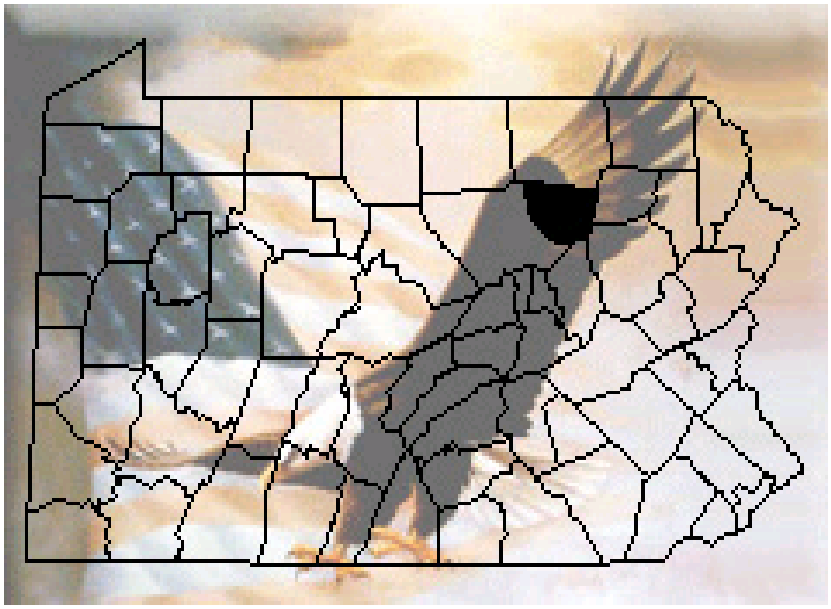
Sullivan County's Implementation Plan For the Chesapeake Bay Tributary Strategy



Revised from the Original
By Rod Morehart
Chesapeake Bay Technician
Sullivan County Conservation District

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Sullivan County finds itself in a unique situation because it shares its Chesapeake Bay Technician position with Lycoming County. In addition to sharing a Chesapeake Bay Technician, Sullivan and Lycoming Counties also share a Watershed Specialist. Both Conservation Districts find these arrangements to be mutually beneficial. This plan was developed to address the needs, solutions, and expected results for Sullivan County only. A separate plan for Lycoming County has also been developed.

County Description

Sullivan County is located on the Appalachian Plateau in north-central Pennsylvania. Sullivan County is 452 square miles in size and has a population of approximately 6,500 full-time residents. Sullivan County is one of only three places in the northeastern United States that the Federal Government considers to be entirely rural. The timber industry, agriculture, and the state and county government are the three largest employers in Sullivan County

Sullivan County's waters, which are entirely in the Chesapeake Bay Watershed, fall into six major watersheds. The Loyalsock/Elk Creeks (10B) covers 67%of the County's landmass, while the Muncy/Little Muncy Creeks (10D) covers 15%, and the West Branch of Fishing Creek (5C) covers 11%. The North Branch of the Mehoopany Creek (4G), Lycoming Creek (10A), and Towanda Creek (4C) watersheds cover the remaining seven percent of Sullivan County's land mass. There are 848.94 miles of streams in Sullivan County. Approximately eight percent of Sullivan's County's waters (64.01 miles) are listed as impaired.

Timberland covers 81% of Sullivan County (Sullivan County Land Cover Map is located in the Appendix). Over one-third of the county's 305,920 acres are owned by the State of Pennsylvania. This state owned land comprises all of World's End State Park, and part of Rickett's Glen State Park, the Loyalsock State Forest, and State Game Lands Numbers 12, 13, 66, and 134.

Agriculture is the second largest land use in the County. According to the Pennsylvania Agricultural Statistics 2002-2003, there are 160 farms in Sullivan County, which cover 29,500 acres. There are approximately 100 cattle operations, 30 dairy operations, 10 hog operations, 10 poultry operation, and five sheep operations. According to the Pennsylvania Agricultural Statistics Service's 2002 Census of Agriculture, there were 10,217 acres used for forage production, 1,508 acre used for corn silage production, 876 acres used for corn grain production, and 187 acres planted in oats. According to stats from the USDA National Agricultural Statistics Service, Sullivan County producers raised 5,500 head of beef, 2,100 milk cows, 200 hogs, and 500 sheep in 2004. There are 210 people who are classified as farm laborers and another 114 people in Sullivan County have a job created by the presence of agriculture.

