



CHESAPEAKE BAY NUTRIENT MANAGEMENT STRATEGY

FINAL PHASE II REPORT *APRIL 2009*

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Delta Development Group, Inc.

..... Leveraging Change

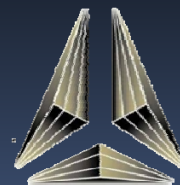




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FORWARD

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April 8, 2009

The Lycoming County Commissioners are pleased to present this report, which documents a body of work conducted from September 2008 through February 2009 as part of the Lycoming County Chesapeake Bay Tributary Strategy (CBTS). In these pages, you will find the information and analysis upon which we are constructing our innovative nutrient management program. This report is a snapshot in time reflecting a great deal of work on a dynamic and ever-changing subject: How to turn the challenge presented by Pennsylvania's Chesapeake Bay Tributary Strategy and regulatory mandate into an opportunity to improve quality of life, support current business, and attract new industry in Lycoming County.

Much has been accomplished in recent months. The Advisory Committee and three work groups, described in this document, are up and running with the participation of more than 50 stakeholders from our municipalities, businesses, conservation organizations, the farming community, state agencies, and other key groups. Planning Department staff members and I have made presentations across the County, reaching out to share our work with the public and gather important feedback. Grant applications for sewer infrastructure upgrades and credit trading program startup funds have been made to state and federal agencies. Our largest wastewater authority, Williamsport Sanitary Authority, has completed a Value Engineering (VE) process that concluded credit trading could be an important part of their compliance strategy. Conservation District staff members are working diligently with our farmers and the PA Department of Environmental Protection (DEP) to certify our first "crop" of home-grown nutrient credits. Every day brings a new challenge and a new opportunity in this effort.

A web page devoted to the Lycoming County Strategy has been created and can be accessed by visiting www.lyco.org and clicking on the CBTS logo on the right side of the home page. Current features include information about the County program, upcoming events, photo slideshows, recent news articles, and links to other educational resources. As the County program evolves, the web page will be continually updated with new information.

The Lycoming County CBTS is bringing together stakeholders from across the County to craft an innovative program that provides flexible options to wastewater treatment plants, preserves economic opportunities, and improves the environment here at home. If we are good stewards of the land and clean-up our own streams, the Bay will take care of itself. It is our hope that this report helps communicate that message and provides useful guidance on how all stakeholders can work together in a collaborative effort.

Sincerely,



Jeff C. Wheeland
Secretary
Board of Commissioners

INTRODUCTION AND OVERVIEW

PURPOSE

This report presents recommendations to implement a Lycoming County-based regional strategy to help wastewater treatment plants and the non-point source community to cost-effectively manage the impact of the Pennsylvania Department of Environmental Protection's (PA DEP) regulatory requirements associated with its Chesapeake Bay Tributary Strategy (CBTS). Phase I of this engagement was completed in July 2008 and is documented in the *Phase I Feasibility Evaluation Report*, dated October 9, 2008. At that time, it was determined the development of a county-based regional strategy was feasible. Phase II involved actual strategy development and recommendations for specific implementation measures. The primary objectives of this report are to: educate in easy-to-understand terms; summarize recommended strategies for a permanent and proactive solution; and outline anticipated impacts. This is an evidence-based guidance document, meant to facilitate discussion and decision making among stakeholders. This document is supported by a list of Frequently Used Acronyms and a Glossary of Terms located immediately before the series of appendices. These lists are not necessarily all-inclusive.

WHAT IS THE CHESAPEAKE BAY ISSUE?

The federal Clean Water Act identifies the Chesapeake Bay as an impaired waterway. This description suggests that this treasured estuary, once rich with aquatic life, is today degraded by pollution, further diminishing the ecological functions and recreational opportunities it provides. Wastewater treatment plants (WWTPs), referred to as point sources of pollution, and non-point sources, such as agriculture and development, contribute significant levels of nutrients (nitrogen and phosphorus) into the Susquehanna River. This river feeds into the Chesapeake Bay. Pennsylvania joined several neighboring states and agencies to sign the Chesapeake Bay 2000 Agreement.

