

**Pennsylvania Nonpoint Source Management Program
FFY2010 Annual Report**

October 1, 2009 through September 30, 2010



**Commonwealth of Pennsylvania
Department of Environmental Protection**

April 8, 2011

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EXECUTIVE SUMMARY

Pa's 2010 NPS Annual Report summarizes our efforts to implement the *NPS Management Program Plan-2008 Update* during the time frame October 1, 2009 through September 30, 2010. Pennsylvania's NPS Management Program Plan-2008 Update incorporates goals to address the U.S. Environmental Protection Agency's Strategic Plan for Water (Strategic Plan). The EPA's Strategic Plan, published in September 2003, includes seven criteria which state NPS programs are to use to help document success and measure water quality improvements:

1. Number of waters restored from all NPS program actions
2. Sediment load reductions
3. Nitrogen load reductions
4. Phosphorus load reductions
5. Section 319 funds used to restore water bodies
6. Watershed-based plans under development and being implemented, and
7. Watershed-based plans substantially implemented.

This report includes information addressing these criteria. Further information is available in the national Nonpoint Source Management Program's Grants Reporting and Tracking System (GRTS) database.

This report includes four sections, which address water quality improvements relating to fully restored and improving waters, progress in implementing Watershed Implementation Plans (WIPs), NPS Success Stories and Improving Watershed Stories and PA's NPS Management Program Plan-2008 Update accomplishments for the seven NPS categories.

NPS Pollution in Pennsylvania

Pennsylvania's 2010 Integrated List of All Waters (2010 Integrated List) provides the most current water quality information as it relates to NPS impairments. The 2010 Integrated List was still in draft status as of September 30, 2010 but is referenced in this report. The 2010 Integrated List includes information for the water quality assessments that have been completed for more than 84,867 miles of streams assessed for aquatic life uses, and 76,483 acres of lakes assessed for aquatic life uses.

A total of 68,320 assessed stream miles and 39,301 assessed lake acres support fishable and swimmable goals and the aquatic life use designation in Pennsylvania's water quality standards. Approximately 15,000 stream miles are identified as being impaired and not supporting the aquatic life use; these represent about 13% of the total stream miles assessed.

A total of 5,349 acres of lakes are impaired by specific pollutants and require a TMDL; these represent about 7.5% of lake acres assessed. Another 20,543 acres of lakes are impaired for aquatic life use by more general sources of pollution and do not require a TMDL; these represent about 27.9% of lake acres assessed.

The 2010 PA Integrated Water Quality Monitoring and Assessment Report documents about 16,121 miles of waters as having both point and nonpoint source impacts. Most of these water quality impairments are due to nonpoint sources of pollution. Abandoned mine drainage (AMD) and agricultural runoff continue to be the primary sources of NPS impairments in Pennsylvania waters.

Pennsylvania's NPS Management Program Plan

The current NPS Management Program Plan-2008 Update (Plan) is the guide we are using to implement our NPS Program through 2013 and perhaps beyond. The NPS Management Program homepage on the DEP web site, <http://www.dep.state.pa.us>, includes the Plan.

There are five Goals in the Plan. These goals drive NPS Management Program implementation and are the basis for reporting accomplishments for each of PA's approved NPS Management Program categories.

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 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.

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).

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 existing financial incentives, technical assistance, education and regulatory programs.

Restoring Lakes and Streams to Meet Designated Uses

Success Stories/Fully Restored Waters

Watershed Success Stories have been written in consultation with EPA Region III and EPA headquarters NPS Program staff. Pennsylvania has written four new watershed success stories over the past year. They will be included on the EPA National Success Story homepage under www.epa.gov and the DEP NPS Management Program homepage at <http://www.portal.state.pa.us/portal/server.pt?open=514&objID=554277&mode=2> when they are approved by the EPA..

Improving Waters Stories

Water quality improvements are also being documented in streams and lakes. Five new Improving Waters Stories have been written. These highlight restoration efforts where data documents significant water quality improvements. Each is published initially in an internal DEP report and later provides the basis of a Success Story once the water body delisting is approved. Pollutant load reductions achieved in each watershed are included.

Lakes

Nine lakes were approved for delisting as a result of state and local restoration efforts and changes to Pennsylvania’s dissolved oxygen standard. Information for these lakes is summarized in the report.

Nonpoint Source Load Reductions

Nonpoint source load reductions for all Section 319-funded NPS implementation projects are documented in the Grants Reporting and Tracking System (GRTS) database. This report includes a summary of cumulative nutrient, sediment and abandoned mine drainage (AMD) pollutant load reduction estimates for projects funded in the FFY2007 through FFY2010 Section 319 grants (all active grants).

Nutrient and Sediment Load Reductions

Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)
14,161	3,822	6,163

Abandoned Mine Drainage Load Reductions

Iron		Aluminum		Manganese		Acidity	
(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
281	51	357	65	59	11	1,199	219

Watershed Implementation Plan Progress

The report also includes Watershed Implementation Plan (WIP) progress. Thirty WIPs have been prepared and accepted by the EPA to date. Four more WIPs are being completed. All WIPs but one are actively being implemented by local project sponsors including county conservation districts and watershed associations.

This report includes a table summarizing Section 319 grants awarded and NPS load reductions reported in each of the 34 WIP watersheds. As requested by EPA Region III, a table showing BMP implementation rates and load reductions achieved from a variety of funding sources is included for 10 of Pennsylvania's most active WIP watersheds.

NPS Program Plan Accomplishments

The NPS Management Program-2008 Update goals are used to organize our FFY2010 accomplishments for Agriculture, Construction and Urban Runoff, Hydromodification, Lakes, Land Disposal, Resource Extraction and Silviculture pollution sources. A summary of accomplishments in each of these areas during 2010 is included. Also included is a table summarizing sources of funding for Pennsylvania's NPS Management Program

Challenges and Opportunities

The report concludes with a discussion of opportunities realized by the NPS Management Program to address concerns about decreasing funds and manpower by partnering with other organizations committed to restoring water quality in the streams and lakes of Pennsylvania.

SECTION ONE: WATER QUALITY IMPROVEMENTS

Over 84,867 miles of streams and rivers, 1,420 lakes and many acres of fresh water wetlands are located within the Commonwealth's borders.

According to the 2010 Pennsylvania Integrated Water Quality Monitoring and Assessment Report, 68,320 miles of the state's streams and rivers that are assessed for aquatic life uses are attaining that water use. Approximately 20% of the state's assessed streams and rivers are impaired for aquatic life uses, equaling about 16,973 miles. Waters having an approved TMDL constitute about 6,105 miles while impaired waters without having a TMDL but needing one constitute about 9,413 miles. Approximately 65 additional miles of streams and rivers are under compliance agreements and are expected to improve.

A few of the state's NPS Management Program accomplishments over the past year are included here. The federal Clean Water Act (CWA) Section 319 NPS Management Program, the Commonwealth's Growing Greener Environmental Stewardship Initiative, and other local, state and federal programs all contribute to the successful NPS Program.

Water bodies documented as showing signs of improvement and fully restored water bodies are included. Water quality improvements and fully restored water bodies are two of the EPA Performance Measures which Pennsylvania uses to help measure the success of its NPS Management Program Plan.

Integrated List of All Waters

The 2010 Integrated List of All Waters (Integrated List) includes all current water quality assessment program data. The Integrated List is included on the Pa DEP web site at www.dep.state.pa.us. Water quality information in the Integrated List is included in several lists which show how streams 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: Not Assessed
- List 4: Impaired for One of More Designated Uses, Not Needing a TMDL
- List 5: Pollutants and Needing a TMDL

NPS restoration efforts are primarily focused on water bodies that are included in Lists 4 and 5. This includes waters where a TMDL is approved or needs to be developed and where a watershed implementation plan (WIP) meeting the EPA's WIP criteria has been developed.

There are six primary nonpoint source impairments which continue to affect the Commonwealth's waters. These six impairments include abandoned mine drainage (AMD); agriculture; urban runoff/ storm sewers; road runoff; small residential runoff; and atmospheric deposition. Impairments due to abandoned mine drainage, agriculture and urban runoff/storm sewers continue to be the three major Aquatic Life Use impairments to

streams, while agriculture and atmospheric deposition (mercury) continue to be the two major Aquatic Life Use impairments to lakes. (See 2010 Integrated List)

Summary of Current Water Quality Information

Pennsylvania's Integrated Water Quality Monitoring and Assessment Report includes current water quality assessment information and is summarized using designated uses. There are four designated use categories: Aquatic Life; Fish Consumption; Recreational; and Potable Water Supply. The majority of nonpoint source restoration activities are targeted to water bodies that do not meet designated Aquatic Life uses.

STREAMS

Approximately 16,973 miles of streams assessed, or about 20% of total stream miles in Pennsylvania, are impaired for aquatic life uses. Approximately 68,320 miles of streams assessed support aquatic life uses. Detailed information on stream miles assessed and impaired stream miles is included in the 2010 Integrated List and is summarized below.

Water Quality Assessment Summary-Streams

	Aquatic Life Use	Fish Consumption Use	Recreational Use	Potable Water Supply Use
Stream (miles)				
Assessed	84867	4337	1397	2883
Supporting	68320	2430	701	2762
Impaired	9413	1195	688	107
* Approved TMDL	6105	712	8	14
Compliance	65	---	---	---
** Pollution	2580	---	---	---

*TMDL miles are only those overlapping impaired stream segments. A TMDL allocation may include an entire watershed and include streams listed as attained.

**Approximately 1,616 miles have both pollution and pollutant problems.

LAKES

Approximately 74,652 acres of Commonwealth lakes have been assessed for the aquatic life use. About 51% or 38,357 lake acres assessed are impaired. About 49% or 36,295 acres of lake acres assessed are supporting the aquatic life use. Detailed information on lake acres assessed and impairments are included in the 2010 Integrated List and are summarized below.

Water Quality Assessment Summary-Lakes

	Aquatic Life Use	Fish Consumption Use	Recreational Use	Potable Water Supply Use
Status (List)	Lake (acres)			
Assessed	76483	58295	79040	44933
Supporting (2)	39301	13942	73928	44921
Impaired (5)	5349	38870	5112	12
Impaired (4c)	20543	---	---	---
Approved TMDL (4a)	11290*	5483	---	---

* The Lake Jean TMDL for pH is not attaining so (248 acres) are no longer included in TMDL total. Dutch Fork Lake has a completed TMDL but has been breached so (87 acres) this is no longer impaired.

*Presque Isle Bay acres are included in the fish consumption and recreation use totals. The remainder of Lake Erie is not included in the pathogen and recreation acre totals.

Nonpoint Source Impaired Water Delistings

The two primary national goals which are included in the EPA Strategic Plan for Water and are used to measure progress in meeting water body improvements are:

**250 water bodies restored by 2008
and
700 water bodies restored by 2012**

These numbers are based on a baseline of 5,967 primarily NPS impaired water bodies. Pennsylvania has documented both fully restored and improving waters since the FFY2006 NPS Annual Report for purposes of documenting state progress in meeting these goals.

Tables included in this section document both fully restored waters and improving waters only. We no longer track partially restored waters as we did in FFY2008 and earlier NPS Annual Reports due to the length of time needed to document and approve a partial delisting or partially restored water body.

Fully Restored Waters

Water bodies fully restored from NPS pollution impacts are being tracked for purposes of helping to meet these goals. A fully restored water body is defined as a water body where all sources of impairment have been addressed and the water body has been fully restored. All designated uses are being achieved in a fully restored water body. Water bodies documented in this section have been approved for delisting and officially removed from the 2006 and 2008 Integrated Lists.

The following tables include information on both streams and lakes in Pennsylvania that have been documented as being fully restored.

Fully Restored Waters

FFY2006						
Water body Name and (County)	Sec. 319 \$ (Yes or No)	319 Grant / Project #	Impairment Source (Cause)	Year First Listed	HUC-8	NHD Reach Code
Manatawney Creek (Berks, Montgomery)	Yes	FFY2000/ 44	Agriculture (Nutrients, Organic Enrichment, Low D.O.)	1996	02040203	02040203000103
UNT to Manatawney Creek (Berks, Montgomery)	Yes	FFY2000/ 44	Hydromodification (Thermal Modification)	1996	02040203	02040203002507
FFY2008						
Semiconon Run (Butler)	No	none	AMD (Metals)	2002	05030105	05030105000787
Step Run (Clarion)	No	none	AMD (pH)	2006	05010005	05010005000441
FFY2009						
Babb Creek (Tioga)	Yes	none	AMD (Metals & pH)	1996	02050205	02050205000064
Gumboot Run (McKean)	No	none	AMD (pH)	2004	05010005	05010005000738
Lloydville Run (UNT to Bells Gap Run) (Blair & Cambria)	No	none	AMD (Metals, pH & Siltation)	2002	02050302	02050302000621
Sterling Run (Centre)	No	none	AMD (Metals, pH & Siltation)	1996	02050201	02050201000511

Fully Restored Waters

FFY2010						
Water body Name and (County)	Sec. 319 \$ (Yes or No)	319 Grant / Project #	Impairment Source (Cause)	Year First Listed	HUC-8	NHD Reach Code
Lake Jean (Luzerne and Sullivan Counties)	No	none	Low pH (atmospheric deposition)	1996	02050107	02050107001824
Johnson Run (Elk County)	No	none	AMD (Metals & pH)	2004	05010005	05010005000766
Little Coon Run (Clarion County)	No	none	AMD (Metals & pH)	2004	05010003	05010003001084
Miller Run (Huntingdon County)	Yes	FFY2002/ 17 FFY2004/ 19 FFY2005/ 21	AMD (Metals & pH)	1996	02050303	02050303000242

Improving Waters

Improving waters are shown in the table following this narrative. This table includes all waters that are primarily nonpoint source impaired and where water quality is being documented as improving. As more current water quality and macroinvertebrate data is gathered we will be able to document long-term improvements and waters now classified as improving waters may eventually be listed as fully restored waters when all nonpoint source problems have been corrected.

Stream Improvements

Water quality improvements can occur both through natural processes and as a result of long term efforts to restore polluted watersheds. Water quality improvements are documented by sampling stream chemistry and the return of aquatic species, i.e. macroinvertebrates or fish, to a stream ecosystem.

Several steps are involved in the process of verifying water quality improvements in streams, as outlined in Steps 1 through 3 below.

1. Referral and data collection

DEP's NPS Program staff works with conservation district watershed specialists, DEP regional offices, DEP district mining offices, DEP Bureau of Abandoned Mine Reclamation offices and the Eastern and Western Pennsylvania Coalitions for Abandoned Mine Reclamation, among others, to identify streams that may be improving as the result of local restoration efforts. Any available monitoring data is collected to allow a preliminary determination of the effectiveness of BMPs installed in the watershed. Following this initial review, a list of water bodies considered to be candidates for reassessment is provided to the DEP Water Quality Standards Division for their evaluation.

2. Stream Sampling

DEP water pollution biologists choose sampling locations and visit each water body on the list to determine if further sampling is warranted. Water bodies that appear to be minimally impaired are then subject to a chemical and biological sampling protocol that requires seven additional visits. After this sampling is completed and the data is analyzed, the water body is considered for removal from the State's list of impaired waters.

3. Removal from the List of Impaired Waters

Three Options:

(1) Stream conditions still exceed all water quality criteria.

The stream will not be eligible for delisting. Streams that are not revisited will be tracked for a revisit in the future (up to 5 years later) to determine if water quality has improved. These water bodies do not appear on any of the following tables.

(2) Stream conditions still exceed some water quality criteria, but attain one or more.

The stream may be eligible for delisting for one or more causes of impairment, and an “*Improving Watershed Story*” may be written to summarize the basic details of the case. New Improving Waters Stories written by Pennsylvania NPS Program staff are included in another part of this report.

(3) Stream conditions attain all water quality criteria.

The water body can be removed from the impaired streams list for all causes of impairment. At this point a “*Success Story*” will be written and submitted to EPA headquarters for posting on their web site at <http://www.epa.gov/nps/success/>.

Improving Waters

FFY2010						
Water body and (County)	Sec. 319 funds Used (Yes or No)	319 Grant / Project Number	Impairment Source and (Cause)	Year First Listed as Impaired	HUC-8	NHD Reach Code
Elmhurst Reservoir (Lackawanna)	No	none	Other/organic enrichment (low D.O., high pH)	2002	02050107	02050107001748
Stephen Foster Lake (Bradford)	Yes (314)	FFY2001/ 51 FFY2007/ 22	Agriculture (nutrients and suspended solids)	1996	02050106	02050106000500
Shoup Run (Huntingdon)	Yes	FFY2005/ 18 FFY2005/ 19 FFY2006/ 18 FFY2007/ 13	AMD (pH & metals)	1996	01187608	02050303000302
Middle Creek (Schuylkill)	No	none	AMD (metals)	1996	01168010	02050305001808
Pierceville Run (York County)	Yes	FFY1999/ 22 FFY2003/ 33	Agriculture (siltation and flow alterations)	2002	01183704	02050306001164

Lake Improvements

Section 314 of the Clean Water Act focuses on lakes. Clean Lakes initiatives since 1995 have been funded through Section 319. Public and non-public lake initiatives have also been funded through Pennsylvania's Growing Greener Program. Other funding sources used for assessment and restoration of lakes include EPA's special 106 appropriation funds, the Natural Resources Conservation Service (NRCS) PL566 program, and other programs such as the Chesapeake Bay Program, and PENNVEST (Clean Water State Revolving Funds).

Pennsylvania has approximately 1,500 lakes and reservoirs that total about 161,000 acres, with 373 lakes open to the public, 150 within 72 different State Parks. Boating, fishing, swimming and other recreational activities are typically integral to a lake community. PA's lake management regulation is codified in the Department of Environmental Protection's Rules and Regulations, Section 95.6- Discharges to Lakes, Ponds and Impoundments, which sets forth treatment requirements for point source discharges necessary to control eutrophication. As aquatic life, recreational, potable water resources, and fish consumption sources, lakes need to be protected and maintained for these resources be fully usable in the future.

The challenge in lake management is to involve the stakeholders in the watershed to prevent nonpoint source pollution and maintain the riparian habitat, as well as to identify and permit in-lake practices that can mitigate lake problems while the watershed is restored. Following reassessments after BMP installation in a number of lake watersheds, a few lakes, amounting to 1,859 acres, were delisted (re-listed) on Pennsylvania's 2010 Integrated List of All Waters (2010 Integrated List).

Some of the changes in delisting (re-listing) are due to the application of the dissolved oxygen standard in Pennsylvania's *Chapter 93. Water Quality Standards* which was changed in 2005. Other changes are due to documented water quality improvements. Many of these improvements are the result of NPS best management practices that have been installed in the watersheds.

The 2010 Integrated List categories involved in the delisting (re-listing) process are shown below. The delisting process is continuing with a number of lakes targeted for delisting in 2012.

- List 5 - 'Impaired Needing a TMDL'**
- List 4C - 'Impaired by Pollutants but not needing a TMDL'**
- List 2 - 'Meeting Some Uses but not all Uses Assessed'**
- List 1 - 'Meeting All Designated Uses'**

The final 2010 Integrated List lakes reclassification status is shown in the following table.

Lakes Reclassified in 2010 Integrated List of All Waters

NHD Stream Reach Code	Name of Lake (County)	List Change	Acres	Listing Date
02050107001748	Elmhurst Reservoir (Lackawanna)	4C to 2	174	2002
02050306002293	Lake Redman (York)	4C to 2	253	2006
02040101001467	Duck Harbor Pond (Wayne)	5 to 1	210	2006
02050107001824	Lake Jean (Luzerne, Sullivan)	5 to 2	245	1996
02050302002569	Greenwood Lake (Huntingdon)	5 to 2	5	2008
02050306002248	Pinchot Lake (York)	5 to 2	358	2008
02040103001075	Promised Land Upper (Pike)	4C removed pH; DO remains as "natural"	468	2002
02050306002286	Muddy Run Reservoir (Lancaster)	5 to 2	98	2002
02040103001011	White Deer Lake (Pike)	5 to 4C	48	2006
Total Acres:			1,859	

Nonpoint Source Pollutant Load Reductions

Nonpoint source load reductions for Section 319 projects only are included here. We have brought together all data for nutrient, sediment and abandoned mine drainage (AMD) projects for the FFY2007 through FFY2010 319 grants.

Post-BMP implementation load reductions only are included in these figures, meaning only BMPs that have been fully implemented and are functioning as designed are accounted for here. There are many projects in the DESIGN stages for which we have not included load reduction estimates in this report.

Nitrogen, phosphorus, sediment and abandoned mine drainage reductions are included in the two tables on the following pages. Nitrogen and phosphorus reductions are reported in pounds/year while sediment reductions are reported in tons/year. All AMD project pollutant load reductions are reported in Units of Measure of pounds per day. This measure is consistent with that used in Pennsylvania's TMDLs written for AMD impaired watersheds.

This information is also included in the national NPS Program's Grants Reporting and Tracking System (GRTS) database. The database may represent a better picture of load reductions that is shown in this report since project records are continually being updated and data is changing as BMPs are documented in the system.

FFY2007 through FFY2010 Nonpoint Source Load Reduction Estimates

	Nitrogen	Phosphorus	Sediment
	(lbs/year)	(lbs/year)	(tons/year)
Grant Year			
2007	3,551	1,036	3,548
2008	10,610	2,036	239
2009	0	750	2,376
2010	0	0	0
Totals	14,161	3,822	6,163

	Iron (Fe)		Aluminum (Al)		Manganese (Mn)		Acidity	
	(lbs/day)	(tons/year)	(lbs/day)	(tons/year)	(lbs/day)	(tons/year)	(lbs/day)	(tons/year)
Grant Year								
2007	281		288		59		1,199	
2008	0		0	0	0	0	0	0
2009	0		69		0		0	
2010	0		0		0		0	
Totals	281	51.3	357	65.1	59	10.8	1,199	218.8

All estimates are from the NPS Program GRTS database and are cumulative for each grant year. Numbers reflect estimates as of January 2011.

SECTION TWO: WATERSHED IMPLEMENTATION PLAN PROGRESS

Pennsylvania's NPS Management Program has supported a watershed-based planning effort since FFY2003 through the development of Watershed Implementation Plans (WIPs). All of the WIPs have been developed for watersheds with NPS impairments where there are active watershed groups and where data are available from previous studies.