Five of the County's nine townships have Agricultural Security Areas with greater than 500 acres enrolled. To date, four tracts totaling 382 acres have had their development rights purchased through the Conservation District's Agricultural Land Preservation Program. The Northcentral Pennsylvania Conservancy, an organization that purchases conservation easements on land to preserve it for future enjoyment for its special natural, cultural, or historical value, has purchased one conservation easement on

a 606 acre tract of land adjacent to World's End State Park. This land has since been transferred to the Bureau of Forestry to be used as State Forest land.

Past Accomplishments

The Chesapeake Bay Program began in Sullivan County in 1993. Since then, the Sullivan County Conservation District has completed 10 Chesapeake Bay projects, while partially completing an eleventh project. The Chesapeake Bay Program contribution to these 11 projects totals $262,360.85. There are nine current Chesapeake Bay Projects in the County. These projects include manure storage structures, sub-surface drains**,** heavy use protection areas, roof runoff structures, milk house waste treatment systems, diversions, grassed waterways, and waste storage ponds. In addition to Chesapeake Bay Program funding, the Limited Input Sustainable Agriculture program has provided $17,237.36 in funding for seven stream bank fencing projects, an off stream watering system, and a pasture management project.

Since its inception in 1997, Sullivan County's Agricultural Land Preservation Program has purchased the development rights on four tracts totaling 382 acres. This program has provided $351,722.69 to the landowners of these four tracts to ensure that these parcels will never be used for anything other than agricultural use. There are currently seven additional landowners in Sullivan County that would like to enroll their farms into the Agricultural Land Preservation Program if funding becomes available. At the current funding level, it takes two years to preserve a 50 acre tract of land.

Thirty-five projects have been completed in Sullivan County through the Dirt and Gravel Road Program since 1998. To complete these projects, the District has worked with eight townships in providing $475,519.00 in assistance.

The Watershed Specialist works with two watershed groups in Sullivan County. The Muncy Creek Watershed Association has received $671,228 to restore the upper part of the watershed. The Loyalsock Creek Watershed Association has received $47,928.00 through the Watershed Restoration and Protect Program (WRAP) and Growing Greener funds to complete initial planning activities within the watershed.

The Conservation District, with the aid of the Rural Abandoned Mine Program (RAMP) and the Bond Forfeiture Program, has worked to reclaim over 163 acres of abandoned mine land. The Sullivan County Conservation District has also worked to come up with low cost and low input measures to treat acid mine drainage. These measures include dousing streams with limestone sand, placing limestone sand in piles next to acid mine drainage areas and having rain water move the calcium carbonate into the waters where treatment is desired, and using limestone dust to treat acid mine drainage instead of the more costly limestone sand.

The following Sullivan County streams are listed on the *2004 Pennsylvania Integrated Water Quality Monitoring and Assessment Report* (formerly the 303d list).

West Branch of Fishing Creek (5C)- Total miles of impaired streams = 40.62

Atmosheric Deposition (Total miles = 40.62)

Atmosheric Deposition/Metals

- East Branch Fishing Creek (and unt) - 4.64 mi.
- Ore Run (and unt)- 1.11 mi.
- Heberly Run (and unt)- 5.72 mi.
- Sullivan Branch (and unt)- 5.06 mi.
- Meeker Run (and unt)- 1.19 mi.
- Hunts Run- 0.49 mi.
- Pigeon Run- 1.30 mi.
- Long Run (and unt)- 4.25 mi.
- Big Run (and unt)- 2.52 mi.
- Lead Run (and unt)- 1.84 mi.
- Blackberry Run (and unt)- 2.91 mi.
- Hog Run- 2.02 mi.
- Trout Run (and unt)- 1.88 mi.
- Elk Run (and unt)- 0.43 mi.
- Peterman Run- 1.63 mi.

