

**Pennsylvania Nonpoint Source Management Program
FFY2009 Annual Report**

Produced for the EPA Region III NPS Program

October 1, 2008 through September 30, 2009



**Commonwealth of Pennsylvania
Department of Environmental Protection**

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EXECUTIVE SUMMARY

Purpose and Scope

This Nonpoint Source (NPS) Management Program Annual Report is a summary of the Commonwealth of Pennsylvania's efforts to implement the *NPS Management Program Plan-2008 Update* from October 1, 2008 through September 30, 2009.

Pennsylvania's FFY2009 NPS Annual Report includes three primary parts, each having detailed information on the current status of Pa's NPS Program. These parts are:

- Section 1.0 Water Quality Improvements,
- Section 2.0 NPS Success Stories and Improving Watershed Stories, and
- Section 3.0 NPS Management Program (Work Group) Accomplishments

Nonpoint Source Pollution Problems and Causes

Of the 16,121 miles identified as impaired by either point sources or nonpoint sources in the DEP 2008 Water Quality Assessment report, the most far-reaching water quality impairment influences are due to nonpoint sources of pollution. The two dominant NPS water quality impairments in Pennsylvania continue to be abandoned mine drainage (AMD) and agricultural runoff.

DEP Watershed Assessment Program Status

Pennsylvania's 2008 *Integrated List of All Waters (Integrated List)* documents that water quality assessments have been completed for more than 84,021 miles of streams and 74,652 acres of lakes. A total of 68,670 assessed stream miles and 36,295 assessed lake acres support the federal "fishable and swimmable" goal and the *Aquatic Life Use* designated in State water quality standards. Approximately 15,000 stream miles, 13% of the total stream miles assessed, are identified as being impaired and not supporting the *Aquatic Life Use*. Approximately 5,593 acres of lakes, 7.5% of lake acres assessed, are impaired by specific pollutants and require a TMDL. Another 20,866 acres of lakes, 27.9% of lake acres assessed, are impaired for *Aquatic Life Use* by more generalized pollution and do not require a TMDL.

Nonpoint Source Management Program Plan-2008 Update

The current *NPS Management Program Plan-2008 Update (Plan)* was approved by the EPA Region III Water Protection Division in late 2008. It is expected to guide Pennsylvania's NPS Program implementation through 2013 and perhaps beyond. The *Plan* may be reviewed at <http://www.portal.state.pa.us/portal/server.pt?open=514&objID=554270&mode=2>.

Five primary goals drive NPS Management Program Plan implementation and provide the framework for the *Objectives and Action Items* that characterize the seven NPS program areas and form the basis for our annual report. The primary goals include:

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.

Accomplishments

During FFY2009, Pennsylvania has made substantial progress in implementing its *Nonpoint Source Management Program Plan-2008 Update*.

Sections of four streams were determined to be fully restored during FFY2009. These water bodies were included in the four new success stories for Pennsylvania which have been added to the EPA National Success Story web site. Water quality improvements were also documented in 17 water bodies, including both lakes and streams. Section 1.0 of this report summarizes key data for these water bodies.

Seven lakes were approved for delisting during the past fiscal year as a result of State and local restoration efforts and revision of Pennsylvania's dissolved oxygen standard. Data describing these water bodies are included in Section 1.0.

NPS load reduction estimates resulting from BMP implementation are also provided in Section 1.0 of the report. The source of this information is the EPA/State NPS Program

Grants Reporting and Tracking System (GRTS) database. BMP load reduction data was drawn in January 2010.

A brief summary of Pennsylvania's NPS load reduction estimates for nutrient, sediment and abandoned mine drainage (AMD) pollutants are shown as follows:

FFY2006 through FFY2009 Nutrient and Sediment Load Reduction Estimates

Nitrogen		Phosphorus		Sediment
(lbs/year)	(tons/year)	(lbs/year)	(tons/year)	(tons/year)
21,117	10.6	7,039	3.5	11,485

FFY2006 through FFY2009 AMD Pollutant Load Reduction Estimates

Iron		Aluminum		Manganese		Acidity	
(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
20.5	4	21.1	4	0.7	0.1	303	55

The reported load reduction estimates and best management practice implementation are achieved through the efforts of DEP central and regional office staffs and project sponsors working directly with landowners. This positive working relationship allows us to implement projects to remove water bodies from the State's list of impaired waters.

Section 2.0 includes watershed *Success Stories* that have been written with EPA Region III and EPA headquarters staff. Success Stories are posted on the EPA Region III and Headquarters web sites. Documented water body de-listings are part of each success story. Pennsylvania has completed four new watershed success stories over the past year. *Success Stories* are located on the DEP NPS Management Program web site at <http://www.portal.state.pa.us/portal/server.pt?open=514&objID=554277&mode=2>.

Ten new *Improving Watershed Stories* are also included in Section 2.0. These highlight restoration efforts in watersheds around the State where sufficient data is available to document significant water quality improvements. Each *Improving Watershed Story* 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 a part of these stories.

Section 3.0 reports accomplishments in the seven functional areas of the State's NPS Management Program: Agriculture, Construction and Urban Runoff, Hydromodification, Lakes, Land Disposal, Resource Extraction and Silviculture. It also covers the State's Watershed Implementation Planning progress through September 30, 2009. Twenty-six Watershed Implementation Plans (WIPs) have now been prepared and accepted by the EPA under Phases I, II and III of this process. Under Phase III, eight more plans are being developed. All but one of the completed WIPs are currently being implemented.

Pennsylvania's NPS Management Program activities are funded through several sources. Section 319 NPS program funding awarded under the federal Clean Water Act equaled \$5.7 million for FFY2009. This brings the total amount of Section 319 funding received by the DEP to nearly \$80.0 million since NPS program start-up in 1991.

SECTION 1.0 -- WATER QUALITY IMPROVEMENTS

The Commonwealth of Pennsylvania has an abundance of surface and groundwater resources. Over 86,000 miles of streams, 1,420 lakes and many acres of fresh water wetlands are located within the Commonwealth's borders. Pennsylvania lakes cover approximately 161,455 surface acres, and fresh water wetlands include approximately 403,924 acres.

Section 1.0 includes some of the accomplishments in the NPS Management Program over the past year. Many of these improvements have been made possible through 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. This section includes all water bodies that we have documented as showing signs of improvement (Table 1-4), as well as fully restored water bodies (Table 1-3). Data supporting our efforts to improve surface waters is also included.

1.1 Background

The *2008 Integrated List of All Waters (Integrated List)* contains a summary of the State's water quality assessment program data. The *Integrated List* is used to help us document baseline conditions. The *Integrated List* is included on the Pennsylvania DEP web site www.dep.state.pa.us under 'Water Topics' and 'Water Quality'.

Pennsylvania's *Integrated List* includes several lists for 'Attainment' or 'Impairment' status of Pennsylvania's water bodies:

List 1: All Uses Attained

List 2: At Least One Use Attained

List 3: Unassessed

List 4: Impaired for One of More Designated Uses, Not Needing a TMDL

List 5: Pollutants and Needing a TMDL

Pennsylvania has traditionally targeted most NPS restoration efforts to water bodies on Lists 4 and 5, including water bodies where a TMDL has been completed or is required and where an EPA-approved watershed implementation plan (WIP) has been completed.

1.2 Surface Water Assessment Program Status

Pennsylvania's water quality assessment program identifies six primary sources of NPS impairments to the Commonwealth's waters:

- Abandoned Mine Drainage (AMD)
- Agriculture
- Urban Runoff/ Storm Sewers
- Road Runoff
- Small Residential Runoff
- Atmospheric Deposition

The three major *Aquatic Life Use* impairments to streams are abandoned mine drainage, agriculture and urban runoff/storm sewers. The two major *Aquatic Life Use* impairments to lakes are agriculture and atmospheric deposition (mercury).

The 2008 *Integrated Water Quality Monitoring and Assessment Report* (formerly known as the 305(b) report) includes Statewide water quality assessment information. Streams (Table 1-1) and lakes (Table 1-2) information are summarized for the four designated use categories:

- Aquatic Life Use
- Fish Consumption Use
- Recreational Use
- Potable Water Supply Use

Table 1-1 shows that 15,294 stream miles of 84,021 total stream miles assessed, or more than 18%, are impaired for *Aquatic Life Uses*. Nearly 82% of the total stream miles assessed support *Aquatic Life Use*.

Table 1-1: Statewide Water Quality Assessment Data – Streams

Stream Miles	Designated Use Category			
	Aquatic Life	Fish Consumption	Recreational	Potable Water Supply
	Number of Stream Miles			
Assessed	84,021	2,381	627	1,569
Supporting	68,670	590	365	1,445
Impaired, Needing TMDL	11,276	1,080	244	88
Impaired, Approved TMDL	3,283	711	8	36
Compliance Issues	57	---	---	---
Pollution Impairments*	2,311	---	---	---

(Source: 2008 *Pennsylvania Integrated Water Quality Monitoring and Assessment Report*)

*Impaired, but not by a specific pollutant and not requiring a TMDL. A total of 1,576 stream miles have both pollution and pollutant problems.

Table 1-2 shows that 74,652 acres of Commonwealth lakes have been assessed for the *Aquatic Life Use*. Just over 51% of lake acres assessed, or 38,357 acres, are impaired. Nearly 49% of those assessed, or 36,295 acres, support designated uses.

Table 1-2: Statewide Water Quality Assessment Data – Lakes

Lake Acres	Designated Use Category			
	Aquatic Life Use	Fish Consumption Use	Recreational Use	Potable Water Supply Use
	Number of Lake Acres			
Assessed	74,652	36,057	70,306	11,469
Supporting	36,295	2,987	68,657	11,469
Impaired, Needing TMDL	5,593	27,587	1,649	---
Impaired, Approved TMDL	11,898	5,483	---	---
Pollution Impairments*	20,866	---	---	---

(Source: 2008 Pennsylvania Integrated Water Quality Monitoring and Assessment Report)

*Impaired, but not by a specific pollutant and not requiring a TMDL.

1.3 Nonpoint Source Impaired Waters Delistings

The EPA’s National Strategic Plan includes several short-term and long-term goals for tracking improvements to our nation’s waterways, including the following two goals. A figure of 5,967 primarily NPS-impaired water bodies was used to establish a baseline.

- 250 water bodies restored by 2008, and
- 700 water bodies restored by 2012

Water bodies fully restored from NPS pollution impacts are being tracked for purposes of helping to meet these goals (Table 1-3). A *water body* is defined as a listed stream segment. 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.

Pennsylvania is using a process to identify and reassess waters where we feel there is a good chance of a water body meeting its designated use(s) so that we can track progress in achieving these goals. The *Aquatic Life Use* is the designated use for the purpose of identifying a *fully restored* water body. Water bodies included in this table were approved for delisting and officially removed from the impaired waters list on the 2006 and 2008 *Integrated Lists*. The four FFY2009 delistings included in Table 1-3 include a total of 28 miles of restored streams.

There is a notable change in the way we are documenting restored water bodies in the FFY2009 report. In previous NPS annual reports, water bodies that were candidates for being *partially restored* or *partial delisting* were included. These water bodies had not yet gone through the entire delisting process. The DEP, Division of Assessment and Standards, takes official action to remove water bodies from the State’s impaired waters

list when a determination has been made that NPS impairments no longer exist. Due to the length of time needed to make a final determination and the timing of the NPS annual report submittal to the EPA, the decision was made to no longer include tables showing *partially restored* water bodies in the FFY2009 report. Therefore, only *fully restored* and *improving water bodies* are being included in the FFY2009 report.

1.3.1 Pennsylvania Stream Codes Methodology

In 2005-2006, the United States Geological Survey (USGS) and contractors assisted the DEP in adopting a new nomenclature for identifying stream reaches. The DEP adopted the 1:24,000 National Hydrographic Database (NHD) streams coverage layer to better identify stream reaches and be consistent with the national system. The NHD is aggregated by Hydrologic Unit Code (HUC) watersheds which are now used to group streams together. This system has replaced the old system which used Segment IDs and five-digit DEP Stream Codes. The new NHD streams layer is based upon national geo-database standards. The new system is attributed by stream name or a fixed combination of NHD fields known as the *Reach Code* and *Com_ID*.

In addition, Pennsylvania began using a more specific method to identify stream segments in the State. This method uses the *Com_ID* as a numeric identifier for specific stream segments. The *Com_ID* identifier was first utilized in the *2006 Integrated List* and is included for all stream segments listed in Pennsylvania's *2008 Integrated List*.

Table 1-3: Fully restored water bodies

Water body Name and (County)	Sec. 319 funds used (Yes or No)	319 Grant Year/ Project Number(s)	Impairment Source and (Cause)	Year First Listed as Impaired	Hydrologic Unit Code (HUC)	NHD Reach Code/ Com_ID
FFY2006						
Manatawney Creek (Berks, Montgomery)	Yes	FFY2000/ 44	Agriculture (Nutrients, Organic Enrichment, Low D.O.)	1996	02040203	02040203000103/ 25965530
UNT to Manatawney Creek (Berks, Montgomery)	Yes	FFY2000/ 44	Hydromodification (Thermal Modification)	1996	02040203	02040203002507/ 25965244
FFY2008						
Semiconon Run (Butler)	No	n/a	AMD (Metals)	2002	05030105	05030105000787/ 126218422
Step Run (Clarion)	No	n/a	AMD (pH)	2006	05010005	05010005000441/ 102668735
FFY2009						
Babb Creek (Tioga)	Yes	n/a	AMD (Metals & pH)	1996	02050205	02050205000064/ 66538997
Gumboot Run (McKean)	No	n/a	AMD (pH)	2004	05010005	05010005000738/ 102662633
Lloydville Run (UNT to Bells Gap Run) (Blair & Cambria)	No	n/a	AMD (Metals, pH & Siltation)	2002	02050302	02050302000621/ 65604954
Sterling Run (Centre)	No	n/a	AMD (Metals, pH & Siltation)	1996	02050201	02050201000511/ 61828805

n/a = not applicable

1.4 Improvements to Nonpoint Source Impaired Waters

Water Quality Improvements Documented in FFY 2009 (Table 1-4) lists waters that are showing signs of recovery from water quality impairments. We anticipate that as additional water quality and macroinvertebrate data is gathered, we will be able to document long-term improvements, and some of these waters may eventually be classified as *fully restored*.

1.4.1 Water Quality Improvements in Streams

Water quality improvements can occur both through natural processes and as a result of long-term watershed restoration initiatives.

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:

- 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.
- 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. Section 3.0 of this report features ten new *Improving Waters Stories* written by Pennsylvania’s NPS Program staff during FFY 2009.

- 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 its web site at <http://www.epa.gov/nps/success/>.

Table 1-4: Water Quality Improvements Documented in FFY2009

Water body and (County)	Sec. 319 funds Used (Yes or No)	319 Grant / Project Number	Impairment Source and (Cause)	Year First Listed as Impaired	Hydrologic Unit Code (HUC)	NHD Reach Code and Com_ID
Bear Run Creek (Fulton)	No	n/a	AMD (Siltation)	2006	02050201	02070003000296/ 36406986
Coalpit Run (Cambria)	Yes	FFY2003/ 24	AMD (Metals, pH)	2006	05010007	05010007001287/ 123720827
Harveys Lake (Luzerne)	Yes	FFY2000/ 45 FFY2001/ 45 FFY2005/ 36 FFY2006/ 30J	On-site waste, stormwater runoff & stream bank erosion (Nutrients)	1996	02050107	02050104000357/ 133506802
Johnson Creek (Tioga)	Yes	FFY2003/ 18 FFY2005/ 16	AMD (Metals, pH)	2002, 2004, 2006	02050104	02050104000358/ 57353363
Johnson Run (Elk)	No	n/a	AMD (Metals, pH)	2006	0501005	05010005000765/ 102663709
Kimber Run (Bedford)	No	n/a	AMD (pH)	1996	02050303	02050303000434/ 65844741
Lake Wallenpaupack (Wayne & Pike)	Yes	FFY1992/ 09 FFY1995/ 20	Agriculture (Nutrients and Suspended Solids) Mercury (Atmos. Dep.)	1996	02040103	02040103001053/ 120022795

n/a = not applicable

Table 1-4: Water Quality Improvements Documented in FFY2009 (continued)

Water body and (County)	Sec. 319 funds Used (Yes or No)	319 Grant / Project Number	Impairment Source and (Cause)	Year First Listed as Impaired	Hydrologic Unit Code (HUC)	NHD Reach Code and Com_ID
Laurel Run (Indiana)	No	n/a	AMD (Metals)	2006	05010007	05010007000723/ 123714945
Little Coon Run (Clarion)	No	n/a	AMD (Metals, pH)	2004	05010003	05010003001084/ 100475699
Little Elk Run (Jefferson)	No	n/a	AMD (Metals)	—	05010006	05010006001360/ 123852282
Middle Branch Huling Run (Clinton)	No	n/a	AMD (Metals)	1996	02050203	02050203000400/ 61115127
Piney Creek (Clarion)	No	n/a	AMD (Metals, pH)	1998	05010005	05010005000351/ 102671059
Stahle Run (Fulton)	No	n/a	Agriculture (Nutrients, Siltation)	2002	02070003	0207000300116/ 36406604
Tarkiln Run (Venango)	No	n/a	AMD (Metals)	2004	05010003	05010003000356/ 100477471
Two Lick Creek (Indiana)	No	n/a	AMD (Metals, pH)	1996	05010007	05010007000202/ 123720041
Valley Creek (Chester)	Yes	FFY2003/ 28	Agriculture (Siltation)	2006	02060306	02050306000047/ 57465301
Walley Run (Clarion)	No	n/a	AMD (Metals)	1996	05010003	05010003001087/ 100475749

n/a = not applicable

1.4.2 Water Quality Improvements in Lakes

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 1500 lakes and reservoirs that total about 161,000 acres, with 375 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. A number of lakes are being proposed for delisting (re-listing) on Pennsylvania's Integrated List of All Waters.

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 water quality improvements. Many of these improvements are the result of NPS best management practices that have been installed in the watersheds.

These proposed changes will result in several lakes being removed from Lists 5 or 4C on the *2010 Integrated List of All Waters* and subsequently added to Lists 1 or 2.

The *Integrated List* categories involved in the delisting (re-listing) process are:

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'

Table 1-5 on the following page summarizes these proposed changes.

Table 1-5: Proposed Reclassification of Lakes on 2010 Integrated List of All Waters

NHD Reach Code	Name of Lake (County)	List Change	Acres	Listing Date
02050107001748	Elmhurst Reservoir (Lackawanna)	4C to 2	181	2002
02050306002293	Lake Redman (York)	4C to 2	290	2006
02050306002290	Lake Williams (York)	4C to 2	200	2002
02040101001467	Duck Harbor Pond (Wayne)	5 to 1	204	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	340	2008
02040103001075	Promised Land Upper (Pike)	4C remove pH	468	2002
02050306002286	Muddy Run Reservoir (Lancaster)	5 to 2	98	2002
02040103001011	White Deer Lake (Pike)	5 to 4C	48	2006
Total			2,079	

1.5 Nonpoint Source Pollutant Load Reduction Estimates

NPS load reductions for nitrogen, phosphorus and sediment are an important EPA and State measure of success in respective NPS Programs. Table 1-6 and Table 1-7 summarize Pennsylvania's NPS load reduction estimates for Section 319 funded project implementation. Table 1-6 includes nitrogen, phosphorus and sediment figures and Table 1-7 includes abandoned mine drainage (AMD) reductions.

These two tables include information from Pennsylvania's FFY2001 through FFY2009 Section 319 grants. The information was extracted from the EPA/State Nonpoint Source Program's Grants Reporting and Tracking System (GRTS) database in January 2010. Only cumulative load reductions for 319 NPS Program projects in the FFY2006 through FFY2009 grants are included. For reference purposes, FFY2008 NPS Annual Report figures are included in parentheses in these tables so one can make a quick comparison between information included in last year's report and this year's information.

It is important to note that in Pennsylvania's FFY2008 and previous NPS Annual Reports, load reduction estimates included both pre-BMP implementation and post-BMP implementation figures. The FFY2009 NPS Annual Report includes only post-BMP implementation load reduction estimates. Thus, load reduction figures for some nutrient and AMD pollutants may appear to be less than in previous reports.

Overall, load reductions have generally shown a decreasing trend since FFY2001 for nitrogen and phosphorus, while sediment and AMD pollutant load reductions have generally increased during this same period. There are several apparent reasons for these trends. Significantly more AMD projects have been funded in recent years. Many of the AMD remediation projects being funded in the FFY2008 and FFY2009 grants are currently in design phase so AMD pollutant reductions will not be realized until actual implementation occurs, accounting for the lesser reductions in the FFY2008 and FFY2009 grants. This is a break from the general AMD trend previously mentioned.

Sediment load reductions have been steadily increasing since FFY2001. This is due in large part to an increase in the number of stream bank and stream channel restoration projects being completed under the FFY2006 through FFY2007 grants. In recent years more Hydromodification type projects have been funded to address both storm water and urban runoff issues and stream bank and stream channel erosion problems.

We see lower agricultural-related nitrogen and phosphorus reductions due to the fact that many recent Section 319-funded agricultural BMP projects are being implemented in smaller WIP watersheds where Amish and Plain Sect farming is dominant. The focus on WIP watersheds was not the case 5 or 10 years ago. The majority of nitrogen and phosphorus reductions from 319 projects are associated with agricultural and lake related BMP implementation. We have a number of these projects that are now in various phases of implementation and we are seeing slow but steady results.

All iron (Fe), aluminum (Al), manganese (Mn) and acidity AMD load reduction estimates are reported in pounds per day. These units of measure are the same as those used in many AMD Total Maximum Daily Loads (TMDLs). Nitrogen and phosphorus load reduction estimates are reported in pounds/year. Sediment reductions are reported in tons/year. These units are consistent with many TMDLs written for nutrients and sediment and are consistent with national NPS Program reporting standards.

