Lycoming County Implementation Plan for the Chesapeake Bay Tributary Strategy

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Lycoming County is in a unique situation because the Chesapeake Bay Technician position is shared with Sullivan County. It is the belief of both Districts that this agreement is beneficial to the citizens of Lycoming and Sullivan Counties. This plan, however, was developed to address the needs, solutions and expected results for Lycoming County. A separate plan was developed for Sullivan County.

County Description

Lycoming County is located in north-central Pennsylvania entirely within the Chesapeake Bay Watershed. There are two distinct geomorphic provinces within the County – the Appalachian Plateau Province located in the northern part of the County and the Valley and Ridge Province in the south. The west branch of the Susquehanna River flows through the county, coming in at Jersey Shore and exiting below Montgomery. At 1215.5 square miles it is the largest county in the Commonwealth and is home to approximately 120,000 people. Roughly seventy-five percent of the County is forested. Agricultural land use accounts for approximately 17 percent of the County's total acreage and is the second largest land use category in the County. Twenty-two townships currently have agricultural security areas. Farming is the major industry in the county with 1,085 farms comprising 145,500 acres. There are 500 cattle farms, 140 dairy operations, 45 hog operations, 50 sheep operations, and 61 poultry operations. About 18,000 acres is used for permanent pasture. According to the 2002 Crop Summary there were 33,700 acres of forage crops, 26,400 acres of corn, 5,500 acres of soybeans, 5,200 acres of small grains, and 1,106 acres of vegetable crops planted in Lycoming County (Pennsylvania Agricultural Statistics 2002-2003). There are six major watersheds in Lycoming County; Pine Creek (9-A), Lycoming Creek/Larry's Creek/Antes Creek (10-A), Loyalsock Creek (10-B), White Deer Hole Creek (10C), Muncy Creek (10-D) and Fishing Creek (5C). There is approximately 2,200 miles of streams and 92 water bodies in the County. Roughly 7 % (150 miles) of the streams located in the County are listed as impaired. Atmospheric Deposition followed by Agriculturally Related Activities, Small Residential Runoff and Acid Mine Drainage are the known causes of impairment.

The population trends of Lycoming County municipalities over the 1970 to 2000 Census periods are indicative of statewide trends where population shifted outward from the cities and boroughs into the suburban and rural townships. Spatially, much of the growth is occurring in the townships located just beyond the suburban fringe of greater Williamsport, which is well within commuting distance. Earth disturbance activity associated with construction has the potential to impact water quality and increases the impervious area resulting in elevated stormwater runoff rates. Development rights of forty-nine farms totaling 6,446 acres have been purchased through the Conservation District for farmland preservation. The Northcentral Pennsylvania Conservancy is another organization that is working to protect the rural nature of the County. Their mission is to conserve, protect and utilize lands, landmarks, and waterways of special natural, cultural and historic value for the enjoyment and well being of present and future generations. To date they have protected 13 properties in Lycoming County totaling over 1,200 acres.

Past Accomplishments

The Conservation District has completed twenty-six Chesapeake Bay projects at a cost of $601,508.78. Under the Nutrient Management Implementation Grant Program and Growing Greener Program the District has assisted agriculture operators in obtaining approximately $369,000. The types of Best Management Practices (BMPs) installed include manure storage structures, heavy use area protection, milkhouse waste treatment systems, roof runoff control structures, diversions, waterways, walkways, stream bank fencing, spring development, contour strips and conservation tillage. Other Growing Greener grants administered in Lycoming County include water quality inventories and assessments, acid mine drainage treatment, development of Watershed Restoration Plans and stream restoration projects. Over 1.5 million dollars have been spent in these efforts.

The District has thirteen active Chesapeake Bay contracts requiring compliance inspection to determine if the operations are maintaining the Best Management Practices that were installed under the Program. There are twenty farming operations that have Act 6 nutrient management plans developed in Lycoming County. The District is responsible to determine if the plans are accurate and being implemented.

The Chesapeake Bay Foundation has funded six projects to install 18,748 ft of steam bank buffers and 4.3 acres of wetlands buffered further than 15 feet from the stream. In 2004 Fiscal Year the Natural Resource Conservation Service planned 1,800 practices and applied 625 practices in Lycoming County.

Various other public agencies and organizations are currently working for the protection and restoration of the County's watersheds. The Lycoming County Conservation District is actively involved in both waterway protection and Erosion and Sedimentation Pollution Control programs. Other local organizations include the Lycoming Creek Watershed Association and the Muncy Creek Watershed Association, and the new Clean Water Institute being developed by the Lycoming College Biology Department, which is very active in the assessment of the water quality in the County. The Susquehanna Chapter of PA Trout Unlimited, The Northcentral Pennsylvania Conservancy, the Susquehanna River Basin Commission (SRBC), and The Alliance for Aquatic Resource Monitoring (ALLARM) are also active in the area. Currently, the County has begun a system-wide investigation of Combined Sewer Overflow in the Williamsport Sanitary Authority (WSA) sewer service area. Known as the Lycoming County Comprehensive Combined Sewer Overflow (CSO) Study, it is a series of nine related projects that will be integrated into a single comprehensive analysis of the WSA area.

