

**PACD Engineering Technical Assistance
March 2009 to May 2010
PA DEP Growing Greener Grant Final Report**

AGRICULTURE ...



AMD ...



STREAM RESTORATION ...



Introduction

The PACD Engineering Technical Assistance Program has been in existence since 2001 when PACD received its first Growing Greener grant. The following report is an account of the work performed from March 2009 to May 2010.

In October 2004, the PACD began receiving matching funds from the federal USDA Natural Resources Conservation Service (NRCS) to provide engineering technical assistance for the implementation of Comprehensive Nutrient Management Plans (CNMP).

To receive engineering assistance, a qualified applicant begins by submitting an application form that is readily available at the PACD website www.pacd.org. Qualified applicants for Growing Greener assistance are watershed organizations, county conservation districts, non-profit organizations, counties, municipalities, and their subdivisions, and educational institutions. Upon receipt of a new Growing Greener request, PACD staff reviews the application and notifies (via e-mail) the DEP Growing Greener grant advisor, DEP watershed managers, DEP mining district (if applicable), county watershed specialist, and NRCS district conservationist, to determine eligibility and reduce possible work redundancies. If the project is deemed eligible, it is entered on the agenda for the workload advisory team. Applicants for CNMP assistance must qualify under NRCS requirements.

The next step is priority ranking by the workload advisory team. This team consists of NRCS, DEP, RC&D, and county conservation district staff and meets quarterly or as needed to review and rank projects. Projects are ranked first according to program and then by the date of grant expiration. The following programs receive the highest ranking: Growing Greener (funded projects and grant applications), 319 NPS (funded projects and grant applications), and agricultural projects that implement a Comprehensive Nutrient Management Plan (CNMP) (funded projects and grant applications). Other projects are considered and ranked lower as long as they are funded, have a prospect of being funded, and/or are in a DEP priority watershed. Projects that do not have any prospect of funds being committed or are requested on speculation are the lowest priority and are generally not given a ranking. Projects are ranked, based on these criteria, either high, medium, or low priority. Applicants are notified of the project ranking and the projects are then completed in the appropriate order.

Program Benefits

Statewide demand for PACD technical assistance has continued to be very strong. Some of the observed benefits of the program and benefits of continued dedicated funding for the program are:

NRCS Standards are Met – Every project that is completed is checked for compliance with NRCS standards and specifications.

Team Building and Partnering – Individuals from various local organizations come together with PACD technical assistance to form a team that can often accomplish much more than any individual. The relationships that are being built with local conservation organizations will ensure successful future projects. Many of the projects that are currently funded will benefit from having the PACD staff that assisted with preliminary design work follow the project through to completion.

Increased Capacity at the Local Level – The availability of PACD technical assistance allows local personnel to focus on other items, increasing the amount of work and number of projects that can be completed. PACD training has also helped increase the knowledge base of many local conservation groups so that they may have a broader understanding of conservation practices and design elements.

Quick Turnover of Work – PACD staff can respond to unforeseen situations and provide technical assistance on a very short time frame and make themselves available to local conservation groups who urgently need technical assistance.

Attention to Detail and Follow Up – Once a project is released to a sponsor, PACD staff makes every effort to ensure that the project will be properly constructed, monitored, operated, and maintained.

Utilization of Sponsor Assets – PACD staff makes an effort to use adequately trained local staff whenever possible. If a local person has surveying knowledge, we invite him to participate in the topographic survey. This allows PACD to do more and gets local personnel actively involved in their project planning, which enhances their understanding and satisfaction when the project is completed.

Small Projects Receive Same Attention as Large Projects – Since all projects are planned to meet NRCS specifications, small projects receive a level of attention that may not be available elsewhere. This helps keep small projects from becoming big headaches.

Specialized Knowledge and Experience – PACD staff has developed a large amount of specialized technical knowledge over the course of the PACD Engineering Technical Assistance program that can be put to use to benefit future projects. Much of the knowledge gained by PACD staff during this time is uncommon to traditional engineering disciplines.