A more detailed summary for Pennsylvania's FFY2006 through FFY2009 Section 319 program grants and projects is provided in Appendix A.

Table 1-6: Nutrient and Sediment Load Reduction Estimates

	Nitrogen		Phosphorus		Sediment
	(lbs/year)	(tons/year)	(lbs/year)	(tons/year)	(tons/year)
Grant Year	Closed Grants				
FFY2001	358,294	179	124,521	62	21,098
FFY2002	217,937	109	44,065	22	5,324
FFY2003	56,383	28	34,810	17	7,788
FFY2004	26,956	13	7,280	4	3,659 (includes 328 TSS)
FFY2005	23,293	12	7,245	4	3,061
Grant Year	Open Grants				
FFY2006	12,308 (14,435)	6.2 (7)	4,288 (4,513)	2.1 (2)	7,590 (includes 2,284 TSS) (3,942)
FFY2007	3,397 (3,309)	1.7 (2)	1,020 (1,007)	0.5 (0.5)	3,547 (1,432)
FFY2008	5,412 (5,647)	2.7 (3)	1,731 (1,522)	0.9 (1)	348 (1,098)
FFY2009 (1)	0	0	0	0	0
Totals (2)	21,117	10.6	7,039	3.5	11,485

(1) No projects have been completed during the October 1, 2008 through September 30, 2009 time frame.

(2) FFY2006 through FFY2009 only.

Note: FFY2008 figures are included in parentheses.

Table 1-7: Iron, Aluminum, Manganese and Acidity Load Reduction Estimates

	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	Closed Grants							
FFY2001	350	63	45	8	4	1	912	166
FFY2002	172	31	58	10	2	1	194	35
FFY2003	129	23	49	9	0	0	88	16
FFY2004	678	123	251	46	402	73	1,749	319
FFY2005	973	177	287		63	11	3,956	539
Grant Year	Open Grants							
FFY2006	2.9 (68)	0.5 (12)	9.5 (48)	1.7 (9)	0 (18)	0 (3)	144 (555)	26 (101)
FFY2007	17.6 (344)	3.2 (62)	11.6 (274)	2.2 (50)	0.7 (1)	0.1 (0)	159 (1620)	29 (296)
FFY2008 (1)	0 (41)	0 (7)	0 (30)	0 (5)	0 (1)	0 (0)	0 (397)	0 (73)
FFY2009 (2)	0	0	0	0	0	0	0	0
Totals (3)	20.5	4	21.1	4	0.7	0.1	303	55

(1) No projects have been completed during the October 1, 2008 through September 30, 2009 time frame.

(2) FFY2006 through FFY2009 only.

Note: FFY2008 figures are included in parentheses.

SECTION 2.0 -- WATERSHED SUCCESS 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 *Watershed Success Stories* during FFY2009. These have been approved by the EPA Region III and EPA Headquarters.

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 de-listed. When a stream reach or water body is de-listed, the *Improving Watershed Stories* will be expanded into more comprehensive *Watershed Success Stories*.

Watershed Success Stories are included on several state and federal NPS Program web sites for the public to read. These web sites are the DEP NPS Program site at <http://www.portal.state.pa.us/portal/server.pt?open=514&objID=554277&mode=2>, the EPA Region III NPS Program site at www.epa.gov/reg3wapd/nps/success/index.htm and the EPA Headquarters NPS Program site at <http://www.epa.gov/nps/success/>.

The following pages include the four new *Watershed Success Stories* for FFY2009. Several figures and tables showing photographs and water quality data accompany each of the *Success Stories*.

2.1 Watershed Success Stories

Success Story: Babb and Pine Creeks - Installing Active and Passive Treatment Systems Restores Water Quality

Abandoned Mine Drainage (AMD) caused high metal levels and low pH in Babb Creek, creating toxic conditions for trout and macroinvertebrates. The Pennsylvania Department of Environmental Protection (PADEP) added three segments of Babb Creek to the State's impaired waters list in 1996 for impairments due to metals and in 2002 for impairments due to pH. PADEP also added one segment of Pine Creek to the impaired waters list in 1998. Stakeholders have worked to restore the creek for nearly two decades by installing active and passive AMD treatment systems. Water quality has improved and now meets standards, so PADEP plans to remove the three impaired segments of Babb Creek's mainstem from the State's 2010 impaired waters list for metals and pH. PADEP removed the impaired Pine Creek segment from the list in 2002.



Figure 2-1. Iron and aluminum precipitate cover the bed of a mine discharge as it emerges from the Anna S. Mine Complex and eventually flows into Babb Creek. Photo provided by the DEP, Bureau of Watershed Management, TMDL Section.



Figure 2-2. A portion of the Anna S. Passive Treatment System. Photo courtesy of PADEP

Problem

Babb Creek flows through north-central Pennsylvania and discharges into Pine Creek. The two streams converge where Pine Creek flows out of the Pine Creek Gorge. The 130-square-mile-watershed is heavily forested. Much of it is managed by the Pennsylvania Department of Conservation and Natural Resources (DCNR) and the Pennsylvania Game Commission. The history of coal mining in the Babb Creek watershed began with deep

mining at the end of the Civil War. Underground mining reached a peak in the early 1900s and was largely done by the mid 20th century. Surface mining, while much more limited than underground mining, resurged in the 1970s and 80s. By 1990 active mining had ceased in the watershed, but AMD continued to degrade nearby water bodies.

Babb Creek was declared biologically dead by the early 1900s after a prolonged absence of aquatic life. Iron and aluminum precipitate covered the streambed (Figure 2-1). PADEP added three segments of the creek to the State's list of impaired waters in 1996 for elevated metal levels and in 2002 for pH. A total of 13.89 miles were included in the impaired classification. PADEP developed a total maximum daily load (TMDL) for Babb Creek and its tributaries in 2003.

A September 1998 report by a PADEP biologist documents that Babb Creek had "abundances and diversity lower than expected for a stream of this size, few individuals in sensitive taxa." Another PADEP biologist's August 1998 report on the conditions at a different location on the mainstem indicates that no mayflies were present in the stream, and that aluminum precipitate was found on the substrate. PADEP collected fish samples on July 30, 1990; data show that seven taxa of fish were found at a control location upstream of any AMD sources. PADEP biologists found no fish at each of four remaining sampling sites downstream of where they observed AMD impacts.

Project Highlights

In 1990 concerned citizens formed the Babb Creek Watershed Association (BCWA). Since then, the group has completed 16 projects throughout the watershed, including installing successive alkalinity producing systems and a lime treatment plant, re-grading and re-vegetating land areas, removing coal refuse, adding settling basins, creating wetlands, injecting limestone slurry into an underground mine, and installing a self-flushing limestone cell.

The Antrim Number One Mine Treatment Plant, which treats one of the principal sources of pollution to Babb Creek, has yielded the most significant water quality improvements. The discharge was abandoned in the mid-1900s. In 1982, the Antrim Mining Company began to surface mine on top of portions of the abandoned underground mine. After compliance action by PADEP, a Consent Order and Agreement was issued in 1991 which required the Antrim Mining Company to build a treatment plant. The plant was turned over to the Antrim Treatment Trust when the Consent Order and Agreement with PADEP was amended in 1999. BCWA assumed operation and maintenance of the facility in 2001. The system has continually been upgraded over the years.

Another significant project in the watershed is the Anna S. Passive Treatment System (Figure 2-2). Constructed in 2004 and covering 20 acres, this is the largest passive treatment system in the world and treats the second largest source of AMD in the watershed.

Results

The new treatment systems allow Babb Creek to meet water quality standards for metals and pH (Table 2-1). Moreover, in a recent sampling survey, PADEP biologists documented a diversity of mayflies and other macroinvertebrates in Babb Creek. Data show that Index of Biotic Integrity (IBI) scores have improved significantly.

Table 2-1. Babb Creek water quality data

Data collected in 2006 show that Babb Creek meets water quality standards.

Pollutant	Water Quality Standard [in milligrams per liter (mg/L)]	Measured Value (mg/L)
Aluminum	<0.75	0.37
Iron	<1.5	0.19
Manganese	<1.0	0.47
pH	>6.0	6.41

An IBI score of 63 or greater supports removal of a stream from the impaired waters list. Four sites sampled in March 2009 had IBIs in the 80s and 90s, which are high enough to warrant delisting and to allow Babb Creek to be considered for a more stringent water quality classification. Additionally, in 1999 the Pennsylvania Fish and Boat Commission (PaFBC) documented the return of fish to three sampling locations where no fish had been found in 1990 (Figure 2-3).

On the basis of these data, PADEP has petitioned the U.S. Environmental Protection Agency (EPA) to remove the three segments of Babb Creek from the impaired waters list in 2010. PADEP has already removed (in 2002) the segment of Pine Creek that was placed on the impaired waters list in 1998. Additionally, the PaFBC has upgraded Babb Creek to a more stringent Wild Trout Stream water body classification.

Partners and Funding

Partners have spent approximately \$10 million on 16 projects that are directly related to the impaired stream segments in the watershed. Funding sources have included Pennsylvania's Growing Greener program, DCNR, the U.S. Department of the Interior's Office of Surface Mining, the Heinz Foundation, and EPA CWA section 104(b) and Section 319 funding. Many other partners have contributed to the Babb Creek watershed efforts in the past 20 years. BCWA receives a tipping fee for waste deposited in a landfill as the result of a 1990 federal lawsuit. BCWA uses those funds to support restoration projects, including operating and maintaining the existing treatment systems.

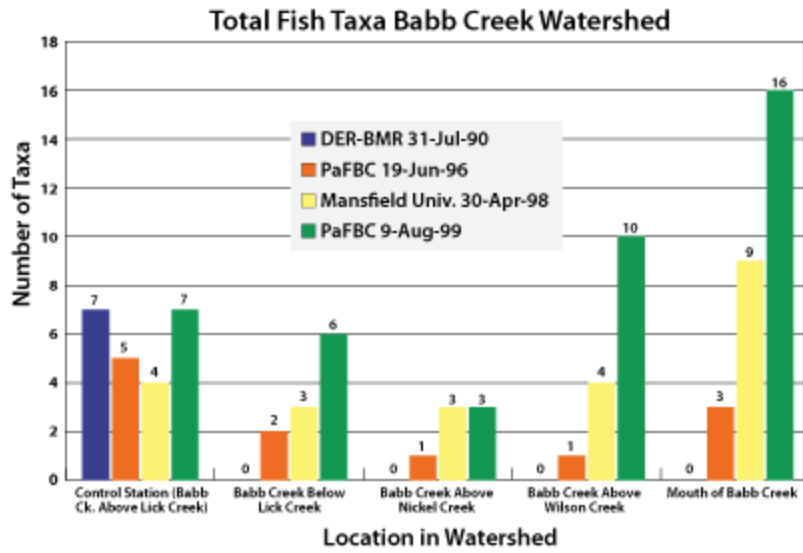


Figure 2-3 . Fish have returned to the Babb Creek watershed after treatment. Data provided by PADEP's Moshannon District Mining Office.

Success Story: Gumboot Run and the East Branch Clarion River - Sealing Mines and Installing Treatment Systems Restores Streams

Abandoned mine drainage (AMD) has polluted Gumboot Run and the East Branch Clarion River in northwestern Pennsylvania's McKean County since the 1800s. Numerous AMD seeps flow in the Gumboot Run watershed, which, in turn, flows into the East Branch Clarion River. Those seeps negatively affected the water quality in four waterbodies, including three segments in the Gumboot Run watershed and one segment on the East Branch Clarion River mainstem, which prompted the Pennsylvania Department of Environmental Protection (PADEP) to add the segments to the State's list of impaired waters for low pH. PADEP added the three segments in Gumboot Run in 2004 and the East Branch Clarion River segment in 2006. Early efforts to clean up the watershed included sealing mines and stabilizing spoil piles in the 1970s. Between 2001 and 2007, several AMD treatment systems were constructed in the Gumboot Run Watershed that produced acceptable levels of pH and metals in both streams. PADEP intends to remove all four segments from the list of impaired waters as the result of the water quality improvements.



Figure 2-4. One of a series of limestone treatment ponds installed. Photo courtesy: Jon Smoyer, PADEP BAMR



Figure 2-5. Another limestone treatment pond. Photo courtesy: Jon Smoyer, PADEP BAMR

Problem

Coal mining began in the Gumboot Run watershed in the late 1800s, near the small village of Clermont in McKean County. Gumboot Run is a tributary of the East Branch Clarion River, which is dammed to form the East Branch Lake in a heavily forested part

of northwestern Pennsylvania. Deep mines produced a large amount of coal that was shipped by railroad to western Pennsylvania and Buffalo, New York. Although coal production decreased in the Gumboot Mines by the early 1900s, coal continued to be taken from the area into the late 1900s. An assessment of the East Branch Clarion River in 1969 determined that numerous AMD sources remained in the watershed. Attempts were made in the 1970s to seal mines and reclaim the area, but water quality impairment persisted.

In the late 1990s, data show that Gumboot Run had a pH as low as 3.8 (standards require a minimum of 6.0 to support aquatic life) and had elevated levels of manganese and aluminum. PADEP biologists sampled the East Branch Clarion River in 2004 and documented an impaired aquatic macroinvertebrate population approximately 0.4 mile downstream of the confluence with Gumboot Run. On the basis of these data, PADEP added four waterbodies (7.48 stream miles total) to the State's impaired streams list for low pH levels. The four water bodies were three segments in the Gumboot Run watershed (added in 2004) and one segment on the mainstem of the East Branch Clarion River (added in 2006).

Project Highlights

Between 2001 and 2005, project partners installed several passive treatment systems in the Gumboot Run watershed. First, in 2001, PADEP's Knox District Mining Office installed a vertical flow system to add alkalinity directly into the stream. Then, in 2007, partners installed an additional passive treatment system to more thoroughly treat AMD sources in the watershed at a cost of approximately one million dollars. This project, designed by PADEP's Bureau of Abandoned Mine Reclamation (BAMR) and completed by E.M. Brown Construction, has a series of ponds with limestone beds that neutralize the acidic water and allow metals to drop out of solution (Figures 2-4 and 2-5).

Results

Water quality has been improving as a result of the restoration efforts. Data from Gumboot Run in 2007 and 2008 indicated that pH was achieving State standards, and aluminum and manganese were dropping to acceptable levels. PADEP's BAMR has collected samples on Gumboot Run approximately three-quarters of a mile downstream of the treatment systems. The average pH at that location was 4.1 between 1996 and 1999. It rose to 7.3 between 2007 and 2008. During the same period, aluminum declined by 46 percent (Figure 2-6) and manganese declined by 78 percent (Figure 2-7) in samples taken at the site.

PADEP's Division of Water Quality Standards reassessed the stream in 2009 to ensure that minimum State standards are being met. Results of their findings are that benthic populations have returned to both Gumboot Run and the previously impaired segment of the East Branch of the Clarion River. The water bodies now meet Pennsylvania's water quality standards. PADEP plans to remove the four segments from the 2010 impaired waters list.

Partners and Funding

Funding for the large, passive treatment system completed in 2007 was provided by the Surface Mining Control Reclamation Act, Title IV, Appalachian Clean Streams Initiative (\$233,304) and Pennsylvania's Growing Greener Program (\$804,972).

Additional partners include the U.S. Army Corps of Engineers, and Pennsylvania's Game Commission, Fish and Boat Commission, and Department of Conservation and Natural Resources. In addition, in the early 1990s, the now disbanded Elk County Fishermen worked to clean up the watershed. The PADEP Knox District Mining Office and BAMR have been very involved in monitoring the benthic populations and metal levels, as well as funding and designing treatment systems.

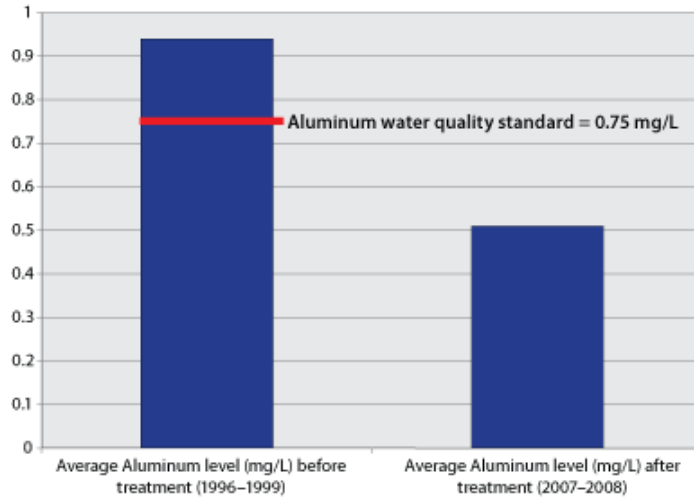


Figure 2-6. Aluminum reductions in Gumboot Run in milligrams per liter (mg/L).

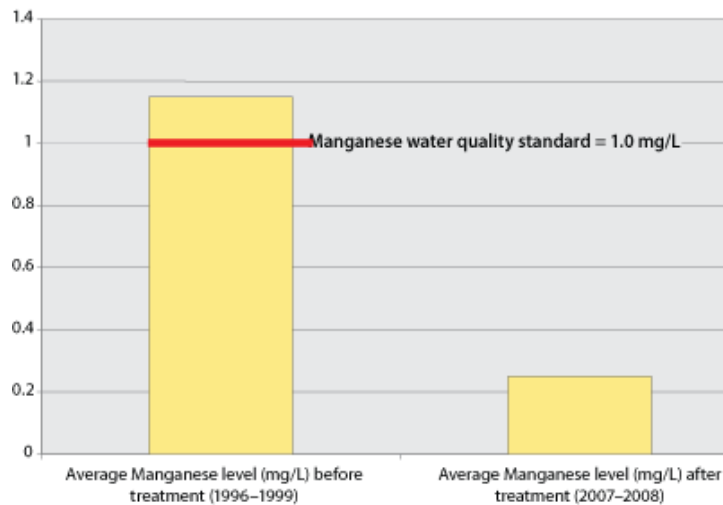


Figure 2-7. Manganese reductions in Gumboot Run in mg/L.

Success Story: Lloydville Run-Abandoned Mine Drainage Treatment Restores Drinking Water Source

Lloydville Run is the local name for an unnamed tributary (UNT) to Bells Gap Run, which has been subject to historic strip mine and deep mine coal extraction, resulting in impaired water quality because of acid mine drainage (AMD). Pennsylvania's Department of Environmental Protection (PADEP) added Lloydville Run to the State's 2002 list of impaired waters for metals, pH and siltation. Water quality improved after PADEP's Bureau of Abandoned Mine Reclamation (BAMR) installed a network of treatment systems designed to remove metals and neutralize the acidity of the inflowing water. As a result, PADEP expects to remove this 2.77-mile segment of Lloydville Run from the State's 2010 list of impaired waters.



Figure 2-8. Lloydville Run in November 2008. Photo courtesy of Kay Spyker, PADEP BAMR

Problem

Lloydville Run (Figure 2-8) flows south near the boundary of Pennsylvania's Cambria and Blair counties before emptying into Bells Gap Run, which flows into the Little Juniata River near Altoona. The headwaters flow through State-owned game lands that contain several abandoned strip and deep coal mines that contribute AMD to Lloydville Run. PADEP added the creek to the 2002 impaired waters list because it was not meeting water quality criteria for metals, pH and siltation and was unable to support its aquatic life designated use.

AMD forms when the iron sulfide mineral pyrite in the mines is exposed to water and air, and a chemical reaction occurs that produces acidic water (low pH). The acidic water can leach various contaminants from rocks in abandoned mines, including metals that can pollute drinking water and endanger aquatic life such as macroinvertebrates and fish. Often, contaminants such as aluminum, iron and manganese are found at toxic levels. Depending on the circumstances, the pollutant that poses the biggest concern at one site might not be an issue at another site, further complicating the problem.

Because AMD contributes to widespread acidic water when it flows into surface water or groundwater, restoring an impaired stream can be challenging. In general, the goal is to get metals to drop out of solution by neutralizing the water's pH. This is done by adding alkalinity to the source of AMD.

Project Highlights

PADEP BAMR designed three treatment systems and a land-reclamation site to clean up the discharges along Lloydville Run. The agency finished constructing the treatment systems in the fall of 2001. The project included 18 acres of bare earth revegetation above the treatment sites.

The network of treatment systems includes an anoxic limestone drain, a limestone vertical flow pond, sediment ponds, and aerobic and anaerobic wetlands. The treatment system series covers an area of approximately 7 acres. To address specific water chemistry issues, BAMR also implemented passive treatment features to address several acidic seeps from abandoned coal extraction areas. Improved water quality in Lloydville Run and Bells Gap Run benefits Bellwood Reservoir, a downstream water source for the Altoona Water Authority.

Results

Monitoring data collected at a sampling location on Lloydville Run downstream of the treatment systems and land reclamation show that the pH level increased from an average of 4.10 in 2000 to 6.92 in 2007 (Figure 2-9). Metal concentrations at the location also dropped significantly over the same period. Manganese dropped by 80 percent, aluminum by 67 percent and iron by 59 percent. Monitoring data collected between 2005 and 2007 show that metal concentrations meet water quality standards (Table 2-2).

In addition, PADEP biologists have documented healthy populations of macroinvertebrates. All sites sampled throughout the Bells Gap Run watershed in 2008 produced Index of Biologic Integrity (IBI) values ranging from 66.4 to 94.4. An IBI value of 63 or greater indicates good water quality and supports removing a stream from the impaired waters list. PADEP expects to remove a 2.77-mile segment of Lloydville Run (UNT to Bells Gap Run) from that list for pH and metals in 2010.

