

## Lackawanna County Chesapeake Bay Implementation Strategy

Lackawanna County lies in northeastern Pennsylvania in the foothills of the Pocono Mountains. It consists of 465 square miles and it was created August 13, 1878 from a portion of Luzerne County. It is named for the Lackawanna River, an Algonquin Indian word meaning “where the streams meet”. Lackawanna County is a fourth class county with population of 210,000 and the city of Scranton is the county seat.

Glaciers sculpted the natural features of the county and soils were formed primarily from deposited materials. The valleys along larger streams and rivers have sand and gravel soils to varying depths. Mountain and plateau areas have soils with abundant stones and boulders throughout the soil profile and scattered on the surface. Most of the soils in the County are wet, shallow, or stony and may stay cold in the spring. They can be difficult to work and have limitations on their use. Poorly drained areas are sometimes defined as wetlands and may cover as much as 10% of the land area. Glaciers shaped many natural lakes in the mountains and on the plateaus. Some of shallower lakes have become filled with sphagnum moss and other vegetation over the ages and formed peat bogs. Elevations in the County range from 600 to 2300 feet above sea level.

Anthracite coal mining and manufacturing dominated the economy from 1870 thru 1930. This County is the heart of the northern anthracite coal field. The great depression, use of alternative fuels, and other factors forced many of these companies out of business. Subsurface coal mining ended in 1959 in Lackawanna County. Only a few strip mining and reprocessing operations continue on a limited scale. Today, service industries, manufacturing, tourism, and recreation have replaced mining as basis of the economy.

In the late 1800's and early 1900's agriculture played a vital role in the local economy. Northern, western and other rural portions of Lackawanna County were completely devoted to agriculture. The city of Scranton was home to several large wholesale markets for vegetables as well as several dairy processing plants that received milk from thousands of dairy farms throughout the region.

Today vegetable and dairy farms are still a part of agriculture production. There are increasing numbers of beef, sheep, and horse farms. The few remaining dairy farms are now expanding to larger more modern facilities.

Beef farming is increasing with available pastureland, grassland, education in grazing, advancement in fencing as well as new management and marketing techniques. Agriculture entertainment is also growing due to the proximity to the Poconos', New York, and New Jersey. Horse boarding and training facilities are occupying former dairy farms or built with new facilities. There are no Concentrated Animal Operations identified in Lackawanna County.

Significant interest occurs with agricultural land preservation. Agricultural Security Areas exist in eight townships containing a total of 21,364 acres. The Agricultural Land Preservation program has been active since the early 1990's and now there are 3500 acres are under permanent agricultural land preservation easements. The preservation easements require conservation and nutrient management plans to be updated and actively implemented.

## Susquehanna River Basin Watersheds

Lackawanna County lies almost entirely within the Chesapeake Bay Watershed. The Chesapeake Bay watershed consists of the Tunkhannock Creek Watershed, Lackawanna River Watershed, and the Meshoppen -Mehoopany Creek watershed. Only a few thousand acres of Jefferson Township and Thornhurst Township drains easterly to the Delaware River watershed but is not considered for the purposes of this Plan.

**Tunkhannock Creek Watershed (04F)** The entire Tunkhannock Creek Watershed is about 413 square miles in size and is located in Lackawanna, Susquehanna and Wyoming Counties. In Lackawanna County it comprises approximately 90 square miles. Here the watershed is mostly rural with predominate land uses of forestry and agriculture. Small villages and rural residential uses also compliment the landscape. PA Code Title 25 Chapter 93 Water Quality Standards classifies the Tunkhannock Creek and its tributaries as CWF (cold water fisheries) or TSF (stocked trout). The Tunkhannock Creek and tributaries have impairments listed as municipal point source, organic enrichment, suspended solids, and mercury.

The Tunkhannock Creek watershed has been a focus of the Conservation District for many years. Much of the animal-based agriculture in Lackawanna County is located here and there have been ongoing projects with farmers to implement nutrient management and soil conservation plans on the property they own and rent.