The Chesapeake Bay watershed includes 26 counties in Pennsylvania, parts of five other states, and the District of Columbia — all of which drain into

the largest estuary on the East Coast. Federal and state laws require prescribed tonnage reductions of nutrients into the Bay within specified time frames.

FIGURE 1



Source: U.S. Environmental Protection Agency, Chesapeake Bay Program

HOW IS LYCOMING COUNTY IMPACTED?

In January 2005, the Pennsylvania Chesapeake Bay Tributary Strategy (CBTS), which mandates reductions in nutrient discharges by specified dates, resulted in some important implications. The seven publicly owned WWTPs in Lycoming County will face millions of dollars in upgrade costs to comply (and fines/penalties if they do not). The impact of these environmental compliance costs is compounded by aged WWTP infrastructure, including required municipal sewage collection systems that require improvements to reduce wet weather overflows and to improve the hydraulic capacity of the WWTP. Ultimately, local ratepayers will shoulder this burden.

1. Infrastructure Upgrade Costs

Lycoming County has seven WWTPs operated by six authorities. Each plays a crucial role in protecting water resources and providing sewage treatment infrastructure that supports economic development throughout the designated growth areas of the County. These WWTPs face millions of dollars in upgrade costs to comply with the nutrient limits established by the PA DEP in each WWTP's National Pollution Discharge Elimination System (NPDES) permit. The impact of these costs is compounded by aged infrastructure in these plants and by expensive, required collection system improvements. In 2008, it was estimated that the collective cost to upgrade these WWTPs and collection systems was approximately \$217,800,000.

2. Regional Waterways

There are over 2,200 miles of waterways in Lycoming County, ranging from mountain runs and streams to the West Branch of the Susquehanna River. The PA DEP designates many of these waterways as "high quality" or "exceptional value." Issues that ultimately affect the Bay's health have an immediate impact on the well-being of local water bodies. The County seeks to fulfill the region's commitment to the Bay in a way that also fulfills a commitment to future generations that will inherit local natural resources. If every tributary community cleans up its own waterways, the Bay will clean itself.

3. Local Impact on Statewide Compliance

To put things into perspective, the County's three WWTPs with specific compliance dates in their NPDES permits (Williamsport Sanitary Authority's Central Plant, Williamsport Sanitary Authority's West Plant, and Montgomery Plant) are responsible for achieving approximately 10 percent of the total nitrogen reduction in the state. Lycoming County is clearly a major player in restoring the Bay's health.

HOW IS LYCOMING COUNTY GOVERNMENT HELPING?

Lycoming County government has invested more than \$500,000 to design a county-based strategy that employs the help of technical and financial consultants, and heavily involves County stakeholders (including WWTPs, farmers, business owners, the Lycoming County Conservation District, landowners, and many others). The strategy includes a nutrient credit trading program to provide increased flexibility for wastewater plants seeking to reach compliance, while keeping costs in check.

Credits are created when best management practices (BMPs) are implemented that reduce total nutrients entering the watershed. BMPs could include installation of riparian buffers, restoration of eroded stream banks, and conversion to no-till agriculture, for instance. WWTPs could purchase credits from a credit aggregator to meet their short- or long-term compliance needs. The strategy presented in this report outlines a Lycoming County-based review of the potential sources of credits, the nutrient reduction needs of the seven WWTPs, and the steps to achieve an operational structure to manage such a trading program. Lycoming County, in concert with the individual WWTPs and collection systems, is also aggressively pursuing multiple sources of state and federal funds for nutrient reduction improvements, infrastructure upgrades at WWTPs, and collection system upgrades.

WHAT ARE THE PRIMARY OBJECTIVES OF THE LYCOMING COUNTY CBTS?

- ✓ Provide maximum flexibility for WWTPs in meeting regulatory requirements and planning for construction needs.
- ✓ Assure that future economic growth and development can be met in terms of nutrient loadings.
- ✓ Support the County's stakeholders with revenues to support essential land use practice improvements (otherwise known as best management practices or BMPs).
- ✓ Preserve or improve the quality of our local waterways.
- ✓ Meet goals of the Chesapeake Bay recovery.
- ✓ Facilitate cooperation with state and federal agencies to maximize funding support for BMPs and the nutrient credit trading program.