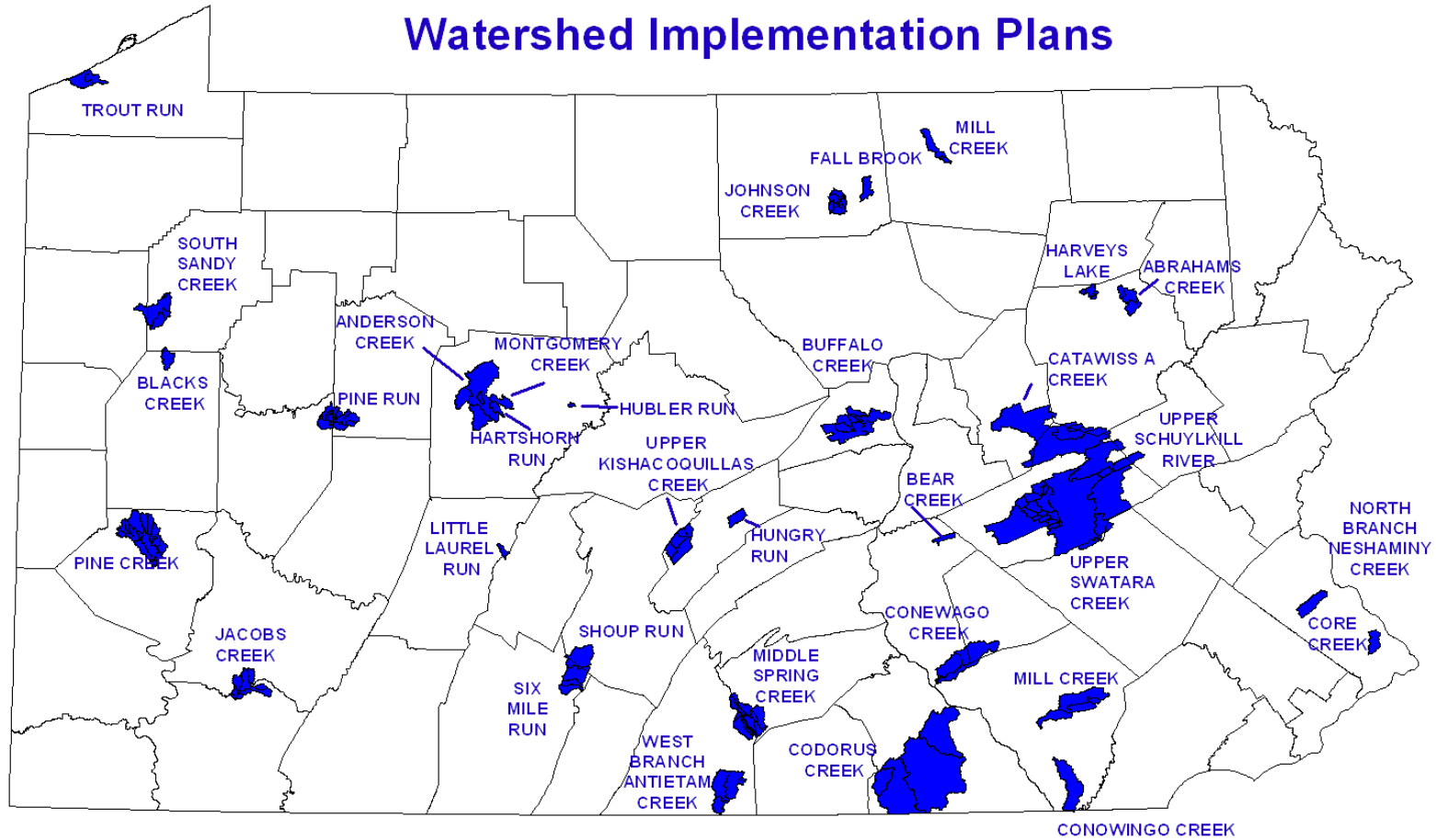
This section of the report includes progress made to date in the implementation of all completed WIPs. The tables included in this section provide project specific information for each of the WIPs. Ten WIPs are covered in more detail. Six of these are related to AMD, three are related to agriculture and one addresses both in-lake and agriculture sources of pollutants.

The DEP Nonpoint Source Management Program web site includes the final products for all completed WIPs. To find a specific WIP report on the Pa DEP web site www.dep.state.pa.us, under the WATER topics tab first select the Nonpoint Source Management Program and then look under 'Program Initiatives' for the 'Watershed Implementation Plans' listing.

The number of WIPs developed and implemented through September 30, 2010 is reported as a measure of progress. Thirty WIPs have been completed and accepted by the EPA. All but one completed WIP are being implemented. Four Section 319-funded WIPs are still being developed. There are several additional WIPs being developed that are not using Section 319 funding.

All Section 319-funded WIPs are located on the map on the following page. This map has not changed significantly since the last annual report. The only difference for the FFY2010 report is that several more of the Plans have been completed.

EPA 319 Section Watershed Implementation Plans



□ Counties
■ Watershed Planning Areas



Watershed Implementation Plans Completed - Abandoned Mine Drainage

Catawissa Creek – Columbia and Schuylkill Counties

Watershed	S. 319 Grant/ Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Catawissa Creek	1999 / 17 (09-30-2001)	No data available.			
	2001 / 55 (02-28-2003)	Design Only			
	2004 / 17 (09-30-2007)	Design Only			
	2005 / 45A (09-30-2007)	3,366	158	229	29
	2006 / 19 (09-30-2007)	No data available			
	2007 / 17 (03-31-2010)	233.8	1.0	11.9	4.1
Totals		3,599.8	159	240.9	33.1

Implementation Progress:

The TMDL for Catawissa Creek developed by the Susquehanna River Basin Commission (SRBC) was approved by the EPA in May 2003. The Addendum to the Catawissa Creek Watershed Restoration Plan (the WIP) was completed in 2005. Prior to this date, some work had been done in the watershed to address the primary sources of AMD pollution. Several projects have been initiated since the completion of the WIP, including those listed above. The Catawissa Creek TMDL identified load reduction goals for acidity, iron and aluminum in order to meet water quality objectives. These goals are being addressed by implementing the Section 319 NPS projects identified and other projects.

Catawissa Creek Implementation and Load Reductions Amounts

TMDL Point	BMP/Action	Unit	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID	Unit	Load Reduction Goal	Load Reduction Achieved	% Load Reduction Achieved
Audenreid Tunnel - Main Stream Catawissa	AMD-Passive Treatment System	UNITS	1	1	100	Acidity	(lbs/day)	6869.1	3366	49
						Metals (Aluminum)	(lbs/day)	767.4	229	30
						Metals (Iron)	(lbs/day)	14.2	158	100
						Metals (Manganese)	(lbs/day)	170.2	29	17
Catawissa Tunnel - Main Stream Catawissa	AMD-Passive Treatment System	UNITS	1	0	0	Acidity	(lbs/day)	113.5	0	0
						Metals (Aluminum)	(lbs/day)	6	0	0
						Metals (Iron)	(lbs/day)	2.9	0	0
						Metals (Manganese)	(lbs/day)	0	0	0
Green Mountain Tunnel - Main Stream Catawissa	AMD-Passive Treatment System	UNITS	1	0	0	Acidity	(lbs/day)	310	0	0
						Metals (Aluminum)	(lbs/day)	31.7	0	0
						Metals (Iron)	(lbs/day)	2.5	0	0
						Metals (Manganese)	(lbs/day)	0.3	0	0
Oneida #3 Tunnel - Tomhicken Creek	AMD-Passive Treatment System	UNITS	1	1	100	Acidity	(lbs/day)	492	233.8	48
						Metals (Aluminum)	(lbs/day)	36	11.9	33
						Metals (Iron)	(lbs/day)	0	1.02	100
						Metals (Manganese)	(lbs/day)	15	4.1	27

Shoup Run – Huntingdon County

Watershed	S. 319 Grant/ Project #s (Completed Projects)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Shoup Run	2002 / 17 (3-8-2004)	183	2	20	2.5
	2004 / 19 (9-30-2007)	144	0.5	11.4	4
	2005 / 18 (9-30-2008)	6	0	1	0
	2005 / 19 (9-30-2008)	27	0	3	0
	2005 / 21 (9-30-2008)	No data available			
	2006 / 18 (03-31-2010)	94.2	0	0.6	1.2
	2007 / 13 (09-30-2010)	39.3	0	4.7	0.9
Totals		360	2.5	40.7	8.6

Implementation Progress:

The TMDL for Shoup Run was completed in February 2001, along with TMDLs for several other small nearby watersheds. The TMDL was approved by the EPA in April 2001. The Shoup Run watershed is listed on the State’s impaired streams list because it is impacted by metals and low pH. The TMDL set goals for several AMD pollutants, including aluminum and acidity. The Shoup Run Watershed Restoration Plan (the WIP) was completed in 2005. To date, several Section 319-funded AMD remediation projects have implemented in the watershed. Restoration projects have so far been successful in addressing the TMDL and WIP implementation goals by reducing aluminum and acidity loadings in Shoup Run. Additional projects are underway and should provide additional load reductions as they are being implemented.

Shoup Run Implementation and Load Reduction Amounts

TMDL Point	BMP/Action	Unit	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID	Units	Load Reduction Goal	Load Reduction Achieved	% Load Reduction Achieved	
Dudley	AMD-Passive Treatment System	UNITS	1	0	0						
	Aggregated BMP Load Reductions					Metals (Aluminum)	(lbs/day)	129.6	0	0	
							Metals (Iron)	(lbs/day)	0	0	0
							Metals (Manganese)	(lbs/day)	88	0	0
HR-1	AMD-Passive Treatment System	UNITS	1	1	100						
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	94	94	100	
							Metals (Aluminum)	(lbs/day)	1.2	0.63	53
							Metals (Iron)	(lbs/day)	0.3	0.1	33
							Metals (Manganese)	(lbs/day)	3.6	1.19	33
MR-1	AMD-Passive Treatment System	UNITS	3	3	100						
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	327	327	100	
							Metals (Aluminum)	(lbs/day)	10.3	31.4	100
							Metals (Iron)	(lbs/day)	2.5	2.5	100
							Metals (Manganese)	(lbs/day)	2.6	6.5	100
SR-1	AMD-Passive Treatment System	UNITS	1	1	100						
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	103	72.3	70	
							Metals (Aluminum)	(lbs/day)	198.3	8.71	4
							Metals (Iron)	(lbs/day)	6.3	0	0
							Metals (Manganese)	(lbs/day)	129.2	0.87	1

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

Watershed	S. 319 Grant/Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Six Mile Run/Sandy Run/Longs Run	2004 / 20 (09-30-2006)	0	67	5	0
	2005 / 12 (09-30-2008)	0	0.2	0	0
	2005 / 13 (09-30-2008)	18	0.4	1.6	0
	2006 / 12 (09-30-2008)	Design Only			
	2006 / 13 (09-30-2009)	145	10	11	0
	2006 / 14 (09-30-2009)	Design Only			
	2006 / 15 (09-30-2008)	27	0.2	2	0
	2006 / 16 (09-30-2008)	Design Only			
	2006 / 30A (12-31-2009)	Design Only			
	2006 / 30B (09-30-2009)	Design Only			
	2007 / 10 (09-30-2009)	63	9	5	0.2
	2007 / 11 (Ongoing)	0	0	0	0
	2007 / 12 (09-30-2009)	15	3	2	1
	2008 / 10 (Ongoing)	0	0	0	0
	2008 / 11 (Ongoing)	0	0	0	0
	2008 / 12 (Ongoing)	Design Only			
	2009 / 14 (Ongoing)	Design Only			
	2010 / 09 (Ongoing)	0	0	0	0
	2010 / 10 (Ongoing)	0	0	0	0
Totals		268	89.8	26.6	1.2

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, including iron, aluminum and acidity. Significant project implementation has taken place in the Six Mile Run, Sandy Run and Longs Run watersheds. These projects are partially meeting the TMDL load reduction goals that have been developed for both the Longs and Sandy Run TMDL (metals and pH) and the Six Mile Run TMDL (metals and pH). Several additional projects are either in the design stage or are just beginning implementation.

Six Mile Implementation and Load Reduction Amounts

TMDL Point	BMP/Action	Unit	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID	Unit	Load Reduction Goal	Load Reduction Achieved	% Load Reduction Achieved
Site 54	AMD-Passive Treatment System	UNITS	1	0	0					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	145.7	63	43
						Metals (Aluminum)	(lbs/day)	2.7	5	100
						Metals (Iron)	(lbs/day)	79.2	9	11
						Metals (Manganese)	(lbs/day)	0.2	0.2	100
Site 55	AMD-Passive Treatment System	UNITS	2	2	100					
	Aggregated BMP Load Reductions					Metals (Aluminum)	(lbs/day)	2.8	0	0
						Metals (Manganese)	(lbs/day)	4.5	0	0
Site 57	AMD-Passive Treatment System	UNITS	1	1	100					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	0	17.7	100
						Metals (Aluminum)	(lbs/day)	4.8	1.6	33
						Metals (Iron)	(lbs/day)	0.4	0.4	100
Site 58	AMD-Passive Treatment System	UNITS	1	1	100					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	139.7	15	11
						Metals (Aluminum)	(lbs/day)	2.8	2	71
						Metals (Iron)	(lbs/day)	3	3	100
						Metals (Manganese)	(lbs/day)	1	1	100
Site 59	AMD-Passive Treatment System	UNITS	1	0	0					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	45.2	0	0
						Metals (Aluminum)	(lbs/day)	3	0	0
						Metals	(lbs/day)	3.5	0	0

						(Manganese)					
Site 50	AMD-Passive Treatment System	UNITS	6	0	0						
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	718.9	0	0	
						Metals (Aluminum)	(lbs/day)	107.7	0	0	
						Metals (Iron)	(lbs/day)	0	0	0	
						Metals (Manganese)	(lbs/day)	28.3	0	0	
Site 53	AMD-Passive Treatment System	UNITS	1	0	0						
	Aggregated BMP Load Reductions					Metals (Iron)	(lbs/day)	74.2	0	0	
						Acidity	(lbs/day)	0	0		
						Metals (Aluminum)	(lbs/day)	0	0		
						Metals (Manganese)	(lbs/day)	0	0		
Site 56	AMD-Passive Treatment System	UNITS	3	3	100						
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	308.7	464	100	
						Metals (Aluminum)	(lbs/day)	72.7	35.2	48	
						Metals (Iron)	(lbs/day)	4.7	6.37	100	
						Metals (Manganese)	(lbs/day)	7.8	0	0	
Site 68	AMD-Passive Treatment System	UNITS	5	3	60						
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	886.6	252.3	28	
						Metals (Aluminum)	(lbs/day)	65.9	18.7	28	
						Metals (Iron)	(lbs/day)	0	21.6	100	
						Metals (Manganese)	(lbs/day)	2.1	0.44	21	

Sandy Run Implementation and Load Reduction Amounts

TMDL Point	BMP/Action	Unit	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID	Unit	Load Reduction Achieved	Load Reduction Achieved	% Load Reduction Achieved
Site 64	AMD-Passive Treatment System	UNITS	6	0	0					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	2077	0	0
						Metals (Aluminum)	(lbs/day)	168.1	0	0
						Metals (Iron)	(lbs/day)	180.5	0	0
						Metals (Manganese)	(lbs/day)	24.7	0	0
Site 67	AMD-Passive Treatment System	UNITS	3	0	0					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	0	0	
						Metals (Aluminum)	(lbs/day)	0	0	
						Metals (Iron)	(lbs/day)	0	0	
						Metals (Manganese)	(lbs/day)	0	0	
Site 69	AMD-Passive Treatment System	UNITS	11	0	0					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	500.5	0	0
						Metals (Aluminum)	(lbs/day)	33.2	0	0
						Metals (Iron)	(lbs/day)	66.4	0	0
						Metals (Manganese)	(lbs/day)	0.8	0	0

Longs Run Implementation and Load Reduction Amounts

TMDL Point	BMP/Action	Unit	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID	Unit	Load Reduction Goal	Load Reduction Achieved	% Load Reduction Achieved
Site 61	AMD-Passive Treatment System	UNITS	8	7	88					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	174.8	47.63	27
						Metals (Aluminum)	(lbs/day)	14.1	3.49	25
					Metals (Iron)	(lbs/day)	5.52	5.52	100	
					Metals (Manganese)	(lbs/day)	8	0	0	
Site 62	AMD-Passive Treatment System	UNITS	2	2	100					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	38.5	69.6	100
						Metals (Aluminum)	(lbs/day)	0.3	1.59	100
						Metals (Iron)	(lbs/day)	24	24	100
					Metals (Manganese)	(lbs/day)	0.1	0	0	
Site 63	AMD-Passive Treatment System	UNITS	3	3	100					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	47.8	47.8	100
						Metals (Aluminum)	(lbs/day)	1.64	1.64	100
						Metals (Iron)	(lbs/day)	31.1	41.96	100
					Metals (Manganese)	(lbs/day)	0	0		

Little Laurel Run – Cambria County

Watershed	S. 319 Grant/Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Little Laurel Run	2005 / 15 (9-30-2008)	166	30	1.4	0
	2007 / 14 (9-30-2009)	75	6	4	0
	2008 / 17 (Ongoing)	Design only			
	2010 / 08 (Ongoing)	0	0	0	0
Totals		241	36	5.4	0

Implementation Progress:

Little Laurel Run is tributary to Clearfield Creek in western Pennsylvania. It is impacted by AMD pollutants including acidity, iron and aluminum. A TMDL was developed and approved for the larger Clearfield Creek watershed in 2007 but it does not include the Little Laurel Run sub-basin. 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 an active organization in implementing the plan. There is great potential to significantly improve water quality in Little Laurel Run since it is a relatively small watershed and the Klondike Mine and Ferris Wheel discharges, two of the largest, have projects that may significantly reduce acidity loadings.

Little Laurel Run Implementation and Load Reduction Amounts

Watershed	BMP/Action	Unit	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID	Units	Load Reduction Goal	Load Reduction Achieved	% Load Reduction Achieved
Mouth of Little Laurel Run	AMD-Passive Treatment System	UNITS	11	2	18					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	731	241	33
						Metals (Aluminum)	(lbs/day)	73	5.4	7
						Metals (Iron)	(lbs/day)	29	36	100
	Vegetative Barrier	AC	53	12	23					

Upper Swatara Creek – Schuylkill County

Watershed	S. 319 Grant/Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Upper Swatara Creek	2001 / 19 (9-30-2002)	No data available.			
	2003 / 20 (9-30-2005)	No data available.			
	2005 / 14 (9-30-2008)	0	231	0	14.5
Totals		0	231	0	14.5

Implementation Progress:

The Upper Swatara Creek watershed is largely impacted by AMD discharges from surface and deep mining operations. Many tributaries to the Upper Swatara Creek are AMD impaired. A TMDL for the Upper Swatara Creek watershed was developed by the DEP in the late 1990s. It focused primarily on the AMD-impacted tributaries in the upper part of the watershed and addresses impairments noted on the State’s impaired waters list including high levels of iron, aluminum and manganese and runoff from abandoned coal mines. The Upper Swatara Creek TMDL Watershed Implementation Plan was completed by the Schuylkill County Conservation District and finalized in May 2006.

One of the three projects using Section 319 funding has produced metals reductions. Additional projects have been completed using DEP-BAMR and federal OSM funding. Most treatment systems are installed on tributaries including Lorberry Creek and Good Hope Springs Creek, which have been documented as having significant adverse impacts on water quality in the Swatara Creek main stem. The Swatara Creek National Monitoring Program project has collected ten years worth of water quality monitoring data to evaluate AMD treatment system effectiveness in the upper watershed. Water quality improvements have been documented in the upper parts of the watershed.

Upper Swatara Creek Implementation and Load Reduction Amounts

Watershed	BMP/Action	Unit	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID	Units	Load Reduction Goal	Load Reduction Achieved	% Load Reduction Achieved
Good Spring Creek - D1 National Monitoring Point	AMD-Limestone Sanding	UNITS	1	1	100					
	AMD-Passive Treatment System	UNITS	7	3	43					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	366	0	0
						Metals (Aluminum)	(lbs/day)	0	7	100
						Metals (Iron)	(lbs/day)	0	231	100
Metals (Manganese)	(lbs/day)	0	21	100						
Land Reclamation	AC	381	381	100						
Headwaters of Swatara Creek – C2 National Monitoring Point	AMD-Passive Treatment System	Units	5	5	100					
	Aggregated BMP Load Reductions				Acidity	(lbs/day)	1305	728	56	
					Metals (Aluminum)	(lbs/day)	3	37	100	
					Metals (Iron)	(lbs/day)	199	163	82	
	Metals (Manganese)	(lbs/day)	27	38	100					
Land Reclamation	AC	75	75	100						
Lorberry Creek – E2-3 National Monitoring Point	AMD-Limestone Sanding	UNITS	1							
	AMD-Passive Treatment System	UNITS	5	3	60					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	1439	803	56
						Metals (Aluminum)	(lbs/day)	40	40	100
						Metals (Iron)	(lbs/day)	219	179	82
Metals (Manganese)	(lbs/day)	30	42	100						
Lower Rausch Creek – E3-2 National Monitoring	AMD-Passive Treatment System	UNITS	1	1	100					

Point	Aggregated BMP Load Reductions					Acidity	(lbs/day)	373	60	16
						Metals (Aluminum)	(lbs/day)	0	4.3	100
						Metals (Iron)	(lbs/day)	18	25.4	100
						Metals (Manganese)	(lbs/day)	14.5	17.4	100
Upper Swatara Creek – D2 National Monitoring Point	Aggregated BMP Load Reductions					Acidity	(lbs/day)	158,156	88,507	56
						Metals (Aluminum)	(lbs/day)	15,633	16,333	100
						Metals (Iron)	(lbs/day)	39,364	18,774	48
						Metals (Manganese)	(lbs/day)	1056	2253	100
	Land Reclamation	AC	53	53	100					

Bear Creek – Dauphin County

Watershed	S. 319 Grant/ Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Bear Creek	2004 / 18 (9-30-2007)	Design only.			
	2006 / 30G (9-30-2009)	No data available			
	2007 / 16	0	257	0	0
Totals		0	257	0	0

Implementation Progress:

The Bear Creek watershed is impacted by AMD discharges which contribute metals, low pH and siltation from a variety of old mining sources. A TMDL for the Bear Creek watershed was developed by the Susquehanna River Basin Commission (SRBC) in March 2001 and approved by the EPA in April 2001. The Bear Creek TMDL includes pollutant reduction targets for metals, pH and siltation. The Bear Creek Watershed TMDL Implementation Plan was completed by the Dauphin County Conservation District and finalized in 2005. The Plan addresses known AMD pollutant sources in the watershed including those from the Lykens Water Level Tunnel. Section 319-funded projects are addressing this discharge site, one of the largest AMD discharges in the watershed.

