WEST VIRGINIA CONSERVATION AGENCY 2009 STATEWIDE NPS PROGRAM NPS CATEGORY OF AGRICULTURE AND CONSTRUCTION October 1, 2008 – September 30, 2009

Pollutants: All; administrative, planning and project development for agriculture and construction

The West Virginia Conservation Agency (WVCA) is the primary entity responsible for the implementation of the West Virginia Agriculture and Construction components of the Section 319 Non Point Source Program and for coordinating and implementing water quality improvement projects.

WVCA's Conservation Specialists (CS) support volunteer watershed associations, educate citizens on non point pollution issues, identify local stakeholders, partners and funding sources, and take the lead for Project Teams consisting of community stakeholders to place projects on the ground.

The WVCA assists in implementing the following programs: State Lime Program, CREP, Conservation Plans, Appalachian Grazing Conference Planning Committee, WV Multiflora Rose and Autumn Olive Program, Grazing Evaluation Contest Committee and Grazing Plans. WVCA provides coordination for the Lost River, Sleepy Creek, Second Creek and Mill Creek of the South Branch incremental projects, WV Conservation Farm Award Program, WV Envirothon.

WVCA Conservation Specialists (CS) working with NRCS and farmers assisted with riparian buffers through CREP on nineteen farms protecting over 70,468 linear feet of stream bank, 1208 acres of karst with estimated sediment load reduction of 56,266.5 tons/year. Thirty-eight agricultural conservation plans were written on 6193.7 acres and 35 nutrient management plans for 3,401 acres were reviewed or written with 20,681 #'s N managed, 248,491 #'s P managed, 97,133 #'s karst managed on 3,334 acres. Approximately 68,208 #'s N were managed on over 1839 acres. Twenty-two watershed associations were provided technical and educational outreach support.

In construction assistance the WVCA reviewed 18 sediment and erosion control plans for construction sites less than one acre with an estimated 109.58 tons of soil saved and provided technical stormwater management assistance to 37 construction projects providing recommendations for BMPs to alleviate problem areas.

The WVCA held 57 nonpoint source educational programs attended by 4,268 students, 252 members of the general public and 957 producers, agency personnel and watershed association members. Fourteen agricultural field days were held with 1,393 attendees. Other outreach activities included sediment and erosion control training for 60 people, leading the WVSOS monitoring on 36 stations, and instructing a watershed management class at the WV Conservation Camp for 120 students.

The WVCA Watershed Resource Center (WRC) provides support for the WV Watershed Network and maintains the WVWN website. The staff also provides planning and outreach coordination to the WVWN. This year WV hosted the EPA Region 3 Water Conference. The WRC provided planning support, coordination and logistical support for the conference. The WRC hosted a Sediment and Erosion Control workshop at the 2009 Contractors EXPO with approximately 75 attendees and displayed / provided technical advice to nearly 6000 attendees. Over 1000 tree seedlings & protective covers, reusable grocery bags, "Losing Ground" post cards, Water Conservation Ideas books were distributed along with WV Conservation District / Conservation Specialist contact information for technical advice and available programs.

The WRC has also actively participated in educating the public through expositions and area youth through conservation education field days. A total of 105 students plus teachers were educated on nonpoint source pollution problems and solutions and composting in the backyard. Students enjoyed learning through interactive activities while exploring the Enviroscape model and building their own “worm farms” to begin composting with worms in their backyards. Instructions were given on how to compost at home and recipes for composting in a bag. Approximately 1500 rain chain, rain barrel, rain garden, and Water Conservation Ideas publications were distributed at the Lawn & Garden Expo and the Kanawha Valley Sustainability Fair. Recyclable grocery bags along with facts on their effect on the environment were promoted and 1000 were distributed along with tree seedlings.

PARTNERSHIPS

Much of this work involves cooperation with a variety of other state, federal and local agencies as well as private sector citizens, and businesses. This cooperative approach provides benefits such as various funding sources for projects, technical expertise and citizen input helping our agency realize and target specific problems in specific areas. This

approach is and continues to be a very effective method to addressing a variety of resource concerns.