Atmosheric Deposition/pH

- Shanty Run (and unt)- 1.84 mi.
- Quinn Run- 2.26 mi.
- Oxhorn Run- 1.86 mi.
- Kitchen Creek **(**and unt)- 0.82 mi.

Loyalsock Creek/Elk Creeks (10B)- Total miles of impaired streams = 23.39

Atmosheric Deposition (Total miles = 15.5)

Atmosheric Deposition/pH (Total miles = 8.26)

- Wolf Run- 3.31 mi.
- Open Run- 1.91 mi.
- Bear Swamp Run (and unt)- 3.04 mi.

Atmosheric Deposition/Natural Sources/pH (Total miles = 7.24)

- Santee Creek (and unt)- 7.24 mi.

Abandoned Mine Drainage/Metals (Total miles = 5.6)

- Loyalsock Creek- 5.6 mi.

Removal of Vegetation/Siltation (Total miles = 1.26)

- Elk Creek- 1.26 mi.

Upstream Impoundment/Thermal Modifications (Total miles = 0.87)

- Marsh Branch- 0.87 mi.

Grazing Related Agriculture/Siltation (Total miles = 0.16)

- Hoagland Branch– 0.16 mi.

Towanda Creek (4C), North Branch of Mehoopany Creek (4G), Lycoming Creek (10A),and Muncy/Little Muncy Creeks (10D)- Total miles of impaired streams = 0

NOTE: A map entitled Sullivan County Impaired Streams is located in the Appendix. This map and the Sullivan County Land Cover Map is also available to be viewed at the Sullivan County Conservation District's office.

Priority Areas

In an effort to reduce the water quality impairments of Sullivan County's portion of the Chesapeake Bay Watershed, priority will be given to installing the most cost-effective Best Management Practices (BMPs) that reduce nutrient and sediment runoff. These BMPs will be used to reduce nutrient and sediment runoff created by Acid Mine Drainage and Agriculturally Related Practices. The Pennsylvania Department of Environmental Protection's *2004 Pennsylvania Integrated Water Quality Monitoring and Assessment Report*'s list of streams requiring Total Maximum Daily Loads (TMDLs) will be used to identify project priority areas. To gather the greatest amount of expertise and support available when planning a project, the Sullivan County Conservation District will work with its conservation partners to complete all projects.

TMDLs are pollution allocations for a particular watershed that are set by the State or the US Environmental Protection Agency. TMDLs allow for the release of pollutants into local waterways in such a way that if the TMDLs are met, the waterways having the TDMLs will not have their water quality impairments exceed the current allowable limits. TMDLs will specify the amount of pollutants that specific entities within the watershed, such as industrial plants and water treatment plants, are allowed to emit into waterways legally on any given day. TMDLs do not specify how an entity is to achieve its daily load requirement. It is the responsibility of each entity to determine how they choose to achieve the daily load requirements.

TMDLs and Tributary Strategies are both documents that have improving water quality as their main goals. Entities with TMDLs are subject to regulatory enforcement if they exceed their allocations. Tributary Strategies are documents that are designed to gain water quality improvements through voluntary actions.

Agriculture is found throughout Sullivan County, but its greatest concentration is found in Cherry, Forks, Elkland, Fox, Hillsgrove, Shrewsbury, and Davidson Townships. These seven townships are where the greatest potential for agriculturally related impairments occurs. The potential for accelerated erosion caused by land disturbances and stream bank erosion exists countywide. This is due to the steep slopes found throughout Sullivan County's topography. Abandoned mine land can be found throughout the Loyalsock Creek Watershed, but it is concentrated heaviest in

southeastern Cherry Township and western Colley Township. Runoff from dirt and gravel roads is a concern that exists countywide.