Development of Sound Applications – PACD staff is able to assist future Growing Greener applicants in the development of sound applications. The PACD staff is available to provide technical assistance for an inventory and evaluation to investigate a

potential problem and recommend improvements. The inventory and evaluation also includes the preparation of cost estimates for grant applications and assists DEP to make better estimations of the use of its grant dollars. In addition, the PACD staff provides unbiased assessments of projects because they are not seeking additional contractual work from the applicant through the approval of the grant.

In Case “Something Comes Up” – Providing technical assistance ensures that when a circumstance arises that was initially unforeseen, the obstacle can be overcome and the project still successfully completed. There have been many projects over the course of the technical assistance program that would not have been completed were it not for PACD technical assistance.

Components of Work Performed

There are eight components to the assistance provided through the PACD engineering assistance program. These eight components are:

Inventory and Evaluation – Inventory and evaluations involve the investigation of a potential problem and the recommended improvements. The typical procedure involves a site visit, photographs, and report preparation, which usually contains a narrative, sketch plan and cost estimates. Inventory and evaluation reports are prepared for most projects and act to put all project stakeholders on the same page with regard to how the final design will function and the cost. The report is presented to the stakeholders to determine modification of the report and the suitability of the project for future action. The inventory and evaluation phase is critical to the success of the project and reduces the number of redesigns performed by PACD staff. It is also an excellent place to start for preparing a new grant application.

Topographic Survey – Topographic surveys are performed to establish the base mapping for a proposed project and ground control for construction. Property boundary surveys are not being performed because they must be performed by a licensed professional surveyor. PACD staff is equipped with total stations and data collectors to conduct surveys at the regional technical centers. PACD has made an effort to use qualified sponsor staff whenever possible to complete topographic surveys.

Soils Investigation – Soil investigations involve the mobilization of excavation equipment to dig test pits in key design locations to determine unknown subsurface conditions. Typical key features identified are the presence of groundwater, bedrock, and existing soil types. Test pits are excavated to a depth of two feet below the lowest elevation of a proposed structure. Identified soil types are checked for suitable strength, bearing capacity, and permeability. Soils investigations are performed for agricultural waste facilities filter areas, AMD ponds, or any other project where unknown soil conditions could present a problem.

Design and Specifications – Designs and specifications are prepared only after sufficient preliminary work has been done and all stakeholders agree on the proposed approach to eliminate recreation of detailed designs. Designs involve the creation of detailed AutoCAD drawings, specifications, quantities, cost estimates, and calculations. All design work is prepared using Section IV of the PA Technical Guide or the NRCS National Engineering Handbook's federal specifications and are checked and approved by the NRCS area engineer. PACD staff strives to collaborate with all available local expertise and technical personnel to create the most beneficial and cost effective project possible.

Construction Quality Assurance – Before a final design is approved, a quality assurance plan is prepared by PACD staff and becomes part of the finished product. Implementation of the quality assurance plan may be provided by PACD staff or through the education of qualified personnel at the local office. PACD is typically involved with pre-bid meetings, pre-construction meetings, answering contractor questions, resolving conflicts in the field, and on-site spot checks during construction. Site layout and as-built drawings may also be provided as part of the construction quality assurance process.

Technical Reviews – PACD also provides technical review of work performed by others. Technical reviews can help local consultants and personnel evaluate proposed alternatives or add value to projects through innovative design. Technical reviews are performed with an emphasis on meeting the requirements of the NRCS technical guide for conservation practices.

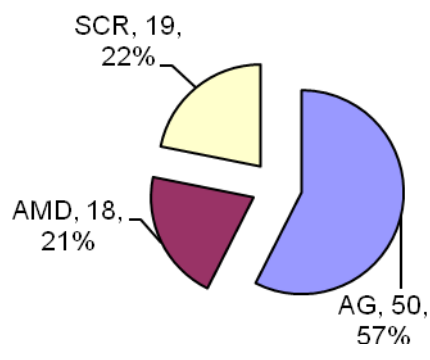
Training – Training can be provided to any qualified applicant for any of the technical areas PACD performs work. Training may also be provided for the operation and maintenance of a specific project or on innovative design or construction techniques developed by PACD staff. In the past, PACD has provided training for the operation of AMD facilities, agricultural BMP design, survey, and AutoCAD use. Training can be a useful tool for increasing capacity and education at the local level.