The following are the streams listed on the *2004 Pennsylvania Integrated Water Quality Monitoring and Assessment Report (formerly the 303d list)* found in Lycoming County. The Source Unknown/Cause Unknown impairments are not included.

Lycoming /Larry's /Antes Creeks (10-A) – Total miles of impaired streams = 103.6

Atmospheric Deposition (Total – 65.8 miles)

- Jacobs Hollow (and Unt) – 0.6 mi
- Abbott Run (and Unt) – 5.2 mi
- Doe Run (and Unt) – 3.2 mi
- First Fork Larry's Creek (and Unt) – 5.1 mi
- Frozen Run (and Unt) – 13.1 mi
- Hickory Swale – 1.8 mi
- Hound Run (and Unt) – 3.7mi
- Long Run (and Unt) – 6.6 mi
- Lycoming Creek (and Unt) – 0.7 mi
- Mill Hollow Run – 1.2 mi
- Miners Run (and Unt) 7.1 mi
- Red Run (and Unt) – 12.3 mi
- Yellow Dog Run (and Unt) – 2 mi

Abandoned Mine Drainage/Metals (Total – 10.5 miles)

- Little Gap Run (and Unt) – 4 mi
- Lycoming Creek (and Unt) – 2.8 mi
- Roaring Run (and Unt) – 3.7 mi

Agriculturally Related (Total – 11.1 miles)

- West Branch Susquehanna River (and Unt) – 6.5 mi
- Little Pine Run (and Unt) – 1.5 mi
- Beautys Run (Unt) – 3.1 mi

Small Residential Runoff (Total – 16.2 miles)

- Daugherty Run – 12.2 mi
- Fox Hollow – 0.3 mi
- Bottle Run – 1.4 mi
- Lycoming Creek (Unt) – 2.3 mi

Muncy/Little Muncy Creeks (10-D) – Total miles of impaired streams = 23.52

Agriculturally Related (Total – 23.52 miles)

- Beaver Run (and Unt) – 3.52 mi
- Carpenters Run (and Unt) – 15 mi
- German Run (and Unt) – 1.4 mi
- Wolf Run (and Unt) – 3.6 mi

Loyalsock Creek (10-B) – Total miles of impaired streams = 19.8

Small Residential and Urban Runoff (Total – 13.6 miles)

- Grafius Run (and Unt) – 9.8 mi
- Millers Run (and Unt) – 1.2 mi

- West Branch Susquehanna River (and Unt) – 2.6 mi

Abandoned Mine Drainage/Metals (Total – 6.2 miles)

- Loyalsock Creek (and Unt) – 6.2 mi

Pine Creek (9A) – Total miles of impaired streams = 5.4

Abandoned Mine Drainage/Metals (Total – 5.4 miles)

- Buckeye Run – 2.1 mi
- Otter Run – 1.5 mi
- Right Fork Otter Run (and Unt) – 1.8 mi