Upper Schuylkill River – Carbon and Schuylkill Counties

Watershed	S. 319 Grant / Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Upper Schuylkill River	1999 / 40 (3-31-2001)	Assessment only.			
	1999 / 41 (12-31-2002)	No data available.			
	2001 / 14 (1-31-2002)	Assessment only.			
	2002 / 15 (9-30-2004)	0	10	5	0
	2003 / 21 (9-30-2006)	82	38	4	0
	2004 / 16 (9-30-2007)	0	52	10	6
	2004 / 21 (9-30-2007)	0	538	31	153
	2007 / 28 (Ongoing)				
	2010 / 14 (Ongoing)				
Totals		82	638	50	159

Implementation Progress:

The Upper Schuylkill River TMDL was developed and approved in April 2007. Several other AMD related TMDLs have been developed and approved for tributaries to the Upper Schuylkill River, including the Little Schuylkill River. The Upper Schuylkill River TMDL Watershed Implementation Plan was completed in May 2005. The upper reaches of the Schuylkill River watershed are largely impacted by pollutants from abandoned mine drainage problems including metals (iron, aluminum and manganese) and pH.

Several Section 319-funded projects have either been completed or are continuing. Initial projects focused on assessments, leading to the development of a WIP in 2005. Successive projects have been implementing WIP-identified priority project sites. Some of these were previously addressed using DEP-BAMR and other funding sources.

Pine Run – Armstrong and Jefferson Counties

Watershed	S. 319 Grant/Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Pine Run	2005 / 23 (9-30-2008)	0	459	0	0
	2009 / 16 (Ongoing)	Design only.			
	2009 / 17 (Ongoing)	Design only.			
Totals		0	459	0	0

Implementation Progress:

The Pine Run watershed is impaired by AMD discharges which contribute iron, aluminum, manganese and pH to the stream. The Pine Run Watershed Implementation Plan was completed in May 2005. The Pine Run TMDL was completed and approved in March 2007. The Plan identifies all of the priority AMD remediation sites in the watershed. Several projects are underway and will help address the TMDL goals and Plan priorities. These projects address the high priority AMD remediation sites in the watershed. Significant water quality improvements may occur as projects are being implemented.

Anderson Creek – Clearfield County

Watershed	S. 319 Grant/ Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Anderson Creek	1999 / 61 (9-01-2002)	No data available.			
	2003 / 16 (9-30-2006)	Assessment only.			
	2007 / 15 (9-30-2009)	6	1	0.3	0
	2007 / 26A, B (Ongoing)	Social marketing initiative.			
	2008 / 13 (Ongoing)	Design only.			
	2009 / 19 (Ongoing)	Design only.			
	2010 / 12 (Ongoing)	Design only.			
Totals		6	1	0.3	0

Implementation Progress:

The Anderson Creek watershed is impaired by AMD discharges. The Anderson Creek TMDL was completed in 2005. The TMDL addresses metals and pH. The Anderson Creek Assessment, Restoration and Implementation Plan was completed in September 2006. The Plan identifies priority restoration sites in the watershed. Several projects have been completed or have been initiated to address high priority remediation sites, including the Bilger Run, Korb, Smouse and Reasinger AMD discharges.

Johnson Creek – Tioga County

Watershed	S. 319 Grant./Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Johnson Creek	2000 / 25 (12-31-2000)	No data available.			
	2003 / 18 (6-30-2004)	Design only.			
	2005 / 16 (9-30-2008)	83	0	3.5	3
Totals		83	0	3.5	3

Implementation Progress:

Johnson Creek is tributary to the Tioga River watershed. Johnson Creek is impaired by AMD discharges contributing metals and acidity to the creek. The Tioga River Watershed TMDL was completed in 2003 and includes load reduction goals for Johnson Creek. The Johnson Creek Implementation Plan was completed in February 2007. The Plan includes priority AMD discharge sites in the watershed. Recent remediation work has been completed at the Arnot No. 2 Mine AMD discharge. Continued work may help to meet TMDL load reduction goals.

Blacks Creek – Butler County

Watershed	S. 319 Grant /Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Blacks Creek	2005 / 24 (09-30-2008)	33	52	0	11
	2006 / 30H (12-31-2008)	No data available.			
	2008 / 32E (Ongoing)	0	0	0	0
	2009 / 15 (Ongoing)	Part of 2008/32E			
Totals		33	52	0	11

Implementation Progress:

The Blacks Creek is tributary to the Slippery Rock Creek in northwestern Pennsylvania. It is impaired by AMD sources of pollution including metals and acidity. A TMDL for metals and acidity impairments in the Blacks Creek watershed was completed in January 2005. The Blacks Creek Restoration Plan was completed in April 2007 and includes the priority remediation sites in the watershed. The Slippery Rock Creek Watershed Coalition, Butler County Conservation District and PA DEP are implementing the Plan. Several projects are being implemented to remediate the highest priority AMD discharge sites.

Hubler Run – Clearfield County

Watershed	S. 319 Grant / Project #s (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Hubler Run	1999 / 62 (12-31-2001)	No data available.			
	2000 / 28 (12-31-2001)	No data available.			
	2005 / 17 (9-30-2008)	175	0	21	0
	2006 / 17 (3-31-2010)	Part of 2007/23B			
	2006 / 30I (9-30-2009)	0	0	0	0
	2007 / 23B (9-30-2010)	14.5	1.8	0.4	1.0
	2007 / 26 (Ongoing)	Social marketing initiative.			
	2008 / 15 (9-30-2010)	Study only.			
	2010 / 13 (Ongoing)	0	0	0	0
Totals		189.5	1.8	21.4	1.0

Implementation Progress:

Hubler Run is a tributary to Alder Run in the West Branch Susquehanna River basin in north central Pennsylvania. Hubler Run is impaired by metals and acidity, the primary impairment in the Hubler Run headwaters. The Alder Run TMDL which includes the Hubler Run subbasin was completed in 2005 and approved in 2006. The Hubler Run Implementation Plan was completed in August 2007. The Plan identifies and prioritizes AMD discharges in the Hubler Run sub-basin. Metals and acidity loadings have been reduced through the implementation of two Section 319-funded project to date. Additional projects are currently being implemented or planned.

Hubler Run Implementation and Load Reduction Amounts

TMDL Point	BMP/Action	Unit	Goal Amount	Implemented Amount	% Action Implemented	Pollutant ID	Units	Load Reduction Goal	Load Reduction Achieved	% Load Reduction Achieved
Hubler Run HR02	AMD-Passive Treatment System	UNITS	1	0	0					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	7.9	0	0
						Metals (Aluminum)	(lbs/day)	1.0	0	0
						Metals (Iron)	(lbs/day)	1.4	0	0
						Metals (Manganese)	(lbs/day)	0.1	0	0
Hubler Run HR03	AMD-Passive Treatment System	UNITS	3	2	67					
	Aggregated BMP Load Reductions					Acidity	(lbs/day)	299.9	189.47	63
						Metals (Aluminum)	(lbs/day)	13.1	21.37	100
						Metals (Iron)	(lbs/day)	21	1.84	9
						Metals (Manganese)	(lbs/day)	23.8	1.04	4

Montgomery Creek – Clearfield County

Watershed	S. 319 Grant / Project # (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Montgomery Creek	2008 / 14 (Ongoing)	Design only.			
	2009 / 18 (Ongoing)	Design only.			
	2010 / 11 (Ongoing)	Design only.			
Totals		0	0	0	0

Implementation Progress:

Montgomery Creek is a tributary to the West Branch Susquehanna River in north central Pennsylvania. It is impaired by metals and acidity from AMD discharges. A TMDL was prepared for Montgomery Creek and was approved in April 2003. The Montgomery Creek Watershed Implementation Plan was completed in August 2008. The Plan identifies projects and prioritizes remediation sites where project implementation will be needed to reduce metals and acidity loadings to the Montgomery Creek. Several projects are currently underway to complete AMD treatment system designs.

South Sandy Creek – Mercer and Venango Counties

Watershed	S. 319 Grant / Project # (Project Completion Date)	Pollutant Load Reductions			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
South Sandy Creek	2005 / 07 (9-30-2008)	Plan development.			
	2006 / 07 (Ongoing)	Plan development.			
	2009 / 31H (Ongoing)				
Totals		0	0	0	0

Implementation Progress:

The South Sandy Creek watershed is an AMD impaired stream located in northwestern Pennsylvania. Past mining practices have severely degraded water quality within the watershed. The primary causes of impairment are loadings of metals and acidity. TMDLs has not yet been completed for the South Sandy Creek watershed and are not scheduled for completion until 2017. The South Sandy Creek Watershed Assessment/Restoration Plan was completed for the South Sandy Creek Watershed Association in February 2009. The Plan includes water quality data and targets restoration priorities for all of the priority AMD remediation sites within the watershed.

Hartshorn Run – Clearfield County

Watershed	S. 319 Grant/Project # (Project Completion Date)	Pollutant Load Reduction			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Hartshorn Run	2006 / 21 (3-31-2010)	Plan development			
	2007 / 26 (Ongoing)	Social marketing initiative.			
	Totals	0	0	0	0

Implementation Progress:

Hartshorn Run is a tributary to the West Branch of the Susquehanna River. This small watershed is located in between Anderson Creek and Montgomery Creek. A TMDL was prepared for Hartshorn Run and was approved in April 2004. It requires load reductions in aluminum, manganese and acidity. The Hartshorn Run Watershed Implementation Plan was completed in 2010 and projects are hoped to begin in the near future.

Watershed Implementation Plans Completed - Nutrients and Sediment

Core Creek/Lake Luxembourg – Bucks County

Watershed	S. 319 grant / project # (Project Completion Date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Core Creek/Lake Luxembourg	1995 / 13 (10-01-1996)	No data available		
	1996 / 14 (3-31-1998)	No data available		
	1997 / 14 (12-31-1998)	No data available		
	1999 / 38 (12-31-2001)	No data available		
	2004 / 29 (9-30-2007)	0	35	46.5
	2010 / 16 (Ongoing)	0	0	0
Totals		0	35	46.5

Implementation Progress:

The Lake Luxembourg watershed has received federal funding through the Section 314 Clean Lakes Program for watershed assessment, and funding through the Section 319 NPS Program for watershed restoration projects since the mid-1990s. The lake is impacted by excessive phosphorus and sediment loadings to the Core Creek watershed upstream of the lake, and to the lake itself. A TMDL was developed for Lake Luxembourg and was completed in 1999. The Restoration Plan for Lake Luxembourg and Core Creek was completed in March 2005. The plan's focus is on implementing restoration projects to minimize NPS pollutant loadings to the Core Creek watershed upstream of Lake Luxembourg. The Bucks County Conservation District is implementing restoration projects that will reduce phosphorus and sediment loadings and help meet TMDL reduction targets.

Upper Kishacoquillas Creek – Mifflin County

Watershed	S. 319 grant / project # (Project Completion Date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Upper Kishacoquillas Creek	2002 / 24 (09-30-2005)	101	22	12
	2002 / 28 (09-30-2005)	3,291	1,562	102
	2002 / 32 (09-30-2005)	410	204	204
	2005 / 26 and 27 (9-30-2008)	3,621	829	115
	2006 / 30C (03-31-2010)	1,565	437	115
	2007 / 23A (Ongoing)	154	11	1
	2008 / 32B (Ongoing)	0	0	0
Totals		9,142	3,065	549

Implementation Progress:

The upper reaches of the Kishacoquillas Creek watershed are impaired by sediment and nutrient enrichment. This part of the watershed was included on the 2002 303(d) list for nutrients and sediment stemming from agricultural sources. There have been no TMDLs developed for the Upper Kish Creek watershed at this time. The Upper Kishacoquillas Creek Watershed Restoration Plan was completed in 2007 by the Mifflin County Conservation District. The Plan identifies all projects within the watershed that have potential to reduce sediment and nutrient loadings from agriculture and stream bank erosion sources. Several projects were completed prior to Plan development and several more are currently underway. The Mifflin County Conservation District, USDA-NRCS and farm operators are taking the lead in implementing the Plan.

Conewago Creek – Dauphin, Lancaster and Lebanon Counties

Watershed	S. 319 grant / project # (Project Completion Date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Conewago Creek	2007 / 19 (Ongoing)	3,397	1,020	432
	2007 / 21 (06-30-2009)	Design only.		
	2009 / 22 (Ongoing)	0	0	0
	2009 / 31B (Ongoing)	0	0	230
	2010 / 23D (Not initiated)	0	0	0
	Totals	3,397	1,020	662

Implementation Progress:

The Conewago Creek is a tributary to the lower Susquehanna River and enters the river in Dauphin County. The watershed is located in parts of three counties and is primarily agricultural and forested. The Conewago Creek is impaired by nutrients and sediment from agricultural sources and urban/stormwater runoff problems and a large portion of it is included on the current 303(d) list of impaired waters for these impairments. A TMDL was initially prepared for the Conewago Creek in March 2001 and was later revised and approved in June 2006. The TMDL includes nonpoint source load allocations for both phosphorus and sediment. The Conewago Creek Restoration Plan was completed in 2006. The watershed is the focus of USDA-NRCS Chesapeake Bay Watershed Initiative and National Fish and Wildlife Foundation-funded watershed restoration initiatives. Section 319 funding is being utilized by both the Dauphin, Lancaster and Lebanon County Conservation Districts to install agricultural and stream bank restoration practices that will help to implement the restoration plan.

Conewago Creek – Dauphin, Lancaster and Lebanon Cos. USDA-NRCS, PA NPS Program and Conservation District BMP Implementation – FFY2010 Summary

Sub Watershed	BMP/Action	Comments	Unit	Goal Amount	Implemented Amount	Year	% Action Implemented	Pollutant ID	TMDL Load Reduction	Target Load Reduction Amount	Unit
Subbasin A 319 bmps	Conservation Crop Rotation	BMP #3 crop rotation, cover crops	AC	735	0	2024	0				
	Contour Farming	BMP #2 stripcropping, contour farming	AC	1069	0	2024	0				
	Cover Crop	BMP #1 crop residue mgmt, cover crops	AC	869	0	2024	0				
	Diversion	BMP #5 terraces, diversions	AC	200.5	0	2024	0				
	Fence	In WIP (stream miles)	MI	12.6	0	2024	0				
	Grazing Planned Systems	BMP #7 grazing land mgmt	AC	48	0	2024	0				
	Nutrient Management	BMP #6 hay, pastureland	AC	267	0	2024	0				
		BMP #6 cropland, row crops	AC	668	0	2024	0				
	Residue Management, No-till & Strip Till	BMP #4 crop rotation, crop residue mgmt	AC	802	0	2024	0				
	Riparian Forest Buffer	Not in WIP									
	Streambank & Shoreline Protection	In WIP (stream miles)	MI	7.6	0	2024	0				
	Vegetative Buffer Strips	In WIP (stream miles)	MI	12.6	0	2024	0				
	Subbasin A nracs bmps	Animal Trails and Walkways	Not in WIP	AC	17.7	17.7	2010	100			
Conservation Cover		Not in WIP	AC	33.4	33.4	2010	100				
Contour Farming		Not in WIP	AC	29.8	29.8	2010	100				
Cover Crop		BMP #3 cover crops, crop rotation	AC	735	86	2024	12				
Fence		Not in WIP (pasture acres)	MI	4.1	4.1	2010	100				
Grassed Waterway		Not in WIP	AC	186.5	186.5	2010	100				
Grazing Planned Systems		BMP #7	AC	48	196.4	2024	409				
Nutrient Management		BMP #6 cropland, row crop only	AC	668	892	2024	134				
		BMP #6 hay, pastureland only	AC	267	256	2024	96				
Residue Management, No-till & Strip Till		BMP #4 crop residue mgmt, crop rotation	AC	802	1008	2024	126				
Riparian Forest Buffer		Not in WIP	AC	75.3	75.3	2010	100				
Stripcropping		BMP #2 stripcropping, contour farming	AC	1069	82	2024	8				
Terrace		BMP #5 terraces, diversions	AC	802	0	2024	0				
Waste Storage Facility	Not in WIP	UNITS	3	3	2010	100					
Subbasin A poll Id reds	Aggregated BMP Load Reductions	Does not include NRCS-funded BMPs	AC	1	1	2024	100	Nitrogen		0	LBS/YR
							100	Phosphorus	4534	2173	LBS/YR
							100	Sedimentation-Siltation	3332921	2368794	LBS/YR
Subbasin B	Contour Farming	BMP #2 strip cropping, contour farming	AC	1105	0	2024	0				

319 bmps	Cover Crop	BMP #3 crop rotation, cover crop	AC	736	0	2024	0				
	Diversion	BMP #5 terrace, diversion	AC	884	128	2024	14				
	Fence	In WIP (stream miles)	MI	9.9	0	2024	0				
	Grassed Waterway	Not in WIP	AC	8.8	8.8	2010	100				
	Grazing Planned Systems	BMP #7 grazing land mgmt.	AC	48	6	2024	13				
		BMP #6 nutrient mgmt-hay, pastureland	AC	120	41	2024	34				
	Nutrient Management	BMP #6 nutrient mgmt-cropland, row crops	AC	589	520	2024	88				
	Residue Management, No-till & Strip Till	BMP #4 crop rotation, crop residue mgmt.	AC	1080		2024					
	Streambank & Shoreline Protection	In WIP (stream miles)	MI	3.1	0.71	2024	23				
	Vegetative Buffer Strips	In WIP (stream miles)	MI	13.2	0.71	2024	5				
Subbasin B nracs bmps	Conservation Crop Rotation	BMP #4 crop rotation	AC	1031	1201	2024	116				
	Contour Farming	BMP #2 stripcropping, contour farming	AC	1105	644	2024	58				
	Cover Crop	BMP #3 cover crops, crop rotation	AC	736	164	2024	22				
	Fence	In WIP (stream miles)	MI	1	1	2010	100				
	Grassed Waterway	Not in WIP	AC	1258	1258	2024	100				
	Grazing Planned Systems	BMP #7 grazing land mgmt	AC	48	25	2024	52				
		BMP #6 cropland, row crops only	AC	589	518.3	2024	88				
	Nutrient Management	BMP #6 hay, pastureland only	AC	120	48.6	2024	41				
	Residue Management, No-till & Strip Till	BMP #1 crop residue mgmt, cover crops	AC	1031	1780	2024	173				
	Riparian Forest Buffer	Not in WIP	AC	83.4	83.4	2024	100				
Streambank & Shoreline Protection	In WIP (stream miles)	MI	3.1	0.02	2024	1					
	Terrace	BMP #5 terraces, diversions	AC	884	591	2024	67				
Subbasin B poll Id reds	Aggregated BMP Load Reductions	Does not include NRCS-funded BMPs	AC	1	1	2024	100	Nitrogen		3497	LBS/YR
							100	Phosphorus	6163	4430	LBS/YR
							100	Sedimentation-Siltation	2993162	3845354	LBS/YR

Mill Creek – Lancaster County

Watershed	S. 319 grant / project # (Project Completion Date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Mill Creek	1995 / 17 (02-20-1998)	No data available.		
	1999 / 59 (8-30-2000)	No data available.		
	2005 / 28 (9-30-2008)	15,407	3,845	1,005
	2005 / 29 (9-30-2008)	864	431	431
	2009 / 23 (Ongoing)	0	0	1,262
	2010 / 15 (Ongoing)	0	0	0
Totals		16,271	4,276	2,698

Implementation Progress:

The Mill Creek watershed is a tributary to the Pequea Creek in southern Lancaster County. The watershed is comprised of primarily agricultural land uses and has a large Amish population. The Lancaster County Conservation District and USDA-NRCS have been working with the agricultural sector to incorporate best management practices on many of the small dairy and other farms in the watershed. Mill Creek is included on the 303(d) list of impaired waters for agricultural sources of nutrients and sediment. TMDLs have been completed for two small tributaries to the Mill Creek’ The Muddy Run TMDL was completed and approved in 2001 and a TMDL for an UNT to the Mill Creek was completed and approved in 2004. The Mill Creek Watershed Implementation Plan was completed in June 2006.

Both federal Clean Water Act Section 319 NPS Program, USDA-NRCS, and other sources of local, state and federal funding are helping landowners implement conservation projects in the Mill Creek watershed. Stream restoration projects have been the major focus in recent years since the Mill Creek Implementation Plan was completed. The Mill Creek Preservation Association is working with the Amish and English communities in the watershed to promote the implementation of both stream bank restoration work and agricultural BMPs. A BMP Summary follows.