WHY DO WE NEED A STRATEGY?

A strategy is needed to maintain a healthy economy and avoid the imposition of harsh budgetary burdens on ratepayers, sustain or improve quality of life in Lycoming County, and manage this issue as cost-effectively as possible. No single municipal authority can cost-effectively address this issue independently; collaboration is the key.

Pennsylvania was the first state to enact nutrient management laws for farms, which are significant contributors of nitrogen and phosphorus into the Bay. Today, more than 5,000 farms in Pennsylvania are covered by nutrient management plans. County conservation districts will play increasingly vital roles in educating farmers and landowners on ways to preserve land, guard against erosion, and restore stream banks. Because agriculture is one of the largest non-point sources of Bay pollution, it is an area where BMPs may be able to achieve the greatest positive impact.

The affected WWTPs in Lycoming County seek to upgrade their facilities in the most cost-effective manner possible. The purpose of the Lycoming County strategy is to make nutrient credit trading available as a viable option for each WWTP to consider. The operating theory is that there is a cost curve for removing nutrients from a WWTP, as shown in Figure 2 titled *Nutrient Credit Trading*. The theory also includes a point known as

the “knee of the curve” for each WWTP. This is the point at which the cost to buy credits becomes as attractive as making facility improvements.

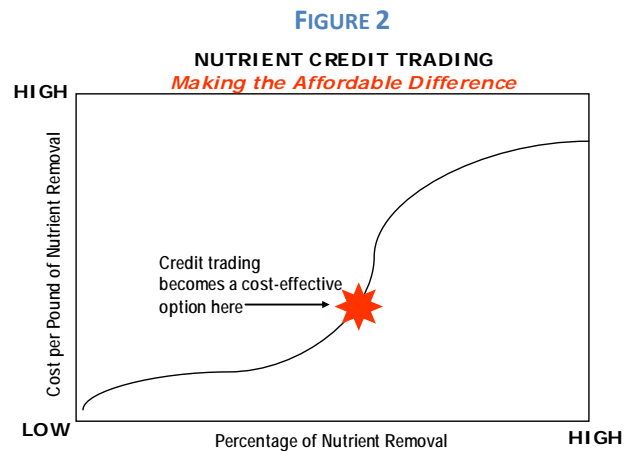
The Lycoming County strategy recognizes there are some WWTP facility upgrades that are inevitable and must be undertaken. The degree to which credit trading can be an integral part of any plant’s nutrient compliance approach depends on four fundamental factors:

1. the quality of credits readily available for a WWTP to purchase
2. the timing of those credits (how soon they are available)
3. the duration of those credits (short-term/3-5 years or long-term/15-20 years)
4. the assurance that the credits will be available at a competitive price when needed (a risk management concern).

The potential for credit trading to help reduce a portion of WWTP facility construction costs is something that will be actively investigated by each authority during their sewage planning, design, and value engineering phases. This Lycoming County initiative is designed to address the four factors identified above, and provide each WWTP with maximum flexibility to cost-effectively meet compliance requirements.

WHO DEVELOPED THE STRATEGY?

Early in 2007, Lycoming County commissioned Delta Development Group, Inc., (Delta) of Mechanicsburg, Pennsylvania to evaluate the feasibility of a county-based nutrient management strategy. After conducting due diligence and significant research, and gathering broad-based community stakeholder input, the Delta team¹ along with the Lycoming County Planning Department, concluded a county-based program was feasible and viable. This Phase II report demonstrates how the program may be implemented.



¹ The Delta team for this engagement included Delta Development Group, Inc. (economic development and finance component), Brinjac Engineering (point source component), LandStudies, Inc. and Red Barn Trading Company, Inc. (non-point source, nutrient credit trading program component).

WHO ARE THE STAKEHOLDERS AND HOW ARE THEY INVOLVED?