White Deer Hole Creek (10-C) – Total miles of impaired streams = 0

Fishing Creek (5-C) – Total miles of impaired streams = 0

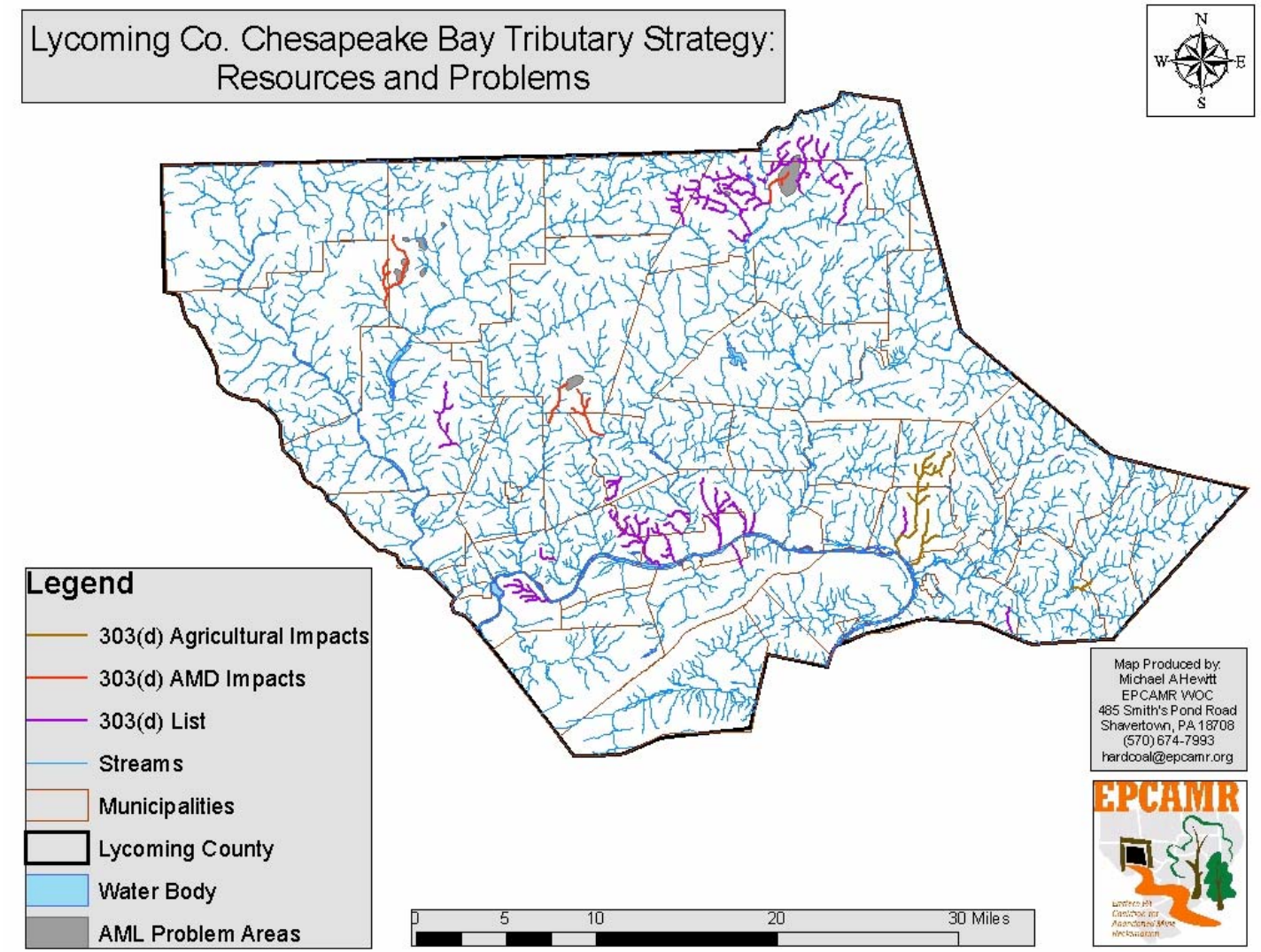
Priority Areas

Priority will be given to implementing the most cost-effective Best Management Practices to reduce nutrient and sediment runoff contributing to the impairment of the Chesapeake Bay. The Lycoming County Comprehensive Plan, the Department of Environmental Protection's 303d list of impaired streams requiring Total Maximum Daily Loads (TMDLs), and the expertise of the Conservation District and its cooperating agencies will be utilized to identify project areas. TMDLs can be considered to be a watershed budget for pollutants, representing the total amount of pollutants that can be assimilated by a stream without causing impairment or water standards to be exceeded. The maximum allowable amount of a specific pollutant is allocated to all sources in the watershed, including point source discharges from sewage treatment plants and industrial wastewater facilities (waste load allocations) and polluted runoff from the land (load allocation). The TMDL process allocates the amount of pollutants that can be discharged into a waterway from each category of pollutant source. The TMDL does not specify how discharges must attain particular load reduction. TMDLs are regulatory allocations. Both TMDLs and the Tributary Strategies are developed to assist in cleaning up impaired waters. The main difference between TMDLs and the Tributary Strategies is that at this time the Chesapeake Bay Program's Tributary Strategy is a voluntary, cooperative restoration process.

The areas of Lycoming County where agriculture is currently concentrated and the greatest potential for nutrient and sediment runoff is located were identified. These target areas include Jordan, Franklin, Moreland and Penn Townships in the eastern part of the County, Limestone and Washington Townships in the southern part of the County and Cogan House Township in the north-central part of the County.

The following is a map produced by the Eastern Pennsylvania Coalition for Abandoned Mine Reclamation identifying these impairments.

Lycoming Co. Chesapeake Bay Tributary Strategy: Resources and Problems



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Technical Resources

The following resources can be utilized to implement this plan:

- Lycoming County Conservation District
- Penn State Extension
- Natural Resource Conservation Service
- Farm Service Agency
- Local Watershed Associations
- PA Department of Agriculture
- Eastern PA Coalition for Abandoned Mine Reclamation
- Chesapeake Bay Foundation
- Local Interest Groups i.e. -Forest Owners Association, Trout Unlimited, Sportsmen's Groups, etc.
- Local Colleges and Universities
- Custom Manure/Fertilizer Applicators
- Local Industry
- Media

Funding Sources

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

- Chesapeake Bay Program
- Environmental Quality Incentive Program
- Nutrient Management Program
- Conservation Reserve Enhancement Program
- Dirt and Gravel Road Pollution Prevention Program
- Growing Greener
- Conservation Security Program
- Agri-Link Loans
- Farm Service Agency Loan Programs
- Miscellaneous Grants i.e. 319 etc.
- Local Industry