Mill Creek-Lancaster County USDA-NRCS, PA NPS Program and Conservation District BMP Implementation FFY2010 Summary

Sub Watershed	BMP/Action	Unit	Goal Amount	Implemented Amount	Year	% Action Implemented	Pollutant ID	Target Load Reduction Amount	Unit	Load Reduction Achieved	% Load Reduction Achieved
Muddy Run NRCS only	Fence	FT		0							
	Grassed Waterway	AC		0							
	Grazing Planned Systems	AC		0							
	Nutrient Management	AC		0							
	Residue Management, No-till & Strip Till	AC	742	120.4	2018	16					
	Stripcropping	AC	1324	42.6	2018	3					
Remaining NRCS only	Conservation Crop Rotation	AC	469.5	469.5	2018	100					
	Conservation Tillage	AC	1656	211.4	2018	13					
	Cover Crop	AC	1449	503.7	2018	35					
	Diversion	AC	28.7	28.7	2018	100					
	Fence	MI	18.5	0.7	2014	4					
	Grassed Waterway	AC	130.1	130.1	2018	100					
				867	18.7	2018	2				
	Nutrient Management	AC	2899	535.5	2018	18					
	Planned Grazing System	AC	495	49.6	2018	10					
	Riparian Forest Buffer	AC	175	8.9	2014	5					
	Streambank & Shoreline Protection	MI	24	0.7	2014	3					
	Stripcropping	AC	1656	177.5	2018	11					
Waste Storage Facility	UNITS	6	6	2018	100						
UNT 319 only							Nitrogen	6093	LB	193	3
							Phosphorus	816	LB	96	12
							Sedimentation-Siltation	721200	LB	192000	27
	Aggregated BMP Load Reductions		1								
	Barnyard Runoff Management	UNITS	4	0	2011	0					
	Conservation Tillage	AC	7.2	200	2011	2778					
	Cover Crop	AC	83.3	100	2011	120					
	Fence	MI	3.4	0	2011	0					
	Grassed Waterway	AC	1.5	0	2011	0					
	Nutrient Management	AC	135.3	227	2011	168					
Riparian Forest Buffer	AC		0.31	2011							

		MI	3.4	0	2011	0						
	Streambank & Shoreline Protection	MI	1	0.43	2011	43						
	Waste Management System	UNITS	2	0	2011	0						
UNT NRCS only	Conservation Crop Rotation	AC	163.4	163.4	2018	100						
	Conservation Tillage	AC	585	440	2018	75						
	Cover Crop	AC	98	157.5	2018	161						
	Nutrient Management	AC	95	0	2018	0						
			254	99.1	2018	39						
	Planned Grazing System	AC	110	4.8	2018	4						
	Stripcropping	AC	293	0	2018	0						
	Waste Storage Facility	UNITS	5	5	2018	100						
Remaining 319 only	Aggregated BMP Load Reductions		1				Nitrogen	110251	LB	433	0	
							Phosphorus	15707	LB	216	1	
							Sedimentation-Siltation	7967603	LB	2956000	37	
	Barnyard Runoff Management	UNITS	42	20	2011	48						
	Conservation Tillage	AC	427.5	860	2011	201						
	Contour Farming	AC	816.7	40	2011	5						
	Cover Crop	AC	1328.3	180	2011	14						
	Fence	MI	18.5	1.25	2011	7						
	Grassed Waterway	AC	21.8	0	2011	0						
	Grazing Planned Systems	AC	481.5	91	2011	19						
	Nutrient Management	AC	1942.4	671	2011	35						
	Riparian Forest Buffer	AC		3.97	2011							
		MI	24		2011							
	Streambank & Shoreline Protection	MI	10	3.45	2011	35						
	Terrace	FT	12250	0	2011	0						
Waste Management System	UNITS	22	0	2011	0							
Muddy Run 319 only	Aggregated BMP Load Reductions		1				Nitrogen	18590	LB	238	1	
							Phosphorus	10477	LB	119	1	
							Sedimentation-Siltation	5022326	LB	238000	5	
	Barnyard Runoff Management	UNITS	1	1	2018	100						
	Conservation Tillage	AC	265	345	2018	130						
	Contour Farming	AC	1324	0	2018	0						
	Cover Crop	AC	742	140	2018	19						

Fence	MI	5.5	0.64	2014	12					
Grassed Waterway	AC	1	1	2018	100					
Nutrient Management	AC	795	320	2018	40					
Planned Grazing System	AC	810	22	2018	3					
Riparian Forest Buffer	AC	50.9	0.38	2014	1					
Streambank & Shoreline Protection	MI	1.7	0.53	2014	31					
Waste Management System	UNITS	0	0	2018						

Codorus Creek – Adams and York Counties

Watershed	S. 319 grant / project # (Project Completion Date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Codorus Creek	1999 / 22 (6-30-2001) SBCC*	0	0	43
	2000 / 39 (9-30-2002) EBCC	Assessment/restoration.		
	2002 / 31 (7-31-2005) EBCC	0	0	350
	2002 / 33 (9-30-2005) SBCC	0	0	119
	2003 / 32 (9-30-2006) EBCC	Design only.		
	2003 / 33 (9-30-2006) SBCC	0	0	5,300
	2004 / 26 (9-30-2007) Oil Creek	Design only.		
	2004 / 28 (9-30-2006) SBCC	0	0	300
	2005 / 32 (9-30-2006) EBCC	Design only.		
	2005 / 42 (9-30-2006) S/EBCC	Monitoring/maintenance.		
	2005 / 45B (9-30-2007) EBCC	0	0	981
	2006 / 30D (9-30-2008) SBCC	3,034	2,016	1,920
	2006 / 30E (9-30-2009) EBCC	0	0	750
	2006 / 30F (9-30-2009) Oil Creek	0	0	682
	2007 / 20 (9-30-2009) EBCC	0	0	3,115
2009 / 31I (Ongoing)	0	0	0	
2010 / 22 (Ongoing)	0	0	0	
Totals		3,034	2,016	13,560

* East Branch Codorus Creek (EBCC); South Branch Codorus Creek (SBCC)

Implementation Progress:

The Codorus is tributary to the lower Susquehanna River. The watershed is located in Adams and York Counties. It has been the focus of many restoration projects since 1999-2000. Local watershed organizations have sponsored most of these projects. The Codorus Creek is an important public water supply for the City of York and surrounding communities. Several lakes lie within the watershed. Most of the restoration projects completed to date involve stream bank and stream channel stabilization and riparian restoration. Many stream bank erosion problems result from severe storm water runoff and unrestricted livestock access. The South Branch Codorus Creek TMDL was developed and approved in August 2003. The TMDL allocates significant nonpoint source load reductions for both phosphorus and

sediment. Following the TMDL development and the implementation of several restoration projects, the Codorus Creek Nonpoint Source Pollution Control Watershed Implementation Plan was completed by the York County Conservation District in July 2007. Recently completed stream bank and stream channel restoration projects have successfully decreased sediment loading to the stream.

Conowingo Creek – Lancaster County

Watershed	S. 319 grant / project # (Project Completion Date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Conowingo Creek	2002 / 25 (9-30-2004)	536	535	132
	2006 / 30K (3-31-2010)	Design only.		
	2008 / 21 (Ongoing)	0	117	117
	2009 / 31A (Ongoing)	0	750	884
Totals		536	1,402	1,133

Implementation Progress:

The Conowingo Creek watershed is located in southern Lancaster County and is tributary to the lower Susquehanna River near the Conowingo Dam. Much of the watershed is in agricultural land uses. The Conowingo Creek is included on the state's 303 (d) list of impaired waters for both phosphorus and sediment pollutants. 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 sources. The Conowingo Creek TMDL Implementation Plan was completed in September 2006. The Plan identifies and prioritizes restoration sites throughout the watershed. The organizations primary involved with restoration work in this watershed are the Donegal Chapter Trout Unlimited, and the Lancaster County Conservation District and USDA-NRCS. The local watershed organization is working on stream bank and channel restoration while agricultural practices are being addressed by the USDA and conservation district. Section 319 funding is currently being used to restore priority restoration sites in the upper reaches within the watershed.

Conowingo Creek – Lancaster County USDA-NRCS, PA NPS Program and Conservation District BMP Implementation – FFY2010 Summary

Sub Watershed	Sub Sub Watershed	BMP/Action	Unit	Goal Amount	Implemented Amount	Year	% Action Implemented	Pollutant ID	Target Load Reduction Amount	Load Reduction Achieved	Unit	% Load Reduction Achieved
Conowingo Aggregate		Aggregated BMP Load Reductions	AC	1	1	2022	100	Nitrogen	209503	0	LBS/YR	0
							100	Phosphorus	22109	117	LBS/YR	1
							100	Sedimentation-Siltation	7750193	234000	LBS/YR	3
Headwaters of Main Stem		Aggregated BMP Load Reductions	AC	1	1	2015	100	Sedimentation-Siltation	144153		LB	
				1								
			FT	22407	2719	2008	12					
			FT	13435	1139	2008	8					
Jackson Run		Vegetative Buffer Strips	FT	30758	2280	2008	7					
			FT	27804	0	2009	0					
			FT	15800	0	2009	0					
Little Conowingo Creek		Vegetative Buffer Strips	FT	26578	0	2009	0					
			AC	140.36	0	2015	0					
			FT	66418	0	2015	0					
			AC	63.93	0	2015	0					
			FT	41820	0	2015	0					
Main Stem Upper Reach		Vegetative Buffer Strips	FT	67328	0	2015	0					
			FT	17442	0	2010	0					
			FT	15421	0	2010	0					
UNT Main Stem-Cardinal Road Area		Vegetative Buffer Strips	FT	17442	0	2010	0					
			AC	64.64	0	2009	0					
			FT	23828	0	2009	0					
			FT	42211	0	2009	0					
UNTs to and Lower Reach of Main Stem		Vegetative Buffer Strips	AC	65.93	0	2022	0					
			FT	76409	0	2022	0					
			AC	97.44	0	2022	0					
			FT	63231	0	2022	0					
			FT	78445	0	2022	0					
UNTs to and Middle Reach of		Access Road	FT	2232	0	2013	0					

Main Stem	Conservation Tillage	AC	10.45	0	2013	0				
	Fence	FT	80026	0	2013	0				
	Grazing Planned Systems	AC	11.24	0	2013	0				
	Nutrient Management	AC	2.89	0	2013	0				
	Streambank & Shoreline Protection	FT	61540	0	2013	0				
	Vegetative Buffer Strips	FT	83464	0	2013	0				
V-NRCS BMPs	Conservation Crop Rotation	AC	1315	1315	2009	100				
	Contour Farming	AC	453	453	2009	100				
	Cover Crop	AC	2446	2446	2009	100				
	Diversion	AC	6.7	6.7	2009	100				
	Grassed Waterway	AC	9.6	9.6	2009	100				
			114.5	114.5	2009	100				
	Nutrient Management	AC	1728	1728	2009	100				
	Residue Management, No-till & Strip Till	AC	2147	2147	2009	100				
	Riparian Forest Buffer	AC	39.3	39.3	2009	100				
	Stripcropping	AC	158	158	2009	100				
	Terrace	AC	354	354	2009	100				

West Branch Antietam Creek – Franklin County

Watershed	S. 319 Grant / Project # (Project Completion Date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
West Branch Antietam Creek	2002 / 23 (9-30-2003)	444	222	222
	2007 / 27C (6-30-2009)	Plan development only.		
Totals		444	222	222

Implementation Progress:

The West Branch Antietam Creek watershed is located in the ridge and valley province in southern Franklin County. The majority of the watershed is included on Pennsylvania’s list of impaired waters for nutrient and sediment pollution from a variety of sources. The Franklin County Conservation District, Chesapeake Bay Foundation and the Antietam Creek Watershed Association have worked with landowners in the watershed to implement stream bank restoration projects and other agricultural best management practices. One Section 319-funded project was completed through the Franklin County Conservation District to address stream bank degradation and riparian buffer restoration. The West Branch Antietam Creek Watershed Implementation Plan was completed for the Antietam Creek Watershed Association in April 2008. The Plan identifies many project sites and prioritizes them for the greatest amount of restoration potential and nutrient and sediment reductions. Most of the project sites identified in the Plan are directed to restoring riparian areas and implementing agricultural BMPs.

Mill Creek/Stephen Foster Lake – Bradford County

Watershed	S. 319 grant / project # (Project Completion Date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Mill Creek/Stephen Foster Lake	2001 / 51 (9-30-2004)	187,313	72,588	216
	2005 / 08 (12-31-2005)	Assessment only.		
	2006 / 08 (date)	Assessment only.		
	2007 / 07 (date)	Assessment only.		
	2007 / 22 (Ongoing)	Design and implementation.		
Totals		187,313	72,588	216

Implementation Progress:

The Mill Creek watershed includes the Stephen Foster Lake and is located in the North Branch Susquehanna River basin in Bradford County. The lake is included on the State’s 303(d) list of impaired waters for total suspended solids (TSS) and phosphorus loadings. A TMDL was developed for Stephen Foster Lake and was approved in April 2001. The Bradford County Conservation District completed the Mill Creek Watershed 319 Implementation in July 2008. The plan addresses Stephen Foster Lake in-lake nutrient loading problems and includes load reduction goals for both phosphorus and TSS. Implementation work has been completed in the watershed since the early 2000’s by the Bradford County Conservation District and primarily with agricultural landowners who are located upstream of the lake. Efforts continue to work with the agricultural community to install needed BMPs and stream restoration projects upstream of the lake, and also to implement in-lake management measures to address nutrient related water quality impairments.

Mill Creek/Stephen Foster Lake, Bradford County BMP Implementation – FFY2010 Summary

Mill Creek

								Pollutant	TMDL Goal	Reduction Goal	Unit	Actual Reduction	% Reduction
		Aggregated BMP Load Reductions	AC	1	1			100 Phosphorus	9960	890.2	LB	276	31
								100 Sedimentation-Siltation	4788	245	TONS/YR	171	70
		BMP	Unit	Target	Implemented	YR	% Implemented						
		Barnyard Runoff Management	SQUARE FEET	26570	26500		100						
		Conservation Crop Rotation	AC	200	200	2009	100						
		Diversion	FT	7000	5000		71						
		Fence	FT	17000	17000	2009	100						
		Filter Strip	SQUARE FEET	26500	26500	2010	100						
		Heavy Use Area Protection	UNITS	12	12	2015	100						
		Manure Transfer	UNITS	7	7	2015	100						
		Milking Center Wastewater Treatment System	UNITS	3	3	2010	100						
		Mulching	AC	2	0	2015	0						
		Pasture & Hayland Management	AC	90	90	2010	100						
		Road Ditch Ceation/Improvements	FT	23120	22820		99	Sedimentation-Siltation			TONS/YR		
		Streambank & Shoreline Protection	FT	6900	2200	2012	32						
		Stripcropping - Field	AC	50	50	2010	100						
		Underground Outlet	FT	100	0	2015	0						
		Vegetative Buffer Strips	AC	1900	1961	2010	103						
		Waste Storage Facility	UNITS	10	7		70						
Mill Creek	Creek	Waste Storage Pond	UNITS	3	3	2010	100						

Mill Creek/Stephen Foster Lake, Bradford County BMP Implementation – FFY2010 Summary

Stephen Foster Lake

							Pollutant	TMDL Goal	Reduction Goal	Unit	Actual Reduction	% Reduction
						100	Algal Growth/Chlorophyll					
						100	Phosphorus	1318	1318	LBS/YR	0	
						100	Sedimentation-Siltation	365	365	TONS/YR	0	
		Aggregated BMP Load Reductions		1	1	100		9.7	9.7	INDIVIDUAL UNITS	0	
		BMP	Unit	Target	Implemented	YR	% Implemented					
		Dredging	CUBIC YARDS	20000	0	2015	0					
		In-lake alum treatment	AC	40	0	2011	0					
		Lake Aeration	AC	60	0	2015	0					
		Native Plant Community Restoration and Management	AC	10	10	2010	100					
			AC	5	5	2010	100					
Stephen Foster Lake	Lake	Restoration And Management of Declining Habitats	GALLONS PER DAY (GPD)	1500	1500	2010	100					

Hungry Run – Mifflin County

Watershed	S. 319 grant / project # (Project Completion Date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Hungry Run	2008 / 32A (Ongoing)	0	0	0
Totals		0	0	0

Implementation Progress:

Hungry Run is a tributary to the Kishacoquillas Creek watershed and the Susquehanna River basin in Mifflin County. The Hungry Run watershed is largely agricultural with an urbanized area located near Burnham at the lower end of the watershed. Most of the impairments are due to agricultural sources of nutrients and sediment. Some impairments in the lower part of the basin are related to storm water and urban runoff. Hungry Run is included on the State’s 303(d) list of impaired waters for nutrient and sediment related pollution. No TMDL has been developed for the Hungry Run watershed.

The 319 Watershed Implementation Plan: Hungry Run was developed and completed by the Mifflin County Conservation District in 2008. Agriculture, storm water and urban runoff, on-lot sewage and unpaved roads are identified as priorities in the plan and restoration work is targeted to these sources of impairment. The Mifflin County Conservation District is utilizing Section 319 funds to help the agricultural community implement needed animal waste management practices on small livestock farms in the watershed. BMP implementation will be completed on the highest priority project sites as landowners are willing to participate.

Buffalo Creek – Union County

Watershed	S. 319 grant / project # (Project completion date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Buffalo Creek	2006 / 07 (12-31-2008)	Plan development only.		
	2008 / 20 (Ongoing)	0	0	0
Totals		0	0	0

Implementation Progress:

Buffalo Creek is a major tributary to the Susquehanna River in Union County in north central Pennsylvania. Agricultural and forest land uses are dominant within the watershed. Some major urban areas exist in the lower reaches of the watershed near Lewisburg and Mifflinburg. The project area has been the focus of efforts by the Union County Conservation District and a local watershed association, working with both the agricultural community and doing water quality monitoring. There is no TMDL completed for the Buffalo Creek watershed for nutrient or sediment. The Union County Conservation District completed the Buffalo Creek Watershed Implementation Plan in November 2008. One 319-funded project is being implemented to complete projects that are identified in the Restoration Plan. Additional projects are in planning stages and Section 319 grant funding will be allocated to these projects in the future. The conservation district is also considering some revisions to the Restoration Plan to bring in additional impaired stream reaches identified in the 2010 Integrated List of All Waters.

Harveys Lake – Luzerne County

Watershed	S. 319 grant / project # (Project completion date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Harveys Lake	2000 / 45 (9-30-2003)	No data available.		
	2001 / 45 (9-30-2003)	0	132	0
	2002 / 30 (9-30-2004)	0	66	0
	2005 / 36 (9-30-2008)	Plan development only.		
	2006 / 30J (12-31-2009)	0	13	0
	2008 / 32C (Ongoing)	Design/implementation.		
Totals		0	211	0

Implementation Progress:

Harveys Lake is a large recreational lake in northeastern Pennsylvania. It is included on the State’s list of impaired waters for nutrients and suspended solids from on-site wastewater and other nonpoint sources respectively. Nutrient over-enrichment in the lake as well as sediment erosion from overland sources and stream bank and shore line erosion have contributed to the impairments. A TMDL was completed for Harveys Lake in 2002 and approved by the EPA in 2003. The TMDL identified total phosphorus levels being too high and that reductions are needed to achieve acceptable water quality conditions. A Stormwater Implementation Plan for the Harveys Lake Watershed was completed in 2009 and was acknowledged by the EPA. The plan lays out a framework for addressing the nutrient- and sediment-related impairments. It identifies and prioritizes projects that can be implemented to minimize phosphorus and sediment inputs to the lake. Clean Lakes Program Phase I and II studies and Section 319-funded projects have been completed and are helping to reduce total phosphorus loadings in the watershed.

Jacobs Creek – Fayette, Westmoreland Counties

Watershed	S. 319 grant / project # (Project completion date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment Tons/yr
Jacobs Creek	2008 / 23 (11-4-2010)	.73	1.46	.23
	2009 / 28 (Ongoing)	0	0	0
	2009 / 29 (Ongoing)	0	0	0
	2009 / 31d (Ongoing)	0	0	0
	2009 / 31e (Ongoing)	0	0	0
	2010 / 19 (Ongoing)	0	0	0
Totals		.73	1.46	.23

Implementation Progress:

The Jacobs Creek Watershed Implementation and Restoration Plan was completed for the Jacobs Creek Watershed Association in June 2009. The plan addresses several major nonpoint source problems within the Jacobs Creek watershed. The primary nonpoint source problems are related to agricultural practices, storm water from urban and developing areas and abandoned mine drainage discharges. There has been no TMDL completed for the Jacobs Creek watershed. The Section 319 NPS Program is providing funds for storm water retrofits in some of the more urban areas of the watershed.

Trout Run and Godfrey Run – Erie County

Watershed	S. 319 grant/ project # (Project completion date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment Tons/yr
Trout Run and Godfrey Run	2006 / 07C (Ongoing)	Plan development only.		
	2009 / 21C (Ongoing)	0	0	0
	2009 / 21J (Ongoing)	0	0	0
	Totals	0	0	0

Implementation Progress:

The Trout and Godfrey Run watersheds were selected as priority watersheds for Watershed Plan development by the DEP Northwest Regional Office. They are both small tributaries to Lake Erie in Erie County, northwestern Pennsylvania. The lake has experienced high levels of bacterial contamination from properties with poorly operating on-site septic systems, and the watersheds also contribute high levels of nutrients and sediment to the lake. Although there has been no TMDL completed to date for Trout and Godfrey Runs, a Watershed Implementation Plan was completed and approved in 2009. The plan identified high priority sites for implementing a variety of water quality improvement practices, including agricultural BMPs, improved septic system management, riparian buffer restoration and stream bank restoration and stabilization. The watersheds are both included on the state’s 303(d) list of impaired waters for nutrient and sediment related impairments. The Erie County Conservation District is taking the lead in implementing the Trout and Godfrey Run Watershed Restoration Plan.

Middle Spring Creek – Cumberland County

Watershed	S. 319 grant/ project # (Project completion date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment Tons/yr
Middle Spring Creek	2001 / 49 (9-30-2004)	34,405	9,085	2,076
	2001 / 50 (9-30-2004)	72,883	21,668	5,591
	2007 / 27A (9-31-2009)	Plan development.		
Totals		107,288	30,753	7,667

Implementation Progress:

Middle Spring Creek is tributary to the Conodoguinet Creek in Cumberland and Franklin Counties. The majority of stream miles in this watershed are impaired by agricultural, urban/stormwater, and other sources. Stream miles in the Middle Spring Creek sub-basin are included on the 303(d) list of impaired streams for agriculture and urban runoff/storm sewer pollutant sources. A TMDL was completed in December 2000 for several of the sub-basins, including the Middle Spring Creek, in the Conodoguinet Creek watershed. Several Section 319 NPS Program funded projects were completed with the Cumberland County Conservation District to implement agricultural best management practices in impaired reaches within the Conodoguinet Creek watershed. The conservation district completed a Watershed Implementation Plan for Middle Spring Creek, Gum Run and Mains Run in December 2009. One Section 319 project is pending approval to begin Plan implementation.

Watershed Implementation Plans for Abandoned Mine Drainage Sources Being Developed Through September 2010 ¹

Watershed (County)	S. 319 Grant/Project # (Project Completion Date)	Pollutant Load Reduction			
		Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Fall Brook (Tioga)	2005 / 26 (1-4-2008)	Design Only			
South Branch Plum Creek (Indiana)	2007 / 27B (Ongoing)	Plan development			

Watershed Implementation Plans for Nutrient and Sediment Sources Being Developed Through September 2010 ²

Watershed (County)	S. 319 Grant/Project # (Project Completion Date)	Pollutant Load Reductions		
		Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Abrahams Creek/ Francis Slocum Lake (Luzerne)	2006 / 29 (3-31-2010)	Plan development		
North Branch Neshaminy Creek/ Lake Galena (Bucks)	1998 / 18 (12-30-2003)	No data.		
	1999 / 39 (9-30-2000)	No data.		
	2005 / 08 (12-31-2005)	No data.		
	2006 / 07 (3-31-2010)	Plan development		
	2010 / 17 (Ongoing)	0	0	0
Totals		0	0	0

¹ This includes plans in final revision, under DEP/EPA review or being prepared.

² This includes plans in final revision, under DEP/EPA review or being prepared.

SECTION THREE: SUCCESS STORIES AND IMPROVING WATERSHED STORIES

Pennsylvania's NPS Management Program is continuing to write and publicize stories related to local watershed improvements. The DEP wants to bring more attention to these watershed restoration efforts. Pennsylvania has prepared four new Success Stories during FFY2010. These have been approved by both EPA Region III and EPA headquarters NPS Program staff.