Technical Resources:

The following resources can be utilized to implement this plan:

- Bureau of Forestry
- Eastern PA Coalition for Abandoned Mine Reclamation (EPCAMR)
- Endless Mountains Resource Conservation and Development Council (Endless Mountains RC&D)
- Farm Service Agency
- Local Interest groups- ie.Trout Unlimited and Northcentral Pennsylvania Conservancy
- Natural Resource Conservation Service
- PennDot
- Sullivan County Conservation District Directors and Staff
- The Penn State Extension Service
- Township and Municipality Governments
- Watershed Associations

Funding Sources:

The following resources can be utilized to assist in the implementation of this plan:

- Agri-Link Loans
- Bureau of Abandoned Mine Reclamation
- Bureau of Mining
- Chesapeake Bay Foundation
- Chesapeake Bay Program
- Conservation Reserve Enhancement Program
- County Commissioners
- DEP's Environmental Educational Grants
- Dirt & Gravel Roads Program
- EPCAMR
- Environmental Quality Incentive Program (EQIP)
- Farmland Preservation Program
- Farm Service Agency Loan Programs
- Forest Land Enhancement Program
- Grow Green PA
- Growing Greener
- StreamReLeaf Program
- Office of Surface Mining
- PACD TAG Assistance
- Plan Development Incentive Program (PDIP)
- Rural Abandoned Mine Program (RAMP)
- 319 Grants
- USDA Program Assistance to Farmers
- Wildlife Habitat Incentives Program (WHIP)

- Water Resources Education Network (WREN) Project Grants
- Watershed Associations

Best Management Practices:

The following Best Management Practices were identified as practical practices that can be used to achieve the goals of Sullivan County's Bay Tributary Strategy.

- Acid Mine Drainage Treatment
- Advanced Nitrogen Management for Corn
- Agricultural Compliance
- Banyard Runoff Control
- Conservation Planning/Soil Sampling
- Conservation Tillage/No-till
- Cover Crops
- Educational Awareness
- Erosion Reduction in Delegation Programs
- Farmland Preservation
- Forest Management
- Land Reclamation
- Nutrient Management Planning
- Off Stream Watering Systems
- Preservation of Wetland Habitats
- Riparian Buffers
- Stream Improvements
- Stream Bank Fencing
- Water Quality Monitoring

Pollution Reduction Strategies for Sullivan County

Acid Mine Drainage Treatment

In addition to scaring the earth and posing human safety risks, past mining activities has impacted the water quality of the upper reaches of the Loyalsock Creek. These water quality impacts are created by the discharge of acid and metal polluted waters from deep within the mines. The Conservation District has worked hard to control the pollution impact of acid mine drainage. Through the cooperation of the State Bureau of Abandoned Mines, two large passive treatment systems are effectively alleviating acid concerns and allow metals to precipitate out of the water prior to entering the Loyalsock Creek.

The Sullivan County Conservation District has also worked to come up with low cost, low input, and effective measures to treat acid mine drainage. These measures include placing limestone rocks (#4) on permanent fords near acid mine drainage sites and having the traffic using those fords grind them to release calcium carbonate into desired treatment areas, placing limestone sand in piles next to acid mine drainage areas and having rain water move the calcium carbonate into the waters where treatment is desired, and using limestone dust to treat acid mine drainage instead of the more costly limestone sand. Water quality monitoring is done prior to attempting acid mine drainage treatment and after treatment has occurred to check the efficiency of each of the treatment methods.

Advanced Nitrogen Management for Corn

The District will work to improve the corn nitrogen (N) management on Sullivan County farms for the environmental and economic benefit of farmers and other stakeholders. Excessive N fertility applications as a result of underestimating the contributions from manures and crop residues are commonplace.

When the only sources of N are the soil and commercial fertilizer, N recommendations for corn have been successfully estimated based on appropriate yield expectations. However, estimating the contributions of manure and legume N is complicated because of the variability of factors such as forage stand composition and the timing, method, and rate of manure applications. Therefore, it is difficult to make economically and environmentally sound N recommendations on many Sullivan County farms.

The District's goal is to have five (5) pilot farmers adopt improved N management techniques. Initial success can drive wider adoption. Good N management, including efficient N use, can minimize the amount of nitrate that is excessive for crop growth and available for possible contamination of water resources.