Of the Tunkhannock Creek sub-watersheds in Lackawanna County, only the Ackerly Creek has significant urban and suburban water quality impacts. This sub-watershed is home to the towns of Clarks Summit, Glenburn, Waverly, Dalton and LaPlume. It is the most urbanized sub-watershed of the Tunkhannock Creek. There are sewage treatment plants with direct stream discharges in Waverly, Glenburn, and Dalton. In addition, the Glenburn area groundwater is contaminated with high hexavalent chromium from a former metal plating business.

Stormwater is a resource problem in the Ackerly Creek sub-watershed. The towns and villages were developed during a time of little regulation or thought about watershed hydrology. Streambank erosion, flooding, and sediment deposition are common here. But

these towns are active in regional planning efforts with a focus on stormwater management, urban forestry, transportation, and open space preservation.

Other conservation partners are also active in the Watershed. The Willary Water Resource Center at Keystone College has devoted years of research, data collection, and education of the Tunkhannock Creek Watershed. A Watershed Atlas, [www.atlas.keystone.edu/](http://www.atlas.keystone.edu/), is maintained by the WWRC and Keystone College for community education. The Center has ongoing water monitoring in the watershed and has also studied the riparian buffer extent and health in the Ackerly Sub watershed.

The Countryside Conservancy, also located at Keystone College, is a partner since 1994. It is a 501(c)(3) non profit organization that focuses on conservation of lands in the Tunkhannock Creek watershed and has protected over 1000 acres of open space and critical habitat. The Conservancy is also host to the South Branch Tunkhannock Creek Watershed Coalition and provides resources for local and community efforts. The Conservancy has developed a Tunkhannock Creek greenway action plan.

**Lackawanna River Watershed** The Lackawanna River drains 370 square miles in Northeastern Pennsylvania primarily in Lackawanna County, but also in parts of Susquehanna, Wayne, and Luzerne Counties. The river bisects the County and flows a distance of 52 miles in a southwesterly direction emptying into the Susquehanna River at the City of Pittston, PA.

Land use in the Lackawanna watershed varies greatly and affects water quality. Ridge tops and upper reaches of the watershed are mostly forested with some agricultural land uses. Along the river at the valley floor there is significant industrial and mine scarred lands, and dense urban centers.

Acid mine drainage (AMD) is a significant pollutant that is discharged into the river and tributary streams either as point sources known as outfalls or smaller spring seeps. Oxidation of the iron in solution deposits large amounts of oxides and destroys in-stream habitat.

In the urban regions of the watershed sedimentation is a significant pollutant. It is derived from active construction sites, unvegetated disturbed areas, mine scarred areas, and stream bank erosion. Stormwater runoff with urban pollutants enters the Lackawanna River watershed. There are sewage discharges from the combined sewer overflows (CSO's). Along the river are three sewer treatment plants with direct discharges of treated waste, they are Forest City, Archbald, and Scranton.

Various reaches of streams within the watershed are identified on the State's 303(d) list of impaired streams requiring TMDL's. The Lackawanna River and its tributaries impacts have been listed as abandoned mine drainage/siltation thermal modifications, road runoff, urban runoff/storm sewers/siltation

**Meshoppen -Mehoopany Watershed** Located in NE Pennsylvania, this broad watershed contains the Meshoppen Creek, Mehoopany Creek many smaller watersheds and streams that flow directly into the Susquehanna River from areas in Bradford, Wyoming, Sullivan, Susquehanna and Lackawanna Counties. In Lackawanna County this watershed is only 7% of the total land mass. Gardner creek is the largest subwatershed followed by Falls Creek, Buttermilk Creek, and lastly Falling Springs. In total, 22,385 acres are in the watershed in Lackawanna County.

Land use in this watershed is 60% forested and 30% in cropland and pasture. Only a few small villages and limited rural residential land use contribute to urban classification. The better soils in this watershed along with the southwest aspect make this watershed a significant agricultural area with a concentration of tomato and vegetable farms. Gardners Creek is included on the PA Fish and Boat Commission Wild Trout List.