Best Management Practices

The following Best Management Practices were identified as being the most cost-effective means of achieving the goals identified in the Bay Tributary Strategy:

- Stream bank stabilization
- Stream bank restoration
- Stream bank fencing
- Riparian buffers
- Off-stream watering systems
- Nutrient management plans
- Conservation plans
- Cover crops
- Critical area planting
- Conservation tillage/ No-Till
- Heavy use area protection
- Rotational grazing
- Land retirement
- Dirt and Gravel Roads Practices

Managed Precision Agriculture

Crop Management Associations (CMAs) are grassroots, nonprofit organizations run by member farmers. Their ultimate goal is to promote more economical, efficient and environmentally sound crop production practices through best management practices and crop input efficiencies. To accomplish this, members generate funds through acreage fees and hire crop management scouts, technicians and consultants to provide a variety of services. Efficient crop production requires managing the many variables that go into growing a crop, which takes time and effort. For CMA members, much of this work is done by the association's employees: personnel, who have a background in agronomy, stay up-to-date on crop management practices and work with county extension agents who have close links to agricultural research at Penn State. Membership in a crop management association makes farmers better equipped to produce crops more profitably because members get the information needed to make sound management decisions. Crop management technicians gather and help interpret information about members' field and crop conditions. For example, technicians monitor crops for destructive insects and offer advice on control measures. Instead of routinely applying pesticides, CMA members can cut back on applications by spraying only when insect populations justify it. This saves money and protects the environment. As a result of insect monitoring information alone, one CMA member reduced chemical, equipment and labor costs by 75 percent.

Nutrient management is another area where CMAs can provide assistance. As a first step, CMA technicians collect soil and manure samples for analysis. After determining crop nutrient needs, soil fertility levels and available nutrients in farm manure, technicians advise members on the application of manure and commercial fertilizer. The goal is to meet a crop's nutrient needs without applying excess nutrients that decrease farm profits and degrade water quality.

In a joint effort between the Conservation District and the Penn State Extension, this District is administering a program that provides cost-share dollars to Lycoming County farmers interested in participating in CMAs.

The cost to enroll in the CMA is an initial signup fee of $25.00 per farm and $7.00 per acre (minimum of 50 acres). The goal of the District is to encourage 30 farms to enroll a total of 2,000 acres in the CMA. In Year 1 the cost would be $750.00 in one-time initial sign-up costs plus $11,200 (2000 acres at $7.00 per acre cost shared at 80%) for a total of $11, 950.00. In Year 2 the cost would be $7,000.00 (2000 acres at $7.00 per acre cost shared at 50%) and Year 3 would be $2,800 (2000 acres at $7.00 per acre cost shared at 20%). The total cost to implement this program for three years would be $21,750.00.

At this time a nutrient reduction efficiency rate for this practice has not been established. For the purposes of this plan an estimate similar to Nutrient Management Plan Implementation on crop fields of 25% for Nitrogen and Phosphorus will be used. Nitrogen loading at Edge of Stream (EOS) for Conventional Tillage in Lycoming County is 28.9 pounds of Nitrogen per year per acre (lbs-N/yr/ac) and 1.77 pounds of Phosphorus per year per acre (lbs-P/yr/ac). If the goal of 2,000 acres is reached, this would compute to a reduction of 14,450 lbs-N/yr and 885 lbs-P/yr. If implemented for three years, this would translate to a saving of 43,350 lbs. of Nitrogen and 2,655 lbs. of Phosphorus.

The Lycoming County Conservation District is also proposing a joint effort with Columbia and Union Counties and the Penn State Extension Service to administer a program that provides cost-share dollars to farmers in Columbia and Union Counties, in addition to Lycoming County, who are interested in participating in CMAs.

The cost to enroll in a CMA is an initial signup fee of $25.00 per farm. For this special project, per acre fees are capped at $7.00 per acre. The goal of the Lycoming, Columbia, and Union County Conservation Districts is to encourage 30 farms to enroll a total of 3,500 new acres into a CMA. In Year 1 the cost would be $750.00 in one-time initial sign-up costs, $12,500.00 (3,500 new acres at $7.00 per acre cost shared at 50%), $13,487.60 (9,634 existing acres at $7.00 per acre cost shared at 20%), and up to $4,950 in soil samples (55 new and existing CMA members at $9.00 per soil sample cost shared at 50% up to $90.00 total for each member over two years), for a maximum of $31,687.60. In Year 2 the cost would be $12,500.00 (3,500 new acres at $7.00 per acre cost shared at 50%), $13,487.60 (9,634 existing acres at $7.00 per acre cost shared at 20%), and up to $4,950 in soil samples (55 new and existing CMA members at $9.00 per soil sample cost shared at 50% up to $90.00 total for each member over two years), for a maximum of $30,937.60. The total cost to implement this program for two years would be $57,675.20.