Watershed Assessment – Assistance can be provided for eligible sponsors developing a watershed assessment or restoration plan. This may involve identifying problems and solutions within a watershed or help developing methodologies for sampling and study of a watershed. An example of watershed assessment assistance would be painting bridge gauges on large watersheds to allow the collection of flow data during times when no other method would be appropriate.

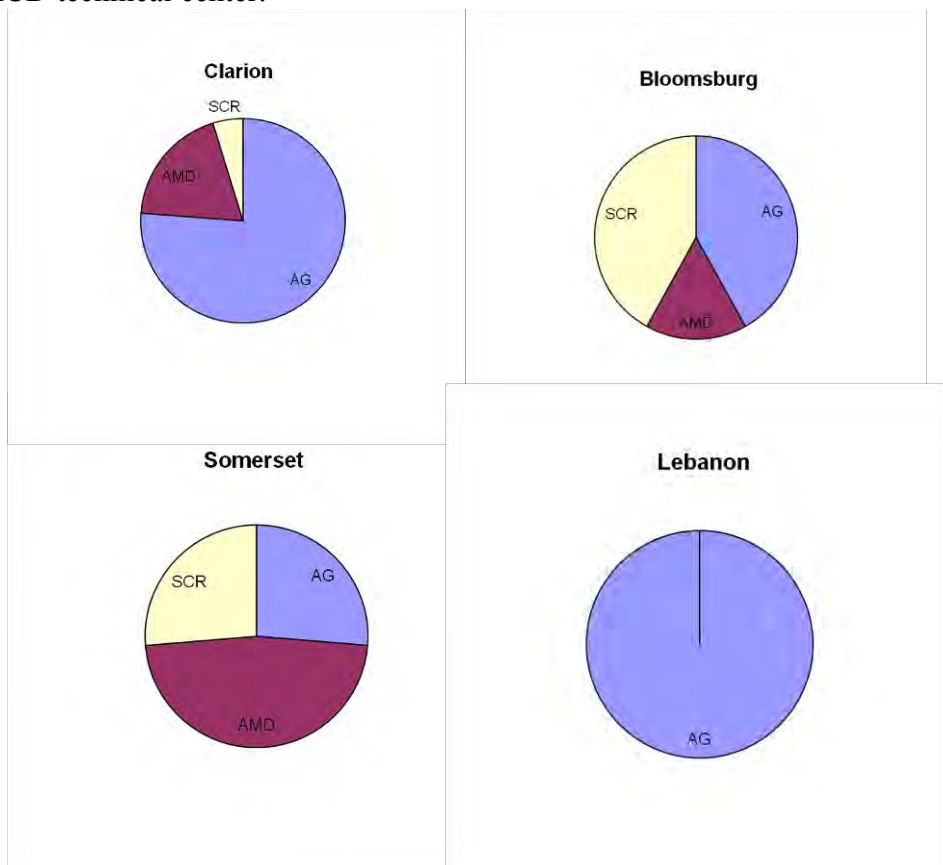
PACD Statewide Technical Assistance

Since March of 2009, PACD has provided technical assistance for a variety of local projects as part of the sixth PACD Growing Greener grant. **It is estimated that PACD technical assistance has been involved with 6.1 million dollars worth of environmental improvement projects during this grant period.** PACD has completed 87 individual projects statewide of the agricultural, abandoned mine drainage, stream corridor restoration, and miscellaneous type. The following graph shows the percentage of each project type in relation to total projects completed:

Projects Completed by Type



The graphs below show the percentage of each project type in relation to total projects completed by each PACD technical center:



PACD Northwest (Clarion)

Staff: Justin Griebel, Conservation Technician

Location: NRCS Technical Center, Clarion, PA

Case Study – Larson Site – Streambank Stabilization – Warren County, Pennsylvania

The Warren County Conservation District requested engineering assistance for inventory and evaluation, survey, design and specifications, and construction quality assurance for a stretch of Rhine Run. The goal of this project was to stabilize an eroding stream bank that had claimed many feet of property and was threatening utility poles, a state highway and a home. PACD, the conservation district, the landowners, and PennDOT, worked together to create an aesthetically pleasing design to stabilize the streambank and provide fish habitat.