The District's intent is to purchase a Minolta SPAD Meter. The meter is a small portable instrument, well-tested and utilized in Pennsylvania, which instantaneously provides a producer with information to accurately determine corn N requirements. N testing techniques previous to the meter being available proved cumbersome and time-consuming. As a result, adoption rates by farmers were low. Perhaps the greatest impediment to the SPAD meter being adopted by individual Pennsylvania farmers is its

initial cost. Utilizing one instrument and combining the N testing requirements of a group of farmers over many acres has proven more workable.

Implementation of the SPAD meter testing procedures will reveal actual economic savings as we compare before and after data. It will also quantify the potential environmental benefits as well. The District anticipates a 30% reduction in total N applications over the affected acres. To ensure that sufficient N recommended by the procedure and ultimately applied by the farmers, we are proposing late-season cornstalk nitrate tests be performed on representative fields of each cooperating farm. Late season cornstalk nitrate tests can determine if N fertilization was sufficient to optimize yields.

Farmers participating with the project will work closely with the Sullivan County Conservation District and Extension personnel. The effort will include classroom meetings and on-farm field demonstrations. Documentation and scientific support for the SPAD Meter and Late Season Cornstalk Nitrate Test are available from Penn State Cooperative Extension.

Agricultural Compliance

Currently, Pennsylvania has regulations requiring farm operations to have a manure management plan and an erosion and sedimentation plan (E & S plan) if certain criteria are met. These regulations are subject to enforcement by PA Department of Environmental Protection. One of the goals of the Sullivan County Conservation District is to work with the local agricultural community to achieve full compliance on each farm in the areas of manure management and erosion and sedimentation control.

According to PA Code Title 25, Chapter 102, all farmland in Pennsylvania that has over 5000 square feet (0.1 acre) of land plowed or tilled per year is required to have a written E & S plan. The E & S plan must show that the farmland is not losing soil at a rate greater than natural soil loss. A current conservation plan that shows that the tolerable soil loss, "T", is being met is acceptable.

According to PA Code Title 25, Chapter 93, all farming operation that produce manure must have a manure management plan or a nutrient management plan. A manure management plan is simply a document that shows how much manure is produced by an operation and how that manure is handled and spread. Nutrient management plans are usually only needed if the operation is a Consolidated Animal Operation (CAO). A CAO is an operation that has over 2,000 pounds of live weight of animal for every one acre of land where it can be manure. Additionally, all farming operations that produce or use manure are required to follow applicable guidelines found in the Manure Management Manual. These guidelines cover manure handling, manure application practices, and best management practices needed to protect water quality.

Barnyard Runoff Controls

Runoff from barnyards can contribute to water being contaminated with excessive nutrients and sediment. The installation of roof gutters and diversions can keep clean water from becoming contaminated by manure and sediment around the barnyard. Best management practices such as heavy use protection areas and manure stacking facilities can be installed to keep manure contained so it cannot contaminate surface water. Treatment filters can be installed to treat water before it enters water resources. These practices, as well as similar practices, can be funded through EQIP and Nutrient

Management Implementation Grants after the barnyard runoff controls have been identified as being needed in a nutrient management. The District will help interested landowners find funding sources, as well as help them go through the proper channels.

Cover Crops

The Sullivan County Conservation District will promote the benefits of using cover crops. Nutrients left in the soil after a crop is harvested can be captured by planting small grains without fertilizer on land usually left fallow after winter. The benefits of establishing cover crops are erosion control, nitrate capture, atmospheric nitrogen fixation, organic matter increase, soil structure improvement, water management, and weed control. To make the best use of cover crops, producers need to match the reason for using them with the characteristics of cover crop species. They also need to be knowledgeable about cover crop management. The District's goal is to have 300 acres of cover crops established. This is 10% of the corn crop in Sullivan County according to the 2003 PA Ag Statistics. The cost is estimated at $40.00/acre, or a total of $12,000.00.