Partnerships

- WV Conservation Districts
- USDA / Natural Resources Conservation Service
- WV Department of Environmental Protection
- WV Department of Agriculture
- Chesapeake Bay Program
- WV Division of Forestry
- Trout Unlimited
- Watershed Associations
- County Health Departments
- WV Watershed Network
- Trout Unlimited
- Mid-Atlantic Chapter of International Erosion Control Association
- USDA Farm Service Agency
- US Fish & Wildlife Service
- WV Division of Highways
- Ducks Unlimited
- USDA Appalachian Plant Materials Center
- WVU Extension

Stream Monitoring and Students

“I hate having cold, wet feet” I think to myself as the water laps up and over the tops of my waterproof hikers, numbing my feet beyond feeling. Oh well, it’s for a good cause, I tell myself. I slowly climb back up the bank with a capped plastic container and make my way back to the school. The water sample will be used in the classroom of a local teacher interested in not only teaching her students about water quality but also giving them “hands on” experience with gathering data. Usually water sampling takes place during the warmer months of the year when officials are concerned with water contact during recreational sports like swimming, fishing and boating etc. However, this class of 5th graders was interested in seeing how the temperature of the stream changed throughout the year and if it affected other parameters within the stream. Therefore, the sample was gathered in mid-December, a week before Christmas break. Usually the majority of the students are lined up along the banks of the stream while a select few help grab water samples. However, this day was just too windy and cold for the students to be outside, therefore the stream had to be taken to them.

The scenario of students monitoring streams is exhilarating to me. In my humble opinion, there is no better classroom setting than a stream. Monitoring streams gives educators the opportunity to present an immeasurable variety of educational experiences to their students. Math and science skills are honed when students are asked to calculate flow rates, average temperature readings and measure a variety of parameters including: pH, dissolved oxygen and turbidity to name just a few. Students then make inferences or predictions after the data is analyzed and summarize their findings by writing reports. Many times the reports lead to in class discussions about what the data suggests and what can be done within the watershed to mitigate the impacts on the stream. This type of activity promotes problem solving and critical thinking skills. During the process they start to formulate the concept of how interrelated the landscape is. In laymen’s terms they see “the big picture”.

I can’t claim or quote any statistical data that suggests an increase in test scores or a bump in the number of students suddenly interested in science. The bottom line is that the students get excited about the processes involved with gathering and discussing data. I can’t imagine anything other than a positive influence on the skills involved with similar-style projects. Additionally, these projects go beyond benefiting the academic endeavors of teachers and their students by promoting a sense of community involvement for young people. It allows them to see that they are part of a larger whole and that the decisions they make can and often do affect others.

Teachers who are interested in taking on such a project may shy away from the process as it can require a large investment of time and or money; two things that aren’t exactly abundant for most of us. However, teachers who are interested and have access to a local stream may be interested to know that there are a variety of opportunities available to them. Conservation districts, watershed associations, and a number of state agencies support a variety of similar activities. Teachers can start their search with a phone call to their local conservation district office or by visiting the website www.wvca.us .

Twelvemile Run Stream Restoration Project

The Horseshoe Run Watershed Association undertook the task of restoring a segment of a native trout stream in a very remote part of their watershed that had been impacted by a logging job in the mid-1990s. The result of that activity lead to the stream's diversion and a new channel being cut down the road, which previously forded the stream, rendering it impassable and dewatering approximately 1000 feet of native trout stream. The new channel progressively incised the road resulting in a gulley 335 feet long, as much as 7 feet deep and a bottom width up to 7 feet wide. An estimated 1,500 tons of road bed material were displaced and a nearly linear, unstable stream with a habitat nearly worthless for fish and other aquatic organisms formed.

THIS WAS ONCE UPON A TIME A ROAD

The original stream bed remained intact with the exception of approximately 250 feet which had been destroyed by a combination of the logger's activity and off-road vehicle use. This stream reach would need to be recreated, the juncture of the road where the stream "blew out" blocked to divert the flow back into the original course and the disturbed areas stabilized.