Every Lycoming County resident is a stakeholder; however, three groups of stakeholders will be more affected by the nutrient caps than others. These stakeholders include point source dischargers, non-point source dischargers, and the business and finance community. In addition to the formation of an overarching Advisory Committee, three work groups have been formed to address issues in each of the areas identified above, as well.

Advisory Committee members were selected by the Lycoming County commissioners and represent a cross section of community and business leaders, elected officials, and stakeholders who are knowledgeable about local dynamics. Their roles will be to: provide advice and counsel to the commissioners; recommend modifications to the strategy; monitor the process; communicate knowledge to the entire community; advocate on behalf of all residents; and facilitate the process.

The Point Source Work Group includes representatives of the County's WWTPs (managers, engineers, and board members, if operated by a municipal authority). Their roles will be to: share information; cooperate and collaborate regionally; nurture unity; communicate with the Advisory Committee and other work groups; and monitor the PA DEP/EPA total maximum daily limit (TMDL) process.

The Non-Point Source Work Group includes the agricultural community, watershed associations, municipalities with stormwater management programs, conservation agencies (including the Lycoming County Conservation District, Natural Resources Conservation Service, and Penn State Cooperative Extension Service), and others. Their roles will be to: define new opportunities for best management practices (BMPs) that generate credits and benefit Lycoming County; review and critique the database developed by the County; cooperate and collaborate regionally; nurture outreach and education about BMPs and credit generation; address specific non-point source BMP and credit trading issues; and maintain coordination and collaboration with the other work groups.

The Economic Development and Finance Work Group includes members of the business community, industry, the financial service industry, local government, and others. Their roles will be to: define the operating structure for the credit trading program; identify new opportunities for investment; cooperate and collaborate regionally; nurture unity; and address specific financing and economic development issues. More specific information about the Advisory Committee and the three work groups' roles and functions can be found in the "Next Steps" section of this report.

WHAT ARE THE STRATEGY'S PRIMARY COMPONENTS?

A comprehensive, Lycoming County-based strategy will include three key components: (1) coordinated design and phasing of WWTP infrastructure upgrades and associated collection system upgrades with the non-point trading program; (2) a Lycoming County nutrient trading program that invests in County BMPs to generate cost-effective nutrient credits to offer a flexible option for municipal authorities; and (3) an Economic Development and Finance plan that provides for long-term sewage needs, including the financing of WWTP upgrades, collection system upgrades, and local investments in BMPs to generate nutrient credits.

1) POINT SOURCES (WWTPs)

Point sources of Chesapeake Bay pollution include WWTPs and municipal authorities responsible for sewage treatment and for maintaining the ability of the Susquehanna River to be used as a clean source of water for drinking water. These are commonly known as "from-the-pipe" sources of Bay pollution. While technically, industrial dischargers are also point sources, there are few direct industrial dischargers in Lycoming County; most discharge to existing WWTPs. Industrial dischargers are not currently part of this strategy.

What does the WWTP/municipal authority component involve?

Working together in a regional forum, the WWTP/municipal authorities within Lycoming County can be mutually supportive by providing technical solutions and nutrient credits for use, as necessary. The options to reduce compliance costs are the critical issue. Individual WWTPs and municipal authorities are responsible for effluent nutrient cap load compliance under the CBTS. WWTP engineers will evaluate nutrient credit trading against infrastructure upgrades. WWTPs and their municipal authorities in Lycoming County will have the opportunity to evaluate the use of the County-based credit trading program to determine the appropriate compliance option.

Each WWTP will evaluate all feasible options for facility improvements. The nutrient credit trading option will be considered as a flexible alternative. WWTPs understand that seeking the least costly option is often a key criterion in public funding decisions.

Over the short term, nutrient credit trading can offset upgrades at the WWTPs to provide additional time for a municipal authority or WWTP manager to:

- ✓ Continue working with municipalities that have collection systems plagued with inflow and infiltration (I&I) problems that may adversely impact nutrient removal capacity and future capacity at WWTPs;
- ✓ Evaluate the rapidly evolving nutrient removal technologies;
- ✓ Evaluate regional approaches that integrate or consolidate operations between WWTPs;
- ✓ Phase in upgrades to adapt to growth and associated generation of revenue, such that only what is needed now is built.

