeake Bay Innovative Nutrient and Sediment Reduction Grant (PA-specific grants)	2.550	2.026	1.207
Sub-total	8.291	7.337	6.073
U.S.D.A. Natural Resources Conservation Service			
Obligated Funding Levels:			
Agricultural Management Assistance	0.700	0.168	0.280
Chesapeake Bay Watershed Initiative	19.400	15.533	9.100
Environmental Quality Incentive Program	13.500	18.636	21.100
Farm and Ranchland Protection Program	4.000	4.390	3.000
Conservation Stewardship Program (new contracts)	0.880	0.832	0.700
Conservation Stewardship Program (funds obligated to pay on prior year contracts)			6.200
Wetlands Reserve Program	8.600	10.000	4.750
Wildlife Habitat Incentive Program	0.800	0.892	2.280
Sub-total	47.880	50.451	47.410
U.S.D.A. Farm Services Agency			
Conservation Reserve Enhancement Program Includes Financial Incentives, Cost-Share and Rental Payments.	22.181	20.690	23.753
Biomass Crop Assistance Program	0.020	0.339	0.152
Grassland Reserve Program	0.160	0.148	0.618
Sub-total	22.361	21.177	24.523
Office of Surface Mining			
AML Reclamation Funding Includes AML, Clean Streams Initiative and Watershed Cooperative Agreement Program.	47.627	67.152	61.735
Sub-total:	47.627	67.152	61.735
Federal Funding Sub-total	126.159	146.117	139.741
Overall Annual Total			
	194.208	203.706	200.914