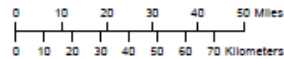
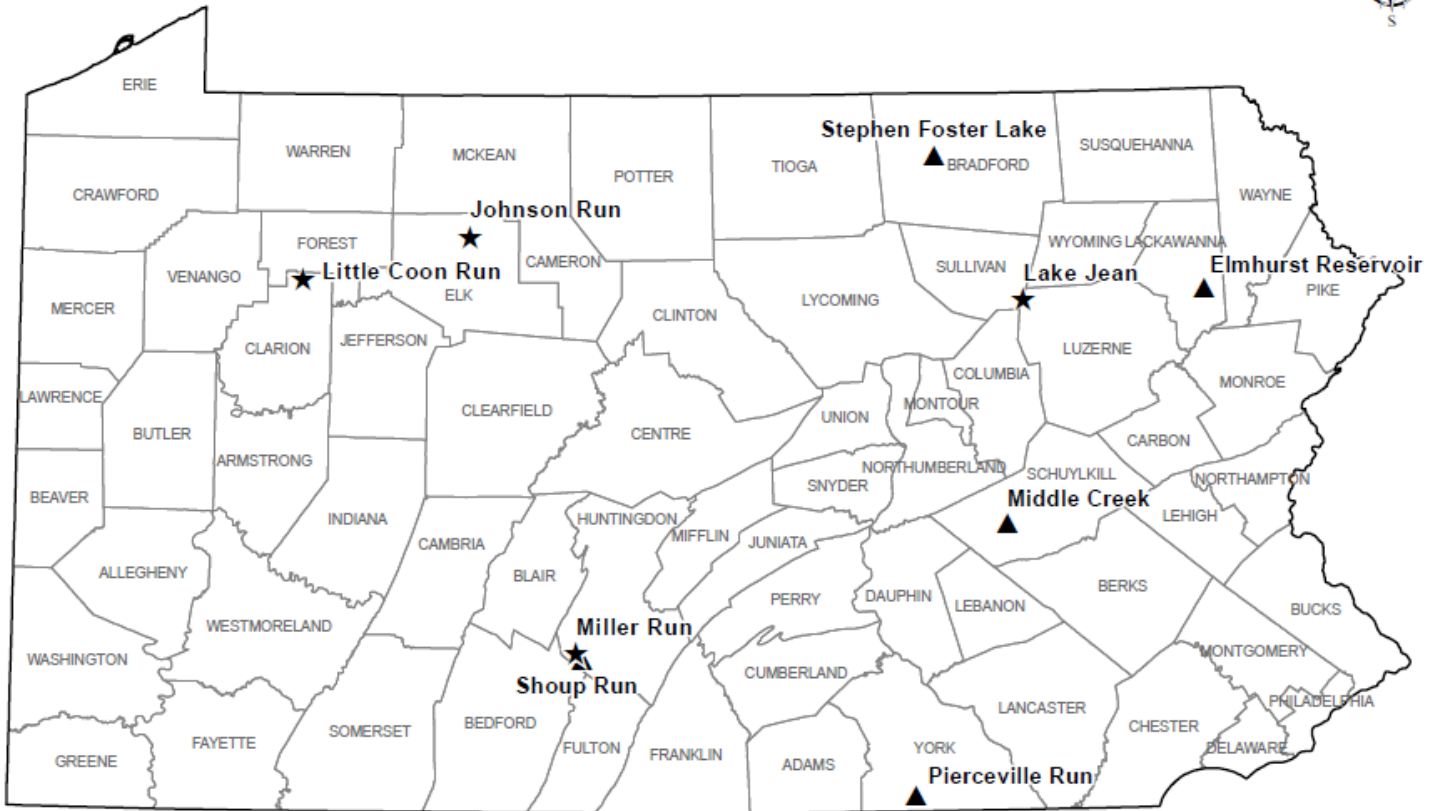
Success Stories are included on both the DEP NPS Program web site <http://www.portal.state.pa.us/portal/server.pt?open=514&objID=554277&mode=2> and the EPA Headquarters NPS Program site at <http://www.epa.gov/nps/success/>.

Significant watershed restoration efforts have been made within each of the watersheds for which an Improving Watershed Story has been written. There is evidence that local water quality conditions are improving in each of these watersheds.

With additional water quality monitoring data, we can show that water quality standards are being met with the eventual goal of waters being removed from the current Integrated List of All Waters impaired water body listings. An Improving Watershed Story may be expanded into more comprehensive Success Story when a stream reach or water body is removed from an impaired water body listing.

The four new Success Stories written during this reporting period, along with five new Improving Watershed Stories, are included on the following pages. The map on the following page provides general locations for all Improving Watershed and Success Stories.

FFY2010 Improving Waters and Success Stories



Legend

- ★ Success Story
- ▲ Improving Watershed Story
- County Boundary

Success Stories

There are four new Success Stories that were completed in 2010 and submitted to EPA's Region 3 Office. Once review of the stories was completed at the Region 3 Office, the four stories were forwarded to EPA's headquarters in Washington D.C. Currently PA DEP staff is working through the editing process to ensure that the four Success Stories meet the requirements of EPA's Headquarters so they can be posted on the EPA web site. Below are the four 2010 Success Stories that were submitted to EPA in 2010.

Johnson Run, Elk County

Local conservation group leads efforts to restore fishery



Johnson Run, looking downstream, above the confluence with East Branch Clarion River.

Water Body Improved

The main branch of Johnson Run and all of its tributaries were placed on the state's 303(d) list of impaired waters in 2004. More than 17 miles of Johnson Run and its tributaries were designated impaired due to low pH and elevated metal loads. The stream and its tributaries were determined to be not meeting the Aquatic Life designated use. Abandoned Mine Drainage treatment systems were constructed between 2002 and 2006, which resulted in significant water quality improvements in the stream. DEP intends to remove the entire Johnson Run watershed, including

all 12 impaired tributaries from the 2012 303(d) list of impaired waters, as the result of these water quality improvements.

Problem

Johnson Run begins near Elk County's border with McKean County to the north and flows into the East Branch of the Clarion River downstream of East Branch Dam. This area has been subject to strip mining and deep mining for coal since the late 1800's. There are currently no active mines in the watershed. Discharges from old deep mines are the most significant source of AMD in the Johnson Run watershed. Discharges from these sources have lowered pH and elevated metal loads. In addition to deep mines, un-reclaimed surface mining activities have contributed to the degradation of the Johnson Run watershed.

Project Highlights

A passive treatment system consisting of vertical flow ponds, limestone lined channels, flush ponds, holding tanks and wetlands was constructed on a headwaters tributary in 2002 to treat flow from an abandoned deep mine that was the most significant source of AMD to the watershed. The system collects and treats two separate discharges from the abandoned deep mine.

In addition to AMD sources seeping from the ground, pyretic spoil piles and previously surface mined areas contributed to water quality degradation in Johnson Run. In 2003 another method of treatment was implemented to treat sources of AMD on the surface. By utilizing alkaline waste residuals from the nearby Weyerhaeuser paper mill, Sweet Soil Inc. completed a project that mixed this material with acid-producing spoil piles remaining from past surface mining activities. Once completed, the reclaimed areas were stabilized with a thick cover of vegetation using limestone and paper fines provided by the paper mill's water treatment plant. These reclamation efforts increased alkalinity and lowered pH readings in the unnamed tributary to Johnson Run where the work was done.



DEP staff counting fish collected while electro-fishing on 8/13/10.

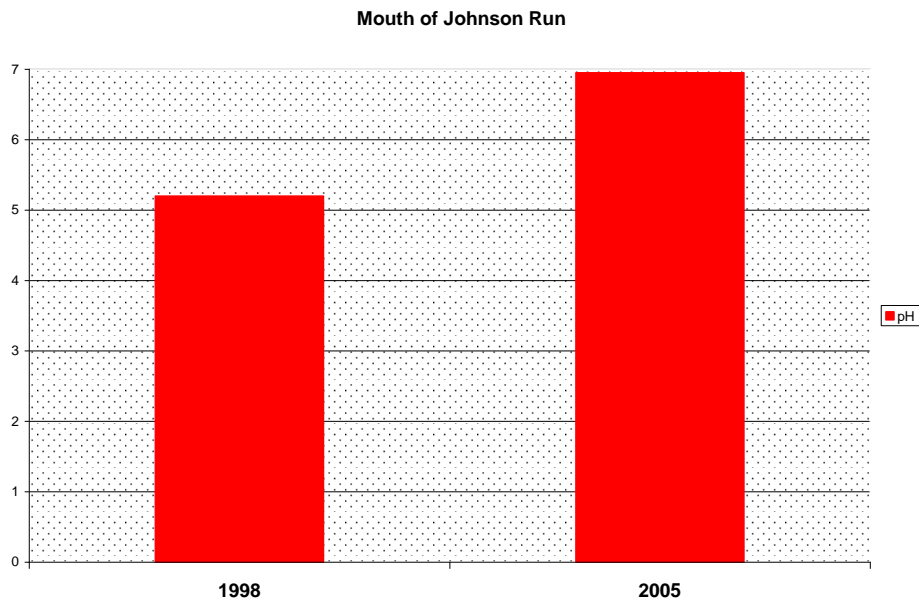


Mottled Sculpin found in Johnson Run during DEP electro-fish sampling on 8/13/10.

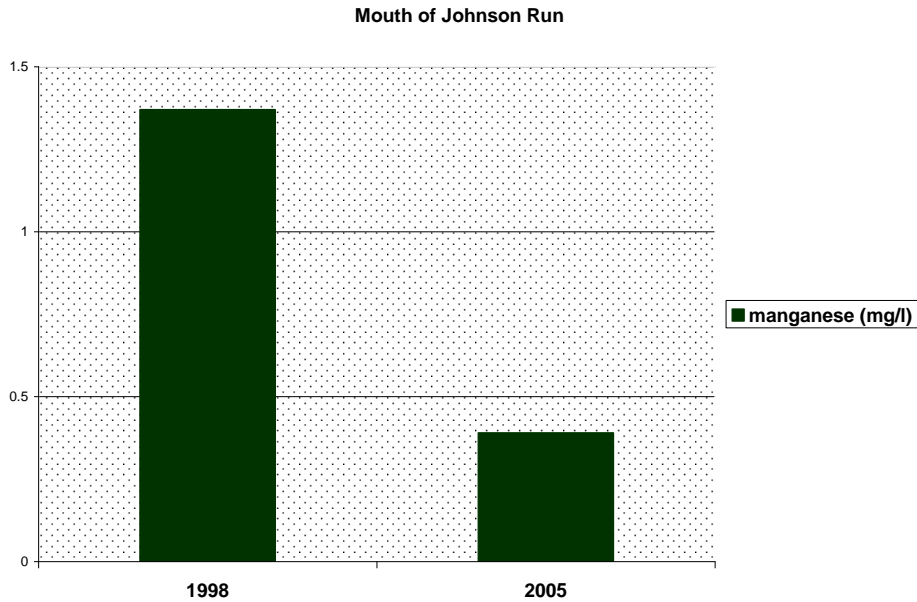
Results

According to DEP's East Branch of the Clarion River Priority Watershed Report 2004 Update, developed by the Knox District Mining Office (DMO), positive results were reported as a result of the land reclamation work done by Sweet Soils, Inc. At a sample location downstream of the reclamation area, pH increased from 4.0 to 7.7 and alkalinity rose from 3.3 milligrams per liter (mg/l) before the project to 243.1 mg/l after it was completed. Metal levels improved as well. Aluminum was reduced from 3.1 mg/l to 0.8 mg/l, iron from 2.0 mg/l to 1.6 mg/l and manganese from 6.7 mg/l to 4.6 mg/l. The improvements made on this unnamed tributary contribute to the overall water quality on the main stem.

Samples from the mouth of Johnson Run have also shown significant improvements. The most significant have been a rise in pH (figure 1), from an average of 5.2 in 1998 to 7.0 in 2005, and a 72% reduction of the Manganese load over the same period (figure 2). Aluminum and Iron levels have decreased by 15% and 17% respectively. The treatment systems remain in place and continue to improve water quality. In order for water quality criteria to be met, the pH must stay above 6.0 and iron levels must not exceed 1.50 mg/l (total 30-day mean), manganese 1.00 mg/l and aluminum 0.75 mg/l. Iron and aluminum, although reduced by the treatment systems were not exceeding criteria before the restoration work. The documented level of manganese and pH now are acceptable.



pH rise resulting from AMD remediation



Manganese decrease resulting from AMD remediation

Partners and Funding

In the late 1990’s, a local watershed group formed to improve East Branch Lake water quality as well as surrounding waters, including Johnson Run. The group, known as the Elk County Fishermen, was responsible for a number of projects intended to clean up AMD, concentrating their efforts on streams tributary to East Branch Lake and Johnson Run. A Restoration Plan for the East Branch Lake and Johnson Run was completed by Hedin Environmental, Inc. in 2002 to focus attention on the steps necessary to restore the impaired water bodies, with the goal of bringing back healthy fish populations. The Elk County Fishermen and the North Central Pennsylvania Regional Planning and Development Commission (NCPRPDC) utilized a total of \$407,000 of Growing Greener and Watershed Restoration and Partnership Act funds, to build the passive treatment system.

Lake Jean, Luzerne and Sullivan Counties

Addition of lime to acidic lake re-establishes fishery.



Boat Launch at Lake Jean. Photo courtesy of Steve Means, PADEP-NCRO

Water Body Improved

The Pennsylvania Department of Environmental Protection (PA DEP) petitioned the EPA in early 2010 to move Lake Jean from Category 5 to Category 2 on the Impaired Waters List, because the lake is now attaining its Aquatic Life, Drinking Water and Recreational designated uses. An effort to improve water quality by adding lime to the lake, led by the Pennsylvania Department of Conservation and Natural Resources (PA DCNR) has resulted in less acidic conditions. Improved water quality has in turn improved the fish population and reduced nuisance aquatic plants in the lake.

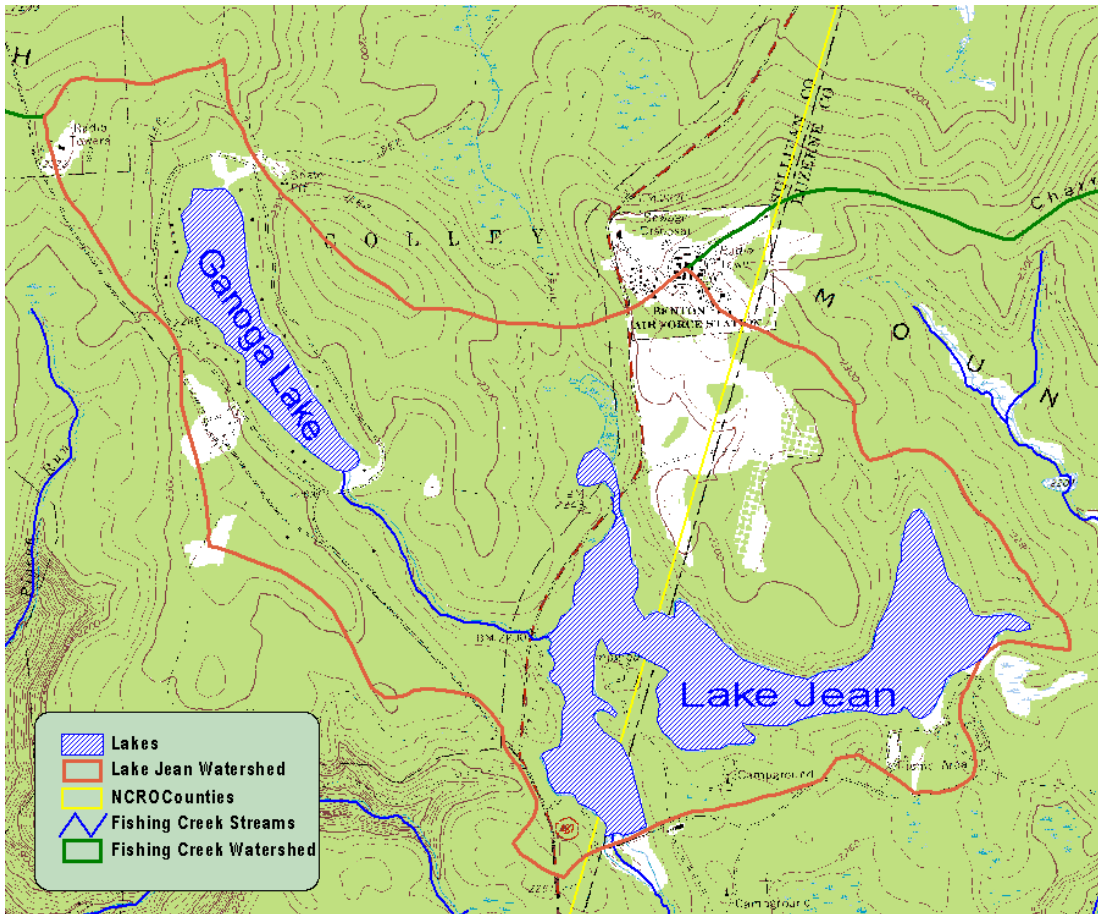
Problem

Lake Jean lies in northeastern Pennsylvania, on the border of Luzerne County and Sullivan County, within Ricketts Glen State Park (Figure 2). The lake covers approximately 253 acres and is relatively shallow, with an average depth of 5.9 feet. About 1,745 acres are tributary to the lake, of which approximately 80% are forested. Kitchen Creek, also called Ganoga Tributary, flows from Ganoga Lake and feeds the western end of Lake Jean (Figure 3). A dam originally built in 1905 was reconstructed in 1956 to deepen the lake. Acidic deposition has historically caused a

low pH in the lake. As a result, Lake Jean was placed on the State's 303(d) "List of Impaired Waters" in 1996 because it did not meet the Aquatic Life Use.



Lake Jean location map, source; TMDL



Map of Ganoga Lake and Lake Jean. Source; TMDL

The source of acidic deposition originates hundreds of miles away through the burning of fossil fuels to generate power and automobile exhaust. The lake is also impaired for mercury caused by atmospheric deposition. According to the 1993 Diagnostic Study of Lake Jean by F.X. Browne, the average pH in the summer of 1991 was 5.8. A TMDL was approved for the lake in 2004. Rainfall monitoring data collected by the National Atmospheric Deposition Program and included in the TMDL indicates that the average rainfall pH in the area of Lake Jean in 2002 was approximately 4.4. The soils and geology in Lake Jean’s watershed are not well suited for neutralizing acidic deposition that is common in this part of the country. Therefore, runoff and groundwater recharge to the lake lower pH and affect the lake’s biota.

The lake’s fish have been negatively affected by the acidic conditions. Species diversity, fish population and health have all been documented to be in poor condition. Also, an intractable bladderwort problem existed prior to liming the lake. This acid tolerant plant is essentially a floating stem which dominated the lake’s surface to the point that it needed to be raked from the beach by PA DCNR personnel on a daily basis. According to a February, 2008 Pennsylvania Fish and Boat Commission (PA F&BC) report, it covered much of the lake’s surface and shoreline.

Even though Lake Jean is a candidate for de-listing based on the pH improvements now meeting the water quality criteria, the lake will remain on Category 4 due to the elevated levels of mercury still found in fish tissue.

Project Highlights

The 1993 Diagnostic – Feasibility Study of Lake Jean Pennsylvania, completed by F.X. Browne, Inc. using 314 funds provided by the EPA as part of the Clean Lakes Program, recommended application of lime to the lake to raise pH in order to improve water quality and improve conditions for aquatic vegetation and fish.

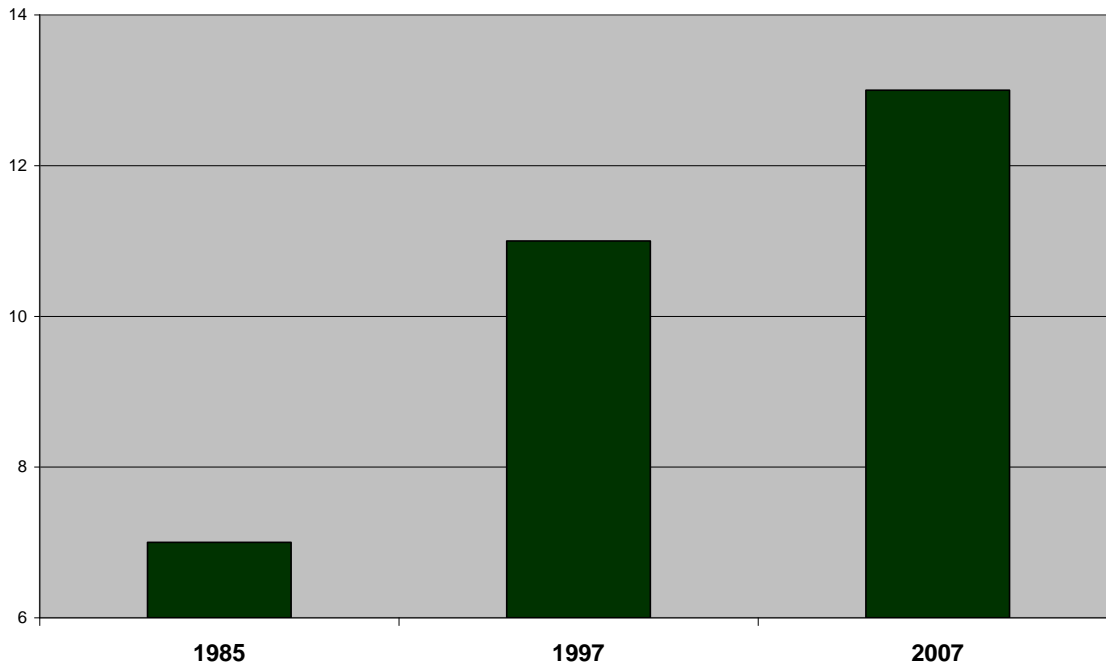
As a result of the study, liming the lake and its main tributary using ground agricultural limestone began in 1995 and continues to the present day on a semi-annual basis, during the spring and fall each year. Liming the lake has been done by the PA DCNR, which is responsible for management of Ricketts Glen State Park. From 1995 through 2009 an average of approximately 19 tons of lime have been applied to the lake annually, except in 2001 due to lake drawdown and 2003 due to good water quality.

Results

Samples taken during a PA DEP study of the lake in 2007 found pH levels at various locations and depths throughout the lake ranged from 6.5 to 7.4. The pH needs to be in the range of 6.0 to 9.0 to meet water quality criteria.

Increasing fish populations, diversity of species, and overall fish health began soon after application of lime began, as documented by the PA F&BC. Relative weight of several species, including pumpkinseed, bluegill, largemouth bass, black crappie and yellow perch, increased from 1997 to 2007. Also, the number of species collected increased from 7 in 1997 to 12 in 2007 (Figure 4). During 2003 and 2007 assessments of the lake by the PA F&BC, it was noted that bladderwort was no longer a problem, and actually it was nearly eliminated. As pH has risen, acid intolerant species have begun to compete with bladderwort, resulting in a more diverse plant community.

Fish Species Collected in Lake Jean



Results of PAF&BC fish surveys

Partners and Funding

Since completion of the F.X. Browne Study in 1995, the collective efforts of the PA DCNR, PA F&BC, PA DEP and the Fishing Creek Sportsmen Association have resulted in a more viable fishery. The PA DCNR, with assistance from the Fishing Creek Sportsmen Association has been responsible for funding and application of lime to the lake. The PA DEP and the PA F&BC have studied and sampled the improvement of aquatic vegetation and fish populations. Approximately \$12,000 total has been spent to add lime to Lake Jean and its main tributary since 1995.

Lake Jean is located in the 10th U.S. Congressional District.

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Little Coon Run, Clarion County

Forested stream recovers from abandoned gas well discharges



Little Coon Run, above the confluence with Coon Creek.