Over the long term, nutrient credits may play a role in implementing a more cost-effective solution. The cost of nutrient removal, using facility upgrades alone, increases exponentially for most WWTPs' rehabilitation projects. Simply put, the more pollution removed from the water, the more expensive each pound becomes. Trading credits provide the WWTP with a more cost-effective way to achieve full compliance with their NPDES caps.

Dischargers and developers can use credits as a long-term compliance measure, an interim solution, or in combination with technology upgrades.

2) NON-POINT SOURCES and a NUTRIENT CREDIT TRADING PROGRAM

Nutrient management includes those practices used to reduce and mitigate the amount of nutrient pollution that flows into a water body. A nutrient credit is created when a BMP is implemented to significantly reduce nutrients entering the watershed. A credit might be created by a watershed group that installs a section of riparian buffer or restores a stream bank, by a farmer who converts to no-till planting, or a WWTP that removes more nutrients than is required by its state permit.

Generally, credits are offered per annual pound of nitrogen or phosphorus, and would go into a "credit bank" operated by a public or private entity, and could be sold to WWTPs. Nutrient trading credits can be aggregated, banked, and traded by a variety of entities. This includes, but is not limited to a county conservation district, a non-profit organization, a cooperative, or a private firm, to name some options.

Why a nutrient credit trading program?

✓ **PROVIDES FLEXIBILITY**

A Lycoming County-based nutrient credit trading program provides flexibility to WWTPs, since some plants have greater cap load requirements and/or shorter compliance time frames. Use of credits can enable more cost-effective technical options to be explored, and allow time to examine simple process changes at each WWTP. The latter can impact nutrient removal and time to explore planning and design collaboration between WWTPs.

✓ **IMPROVES FINANCING OPTIONS**

A regional approach increases the viability of funding options, including government sources that prefer to address environmental issues on a greater geographic scale. This will help to minimize ratepayer impact.

✓ **IMPROVES AGRICULTURAL PRACTICES**

The retention of agriculture in Lycoming County is fostered when local farms make long-term improvements by implementing BMPs.

✓ **MULTIPLIES ENVIRONMENTAL BENEFITS**

Local investments in BMPs improve the County's natural habitat, recreational uses, tourism, stormwater management, and flood control. A regional approach also provides more opportunities to implement local resource management plans.

✓ **ENABLES ECONOMIC GROWTH**

Businesses are attracted to a county that demonstrates innovative approaches to address compliance cost-effectively. A regional approach also increases the feasibility of brownfield

redevelopment, such as abandoned industrial sites, and the targeting of economic growth in planned growth corridors.

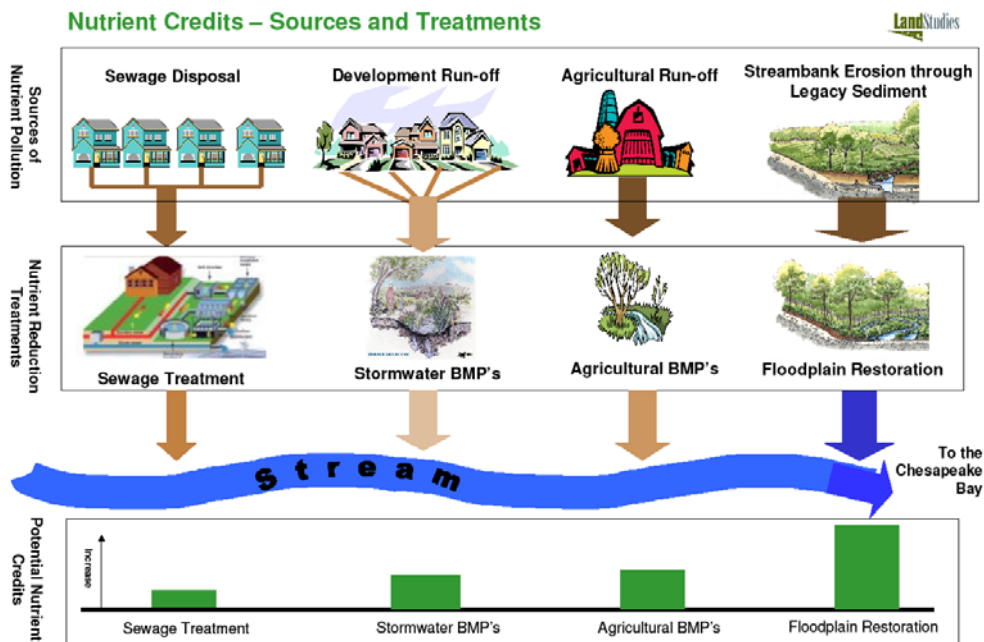
✓ **DRIVES COST-EFFECTIVE COMPLIANCE AND ENABLES LOCAL CONTROL**