To quantify the nutrient and sediment savings created by planting cover crops you must take the landuse loading rate times the total acres planted times the reduction efficiency. The reduction efficiency rates are 45% for nitrogen, 15% for phosphorous, and 20% for sediment. Assuming that all 300 acres were planted at least seven days prior to the first frost using conventional tillage, a net savings of 3,726 # nitrogen, 78 # phosphorous, and 56T sediment would be achieved.

Dirt and Gravel Road Pollution Prevention Program

The Sullivan County Conservation District oversees the Dirt and Gravel Road Pollution Prevention Program in Sullivan County. This program is funded by earmarked state funds for the purpose of eliminating dust and sediment pollution created by dirt and gravel roads. The runoff from dirt and gravel roads can enter local waters and cause decreased dissolved oxygen levels in these waterways. Decreased dissolved oxygen levels make it harder for aquatic organisms to survive and can even lead to their demise by causing them to suffocate due to a lack of oxygen availability in their water.

Each year the Sullivan County Conservation District receives requests for $150,000.00 - $200,000.00 to accomplish environmentally sound maintenance practices and approved products to correct existing pollution problems. Annual fund for the Dirt and Gravel Road Pollution Prevention Program in Sullivan County is approximately $70,000.00.

Educational Awareness

Public education is a vital component of everything that the Sullivan County Conservation District does. Without public education and public awareness, there would be little hope in making any gains in improving soil and water quality throughout Sullivan County. Whenever a landowner or a group contacts the District about a project that they would like to do, it is the District's responsibility to provide information and education about that project to the landowner or group. This helps to create or maintain a good relationship between the District and the landowner or group. It also helps to ensure that the project accomplishes the desired objectives and that it is done properly.

To promote the best use of natural resources, the District will work with the Penn State Extension Service and other conservation partners to spread information as efficiently as possible. The Sullivan County Conservation District publishes a bimonthly newsletter called *The Conservationist*. The Conservation District will continue to host educational programs on various topics whenever the need arises.

The District also does regular outreach education throughout the community. Annually, the District partners with the Sullivan County School District by assisting Sullivan County High School's Envirothon team, judging the annual Conservation Poster Contest posters submitted by students at the county's two elementary schools, and assisting teachers in the Sullivan County School District with lessons about soil and water conservation. The District also has an annual seedling sale which promotes the benefits of forest regeneration.

Erosion and Sediment Pollution Control Program

The Sullivan County Conservation District oversees the Erosion and Sediment Pollution Control Program in Sullivan County. The District's responsibilities for this program include reviewing and approving Erosion and Sediment Control Plans (E & SC Plan) and inspecting sites that require an E & SC Plan while the project is being completed. The purpose of the site inspections is to assure that the plans are being properly implemented, erosion and sediment control are being installed, and to ensure that work is being completed in the proper sequence.

Under the Pennsylvania Department of Environmental Protection's (PA DEP) guidelines, any site disturbing soil is required to have some form of erosion and sediment control. Sites disturbing less than 5,000 square feet of soil are required to takes steps to minimize accelerated erosion and sedimentation, but do not need a written E & SC Plan. Sites disturbing over 5,000 square feet are required to have a written E & SC Plan. Any site over one acre with a point source discharge into waters of the Commonwealth or any site disturbing over five acres is also required to have an E & SC Plan approved by the District as part of a National Pollutant Discharge Elimination System (NPDES) permit. Any project that is regulated under DEP guideline is also required to have an E& SC Plan.

Forest Management

The Sullivan County Conservation District is committed to preserving, maintaining and creating healthy forests through education and professional assistance. The District has a Nationally Certified Arborist who can assist private woodland owners, foresters, loggers and developers in forest planning, management, and tree care. The Conservation District also oversees the Erosion and Sediment Pollution Control Program in Sullivan County.

Through the Erosion and Sediment Pollution Control Program, the District reviews activities relating to the timbering of the local forests that require an Erosion and Sediment Control Permit. This includes harvesting and road maintenance activities that disturb over 25 acres and assisting with stream crossing permits. The District is also available to assist people who need an Erosion and Sediment Control Plan but do not require a permit for their forest harvesting activities.