Construction began in September of 2009 and was completed in weeks. The project is a wonderful success and is surviving the hard rains and glacial till soils nicely.

Photos Taken Before Construction**Photos Taken After Construction**

PACD Northwest (Clarion) Project Listing

The following list contains projects completed by the PACD Clarion Technical Assistance office during the Growing Greener grant period of March 2009 to May 2010. Smaller components or partially completed projects have been omitted from the list.

South Sandy Creek Watershed Association – Venango County – Continued construction quality assurance, as-built surveys and drawings for an AMD Treatment system.

Larson Site – Warren County – Design and construction quality assurance of a stream bank stabilization project.

Kulinski II Farm, Phase III – Lawrence County – Survey and design and construction quality assurance of waste storage facility.

Long Run – Clearfield County – Design and construction quality assurance for treating AMD utilizing diversion wells.

McElroy Farm II – Armstrong County – Design and construction quality assurance for roofed heavy use area.

Scharf Farm – Venango County – Layout and construction quality assurance of storm water control, heavy use area, access roads, and walkways.

Henry – Venango County – Construction quality assurance of heavy use area, filter area, water system, storm water controls, access road, and animal walkways.

Conifer Discharge Treatment System – Jefferson County – Inventory and evaluation, survey, design and specifications, and construction quality assurance of mine discharge treatment system.

McQuiston Farm – Venango County – Inventory and evaluation and survey of various agricultural best management practices.

Gadsby Farm Mine Lands Reclamation – Venango County – Inventory and evaluation, survey and mapping, and preliminary design of 40 acre mine reclamation project.

Smoker Farm – Potter County – Inventory and evaluation, survey and design of stormwater controls, animal walkways, watering facilities, and stream crossings.

Holden Farm – Venango County – Inventory and evaluation of heavy use area, access road stream crossing, filter area and various other agricultural best management practices.

Hooks Farm – Armstrong County – Inventory and evaluation and preliminary design for an irrigation system

Morrison Farm – Armstrong County – Inventory and evaluation, survey for heavy use area and various other agricultural best management practices.

Harkelroad Farms – Armstrong County – Inventory and evaluation of various agricultural best management practices.

Lilstrom Farms – Armstrong County – Inventory and evaluation of various agricultural best management practices.

Pine-Ton Farms – Warren County – Inventory and evaluation and survey and design of milk house and silage leachate treatment systems.

VAHRA Farms – Venango County – Inventory and evaluation for various agricultural best management practices.

Ohler Farms – Venango County – Inventory and evaluation and survey and design of various agricultural best management practices.

Perry Farm – Venango County – Inventory and evaluation of various agricultural best management practices.

Polk Farm – Venango County – Inventory and evaluation of various agricultural best management practices.

PACD Southwest (Somerset)

Staff: Eric Robertson, PE, Conservation Engineer
Phil Gardner, Conservation Technician

Location: NRCS Technical Center, Somerset PA

Case Study – Lion Mining AMD Treatment System, Ferndale Sportsman’s Club, Somerset County, Pennsylvania

DEP, with the support of many other project sponsors and through the Ferndale Sportsman’s Club, approached PACD about replacing an existing bond forfeiture active site treating approximately 600 GPM of abandoned mine drainage near Jennerstown, PA. The water was net alkaline but contained a great deal of iron. The mine water was coming up under pressure through a bore hole and the Bens Creek HQ-CWF was being impacted during rainy seasons due to insufficient treatment capacity to keep the mine pool at safe levels. PACD staff designed a large passive treatment system for the mine water approximately a quarter mile away to treat 1,000 GPM of mine water which will keep the mine pool significantly lower and allow for surges and mine pool recharges. The project will also eliminate the high hazard ponds that are currently being used to actively treat the water. Many innovative mine treatment solutions were employed as part of this project including Venturi outgassing and oxygenation systems, floating pond baffles, and creative aesthetic design and landscaping using deep and shallow water gardens for treatment. The system will save nearly one third of its total construction costs in chemical costs annually while maintaining safe mine pool levels for a high quality stream.