Partners and Funding

Partners involved in restoring the watershed include Environmental Alliance for Senior Involvement (EASI), BAMR, and the Altoona Water Authority. EASI performed the original water quality monitoring. Although the organization disbanded locally, many of the same volunteers continue to monitor the watershed. The project's total cost was \$503,970. PADEP's Growing Greener Program provided \$337,515 and the U.S. Department of Interior Office of Surface Mining's Clean Streams Initiative funded the remaining \$166,455.

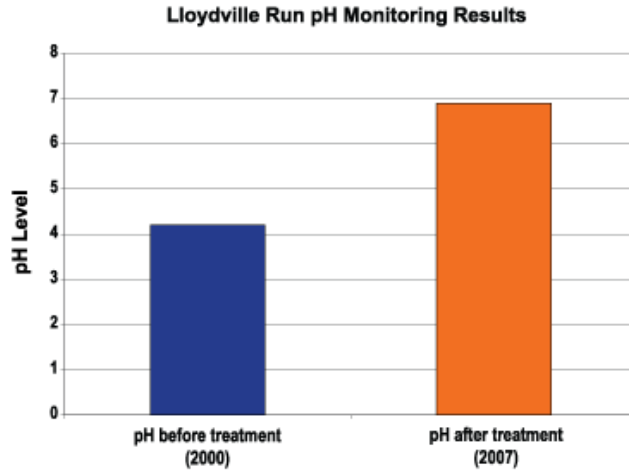


Figure 2-9. Increase in pH in Lloydville Run from 2000 to 2007 as a result of land treatment.

Table 2-2. Lloydville Run metals reductions

Measured reductions in metal concentrations in Lloydville Run

	2000 average measured concentration [in milligrams per liter (mg/L)]	2005-2007 average measured concentration [in milligrams per liter (mg/L)]	Water quality criteria maximum [in milligrams per liter (mg/L)]
Aluminum	2.7	0.64	0.75
Manganese	2.6	0.48	1.00
Iron	1.5	0.4	1.50

Success Story: Sterling Run-Installing Passive Treatment System Restores Trout Population

Abandoned mine drainage (AMD) polluted central Pennsylvania's Sterling Run watershed. The Pennsylvania Department of Environmental Protection (PADEP) added Sterling Run and four of its tributaries to the State's 1996 list of impaired waters for siltation, metals and pH. PADEP's Bureau of Abandoned Mine Reclamation (BAMR) designed and contracted the construction of a treatment system that increased pH and significantly reduced metal levels in the stream. PADEP's Division of Water Quality Standards determined that segments in the Sterling Run watershed meet water quality standards and plans to remove the waters from the State's 2010 list of impaired waters.

Problem

Sterling Run is in a heavily forested part of central Pennsylvania, just east of the town of Pine Glen and northwest of State College in Centre County. Numerous tributaries, including Boake Run (Figure 2-10), flow into Sterling Run, which in turn flows into the West Branch of the Susquehanna River. Decades of strip mining during the mid-1900s left multiple abandoned coal mines. Coal mines that are not properly reclaimed after coal is removed often leach pollutants into nearby streams. A chemical reaction occurs when rain, stormwater runoff or groundwater contact the mineral pyrite, which is exposed during mining activities. The product of that chemical reaction is often toxic to receiving waters because of acidic pH and elevated levels of metals including aluminum, iron and manganese. Severely affected streams lose all aquatic life and become coated with white- or orange-colored sediment.



Figure 2-10. Boake Run, a tributary of Sterling Run. Photo courtesy of Kay Spyker, PADEP BAMR

Water flowing from mines contributed acidic water, metals and sediment to Sterling Run and its tributaries. The impairments prevented the waters from attaining their aquatic life designations. PADEP added five segments of Sterling Run and its tributaries (12.33 total stream miles) to the State's 1996 list of impaired waters for elevated metals, low pH and siltation. PADEP completed a total maximum daily load for Sterling Run and its tributaries in 2004.

The most significant source of AMD in the watershed is an abandoned strip mine along Boake Run. This tributary to Sterling Run suffers elevated levels of aluminum and magnesium and low pH. A 2008 report by BAMR documents that water in Boake Run

had an average pH of 4.5, an average aluminum level of 5.47 milligrams per liter (mg/L) and an average manganese level of 6.17 mg/L. Pennsylvania water quality standards require that water quality metal concentrations not exceed 1.00 mg/L for manganese and 0.75 mg/L for aluminum. Additionally, the pH level must be between 6.0 and 9.0 to ensure attainment of designated uses.

Project Highlights

The DEP-BAMR designed and contracted the construction of a passive treatment system to address the AMD problem. The project diverts Boake Run and a smaller, unnamed tributary into the treatment system to improve water quality, and it then re-directs the treated effluent back to the stream channel below the site. Construction began in the summer of 2004 and took about a year to complete. The system, which consists of collection channels, limestone treatment and settling ponds (Figures 2-11 and 2-12), raises pH levels and allows the metals to drop out of solution. The project also included planting 50,000 trees on Pennsylvania Game Commission watershed land in 2000, which emphasized including trees and shrubs that are desirable to local wildlife.



Figure 2-11. Vertical flow limestone treatment pond. Photo courtesy of Richard Macklem, Pennsylvania State Game Commission



Figure 2-12. Settling pond with limestone baffles. Photo courtesy of Kay Spyker, PADEP BAMR

Results

Data collected by BAMR in November 2006 through July 2008 show an average pH of 4.5 above the treatment system and an average downstream pH of 7.5. Data indicate that

the passive treatment system captures 84 percent of aluminum and 86 percent of manganese present.

On the basis of a 2008 BAMR biologist's assessment of aquatic macroinvertebrates in the Sterling Run watershed, PADEP's Division of Water Quality Standards has determined that the Index of Biotic Integrity is sufficiently high to support removing five segments (12.33 miles) of Sterling Run from the State's 2010 list of impaired waters.

Studies by the Pennsylvania Fish and Boat Commission show that brook trout populations increased post-project. A May 2009 report notes that only one brook trout was present in 1985 below the point where Boake Run flows into Sterling Run. When sampled again in 2008, 31 brook trout were present. Also, the overall biomass at that location increased from 0.2 kilograms per hectare (kg/ha) to 5.9 kg/ha from 1985 to 2008. The number of brook trout and biomass present increased significantly after completing the treatment system. This reestablishment of naturally reproducing brook trout population indicates that water bodies are attaining their aquatic life designated use.

Partners and Funding

Sterling Run's heavily forested watershed drains mostly State-owned land that is managed by the Pennsylvania Game Commission. The rest of the watershed is privately held, except for a small portion that lies within the Sproul State Forest and is managed by the Pennsylvania Department of Conservation and Natural Resources. Primary partners in the project were BAMR and the Game Commission. Other partners include the Pennsylvania Fish and Boat Commission, which has sampled for fish species in the watershed as far back as 1985, and E.M. Brown Construction.

The Game Commission dedicated the Boake Run Mine Acid Abatement Project on September 29, 2005 (Figure 2-13). Final cost for the entire project was \$856,677, which was provided by the federal Office of Surface Mining through the Appalachian Clean Stream Initiative.



Figure 2-13. Partners from PADEP BAMR, Pennsylvania Game Commission and E.M. Brown Construction gathered to dedicate the Boake Run project. Photo courtesy of Richard Macklem, Pennsylvania State Game Commission.

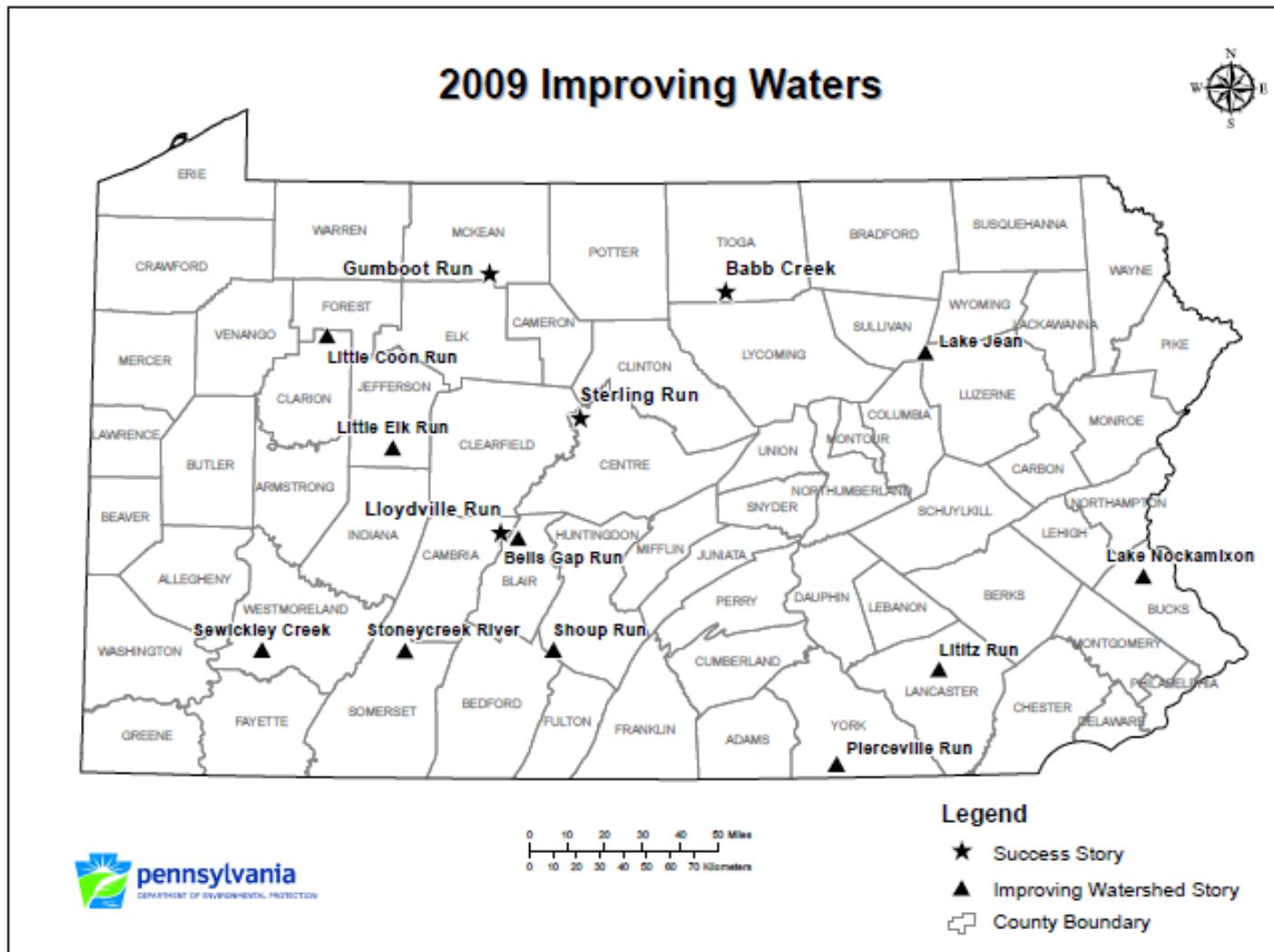


Figure 2-14. Improving Watershed Story Locations

2.2 Improving Watershed Stories

The locations of the *ten* new *Improving Watershed Stories* are shown in Figure 2-14. These watersheds include *Little Coon Run* (Clarion County), *Little Elk Run* (Jefferson County), *Sewickley Creek* (Westmoreland County), *Stoneycreek River* (Somerset County), *Shoup Run* (Huntingdon County), *Bells Gap Run* (Blair County), *Lake Jean* (Luzerne County), *Lake Nockamixon* (Bucks County), *Lititz Run* (Lancaster County) and *Pierceville Run* (York County).

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 abandoned mine drainage (AMD) sources. There are few watersheds that are nutrient or sediment impaired for which improving waters 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.

Little Coon Run-Clarion County

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 Abandoned Mine Drainage 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" in 2004, which is now known as Category 5 of the "Integrated List of All Waters". The source of impairment is Abandoned Mine Drainage (AMD), and the cause is metals and pH.

A Watershed Assessment and Restoration Plan funded by Growing Greener was completed by Hedin Environmental in 2003. Three discharges were identified as the most significant sources of AMD in the watershed and were targeted for treatment. Two of the discharges were abandoned gas wells that were best suited for being plugged. A passive treatment system was constructed for the third source, which consists of an anoxic limestone drain, a settling pond and a constructed wetland. The well plugging and passive system were all completed in 2007.

Partners involved in the restoration of Little Coon Run include DEP-BAMR, PA Game Commission, Farmington Township and Hedin Environmental. The projects were funded by the Growing Greener program and the Office of Surface Mining's Appalachian Clean Streams Program.

According to the project's final report, sample results from the mouth of Little Coon Run demonstrate improving water quality. In 2001, before restoration projects were completed, average pH at the mouth of Little Coon Run was 4.5. Sample results from 2008 produced an average pH of 6.12, with a high reading of 7.0 in September. Metals have been declining as well. The largest decline was Manganese, which dropped 70% between 2001 and 2008, while Aluminum declined 26%. Additional monitoring is necessary, but Aluminum and Manganese levels appear to be attaining state standards. Manganese was last measured at 0.22 mg/l in September 2008 and Aluminum was 0.5 mg/l.

Little Elk Run-Jefferson County

Little Elk Run flows through southern Jefferson County until it empties into Elk Run near Punxsutawney. It is located within the Allegheny River Watershed. This part of Jefferson County was dominated by deep coal mines in the 1800's and strip mining activities throughout the 1900's. These methods of coal extraction produced a lasting effect of degraded water quality in the region from Abandoned Mine Drainage (AMD), increasing the level of metals and lowering pH in local streams. Little Elk Run appears on **Part 2: At least One Use Attained** of the **2008 Integrated List of All Waters**, having attained some uses. No TMDLs have been completed for this watershed.

The Borough of Punxsutawney secured a Growing Greener Grant in 2001 to fund development of the Elk Run Watershed Assessment and Restoration Plan. It determined that the most significant source of AMD originated in a small unnamed tributary of Little Elk Run and that it should be the first impairment to be treated. The remaining part of the study addressed stream rehabilitation, recreational enhancement and stormwater improvements. Additional Growing Greener funds were obtained by Young Township for work on AMD remediation; additional partners included Hedin Environmental and DEP.

A passive treatment system was designed to treat the AMD source by diverting flow into compost beds followed by a limestone bed and eventually a polishing wetland at the outflow. In addition to the treatment system, a coal spoil pile was removed before work began. The system was completed in the Fall of 2003 and AMD was directed into the system in the Spring of 2004.

The final report, compiled by Hedin Environmental, compares pre-treatment and post-treatment water quality. Significant improvements were documented shortly after the project was completed. The AMD source had a pH of 2.9, Iron was measured at 15.0 mg/l and Aluminum was 11.0 mg/l before construction of the system. After treatment, the discharge measured a pH of 7.4, and Iron and Aluminum dropped to 0.5 and 0.1 mg/l, respectively. Also, improvements were measured in Little Elk Run downstream of the confluence with the AMD source. The pH rose from 3.9 to 6.8 and Iron was reduced from 5.5 to 1.6 mg/l and Aluminum from 4.4 to 0.2 mg/l. Although the stream still displays a slightly elevated level of iron, improvements have been significant.

Sewickley Creek-Westmoreland County

Sewickley Creek flows west through Westmoreland County until it reaches the Youghiogheny River. The stream flows through an area that was historically active with deep coal mines from the late 1800's into the mid 1900's. The most significant source of Abandoned Mine Drainage (AMD) to Sewickley Creek is the Marchand Mine near Lowber, PA. This discharge produces a significant flow that carries an extremely high level of iron. Sewickley Creek was placed on the State's list of impaired waters in 2006, the source of impairment is AMD and the cause is metals and pH. Sewickley Creek does not have a TMDL because the stream was not listed as impaired in 1996.

In 2002, the Sewickley Creek Watershed Association (SCWA) was awarded a State Growing Greener Grant for 1.2 million dollars to sponsor a project that would involve the design and construction of a large passive treatment system. Additional partners were the Department of Environmental Protection, Hedin Environmental and Iron Oxide Recovery, Inc. Construction of the treatment system began in 2005. The system includes six settling ponds which cover 5.5 acres and a constructed wetland that that is 7.7 acres.

During the first year of treatment, approximately 400 tons of iron were captured that would have flowed into Sewickley Creek. According to sample results by Stream Restoration, Inc., the average iron level flowing to the system from the Marchand Mine in 2007 was 72.64 mg/l, while treated effluent leaving the system averaged 1.06 mg/l. Samples through September 2008 show the average iron level was further reduced to 0.33 mg/l. The stream will be assessed by DEP-Division of Water Quality Assessment and Standards staff to ensure that minimum state standards are being met.

The SCWA and Iron Oxide Recovery, Inc. received the Governor's Award for Environmental Excellence in 2008 as recognition of their achievements on the project. Iron Oxide Recovery, Inc. removes iron deposited in the settling ponds and sells it for use as a pigment in a variety of commercial products including paints and stains. This way the material is used in a productive and profitable way instead of being disposed of in a landfill.

Stonycreek River-Somerset County

The Stonycreek River flows north through Somerset County until it empties into the Conemaugh River in Johnstown, PA. The watershed covers approximately 467 square miles. Nearly two thirds of the watershed is forested, while agriculture occupies approximately a quarter of the land. Historic coal mining, including deep mines and later strip mines, has negatively impacted water quality. It was originally placed on the State's 303(d) "List of Impaired Waters" in 1996, which is now known as Category 5 of the "Integrated List of All Waters". The source of impairment is Abandoned Mine Drainage (AMD), and the causes are metals and pH as well as siltation and nutrients. A TMDL was developed for the Stonycreek River and its tributaries in 2004 to address agriculture and sediment. There are additional TMDLs for tributaries that address AMD. A coalition of watershed groups, known as the Stonycreek - Conemaugh River Improvement Project (SCRIP) has been instrumental in promoting watershed restoration.

The Stonycreek River Watershed Reassessment, completed in May, 2008 by the Somerset County Conservation District, highlights work completed and recommends future work to continue watershed restoration. Funded by the Foundation for Pennsylvania Watersheds, it analyzes water quality, physical properties and aquatic life in the watershed. Indicators of water quality are compared to a USGS assessment completed in the early 1990's. It documents that the water quality and aquatic life have improved, however more work needs to be done. Approximately \$10 million dollars have

been spent on a variety of projects, including AMD treatment systems and agricultural improvements, since the USGS assessment was completed.

According to the Stonycreek River Watershed Reassessment, pH rose at 6 of 7 main stem sampling sites included in the report, while Iron levels declined at 4 of the 7 sites. The most significant Iron reductions were observed below Paint Creek (57%) and at Glessner's Bridge (88%). The average number of fish species collected in 1998 at five sites on the main stem increased 38% when the same locations were re-sampled in 2007. Also, the total number of fish increased 50% over the same period. Through the continuing efforts of SCRIP, the Somerset County Conservation District, the various watershed organizations and other partners involved, additional projects will be implemented to address AMD and agricultural impacts to the watershed.

Shoup Run-Huntingdon County

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 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 stream bank 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.

Bells Gap Run-Cambria, Blair Counties

Bells Gap Run flows along the boundary of Cambria and Blair Counties before turning east, eventually emptying into the Little Juniata River near Altoona. The headwaters of the stream are located in State Game Lands # 108. This watershed has been subject to historic strip mine and deep mine coal extraction. As a result of mines not being properly retired, drainage from these locations has led to water quality impairments in nearby streams, including elevated metals and low pH. Bells Gap Run was placed on the State's list of impaired waters in 2002. The source of impairment is Abandoned Mine Drainage (AMD) and the cause is metals, pH and siltation. The most significant source of AMD to the stream is located along an unnamed tributary locally known as Lloydsville Run. Bells Gap Run does not have a TMDL.

Partners involved with restoration of the watershed include Environmental Alliance for Senior Involvement (EASI), BAMR, and the Altoona Water Authority. Not only does treating sources of AMD benefit water quality of Lloydsville Run and Bells Gap Run, but it also improves water quality of Bellwood Reservoir, a water source for the Altoona Water Authority. Water monitoring was originally done by EASI. Even though the organization disbanded locally, many of the same volunteers continue to monitor the watershed.

BAMR designed three treatment systems and a land reclamation site to clean up the discharges. Total cost was approximately \$500,000 and was funded by the USDI Office of Surface Mining (OSM) Clean Streams Initiative and Growing Greener. The project was completed in the fall of 2001. The treatment systems include a limestone Vertical Flow Pond (VFP), a compost wetland, an Anoxic Limestone Drain (ALD) and a re-vegetation area covering approximately 18 acres that was originally a Scar Lift project where vegetation did not get adequately established.

Water chemistry and aquatic life have responded favorably in the Bells Gap Run watershed since treatment systems were completed. Comparing results from a sampling location on Lloydville Run downstream of the treatment systems and land reclamation, the pH increased from an average of 4.10 in 2000 to 6.92 in 2007. Metal reductions at this location over the same time period were also significant. Manganese dropped 80%, Aluminum 67% and Iron 59%. DEP biologists have documented healthy populations of macroinvertebrates. All sites sampled throughout the Bells Gap Run Watershed in 2008 produced Indexes of Biologic Integrity (IBI) ranging from 66.4 to 94.4. An IBI of 63 or greater supports a stream de-listing. Water Quality Standards staff intends to de-list Bells Gap Run and its tributaries later this year, based on improved water quality and the healthy benthic population.

Lake Jean-Luzerne and Sullivan Counties

Lake Jean lies in northeastern Pennsylvania, on the border of Luzerne County and Sullivan County, within Ricketts Glen State Park. The lake covers approximately 253 acres and is relatively shallow, with an average depth of 5.9 feet. Approximately 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. 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 list of impaired waters in 1996. The source of impairment is low pH caused by acidic deposition. The lake is also impaired for mercury caused by atmospheric deposition. A TMDL was approved for the lake in 2004.