## Conservation District Agricultural Programs Nutrient Management Program

### **Chesapeake Bay Program:**

Since the beginning of Pennsylvania's Chesapeake Bay program in the late 1980's, many things have changed in Lackawanna County including number of farms, type of farms, engineering support on the area level (NRCS), funding of Best Management Practices(BMP) on farms as well as emphasis on various management practices.

Lackawanna County Conservation District has always focused on treating all water quality problems on Chesapeake Bay contract farms. Many times, more than one program was combined with the Chesapeake Bay program to complete the project. As BMP funding diminished with the Bay program, the District utilized funding from other programs and continued our focus on soil quality education, no-till farming, composting, grazing, soil testing and cover crops which was funded by farmer contribution, Chesapeake Bay administrative money, 319 grant money, and District and University in-kind contributions. The District applied about \$45,000 per year (Chesapeake Bay funds) on BMP's for the first 15 years along with other program money to total over 1 million dollars spent on Bay projects in Lackawanna County. All administrative money from our program has been spent on education, research, and demonstrations in an effort to improve soil quality, improve crop yields, and better utilize nutrients which have lead to cleaner water leaving our farms.

## **Soil Health Program:**

The District's involvement in local composting projects has led the District to a focus on soil health education. It has been shown that water quality is directly related to cropland soil health and the ability to hold and recycle nutrients. Education is a good method to approach landowners with this issue. Organic matter, soil testing, cover crops, and minimum tillage are key factors in soil health improvement. Lackawanna, Wayne, and Susquehanna Conservation Districts sponsor winter educational meetings and address soil quality as outlined in the PA State Agronomy Guide and other sponsored research. The Lackawanna Conservation District has included soil health education in summer pasture walks, winter grazing meetings and no-till meetings. Improving soil health is essential to reduced soil erosion and cleaner surface waters.

## **Grazing Program:**

The soils, climate, and topography of Northeast Pennsylvania favor grass production and animal grazing. Grazing programs have been incorporated in many of the Chesapeake Bay landowner contracts in Lackawanna County going back to the early 1990's. The Conservation District has developed an inventory of grazers in Lackawanna, Wayne, Susquehanna Counties that have participated in pasture walks, grazing meetings, and field days to promote managed grazing, no-till, and soil health. The District continues to be involved in Project Grass programs and has held five producer meetings in the tri-county area to discuss issues related to grazing.

## **Composting Program:**

A composting program was initiated in 1994 by the Lackawanna County Conservation District to explore alternatives to manure management BMP's. Chesapeake Bay funding provided education and training for the proper composting of animal waste, carcasses and food waste in order to reduce volumes by at least 50%, eliminate odors, stabilize nutrients, and provide stable nutrients for cropland. Composting also offered additional income potential for a family farm.

Equipment for composting included a compost turner and testing equipment used for providing quality assurance. The program was a joint effort with Natural Resources Conservation Service (NRCS) RC&D, Lackawanna County Conservation District, local farmers/cooperators/district board members in Lackawanna County and farmer/cooperators and Bloomsburg University in Columbia County. Three years of research led to a report by Bloomsburg University revealing the environmental advantages of compost over fresh manure and commercial nitrogen fertilizer.

Our effort in Lackawanna County has resulted in one full time composting operation on a Chesapeake Bay Program farm. This operation is also used as education site for other farmers as well as for general composting education.

This program has gained attention in many parts of Northeastern PA. including Wayne County, Susquehanna County, Columbia County, Northumberland County, landfills,

prisons, universities, recycling centers, and farms. This program has been a very large part of Chesapeake Bay education in Lackawanna County funded thru several program grants.

## **No-Till Program**

The Lackawanna County No-Till Program is going into the twenty first season. In the early 1990's, a no-till seeder was purchased with Chesapeake Bay administrative funds and a no-till corn planter, leased thru John Deere provided an opportunity for farmers to experience no-till and its environmental impact on their own farming operation. The program has always been a high priority and administered by the Chesapeake Bay technician. No-till forage, cover crops, summer annuals, fall/winter grain and wildlife habitat keep the no-till seeder busy for about 6 months a year in Lackawanna County as well as three neighboring counties.