Water Body Improved

The Little Coon Run watershed has been subject to Abandoned Mine Drainage (AMD) for decades, resulting in water quality degraded by elevated metal loads and depressed pH. Little Coon Run was placed on the State's 303(d) "List of Impaired Waters", which is now known as Category 5 of the PA Integrated Water Quality Monitoring and Assessment Report in 2004. The source of impairment is Abandoned Mine Drainage, and the cause is metals and pH. Water quality has been improved as the result of passive AMD treatment systems and abandoned gas well plugging. State water quality criteria are now being met. The Department of Environmental Protection (DEP) plans to move all four segments on the impaired list, totaling 5.12 miles, from Category 5 to Category 2, because it is attaining its Aquatic Life designated use.

Problem

Little Coon Run flows north through Clarion County until its confluence with Coon Creek, which empties into the Tionesta Reservoir in Forest County. This watershed has been subject to AMD for decades, resulting in water quality degraded by elevated metal loads and depressed pH.

AMD occurs after coal mining activities when pyrite, an iron-sulfide mineral, becomes exposed to air and water. When rain, stormwater runoff or groundwater makes contact with the pyrite, a chemical reaction occurs that produces a low pH, acidic water, often with elevated levels of metals

such as aluminum, iron and manganese. Acidic water can endanger aquatic life such as macroinvertebrates and fish. Often pollutants such as Aluminum, Iron and Manganese are present at toxic levels. However, each site is unique and while one metal may be a problem at one site another may be a bigger problem at another site. In order to restore AMD degraded streams, efforts are generally directed toward reducing the metal loads and neutralizing pH by adding alkalinity to the discharge.

A PADEP biologist's field assessment at the mouth of Little Coon Run in August, 1999 noted that the stream had a "very low pH, lack of mayflies". It also mentioned that no fish were observed. The field assessment identified Little Coon Run's biology as impaired.

Project Highlights

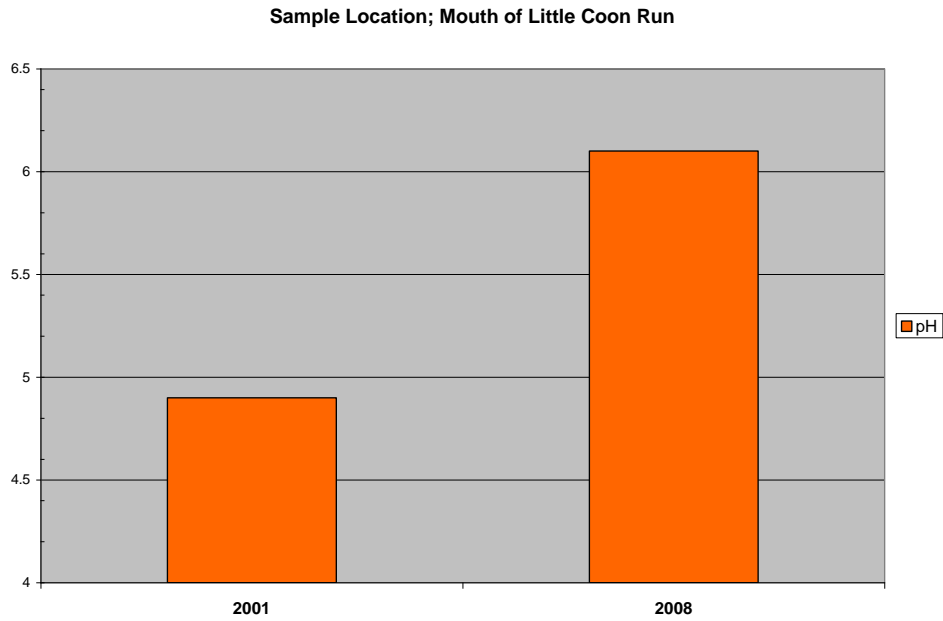
A Watershed Assessment and Restoration Plan funded by Growing Greener was completed by Hedin Environmental in 2003. Three discharges, all abandoned oil and gas wells, were identified as the most significant sources of AMD in the Little Coon Run watershed and were targeted for treatment. It was determined that two of the discharges were best suited for being plugged while the other would need to have its discharge directed into a passive treatment system to clean up the AMD.

The passive treatment system consists of an anoxic limestone drain, a settling pond and a constructed wetland. The well plugging and passive treatment system were all completed in 2007. The passive treatment system is located on State Game Lands # 24. Nearly a mile of permanent access road needed to be constructed to provide access to the treatment site. Passive AMD treatment sites need to be inspected periodically so permanent access must be maintained.

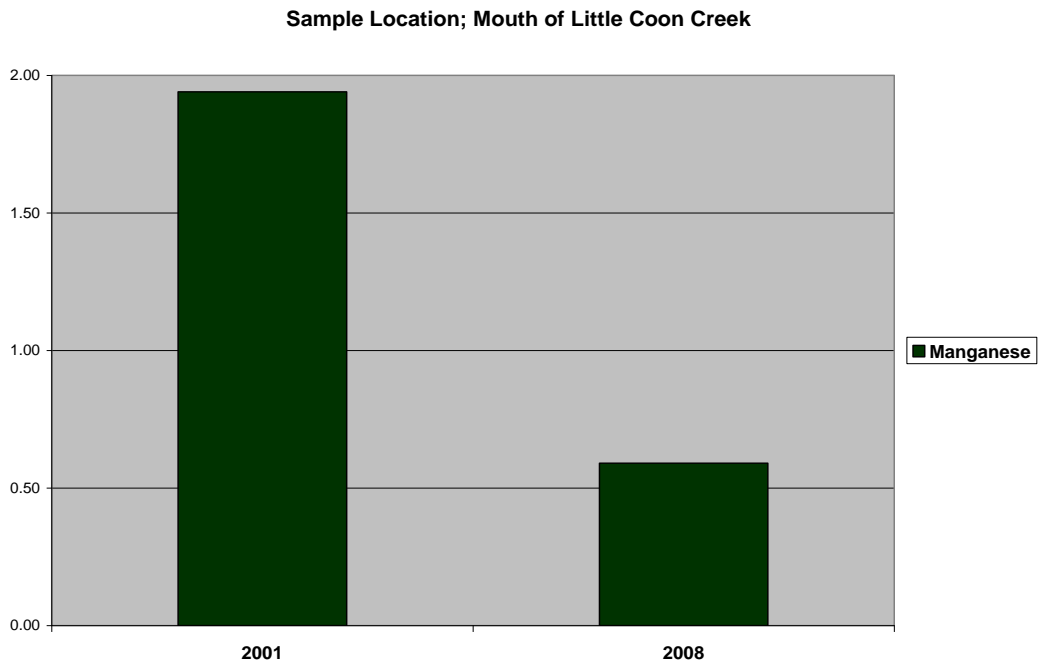
Results

According to the restoration project's final report, sample results from the mouth of Little Coon Run demonstrate significantly improved water quality. In 2001, before restoration projects were completed, average pH was 4.5. The average pH at the same location in 2008 was 6.24 (figure 1) with the final reading in September of that year at 7.0. In order to meet state standards for attaining the designated use of Aquatic Life, a stream pH needs to be 6.0.

Metal concentrations have shown significant improvements as well. The largest decrease was Manganese, which dropped 70% between 2001 and 2008 (figure 2), while Aluminum declined 26%, although it was attaining before the treatment projects were completed. Manganese levels now appear to be attaining state standards. Manganese was last measured at 0.22 mg/l in September 2008.



Pre- and Post- treatment Little Coon Run pH levels



Pre- and Post- treatment Little Coon Run Manganese levels

The following were collected during a fish survey conducted by PADEP staff in August, 2010;

- 1 - Northern Hogsucker
- 2 - Mottled Sculpin
- 2 - Common Shiner

- 3 - Longnose Dace
- 4 - Creek Chub

The fish collected indicate water quality has improved significantly. Particularly the Mottled Sculpin, which are pollution intolerant and are not frequently found in streams with elevated levels of pollutants. PA Fish and Boat Commission's web site states that Mottled Sculpin are common in "clear, clean upland and mountain streams". Finding the fish in Little Coon Run in 2010, when none were present during the DEP field biologist's site visit in 1999 before any treatment work was completed, indicates that considerable improvements to water quality have occurred as a result of the remediation efforts in the watershed. This is especially true when a species such as Mottled Sculpin are present.



Mottled Sculpin from near the mouth of Little Coon Creek electro-fishing on 8/12/10

Partners/Funding

Partners involved in the restoration of Little Coon Run include DEP-BAMR, PA Game Commission, Farmington Township, Western Pennsylvania Coalition for Abandoned Mine Reclamation (WPCMR) and Hedin Environmental. The projects were funded by Growing Greener and the Office of Surface Mining's Appalachian Clean Streams Program. Continual Operation and Maintenance is provided by Farmington Township.

While no 319 funds were specifically used to construct the passive treatment system or plug the abandoned oil and gas wells, PA DEP's Nonpoint Source program provided \$40,000 as part of Growing Greener Grant that was utilized for the Watershed Assessment. Additional funds were provided in excess of \$400,000 that enabled the project partners to complete the construction of the passive treatment system and plug the abandoned wells.

Miller Run, Huntingdon County

Conservation group restores stream degraded by abandoned coal mines

Water Body Improved

Discharges from abandoned coal mines and coal spoil material used to build dirt and gravel roads have been a source of acidic runoff to Miller Run for decades. As a result of the Abandoned Mine Drainage (AMD), Miller Run became impaired with low pH and elevated metals, particularly aluminum and manganese. Consequently, Miller Run was placed on Category 5 of the PA Integrated Water Quality Monitoring and Assessment Report in 1996. The source of impairment is AMD and the causes are metals and pH. A number of partners utilizing several funding sources have constructed AMD treatment systems and made dirt and gravel road improvements that improved water quality in Miller Run. The PA Department of Environmental Protection (DEP) plans to move the 4.47 mile stream segment from Category 5 to Category 2, on the 2012 PA Integrated Water Quality Monitoring and Assessment Report, because it is attaining its Aquatic Life designated use.

Problem

Miller Run flows through the Broad Top Coal Fields in Huntingdon County. It is a tributary of Shoup Run, which empties into the Raystown Branch of the Juniata River. This part of south central Pennsylvania has been subject to deep mining operations dating back to the early 1900's and surface mining operations that were mostly abandoned by the 1980's. Prior to 1977, no regulations were in place to mandate stabilization of coal mining operations. Unstable excavations and spoil material remaining from abandoned mining activities degraded Miller Run's water quality. By the 1990's Miller Run was only able to support fish in its headwaters, upstream of the most significant AMD impacts. Metals and pH exceeded the state's water quality criteria.

When surface and subsurface coal mining activities are not properly reclaimed, minerals such as iron-sulfide (pyrite) are left exposed to the elements. When rain, stormwater runoff or groundwater makes contact with pyrite, a chemical reaction occurs that produces low pH and acidic water. The polluted water then enters the ecosystem, often with toxic levels of iron, manganese and aluminum causing stress to aquatic organisms, sometimes to the point where streams can be rendered lifeless. Through a variety of approaches to remediation, generally it is necessary to increase the alkalinity of the polluted streams to reduce metal loads and enable aquatic organisms to return.

A DEP biologist's survey near the mouth of Miller Run in June, 2004 noted that the biology of Miller Run was impaired. It documented metal precipitate in the stream, and only acid and metal tolerant macroinvertebrates were present. Other surveys conducted in the watershed at the same time indicated that the headwaters and tributaries of Miller Run were not impaired. AMD impacts were directly affecting the main stem of Miller Run. Remediation efforts to date were not yet showing benefits to the polluted waters. Although a native brook trout population had been

documented in the headwaters of Miller Run, trout no longer existed from the upper reaches of the watershed downstream to the confluence with Shoup Run.

Project Highlights

The Shoup Run Watershed Association (SRWA) formed in 1998 and began working to clean up Shoup Run, including its tributary Miller Run. A number of projects have been completed since the late 1990's in the watershed, including those that address AMD sources of pollution as well as other nonpoint sources, such as streambank stabilization and fluvial geo-morphological (FGM) stream restoration. However, AMD remediation has been the primary focus because it is the most significant cause of impairment in the watershed. Passive treatment systems in the Miller Run watershed include several limestone ponds (Figure #1) and wetlands to allow metals to drop out. Limestone sand was applied directly to Miller Run and one of its tributaries. Land reclamation was also done to stabilize areas on the surface that were contributing AMD runoff to Miller Run.

In one reclamation effort, SRWA and the Huntingdon County Conservation District (HCCD) partnered on a passive alkalinity project for a dirt access road to State Game Lands #67, which runs along Miller Run. The road had been built out of coal mine spoil. It was contributing AMD to Miller Run with each runoff-producing rainfall event. There were concerns that runoff from the road might reverse the positive trends in stream quality that had been achieved by the completed passive AMD treatment systems. The acid producing material was removed and replaced with limestone rock. Also, erosive roadside ditches along more than a mile of the road were stabilized with limestone rock to reduce erosion and raise the alkalinity of runoff flowing to Miller Run (Figure #2).



Miller Run Limestone Pond

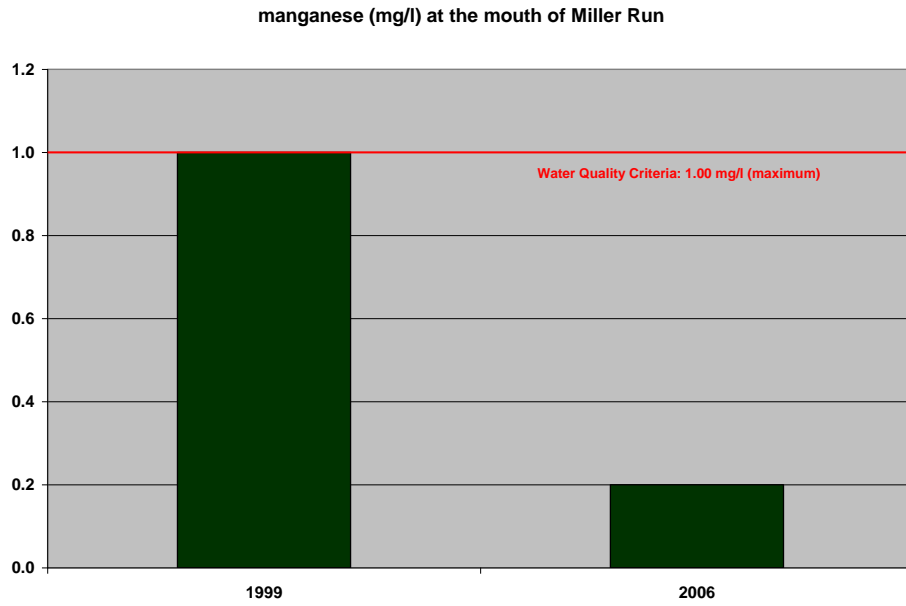


Passive Alkalinity Addition Project on State Game Lands #67 Access Road.

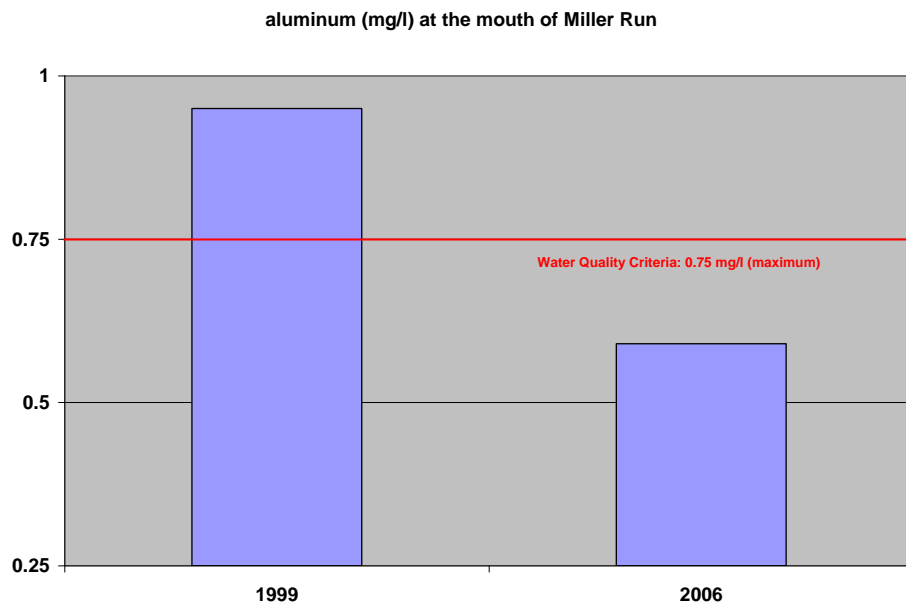
Results

Water quality in Miller Run has improved significantly as a result of completion of all the work in the watershed. Comparing sample averages from just above the mouth of Miller Run taken in 1999 and 2006, manganese dropped from 1.00 milligrams/liter (mg/l) to 0.20 mg/l (Figure #3), aluminum from 1.31 mg/l to 0.59 mg/l (Figure #4) and pH rose from 4.6 to 7.0 (Figure #5). The stream is now attaining its state water quality criteria for metals and pH.

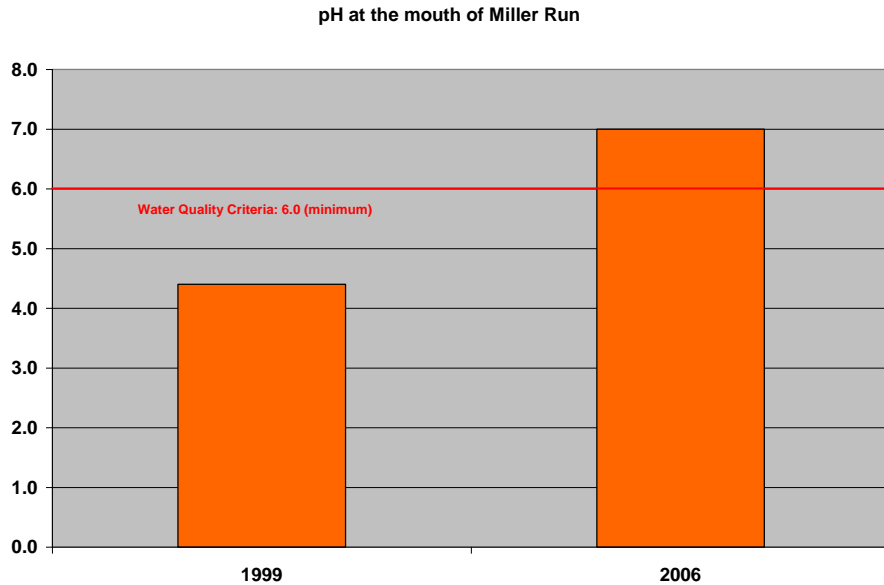
Brook trout can now be found in the stream between the headwaters and the mouth. The presence of brook trout in Miller Run enables funding by the Coldwater Heritage Foundation to develop a Coldwater Conservation Plan for the stream, which was recently completed by the HCCD and is currently out for public comment. This will ensure that the improved water quality in Miller Run does not become degraded again in the future.



Manganese decrease resulting from AMD remediation projects.



Aluminum decrease resulting from AMD remediation projects.



pH rise resulting from AMD remediation projects.

Partners/Funding

The SRWA was formed in 1998. Funding provided by the Western Pennsylvania Coalition for Abandoned Mine Reclamation (WPCAMR) helped get the association started. In their effort to improve Shoup Run, the SRWA acquired funds from PA Growing Greener, Clean Water Section 319 and Office of Surface Mining (OSM) to improve Miller Run’s water quality, one of the major AMD producing tributaries to Shoup Run. Since work began, the SWRA has partnered with EPA, the Federal Office of Surface Mining (OSM), PA DEP, PA Game Commission, HCCD and the Western PA Watershed Program as well as many other public and private organizations.

Since work began in the late 1990’s, approximately \$500,000 has been spent building 11 projects to remediate Miller Run, some were two-phase projects or treatment system upgrades. The majority of the cost and effort was directed toward addressing AMD, although some smaller projects addressed eroding stream banks and flooding issues. Approximately \$300,000 of the funds spent were provided by Clean Water Act Section 319 through four projects, which were awarded and implemented by the PA DEP Watershed Management Program.

Improving Watershed Stories

Many of the watersheds identified in these Improving Watershed Stories are part of a long-term restoration effort to improve water quality where water bodies have historically been impaired by AMD sources. There are few watersheds that are nutrient- or sediment-impaired for which Improving Watershed Stories have been written to date, although several nutrient- and sediment-impaired water bodies are showing signs of improvement. Water quality information is included for these watersheds in each write-up if data is available.

These watersheds include: Elmhurst Lake (Lackawanna County); Middle Creek (Schuylkill County); Pierceville Run (York County), Shoup Run (Huntingdon County); and Stephen Foster Lake (Tioga County).

Elmhurst Lake

Elmhurst Lake, a 181 acre water supply reservoir with public shoreline fishing access, is located south of Scranton in Lackawanna County. The large (37.3 sq. mi.) watershed includes numerous upstream impoundments and a mixed forest (67%), agricultural (17%), and urban (7.6%) land use coverage. Roaring Brook is the main tributary. The lake receives two municipal sewage treatment plant (STP) discharges (Moscow and Covington Township).

The lake was listed in 2002 as Impaired for Aquatic Life Use because of dissolved oxygen and pH violations based on both the 1999 and 2001 assessed lake data and the water quality standards which were in place at that time. All 2006 data meets PA standards and lake assessment benchmarks, and the lake has visibly improved.

The improvement in the water quality trends in Elmhurst Lake can be attributed to several supporting point and non point source discharge factors, including: 1) low discharge limits permitted to the two STP dischargers in the watershed. The Moscow plant has just recently been upgraded as well; 2) The Lake is *drained* (not just drawn down) periodically, which flushes out accumulating nutrients and prevents nutrient build-up as would normally occur; 3) Agricultural best management practices (BMPs) installed in the watershed recently totaling 904.2 acres of various practices including crop, tillage and pasture management, cattle access control, nutrient management, and wildlife enhancements; 4) All tributaries and the main stem Roaring Brook are meeting Aquatic Life Use.

Middle Creek

Middle Creek flows into the Upper Swatara Creek in eastern Schuylkill County. This region of the state is well known for its anthracite coal mining, which occurred from the mid -1800's through the mid -1900's. Deep coal mining was predominant, resulting in extensive mine shafts and tunnels, many of which remain. Strip mining and re-mining coal spoil in the vicinity of Middle Creek degraded the stream physically. As a result of decades of impacts from the mining activities, Middle Creek was impaired with high metal concentrations and was flowing directly into an open

mine pit. Middle Creek was placed on the State's 303(d) "List of Impaired Waters" in 1996. The source of impairment is Abandoned Mine Drainage (AMD) and the cause is metals. Middle Creek is included in the Upper Swatara Creek TMDL.