Rainfall monitoring data collected by the National Atmospheric Deposition Program, included in the TMDL, indicates that the average rainfall pH in the area of Lake Jean in 2002 was approximately 4.3 to 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.

Using 314 funds provided by the US-EPA as part of the Clean Lakes Program, F.X. Browne, Inc. completed a feasibility study in 1995 which recommended application of lime to address the acidic condition of the lake. As a result, liming the lake and its main tributary using ground agricultural limestone was conducted from the late 1990's until the present, mostly by the Department of Conservation and Natural Resources (DCNR) and the PA Fish and Boat Commission (PAF&BC). DCNR continues to add lime to the lake in the spring and fall each year.

Samples taken during a 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. Fish sampling by the DEP and PAF&BC from 1997 through 2007 found increases in the number of brown bullhead, black crappie and largemouth bass. Overall weight of fish caught also increased, which indicates there is less stress on fish living in the lake as a result of less acidic conditions. DEP personnel plan to petition the EPA in early 2010 to move Lake Jean from Category 5 of the Impaired Waters List to Category 2, because the lake is now attaining its designated use.

Lake Nockamixon-Bucks County

Lake Nockamixon is located in northwestern Bucks County, approximately 8 miles east of Quakertown, within Nockamixon State Park. Its primary tributary is Tohicken Creek, which also drains the lake and flows to the Delaware River. A dam was constructed in 1973 by the Department of Environmental Resources (DER) to create the lake. The drainage area above the dam is 73.3 square miles, and the lake covers approximately 1,450 acres. The lake is a popular recreational destination in southeastern Pennsylvania. Popular activities include fishing and boating.

Stormwater runoff carrying elevated phosphorous loads caused frequent algal blooms beginning in the 1970's, shortly after the lake was created. As a result, Lake Nockamixon was placed on the State's 303(d) "List of Impaired Waters" in 1996, which is now known as the "Integrated List of All Waters". It can be found in Category 4a, the list for water bodies that have a TMDL. The sources of impairment are agriculture, on site wastewater and municipal point sources, and the causes are suspended solids and nutrients. A TMDL was completed for Lake Nockamixon in 2003.

In the early 1980's public lakes in Pennsylvania were studied by the Department of Environmental Resources (DER) to determine their health. Lake Nockamixon was identified as impaired by high nutrient loadings and excessive algae growths. It was about this time that the Bucks County Conservation District began efforts to further assess the lake with funding provided by the DER Clean Lakes Program. The most significant sources of nutrients, in order of degree of significance, were identified as wastewater treatment plant effluent, agricultural practices and on-lot septic systems.

According to information published by the Bucks County Conservation District, the total amount of topsoil saved in the watershed is approximately 7,328 tons per year. There are no state standards for phosphorous, but it is identified as the nutrient of primary concern in the TMDL. Phosphorous levels were reduced 51% and Nitrogen 33% from 1980 to 2007. In addition to the reduction of nutrients and less frequent algae blooms, the fish population is thriving. The PA Fish and Boat Commission stocks a variety of species. The improved water quality supports the diverse population in the lake.

Funding for studies and implementation of BMPs was provided by DER and EPA. Additional partners became involved, including the USDA Soil Conservation Service, Penn State Cooperative Extension and the PA Fish and Boat Commission to name a few. The collective efforts of all involved resulted in a \$13 million upgrade to an upstream municipal wastewater treatment plant, better nutrient and runoff management on farms and better management of private septic systems within the watershed. Thirty-four BMPs were installed on 28 farms, including 34,075 linear feet (LF) of grassed waterways, 17,503 LF of diversions and terraces, 27,865 LF of sub-surface tile, 15 water control basins and 7 manure storage facilities. The total cost of these improvements to the Clean Lakes Program was nearly \$500,000.

Lititz Run-Lancaster County

Lititz Run flows through north central Lancaster County from its origins as a spring in the town of Lititz before flowing south east, eventually emptying into the Conestoga River. The stream has been negatively impacted by residential development and farming activities. The 2004 TMDL Report identifies land use in the watershed as 71% farming, 19% developed and 9% forested land. Extensive farming and residential development provided a source of pollutants and removed vegetative buffers along the stream. These conditions also elevated temperatures and reduced dissolved oxygen levels. As a result, Lititz Run was first placed on the State's list of impaired waters in 1996. The source of impairment is Nutrients and Suspended Solids/Turbidity caused by Agriculture, Urban Runoff and Storm Sewers. Part of the stream was de-listed in 2004 due to improved water quality; however additional improvements are necessary for Lititz Run to meet the TMDL.

In 1992, the Lititz Run Watershed Alliance (LRWA) was formed and began coordinating restoration efforts to improve stream quality. The LRWA, in cooperation with the Lancaster County Conservation District, DEP, Donegal Chapter Trout Unlimited, Warwick Township and other organizations, implemented several restoration projects. Growing Greener and 319 funds supported a number of these projects. In 2005 and 2006, Best Management Practices (BMPs) were constructed on two farms to control runoff from pasture and crop land. BMPs such as stormwater diversions, stream bank fencing, erosion controls, and manure storage facilities were built. In addition to agricultural BMPs, other projects included relocating the stream channel where it was surrounded by legacy sediments, wetland and riparian restoration and the removal of two dams. The LWRA received awards including the 1999 EPA Clean Water Action Plan National Showcase Watershed and, along with Land Studies, Inc., the 1999 Governor's Award for Environmental Excellence.

Results show significant declines in Nitrate, Phosphate and sediment. In 1996 and 1997 average levels of Nitrate were 10.9 mg/l, Phosphate 1.00 mg/l and Turbidity 13.3 NTUs. In 2006 and 2007 Nitrate values averaged 5.5 mg/l, Phosphate 0.18 mg/l and Turbidity 5.4 NTUs. Samples over this ten year period show declines of Nitrate levels by 49%, Phosphate 82%, and Turbidity 60%. Holdover Brown Trout have been observed in the stream, but a survey conducted by DEP in July 2007 indicates the benthic macroinvertebrate community is still moderately impaired. It is anticipated that with time the physical improvements to the stream will enable aquatic populations to rebound as well. Suspended Solids have not yet dropped far enough for Lititz Run to be removed from the Impaired Streams List, but the LWRA and its partner organizations continue to work toward that goal.

The LRWA has been monitoring the stream in cooperation with students from Warwick High School and the Lancaster County Conservation District for more than a decade.

Pierceville Run-York County

Pierceville Run flows 2.67 mi thru hilly farmland in southern York County in Sub-basin 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 sub-watershed. 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 stream bank 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 stream banks, 2,387 lbs/yr (a 73% reduction); sediment reductions for farmland and stream banks 1.54 million lbs/yr (42%) (page 22 of the TMDL).

The IWLA secured a 319/Growing Greener Grant in 2003 to design and restore 2,271 linear ft of Pierceville Run using natural stream channel design. The project, implemented in 2006, improved flow regimes and aquatic habitat by grading and stabilizing stream banks 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 .308T/ln 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.

The 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. In May 2006, just before construction, the mid-station substrates were 34% sand-silt, 62% pebbles and 4% cobbles; by September 2009, the percentages were 4%, 81% and 15 % respectively (see chart below).

SECTION 3.0 -- NPS PROGRAM PLAN ACCOMPLISHMENTS

The U.S. Environmental Protection Agency's National Strategic Plan (EPA Plan), published in September 2003, includes seven criteria which state NPS programs are to use to help document success and measure water quality improvements.

The seven criteria included in the EPA Plan are:

1. Number of waters restored from all NPS program actions
2. National goals are 250 water bodies by 2008 and 700 water bodies by 2012
3. Sediment load reductions
4. Nitrogen load reductions
5. Phosphorus load reductions
6. Section 319 funds used to restore water bodies
7. Watershed-based plans under development and being implemented, and
8. Watershed-based plans substantially implemented.

3.1 NPS Management Program Plan-2008 Update Background

Pennsylvania's *NPS Management Program-2008 Update* includes five long-term goals which are largely based on the seven criteria in the EPA Plan. The five long-term goals are:

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.

Goals 1 through 5 are incorporated in the seven Action Plans in the *NPS Management Program Plan-2008 Update*. The Action Plans are specific to the seven approved NPS categories:

- Agriculture
- Construction and Urban Runoff
- Hydromodification
- Lakes
- Land Disposal
- Resource Extraction
- Silviculture

3.2 NPS Management Program Plan-2008 Update Accomplishments

Accomplishments for the seven Action Plans are included in this section. Pennsylvania reports on its NPS Management Program Plan goals and objectives as part of its annual reporting requirements. NPS Management Program staff coordinates with program partners on the Action Plan accomplishments.

3.2.1 Agriculture

Goal 1

Objective:

Track agricultural BMP implementation and estimate reductions in sediment and nutrients. Track designated use attainment in watersheds where agriculture is the major source of impairment. Further develop or refine the existing Section 319 NPS GRTS database to collect this information on a watershed basis by 2012

Accomplishments:

- **The NPS Program database tracks bmp implementation and nutrient, sediment load reductions for all Section 319-funded agricultural bmp implementation projects.**

Goal 2

Objective:

Increase the agricultural producers' involvement in watershed planning/implementation efforts by 2008.

Accomplishments:

- **Project sponsors work with landowners to implement WIP project priorities. County conservation district and USDA-NRCS staff, local watershed associations, and farmers have been successful in completing WIP agricultural BMP implementation in many of the WIP approved watersheds.**

Goal 3

Objective:

Increase accessibility of local, state, and regional water quality data to decision makers, watershed organizations and producers to target water quality restoration and protection efforts.

Accomplishments:

- **Water quality data is made available to the public by local, state and federal organizations through a variety of methods.**
- **The web sites for the DEP NPS Management Program www.dep.state.pa.us and the EPA Region III NPS Program <http://www.epa.gov/reg3wapd/nps/index.htm> provide water related information. The USDA-NRCS, Pennsylvania Department of Agriculture (PDA), State Conservation Commission (SCC) and USDA-FSA track program progress related to water quality restoration and protection.**

Objective:

Establish local water-quality monitoring sites to obtain baseline data and assess the effectiveness of agricultural practices or actions to obtain baseline data.

Accomplishments:

- **Some agricultural projects, including on CREP sites in several counties, have long-term habitat and water quality data being collected.**
- **Water quality monitoring is done by local watershed associations, local colleges, universities and conservation districts to collect data in some ag impaired areas.**

Goal 4

Objective:

Assess the feasibility of nutrient reduction credit trading using the Conestoga River watershed pilot project by 2008.

Accomplishments:

- **New nutrient trading legislation is being formulated. Credits are being approved and assigned for nutrient trading projects Statewide, most within the Susquehanna River basin. Applications for trading credits are reviewed by a special work group. Nutrient reduction credit trading is considered to be a feasible method to reduce excessive nutrient inputs to surface waters.**

Objective:

Increase the adoption of cost-effective best management practices to minimize ammonia emissions and protect/improve air quality on 1,000 farms by 2012.

Accomplishments:

- **There is technical guidance for Odor Management and Odor Site Index to assess impacts of some new agricultural operations. The SCC has helped develop this guidance and training as part of Act 38 requirements.**
- **Approximately fifty-four Odor Management Plans (OMPs) have been developed for CAOs and CAFOs where new barns or manure storage structures are being built. SCC staff administers Pennsylvania's Odor Management Program.**
- **Air Quality Non-Attainment Areas have been designated for SE and SW Pennsylvania counties by the USDA-NRCS. Specific practices are eligible for**

assistance. The Pennsylvania NRCS web site includes information on Air Quality Non-Attainment Areas.

Objective:

Facilitate four projects demonstrating market-based opportunities to address agricultural water quality issues by 2008.

Accomplishments:

- The DEP Nutrient Trading Program web site has a link titled ‘Nutrient Trading’ on DEP web site www.dep.state.pa.us.
- Since Pennsylvania’s Trading Program officially began in 2006 the DEP Water Planning Office has helped facilitate many trades. 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) (AAB Meeting 12/16/2009). Thirty projects have been implemented and certified, the majority of which include one or more agricultural BMPs. Approved proposals and contracts/trades are listed on a registry on the DEP web site www.dep.state.pa.us.

Objective:

Demonstrate the implementation of technologies and management systems (conservation tillage, composting, etc.) identified to be environmentally sound and economically feasible.

Accomplishments:

- Pennsylvania’s Agriculture, Communities and Rural Environment (ACRE) legislation, part of Act 38 of 2005, has funded many new and innovative BMPs and management systems. The ACRE initiative provided over \$800,000 to 21 grants for agricultural BMPs through September 2008.
- Odor Management Plan regulations, also required under ACRE, became effective in February 2009.
- The Resource Enhancement and Protection (REAP) program was created through Act 55 of 2007. During FY2008-09 REAP made available \$10 million in tax credits for eligible practices. Total FY2008-09 project costs exceeded \$23 million. Credits were awarded for 461 BMPs as of October 1, 2009. The FY2009-10 funding cycle provided \$5 million. The PDA and SCC administer the REAP program. Information is available at www.agriculture.state.pa.us under ‘REAP.’
- Lancaster County Conservation District received a \$250,000 grant from the Chesapeake Bay Funders Network to write conservation plans for farmers in Warwick Township. The project was completed in November 2009. A total of 101 farms participated and approximately 4,500 acres were planned for.
- The Penn State University (PSU) received a \$750,000 NFWF grant for the Conewago Creek Watershed Restoration Initiative. Funds will help implement the WIP and other practices over a 3-year period.

Objective:

Assess the feasibility of new technology and BMPs to address the nutrient imbalance on agricultural lands.

Accomplishments:

- **An Alternative Manure Utilization & Technologies Strategy has been developed by the SCC. The Strategy assesses various alternative manure processing technologies. The DEP, USDA-NRCS, SCC and Penn State University collaborate to assess alternative technologies and evaluate BMP effectiveness.**
- **A benefit of Pennsylvania's Nutrient Trading Program is in the adoption of new and innovative technologies.**

Goal 5

Objective:

Increase farmer participation by 250 producers in the Pennsylvania Environmental Assessment and Conservation Certification of Excellence (PEACCE) program by 2012.

Accomplishments:

- **The PEACCE program has not been funded in full in recent years. No recent activity has taken place.**

Objective:

Maintain and increase nutrient management, soil conservation and agronomic management educational efforts to producers, program and technical support staff and agri-business by 2012.

Accomplishments:

- **Three certification programs are available to help meet nutrient management planning requirements under Act 38 of 2005. The (1) Manure Hauler and Broker, (2) Odor Management, and (3) Nutrient Management Planning programs offer an 11-day annual training course for NMP certification, as well as training sessions for the Manure Hauler and Broker and Odor Management Programs. The SCC and PSU provide NMP certification training.**
- **Level I and Level II Boot Camps for are provided annually for Conservation Planners.**
- **Pennsylvania's NMP publishes the Nutrient Management Program Newsletter monthly.**

Objective:

Track nutrient management plan implementation on Concentrated Animal Operations (CAOs) and Concentrated Animal Feeding Operations (CAFOs) where required by state and/or federal mandate.

Accomplishments:

- **Pennsylvania's Nutrient Management Program, revised under Act 38 or 2005, requires the DEP to track all NMP implementation for CAOs and CAFOs. NMP regulation revisions were phased in over 3 years ending October 2009 on existing farms. During 2009 932 CAOs were required to have a NMP. CAFO permit applications increased to 341 as of March 2009 and close to 350 as of September 2009.**

Objective:

Fully implement Pennsylvania's Conservation Reserve Enhancement Program (CREP) in the Susquehanna and Ohio River basins and investigate the possible future expansion of CREP to include the Delaware River Basin.

Accomplishments:

- **Enrollment continues to increase in the Susquehanna and Ohio River basin CREP areas in Pennsylvania. Acres 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). CREP was reauthorized through December 2012 in the 2008 Farm Bill.**
- **The Delaware River basin in eastern Pennsylvania is under consideration for CREP.**

Objective:

Develop and fully implement a Manure Hauler and Broker Certification Program by 2008.

Accomplishments:

- **Over 850 commercial manure haulers, applicators and brokers were certified through December 2009 by the PDA. Twenty continuing education programs were held in 2009. The PDA web site at www.agriculture.state.pa.us includes information on the program under 'State Conservation Commission-Nutrient Management'.**

Objective:

Increase accessibility to agriculture research data and information on the water-air pollutant mechanisms through workshops, print media, and the internet by 2012.

Accomplishments:

- **Nutrient management training incorporates current research in both classroom and field exercises. The PSU held a series of web-based seminars related to manure management and air quality to highlight new research.**
- **Frequent workshops and trainings are held for the agricultural community at the Rock Springs and Landisville Agricultural Research Stations.**
- **The PSU Agriculture & Environment Center web site <http://aec.cas.psu.edu> includes links to current water quality-air quality research work.**

Objective:

Facilitate conservation planning and implementation efforts and track conservation planning and implementation to help producers comply with USDA-NRCS and conservation district requirements by 2012.

Accomplishments:

- **The DEP, USDA-NRCS, PDA, SCC and county conservation districts promote CORE-4 practices as part of the Chesapeake Bay Watershed Initiative (CBWI).**
- **A 'Conservation Planning Tool' will be developed to enable farmers to write their own Conservation Plan.**

- **The DEP, Lancaster and Bradford County Conservation Districts complete an Ag Action Packet to help farmers write E&S plans and comply with Pennsylvania environmental regulations governing agriculture.**
- **As of October 2009, Act 38 of 2005 requires CAOs, CAFOs and Volunteer Ag Operations to have a Conservation Plan before a NMP will be approved. This requirement has led to more conservation plans being developed in the State.**
- **Lancaster County CD completed 4,500 acres of conservation planning on 101 farms in Warwick Township, Lancaster County through November 2009.**

Objective:

Develop and implement Mushroom Farm Environmental Management Plans (MFEMP) on all sites utilizing mushroom substrate (MS) and spent mushroom substrate (SMS) by 2012.

Accomplishments:

- **A ‘Mushroom Manual’ supplement will be included in the ‘Manure Management for Environmental Protection’ publication.**
- **Nutrient Balance Sheets have been included, Air Quality and Odor Management are being addressed, and waste water storage requirements are being incorporated into the ‘Mushroom Manual.’**
- **A standard format for MFEMPs has been approved and will be utilized by Pennsylvania mushroom farm operations.**

Objective:

Complete four projects that implement alternative-use technologies for spent mushroom substrate (SMS) by 2008.

Accomplishments:

- **The PSU-Berks Campus, Chester County Conservation District and Cooperative Extension, the Penn State University, and the American Mushroom Institute are experimenting with SMS alternative uses.**

3.2.2 Construction and Urban Runoff

Goal 1

Objective:

Reduce storm water impairments that are caused by construction, dirt and gravel roads, and urban runoff by 2009.

Accomplishments:

- In 2008, GreenTreks released Stormwater PA (<http://www.stormwaterpa.org/>) to assist decision-makers with a tool to use for flood protection and prevention. The program has proven successful and has secured funding for the next stage of development. It will be expanding across the Commonwealth in the future.
- The Department developed the Erosion and Sediment Control General Permit – 1 (ESCGP-1) permit for earth disturbance activities that disturb five or more acres over the life of the project associated with oil and gas exploration, production, processing, or treatment facilities or transmission facilities. Training was conducted in two sessions held in October and November 2008 for both conservation district staff and DEP Regional Office staff, and industry representatives. There were a total of 124 conservation district staff/DEP staff and 269 industry representatives that attended this training. This training covered Chapter 105 permits and requirements, ESCGP-1 permit requirements and procedures, How to review or complete the ESCGP-1 application, appropriate erosion and sediment control best management practices for oil and gas activities, and a review of problems found at oil and gas well sites and recommended solutions.
- DEP continued its work to revise and update the Chapter 102 regulations to incorporate post construction stormwater, buffer permitting options, and anti-degradation requirements.
- During 2008, DEP developed a Post Construction Stormwater Management Delegation Agreement which allows conservation districts the opportunity to conduct technical reviews of post construction stormwater management plans submitted as part of an NPDES Individual permit package. There were three conservation districts that signed this new delegation agreement in 2008.
- During 2008, 63 conservation districts administered the Dirt and Gravel Roads Pollution Prevention Program in Pennsylvania.
- DEP extended the expiration of the existing PAG-2 (NPDES General Permit) for stormwater discharges associated with construction activities to June 2009 to allow additional time to revise and reauthorize the General Permit.

Goal 2

Objective:

Involve municipal officials, county planning officials, conservation district, local stakeholders, watershed groups, and other local advocate groups by 2009.

Accomplishments:

- The Pennsylvania DEP continues to provide training to stakeholders on the Stormwater Best Management Practices (BMP) Manual.

- **DEP outreach efforts to promote local model ordinance implementation for water quality protections are ongoing. There are roughly 1,000 municipal stormwater management ordinances in place in the State, with an additional 1,400 expected to be adopted in the next three years.**
- **PennDOT has recently developed the “Smart Transportation” initiative, which is all about building partnerships among various stakeholders and coordinating land use and transportation decisions.**

Objective:

Past and present planning efforts by federal and state transportation agencies have concentrated primarily on addressing interstate road standards. Identify practical applications of good design criteria, construction and or maintenance standards that can be adopted by local governments by 2009.

Accomplishments:

- **PennDOT has not taken action as yet; the agency’s Bureau of Municipal Services (Agility Center or Program and Services Division) and Bureau of Design (Design Services Division) may review this matter at some future date.**
- **DEP conducted nine training sessions statewide for PennDOT construction and maintenance staff on erosion and sediment controls for PennDOT road construction and maintenance activities.**
- **The Center for Dirt and Gravel Roads continued to provide training sessions directed toward municipalities for dirt and gravel road maintenance.**
- **The Center for Dirt and Gravel Roads retains a clearinghouse for information on dirt and gravel road maintenance and maintains project summaries on its website.**

Objective:

Update/revise the PennDOT guide to local roads handbook.