At this time a nutrient reduction efficiency rate for this practice has not been established. For the purposes of this plan an estimate similar to Nutrient Management Plan Implementation on crop fields of 25% for Nitrogen and Phosphorus will be used. Conventional tillage in Columbia, Lycoming, and Union Counties are respectively 23.8, 28.9, and 25.21 lbs-N/yr/ and 1.87, 1.77, and 1.66 lbs-P/yr/ac. EOS loading rates for conservation tillage in Columbia and Union Counties are 27.1 and 22.2 lbs-N/yr/ac and 0.95 and 0.89 lbs-P/yr/ac, while Lycoming County is listed as not having any acres of conservation tillage implemented. Using a weighted average of the three counties' percentage of land that is planted in either conventional or conservation tillage (62% conventional tillage and 38% conservation tillage in both Columbia and Union Counties), the amount of nutrients saved would be 61,470 lbs-N/yr and 8,706 lbs-P/yr. This would equate to a total savings of 122,940 lbs-N and 17,412 lbs-P over the two years that the program is implemented.

Urban Nutrient Management

More efficient use of chemical fertilizers can be attained through the promotion of Penn State Soil Fertility Testing Program. This program is designed as a soil-management tool for farmers, homeowners, landscape contractors, golf-course superintendents, ornamental nurserymen and others interested in the fertility of their soil and in determining the optimum lime and fertilizer requirements of their crop. By better matching application rates to nutrient needs, over application of nutrients resulting in pollution can be avoided.

The over-application of commercial fertilizers to lawns is perceived as a threat to the quality of the streams of Lycoming County and the Commonwealth. Through a cooperative endeavor between the Conservation District and the Penn State Extension, a program is proposed to educate the public as to the benefits of soil sampling. This can be done by conducting workshops for homeowners promoting the importance of proper soil sampling and resources available to them through the Cooperative Extension. The

District will in turn provide participants with soil sample test kits they can use in order to utilize the information they learned. This will benefit the public in two ways: (1) an increase in water quality (locally and in the Chesapeake Bay) and (2) a reduction in fertilizer costs. It is the assumption of this workgroup that the participants of this workshop will learn their lawns are in need of lime and not necessarily fertilizer. If 100 people attend, at $9.00 per soil test kit, the total cost of the workshop will be $900.00.

There are few mechanisms for reporting the nutrient and sediment reductions from this practice. It is difficult to assign a "before" condition; urban pervious acreage actually receiving fertilizer, the amount of that fertilizer, and timing of application or the definition of the "after" condition. Another difficulty is tracking the numbers (acreage) and location in both categories over time. Nutrient reductions for this practice are as follows: Nitrogen =17%, Phosphorus = 22%. This practice is applied to mixed open land and developed land. The upland loading rates (EOS) in Lycoming County for mixed open land are 6.3 lbs-N/yr/ac and 0.50 lbs-P/yr/ac. This would compute to a reduction of 1.071 lbs-N/yr/ac and 0.11 lbs-P/yr/ac. The upland loading rates (EOS) in Lycoming County for pervious developed land are 10.6 lbs-N/yr/ac and 0.69 lbs-P/yr/ac. This would compute to a reduction of 1.802 lbs-N/yr/ac and 0.15 lbs-P/yr/ac. Assuming 100 acres of this practice were adopted it would translate into nutrient reduction of 180.2 lbs-N/yr and 15 lbs-P/yr.

Barnyard Runoff Controls

Runoff from barnyards containing manure and sediment will be reduced by installing roof water control and diversions to direct clean water away from the animal concentration area. Heavy Use Area Protection and associated runoff treatment filters will be used to armor the barnyard areas so the manure can be collected and land applied according to a nutrient management plan. Funding sources will be sought after the completion of an Act 6 Nutrient Management Plan. These sources are primarily the EQIP program, Nutrient Management Implementation Grant Program and Miscellaneous grants (e.g. Growing Greener).

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

The degradation of stream banks due to animal access is evident throughout Lycoming County resulting in sediment and nutrients entering the streams. Fencing promotes pasture management allowing the operator more control over where cattle graze. By reducing animal contact with surface water there is less potential for pollution from 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 streams include reduction of nutrients, sediments, farm chemicals and bacteria entering the streams resulting in increased water quality.

An adequate amount of quality water is essential for efficient animal production. Therefore, animals excluded from streams will need to be provided water by other means, such as 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 shading streams to optimize light and temperature conditions for aquatic plants and animals. The roots of trees and shrubs aid in stabilizing stream banks thus reducing cut bank erosion.

There are several programs available to farm operators in Lycoming County promoting fencing and riparian buffers. Various options are available from the Chesapeake Bay Foundation (CBF), Department of Environmental Protection (DEP) and the Natural Resource Conservation Service (NRCS). The District intends to promote these programs and assist in the implementation of these buffers. The Conservation District will assist NRCS to install more than 1000 acres of Riparian Buffers and more than 400 acres of Grassed Filter Strips in Lycoming County under the Conservation Reserve Enhancement Program (CREP).