The Bureau of Abandoned Mine Reclamation (BAMR) built the Indian Head and Middle Creek Projects in the past decade. Completion of these projects significantly improved the stream's water quality. The Indian Head Project was completed in 2001, at a cost of approximately \$200,000. It is a passive treatment system consisting of aerobic wetland cells and a settling basin which treat two AMD outfalls. Highwalls in the watershed were backfilled as well. The Middle Creek Project was built in 2003. During this project over 1,000 feet of the stream was reconstructed because it had been moved several times as it flowed through an area of extensive strip mining. This project also reclaimed stripped mine lands by regrading more than a million cubic yards of material. Final cost was approximately \$1,300,000 and was provided by the Appalachian Clean Stream Initiative.

According to the TMDL, which was completed in 1999, the iron level at that time was 2.18 mg/l, aluminum 1.02 mg/l and manganese 1.07 mg/l. In 2007 and 2008 DEP Water Quality Standards staff sampled Middle Creek. Results show reductions of metals in the stream. The average iron level was 0.89 mg/l, aluminum 0.18 mg/l, and manganese 0.99 mg/l. Fish populations appear to be improving as well. In July, 2010, DEP staff electroshocked Middle Creek upstream of Tremont and found brook trout, creek chubs, blacknose dace, longnose dace, and common shiners. Eleven of the 17 brook trout collected were young of the year, which indicates that they are not only present in the stream, but are also reproducing. Middle Creek will continue to be assessed by DEP to ensure that minimum state standards are being met. If so, it will be removed from the 2012 Impaired Waters List.

Pierceville Run

Pierceville Run flows 2.67 miles through hilly farmland in southern York County in Subbasin 7H, (Lower Susquehanna River). It joins Centerville Run, which then flows into the South Branch Codorus Creek just north of Centerville, PA. Land use in this 6.7 sq. mi. area of York County is a mix of crop fields and pasture along with forested patches. There are no urban areas in this subwatershed. The stream was assessed as "high priority" for restoration during a full South Branch watershed assessment project sponsored by the Izaak Walton League's Chapter 67 (IWLA) under a 1999 Section 319 NPS grant. Pierceville Run streambank erosion was significant, with 3 to 4 foot vertical banks eroding up to 1.5 ft./yr. Two stations on the reach were also assessed for habitat and macroinvertebrate conditions by DEP in 1999, resulting in the 2002 Impaired Aquatic Life Use listing on the Integrated Report due to agriculture, leading to "siltation and flow alterations" (i.e. unstable stream banks resulting in extensive stream migration). A TMDL for the entire South Branch watershed was approved by EPA in 2003. Impairments addressed were nutrients, siltation, and suspended solids. Pierceville Run impacts were singled out as 'Allocation 4' for targeted reductions as follows: Phosphorus reductions needed for farmland and streambanks, 2,387 lbs./yr. (or 73% reduction); sediment reductions for farmland and streambanks, 1.54 Mlbs./yr. (42%) (from page 22 of the TMDL).

The IWLA secured a 319/Growing Greener Grant in 2003 to design and restore 2,271 linear feet of Pierceville Run using natural stream channel design. The project, implemented in 2006, improved

flow regimes and aquatic habitat by grading and stabilizing streambanks using numerous in-stream rock structures, and by installing an extensive riparian buffer including grasses, forbs and 600 trees. The tree buffer installation was funded by the DEP CREP program managed by the York County Conservation District. After project completion, the estimated sediment savings for this reach was reported at 700 tons/year (2272 ft. x .308 ton/lin. ft. average erosion rate in project area) in the final report (July 2006). This amounts to 9% of the TMDL sediment load reduction needed for the entire South Branch Codorus Creek watershed.

DEP's Watershed Support Section has been monitoring this project for macroinvertebrates, habitat, pebble counts and water chemistry since Spring 2006, using protocols that could be used by citizen monitors. Unfortunately, no citizen groups have stepped forward. Besides visual observations and photo documentation that indicate greatly improved habitat, our data is documenting improvements in pebble counts: the trend is towards larger gravel and cobbles, which provides increased living space for macroinvertebrates. Just before construction (May 2006), the mid-station substrates were 34% sand-silt, 62% pebbles and 4% cobbles; by 2009 (Sept), the percentages were 4%, 81% and 15 % respectively.

Shoup Run

Shoup Run flows through the Broad Top Coal Fields in southwestern Huntingdon County. It is a tributary of the Raystown Branch of the Juniata River. This area has been subject to a number of deep mining operations dating back to the early 1900's and surface mining activities that were mostly abandoned by the 1980's. Abandoned Mine Drainage (AMD) from un-reclaimed coal extraction has contributed to elevated metal levels and lowered pH. As a result, Shoup Run was placed on the State's 303(d) "List of Impaired Waters" in 1996. The source of impairment is AMD and the causes are metals and pH. A TMDL was completed for the Shoup Run watershed in 2001.

The Shoup Run Watershed Association (SRWA) was formed in 1998 with funds provided by the Western Pennsylvania Coalition for Abandoned Mine Reclamation (WPCAMR). The SRWA has been acquiring Growing Greener and Section 319 funds for AMD treatment projects to improve water quality in Shoup Run. The Huntingdon County Conservation District (HCCD) completed a Section 319 funded Watershed Implementation Plan for Shoup Run and its tributaries in 2004. The plan identified AMD as the most significant issue in the watershed and suggested a number of AMD treatment projects to improve water quality.

Two AMD passive treatment projects were completed in 2005 and an alkalinity addition project in 2006, totaling \$242,000. All three were funded by Section 319. Another project, which has been awarded \$370,000 of Section 319 funds, is planned for construction early in 2010. The SRWA, often with the assistance of partners such as the HCCD and DEP have also implemented projects to address streambank erosion, excessive flooding and to clean up illegal dump sites.

Samples from upstream of the mouth of Shoup Run show water quality has been improving. The average pH from 1999 through 2001 was 4.61. The average pH from 2005 through 2007 was 6.08. At the same location and over the same time periods, the average manganese level was reduced from 1.60 mg/l to 0.85 mg/l and the average aluminum level dropped from 2.73 mg/l to 1.19 mg/l.

Iron was reduced significantly as well, but levels were attaining state standards from the beginning. Manganese appears to be attaining the state standard of 1.00 mg/l and aluminum has been significantly reduced, but has not yet achieved the standard of 0.75 mg/l. As additional projects are completed, water quality in Shoup Run will continue to improve.

Stephen Foster Lake

Stephen Foster Lake is located in northeastern Pennsylvania, in Bradford County west of Towanda. Mill Creek was dammed in 1977 to form the lake, which covers approximately 75 acres. The lake's watershed covers a little more than 10 square miles and discharges back to Mill Creek, which eventually empties into the Susquehanna River. It is located in Mount Pisgah State Park, which has approximately 150,000 annual visitors enjoying the lake's recreational opportunities, including boating and fishing. The lake is well known as a fishery for bass and panfish.

Approximately 58% of the lake's drainage area is managed for pasture and row crops while approximately 41% is forested. Algae blooms began to occur shortly after the dam was constructed. In time, they became more frequent and severe. Stephen Foster Lake was placed on the State's 303(d) "List of Impaired Waters" in 1996, after a Phase I Feasibility study was completed by Coastal Environmental Services using Clean Water Act Section 314 funds secured by the Bradford County Conservation District. The source of impairment is Agriculture and the causes are nutrients and suspended solids. A TMDL was approved for Stephen Foster Lake in 2001.

By 2004, 11 of the 13 farms in the Stephen Foster Lake Watershed had installed a wide variety of agricultural best management practices (BMPs) as well as a 2,500 foot stream channel restoration project on Mill Creek. Animal waste control, barnyard runoff management systems and stream bank fencing were the principal Ag BMPs installed. Approximately \$1.2 million dollars have been spent to study and implement BMPs in the watershed. Sources of funding have included Growing Greener, Section 319, EQIP, CREP, Act 6, Chesapeake Bay Foundation, Chesapeake Bay Program and matching funds provided by the landowners.

Efforts of the partners supported by these state and federal funds have resulted in improved conditions in Stephen Foster Lake, most notably a significant reduction of phosphorus. A report recently 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. Due to the significant drop of phosphorus flowing into the lake, efforts are now focused on reducing in-lake phosphorus. A current 319 grant is being utilized to determine the most suitable BMP that will reduce in-lake phosphorus to levels that will support a de-listing for aquatic life use.

SECTION FOUR: NONPOINT SOURCE MANAGEMENT PROGRAM PLAN ACCOMPLISHMENTS

Background

Pennsylvania's NPS Management Program Plan-2008 Update includes five long-term goals. These goals were developed during the writing of the 2008 Update. They are largely reflective of the U.S. Environmental Protection Agency's National Strategic Plan goals for watershed restoration which were 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 watershed groups, local governments, and others in the development and implementation of 20 watershed implementation plans meeting EPA's Section 319 criteria to protect and restore surface and groundwater quality.

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.

These goals are incorporated in the NPS Management Program Plan-2008 Update Action Plans for seven approved NPS categories: Agriculture; Construction and Urban Runoff; Hydromodification; Lakes; Land Disposal; Resource Extraction; and Silviculture.

Accomplishments for each of the seven NPS areas are summarized on the following pages.

Agriculture Accomplishments

Goal 1

- Approximately 525 lake acres were changed from either List 4c or List 5 to List 2 on Pa's 2010 Integrated List of All Waters. These lake acres include the Elmhurst Reservoir, Lake Redman and the Muddy Run Reservoir.
- Approximately 83.5 stream miles were listed as impaired for Causes: siltation, nutrients and/or other habitat alterations on the 2008 Integrated List and were removed from the 2010 Integrated List.

Goal 2

- Fifteen Watershed Implementation Plans (WIPs) addressing agricultural sources of impairments have been developed using S. 319 funding. Most are being implemented and progress documented.

Goal 3

- Pre- and post-implementation water quality and BMP monitoring is being completed in agricultural impaired watersheds including the Mill Creek (Lancaster County), Conewago Creek and the Conowingo Creek.
- The EPA developed WIP Tracker Tool is being used to document progress in three agricultural WIP watersheds: Mill Creek (Lancaster County), Conewago Creek and the Conowingo Creek.

Goal 4

- Approximately fifty-four Odor Management Plans (OMPs) have been developed for CAOs and CAFOs where new barns or manure storage structures are being built.
- PA DEP Nutrient Trading Program web site link 'Nutrient Trading' provides current information on Trading Program status. See the DEP web site www.dep.state.pa.us. Approved proposals and contracts/trades are included on the site.
- DEP Water Planning Office facilitates the Trading Program. Seventy-eight (78) proposals have been submitted, fifty-five (55) have been approved for credits, and eight (8) contracts have been completed (six for new development, and two for existing WWTP facilities) through December 2009. Thirty projects have been implemented and certified.
- The Resource Enhancement and Protection (REAP) program made available \$5 million in tax credits for eligible practices in the state's 2009-2010 funding cycle. Total project costs exceeded \$23 million. More information on REAP can be found at www.agriculture.state.pa.us.

- **Pennsylvania's Nutrient Trading Program is facilitating the adoption of many new and innovative technologies to more efficiently utilize agricultural nutrients.**

Goal 5

- **Pennsylvania's Nutrient Management Program tracks NMP implementation for Concentrated Animal Operations (CAOs) and Confined Animal Feeding Operations (CAFOs). Nutrient Management Plans (NMPs) were required for a total of 932 CAOs through 2009. CAFO permit applications approached 350 at the end of 2009.**
- **Act 38 of 2005 required CAOs, CAFOs and volunteer agricultural operation (VAO) farms to have a current conservation plan before nutrient management plans are approved. Additional farm conservation plans are being developed as a result.**
- **Susquehanna and Ohio River basin CREP enrolled increased to 176,222 in the Susquehanna River CREP (200,000 acres goal) and 26,051 acres in the Ohio River CREP (65,000 acres goal) through 2009. The 2008 Farm Bill reauthorized CREP through December 2012. A Delaware River basin CREP is under consideration.**
- **Over 850 commercial manure haulers, applicators and brokers were certified by the PA Dept. of Agriculture through December 2009.**
- **The Penn State University Agriculture & Environment Center web site includes current references to water quality-air quality research. See the AES web site at <http://aec.cas.psu.edu>.**

Construction and Urban Runoff Accomplishments

Goal 1

- **The DEP developed the Erosion and Sediment Pollution Control (E&SPC) General Permit-1 (ESCGP-1) permit for earth disturbance activities of five or more acres over the life of the project. ESCGP-1 is associated with oil and gas exploration, production, processing, or treatment facilities or transmission facilities. Training was held for staff of both conservation districts and DEP Regional Offices, and industry representatives.**
- **DEP completed revisions to the Chapter 102 regulations to incorporate post construction storm water, buffer permitting options, and anti-degradation requirements. Revisions became final on November 19, 2010.**
- **63 conservation districts administered the Dirt and Gravel Roads Pollution Prevention Program in Pennsylvania.**

Goal 2

- **DEP continues its outreach efforts to promote local model ordinance implementation for water quality protections. Approximately 1,000 municipalities have storm water management ordinances in PA, with an additional 1,400 expected to be adopted in the next two years.**
- **The Penn State Center for Dirt and Gravel Road Studies provided training sessions for municipalities throughout the state. An information clearinghouse is maintained at www.dirtandgravelroads.org.**

Goal 3

- **Revisions to program guidance documents and manuals are an ongoing; The DEP has revised the Chapter 102 regulations (Erosion and Sediment Pollution Control) and updates to the more recent Stormwater BMP Manual are in progress.**
- **PennDOT demonstration projects involving the use of compost materials (compost filter blankets, filter berms, and/or filter socks) will be completed in Districts 2-0, 8-0, and 9-0. The PennDOT Specifications Manual, Publication 408, includes standards for erosion and sedimentation control BMPs along roads and highways and at its stockpile and garage maintenance facilities.**
- **Conservation districts and DEP Regional offices issued over 1,853 NPDES General Permits, and 320 NPDES Individual Permits for stormwater discharges associated with construction activities. They also conducted 15,321 site inspections and responded to over 2,706 complaints.**
- **The NPDES Permit application form and permit application process is being revised to include addressing TMDL issues.**

Goal 4

- **The PennDOT Smart Transportation initiative promotes the use of environmentally-sensitive site design techniques including compost filter blankets, filter berms, and/or 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 initiative. Planning is underway for the September 2011 Pennsylvania Stormwater Management Symposium - Sustainable Stormwater and LID conference in Philadelphia. Storm water management BMP research continues with Villanova University.**

Goal 5

- **The Pa DEP provides training and promotes innovative stormwater management measures, and interacts with DEP regional offices and conservation districts to hold training sessions and program evaluations.**
- **The PennDOT provides for facility audits which include Stockpile Quality Assurance visits by the Pennsylvania State Center for Dirt and Gravel Road Studies staff, and ISO 14001 Environmental Management Systems internal, external and surveillance audits.**
- **The PennDOT Strategic Recycling Program promotes the use of recyclable materials (e.g. foundry sand, crushed glass, reclaimed asphalt pavement (RAP)) in road and highway construction or maintenance projects.**
- **The DEP Stormwater Management Program staff developed a draft Pennsylvania Model Stormwater Management Ordinance to serve as a model ordinance or template for municipalities developing municipal stormwater management ordinances.**
- **A total of 58 counties are either developing a countywide stormwater plan or negotiating a contract to submit a request for stormwater planning. State funding for the preparation and implementation of local stormwater management plans was discontinued by the PA legislature effective July 1, 2009. Approximately thirty-two county wide plans were completed and approximately fifteen are proceeding on a reduced scope.**
- **The DEP has developed a Draft PAG-13 General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s). This draft was published for public comments on April 4, 2009. Comments were compiled and analyzed, and the draft final PAG-13 was submitted to EPA on March 9, 2010. Negotiations with the EPA are continuing. The current PAG-13 has been extended to June 11, 2012.**

Hydromodification Accomplishments

Goal 1

- Information relating to removal of dams in Pennsylvania is maintained at the http://www.americanrivers.org/site/PageServer?pagename=AR7_Region_MidAtlantic_dept American Rivers webpage.
- Sediment impacts are addressed on impaired water bodies through stream bank restoration, riparian buffer planting, and NSCD projects to improve stream channel stability and function. Section 319 funds are targeted to impaired water bodies where TMDLs and Watershed Implementation Plans have been completed.
- Growing Greener II, through the County Environmental Initiative allocations, has made it possible for many creative approaches. It is also utilizing NRCS, County and Conservation District resources to address those sites.

Goal 2

- The Keystone Stream Team (KST) completed the Natural Stream Channel Design Guidelines in March 2007. This document can be found on its webpage at www.keystonestreamteam.org. The KST is considering an update to the NSCD guidelines.

Goal 3

- The Citizens Volunteer Monitoring Program (CVMP) has evaluated and selected several monitoring protocols appropriate for use with volunteers and is field-testing their use on NSCD projects located on the South Branch of Codorus Creek in York County.
- Representatives of Aquatic Resources Restoration Company have continued post NSCD Project construction monitoring workshops on the East Branch Codorus Creek and South Branch Codorus Creek.

Goal 4

- During 2006, the KST researched and documented a range of costs for assessment, design and construction of NSCD projects and posted it on its web site at www.keystonestreamteam.org. This information is still available, but the KST is considering an update to the NSCD Guidelines.
- Currently there are two databases accessible through the KST web site. One contains engineering design data and reference reach data for designing NSCD projects around the State. The other contains information on NSCD projects that have been constructed in the North Central and South Central regions of Pennsylvania. The creation of these databases was supported by a Section 319 grant.

- The KST continues to be the focal point for NSCD information, education, and outreach. A wealth of information is available and maintained on www.keystonestreamteam.org. Specific information regarding BMPs relating to NSCD can be found in the Natural Stream Channel Design Guidelines, Chapters 6, “Creating the Final Design”. The KST is considering an update to the Natural Stream Channel Guidelines.
- Current reference reach and sediment transport data for new and existing projects is included in the NSCD repository www.keystonestreamteam.org.

Goal 5

- The Natural Stream Channel Design Guidelines, which can be found on the KST web site at www.keystonestreamteam.org is a comprehensive tool for educating the public about channel maintenance and stream function, particularly in Chapter 2, “Reading the River” and Chapter 4, “Data Collection and Analysis”.

Lakes Accomplishments

Goal 1

- The reclassification of individual lakes is a lengthy lake-by-lake process, requiring in-depth review, input from outside groups and the DEP Regions, formal presentation of pertinent lake data and eventual approval by the Environmental Quality Board. This task is an ongoing effort of DEP's Bureau of Watershed Management (Clean Lakes Program) and Bureau of Water Standards and Facility Regulation (Water Quality Standards Division). The Division of Water Quality Standards has developed a template for the reclassification process, and the Division of Watershed Support maintains a list of lakes needing reclassification. Five lakes (Blue Marsh Lake, Lake Luxembourg, Walker Lake, Lake Redman, and Lake Williams) have been reclassified since 2005.
- Several good water quality lakes were removed from the 2008 Integrated List, Category 4C or 5 to Cat 2 or better, with justification by DEP approved by EPA. The lakes and acreages moved from Cat 5 to Cat 2 (meeting assessed uses) are: Duck Harbor Pond (210 ac); Lake Jean (245); Greenwood Lake (5); Pinchot Lake (358); Muddy Run Reservoir (98). Deer Lake was moved from Cat 5 to 4C and will be further removed in 2012 to Cat 2, with the acquisition of 2010 data. Lakes removed from Cat 4C to Cat 2 include Elmhurst Reservoir (174 ac); Lake Redman (253); and Promised Land Upper Lake (468) for pH.
- The 2005 updated Chapter 93 Water Quality Standards (see <http://www.pacode.com>) recognize the natural process of stratification in lakes, ponds and impoundments and apply dissolved oxygen (DO) criteria only in the epilimnion of lakes. In non-stratified lakes, ponds and impoundments, the criteria apply throughout. Water temperature criteria apply only to heated discharges. These changes continue to result in the removal of lake acres from impaired status to meeting aquatic uses. Lake data was assessed as per DEP methods documents available at http://www.portal.state.pa.us/portal/server.pt/community/water_quality_standards/10556/2009_assessment_methodology/666876

Goal 2

- Five conservation districts have completed Watershed Implementation Plans (WIPs) involving lakes with the cooperation of local stakeholders and lake management consultants. The lakes are Lake Luxembourg and Lake Galena in Bucks County, Stephen Foster Lake in Bradford County, and Harveys Lake and Frances Slocum Lake in Luzerne County. Two of the above continue to apply for 319 funds for watershed improvements towards the goal of meeting the TMDL goals.
- Frances Slocum Lake will require a TMDL.

Goal 3

- DEP updates all monitoring documents in the odd-numbered years. In 2011, all lake assessments documented will be updated, posted for public comment, and submitted to EPA for final approval. Currently, the 2009 documents are available at: http://www.portal.state.pa.us/portal/server.pt/community/water_quality_standards/10556/2009_assessment_methodology/666876. The lake methods follow EPA's *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b)*,

and 314 of the Clean Water Act, specifically Table 5-1, Recommended Water Quality Indicators for General Designated Use Categories. Partnerships forged to accomplish statewide lake assessments include those with the Department of Conservation and Natural Resources (DCNR), the County Conservation Districts, the Pennsylvania Lake Management Society (PALMS), the Consortium for Scientific Assistance to Watersheds (C-SAW), and private citizens.

- The Department's switch to the National Hydrography Data Layer (NHD) and new 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 will be moved to the web in 2011-12.
- 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 lowered. Also, as of 2009 data, the watershed loadings of both total phosphorus (TP) and total suspended solids (TSS) have met the targeted TMDL.
 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.
 3. Harveys Lake (Luzerne County) has been monitored for stormwater mitigation, as that is the main focus of BMP implementation. To date, the Lake's total phosphorus loadings have been reduced by more than 45%. A number of phosphorus-reducing stormwater BMPs were installed in 2009 and 2010 with more scheduled for 2011-12.
 4. Lake Wallenpaupack continues to be monitored monthly by the local watershed management district, and they have recently hired a consultant to statistically analyze their data with regard to the TMDL. Significant BMP implementation continues in the watershed.
 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.

Goal 4

- Aquatic invasive species control programs have largely been accomplished by the development and adoption of a formal Aquatic Species Management Plan, the efforts of Pennsylvania's Invasive Species Council (PISC) and the Aquatic Invasive Species Workgroup. DEP has a seat as one of six state agencies represented on the Council in addition to 10 public members. Meetings are held quarterly. The Council has identified priorities and is seeking funds to implement its objectives. The PISC has also completed a management plan for terrestrial invasive species.