Measurements were taken within the gulley and calculations made to determine the amount of material that had been eroded were made and the banks were pinned in several places to be measured again later to determine the extent of erosion within that time frame. The pinning was done on November 9, 2007 and comparative measurements taken again on August 25, 2008 and approximately 274 tons of additional earth and rock had eroded from the banks of the gulley during that period.

THIS WAS ONCE UPON A TIME A STREAM

Funding was the issue to attain the goal of stream restoration and when the group learned of the WV Department of Environmental Protection's AGO grant program through Lou Schmidt, Basin Coordinator, they invited agency representatives from WV Department of Natural Resources, Department of Highways and the WV Conservation Agency as well as representatives of the Canaan Valley Institute to a site visit to plan and formulate a proposal in the fall of 2007.

All agreed the project was worthy of consideration, the proposal was written, submitted and funding was approved. The association then asked Lou Schmidt of WVDEP and Brad Durst of the Conservation Agency to assist them with the technical aspects and construction coordination for implementation of the plan.

Construction began in September with support of the Tygarts Valley Conservation District and the project's implementation moved quickly and was completed in less than 4 days. The new stream was cut and a berm constructed to divert the stream flow to it using native materials and downed trees, then the site was stabilized with a native plant mix seeded with cereal rye for quick vegetative cover and mulched. Part of the original plan was to reconstruct the road as well but it was decided that, due to the site's isolation, access difficulties and additional cost, this goal was one that could not be accomplished.

Additional work was done on the stream corridor above the site removing blockages caused by fallen timber and debris accumulations and a berm was constructed along one part of the road to keep the stream from entering the road which was eroding severely and bringing additional sediment to the stream. One highly eroded stream bank area that off road vehicles were using was stabilized and made impassable, eliminating another sediment source.

The site will be monitored and biological assessments done to measure the reach recovery resulting from the project implementation.

Lost River 319 Stream Project Funkhouser Site

Mr. Rodney Funkhouser, a landowner, in the Lost River Valley located in eastern Hardy County had been experiencing tremendous erosion along a corn field. In the fall of 2008, the stream bank erosion was addressed using natural stream restoration structures.

Mr. Funkhouser approached USDA-NRCS for assistance. At that time NRCS was able to provide technical assistance, but not financial assistance. The local NRCS District Conservationist referred Mr. Funkhouser to the Moorefield West Virginia Conservation Agency Field Office. At that time the Conservation Specialist was working with West Virginia Department of Environmental Protection, Cacapon Institute, and local landowners to develop a watershed based plan. The working group made it a goal to address the severe stream bank erosion in the 319 Project Proposal. The Lost River 319 Project Proposal received approval from EPA and funding was allotted for the Funkhouser site.

The concern of the landowner was the erosion occurring after large rainfall events. When the water would rise, up to a foot of stream bank would be eroded away. In the summer of 2008 the design was completed and construction was scheduled to begin in October. The contractor, Jennings Excavating, worked with WVCA Watershed Division inspectors for four weeks. The design consisted of constructing a flood-plain bench, designating a stream channel (the river had several braded areas), constructing six structures, and sloping the stream bank.

This project has been collaboration for partnering agencies. WVCA provided the design and finical assistance. The Potomac Valley Conservation District sponsored the project as well as handled the finances. Mr. Funkhouser is currently working with USDA-NRCS and USDA-FSA to place the crop land into CREP. This will provide Mr. Funkhouser with financial assistance for purchasing trees to establish in the buffer area, and ensure the buffer area is maintained. WV Department of Environmental Protection and Cacapon Institute have been key players in the development of the watershed based plan and project proposal.

SCWA Successful Tree Planting

Despite heavy rain on Saturday, October 25, 20 volunteers from the Sleepy Creek Watershed Association planted 140 trees as a Riparian Buffer along the newly restored stream bank of Sleepy Creek after a demonstration on proper tree planting techniques by

Herb Peddicord, Chesapeake Bay Program Forester. Water for the workers was given by BB&T Bank, and Creekside Creamery provided prepared sandwich lunches at a reduced cost.