The nutrient and sediment reductions for Riparian Buffers on agricultural land includes the original landuse loading rate (e.g. pasture, conventional tillage, hay ground) minus the forest loading rate times total acres converted plus upland landuse loading rate times total acres treated times percent efficiency. The upland landuse efficiency varies by hydrologic setting. In Lycoming County the practice will be installed on Valley and Ridge –Silicicastic soils. For nitrogen every 435.5 linear feet of buffer (average width 100 feet) is estimated to treat 5 upland acres. For phosphorus and sediment every 435.5 linear feet of buffer is estimated to treat 2 upland acres of land. The efficiency rates for forest buffers are as follows: Nitrogen 44%, Phosphorus 45% and Sediment 45 %, the efficiency rates for grass buffers are as follows: Nitrogen 37%, Phosphorus 65% and Sediment 65 %. It is estimated that 90% of the forested riparian buffers will be installed on pasture ground and 10% installed on conventional tillage ground. This would compute to a reduction of about 48,196 lbs-N, 2,170 lbs-P and 511 tons of sediment. Four hundred acres of Grass buffers installed on previously conventional tillage ground would translate to a savings of about 31,706 lbs-N, 1,616 lb-P, and 697 tons of sediment. All of these Best Management Practices are expected to perform for at least ten years and the reductions are cumulative throughout the years.

Cover Crops

The 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 over 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.

Woodland Management

Lycoming County has over half a million acres of forested land in the county that have the potential to contribute pollutants to the Chesapeake Bay. The Conservation District will work with the Lycoming County Woodland Owner's Association to promote sound forest management practices. This will reduce the erosion potential resulting in

sediment and nutrient losses to the waters of the Commonwealth through the proper construction of roads, trails and landings.

Currently there isn't a method for crediting this practice in the watershed model. It suffers from the same problems as urban nutrient management, i.e. what is the acreage of harvest, define its condition before/after practices are installed, where is it located, how does it change annually (location, acreage).

Nutrient Management Plans

Nutrient management plans are developed to match crop nutrient needs of each field with the expected crop yield based on soil productivity data or yield history for the site. NMPs recommend appropriate rates of nutrient application, timing of applications and placement of nutrients to result in economically optimum crop yields while managing the level of nutrient loss. Nitrogen application rates have been revised to 135% of modeled crop uptake. The phosphorus application rate assumptions are under review.

The District implements the Nutrient Management (Act 6) Program in Lycoming County. The purpose of this program is to ensure the State regulations, regarding concentrated animal operations and volunteers under the program, are being followed.

Dirt and Gravel Road Pollution Prevention Program

Pennsylvania's Dirt & Gravel Road Maintenance Program provides dedicated and earmarked funding to eliminate stream pollution caused by dust and sediment from unpaved roads. In Lycoming County, annual requests total approximately $150,000 to install about six miles of environmentally sound maintenance practices and approved products to correct pollution problems. Current funding allows the District to allocate roughly $75,000 towards addressing three miles of impaired roads. The practices used by the Dirt and Gravel Road Program in Lycoming County primarily include the placement of Driving Surface Aggregate (DSA) and construction of water control structures. The Conservation District would need an additional $75,000 to address all the requests currently received each year. At this time a method of calculating the nutrient and sediment reductions form implementing these practices has not been established.

Conservation Plans

Conservation Plans contains a USDA participant's decisions regarding the conservation system being used when producing agricultural commodity crops on highly erodible cropland. A conservation plan is a document that describes the conservation system to be applied, documents the status of system application, describes the decisions of the person with respect to location, land use, tillage systems, and conservation treatment measures and schedules and is approved by the local soil conservation district.

Storm Water Management

Two (2) Act 167 Stormwater Management Plans have been completed for the watersheds in the Lycoming County Planning Area. The Chatham Run watershed in Watson Township lies at the headwaters of Chatham Run near Springer Corners and has an Act 167 Plan. The Miller's Run, Grafius Run, and McClures Run watersheds have been studied and approved by Lycoming County. The Miller's Run watershed extends into Hepburn and Eldred Townships. An Act 167 Stormwater Management Plan is in the process of being developed for White Deer Creek, which receives storm water from the

southern fringe of Washington Township. Where a specific stormwater management ordinance is not developed, stormwater management is controlled through Subdivision and Land Development Ordinance provisions.

National Pollutant Discharge Elimination System (NPDES) permit regulations require a degree of storm water management on some projects. Persons proposing earth disturbance activities which disturb one (1) to less than five (5) acres with a point source discharge to surface waters of the commonwealth, or five (5) or more acres require an NPDES permit. The District reviews these plans and is active in educating the public and townships in their requirements.

Nutrient, sediment, and pesticide runoff from farm fields into road ditches has been identified as a storm water management concern. Under the current NRCS CREP program guidelines, buffers can be installed along streams on agricultural lands, but not along road ditches. To address this issue, the Lycoming County Conservation District proposes a special project to create a road ditch buffer pilot program in Muncy and Mill Creek Townships. The program's goal would be to establish 15 acres of grass buffers with a minimum width of 20 feet to reduce nutrient, sediment, and pesticide runoff from leaving crop fields and entering township road ditches. The establishment of rock based cover areas will also be allowed, but only when road ditch buffers alone will not fully address the runoff problem present at a particular site. The landowner would be paid a rental fee to maintain these practices for three years, as well as the full cost of the establishing the practice.