Accomplishments:

- **The most current version of the PennDOT publication, “Guidelines for Design of Local Roads and Streets” is December 2002.**

Goal 3

Objective:

Track and report on existing regulatory and non-regulatory program requirements and the potential effect they have on protecting and maintaining water quality on an annual basis.

Accomplishments:

- **Program activity reports on BMPs to reduce pollutants from urban development and DGRP maintenance activities will be revisited pending progress from the DEP, PennDOT, and the Pennsylvania State University’s course on managing dirt and gravel roads.**
- **Revisions to program guidance documents and manuals are an ongoing; The DEP is revising the Chapter 102 regulations (Erosion and Sediment Pollution Control) and the more recent Stormwater BMP Manual.**
- **PennDOT is planning some demonstration projects that involve the use of compost materials (compost filter blankets, filter berms, and/or filter socks).**

There are now standards for these in the PennDOT Specifications Manual, Publication 408, as erosion and sedimentation control BMPs along roads and highways and at its stockpile and garage maintenance facilities. These projects will be completed in Districts 2-0, 8-0, and 9-0.

- **DEP staff continues to revise its Erosion and Sediment Pollution Control Program Manual to ensure all BMP standards and specifications are up to date.**
- **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

Objective:

As resources allow, continue support of Villanova University Storm water Partnership and other educational institutions as a resource center to identify and research appropriate best management practices.

Accomplishments:

- **DEP Growing Greener grants and EPA Clean Water Act-Section 319 grants are assisting this effort.**
- **The PennDOT Smart Transportation initiative and the planned use of compost filter blankets, filter berms, and/or filter socks at selected road and highway projects and at stockpile and garage facilities are promoting use of environmentally-sensitive site design techniques.**
- **DEP continues to update the Stormwater BMP Manual.**
- **DEP and EPA employ aspects of their respective Growing Greener and Section 319 grant programs to assist in promoting pilot projects that focus on protecting surface water and groundwater quality. The upcoming PennDOT compost projects also quality as surface water and groundwater quality protection efforts, as they are meant for erosion and sedimentation control, in order to keep pollutants out of surface water and/or groundwater.**
- **Participation of DEP staff on the Villanova University Stormwater Partnership continued in 2008.**
- **Research on BMPs continues at the BMP Stormwater Research and Demonstration Park at Villanova University.**

Goal 5

Objective:

Continue to support long range planning, technical assistance, financial assistance, and compliance for storm water management systems and programs for local governments as resources allow.

Accomplishments:

- **DEP regularly participates in the development of training and the promotion of innovative measures for stormwater management (e.g. runoff plans for construction operations). The agency also interacts with its regional offices**

(Watershed Managers) and conservation districts to find ways to resolve water quality problems, per training sessions and program evaluations.

- PennDOT engages in various audits of its facilities. These audits include Stockpile Quality Assurance (QA) visits performed by the Pennsylvania State University DGRP staff, ISO 14001 Environmental Management Systems (EMS) internal, external and surveillance audits. Water quality matters (e.g. runoff control, discharges at facilities) do come up occasionally during these stockpile QA visits and audits.
- PennDOT maintains a Strategic Recycling Program (SRP) which promotes the use of recyclable materials in road and highway construction or maintenance projects. The relevance here is that by using recyclable materials (e.g. foundry sand, crushed glass, reclaimed asphalt pavement (RAP) in such projects, the materials are kept out of the environment and out of the NPS universe. Also, the use of compost for erosion and sedimentation control at PennDOT projects and facilities will assist the agency in doing its part to keep pollutants out of stormwater runoff, and hence, away from surface water and groundwater.
- DEP staff completed the development of a draft Pennsylvania Model Stormwater Management Ordinance to serve as a model ordinance or template for municipalities developing municipal stormwater management ordinances. The Model Ordinance has been sent to DEP executive staff for review prior to final publication.
- 58 counties have been identified as either in progress on the development of a countywide stormwater plan or negotiating a contract to submit a request for stormwater planning.
- DEP has developed a draft of the PAG-13 General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (Ms4s). This draft has been sent to DEP executive staff for review prior to publication for public comments.

3.2.3 Hydromodification

Goal 1

Objective:

Modify or remove dams and implement Natural Stream Channel Design (NSCD) measures when applicable.

Accomplishments:

- **Information relating to removal of dams in Pennsylvania is maintained at the http://www.americanrivers.org/site/PageServer?pagename=AR7_Region_MidAtlantic_depth American Rivers webpage.**

Objective:

Promote remediation on waterways that are impacted by sediment.

Accomplishments:

- **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

Objective:

Continue to update the Guidelines for Natural Stream Channel Design for Pennsylvania Waterways.

Accomplishments:

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

Goal 3

Objective:

Establish monitoring protocol for Natural Stream Channel Design, with the goal of measuring environmental results.

Accomplishments:

- **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

Objective:

Promote the Keystone Stream Team as the mechanism to facilitate the transfer of information on Natural Stream Channel Design.

Accomplishments:

- **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.**

Objective:

Promote an understanding of BMPs available for stream channel restoration and where they are appropriate.

Accomplishments:

- **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.**

Objective:

As resources allow, continue definition of regional characteristics related to sediment transport, regional curves, reference reaches, etc.

Accomplishments:

- **Current reference reach and sediment transport data for new and existing projects is included in the NSCD repository www.keystonestreamteam.org.**

Goal 5

Objective:

Promote a general understanding of stream channel maintenance and its impact on channel function.

Accomplishments:

- **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”.**

3.2.4 Lakes

Goal 1

Objective:

By 2012, develop a comprehensive Pennsylvania Lake Classification and Lake Criteria System, and remove from the impaired list lakes that have good water quality and meet designated uses but violate stream-based criteria of dissolved oxygen and temperature.

Accomplishments:

- **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.**
- **Removing good water quality lakes from Category 5 on the Integrated List now requires a new assessment and review of the data and is ongoing for the 2010 Integrated List.**
- **The 2005 updated Chapter 93 Water Quality Standards (see <http://www.pacode.com>) now 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. Total impaired lake acres were reduced from 45,197 in the 2004 listing to 11,137 in the 2006 listing and to 5,895 (draft) acres in the 2010 listing. Fish Consumption Use lake acres increased from 27,587 to 38,870. Recreational Use impairments decreased from 1649 to 1370 acres. Five acres are now impaired for Portable Water Supply. 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

Objective:

Continue tracking improvements in lake watershed implementation planning projects and implement BMPs to meet the TMDLs by 2012.

Accomplishments:

- **Three conservation districts have completed Watershed Implementation Plans (WIPs) with the cooperation of local stakeholders and lake management consultants). The lakes are Lake Luxembourg in Bucks County, Stephen Foster Lake in Bradford County and Harveys Lake in Luzerne County. All three**

should be applying for 319 funds for watershed improvements, and will be targeted by DEP's Lake Program for monitoring to track water quality.

- Two additional lakes are currently finishing up WIPs: Frances Slocum Lake in Luzerne and Lake Galena in Bucks County. Frances Slocum Lake will require a TMDL.

Goal 3

Objective:

By 2006, develop standardized monitoring protocols that adequately assess the status of lakes' aquatic life use.

Accomplishments:

- These protocols were completed and were reviewed and accepted by EPA in early 2009. The documents are available at: http://www.portal.state.pa.us/portal/server.pt/community/water_quality_standards/10556/2009_assessment_methodology/666876. These 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. The State's Citizen Volunteer Monitoring Program, which uses DEP's Lake Monitoring Protocols, provides additional information and data on the State's lake resources by involving citizens and others in the monitoring of their lakes. In 2009, six lakes were enrolled in this program. Partnerships forged to accomplish extra lake assessments include those with the Dept. of Conservation of Natural Resources, 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.

Objective:

Continue monitoring and tracking efforts to determine if projects implemented to address NPS impairments are making water quality improvements and addressing TMDLs.

Accomplishments:

- 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 being 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 30%. A number of phosphorus-reducing stormwater BMPs were installed in 2009, and the final report is imminent.

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.

6. Lake Jean (Luzerne County) will be delisted in the 2010 Integrated Report. The lake is now meeting its Aquatic Life Use classification.

Goal 4

Objective:

By 2007, develop a strategy to control, prevent, and mitigate aquatic invasive species that affect aquatic life and recreational uses of Pennsylvania's water bodies and riparian areas.

Accomplishments:

- **This is ongoing. This goal has 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.**

Objective:

Support conferences and outreach events for dissemination of current information on innovative technologies for lake management.

Accomplishments:

- **The PALMS annual conference was held March 2009. Several regional workshops were also held in 2009.**

Objective:

By 2007, expand the availability of technical and educational resources on lake management and restoration issues through a public clearinghouse, to provide outreach to public and private lake managers, owners, and stakeholders.

Accomplishments:

- **Work on his task is ongoing. PALMS has expanded its services and its web site, and links to the North American Lake Management Society expands those resources significantly.**
- **DEP now has a lake section in its web site, which will offer not only lake status reports but also historical information and resources.**
- **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.**
- **In 2008, the Consortium for Scientific Assistance to Watersheds (C-SAW), and a partnership between the PA Lake Management Society (PALMS) and Penn State Extension Services assisted several lake associations and one lake management district with watershed and lake management issues, and they continue to facilitate popular lake and pond workshops. C-SAW recently updated its brochure and web site (<http://pa.water.usgs.gov/csaw/>).**

Goal 5

Objective:

By 2007, disseminate new information and outreach materials on NPS issues for municipalities, watershed groups and local stakeholders.

Accomplishments:

This is ongoing. DEP provides speakers and literature resources for the annual conference of the Pennsylvania Lake Management Society (PALMS). This is the premier lake stakeholder workshop in Pennsylvania. The 2010 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 and disseminated its new Stormwater BMP manual in 2007, and provided numerous regional training sessions.

3.2.5 Land Disposal

Goal 4

Objective:

Evaluate de-nitrification and other alternate wastewater treatment technologies as they are submitted, using DEP Experimental On-lot Technology Verification Protocols.

Accomplishments:

- **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. These include American Manufacturing, Infiltrator, Orenco, Rissy Plastics and Soil Air.**

Goal 5

Objective:

Provide pre-certification training to individuals who would like to become certified Sewage Enforcement Officers (SEOs).

Accomplishments:

- **During 2009, 37 candidates attended the SEO Pre-certification Academy training and 36 candidates became certified SEOs.**

Objective:

Provide continuing education training to 1,157 certified SEOs, and promote increased participation by other municipal officials.

Accomplishments:

- **During 2009, 613 SEOs successfully completed 29 classroom courses, 145 completed post-tests and 142 completed Web-based courses.**
- **Seven Web-based courses are currently being offered that deal with alternative treatment technologies.**
- **Continuing education training for the Orenco AdvanTex AX series treatment system was developed in 2009 and is being offered as classroom training in February and March 2010. This course will likely be offered subsequently as Web-based training. Other SEO training courses for newly approved on-lot treatment technologies are under consideration.**
- **Two new classroom courses were developed in 2009: #215-Sewage Management Basics, a half-day course, discusses the importance of sewage management and provides information about creating, implementing, administering and enforcing a program. This course includes strategies for tackling a sewage management program that SEOs can share with their municipal officials. #613-Planning Basics has self-study materials for an SEO to complete prior to attending a half-day classroom session. This session will cover the terminology and the basics of sewage facilities planning under Act 537 and will include activities that apply the information taught in the self-study materials.**

- **A new format for the Pre-certification Academy is currently under development. The Orientation Course was added as a prerequisite to attending the Academy in 2009. Course A-Site Testing and Evaluation is now in the development process.**

Objective:

Encourage an additional 100 municipalities to develop and update Sewage Management Programs (SMPs) in accordance with Act 537 by 2010. (An estimated 85 municipalities had programs planned or operational in 2003.) Explore regional options for the treatment and disposal of pumped septic wastes.

Accomplishments:

- **As of October 19, 2009, there were 270 SMPs on record, serving at least 392 Pennsylvania municipalities. This is up from 204 SMPs serving at least 262 municipalities at the end of 2008. 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.**
- **On April 20, 2009, at the Annual Convention and Trade Show of the Pennsylvania State Association of Township Supervisors, the DEP presentation “New Developments in Act 537 Planning for Municipal Officials” provided specific details on sewage management programs and examples of SMPs addressing various types of sewage facilities. In addition, the presentation sought to introduce and compare sewage management programs in the State with the national effort to achieve decentralized wastewater management. Approximately 75 township supervisors and related individuals attended**
- **Assistance continues to be provided to all municipalities seeking support in developing new SMPs.**
- **Efforts are ongoing to improve availability and access to SMP education and resource materials for municipalities in need. DEP staff continues to locate or develop additional resources to assist municipalities in the development and administration of sewage management programs.**
- **The Sewage Management Basics course developed in 2009 is intended to promote SMPs to local officials by empowering the SEO as an initial resource in efforts to create a sewage management program. It is anticipated that this course will be used as a platform on which to develop more in-depth training and/or resource assistance on SMPs to local officials.**
- **Efforts by municipalities to develop and administer sewage management programs have been challenged through 2009 and into 2010 by unprecedented reductions in state FY 2009-2010 budget allocations reimbursing these programs for the costs of services provided. However, efforts are being undertaken to motivate and support municipal SMPs during this difficult period through one-on-one contacts with affected agencies and discussion of these issues at venues involving local officials and sewage enforcement officers.**

Objective:

Increase use of the PENNVEST Individual On-lot Sewage Disposal Funding Program for repair and replacement of malfunctioning systems by 2007. (An average of 32 projects per year were financed between 1994 and 2004.)

Accomplishments:

- **In 2009, PENNVEST closed on 14 new loans for repair and replacement of on-lot treatment systems, totaling \$200,000. Since the program's inception in 1994, the agency has closed on 420 loans totaling \$4,500,000.**
- **As part of the federal stimulus program under the American Recovery and Reinvestment Act of 2009, PENNVEST approved 37 nonpoint source projects, of which 34 reached settlement for a total amount of \$32,600,000.**
- **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.**
- **DEP's Act 537 Management Program began including a promotional paragraph for PENNVEST on-lot repair and replacement loans in its periodic SEO newsletter, beginning with the October 2006 issue.**

Objective:

Enhance public awareness of household hazardous waste (HHW), and increase the number of participants in HHW collections by 2007. (33,934 participants were reported in 2003.)

Accomplishments:

- **Preliminary 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.**
- **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.**

Objective:

Increase the number of regional (inter-municipal, public/private partnership) HHW collections by 2009. (Two were reported in 2003.)

Accomplishments:

- **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).**

Objective:

Expand on-farm assessments and collections of the Farm-A-Syst and Chemsweep programs, emphasizing performance-based approaches to environmental management.

By 2010, increase the total amount of waste pesticides collected by the Chemsweep program to 2.0 million pounds.

Accomplishments:

- **Worksheet 1-Well Water Condition and Construction and Worksheet 5-Milkhouse Waste Management were revised during 2009. These revised versions will be available from Penn State Publications in the PDF format only.**
- **The Farm-A-Syst materials continue to be used extensively in Penn State University Cooperative Extension's nutrient management education program.**
- **The Chemsweep Program was not operational during 2009. It collected 103,048 pounds of pesticides in 2008, well above the 1999-2007 average of 97,403 pounds per year. Of this total, 29,514 pounds were collected at nine Chemsweep/Household Hazardous Waste partnership events, averaging 3,279 pounds per event. The annual average amount of homeowner pesticides collected per partnership event was 3,006 pounds over the last six years. Total pesticides collected by the Chemsweep Program since its inception in 1993 now stands at 1,814,077 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.**

Objective:

Reclaim additional acres of disturbed or degraded lands using bio-solids or other recycled by-products by 2008. (An average of 200 acres per year was reclaimed from 2001 to 2003.)

Accomplishments:

- **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. In addition, approximately 4,410 tons of paper mill sludge were applied to abandoned mine lands and 435 cubic yards of spent mushroom compost were used in passive abandoned mine drainage treatment systems.**
- **DEP's Biosolids Program continued to provide formal training for biosolids generators and land appliers in recommended procedures for producing and applying biosolids during 2009.**
- **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.**

Objective:

Utilize existing programs to clean up 50 illegal dumps threatening lakes, streams, groundwater or wetlands by 2012.

Accomplishments:

- **Pennsylvania Clean Ways cleaned up 124 dump sites during 2009, collecting 986 tons of assorted refuse and 23,994 tires. The Pennsylvania Environmental Council (PEC) assumed responsibility for Project COALS in 2008 and in 2009 cleaned up 28 dump sites, collecting 180 tons of trash and 2,977 tires. Since 1990, these programs and the Susquehanna River Basin Commission have restored more than 1,125 sites and collected upwards of 35,228 tons of refuse and more than 396,100 tires.**
- **Pennsylvania CleanWays 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 4,159 dump sites containing approximately 14,500 tons of trash in 37 counties since its inception in 2005. Of the identified sites, 78% are considered active, 29% are within 50 feet of a waterway and 15% of the sites contain 71% of the trash. The goal of this program is to survey the entire State for illegal dump sites by 2012. 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 are expected to be accomplished by spring of 2010. The Department does not currently intend to offer a subsequent grant round.**

3.2.6 Resource Extraction

Goal 1

Objective:

Evaluate and categorize or prioritize watersheds with abandoned mine lands for restoration activities.

Accomplishments:

- **Growing Greener, Section 319 Nonpoint Source Program, District Mining Offices, Regional Offices and BAMR all have priority watersheds in which they concentrate their efforts. Some factors that influence the priority status would be a TMDL present, a restoration plan complete and other funding invested in the watershed.**

Objective:

If resources allow, restore 100 stream miles to designated uses by improving aquatic habitats to support fish and associated aquatic life in streams impaired by Abandoned Mine Drainage (AMD). (By the end of 2009)

Accomplishments:

- **39 Growing Greener projects were awarded from 10/07 to 9/08**
- **19 Growing Greener Projects were completed from 10/07 to 9/08**
- **Projects that were funded by the Section 319 Program began 10/08 to 9/09**
- **Projects that were funded by Section 319 program were finished 10/08 to 9/09**
- **18 projects were completed by BAMR, 13 of which was surface reclamation and the rest were AMD treatment**
- **Watersheds that are now meeting designated uses that were once impaired by AMD:**
- **Babb Creek, Tioga County, 13.89 miles**
- **Gumboot Run and East Branch Clarion River, McKean County, 7.48 miles**
- **Lloydville Run, Blair and Cambria County, 2.77 miles**
- **Sterling Run, Centre County, 12.3 miles**

Objective:

If resources allow, reclaim 2,500 acres of Abandoned Mine Lands (AML). (By the end of 2009)

Accomplishments:

- **BAMR reclaimed 648.7 acres**
- **The District Mining Offices facilitated the reclamation of 118.3 AML acres, 8,350 feet of dangerous highwall eliminated, 53.7 acres of subsidence area reclaimed and one discharge of about 15 gpm that was abated during the reporting period through government financed construction contracts and remining permits. One bond forfeiture project reclaimed 14 acres.**

Objective:

Plug 1,100 of the 6,600 known abandoned oil and gas wells to improve water quality, eliminate safety hazards, and eliminate pollution resulting from uncontrolled discharges into ground and surface water, contingent on having adequate resources. (By the end of 2009)

Accomplishments:

- **From 10/01/08 – 9/30/09 DEP’s Bureau of Oil and Gas plugged 206 abandoned wells.**

Goal 2

Objective:

Develop 20 integrated watershed management plans that incorporate AMD/AML Assessments by 2009.

Accomplishments:

- **There are 15 completed Watershed Implementation Plans (WIPs) and 3 being developed that incorporate AMD assessments.**
- **Two AMD assessments funded by Growing Greener were completed from 10/07 to 9/08.**
- **TMDLs for 74 AMD segments on the 1996 list were approved in 2009.**
- **The map containing the 319 AMD WIPs was updated by EPCAMR and compared to other DEP watershed based plans including TMDLs, BAMR HUPs and QHUs.**

Objective:

Develop operation, maintenance and replacement (OM&R) plans and funding sources for AMD remediation projects as resources allow. (By end 2009)

Accomplishments:

- **Any construction projects for AMD remediation 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.**
- **The Bureaus of Mining and Reclamation and District Mining Operations have secured a stable source of funding to provide annual OM&R activities at 100 abandoned discharges bond forfeiture sites that were bonded under the old Alternate Bonding System.**
- **Wildlands Conservancy secured \$10,000 from the PA DCED to support ongoing O& M for their Lausanne Tunnel AMD Treatment System.**
- **Datashed, a GIS-enabled internet database, was developed to help analyze results of passive treatment systems and allow access to the data in a consistent format. The water quality and quantity data from treatment systems need to be added by the project sponsors.**
- **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. To date, there have been \$173.3 million in bonds posted for discharges and there are trusts with a value of approximately \$58 million in place.

- WPCAMR continues to administer the Growing Greener funded “Quick Response” program to provide emergency funding for treatment system repair. Eleven projects were funded with this from 10/08 – 9/09.

Goal 3

Objective:

Utilize a single, Statewide database (clearinghouse) to coordinate the sharing of monitoring and tracking data by 2009.