Trees were planted to repair disturbed areas of the buffer after a $30,000 natural stream restoration project was completed. Over many years, during rain events and high water, Sleepy Creek had dug separate channels as it flowed along Creek Road. This caused bank erosion with resulting loss of large trees and sections of the stream bank. Continued erosion caused deterioration of the stream bank and impacted Creek Road.

The restoration project begun August 4th and was completed October 24th. Natural stream restoration technology was employed to return the stream reach to a stable pattern, profile, and dimension that allows for proper sediment transport, decreased stream bank erosion, and enhanced aquatic habitat. The restoration team removed fallen trees, soil, and gravel deposits from the middle of the creek and sloped the eroded stream bank to redirect the creek's force toward the middle of the channel. The project also included the construction of a stream crossing for access to pastures on the opposite side of the creek.

Little Grave Creek II Stream Restoration Project

The residents along Little Grave Creek were greatly affected by the widespread flooding in 2004 brought on by Hurricane Ivan. As a result the residents and business owners along this watercourse came together to form the Little Grave Creek Watershed Association. The association was formed to determine the problems affecting the stream, find resolutions, and educate the public on the issues affecting their watershed. Soon after formation of the

Watershed Association, the group began working the West Virginia Department of Environmental Protection Basin Coordinator. While working with the WV DEP, it was determined that one of the main problems within the watershed was excessive stream bank erosion which was depositing large amounts of sediment in the water course. As a result, the Watershed Association worked with the WV DEP to develop a watershed based plan that would address a total of fourteen sites on the stream that were contributing the largest amounts of sediment to the watershed.

After completion of this plan, the LGCWA started working with the West Virginia Conservation Agency to secure the funding, permits, and designs necessary to restore these fourteen sites and reduce the amount of sediment entering their stream. The association worked with the WVCA to bid out and complete construction on the first ten sites of the plan over the summer of 2007. After the completion of these first ten sites, the watershed association immediately began to seek funding to complete the four remaining sites on their watershed based plan. Funding was secured and construction began on the remaining sites during the fall of 2008.

The first site to be restored under the second round of funding was the Huff /Peabody site. This site was on a sharp turn in the stream in which the water was cutting away at the outside of the turn and widening the creek at a rapid rate which was causing property damage, loss of yards, and considerable sediment loading to the stream. As a result, a design was drafted and implemented which used natural stream structures such as rock vanes and cross vanes to direct and steer the natural flow of water away from the outside bank and into the center of the channel thus reducing the amount of erosion and sediment entering the stream. By directing the flow of water to the center of the channel, it enables to the stream to keep sediment deposits cleaned out of the main channel and the stream flowing clear during high water events. After the natural structures were installed, the banks of the stream were sloped and re-vegetated with natural grasses and trees to help establish suitable ground cover on the banks to provide added protection during high water events.

After the completion of the Huff / Peabody site the crew then moved down stream to the Knight/Lawther/Hall site in which three land owners were losing considerable amounts of their backyards to erosion. This site was also contributing considerable amounts of sediment to the stream after each heavy rainfall or high water event. The site was between two sharp turns in the creek with the outer bank being a rock face. As a result of the sharp turns, the natural flow of the water was hitting the outside bank and bouncing across to the inside bank. This resulted in the erosion of the homeowner's backyards. The home owners were losing between two to six feet of yard a year, contributing a substantial amount of sediment to the stream. As a result, a plan was designed that employed the use of log vanes to slow and direct the flow of water off the inside bank and back into the center of the channel. This was done to reduce the amount of erosion and to stabilize the banks along the inside of the channel. After the structures were installed the inside bank of the channel was reshaped and seeded with natural grasses and trees to provide additional protection against erosion. In addition, the outside bank of the stream channel was sloped and vegetated were it could be just upstream of the rock face.

Presently, the LGCWA is working to secure funding to complete the remaining two sites of their original watershed based plan. In addition, the Watershed Association is also working with both the WVCA and the WV DEP to develop a second watershed based plan that is aimed at restoring additional sites that have either worsened in condition or become a problem since the original plan was written.