Under the proposal, the District will work with NRCS staff, and township supervisors and employees to identify areas that would benefit from this program and people who may be interested in this type of project. The Penn State Extension Service will help spread information about this program and educate farmers on the benefits of establishing grass buffers and/or rock based cover areas on their properties. It is hoped that the townships will do the establishment and maintenance work on the buffers. This would ensure that they are built properly and in a manner that would allow them to be maintained easily.

To determine the benefits of installing grass buffers along road ditches the Chesapeake Bay Program Watershed Model for Riparian Grass Buffers for non-developed land was utilized. The nutrient and sediment reductions for Riparian Grass Buffers on agricultural land includes the original land use loading rate (e.g. pasture, conventional tillage, hay ground) minus the forest loading rate times total acres converted plus upland land use loading rate times total acres treated times percent efficiency. The upland land use efficiency varies by hydrologic setting. In Lycoming County the practice will be installed on Valley and Ridge –Silicicastic soils. For nitrogen every 435.5 linear feet of buffer (average width 100 feet) is estimated to treat 5 upland acres. For phosphorus and sediment every 435.5 linear feet of buffer is estimated to treat 2 upland acres of land. The efficiency rates for grass buffers are as follows: Nitrogen 37%, Phosphorus 65% and Sediment 65 %. It is expected that the 15 acres of newly established grass buffers will be installed on conventional tillage ground at a width of 20 feet. This would compute to a reduction of 5,470 lbs-N, 133 lbs-P and 14 tons of sediment. These Best Management Practices are expected to perform for at least the three years that they are enrolled in the program. Theses reductions are cumulative throughout those three years.

Flooding has also been identified as a storm water management concern. One problem landowners face is a lack of funding to do projects on their land unless it is currently farmland. The District proposes a pilot program to help decrease the amount of floodwater during storms by providing financial assistance to landowners to create storm water retention areas on their properties.

The storm water retention areas will serve two purposes during a flood. First, they will decrease the overall floodwater amount by the volume of the water collected in them during the flood. This will decrease the downstream water levels of not only the Lycoming Creek, but also the Susquehanna River. The Lycoming Creek is prone to flooding during heavy rainstorms. The Susquehanna River is prone to flooding downstream of the Lycoming Creek during heavy rainstorms at Muncy and Montgomery in Lycoming County, as well as Watsontown and Lewisburg in Union County, and Milton in Northumberland County. Muncy, Montgomery, Watsontown, Milton, and Lewisburg are downstream of the point where the Lycoming Creek flows into the Susquehanna River by 11.5 miles, 16.8 miles, 23.4 miles, 27.9 miles, and 32.0 miles, respectively. Secondly, the storm water retention areas will trap the nutrients and sediment in the floodwater that collects there, therefore, reducing the nutrient and sediment loads in the Lycoming Creek during a flood.

Under this proposal, the District's Watershed Specialist will work with the Lycoming Creek Watershed Association to help match landowners with program funding on storm water retention projects that cannot be funded through existing cost share programs, such as the NRCS CREP program. The Lycoming Creek Watershed Association was chosen because a comprehensive plan for the Lycoming Creek Watershed has already been created. In addition to having an existing comprehensive review of the watershed, the Lycoming Creek Watershed Association has a desire to start addressing the problems that were identified by the comprehensive review.

Public Education

Public education was identified as a vital component to attaining nutrient and sediment reductions. The District must initially inform people of the changes that must be made in order to reduce pollution to the Waters of the Commonwealth and ultimately the Chesapeake Bay. It is essential to inform the public that everyday activities commonly perceived as minor or insignificant can have a considerable impact on water quality. Enhancing community awareness and involvement will assist in accomplishing this goal. This objective can be achieved by developing newspaper articles and newsletters, distributing brochures, conducting classroom visits, presenting workshops and through one-on-one contacts. The District will work closely with Penn State Cooperative Extension to promote the proper utilization of our natural resources.

Stream Bank Stabilization and Stream Bank Restoration

Sediment from stream bank erosion is a source of non-point source water pollution. The eroded sediment that enters streams may also contain nutrients and chemicals. Once stream bank erosion enters local waterways, it can decrease a stream's water carrying capacity, leading to increased flooding during a heavy rainfall event. With approximately 2,200 miles of streams in Lycoming County, the potential for

pollution occurring at individual sites with stream banks that are in need of stabilization or restoration work is great.