- The Pennsylvania Fish and Boat Commission plays an active role in the PISC, has aquatic nuisance species information on its web site and has published educational materials on aquatic invasive species.
- DCNR mounts extensive efforts to mitigate aquatic invasives in the State's public parks. Main targets are Eurasian water milfoil, and in the southeast, water chestnut (Nockamixon State Park).
- DEP participates annually in a partnership with local entities in efforts to control water chestnut in Towhee Lake in Bucks County.
- Outreach on lake issues is accomplished through annual PA Lake Management Society (PALMS) conferences in State College in March of each year. Several regional workshops are also co-sponsored by PALMS.
- PALMS has expanded its services and its web site, and its links to the North American Lake Management Society, which expands those resources significantly.
- PALMS and the Lake Wallenpaupack Watershed Management District web sites offer educational materials on lake protection and management, offer BMP manuals for free downloading, and offer other contacts and links for further information.
- The Consortium for Scientific Assistance to Watersheds (C-SAW), with a partnership with PALMS and Penn State Extension Services, continues to assist lake associations and concerned citizens with watershed and lake management issues and to facilitate popular lake and pond workshops. C-SAW's mission, brochure and program is on the web at (<http://pa.water.usgs.gov/csaw/>).

Goal 5

- DEP initiatives for outreach on NPS lake issues and programs continue as the Department provides speakers and literature resources for conferences such as the Pennsylvania Lake Management Society (PALMS), the premier lake stakeholder workshop in Pennsylvania. The 2011 conference is scheduled for March 2 & 3. The PALMS web site, www.palakes.org, provides information on lake and watershed BMPs, water quality parameters, and other outreach material.
- DEP revised Chapter 102 regulations and guidance which includes protection for stream and lake shorelines, and provided numerous public training sessions for governments, realtors, construction companies and the general public.

Land Disposal Accomplishments

Goal 4

- Several vendors have submitted requests to market their products as alternate on-lot wastewater treatment technologies in Pennsylvania. Vendors that have received classification status 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.

Goal 5

- During 2010, 36 candidates attended the Sewage Enforcement Officers (SEO) Pre-certification Academy training and 34 candidates became certified SEOs.
- A new format for the Pre-certification Academy is currently under development.
- During 2010, 868 SEOs successfully completed 41 classroom courses, 187 completed post-tests, 463 completed Web-based courses, and two SEOs participated in a peer training session.
- Seven Web-based courses are currently being offered that deal with alternative treatment technologies. Two of these were new in 2010 and two others are currently under development.
- Two new classroom courses were also delivered in 2010.
- As of November 4, 2010, there were 271 Act 537 Sewage Management Programs (SMPs) on record, serving at least 395 Pennsylvania municipalities. This is up from 270 SMPs serving at least 392 municipalities at the end of 2009. Without full verification (ongoing), it cannot be concluded that every SMP is valid, or implemented, or that there are not other SMPs in the State as yet undiscovered.
- The Pennsylvania State Association of Township Supervisors (PSATS), in cooperation with DEP, has completed development of a Web-based clearinghouse of resources designed to assist municipalities and their SEOs in developing or modifying a SMP.
- DEP is working with PSATS to create two new SMP fact sheets: 1) Act 537 Sewage Management Programs: Structuring Management Program Requirements and Provisions and 2) Act 537 Sewage Management Programs: Treatment Tank Pumping is Fundamental.
- In 2010, PENNVEST closed on 16 new loans for repair and replacement of on-lot treatment systems, totaling \$322,345. Since the program's inception in 1994, the agency has closed on 436 loans totaling \$4,800,000.
- As part of the federal stimulus program under the American Recovery and Reinvestment Act of 2009, PENNVEST approved 36 nonpoint source projects totaling \$32,600,000, of which 30 have completed construction.
- PENNVEST promotes its Individual On-lot Sewage Disposal Funding Program through DEP, the Pennsylvania Housing Finance Authority, local Sewage Enforcement Officers, conference exhibits, meetings with legislators, county planners, etc.

- **In 2010, the Department of Environmental Protection (DEP) partnered with PENNVEST to develop a non-point source (NPS) funding program to provide a 20% set-aside of the State Revolving Loan fund monies for “green infrastructure”. This program addresses four primary sources of NPS pollution: agriculture, abandoned mine drainage, urban runoff and brownfields. To date, PENNVEST has approved 12 NPS projects as follows:**
 - **8 Agriculture projects funded for a total of \$35,619,668. This will result in the removal of 4.4 million pounds of Nitrogen per year and 2 million pounds of Phosphorus per year from entering surface water streams.**
 - **3 Urban Stormwater projects funded for a total of \$3,070,628. This will result in the removal of 107,000 lbs of sediment per year from entering surface water streams.**
 - **1 Brownfield project funded for \$11,000,000. This project will eliminate contaminated stormwater from introducing high pH and heavy metals into Nine Mile Run and also into the groundwater.**

- **Program data for 2009 indicate that 124 HHW collections were held in 62 communities, involving 96,835 participants and collecting 10,450,230 pounds of HHW, electronics and tires. Data is unavailable for 2010.**
- **At the end of 2009, there were 856 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.**
- **There were eight inter-municipal and public/private collection partnerships in Pennsylvania at the end of 2009: the SW PA HHW Task Force (HHW), the SE PA Regional HHW Program (HHW and electronics), the Loyalhanna Watershed Association (electronics), the Northern Tier Solid Waste Authority (HHW, electronics and tires), PA CleanWays of Butler and Lawrence Counties (electronics and tires), Bedford/Fulton/Huntingdon Counties (HHW and electronics), Elk/Cameron Counties (electronics) and Butler/Crawford/Venango Counties (electronics). More recent data is unavailable.**

- **The Farm-A-Syst materials continue to be used extensively in Penn State University Cooperative Extension’s nutrient management education program.**
- **PDA entered into a multi-year contract with a waste disposal company starting in 2010. After not doing pesticide collections in 2009, Chemsweep collected a total of 73,225 pounds of pesticides in 2010. Because of the interruption of service in 2009, the number of Chemsweep/Household Hazardous Waste partnership events dropped from nine in 2008 to only one in 2010. However, the 3,505 pounds collected at the single HHW event was above the seven-year average of 3,013 pounds per event. Total pesticides collected by the Chemsweep program since its inception now stands at 1,887,302 pounds.**
- **Chemsweep sends out pesticide inventory packets to licensed dealers and applicators in selected counties. This list includes professional applicators, golf courses, landscape services, schools and pest exterminators. Also, Chemsweep is promoted to all applicators at update training and recertification meetings throughout the year. 21 counties are selected for Chemsweep collections in 2011.**
- **In 2009, 49,560.21 dry tons of biosolids were used as a soil supplement on 269.1 acres of active mine lands and 19,397.0 tons were used on 378.4 acres of abandoned mine lands.**

2010 biosolids data are not yet available. In 2010, approximately 4,092 cubic yards of spent mushroom compost were used in wetlands constructed for AMD treatment.

- DEP's Biosolids Program continued to provide formal training for biosolids generators and land appliers in recommended procedures for producing and applying biosolids during 2010.
- The program continued to register haulers of residential septage in an effort to eliminate illegal disposal practices.
- The 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 Department regulations were discovered.
- Pennsylvania Clean Ways merged with Keep America Beautiful in 2010. Collectively, they conducted 5,038 litter and illegal dump cleanups during the year, collecting 7,133 tons of assorted refuse and 66,267 tires. The Pennsylvania Environmental Council (PEC) assumed responsibility for Project COALS in 2008 and in 2010 cleaned up 8 tons of trash and roughly 4,555 tires. Since 1990, these programs and the Susquehanna River Basin Commission have restored more than 5,038 sites and collected upwards of 42,369 tons of refuse and more than 466,922 tires.
- Keep Pennsylvania Beautiful also provides educational resources to help communities raise awareness of the hazards associated with illegal dumping and the availability of affordable disposal and recycling alternatives. With DEP financial support, the organization maintains an Illegal Dump Survey Program, which has identified 5,386 dump sites containing approximately 16,367 tons of trash in 49 counties since its inception in 2005. Of the identified sites, 79% are considered active, 31% are within 50 feet of a waterway and 10% of the sites contain 62% of the trash. The goal of this program is to survey the entire State for illegal dump sites by 2013. For additional results from the Pennsylvania Illegal Dump Survey see the Center for Rural Pennsylvania White Paper 2009 at http://www.rural.palegislature.us/Illegal_Dumpsites09.pdf.
- During 2009, DEP continued the administration of a \$500,000 Illegal Dump Cleanup Grant Program. This program provided competitive grants of up to \$25,000 to 42 successful applicants for public education, cleanup and restoration of dump sites, continuing site surveillance and enforcement of littering and illegal dumping ordinances. Applicants were required to provide match funding in the amount of at least 50% of the grant amount and cannot, in any way, be responsible for the creation or use of an illegal dump located within the Commonwealth of Pennsylvania. All cleanups were expected to be accomplished by spring of 2010. The Department did not offer a subsequent grant round.

Resource Extraction Accomplishments

Goal 1

- **Eighteen Growing Greener grants and 8 Section 319 NPS grants were awarded for AMD. BAMR completed 24 projects, 18 of which was surface reclamation and the rest were passive treatment systems. BAMR also reclaimed 859 acres. DEP's Bureau of Oil and Gas plugged 212 abandoned wells.**
- **The District Mining Offices continue to facilitate the reclamation of AML including places of subsidence and elimination of dangerous highwalls.**

Goal 2

- **Conservation groups are using the various 319 Watershed Implementation Plans and also other AMD Restoration plans as a planning tool to remediate AMD.**
- **In order to qualify for BAMR funding through SMCRA, watersheds must be considered a qualified hydrologic unit (QHU).**
- **Any construction projects for AMD treatment systems are required to have an OM&R plan as one of the deliverables. The plan needs to address basic maintenance issues along with a replacement schedule for the future, and who the responsible party is for each section of the plan. Also possible funding sources to implement the plan must be identified.**
- **Under the new Full Cost Bonding system, the District Mining Offices have required mine operators to post a separate bond or trust which will insure sufficient funds to continue annual operational, maintenance and replacement activities on AMD treatment facilities in perpetuity even if the operator should abandoned the facility.**
- **WPCAMR continues to administer the Growing Greener funded "Quick Response" program to provide emergency funding for treatment system repair.**

Goal 3

- **A Mine Pool Mapping Project for Anthracite Coal Fields has been started by SRBC and EPCAMR and has been concentrated in the southern and western fields. Also these partners have been working on an Anthracite AMD Remediation Strategy.**
- **Since the Office of Surface Mining (OSM) stopped maintaining a GIS database of all passive AMD treatment systems in Pennsylvania. Datashed (created by Stream Restoration Inc.) is now going to be used to store information on the various passive treatment systems in the state. Data from a recent "snapshot" of passive treatment systems will be stored there.**

- EPCAMR continues to update the Reclaimed Abandoned Mine Lands Inventory (RAMLIS) GIS Tool CDs. Version 10 is now available.
- WPCAMR and EPCAMR continue to solicit information about improving streams during meetings, phone calls, and field visits with the watershed community.

Goal 4

- WPCAMR continues their email subscription service called "Abandoned Mine Posts" & "AML Video Diaries"; EPCAMR continues to host www.epcamr.org with the "EC Express News Flash";
- The Joint Mining Reclamation Conference and 12th Annual PA Statewide Conference on AMR and Coal Mining Heritage was held in Pittsburgh with 325 attendees.
- The 5th West Branch Susquehanna Symposium, conducted by Trout Unlimited and West Branch Susquehanna Restoration Coalition, was an opportunity for attendees to hear about accomplishments in the watershed.
- The Ohio River Watershed Celebration in Pittsburgh was held in 2010 with activities for adults and children.

Goal 5

- Controversial R&D project in Hazleton, PA proposes to reclaim about 220 acres of abandoned mine lands with more than 10 million cubic yards of river dredge & fly ash.
- ARIPPA member plants continue to burn coal waste and reclaim lands with coal ash. EPCAMR uses RAMLIS to produce custom mapping of waste piles for ARIPPA member plants.
- Work continues on projects that were funded by PA Energy Harvest Program located in Babb Creek and Upper Saxman Run. Both of these projects are installing micro hydro turbines on discharges to help operate treatment systems.
- SRBC and EPCAMR are continuing a study of mine pools in Anthracite region.
- DEP and other organizations are studying the possibility of using mine water for fracing for drilling for gas in the Marcellus Shale.
- OSM has budget authority to enter into project agreements with local non-profit watershed groups, to provide funding to remediate AMD.
- Funding for the AMD Set-Aside Program is sourced from grants awarded to Pennsylvania in accordance with the federal Surface Mining Control and

Reclamation Act (SMCRA) of 1977. A watershed must be located in a qualified hydrologic unit (QHU) to be able to qualify for the funding.

- **The Keeley decision in WV requires that any entity that discharges any pollution to any body water must get a NPDES permit. This would include AMD passive treatment systems. This would have huge ramifications and force some difficult decisions for watershed groups in the state if this also applies to Pennsylvania.**

Silviculture Accomplishments

Goal 1

- Woodland owner groups continue to be the strongest source of peer-to-peer outreach of best practices. There are currently twenty-four forest landowner groups in Pennsylvania.
- During 2009, 849 Sustainable Forestry Initiative (SFI) packets were distributed to landowners prior to timber harvesting.
- Penn State Forest Resources Cooperative Extension continues to provide approximately 10 monthly Forest Stewardship News Releases on forest best management practices to forest landowners and agencies.
- Twenty-five new Pennsylvania Forest Stewards (PAFSs) completed core training in 2009. PAFSs are trained volunteers who do outreach for the Forest Stewardship Program. PAFSs are active in all of Pennsylvania's woodland owner organizations. Many woodland owner organizations were started by PAFS.
- The DCNR Bureau of Forestry partnered with Penn State Forest Resources Extension to provide a Best Management Practices for Woodland Owner Organizations. 92 representatives participated. This workshop was very well received.

Goal 2

- In 2009, 136 individuals took Environmental Logging/Advanced Environmental Logging training. Through continuing education courses, 276 individuals have taken training.
- With the addition of the silviculture BMP demonstration site on Sproul State Forest in Clinton County, Pennsylvania has 15 such demonstration sites.

Goal 3

- The environmental logging training offered by the SFI program will continue to place special emphasis on erosion on timber sales.

Goal 4

- Potomac Watershed Conservancy's "Growing Native" program continues to expand in Pennsylvania, including areas outside of the Potomac River watershed. The DCNR, Bureau of Forestry and Forest Districts have the lead for collecting native plant seeds.
- 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 3,901 miles of forested riparian buffers have been added in the Chesapeake Bay Watershed. More than 4,700 miles of forested riparian buffers have been added Statewide. During 2009, 661 miles were added in the Chesapeake Bay Watershed, and an additional 130 miles of buffers were planted in other drainages across

the State. Of the 791 new buffer miles, at least 141 miles were protected through new conservation easements.

- **Landowner enrollment in the Forest Stewardship Program (FSP) continues. 126 new Stewardship Plans were written between October 2008 and September 2009.**

Goal 5

- **Between October 1, 2008 and September 30, 2009 through the DCNR's TreeVitalize Program, significant work has been accomplished in working with various facets of the general public to address non-point source pollution.**
- **An additional 1,086 people were trained as "Tree Tenders" in 14 metropolitan areas across the state, bringing the total number trained since TreeVitalize began in 2004 to 4,026. The 8-hour training provides citizens with a better understanding of the biology and many benefits of trees in urban areas, including their value in intercepting and utilizing rainwater, pollutants, and excess nutrients. It also provides hands-on training on successfully establishing and caring for trees.**
- **A partnership was established with County Conservation Districts to encourage riparian buffer plantings, offering the districts \$1 for every tree planted. Nearly 16,000 trees have been planted through that initiative.**
- **A partnership was initiated with area nurseries in the Fall of 2009 to provide a \$15 discount off the purchase of a tree. Additional nurseries have signed on to participate for Spring 2010.**
- **Partnerships have been established with a number of public radio stations across the State. Through WITF in Harrisburg, two riparian buffer plantings have been established in public parks with volunteers planting a total of 675 trees. Signage at each site explains the importance of trees to water quality and aquatic life. A third location has been selected for Spring 2010. Through WDIY in Allentown, a similar project was completed through which 550 trees were planted. Work is underway to partner with WHYI in Philadelphia, WQED in Pittsburgh and WVIA in Scranton.**
- **Through the American Recovery and Reinvestment Act (ARRA), the Pennsylvania Infrastructure Investment Authority (PENVEST) awarded \$5.6 million for urban tree planting projects to address stormwater runoff. These projects are under contract and partially complete at this point. In Pittsburgh five parking lots will be retrofitted with 364 trees to reduce stormwater runoff and cool paving. 6,250 street trees will be planted where they are most needed, using curb cuts, tree box filters, and other state of the art urban planting practices. In Philadelphia 970 street trees will be similarly planted, and 7,000 trees will be planted into riparian buffers. In Luzerne County an additional 1,000 street trees will be planted in communities with proven track records in caring for urban trees.**
- **The Summer 2009 issue of "Pennsylvania Forests" was dedicated to Forestry for the Bay. Articles included: Chesapeake Forests, the Chesapeake Bay and It's Forests, The Chesapeake Bay Program, Forestry for the Bay: The Interplay of Woods and Water, Abandoned Mine Drainage in the West Branch of the Susquehanna Watershed and Water and Forests: One Hundred Years Ago.**

Pennsylvania Nonpoint Source Management Program Funding

State Sources (FY)	
DEP	(\$ millions)
Conservation District Watershed Specialists	1.963
Environment Stewardship and Watershed Protection (Growing Greener):	
FY2010 Allocation	8.073
Surface Mining Conservation and Reclamation Grant	1.784
Sub-total	11.820
DEP	
Chesapeake Bay Implementation Grant FY2009-2010 Funding:	
Technical and Engineering Assistance	2.613
Special Projects	1.354
Sub-total	3.967
Conservation District Fund Allocation Program	2.914
Dirt and Gravel Roads Pollution Prevention Program FY2010-2011 Allocation	3.528
Nutrient Management Fund	2.035
Abandoned Mine Reclamation Program 2010 Projects	0.380
American Recovery and Restoration Act (ARRA) Chesapeake Bay Watershed Projects Only	>20.000
PA Infrastructure and Investment Authority (PENNVEST) 2010 NPS Projects Only	17.149
Sub-total	45.664
PDA	
Nutrient Management Fund	0.706
Conservation District Fund Allocation Program	1.039
Resource Enhancement and Protection FY2010-2011 Tax Credits Available	4.500
Sub-total	6.245
Federal Sources (FFY)	
U.S. Environmental Protection Agency	
Section 319 Nonpoint Source Management Program	5.680
National Fish and Wildlife Foundation	
Chesapeake Bay Small Watershed Grant-2010 Funding	0.554
Chesapeake Bay Innovative Nutrient and Sediment Reduction Grant	0.400
Sub-total	6.634
U.S.D.A. Natural Resources Conservation Service	
Obligated Funding Levels:	
Agricultural Management Assistance	0.855
Chesapeake Bay Watershed Initiative	9.776
Environmental Quality Incentive Program	12.886
Farm and Ranchland Protection Program	6.300

U.S.D.A. Natural Resources Conservation Service	
Obligated Funding Levels:	
Conservation Stewardship Program	3.975
Wetlands Reserve Program	4.100
Wildlife Habitat Incentive Program	0.822
Sub-total	38.714
U.S.D.A. Farm Services Agency	
Conservation Reserve Enhancement Program Includes Financial Incentives, Cost-Share and Rental Payments.	25.948
Biomass Crop Assistance Program	3.694
Grassland Reserve Program	0.049
Sub-total	29.691
Office of Surface Mining	
AML Reclamation Funding (FY2010) Includes AML, Clean Streams Initiative and Watershed Cooperative Agreement Program.	43.807
Sub-total:	43.807
Total	186.542

(All figures are in FFY2010 dollars unless otherwise noted)

Challenges and Opportunities

The primary focus of Pennsylvania's Nonpoint Source Management Program is the restoration of streams and lakes through development and execution of Watershed Implementation Plans. The primary challenge is to maintain the pace of our efforts in an environment of decreasing grant funds and threats of staffing reductions at the state and local levels. In the face of this uncertainty, we have found it increasingly valuable to partner with organizations which have similar goals, not only to leverage additional funds and manpower, but to raise awareness throughout the State of the work we're doing.

We have partnered with the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS), Penn State University, three county conservation districts and a local watershed group in the Conewago Creek Initiative, a comprehensive interdisciplinary effort to focus our combined expertise and resources on restoring water quality in a single watershed until it can be removed from the State's impaired streams list. If this approach proves effective, it has potential to be expanded to other NRCS priority watersheds throughout the State.

We have dedicated \$1.0 million from Pennsylvania's FFY 10 nonpoint source management grant to projects that will assist farmers to achieve compliance with agriculture-related water quality regulations. We are partnering with the Chesapeake Bay Foundation (CBF) in that group's application for a Cooperative Conservation Partnership Initiative grant from USDA to implement ag compliance projects on dairy farms in Lancaster County.

We are also working with CBF in the West Branch Antietam Creek watershed in Franklin County to develop projects targeting forested riparian buffers and ag BMPs recommended in the West Branch Antietam Watershed Implementation Plan (WIP). This effort will combine funding from CREP, Section 319 and other sources available to CBF, including a potential grant from the State of Maryland for work within the Antietam Creek drainage basin.

We partnered last year with PENNVEST, Pennsylvania's State Revolving Fund custodian, to distribute funding made available by the American Recovery and Reinvestment Act of 2009 and also advised that organization in creating a new nonpoint source funding mechanism in the State. Our 319 program has recently provided the Pennsylvania Association of Conservation Districts (PACD) with funds to hire a "circuit rider" to publicize the program and assist conservation districts, municipalities, watershed groups and others in preparing online applications. It is our hope that this small investment will yield a substantial increase in the number and quality of applications submitted to and funded through PENNVEST to address problems of nonpoint source pollution.

We are currently working with DEP's Bureau of Abandoned Mine Reclamation (BAMR) and the U.S. Department of the Interior's Office of Surface Mining (OSM) to identify areas where their Priority 1 and 2 sites lie within a Section 319 WIP watershed, in order to leverage SMCRA Title 4 monies for AMD remediation in those watersheds.

We have worked closely with the Pennsylvania Department of Conservation and Natural Resources (DCNR) for a number of years to restore and maintain water quality in lakes located within the boundaries of several State Parks.

Our NPS management program supports the Schuylkill Action Network (SAN), a broad coalition of federal, state and local organizations combining their knowledge and resources to restore the Schuylkill River watershed.

We support and provide technical assistance to the Pennsylvania Senior Environmental Corps (SEC), training and equipping local volunteers to monitor water quality in streams and lakes throughout the State, including before and after monitoring on Section 319 projects.

We have partnered for over 10 years with the League of Women Voters' Water Resource Education Network (WREN), the PACD and the Eastern and Western Pennsylvania Coalitions for Abandoned Mine Reclamation (EPCAMR and WPCAMR) to educate citizens and public officials about the problems of nonpoint source pollution and support their efforts to address those problems in their local communities.