Sleepy Creek Incremental Project

FAILING SEPTIC SYSTEM

INSTALLATION OF AN ELJEN BED

The Sleepy Creek Incremental Project proposal's budget is $487,586.00, which is 60% 319 funds of $292,550.00 and 40% of local and state match of $195,036.00. The goal of the Sleepy Creek 319 Incremental Project is to reduce the fecal coliform loads within the watershed. One of the teams' goals was to repair 25 septic systems; they have completed over half of this goal with 6 more to be installed by the end of October 2009. This summer the project team with help from the Morgan County Health Department has seen 14 different systems designed, completed and paid in the amount of $90,055.00. During the same time the project team has paid $1,137.50.00 for septic system pumping. This program has been very successful and shown a great need within the watershed. The Morgan County Health Department has already started to develop a waiting list for failing septic systems for future grant possibilities. The project manager has been invited to the Kearneysville District In-Service Meeting on October 30, 2009. The role of this meeting is to explain the process of how Sleepy Creek got the funding and the important role the health department had in making this program such a success. The goal is educate the local health departments to take part in their local watershed associations.

Guyan Conservation District Helps Local Boy Scouts Address Erosion Problem at Beech Fork Park

On the weekend of May 30 and 31st several volunteers from Boy Scout Troop #12 took part in a sediment erosion control project at Beech Fork State Park. The project was very important to one young man in particular; Matt Peyton of Huntington, who would earn his Eagle Scout Badge with its completion. The Guyan Conservation District funded the project, and personnel from the WVCA guided Matt through the process. The .2 acre denuded site has been plagued by a number of rills and gullies along the face of the slope for some time. "Vegetation just never established itself along the hill" recalls Matt Yeager, the park superintendent. As a result, thousands of pounds of soil were stripped from the hillside. Matt Peyton organized members from his troop and directed them during the course of the project. Volunteers "dressed" the face of the slope and created a smooth seedbed by filling in the rills and gullies. After applying lime at a rate established by soil sample results, two volunteers broadcast a mixture of Kentucky 31 and Annual Rye. The remaining volunteers secured erosion control blankets to the slope to hold the seed in place. Ample rain and mild temperatures have helped get the seedlings off to a good start. Establishment of vegetation on the .2 acre site will eliminate an estimated 2.92 tons of soil/yr from entering Beech Fork Lake.

Technical Support

You can see the effort behind the incremental and base grant projects. Sometimes components of these base grants can be applied in other watersheds where there are no incremental efforts present. They serve to support the 319 program by addressing water quality issues but are not part of any larger effort. These are short term activities that may include Public outreach and education, reviewing sediment erosion control plans for construction sites less than an acre, monitoring assistance to watershed associations, and producer assistance in the form of conservation planning, forage and soil testing, and

nutrient management planning. Many of these projects are carried out with help from partnering agencies like NRCS, FSA and DEP.

Additionally, these projects may take place in a watershed that may not have a TMDL but is carried out as a preventative measure.

Conservation District Roles

The Conservation Districts have various programs that the conservation specialists play a role in delivering. The statewide Lime Program benefits from nutrient management planning provided by the Conservation Specialists. Implementation monitoring with the participating cooperators will provide information on program effectiveness and measure land use improvements such as soil erosion reductions and nutrient application effectiveness. Conservation Specialist assistance in helping farmers with management decisions regarding grasslands, Multiflora Rose and Autumn Olive, in eliminating these

non-native invasive and provide assistance on seeding these areas left exposed and vulnerable to soil erosion.

Soil Bioengineering Projects
Greenbrier Valley Conservation District
Site 1 on Anthony Creek

The first site is located on the Greenbrier and Pocahontas county line. At this site Anthony Creek was eroding an area of pasture land at a rate of 30.6 tons of soil per year according to the Revised Universal Soil Loss Equation. The soil on this site is a Potomac very gravelly fine sandy loam with a tolerable (T) soil loss rate of 3 tons per acre/year and an erodibility factor (K) of .24. During construction, the stream-bank was sloped to a 2:1 grade, removing 50.31 tons (37.30 cubic yards) of unstable soil from the streambank. This soil was placed in an upland location and stabilized from future erosion.