The Conservation District can assist private woodland owners by helping them determine which tree species will grow best with their soil conditions and by selling them tree tubes to help ensure a greater survival rate for their tree plantings. Landowners may also purchase seedlings from the Conservation District to plant on their properties. The District can also assist landowners how are interested in completing habitat improvement projects to create better habitat for specific birds and animals. The Sullivan County Conservation District also offers urban forestry classes that cover topics such as pruning, tree selection, and tree disease problems.

Mine Land Reclamation

The Sullivan County Conservation District supports and sponsors mine land reclamation projects throughout the county. Past coal mining activities has left scars on the land and has impacted the water quality of the upper reaches of the Loyalsock Creek. Surface mining has left numerous high walls of 40-50 feet that pose a threat to human safety. Through the cooperation of landowners, state and federal agencies and the Sullivan County Conservation District, much of this land has been restored to cause minimal impact to the environment and eliminate human risk factors. One hundred and sixty-three acres of mine land have been reclaimed in Sullivan County. The Conservation District is still actively working to reclaim additional acid mine land.

No-till farming

The District will promote the use of no-till farming practices. The environmental benefits of switching to no-till farming from conventional tillage practices are decreased soil erosion, increased water quality, and decreased amounts of fossil fuels and carbon gasses being released into the atmosphere. No-till farming will benefit the health of the soil by increasing soil tilth and water infiltration, while decreasing soil compaction. Farmers will also benefit from having increased soil moisture retention.

In addition to the environmental benefits that farmers will gain by switching to no-till farming, they will also see a decrease in labor requirements and machinery wear from not having to plow their fields. This will lead to increased time to do other necessary farm related duties and decreased fuel costs.

The District's goal is the have 300 acres in additional acres planted by no-till methods. This represents 10% of the corn crop that is planted in Sullivan County annually. The reductions in water pollution for each acres that is switched to no-till form convention tillage are as follows: 3.4 #/A nitrogen, 0.85 #/A phosphorous, and 0.646 T/A sediment. Over 300 acres, this would lead to a saving of 1,020 # nitrogen, 255 # phosphorous, and 194 T sediment from entering the waters of Sullivan County.

Farmers switching to no-till can get information at the Sullivan County Agricultural Resources Center from Mark Madden of the Penn State Cooperative Extension Service and Jay Bagley, the Sullivan County Conservation District's Agricultural Conservation Technician. Another valuable source of information for farmers interested in switching to no-till farming practices would be farmers already doing no-till farming in the northeastern region of Pennsylvania.

Stream Bank Fencing, Off Stream Watering Systems, and Riparian Forest Buffers

The degradation of stream banks due to animal access is evident throughout the County. This results in sediment and nutrients entering the streams. Fencing promotes pasture management, giving the operator more control over where cattle graze. By reducing animal contact with surface water, there is less potential for pollution such as sediment and nutrients. There are many benefits of stream bank fencing to farm operators, local communities, and the entire region. Farmers are under increasing pressure to consider how their management affects others. Stream bank fencing is a low-cost, low-maintenance management tool that protects a shared resource and maintains good public relations.

The environmental benefits of excluding livestock from the streams include reduction of nutrients, sediments, farm chemicals, and bacteria entering the streams. This results in increased water quality.

An adequate amount of water quality is essential for efficient animal production. Therefore, animals excluded from streams will need to be provided water by other means. Those alternatives include spring developments, pumps, and stabilized access areas.

Allowing trees and shrubs to grow along the stream banks, also known as riparian buffers, decrease the frequency and severity of floods and increase groundwater recharge. These streamside forests are also effective in removing excess nutrients and sediment from surface runoff and in shading streams to optimize light and temperature conditions for aquatic plants and animals. The roots of the trees and shrubs aid in stabilizing stream banks, thus reducing cut bank erosion.