Accomplishments:

- The West Branch Treatment Simulation Google Maps Application came from the West Branch Susquehanna Remediation Strategy. In this application, various discharges and a point downstream of them can be selected. The program will then calculate what the water quality would be in the stream at that selected point if the selected discharges upstream were treated.
- SRBC is in the process of completing an Anthracite Remediation Strategy for the Susquehanna River. They plan to model it closely to the West Branch Susquehanna AMD Remediation Strategy.
- The Office of Surface Mining (OSM), with significant participation of PADEP, has been maintaining a GIS database of all passive AMD treatment systems in Pennsylvania. Approximately 257 individual passive treatment project sites have been entered into the Pennsylvania GIS data base. These projects have a total capital investment of over 70 million dollars.
- EPCAMR has created a standard form for data collection as a part of the AMD sampling protocols certification training. Datashed has a standard set of protocols that are accepted through the import data tool.
- EPCAMR conducts an AMD sampling protocols certification training on an as needed basis to watershed groups and VISTAs. The training program is similar to EPA's standards, but personalized for the Anthracite Region. EPCAMR also encourages and helps groups to post their data to Datashed.
- EPCAMR continues to update the Reclaimed Abandoned Mine Lands Inventory (RAMLIS) GIS Tool CDs. Version 9 is available with snapshot of 2009 GIS Data. Distributed 15 copies and 1 online beta version. Conducted 3 RAMLIS investigations which included 4 maps and 2 set of statistics.
- EPCAMR has been utilizing the RAMLIS tool and data from DEP and watershed groups to suggest candidate streams for reassessment by the PA DEP Bureau of Watershed Management and possible removal from the State's list of impaired waters. Currently the goal is to suggest five segments per year.
- WPCAMR continues to solicit information about improving streams during meetings, phone calls, and field visits with the watershed community. WPCAMR has a page on its web site (www.wpcamr.org) where the public is encouraged to report improving streams. (<http://www.wpcamr.org/projects/GotABetterStream/index.html>). Information

regarding any improved streams is forwarded to PA DEP's Section 319 program staff.

- In an effort to glean up-to-date information about passive treatment systems throughout the State, WPCAMR and EPCAMR, in partnership with the PA DEP, Stream Restoration Inc., and watershed stewards throughout the coal regions, began coordinating a series of sampling events, "snapshots" of passive treatment systems throughout the State. The sampling results are to be available on Datashed.org, an online database of treatment systems managed by Stream Restoration, Inc.

Goal 4

Objective:

Encourage development and implementation of new technologies and technology transfer with a goal of more cost effective AMD remediation by 2009.

Accomplishments:

- Cambria DMO assists the Laurel Falls Watershed Assoc. develop technical information for a permit for limestone sand dosing
- Cambria DMO assists the Blackleggs Creek Watershed Association to measure the efficiencies of different lime reagent dissolution to determine best material for use in treatment silos
- PEC in Pittsburgh has teamed up with the Chesapeake Bay Foundation and Duquesne University to continue the Manure and Mine Lands Research program utilizing poultry manure to enhance soils on mine lands. One pilot project has been completed in Schuylkill County.
- Taylor Borough (Lackawanna County), working with Malcolm Pirnie, was awarded an EPA Brownfields Redevelopment Grant in 2006 and has completed a Phase I and II assessment of 150 acres of AML in the heart of Taylor, PA. BAMR awarded a \$1.4 million contract to regrade piles on the site and restore Keyser Creek.
- EPCAMR continues to host www.orangewaternetnetwork.org with the "EC Express News Flash" to alert visitors to new technologies and ongoing efforts to reclaim AML.
- EPCAMR and SRI continue to collect small amounts of AMD oxides and create products such as pigment, chalk, and pottery glazes. EPCAMR created a brochure promoting the use of iron oxide.
- WPCAMR's educational web site (www.amrclearinghouse.org), its e-mail newsletter "Abandoned Mine Posts" with accompanying blog archive (www.amp.wpcamr.org), and its new initiative "WPCAMR Video Diaries" continue to be effective and cost efficient ways to promote understanding and technology transfer to a wide audience. Also, through its e-mail newsletter, WPCAMR continues to encourage the exploration of alternate uses for mine water, e.g. geothermal uses.

Objective:

Improve and encourage education and outreach programs for information dissemination to the general public by 2006.

Accomplishments:

- **ARIPPA and EPCAMR continue to partner in this effort. Currently coal ash is under scrutiny nationally, the PA DEP still approves the disposal on mine lands as a beneficial use. EPCAMR staff presented at the ARIPPA Technical Symposium and lead political leaders on a tour of sites reclaimed by coal ash.**
- **EPCAMR continued its education program including 6 AMD site tours, 4 work days with Wilkes-Barre Vo Tech students, 18 AMD Tie Dye / Chalk Workshops and 2 cleanups.**
- **EPCAMR hosts <http://www.orangewaternetwork.org/> and WPCAMR hosts <http://www.wpcamr.org/> and <http://www.amrclearinghouse.org/> and the 2010 Joint Mining Reclamation Conference, [2010 Pgh Joint Mining Reclamation Conference](#). EPCAMR also recently started a "cause" on www.Facebook.com to reach a new market of individuals. Currently we have 77 "fans".**
- **In February, WPCAMR launched its "Tales from the Creeks" series in *Abandoned Mine Posts* that chronicles the work of our county Watershed Specialists and the need for funding those positions. The response by our reclamation community to our call to write their legislators about the need to continue the Watershed Specialist program beyond 2010 was gratifying. WPCAMR, with help from partners [Pennsylvania Association of Conservation Districts](#) and the [Foundation for Pennsylvania Watersheds](#), drew attention to the importance of the Watershed Specialist program and in the fall, the PA DEP reaffirmed the importance of this program by approving Watershed Specialist funding until 2012.**
- **The 11th annual Pennsylvania Statewide Conference on Abandoned Mine Reclamation and Coal Mining Heritage was held in Johnstown. The 2009 conference showcased fascinating projects such as using mine pool water to provide geothermal heat in the Hill district of Pittsburgh, as well as presentations about our industrial past. Over 175 attended the 4 day conference held at the Living & Learning Center on the University of Pitt, Johnstown Campus. The conference proceedings can be found at <http://2009.treatminewater.com/>.**
- **Instead of the having the West Branch Symposium, which has been held annually, Trout Unlimited and West Branch Susquehanna Restoration Coalition held five mini-symposiums and tours. The purpose of symposiums were to educate local residents and government officials about abandoned mine drainage. The tours consisted of trips to various AMD problem areas and treatment systems. The programs were held in the West Branch Susquehanna Headwaters, Anderson Creek, Moshannon Creek, Babb Creek and Clearfield Creek. One is planned in the Beech Creek Watershed sometime in 2010.**
- **Seven Environmental Education grants were awarded that would educate youth and adults on abandoned mine drainage.**
- **WPCAMR participated in the organization of the 2009 Ohio River Watershed Celebration in Pittsburgh in October. More than 400 adults and 277 students**

learned about rivers and water quality. Two boats were chartered this year; one for school age children and one for adults. There were 23 organizations present to provide educational activities for the students.

- WPCAMR continues to make its brochures, “Environmental Benefits of Burning Waste Coal in CFB Power Plants” ” and “Remining for Abandoned Mine Reclamation” available at public events or meetings where WPCAMR has a display.
- WPCAMR continues to update and host the CRRDL web site: <http://www.crrdl.wpcamr.org/>
- WPCAMR promotes its web site on all materials/videos/emails released for public consumption.

Goal 5

Objective:

If resources allow, establish a system of long-range planning, technical support, and financial assistance needs for AMD/AML systems and programs for local governments and watershed groups by 2009.

Accomplishments:

- **EPCAMR continues to provide technical support to watershed groups and local governments. Updated 8 GIS layers, converted 32 GIS datasets to AutoCAD format and created 16 and printed 11 maps in general for EPCAMR Partners.**

Objective:

Encourage more use of sound science and innovative technology in beneficial uses of bio-solids, alkaline coal ash, dredge, and other by-product materials in reclamation by 2009.

Accomplishments:

- **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. Since 2006, approximately 1 million cubic yards from Ft. Mifflin has been used on site.**
- **Supplier and Independent tests were performed before shipment of the dredge materials and after they arrived on the site in Hazleton. A few batches were rejected with substances over permitted levels.**
- **ARIPPA reports that 145 million tons of culm (waste coal) has been processed and burned for energy by their member plants from 1998 to 2008. They also claim the reclamation of approximately 4,500 acres of mine lands and the employment (directly and indirectly) of approximately 2,500 workers.**
- **EPA is overseeing the cleanup of the Palmerton Zinc Pile Site near Palmerton, PA. CBS Operations spread fertilizer and seed using a crop-duster over approximately 700 acres of National Parks Service and PA Game Commission Land with success in 2008-2009. EPA Case study concluded that as a result of negative public perception, biosolids application was replaced with mushroom compost.**

Objective:

Promote the new Pennsylvania Energy Harvest Program, funded by a combination of sources including the Clean Air Fund, Growing Greener and U.S. Department of Energy, as a means to use environmental problems as economic opportunities.

Accomplishments:

- **The Babb Creek Watershed Association, Inc. received funding for a 53 kilowatt microhydroturbine on the discharge side of the Antrim acid mine drainage treatment plant. Expected generation is 460,000 kilowatt hours per year. The Antrim treatment plant will receive a large portion of the power, saving it \$9,400 annually, with excess to be sold, generating \$17,300 annually. The treatment plant treats 1,800 gallons per minute of acidic mine drainage, one of the State's most difficult environmental challenges.**
- **For the Upper Saxman Run Discharge Project in Westmoreland County (Loyalhanna Creek Watershed) the water from an AMD discharge will flow through a microhydroturbine to generate electricity to operate an AMD treatment system at the Latrobe Sewage Treatment System.**

Objective:

Encourage industry to establish and implement a means for beneficial use of abandoned mine pools and mine discharges by 2009.

Accomplishments:

- **EPCAMR is continuing a study of mine pools in Anthracite region. So far, preliminary data has been generated for the Western Middle Field and started for the Southern Field. It has georeferenced 44 maps (including 23 OSM Folio maps), created 3 & updated 10 layers for the Mine Pool Mapping Project. It has also converted 4 sets of coal cross sections into 3D grids and a fault models for the Mine Pool Mapping Project using EarthVision.**
- **EPCAMR has been meeting with industrial and commercial businesses to encourage and share some preliminary findings related to mine pool water availability.**
- **SRBC has been thinking about encouraging incentives in water withdrawal permits when AMD is used or treated and used. A decision has been pending since early 2009.**
- **The Botanic Garden of Western Pennsylvania in Allegheny County is re-using mine water for irrigation. The project is located in the Chartiers Creek Watershed.**
- **DEP and other organizations are studying the possibility of using mine water for fracing natural gas wells in the Marcellus Shale.**

Objective:

Encourage and implement the redevelopment of abandoned mine lands for recreational, industrial, commercial and residential uses by 2009.

Accomplishments:

- **The Collier Farm AML conversion project in Armstrong County reclaimed 500 feet of dangerous highwall and 5 acres of abandoned mine lands. The land was**

restored to productive farmland for beef cattle production. The project is located in the Pine Creek Watershed.

- The abandoned mine land to community asset project in Washington County reclaimed an abandoned 3 acre coal refuse pile. The reclaimed area is being converted into youth baseball fields for the community. The project is located in the Chartiers Creek Watershed.
- The Pottsville Office approved a Good Samaritan Act proposal for the U.S. Army Corp of Engineers to construct a U.S. Armed Forces Reserve Center at the Marvine Business Park in the City of Scranton, Lackawanna County. The project will utilize 25 acres of abandoned mine lands which have previously been used for coal storage and mine tailings. The project will restore the blighted property to a much more productive use.
- Habitat for Wildlife Inc., a small non profit sport group, has been cleaning up inactive "active" and abandoned mine lands in Schuylkill and Northumberland Counties since 2006 for hunting uses. Recently the group had an offer to lease land from mine company owners for this purpose for \$1.

Objective:

Continue to encourage the use of coal refuse and waste coal to generate electricity and to refine technology that will convert waste coal into energy, thereby cleaning up refuse piles and reducing surface production of AMD.

Accomplishments:

- EPCAMR uses RAMLIS to produce custom mapping of waste piles for ARIPPA member plants.

Objective:

Use existing sources of funding and encourage establishment of new sources of funding for reclamation and mine drainage treatment.

Accomplishments:

- OSM has budget authority to enter into project agreements with local non-profit watershed groups, to remediate AMD. During the time period of October 2008 through September 2009, OSM awarded one new cooperative agreement in the total amount of \$17,000. These projects involve multiple partners, providing financial and other assistance.
- Successes continued, this time on the federal level, thanks to letters from the public, responding to WPCAMR's call for action to re-insert language into the Fiscal Year 2010 Federal Appropriations Bill that allows the Watershed Cooperative Agreement Program funds to be used as match for other federal funds. Our counterparts in West Virginia, at the [Eastern Coal Regional Roundtable](#), were instrumental in pushing this issue with their constituency throughout the rest of the eastern coal states and communicating the need to our federal legislators.
- 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. Funds are authorized for use in addressing mine drainage problems, including operation, monitoring, maintenance, and

replacement (OM&R) of existing treatment facilities. The Department is committed to working to restore watersheds degraded by abandoned mine drainage and to providing resources to sustain restoration efforts across the Commonwealth. Following the reauthorization of SMCRA, DEP, through the Bureau of Abandoned Mine Reclamation (BAMR) established a workgroup to develop guidelines for implementing the AMD Set Aside Program in Pennsylvania.

- The workgroup finalized a revised draft AMD Set Aside Program Implementation Guidelines that were released by the Department on July 15, 2009. The guidelines outline priorities for new treatment facilities as well as funding for OM&R funding for existing treatment facilities. The guidelines provide many more details about the AMD Set-Aside Program and can be found at the following web link:
[http://www.depweb.state.pa.us/abandonedminerec/lib/abandonedminerec/Publications/AMD Set Aside Program Guidelines Revised Draft 07 15 2009.pdf](http://www.depweb.state.pa.us/abandonedminerec/lib/abandonedminerec/Publications/AMD%20Set%20Aside%20Program%20Guidelines%20Revised%20Draft%2007%2015%202009.pdf).
- A new threat emerges due to a legal battle in West Virginia and Colorado courts which may force AMD Treatment Systems to carry NPDES permits. PA DEP is in the development of special permits for treatment systems built and run by citizen groups.

3.2.7 Silviculture

Goal 1

Objective:

Provide effective communications with 744,000 woodlot owners and 4,000 forest practitioners, managing 13 million acres of private woodland, on forest best management practices for silviculture activities.

Accomplishments:

- **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

Objective:

Provide training to forest practitioners on using water quality best management practices for silviculture activities.

Accomplishments:

- **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

Objective:

To assure that timber harvesting activities are carried out in such a way that the potential for polluted runoff during harvesting is minimized.

Accomplishments:

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

Goal 4

Objective:

To provide the tools to forest landowners and timber harvesters to help them manage forest lands for water quality protection and sustainability.

Accomplishments:

- **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

Objective:

To encourage people outside of the forest landowner/practitioners/logger constituency to utilize trees to help attain water quality improvements.

Accomplishments:

- **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 WHYY in Philadelphia, WQED in Pittsburgh and WVIA in Scranton.

- **Through the American Recovery and Reinvestment Act (ARRA), the Pennsylvania Infrastructure Investment Authority (PennVest) 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.**

3.3 Additional Sources of Information

Pennsylvania's NPS Implementation Program and local organizations have been developing Watershed Implementation Plans (WIPs) over the past several years. WIPs are a 'blueprint' to help implement priority watershed restoration projects. Section 319 NPS Program funding and other sources are used to implement these projects. Twenty-six WIPs have been completed and acknowledged by the EPA as of September 30, 2009.

Various funding sources help Pennsylvania implement its NPS Management Program Plan – 2008 Update. Sources include both local, state and federal such as Pennsylvania's *Environmental Stewardship and Watershed Protection Act (Growing Greener)* and the federal *Clean Water Act Section 319 NPS Implementation Program*. Local organizations and private sector sources provide additional funding for watershed restoration.

Pennsylvania's NPS Management Program works with many federal agencies. It strives to implement watershed protection and restoration projects in a manner consistent with federal organizations' programs. The U.S. EPA provides NPS Program guidance and a large portion of federal funds to implement the State program. The United States Departments of Agriculture (USDA), Interior (DOI), and Fish and Wildlife Service (USFWS) also provide significant technical assistance and funds. Pennsylvania anticipates continued cooperation as we work together to implement the American Recovery and Reinvestment Act of 2009 (ARRA) and future recovery efforts.

3.3.1 Watershed Implementation Plan (WIP) Locations and Status

Pennsylvania's NPS Management Program has supported a watershed-based planning effort since FFY2003 through the development of Watershed Implementation Plans (WIP). 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.

The number of plans developed and implemented through September 30, 2009 is reported as a measure of progress. Twenty-six WIPs have been completed and accepted by the EPA through FFY2009. The DEP NPS Program web site <http://www.portal.state.pa.us/portal/server.pt?open=514&objID=554272&mode=2> includes the final products for all completed WIPs. One can search for a WIP under 'Program Initiatives' and 'Watershed Implementation Plans'. As of September 30, 2009 all but one completed plan was being implemented. There are eight additional plans still being developed.

Section 3.0 includes a summary of progress being made to implement completed WIPs. This information was first included in Pennsylvania's FFY2005 NPS Annual Report. Tables 3-1 through 3-18 summarize WIPs that have been completed and address abandoned mine drainage. Tables 3-19 through 3-31 summarize WIPs that have been completed and address agricultural and storm water/urban runoff. Tables 3-32 and 3-33 summarize WIPs being developed to address agricultural, urban runoff and AMD. The EPA Region III has agreed to estimate 'water miles' and 'acres covered' based upon the

information provided. A map showing the locations of WIPs (Figure 3-1) that are both completed and still being developed and pollutant load reduction estimates (Table 3-1 through Table 3-32) for projects in WIP watersheds appear on the following pages.

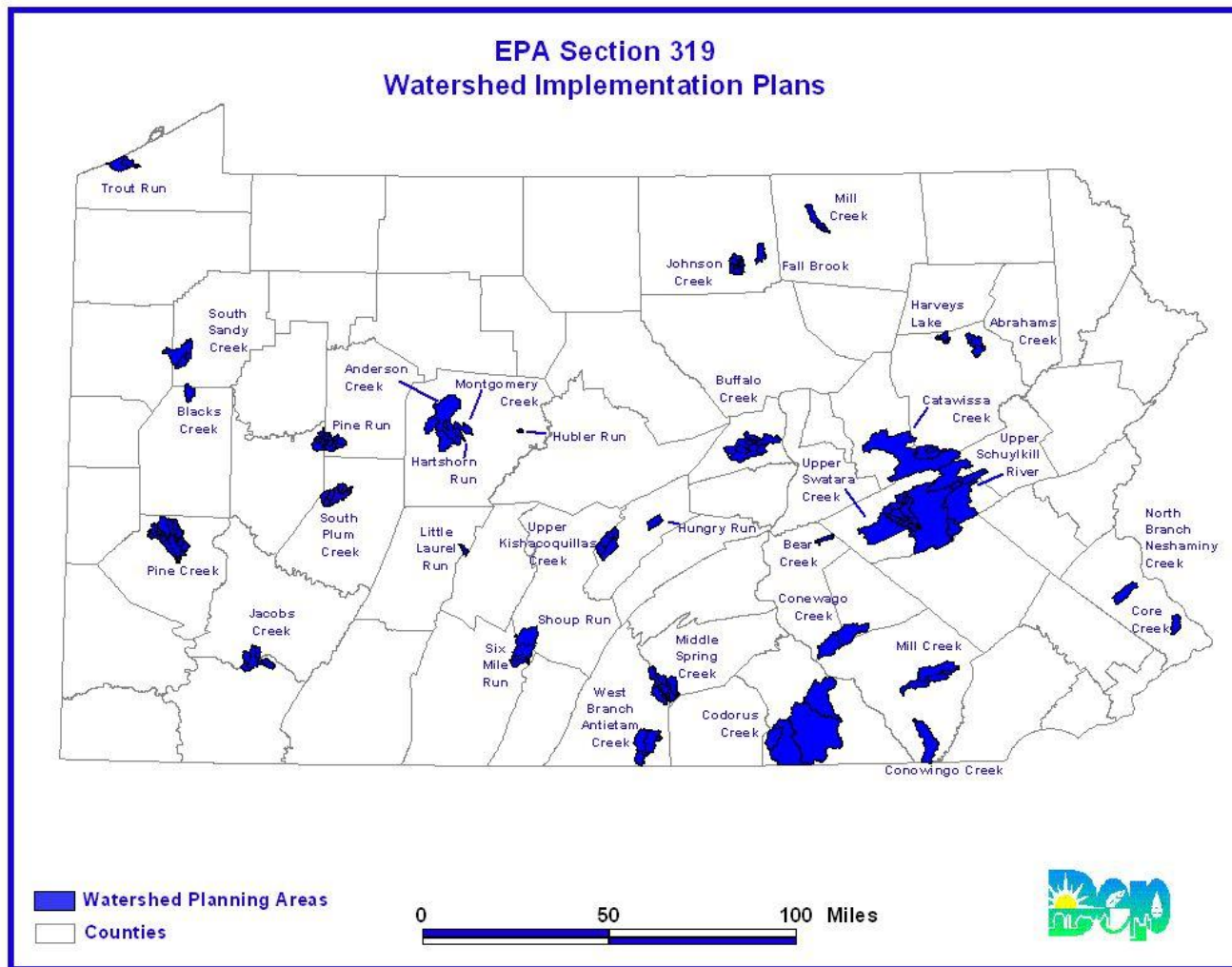


Figure 3-1. Watershed Implementation Plans

Watershed Implementation Plans Completed - Abandoned Mine Drainage Pollutants

Table 3-1. Catawissa Creek WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant/ Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Catawissa Creek (Schuylkill County)	Abandoned Mine Drainage	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 (Ongoing)	0	0	0	0
		Totals	3,366	158	229	29

Summary of Project Implementation and Success in Meeting WIP goals

TMDL for Catawissa Creek developed by the Susquehanna River Basin Commission (SRBC) and was approved by the EPA in May 2003. This watershed is impacted by the following AMD pollutants: acidity, iron, and aluminum. The Addendum to the Catawissa Creek Watershed Restoration Plan 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. In addition to these 319 NPS projects, there are additional projects being implemented within the watershed.