Photos of Existing Active Treatment Site



Photos Taken During Construction



PACD Southwest (Somerset) Project Listing

The following list contains projects completed by the PACD Somerset Technical Assistance office during the Growing Greener grant period of March 2009 to May 2010. Smaller components or partially completed projects have been omitted from the list.

Little Conemaugh AMD 50 Phase 2 – Cambria County – Design and construction of additional AMD passive treatment systems.

Miller Run Barta – Somerset County – Community involvement and volunteer construction of a 60 GPM AMD passive treatment system.

Ruff Creek Streambank Stabilization – Greene County – Design for the rehabilitation of approximately 1000 feet of eroded streambank.

Glendale Lake Shoreline Stabilization – Cambria County – Design for the rehabilitation of a wind eroded shoreline at a popular state park lake.

Knopsnyder Farm – Fayette County – Survey, design, and construction of a large multiple line watering system for a beef cattle operation.

Maust AMD Rehab – Somerset County – Design for the rehabilitation of an AMD passive treatment facility.

Lamberts Run AMD – Somerset County – Design and review of an AMD passive treatment facility rehabilitation.

Quigley Farm – Huntingdon County – Design and construction of a large stormwater culvert system to convey storm flows under an existing heavy use area.

Lion Mining AMD Passive Treatment – Somerset County – Design and construction for an innovative 1,000 GPM AMD passive treatment system.

Lilly Streambank Stabilization – Cambria County – Preliminary design of a streambank stabilization project.

Tubmill Creek Dosing Silo – Westmoreland County – Site design for a lime dosing silo application on AMD impacted water.

Will Farm – Somerset County – Design and construction of a concrete heavy use area for a beef cattle operation.

Listie VFC AMD Passive Treatment – Somerset County – Preliminary design for a large AMD passive treatment system.

Platt Farm – Somerset County – Design and construction of a roofed concrete heavy use area for a dairy cattle operation.

Big Run AML Rehabilitation – Indiana County – Design reviews for a large AMD remediation project.

Poplar Run Streambank Stabilization – Blair County – Design for the rehabilitation of approximately 200 feet of eroded streambank using volunteer labor forces.

Glessner Farm – Somerset County – Design and construction of a stormwater system to convey storm flows away from agriculturally sensitive areas.

Hinemyer AMD Passive Treatment System – Somerset County – Design for an approximately 120 GPM AMD passive treatment systems on land slated for the Flight 93 Memorial National Park.

Reitz #1 AMD Emergency Response – Somerset Counties – Site recon and analysis of a blowout that occurred upstream of an existing AMD passive treatment system.

PACD Southeast (Lebanon)

Staff: Frank Harvatine, Conservation Technician
 Jared Boger, Conservation Technician
 Adam Hartz, Former PACD Conservation Technician

Location: NRCS Technical Center, Lebanon PA

Case Study – Clark Yoder Farm – Ag Waste Management – Montgomery County

PACD staff worked with the landowner to create a plan to control runoff and stabilize a heavy use area, with the additional goal of keeping sediment off of a public road. The barnyard runoff and milk house water is diverted to a collection system, and is then pumped to a filter area. A stacking pad was installed to control runoff, and a screen box was installed to collect manure laden runoff in the stacking pad area. The manure laden runoff and milk house water is transferred to 2000 gallon holding tank, and then pumped to a grass filter with a sprinkler system. A gravel feed handling pad was installed adjacent to the manure stacking pad for Ag-Bag storage. Off site runoff and roof runoff is collected in a drop inlet and piped to a stone swale to reduce water entering onto the barnyard and sediment on the public road. The project was successfully completed in April of 2009.