Due to change in the equipment dealer leasing policies, the District was forced to purchase the no-till corn planter and has owned many different corn planters for over 15 years and serving about 25 farmers each year in three counties. The District owns a truck to move and service the planters.

The Lackawanna Conservation District helped pioneer a no-till vegetable program in Pennsylvania. Initially, the District demonstrated a no-till vegetable planter designed by Virginia Tech on three commercial tomato operations in Lackawanna County in collaboration with Penn State Cooperative Extension Service. Yields were monitored as well as plant growth, weed control, and insect control. The District and NRCS calculated and compared soil loss data, to conventional plantings. Presentation of all data at local/regional growers meetings led to the purchase of three no-till vegetable planters paid for with grant funds thru Pocono NE Resource Conservation and Development Council. No-till vegetable demonstrations were conducted by Lackawanna Bay Technicians in Lackawanna, Columbia, Luzerne, Lancaster, and Center Counties (Ag Progress Days). These planters have led to a number of successful no-till programs across the State.

Lackawanna Conservation District has found that a no-till program is one of the best ways to help farmers understand, review, and follow, and their nutrient plan, or in some cases introduce the nutrient management concept. It is an opportunity to evaluate starter fertilizer rates, soil tests and real yield potential on given soils. As a result of this program there has been a reduction in the use of fertilizer.

# Conservation District Urban Water Quality Programs

## **Dirt and Gravel Roads Program**

The Lackawanna Conservation District has been involved with the Dirt & Gravel Roads Program since 1998 and seventeen projects have been completed at sites in eight municipalities throughout the county. Currently, the Conservation District receives annual funding from the State Conservation Commission to administer the program. The program's primary goal is to reduce the potential of sediment pollution generated on dirt & gravel roads and adversely affecting nearby streams. Lackawanna County's program accomplishments are the stabilization of nearly 270,000 square feet of previously eroded roadway and ditches in the Chesapeake Bay Watersheds.

Since the State Conservation Commission has pledged that the program will be non lapsing, the District expects to continue involvement into the future. Provided with additional funding, the District has many more potential projects in the Chesapeake Bay Watershed. .

## **Erosion and Sedimentation Pollution Control Program Section 102, NPDES**

Construction activities and land development activities continue to impact the Chesapeake Bay Watershed in Lackawanna County. Lackawanna Conservation District reviews an average of 230 E&S plans per year for Best Management Practices for minimizing erosion and sediment pollution to the Chesapeake Bay. Additionally, an average of 135 inspections of construction sites are performed by district personnel to insure BMP's are installed to protect the watershed. Approximately 600 acres of new earth disturbance is planned yearly. Technical assistance and training on E&S issues were provided to 800 individual annually. Since the inception of the NPDES Phase II Program in December of 2003, 55 post construction stormwater management water quality plans have been developed which will provide added water quality benefits to the Chesapeake Bay.

In the next five (5) years the Conservation District County Implementation Strategy is to continue implementing a Chapter 102-NPDES Program in the Chesapeake Bay Watershed. It is anticipated that the E&S plan reviews to remain constant at 230 plans with projects shifting to more infrastructure development. Compliance inspections should also remain at 135 annually. Our office does anticipate an increase in additional (PCSWM) Post Construction Stormwater Management Plans and associated BMP's due to the State's NPDES requirements. 175 new PCSWM plans and associated BMP's are anticipated in the next five years.

## Remaining and Future Needs

Lackawanna County plans to build and maintain solid programs that support local conservation priorities including Level II E&S-NPDES, Dirt & Gravel Roads, employing a Watershed Specialist, employing a Chesapeake Bay Technician. And the District needs to be flexible to the changes of these programs and projects due to funding, priorities, and state water quality goals.