In an effort to keep sediment from eroded stream banks from entering local waterways, the Lycoming County Conservation District will work with interested landowners to remedy existing stream bank erosion conditions. These landowners can be owners of agricultural and non-agricultural land, as well as municipalities. This work will be done in addition to work that is currently being done through the District;s cooperation with watershed associations and through the Erosion and Sedimentation Control Program.
This work would include, but not be limited to, offering technical services and trying to obtain grant funding to do stream bank stabilization and restoration projects. Types of projects that could be done through potential grant funding sources include installing stream bank fencing, sloping and vegetating stream banks, installing riparian buffers, hard armoring streams with riprap, and installing log deflectors. Other best management practices, not listed above, may be used in stream bank and restoration projects, if they are needed in addition to, or instead of, these listed practices.

Summary

The Lycoming County Conservation District will locate and interact with interested farm operators to address specific problems resulting in non-point source pollutants entering the waters of the Commonwealth. Runoff from barnyards containing manure and sediment will be reduced by installing roof water control and diversions to direct clean water away from the animal concentration areas. Heavy Use Area Protection and associated runoff treatment filters will be used to armor the barnyard areas so manure can be collected and land applied according to a nutrient management program developed by the District. Stream bank fencing, riparian and /or grass buffer development, cattle crossings and off-stream watering systems will be installed to reduce the accelerated erosion of the stream banks caused by unlimited cattle access. Nutrients from manure and commercial fertilizer as well as sediment leaving agricultural crop fields and pastures can be reduced by implementing an integrated management system including nutrient management and erosion control practices. Riparian buffers will be established and are effective in removing excess nutrients and sediment from surface runoff and shading streams to optimize light and temperature conditions. In addition, Conservation District staff will continue to work with watershed associations in an effort to implement environmentally sound practices to decrease the erosion potential of unstable stream banks. Any attempt at implementing a voluntary approach to restoring the waters of the Commonwealth will have to occur in combination with increased enforcement of existing regulations.

The District will assist the Natural Resource Conservation Service in promoting, planning and installing practices under the Conservation Reserve Enhancement Program. If the goal of 1,000 acres of forest riparian buffers and 400 acres of grass buffers are established the pollutant reduction is expected to be 79,902 pounds of nitrogen (lb-N) per year, 3,786 pounds of phosphorus (lb-P) per year and 1, 208 tons of sediment per year. By 2010, a reduction of 399,510 lb-N, 18,930 lb-P and 6,040 tons of sediment is expected. In Lycoming County these practice are most commonly under contract for 15

years, the nutrient and sediment reduction over this time period would be 1,198,530 lb-N, 56,790 lb-P and 18,120 tons of sediment.

Four "Special Projects" are proposed to be implemented under the Chesapeake Bay Program. The Managed Precision Agriculture project proposes to establish this practice on 3,500 acres in Lycoming, Columbia, and Union Counties. The pollutant reduction over the three years of this project would be 122,400 pounds of nitrogen and 17,412 pounds of phosphorus. The Urban Nutrient Management project proposes to implement soil testing on 100 lawns in Lycoming County. If 100 acres of this practice were to be established, a reduction of 180.2 pounds of nitrogen per year and 15 pounds of phosphorus per year would be expected.

The Road Ditch Grass Buffer special project proposes to create 15 acres of grass buffers or rock based cover areas where grass buffers alone will not resolve the problem a site has pertaining to nutrient and sediment runoff entering township road ditches from agricultural fields. The pollutant reduction over the three years of this project would be 5,470 pounds of nitrogen, 133 pounds of phosphorous, and 14 tons of sediment. Chemical fertilizers and pesticides would also enter the road ditches at a decreased rate once the grass buffers are established.

By establishing five acres of storm water retention areas on the upper reaches of the Lycoming Creek Watershed, 219 pound of nitrogen, 10 pounds of phosphorous, and 21 tons of sediment will be trapped in them during a flooding event. In addition to the nutrient savings during a flood that is created by establishing these storm water retention areas, 29,118 gallons of floodwater will be kept from proceeding downstream during a flood for each foot of surface water trapped in the storm water retention areas during a flood.

In addition to the four proposed special projects listed above, the Lycoming County Conservation District also has a Managed Precision Agriculture Special Project that it is currently conducting. Additionally, the Lycoming County Conservation District is willing to work with conservation groups to promote land easement programs that they offer. Currently the Northcentral Conservancy is the only known conservation group working in Lycoming County that offers a land easement program.

This plan was developed in cooperation with the Lycoming County Conservation District, Natural Resource Conservation Service, Farm Service Agency, Department of Environmental Protection, Penn State Extension, Lycoming County Planning Commission, Eastern Pennsylvania Coalition for Abandoned Mine Reclamation and the Chesapeake Bay Foundation in an effort to address non-point source pollution resulting from agricultural and urban/mixed open land. Information gathered to develop this plan was derived from the Lycoming County Conservation District's Strategic Plan and several workgroups recently held by the aforementioned cooperating agencies.

The Lycoming County Conservation District's Board of Directors approved this version of the Lycoming County Implementation Plan for the Chesapeake Bay Tributary Strategy during their November 15, 2006 meeting.