Photos Taken Before Construction



Photos Taken After Construction



PACD Southeast (Lebanon) Completed Project List

The following list contains projects completed by the PACD Lebanon Technical Assistance office during the Growing Greener grant period of March 2009 to May 2010.

Eli Nolt – Lebanon County – Survey, design and construction of manure storage. Completed April 2009.

Clark Yoder – Montgomery County – Agricultural waste survey design and construction. Completed August 2009.

R. Diller (Diller Dairy) – Franklin County – Agricultural waste design. Completed February 2009.

Rickety Bridge – Adams County – Agricultural waste design and construction. Completed November 2009.

Irvin Martin – Franklin County – Agricultural waste inventory and evaluation and design. Completed May 2009.

Lamar Burkholder – Berks County – Agricultural waste inventory and evaluation, design and construction. Completed February 2009.

Allen Mason (Mason Chrome Farm) – Chester County – Agricultural waste survey and design. Complete June 2009.

Sidney Nolt (Nolt Dairy) – Lebanon County – Agricultural waste design and construction. Completed February 2009.

Bob Peifer – Chester County – Design of heifer manure storage. Completed January 2009.

Gideon Stolfus – Chester County – Design of heifer manure storage. Completed January 2009.

Elam Smucker – Chester County – Agricultural waste inventory and evaluation and design. Completed December 2009.

Rotz Dair – Franklin County – Agricultural waste design and construction. Completed December 2009.

Elvin Brubaker – Berks County – Agricultural waste inventory and evaluation, design and construction. Completed December 2009.

Ron Royer – Lebanon County – Agricultural waste design and construction. Completed May, 2010.

Brent Hostetter – Lebanon County – Agricultural waste slatted heifer barn. Completed May 2010.

Marlin Nolt – Lebanon County – Waterway and terrace rebuild. Completed May 2010

PACD Northeast (Bloomsburg)

Staff: John Coleman, PE, Conservation Engineer
Owen Hess, Conservation Technician

Location: NRCS Technical Center, Bloomsburg PA

Case Study – Kendrick Dairy Farm, Tioga County, Pennsylvania

The John Kendrick farm is a dairy operation located in Mainesburg, Tioga County. This farm is one of many involved in an effort to improve the water quality of the Corey Creek Watershed through the implementation of agricultural best management practices. The farm has a dairy herd that maintains an average size of approximately 50 milking animals. The major concerns associated with this farm were related to the undeveloped heavy use areas. These areas were not stable and there was no effective way to collect animal waste within these heavy use areas. Runoff from the slope above the site and the roofed structures also flowed through the heavy use areas. The combination of the runoff and the animal traffic resulted in a denuded condition that readily facilitated the transport of nutrients into the drainage ways of the Corey Creek Watershed. Milk house wastewater, ground seeps, and improving the walkways used by the animals to access the numerous paddocks were also addressed to alleviate water quality concerns.

Photo Taken Before Construction



Photo Taken After Construction



PACD Northeast (Bloomsburg) Project Listing

The following list contains projects completed by the PACD Bloomsburg Technical Assistance office during the Growing Greener grant period of March 2009 to May 2010. Smaller components or partially completed projects have been omitted from the list.

Constable Farm – Wyoming County – Provided inventory and evaluation, survey, and design for this agricultural BMP project. Barnyard improvements, including roof runoff control, heavy use area protection, fencing, and seeding.

Jacob Fisher Farm – Centre County – Provided quality assurance for barnyard improvements including roof runoff control, heavy use area protection, stream crossing, fencing, and seeding.

Beachel Farm – Montour County – Provided survey and design for barnyard improvements including roof runoff control, heavy use area protection, manure storage, fencing, and seeding.

Lake Wallenpaupack – Wayne County – Provided survey and design for shoreline protection project.

Wallenpaupack Creek – Wayne County – Provided continued monitoring for streambank erosion site.