These practices are funded through the Conservation Reserve Enhancement Program (CREP) at a rate of 140%. Rather than compete with this program, the District will assist the Nature Resources Conservation Service (NRCS) in promoting the CREP program. It is anticipated that with District cooperation the following practices can be installed over the next two years in Sullivan County:

- 25 miles of Forested Riparian buffers
- 20 acres of Grass Buffer Strips
- 20 miles of Stream Bank Fencing
- 8 Off-stream Watering Systems

To quantify the nutrient and sediment load decrease created by establishing 25 miles of forested riparian buffers you need to figure a reduction calculation and add it to a landuse efficiency calculation. To calculate the reduction, you need to take the original upland landuse loading rate minus the forest loading rate and multiply that by the number of acres converted. This is added to the upland land use efficiency times total acres treated times an efficiency rate. To figure acres treated, it is assumed that every 435.6 foot buffer strip that is 100 feet wide will treat 5 upland acres for nitrogen and 2 upland acres for phosphorous and sediment. The efficiency rate used for Sullivan County is the Appalachian Plateau efficiency rate, which is 60% for nitrogen, phosphorous, and sediment. Assuming that 90% of the forested riparian buffers will be established on conventionally tilled farmland and the remaining 10% will be established on pasture, a net savings of 24,892 # nitrogen, 949 # phosphorous and 609T sediment will be achieved.

To quantify the nutrient and sediment load decrease created by establishing 20 acres of grassed buffer strips you need to figure a reduction calculation and add it to a landuse efficiency calculation. To calculate the reduction, you need to take the original

upland landuse loading rate minus the forest loading rate and multiply that by the number of acres converted. This is added to the upland land use efficiency times total acres treated times an efficiency rate. To figure acres treated, it is assumed that every 435.6 foot buffer strip that is 100 feet wide will treat 5 upland acres for nitrogen and 2 upland acres for phosphorous and sediment. The efficiency rate used for Sullivan County is the Appalachian Plateau efficiency rate, which is 41% for nitrogen, and 60% for phosphorous and sediment. Establishing 20 acres of grass buffer strips will result in a net savings of 1,626 # nitrogen, 75 # phosphorous and 4T sediment.

To quantify the nutrient and sediment load decrease created by establishing 20 miles of stream bank fencing in conjunction with forested riparian buffers, you need to figure a percent efficiency reduction calculation and add it to a land use reduction calculation. To calculate the percent efficiency reduction, you need to take the pasture upland loading rate times the total acres treated times the percent efficiency. The percent efficiency is 60% for nitrogen and phosphorous and 75% for sediment. This is added to the land use reduction calculation, which is the pasture loading rate minus the mixed open loading rate times the total acres excluded by this practice. To figure acres treated, it is assumed that every 208 linear or fencing will treat 2 upland acres for nitrogen, phosphorous, and sediment. By establishing 20 miles of stream bank fencing in pastureland, a net savings of 9,571 # nitrogen, 630 # phosphorous and 214T sediment will be achieved.

Watershed Associations

The Sullivan County Conservation District is committed to working with local watershed associations to help improve the water quality of the waters of Sullivan County. Watershed associations throughout Sullivan County are working to stabilize stream banks, restore riparian buffers along our streams, control invasive plant species, restore fisheries, monitor water quality, encourage better management practices for storm water and land use, and educate their communities on the importance of environmental protection and conservation.

Summary

The Sullivan County Conservation District will work with its conservation partners to maintain and improve the water resources of Sullivan County. Areas where impaired waters are located will be targeted as areas to focus our attention to get the quality of those waters back to acceptable standards. At the same time, we will strive to maintain water quality in areas where water quality standards are being met through educational awareness activities.

In order to maintain and/or improve water quality, The Sullivan County Conservation District will fulfill its delegated obligations of the Erosion and Sediment Pollution Control Program and the Dirt and Gravel Road Pollution Prevention Program. We will also work with local watershed associations to improve stream conditions in the County. Through the Chesapeake Bay Program, we will provide funding for special projects to improve water quality by reducing nutrient and sediment loads from agriculture practices.

This version of the Sullivan County Implementation Plan for the Chesapeake Bay Tributary Strategy was approved by the Sullivan County Conservation District's Board of Directors at their March 2006 meeting.