Table 3-2. Shoup Run WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant/ Project #s (Completed Projects)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Shoup Run (Huntingdon)	Abandoned Mine Drainage	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 (Ongoing)	0	0	0	0
		2007 / 13 (Ongoing)	0	0	0	0
Totals			360	2.5	35.4	6.5

Summary of Project Implementation and Success in Meeting WIP goals

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 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.

Table 3-3. Six Mile Run/Sandy Run/Longs Run WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant/ Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
		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			
				Totals	268	89.8

Summary of Project Implementation and Success in Meeting WIP goals

The Sandy Run/Longs Run TMDL was approved in 2003 and the Six Mile Run TMDL was approved in 2006. 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.

Table 3-4. Bear Creek WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant/ Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Bear Creek (Dauphin)	Abandoned Mine Drainage	2004 / 18 (9-30-2007)	Design only.			
		2006 / 30G (9-30-2009)	No data available			
		2007 / 16 (Ongoing)	0	0	0	0
Totals			0	0	0	0

Summary of Project Implementation and Success in Meeting WIP goals

A TMDL for the Bear Creek watershed was developed by the SRBC in March 2001 and approved by the EPA in April 2001. This watershed is impacted by AMD pollutants including metals, pH and siltation from mining sources. 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 acknowledged by the EPA in 2005. The Plan specifically addresses known AMD pollutant sources within the Bear Creek watershed including those from the Lykens Water Level Tunnel. Current Section 319-funded projects are addressing one of the largest AMD discharges in the watershed. 319 funds have been used for design and installation of an AMD treatment system. System upgrades are in the planning stage.

Table 3-5. Upper Schuylkill River WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant / Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Upper Schuylkill River (Schuylkill)	Abandoned Mine Drainage	1999 / 40 (3-31-2001)	No data available.			
		1999 / 41 (12-31-2002)	No data available.			
		2001 / 14 (1-31-2002)	No data available			
		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)	0	0	0	0
		Totals	82	638	50	159

Summary of Project Implementation and Success in Meeting WIP goals

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 reaches of the Schuylkill River watershed are largely impacted by pollutants from abandoned mine drainage problems including metals (iron, aluminum and manganese) and pH. The Upper Schuylkill River TMDL Watershed Implementation Plan was completed and acknowledged by the EPA in May 2005.

Several Section 319-funded projects have been completed and several more are ongoing. 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.

Table 3-6. Little Laurel Run WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant / Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Little Laurel Run (Cambria)	Abandoned Mine Drainage	2005 / 15 (9-30-2008)	166	30	1.4	0
		2007 / 14 (9-30-2009)	75	6	4	0
		2008 / 17 (Ongoing)	Design only			
Totals			241	36	5.4	0

Summary of Project Implementation and Success in Meeting WIP goals

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 in determination for the Little Laurel Run in 2005 but it was not expected to be completed for at least a year. 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. A Restoration Plan for Little Laurel Run 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. Two of the largest AMD sources in the watershed are being addressed in the Klondike Mine and Ferris Wheel AMD projects. There is potential to significantly improve water quality and achieve water quality standards, since this is a relatively small watershed and acidity loading may be significantly reduced through these two projects.

Table 3-7. Pine Run WIP

Watershed (County)	Source of Impairment To Watershed	S. 319 Grant/Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Pine Run (Jefferson and Armstrong)	Abandoned Mine Drainage	2005 / 23 (9-30-2008)	0	459	0	0
		2009 / 16 (Ongoing)	Design only			
		2009 / 17 (Ongoing)	Design only			
Totals			0	459	0	0

Summary of Project Implementation and Success in Meeting WIP goals: Pine Run watershed

The Pine Run is an AMD-impacted watershed in western Pennsylvania. Sources of impairment in Pine Run include iron, aluminum, manganese and pH. A TMDL was completed for the Pine Run watershed in January 2007 and approved by the EPA in March 2007. The Pine Run Watershed Implementation Plan was completed and acknowledged by the EPA in May 2005. All of the priority AMD remediation sites in the watershed are identified in the plan. Several Section 319-funded projects have been initiated since the Pine Run TMDL and Watershed Implementation Plan were completed. These projects seek to address high priority AMD restoration sites within the Pine Run watershed. It is anticipated that significant water quality improvements will be seen with continued project implementation. In-stream water quality is expected to improve in Pine Run, and TMDL load reduction goals will begin to be achieved with reductions in metals and acidity loadings.

Table 3-8. Upper Swatara Creek WIP

Watershed (County)	Source of Impairment To Watershed	S. 319 Grant/Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Upper Swatara Creek (Schuylkill)	Abandoned Mine Drainage	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

Summary of Project Implementation and Success in Meeting WIP goals

The Upper Swatara Creek watershed is largely impacted by abandoned mine drainage problems from both surface and deep mines. Many of the tributary streams to the Upper Swatara Creek are impaired by AMD sources. A TMDL for the Upper Swatara Creek watershed was developed by DEP in the late 1990s. It focused primarily on the AMD-impacted tributaries in the upper part of the Swatara Creek watershed. The TMDL 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 acknowledged by EPA in May 2006.

One of the three projects supported with Section 319 funding for BMP implementation have resulted in load reductions for metals. Many other projects have been completed using other funding sources, including DEP-BAMR and USDOJ-OSM. Most AMD treatment systems have been installed on tributary streams, 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 EPA National Monitoring Program (NMP) project for the Swatara Creek watershed has conducted water quality monitoring over the past ten years to evaluate the effectiveness of AMD treatment systems in the upper reaches of the watershed. The NMP project has documented that water quality is improving throughout the watershed.

Table 3-9. Anderson Creek WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant/ Project #s (Completed Projects)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
		1999 / 91 (9-01-2002)	No data available.			
		2003 / 16 (9-30-2006)	No data available.			
		2007 / 15 (9-30-2009)	6	1	0.3	0
		2007 / 26A, B (Ongoing)	0	0	0	0
		2008 / 13 (Ongoing)	0	0	0	0
		2009 / 19 (Ongoing)	Design only.			
		Totals	6	1	0.3	0

Summary of Project Implementation and Success in Meeting WIP goals

The Anderson Creek watershed is primarily impacted from AMD sources. It is listed on the State’s list of impaired waters. Anderson Creek is a fairly small watershed, having a 78 square mile area, and is likely to see water quality improvements with the completion of AMD remediation projects. The Anderson Creek watershed TMDL was completed and approved by the EPA in 2005. The TMDL was developed to address impairments related to metals and pH. The Watershed Implementation Plan, called the Anderson Creek Assessment, Restoration and Implementation Plan, was prepared for the Anderson Creek Watershed Association and completed in September 2006. The Plan identifies priority restoration sites to address AMD problems in the watershed.

Since the TMDL and Watershed Implementation Plan for Anderson Creek were completed, several 319-funded projects have been completed or initiated to address the highest priority AMD sites in the watershed. It is expected that these projects along with new ones will have an impact in meeting the TMDL goals and WIP objectives. To date, projects addressing the Bilger Run and the Korb AMD discharge sites are having positive impacts.

Table 3-10. Johnson Creek WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant./Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Johnson Creek (Tioga)	Abandoned Mine Drainage	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

Summary of Project Implementation and Success in Meeting WIP goals

The Johnson Creek watershed is part of the larger Tioga River watershed in northcentral Pennsylvania. Johnson Creek watershed contributes metals and low pH pollutant loadings to the Tioga River. The Tioga River Watershed TMDL was developed for the DEP in 2003. The TMDL includes pollutant load reduction goals for the Johnson Creek sub-basin. The Implementation Plan for Johnson Creek was completed for a local sportsman association and was acknowledged by the EPA in February 2007. The Plan prioritizes the major AMD pollutant sources in the watershed and sets goals to the TMDL load reduction goals for the watershed. Recent remediation work has helped to remediate the Arnot No. 2 Mine site discharge. Continued AMD pollutant reductions will help meet the TMDL reduction goals and the implementation plan objectives.

Table 3-11. Blacks Creek WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant /Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Blacks Creek (Butler)	Abandoned Mine Drainage	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)	0	0	0	0
Totals			33	52	0	11

Summary of Project Implementation and Success in Meeting WIP goals

The Blacks Creek is a large headwaters stream in the Slippery Rock Creek watershed, located in northwestern Pennsylvania. It is severely impaired by AMD sources of pollution, specifically by metals and low pH. It is included in the State’s list of impaired waters for metals and acidity contamination. A TMDL was prepared for the Blacks Creek watershed by the DEP-Knox DMO in 2004 and approved by the EPA in January 2005. The TMDL includes load reduction goals that can be met by reducing inputs of metals and acidity. Following the TMDL approval, the Blacks Creek Restoration Plan was developed for the Slippery Rock Watershed Coalition and acknowledged by the EPA in April 2007. The plan includes priorities and objectives to meet the TMDL goals.

The Blacks Creek watershed has been the subject of a focused restoration effort by the Slippery Rock Creek Watershed Association, Butler County Conservation District, and the DEP. The implementation plan is focusing efforts on the highest priority stream reaches and AMD restoration sites in the watershed. Several 319-funded projects are being proposed in high priority areas, which should achieve substantial load reductions when completed. At this time, only one 319-funded implementation project has been completed.

Table 3-12. Hubler Run WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant / Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Hubler Run (Clearfield)	Abandoned Mine Drainage	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 (Ongoing)	0	0	0	0
		2006 / 30I (9-30-2009)	0	0	0	0
		2007 / 26 (Ongoing)	0	0	0	0
		2008 / 15 (Ongoing)	Design only.			
Totals			175	0	21	0

Summary of Project Implementation and Success in Meeting WIP goals

Hubler Run is tributary to Alder Run in central Pennsylvania. This stream is included on the State’s list of impaired waters for metals and pH. Acidity is the main impairment in the Hubler Run headwaters. A TMDL was completed for the Alder Run watershed by the DEP in 2005 and was approved by the EPA in 2006. The TMDL includes the Hubler Run sub-basin. The Implementation Plan for Hubler Run was completed in August 2007 and acknowledged by EPA. The plan identifies and prioritizes AMD discharges in the Hubler Run sub-basin. The completion of one Section 319-funded project has had a positive impact in reaching the TMDL reduction goals for metals and acidity. Several additional AMD remediation projects are currently in the design stage or are being implemented.

Table 3-13. Montgomery Creek WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant / Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
		2008 / 14 (Ongoing)	Design only.			
		2009 / 18 (Ongoing)	Design only.			
Totals			0	0	0	0

Summary of Project Implementation and Success in Meeting WIP goals

The Montgomery Creek watershed is an abandoned mine drainage-impacted stream in west central Pennsylvania. It is a tributary to the West Branch Susquehanna River. A TMDL was prepared for Montgomery Creek and was approved by the EPA in April 2003. Following the TMDL, a Watershed Implementation Plan for Montgomery Creek was completed in August 2008 and was acknowledged by the EPA. The plan identifies projects and priorities that will reduce the substantial amounts of metals and acidity which are carried by Montgomery Creek to the West Branch Susquehanna River. The plan for Montgomery Creek will provide a good baseline with which to measure progress in meeting the TMDL load reduction goals. Of the three 319-funded projects that have been initiated in this watershed, no load reductions have been documented to date.

Table 3-14. South Sandy Creek WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 Grant / Project #s (Project Completion Date)	Actual NPS Pollutant Load Reductions			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
South Sandy Creek (Venango)	Abandoned Mine Drainage	2005 / 07 (9-30-2008)	Plan development.			
		2006 / 07 (Ongoing)	Plan development.			
Totals			0	0	0	0

Summary of Project Implementation and Success in Meeting WIP goals

Two projects have funded development of the Watershed Implementation Plan for this watershed. Section 319 funding will be used to implement the plan. The South Sandy Creek Watershed Assessment/Restoration Plan was completed for the South Sandy Creek Watershed Association in February 2009 and was acknowledged by the EPA Region III. No TMDLs have been completed for any segments within the South Sandy Creek watershed. Funds to complete the WIP came from two 319 grants/projects.

Watershed Implementation Plans Completed - Nutrient and Sediment Pollutants

Table 3-15. Core Creek/Lake Luxembourg WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 grant / project # (Project Completion Date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Core Creek/Lake Luxembourg (Bucks)	Nutrients, Sediment	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 TSS
		Totals	0	35	46.5

Summary of Project Implementation and Success in Meeting WIP goals

The Lake Luxembourg watershed has been the subject of numerous implementation projects since the federal Section 314 Clean Lakes Program Assessment was completed in the 1990s. A TMDL for Lake Luxembourg was developed by the DEP in 1999 and approved by the EPA in 1999. The lake is impacted by upstream nonpoint sources of pollution including inputs of nutrients and sediment. A Revised Restoration/Management Plan for Lake Luxembourg/Core Creek Watershed was prepared in March 2005 and acknowledged by the EPA. The plan directs efforts to reduce nutrient and sediment related impairments to Lake Luxembourg and the Core Creek watershed upstream of the lake.

Implementation has been taking place since the mid-1990s and continues with current Section 319-funded projects. The TMDL has set load reduction goals for sediment and phosphorus and the Watershed Restoration Plan has identified priority project sites. The Bucks County Conservation District is working to implement projects that are recommended by the plan and which will help to reduce phosphorus and sediment loadings in the watershed, in turn helping to meet the TMDL goals for Lake Luxembourg. Estimated load reductions are only available for more recent projects and are included in the table above.

Table 3-16. Upper Kishacoquillas Creek WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 grant / project # (Project Completion Date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Upper Kishacoquillas Creek (Mifflin)	Nutrients, Sediment	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 2005 / 27 (9-30-2008)	3,621	829	115
		2006 / 30C (Ongoing)	1,565	437	115
		2007 / 23A (Ongoing)	0	0	0
		2008 / 32B (Ongoing)	0	0	0
Totals			8,988	3,054	548

Summary of Project Implementation and Success in Meeting WIP goals

The Upper Kish Creek watershed is impaired in many reaches due to sediment and nutrient enrichments. It is included on the current list of impaired waters for these pollutants. There has been no TMDL developed to date for the Upper Kish Creek watershed. The 319 Watershed Implementation Plan: Upper Kishacoquillas Creek was completed by the Mifflin County Conservation District in 2007 and acknowledged by the EPA. The Plan provides a blueprint for implementation of priority projects that will reduce sediment and nutrient inputs to the watershed in order to improve existing water quality conditions. Project sites are located in the majority of the tributary stream sub-sheds and along the main stem in the Upper Kish Creek watershed. Several 319-funded projects have been completed in the watershed, and several more are ongoing. Additional projects are being designed. Projects are consistent with the project sites that are identified in the Plan that will help to reduce sediment and nutrient inputs to tributary streams. Most of the projects address agricultural land uses and some are related to stream restoration.

Table 3-17. Conewago Creek WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 grant / project # (Project Completion Date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Conewago Creek (Dauphin, Lancaster and Lebanon)	Phosphorus, Sediment	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	0
		Totals	3,397	1,020	432

Summary of Project Implementation and Success in Meeting WIP goals:

The Conewago Creek (East) watershed is tributary to the lower Susquehanna River. It is primarily an agricultural and forested land use watershed with some small urban areas. Most of the lower half of the watershed is impaired by nutrients and sediment. It is included on the State’s list of impaired waters. A TMDL for the Conewago Creek was developed in March 2001 and approved by the EPA in April 2001. The TMDL was revised in June 2006. The TMDL covers the entire watershed and addresses phosphorus and sediment loadings. The Conewago Creek Restoration Plan was developed by the Tri-County Conewago Creek Association in 2006 and acknowledged by the EPA. The County conservation district, NRCS and the local watershed organization are implementing agricultural and stream restoration BMPs. The watershed is recently the focus of USDA-NRCS CBWI and NFWF-funded watershed restoration initiatives. Dauphin, Lancaster and Lebanon County Conservation Districts are using Section 319 funding to help implement projects identified in the restoration plan.

Table 3-18. Mill Creek WIP

Watershed (County)	Source of Impairment to Watershed	S. 319 grant / project # (Project Completion Date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Mill Creek (Lancaster)	Nutrients, Sediment	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	0
		Totals	16,271	4,276	1,436

Summary of Project Implementation and Success in Meeting WIP goals:

Mill Creek is in an agricultural land use area in Lancaster County. It is tributary to the lower Susquehanna River. The County conservation district and NRCS have worked with farmers to install BMPs for nutrient and sediment control in the watershed. It is included on the State’s list of impaired waters for nutrients and sediment. TMDLs have been completed for two small tributaries to the Mill Creek; the Muddy Run TMDL was completed and approved by the EPA in 2001, and a TMDL for an UNT to the Mill Creek was completed and approved by the EPA in 2004. The County conservation district developed the Mill Creek Watershed Implementation Plan in June 2006 and was acknowledged by the EPA.

Several Section 319-funded projects have been completed in the Mill Creek. Recent work has focused on stream restoration. The Mill Creek Preservation Association is working with the Amish community in the watershed to promote watershed restoration and agricultural conservation efforts. A summary of BMPs proposed and implemented in the watershed to date is shown in the following table:

Table 3-19. Mill Creek BMP Summary

<u>BMP</u>	<u>Units</u>	<u>Goal</u>	<u>Installed</u>	<u>% of Goal</u>
Barnyard Runoff Management	Units	66.0	20.0	30.3
Conservation Tillage	Acres	539.5	1,405.0	260.4
Constructed Wetland	Acres	30.0	0.0	0.0
Contour Farming	Acres	1,141.7	40.0	3.5
Cover Crop	Acres	2,101.2	420.0	20.0
Field Border	Acres	800.5	0.0	0.0
Filter Strip	Acres	1.3	0.0	0.0
Grassed Waterway	Acres	26.4	21.8	82.6
Grazing Planned System	Acres	224.5	2.0	0.9
Infiltration Ditch	Units	10.0	0.0	0.0
Livestock Stream Crossing	Units	11.0	11.0	100.0
Natural Channel Restoration	Miles	10.0	0.0	0.0
Nutrient Management	Acres	2,970.2	1,218.0	41.0
Prescribed Grazing	Acres	481.5	91.0	18.9
Riparian Forest Buffer	Acres	1.6	1.6	100.0
Roof Runoff Management	Units	15.0	0.0	0.0
Sediment Basin	Units	1.0	1.0	100.0
Stream Bank Fencing	Miles	28.9	0.6	2.1
Stream Bank Protection	Miles	13.0	1.0	7.7
Terrace	Feet	12,250.0	0.0	0.0
Underground Outlet	Feet	880.0	850.0	96.6
Urban Vegetated Filter	Units	21.0	0.0	0.0
Vegetative Buffer Strip	Miles	34.4	0.0	0.0
Waste Management System	Units	34.0	0.0	0.0
Waste Storage Facility	Units	17.0	0.0	0.0
Watering Facility	Units	1.0	1.0	100.0

Table 3-19. Codorus Creek WIP

Watershed (County)	Nonpoint Source Impairment(s)	S. 319 grant / project # (Project Completion Date) <i>Sub-shed abbreviation (1)</i>	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Codorus Creek (York)	Phosphorus, Sediment	1999 / 22 (6-30-2001) <i>SBCC</i>	0	0	43
		2000 / 39 (9-30-2002) <i>EBCC</i>	No data available.		
		2002 / 31 (7-31-2005) <i>EBCC</i>	0	0	350
		2002 / 33 (9-30-2005) <i>SBCC</i>	0	0	119
		2003 / 32 (9-30-2006) <i>EBCC</i>	Design only.		
		2003 / 33 (9-30-2006) <i>SBCC</i>	0	0	5,300
		2004 / 26 (9-30-2007) <i>Oil Creek</i>	Design only.		
		2004 / 28 (9-30-2006) <i>SBCC</i>	0	0	300
		2005 / 32 (9-30-2006) <i>EBCC</i>	Design only.		
		2005 / 42 (9-30-2006) <i>S/EBCC</i>	No data available.		
		2005 / 45B (9-30-2007) <i>EBCC</i>	0	0	981
		2006 / 30D (9-30-2008) <i>SBCC</i>	3,034	2,016	1,920
		2006 / 30E (9-30-2009) <i>EBCC</i>	0	0	750
		2006 / 30F (9-30-2009) <i>Oil Creek</i>	0	0	682
2007 / 20 (Ongoing) <i>EBCC</i>	0	0	0		
		Totals	3,034	2,016	10,445

(1) *Sub-shed abbreviations: EBCC = East Branch Codorus Creek; SBCC = South Branch Codorus Creek; Oil Creek = Codorus Creek Sub-shed*

Summary of Project Implementation and Success in Meeting WIP goals:

The Codorus Creek watershed is tributary to the lower Susquehanna River. 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 York, PA and surrounding communities. Several lakes lie within the watershed. Most of the restoration projects are for stream channel stabilization and riparian restoration. Many stream bank erosion problems result from severe storm water runoff and unrestricted livestock access. The DEP developed the South Branch Codorus Creek TMDL in July 2003, and it was approved by the EPA in August 2003. The TMDL targets significant load reductions for both phosphorus and sediment loads for each of the two sub-basins delineated in the TMDL. 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. The Plan was acknowledged by

the EPA shortly afterwards. Several Section 319-funded stream bank and channel restoration projects have recently been completed in the East and South Branches of the watershed. These projects are primarily addressing excessive sediment loading rates.