Buffalo Run – Union County – Provided inventory and evaluation for streambank erosion site.

Kocher Park – Columbia County – Continued engineering review of natural stream channel design proposals.

Fishing Creek Watershed – Columbia County – Provided technical support for pH buffering project.

King Farm – Lycoming County – Provided quality assurance construction oversight for a stream stabilization project on Muncy Creek.

Druck Farm – Tioga County – Provided inventory and evaluation, survey, and design for second barnyard improvements project including roof runoff control, heavy use area protection, manure storage, stream crossing, fencing, and seeding.

Kendrick Farm – Tioga County – Provided quality assurance for barnyard improvements including roof runoff control, heavy use area protection, manure storage, stream crossing, fencing, and seeding.

Jacob Stoltzfus Farm – Centre County – Provided inventory and evaluation for barnyard improvements of a dairy facility that included manure storage, roof runoff control, heavy use area protection, watering facility, fencing, and seeding.

Jonas Stoltzfus Farm – Centre County – Provided inventory and evaluation for barnyard improvements of a dairy facility that included manure storage, roof runoff control, heavy use area protection, watering facility, fencing, and seeding.

Emmanual Fisher Farm – Centre County – Provided inventory and evaluation for barnyard improvements of a dairy facility that included manure storage, roof runoff control, heavy use area protection, watering facility, fencing, and seeding.

Samual Zook Farm – Centre County – Centre County – Provided inventory and evaluation for barnyard improvements of a dairy facility that included manure storage, roof runoff control, heavy use area protection, watering facility, fencing, and seeding.

Fishing Creek Watershed – Columbia County – Provided technical support for watershed evaluation to identify erosion sites of concern.

Chillisquaque Creek – Northumberland County – Provided inventory and evaluation and a cost estimate for streambank stabilization proposal.

Alwada Cove – Lake Wallenpaupack – Wayne County – Provided inventory and evaluation and a cost estimate to stabilize a stream at its confluence with Lake Wallenpaupack.

Schrack Farm – Clinton County – Provided inventory and evaluation, survey, design waterway stabilization effort.

Mahoning Creek – Montour County – Completed required annual as-built survey and mapping of natural stream design project completed in 2006.

Walker Site – Clinton County – Provided inventory and evaluation, survey, design waterway stabilization effort.

Catlin Hollow Creek – Tioga County – Completed required as-built survey and mapping of stream stabilization project completed in 2007.

Little Loyalsock Creek – Sullivan County – Provided survey for a stream bank stabilization project located in Dushore.

Mathew Shaffer Farm – Wayne County – Provided inventory and evaluation for barnyard improvements of a dairy facility that included manure storage, roof runoff control, heavy use area protection, watering facility, fencing, and seeding.

Ron Mayeski Farm – Lackawanna County – Provided inventory and evaluation for barnyard improvements of a dairy facility that included manure storage, roof runoff control, heavy use area protection, watering facility, fencing, and seeding.

Downey Site – Lycoming County – Provided inventory and evaluation, survey, design, and quality assurance for the stream stabilization of a reach of Mill Creek.

Buck Site – Lycoming County – Provided inventory and evaluation, survey, design, and quality assurance for the stream stabilization of a reach of Muncy Creek.

Oneida #3 AMD – Schuylkill County – Continued technical review of AMD treatment system.

Audenreid Discharge – Schuylkill County – Continued assistance with reviewing design proposals of technical service provider.

Peterman Site – Sullivan County – Provided inventory and evaluation, survey, and design for the stream stabilization of a reach of Big Run in Sonestown.

Bohesky Site – Sullivan County – Provided inventory and evaluation, survey, and design for the stream stabilization of a reach Little Loyalsock Creek in Dushore.

Summary

The funds provided for statewide engineering assistance through the Growing Greener grant program have enabled the Pennsylvania Association of Conservation Districts to complete 87 individual environmental improvement projects throughout the state of Pennsylvania during the last year, totaling an estimated 6.1 million dollars worth of improvements.