The Conservation District will focus on priority projects supported by the Board of Directors with the staff and partners providing technical assistance, quality assurance, and education to landowners on how to implement their nutrient plans, conservation plans, and management practices. Chesapeake Bay Special project funds, NRCS Program funds, and grants will provide funding for work the Chesapeake Bay Watershed in Lackawanna County.

The Chesapeake Bay Technician will receive ongoing training on aspects of agricultural production, conservation planning, nutrient planning, pasture management, and no-till technology to be able to communicate and maintain a productive relationship with the farming community.

Lackawanna County supports a Chesapeake Bay Engineer Assistant on the District staff. This position helps to address our waste management system design and installation. NRCS has added many programs as well as assumed technical responsibility for many other programs. Therefore, they have very limited capacity to aid in engineering needs. In Lackawanna County the Chesapeake Bay Technician and Engineering Assistant have played a key role in Inventorying and Evaluation, survey and design, quality assurance, and follow up on projects in the Chesapeake Bay watershed.

### **Chesapeake Bay Tributary Strategy County Implementation Plan (CIP)**

#### **Statewide Chesapeake Bay strategy and Targeted BMP's**

In the document, "Cost effective Strategies for the Bay" the Chesapeake Bay Commission evaluated a list of 34 nutrient reduction practices. Listed below are five best management practices identified by the Chesapeake Bay Commission that will reduce nutrient and sediment pollution for the least cost. The Lackawanna Conservation District will support local program efforts for meeting the Statewide Chesapeake Bay Strategy.

- Wastewater treatment plant upgrades
- Traditional Nutrient Management
- Enhanced Nutrient Management
- Conservation Tillage
- Cover Cropping

**Chesapeake Bay Lackawanna County Implementation Strategy for years 2010-2015**

**Technician Education:** The Chesapeake Bay Technician will maintain a high level of training in all aspects of nutrient management, no-till, soil quality and production agriculture. Knowledge of the business is essential to gaining trust and respect in the farming community.

<b>Resources</b>	State Commission Nutrient Management Ag Education Society Programs PA Forage & Grassland Program PA Corn & Soybean Grower Program National and State No-Till Program PA Agronomy Guide Ag Progress Days PA Farm Show
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**Expected Result:** County landowners and farmers will have better acceptance of the Conservation District and our partners with properly trained staff. The District will be better equipped to understand and address the clients' issues which will lead to more cooperation in addressing water quality issues with the landowner.

**Cooperator Education:** The Lackawanna County Conservation District will provide field days, pasture walks, no till training, grazing meetings, soil health programs, as well as meetings for contractors who construct projects related to water quality. These meetings will continue to be both local and multi-county in cooperation with and not exclusive to the District, NRCS and Penn State Cooperative Extension Service.

**Resources Needed:** Funding for these programs have become self sustaining. Registration fees and company sponsors pay most of the program costs. Motivational speakers with cutting edge knowledge of current topics are needed to secure local lanowner participation and attendance. Chesapeake Bay Special Project funds will be requested for special programs

**Expected Results:** We expect these topics to continue to grow and improve with local participation and thereby improve water quality through education.

## **No-till Farming**

The Districts no-till Program in Lackawanna County is coordinated and managed by the Chesapeake Bay Technician. Technician and staff will encourage and help farmers secure the necessary equipment for using no-till. Along with corn, grains, grass, the District will support additional help with sweet corn, pumpkins, other vegetables, and wildlife habitat. This program will continue to link the farmer to an annual review of his nutrient plan, conservation plan, soil tests, and soil health report card, while improving water quality, soil quality, and overall profitable bottom line.

**Resources Needed:** Funding for staff training, equipment purchase, equipment maintenance, soil testing, and farmer training and workshops.

**Expected Results:** Farmers will realize the benefits of no-till farming to control nutrient pollution, soil erosion, and improve energy efficiency. No till acreage will increase and replace conventional tillage.

## **Composting**

After several years of research and demonstration we have shown that composting is a very practical, environmentally sound and economical way to manage animal waste.

**Resources Needed:** This program is managed by the Chesapeake Bay Technician in Lackawanna County. Needs are periodic update training for technicians, farmers, and organic waste producers.