Table 3-20. Conowingo Creek WIP

Watershed (County)	Nonpoint Source Impairment(s)	S. 319 grant / project # (Project Completion Date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Conowingo Creek (Lancaster)	Nutrients, Sediment	2002 / 25 (9-30-2004)	536	535	132
		2006 / 30K (Ongoing)	0	0	0
		2008 / 21 (Ongoing)	0	117	117
		2009 / 31A (Ongoing)	0	0	0
Totals			536	652	249

Summary of Project Implementation and Success in Meeting WIP goals:

The Conowingo Creek watershed is located in Lancaster County in south central Pennsylvania. It is tributary to the lower Susquehanna River basin. Much of the watershed is in agricultural land uses. The Conowingo Creek is included on the State’s list of impaired waters for nutrients and sediment problems. The local watershed organization is trying to correct stream bank and channel erosion problems, and the Lancaster County Conservation District and NRCS have been working with agricultural conservation projects. The Conowingo Creek Watershed TMDL was written by the SRBC in March 2001 and approved by the EPA in April 2001. The TMDL identifies the load reductions needed to reduce nutrients and sediment and achieve water quality objectives. The nutrient related part of the TMDL is for phosphorus. Agriculture was identified as the primary contributor of excess nutrient and sediment loads. The Conowingo Creek TMDL Implementation Plan was completed in September 2006 and acknowledged by the EPA. It identified and prioritized restoration sites. Section 319 funding is being targeted to priority restoration sites in the upper Conowingo Creek watershed.

Table 3-21. West Branch Antietam Creek WIP

Watershed (County)	Nonpoint Source Impairment(s)	S. 319 Grant / Project # (Project Completion Date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
West Branch Antietam Creek (Franklin)	Phosphorus, Sediment	2002 / 23 (9-30-2003)	444	222	222
Totals			444	222	222

Summary of Project Implementation and Success in Meeting WIP goals:

The West Branch Antietam Creek watershed is included on Pennsylvania’s list of impaired waters for nutrient and sediment pollution, primarily due to agricultural sources. The Antietam Creek Watershed Association and the Franklin County Conservation District have been working with landowners in the watershed to implement stream bank restoration BMPs. One Section 319-funded project has been completed, which addressed sediment-related issues due to stream bank degradation. The West Branch Antietam Creek Watershed Implementation Plan was completed for the local watershed association in April 2008 and acknowledged by the EPA. The Plan identifies project sites throughout the watershed. Most of the project sites are related to riparian restoration and agricultural BMPs and are prioritized by sediment and nutrient impacts to the watershed.

Table 3-22. Mill Creek/Stephen Foster Lake WIP

Watershed (County)	Nonpoint Source Impairment(s)	S. 319 grant / project # (Project Completion Date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Mill Creek/Stephen Foster Lake (Bradford)	Phosphorus, Sediment	2001 / 51 (9-30-2004)	187,313	72,588	216
		2005 / 28 (12-31-2005)	No data available.		
		2007 / 22 (Ongoing)	No data available.		
Totals			187,313	72,588	216

Summary of Project Implementation and Success in Meeting WIP goals:

Mill Creek and Stephen Foster Lake are located in Bradford County in north central Pennsylvania. The lake is included on the State’s list of impaired waters for total suspended solids and nutrients. The lake is impaired by nutrients, specifically phosphorus, and the TMDL reduction goals relate to phosphorus loadings. A TMDL was developed for the lake by the DEP Northcentral Regional Office in 2001 and was approved by the EPA in April 2001. The Bradford County Conservation District completed the Mill Creek Watershed 319 Implementation Plan, including Stephen Foster Lake, in July 2008, which was acknowledged by the EPA. The plan includes load reduction goals for both phosphorus and sediment. Since the early 2000’s implementation work has been conducted within the watershed, primarily with the agricultural sector, by the Bradford County Conservation District. There are continuing efforts 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 impairments.

Table 3-23. Hungry Run WIP

Watershed (County)	Nonpoint Source Impairment(s)	S. 319 grant / project # (Project Completion Date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Hungry Run (Mifflin)	Nutrients, Sediment	2008 / 32A (Ongoing)	0	0	0
Totals			0	0	0

Summary of Project Implementation and Success in Meeting WIP goals

Hungry Run is tributary to the lower Kishacoquillas Creek watershed and, in turn, to the central Susquehanna River basin. The Hungry Run watershed is largely in agricultural land use, although the lower part of the basin is within Burnham, an urbanized area. Most of the impairments related to nutrients and sedimentation resulting from agricultural sources. Some of the impairments in the lower part of the basin are due to storm water and urban runoff-related sources. The basin is included on the State’s list of impaired waters for nutrient and sediment problems. There is no TMDL developed for the Hungry Run watershed at this time. **The 319 Watershed Implementation Plan: Hungry Run** was developed by the Mifflin County Conservation District in 2008 and was acknowledged by the EPA. Agriculture, storm water and urban runoff, on-lot sewage, and unpaved roads are identified in the plan as priorities for restoration work. The Conservation District has since been utilizing 319 funds to start working with the agricultural community in the watershed, and is just beginning the process of BMP implementation on farm projects that are identified in the plan. BMP implementation will be completed on the highest priority project sites as landowners are willing to participate.

Table 3-24. Buffalo Creek WIP

Watershed (County)	Nonpoint Source Impairment(s)	S. 319 grant / project # (Project completion date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Buffalo Creek (Union)	Nutrients, Sediment	2006 / 07 (12-31-2008)	Plan development.		
		2008 / 20 (Ongoing)	0	0	0
Totals			0	0	0

Summary of Project Implementation and Success in Meeting WIP goals

Buffalo Creek is located in the central Susquehanna River basin. It is a major tributary to the Susquehanna River. The majority of land uses in the watershed are agricultural and forested. Some major urban areas exist in the lower reaches of the watershed. 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 County conservation district completed the 319 Watershed Implementation Plan: Buffalo Creek Watershed in November 2008, which was acknowledged by the EPA. Since then, one 319-funded project has been approved to implement priorities identified in the plan. No BMPs have been completed at this time.

Table 3-25. Harveys Lake WIP

Watershed (County)	Nonpoint Source Impairment(s)	S. 319 grant / project # (Project completion date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Harveys Lake (Luzerne)	Nutrients, Sediment	2000 / 45 (9-30-2003)	0	0	0
		2001 / 45 (9-30-2003)	0	132	0
		2002 / 30 (9-30-2004)	0	66	0
		2005 / 36 (9-30-2008)	0	0	0
Totals			0	198	0

Summary of Project Implementation and Success in Meeting WIP goals

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 the reduction of total phosphorus levels in order 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 implemented to reduce total phosphorus loadings in the watershed.

Table 3-26. Jacobs Creek WIP

Watershed (County)	Nonpoint Source Impairment(s)	S. 319 grant / project # (Project completion date)	Actual NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment Tons/yr
Jacobs Creek (Fayette, Westmoreland)	Nutrients, Sediment	2008 / 23 (Ongoing)	0	0	0
		Totals	0	0	0

Summary of Project Implementation and Success in Meeting WIP goals

The Jacobs Creek Watershed Implementation and Restoration Plan was completed in June 2009 for the Jacobs Creek Watershed Association. The plan addresses several major nonpoint source problems within the Jacobs Creek watershed, including existing agricultural practices, storm water from urban and developing areas and abandoned mine drainage. No TMDL has been completed for the Jacobs Creek watershed. The current 319-funded project is for implementation of storm water retrofits in an urban area.

Table 3-27. Watershed Implementation Plans Currently Being Developed - Abandoned Mine Drainage Pollutants¹

Watershed (County)	Nonpoint Source Impairments(s)	S. 319 Grant/Project # (Project Completion Date)	NPS Pollutant Load Reduction			
			Acidity lbs/day	Fe lbs/day	Al lbs/day	Mn lbs/day
Hartshorn Run (Clearfield)	Abandoned Mine Drainage	2006 / 21 (Ongoing)	Plan development			
Fall Brook (Tioga)	Abandoned Mine Drainage	2005 / 26 (1-4-2008)	n/a			
South Branch Plum Creek (Indiana)	Abandoned Mine Drainage, Sediment	2007 / 27B (Ongoing)	n/a			
Totals			0	0	0	0

n/a = not applicable

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

Table 3-28. Watershed Implementation Plans Currently Being Developed – Nutrient and Sediment Pollutants

Watershed (County)	Nonpoint Source Impairments	S. 319 Grant/Project # (Project Completion Date)	NPS Pollutant Load Reductions		
			Nitrogen lbs/yr	Phosphorus lbs/yr	Sediment tons/yr
Pine Creek (Allegheny)	Nutrients, Sediment, Pathogens	2006 / 07D (Ongoing)	Plan development		
		2008 / 22 (Ongoing)	0	0	0
		Sub-totals	0	0	0
Trout Run/Godfrey Run (Erie)	Nutrients, Sediment, Pathogens	2006 / 07C (Ongoing)	Plan development		
		2009 / 21 (Ongoing)	0	0	0
		Sub-totals	0	0	0
Middle Spring Creek (Cumberland, Franklin)	Nutrients, Sediment	2001 / 49 (9-30-2004)	34,405	9,085	2,076
		2001 / 50 (9-30-2004)	72,883	21,668	5,591
		2007 / 27A (Ongoing)	Plan development		
		Sub-totals	107,288	30,753	7,667
Abrahams Creek/ Francis Slocum Lake (Luzerne)	Nutrients, Sediment	2006 / 29 (Ongoing)	Plan development		
		Sub-totals			
North Branch Neshaminy Creek/ Lake Galena (Bucks)	Nutrients, Sediment	1998 / 18 (12-30-2003)	No data available.		
		1999 / 39 (9-30-2000)	No data available.		
		2005 / 08 (12-31-2005)	n/a		
		2006 / 07B (Ongoing)	Plan development		
Sub-totals					
Totals			107,228	30,753	7,667

n/a = not applicable

3.3.2 Funding Sources for Nonpoint Source Management Program

Many funding sources are being used to implement Pa's NPS Management Program (Table 3-35). All figures are in 2009 dollars unless otherwise noted.

Table 3-29. Local, State, Federal and Other Sources of NPS Program Funding

Funding Source	
Department of Environmental Protection (DEP)	
<i>Environmental Stewardship and Watershed Protection Act (Growing Greener)</i>	
	(\$ millions)
Conservation District Watershed Specialists	2.109
Conservation Reserve Enhancement Program (CREP)-Cost Share Payments (approximate)	8.000
Growing Greener I-Water and Mining Grants	8.298
Growing Greener II-Water and CEI Water	8.389
Growing Greener II-Mining and CEI Mining	3.617
Sub-total	30.413
<i>Bureau of Watershed Management</i>	
Chesapeake Bay Program-Technical Assistance	2.600
Chesapeake Bay Program-Best Management Practices	1.100
Conservation District Fund Allocation Program	3.006
Dirt and Gravel Roads Program	3.528
Nutrient Management Delegation (Act 38)	2.111
Sub-total	12.345
<i>Office of Water Planning</i>	
CZM-Pa Coastal Nonpoint Pollution Control	0.200
Sub-total	0.200
Department of Agriculture (PDA)	
Nutrient Management Grant Program	0.000
Nutrient Management Fund	3.100
Conservation District Financial Assistance Program	1.650
Resource Enhancement and Protection (REAP)	5.000
Sub-total	9.750
U.S. Environmental Protection Agency-federal Clean Water Act	
Section 319 Nonpoint Source Program	5.698
Sub-total	5.698
U.S.D.A. Natural Resources Conservation Service-2010 Initial Allocations	
Agricultural Management Assistance (AMA)	0.668
Chesapeake Bay Watershed Initiative (CBWI)	9.434
Environmental Quality Incentive Program (EQIP)	9.708
Farm and Ranchland Protection Program (FRPP)	4.028
Grassland Reserve Program (GRP)	0.828

**Table 3-29. Local, State, Federal and Other Sources of NPS Program Funding
(continued)**

U.S.D.A. Natural Resources Conservation Service-2010 Initial Allocations (cont.)	
	(\$ millions)
Wetland Reserve Program (WRP)	3.782
Wildlife Habitat Incentive Program (WHIP)	0.650
Sub-total	29.098
U.S.D.A. Farm Services Agency (FSA)	
Conservation Reserve Enhancement Program (CREP)-Cost Share Payments (approximate)	4.000
Conservation Reserve Enhancement Program (CREP)-Annual Rental Payments	21.500
Sub-total	25.500
U.S. Dept of Interior	
U.S. Fish and Wildlife Service / Partnerships	1.300
Office of Surface Mining (OSM)	
Watershed Cooperative Agreement Projects (WCAP)	0.017
Abandoned Mine Lands (AML) Program (through DEP-BAMR)	19.900
Sub-total:	19.917
Total	134.221

3.3.3 Federal Consistency in Implementing NPS Management Program

There is a significant amount of federally owned land in Pennsylvania. The DEP strives to maintain good working relationships with federal land management agencies that manage lands within the Commonwealth. Management plans that have been developed for federally owned lands try to be consistent with Pennsylvania's Nonpoint Source Management Program Plan.

There are several federal agencies that own and manage federal lands in Pennsylvania. These include the:

- U.S. Department of Agriculture, U.S. Forest Service
- U.S. Department of the Interior, U.S. Fish and Wildlife Service
- U.S. Department of the Interior, National Park Service
- U.S. Department of Defense

U.S. Department of Agriculture, U.S. Forest Service

Allegheny National Forest

The Allegheny National Forest is the single largest holding of land operated by the federal government within the State. This area is located in parts of several northwestern Pennsylvania counties and encompasses approximately 513,000 acres of land. It is a largely forested and undeveloped area. The U.S. Forest Service is responsible for managing the forest resources within the Allegheny National Forest. Nonpoint source pollution control activities are implemented through timber sale contract provisions. See the following web site for more information: <http://www.fs.fed.us/r9/forests/allegheny>.

U.S. Department of the Interior, Fish and Wildlife Service

Erie and John Heinz National Wildlife Refuges (NWR)

The Erie National Wildlife Refuge (NWR) in northwestern Pennsylvania and the John Heinz National Wildlife Refuge in southeastern Pennsylvania are the two NWRs located within the State. The U.S. Fish and Wildlife Service oversees the management of the NWR system in the United States, and works to conserve, protect and enhance fish, wildlife, and plants and their habitats.

The John Heinz NWR is managed to protect and enhance the largest remaining freshwater tidal marsh in the Commonwealth. These tidal wetlands are located in the Delaware River estuary in southeastern Pennsylvania. They are an important water resource for residents of the area. The John Heinz NWR web site <http://heinz.fws.gov> provides more information.

The Erie NWR is located in Crawford County. The Erie NWR is a partner agency in the Pennsylvania Partners for Wildlife Program which contributes significantly to the Ohio River Valley Ecosystem and North American Waterfowl Management goals. The Erie NWR web site, <http://erie.fws.gov>, provides more information.

U.S. Department of the Interior, National Park Service

National Park Service Areas

The U.S. Department of the Interior, National Park Service, manages fifteen individual national park areas within the Commonwealth. Each National Park Service area is managed according to its enabling legislation and is under the direction of a park superintendent. The National Park Service's *2001 Management Policies* document is the basic service-wide document used to interpret statutes and other guidance that impacts park administration and management. This document is updated and revised as necessary. The park superintendent is responsible for water resources management within each of the Commonwealth's fifteen national park areas.

National Park Service managed areas within the Commonwealth include:

- Valley Forge National Historical Park
- Independence National Historical Park
- Delaware Water Gap National Recreation Area
- Lower Delaware National Wild and Scenic River

The following National Park Service web site provides more information on each of Pennsylvania's National Park areas: <http://www.nps.gov/> .

U.S. Department of Defense

Defense Environmental Restoration Program

The Pennsylvania Department of Environmental Protection (DEP) and the U.S. Army, Navy, Air Force and Defense Logistics Agency entered into a cooperative long-term agreement in 1998. This agreement links the federal government's Department of Defense (DOD) Defense Environmental Restoration Program with Pennsylvania's Land Recycling Program. The agreement is based on Pennsylvania's successful Multi-Site Agreement approach to voluntary cleanups. The Cooperative Multi-Site Agreement (CMSA) not only covers remedial work at current Department of Defense installations but also addresses formerly used defense sites. The primary goal of the Cooperative Multi-Site Agreement is to have all sites evaluated and a cleanup program in place at those sites in need of work by September 30, 2010. Pennsylvania had a total of 1,095 known sites; a total of 572 have been resolved under the agreement, 96 are scheduled for further remedial action and 416 have been deferred from any actions, as of March 2005.

The DEP, Bureau of Waste Management web site provides additional information at, <http://www.depweb.state.pa.us/landrecwaste/cwp/view.asp?A=1241&Q=464187>.

APPENDIX A – Section 319 Project Load Reductions for Completed Projects Only

FFY2006 Abandoned Mine Drainage Load Reduction Estimates

Project #	Iron (lbs/day)	Aluminum (lbs/day)	Manganese (lbs/day)	Acidity (lbs/day)
2612	Project is Design only			
2613	2.6	7.5	n/a	122.4
2614	Project is Design only			
2615	0.3	2.0	n/a	21.7
2616	Project is Design only			
2617	Project has Not been completed.			
2618	Project has Not been completed.			
2619	Not applicable for this project.			
2621	Project has Not been completed.			
2630 A	Project is Design only.			
2630 B	Project is Design only.			
2630 G	Load reductions are Included with Project #2418.			
2630 H	Load reductions are Included with Project #2524.			
2630 I	Load reductions are Included with Project #2517.			
Totals	2.9	9.5	0	144.1

FFY2007 Abandoned Mine Drainage Load Reduction Estimates

Project #	Iron (lbs/day)	Aluminum (lbs/day)	Manganese (lbs/day)	Acidity (lbs/day)
2710	9	5.4	0.2	63
2711	Project has Not been completed.			
2712	2.5	1.8	0.5	14.9
2713	Project has Not been completed.			
2714	5.5	4.1	n/a	74.5
2715	0.6	0.3	n/a	6.4
2716	Project has Not been completed.			
2717	Project has Not been completed.			
2718	Project has been removed from the grant.			
2728	Project has Not been completed.			
Totals	17.6	11.6	0.7	158.8

Note: n/a = does not apply to this parameter.

FFY2008 Abandoned Mine Drainage Load Reduction Estimates

Project #	Iron (lbs/day)	Aluminum (lbs/day)	Manganese (lbs/day)	Acidity (lbs/day)
2810	Project has Not been completed.			
2811	Project has Not been completed.			
2812	Project is Design only.			
2813	Project has Not been completed.			
2814	Project is Design only.			
2815	Project is Design only.			
2817	Project is Design only.			
2818	Project has been removed from the grant.			
2819	Project has Not been completed.			
Totals	0	0	0	0

FFY2009 Abandoned Mine Drainage Load Reduction Estimates

Project #	Iron (lbs/day)	Aluminum (lbs/day)	Manganese (lbs/day)	Acidity (lbs/day)
2914	Project is Design only.			
2915	Project has Not been completed.			
2916	Project is Design only.			
2917	Project is Design only.			
2918	Project is Design only.			
2919	Project has Not been completed.			
2920	Project has Not been completed.			
Totals	0	0	0	0

FFY2006 Nitrogen, Phosphorus and Sediment Load Reduction Estimates

Project #	Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)
2610	137	n/a	232
2622 (ongoing)	7,505	1,817	306
2623	Project has been removed from the grant.		
2624	Project has been removed from the grant.		
2625	0	0	601
2626	7	18	2,284 (TSS)
2627	0	0	700
2628	Project has Not been completed.		
2629	Not applicable for this project.		
2630	Not applicable for this project.		
2630 A	This is a Design only project.		
2630 B	This is a Design only project.		
2630C (ongoing)	1,625	437	115
2630 D	3,034	2,016	1,920
2630 E	n/a	n/a	750
2630 F	n/a	n/a	682
2630 G	Reductions are included with Project #2418.		
2630 H	Reductions are included with Project #2524.		
2630 I	Reductions are included with Project #2517.		
2630 J	Project has Not been completed.		
2630 K	Reductions are included with Project #2821.		
2631	Project has been removed from the grant.		
Totals	12,308	4,288	7,590

Notes: Totals include Project #2626 TSS reductions; n/a = does not apply for this parameter.

FFY2007 Nitrogen, Phosphorus and Sediment Load Reduction Estimates

Project #	Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)
2719 (ongoing)	3,397	1,020	432
2720	n/a	n/a	3,115
2721	Project is Design only.		
2722	Project is Design only.		
2723	Not applicable for this project.		
2723 A	Reductions are included with Project #2630 C.		
2724	Not applicable for this project.		
2725	Not applicable for this project.		
2727	This project is a Planning only.		
2727 A	This project is a Planning only.		
2727 B	This project is a Planning only.		
Totals	3,397	1,020	3,547

Note: n/a = does not apply for this parameter.

FFY2008 Nitrogen, Phosphorus and Sediment Load Reduction Estimates

Project #	Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)
2809	1	1	410 (TSS)
2820	Project has not been Completed.		
2821(ongoing)	n/a	117	117
2822	Project has not been Completed.		
2823	Project has not been Completed.		
2824	Project has been removed from the grant.		
2825	Project has been removed from the grant.		
2826	Project has not been completed.		
2827	Project has not been completed.		
2828	Project has not been completed.		
2829	Project has not been completed.		
2830(ongoing)	1,232	382	65
2831	4,180	1,232	166
2832	Not applicable for this project.		
2832 A	Project has not been completed.		
2832 B	Project has not been completed.		
2832 C	Project has not been completed.		
2832 D	This is a Design only project.		
2832 E	Reductions are included with Project #2915.		
2833	Not applicable for this project.		
Totals	5,413	1,732	758

Notes: Totals include Project #2809 TSS reductions; n/a = does not apply for this parameter.

FFY2009 Nitrogen, Phosphorus and Sediment Load Reduction Estimates

Project #	Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)
2909	Project has just been initiated.		
2921	Project has just been initiated.		
2922	Project has just been initiated.		
2923	Project has not been completed.		
2927	Project is now identified as Project #2931 A.		
2928	Project has just been initiated.		
2929	Project has just been initiated.		
2931	Reductions will be included with Projects #2931 A, B, C, etc.		
2931 A	Project has just been initiated.		
2931 B	Project has just been initiated.		
Totals	0	0	0

Note: No BMP implementation has been completed for any projects.