Tree revetments are non-sprouting trees installed along the toe of streambanks. The purpose of a revetment is to slow stream velocity adjacent to an eroding bank and to promote sediment deposition at the toe of the bank. The revetment material does not need to sprout. It is generally recommended that live willows or other quickly sprouting species be planted behind the revetment to provide permanent cover.

The site is 170 feet long and was stabilized using a high performance turf reinforcement mat (TRM) and earth anchor system, commercially known as the Armor-Max system. A tree revetment utilizing on site materials and rock from a local quarry was used to stabilize the toe of the bank and anchor the TRM. In recent years technology has been developed utilizing geosynthetic materials and earth anchors to stabilize failing and newly graded slopes. This is known as anchored reinforced vegetation systems. Generally these materials consist of uniquely shaped polypropylene fiber yarn woven into a turf reinforcement mat. The unique shape allows the matrix to capture and retain moisture, soil, and seed. This system installed with earth anchors has a field tested pull out capacity of 500 lbs with a

minimum of 24 inch depth. This system has also been used by the US Army Corps of Engineers to stabilize the levees breeched during hurricane Katarina in New Orland's.

Seedling trees were planted into the TRM, compost was utilized to cover the TRM and both over top and underneath of the mat, grass was planted

Note: The compost being used to spark quick germination of grass seed. Using this product to establish quick ground cover is one of the most effective practices to combat erosion. I would recommend to all conservation districts, that if you do not have a good source of compost for projects like this and for contractors to use for erosion control on other sites, that you start talking to some farmers about developing this as a business in your area.

Trees planted were a result of a partnership with the USDA NRCS Plant Materials Center. We provided the potting soil and they grew the trees. Seed for the trees was also collected locally. The total site covered 2,222 square feet and cost $9,228.75. This cost broken down equals $4.15 per square foot or $37.37 per square yard. Utilizing the Revised Universal Soil Loss Equation, the new soil loss rate after the installation of these practices is .33 tons per year (98.91% less than before initialization).

Note: The installation practice in the photo is the trenching of the edge of the mat in a manner that it can be flipped back overtop of itself to prevent high water from undercutting.

HPTRM should be installed in a shingling manor starting on the down stream end of the site working up to prevent water from working underneath. Anchors should be placed in a diamond pattern over the mats and straight along the edge of the mats. If tree revetments are not used, the bottom needs to be anchored with rock. The anchor forms a cone of pressure creating approximately 500 lbs of pull out pressure. The finished system will provide the same effect as rip rap with more vegetation established quicker.

To achieve the same soil loss results for this project utilizing rip-rap, the total cost of the project would have been $11,021.12. Utilizing 183 tons of rock and twice as much labor, this would have cost $4.96 per square foot. Another comparison was also conducted to determine the effect of the TRM on the overall system. If all factors of the installed system stayed constant excluding the TRM and included hay mulch at .5 tons per acre, the overall efficiency of the system would reduce by 26.35% and the cost would reduce to $1.69 per square foot. According to the Revised Universal Soil Loss Equation, the annual soil loss for the site would be 8.37 tons per acre per year. This would not be enough protection to bring the soil loss for the site to a tolerable level.

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Site 2 on Anthony Creek - Utilized Coconut Fiber and Tree Establishment Banks were sloped to a 2:1 slope

The second site developed on Anthony Creek utilized less hard armor due to the lower stress on the bank. Coconut matting was installed to prevent sheet erosion on the banks while grass was establishing.

Site 3 on Anthony Creek - Utilized Root Wads (the most traditional soil bioengineering practice utilized in this project)

Root wads armor a bank by keeping the current off the bank. They should be used in combination with other soil bioengineering techniques to stabilize a bank. Three trees were used. The tops of the trees were used as footers and the lower parts were driven into the bank with the root wads exposed. Soil was backfilled and trees were planted to develop an additional root system.