**Expected Results:** Assist farmers with creating or enhancing composting programs. Provide composting assistance to urban producers of waste and redirect beneficial wastes from the landfills to the land.

## **Grazing Program**

There has been an established grazing program in Lackawanna County for over 15 years. Our emphasis in the future will for beef, sheep, and horse farmers. Horse owners, breeders, trainers, are a new and fast growing industry hungry for knowledge on forage production, grazing and grass species. They seem to lack an understanding of soil erosion, stocking rates, and nutrient management. The District will introduce them to proper grazing using pasture walks and information. This will lead to better conservation planning, grazing, soil health, and water quality improvement programs.

**Resources Needed:** Training for staff regarding the horse farming and other animal agricultures so we can incorporate into our program in a way that is acceptable to the needs of the producers.

**Expected Results:** We expect to expand our grazing acres to around 2000 acres in the next two years on beef and dairy operations. We expect to improve the grazing practices and initiate a special program for horses over the next two years.

## **Other Program Strategies**

Agriculture land use constitutes only a portion of the landscape in Lackawanna County. There is also rural residential, suburban, and urban land uses that impact Chesapeake Bay water quality. Housing developments, golf courses, business parks and industrial areas can also employ Best Management Practices (BMP's) to help mitigate water quality impacts.

Non-traditional water quality programs and projects are appealing to the Conservation District because of the growing numbers of citizens and landowners that can be reached. In addition, studies have shown how an average homeowner or citizen can improve water quality through proper landscaping techniques, stormwater management, and water conservation. Urban forest enhancement, the establishing of riparian buffers, and creating rain-gardens and retrofitting bioretention areas have beneficial water quality impacts in urban areas and are identified in the Best Management Practices for developing areas handbook.

**Resources Needed:** Training for District Watershed Specialist for environmental education and green landscaping techniques. Supplies of rain barrels, soil testing kits, and plant materials for demonstration plots and education programs. Funding required for planning and demonstration projects.

**Expected Results:** Enhanced cooperation with watershed organizations, municipal governments, shade tree commissions, and homeowner associations. Also improve relationships with commercial and industrial land users by completing outreach and demonstration projects.

Acid Mine Drainage (AMD) is a pollutant in the Lackawanna River Watershed. According to a 1999 report from the Chesapeake Bay Program, "Acid mine drainage from abandoned coal mines has been considered the most severe and extensive water pollution problem in western Maryland, West Virginia, and northeast, north central and western Pennsylvania." Acid mine drainage has devastated at least 1,100 miles of streams in the Chesapeake Bay watershed.

Subsurface abandoned anthracite coal mines are partially or fully submerged with groundwater and discharge water to the streams and river of the Lackawanna watershed. This water, after being exposed to air and oxidation occurs, generates acidity that impacts water quality. The goal is to neutralize the acid content of the water and remove the metals. A treatment process must be adapted specifically to each site.

**Resources Needed:** Staff time and volunteer groups to identify AMD discharges, collect data, monitor, evaluate and prioritize sites that have potential for remediation. Technical assistance from engineers and technical staff to design demonstration and projects sites.

**Expected Results:** Develop a Conservation District focus on acid mine drainage (AMD) and develop a strategy and programs to reduce damaging impacts to the local watershed and the Chesapeake Bay.

## **Summary**

This revised and updated County Implementation Plan (CIP) for Lackawanna County Conservation District shows a broadening of efforts to protect the Chesapeake Bay Watershed. No longer does the Conservation District feel that agricultural nutrient management remain as the only front whereby improvements to water quality can be made. Many activities that the District is involved with can help reduce sediment, nutrient pollution, stormwater and acid mine drainage impacts to the Chesapeake Bay Watershed.

In addition to wider program efforts, the District will also focus other qualified District staff such as the Erosion Control technicians and the Watershed specialist towards the County Implementation Plan. This staffs are well positioned in the community to address more urban issues of erosion control, urban nutrient management, stormwater management, and the protection and enhancement of riparian and forested areas.