Kitchen Creek Soil Bioengineering Project (Greenbrier County)

A braded channel in Kitchen Creek is eroding away pasture land. A new channel was established, ARVS was established on the outside bank to prevent it from washing out into the pasture, coconut matting was used on the inside bend of the new channel. Trees were

also established to develop the “firewall” root system. A compost blanket was also used to encourage rapid herbaceous growth.

Stream Bank Erosion Monitoring On Cow Creek Leads to Soil Bioengineering Project

Thousands of streams and rivers in West Virginia and the nation have one problem in common - severely eroded banks. This soil erosion generates hundreds of thousands of tons of sediment that creates even greater problems and is considered the largest water quality problem in the United States. The increased cost of treating drinking water, the destruction of a fish and wildlife habitat, streams form islands and point bars that change the direction of flow causing more erosion, our favorite swimming and fishing holes are filled, trees uproot and dangerous undercuts are made atop the banks. Damages from flooding can worsen when the stream fills with earth reducing water holding capacity, high stream flows are more often out-of-bank events and redirected water often threatens homes, buildings, farm fields, lawns, pipelines and roads.

The human activities that cause much of the problem include road construction, railroads, agriculture, natural resource extraction (coal, timber, natural gas and oil) and even small things such as lawn landscaping can contribute to the erosion issue. The two major factors causing excessive erosion are altering the stream channels and streambanks in any manner such as widening, deepening and moving them and the removal of vegetation, especially trees and shrubs, along and atop the stream banks.

Cow Creek is one of those many streams impacted by severe erosion and the residents of the community of Schultz have formed the Cow Creek Watershed Association to bring attention to the steam’s plight and work on getting help to repair problems. Paul Janes, Supervisor with the Upper Ohio Conservation District and resident of the community of Schultz is leading an effort to bring attention to Cow Creek by involving the Upper Ohio

Conservation District and West Virginia Conservation Agency as partners in resolving some of the problems.

Surveying the stream to evaluate the extent of the problems is the first step toward bringing project monies to the creek. Several sites were visited and measurements and physical assessments have been performed. Estimates of the amounts of soil erosion that has occurred have been calculated and some study of the stream's biological qualities done all in an effort to prove the level of need by showing the damaging effects of the problem.

The results of the three segment survey, a total reach length of about 780 feet of stream, shows approximately 7,690 tons of soil have been lost and that is just a small sampling of the watershed. Each site was also "pinned" with steel rods that are driven horizontally into the bank at critical points and will serve as references to monitor additional streambank erosion as time passes.

The negative environmental effects must be documented and quantified before monies can be justified to fix any problem. The data collected so far, along with additional data to be collected, will be used to demonstrate the need for additional project monies in an attempt to remedy the problems of land loss facing property owners along the stream and improve the fish and wildlife habitat of Cow Creek.

In Pleasants County, Cow Creek was eroding an area of pasture land at a rate of 41 tons of soil per year according to the Revised Universal Soil Loss Equation (RUSLE). The soil on this site is a Gilpin-Upshur complex with a tolerable (T) soil loss rate of 3 tons per acre/year and an erodibility factor (K) of .32. On this site, the streambank was sloped to a 3:1 grade removing unstable soil from the streambank. 462 tons of soil was placed back into the bends of the stream to re-establish the original pattern of the channel. The total site length is 300 feet long and was stabilized using two types of erosion control devices.

A high performance turf reinforcement mat (TRM) and earth anchor system, commercially known as the Armor-Max system was used in the 90 foot section of the bank that receives the most stress from high water. The remaining 210 feet were covered with a straw rolled erosion control blanket. Coconut fiber logs were installed at the toe of the slopes to anchor the bottom of the mats and to prevent undercutting of the system. Grass was then seeded to establish permanent cover.

The total site covered 630 square feet and cost $4,552.35. This cost broken down equals $7.22 per square foot or $64.98 per square yard. Utilizing the Revised Universal Soil Loss Equation (RUSLE), the new soil loss rate after the installation of these practices is .71 tons per year (98.47% difference than before initialization).

To achieve the same soil loss results for this project utilizing Rip Rap, the total cost of the project would have been $6,144.65. Utilizing 51.97 tons of rock and twice as much labor, this would have cost $9.75 per square foot.