A County-based nutrient credit trading program offers cost-effective alternatives that drive WWTP compliance, while enabling local program control to reduce financial risks.

In sum, nutrient credit trading must be cost-competitive, available in a timely manner, have long-term durability, and provide minimal risks to WWTP operators. Investing in local BMPs that can generate a substantial number of cost-competitive credits can substantially impact the way WWTP operators may choose to use credits to find least-costly solutions. Also, local investments can provide more opportunities to implement local resource management plans to improve natural habitat, recreational uses, flood control, stormwater management, and tourism.

Figure 3 below illustrates the sources of nutrients into the Chesapeake Bay and treatments that could lead to nutrient credits.

FIGURE 3



Source: LandStudies, 2008



3) ECONOMIC DEVELOPMENT and FINANCE

Managing nutrient discharges is a long-term, never-ending responsibility. Doing so cost-effectively requires a plan to address long-term growth and to finance the associated sewage treatment needs. A good strategy should be *sustainable*, by providing for growth that pays for its sewage treatment needs, while making investments that benefit Lycoming County. This County-based strategy is focused on both public and private funding to support nutrient credit trading and physical upgrades at the WWTPs and associated municipal collection systems.

A good strategy should be sustainable, by providing for growth that pays for its sewage treatment needs, while making investments that benefit Lycoming County.

What are some other benefits of a Lycoming County-based strategy?

A very important aspect of this County-based strategy relates to how government entities — federal, state, and local — invest in the future. On May 31, 2005, the Governor’s Economic Development Cabinet adopted the *Keystone Principles and Criteria for Growth, Investment, and Resource Conservation*. These were developed by the Interagency Land Use Team, a working group of the governor’s cabinet. These *Keystone Principles* are designed to facilitate a coordinated interagency approach to fostering sustainable economic development and conservation of resources through state investments in Pennsylvania’s diverse communities. Lycoming County’s Chesapeake Bay Nutrient Management Strategy can facilitate actions and investments at the local level consistent with these principles.

- ✓ **REDEVELOP FIRST** – The Lycoming County strategy emphasizes redevelopment of brownfields to encourage reuse and active consideration of the County’s Brownfields Assessment Program findings.
- ✓ **PROVIDE EFFICIENT INFRASTRUCTURE** – Credits may allow WWTPs to partially upgrade, rather than build entirely new systems.
- ✓ **CONCENTRATE DEVELOPMENT** – The strategy emphasizes “smart growth” to encourage development in areas with existing infrastructure and reduce new sewage infrastructure needs. Establishment of designated growth areas has been documented in the County and multi-municipal comprehensive plans.
- ✓ **INCREASE JOB OPPORTUNITIES** – The strategy encourages growth in existing service areas, industrial parks, and brownfield redevelopment areas.
- ✓ **FOSTER SUSTAINABLE BUSINESSES** – Investments in BMPs will help support the farming and agricultural industries in Lycoming County; remove nutrients and make waterways cleaner;

KEYSTONE PRINCIPLES

REDEVELOP FIRST

✦

PROVIDE EFFICIENT INFRASTRUCTURE

✦

CONCENTRATE DEVELOPMENT

✦

INCREASE JOB OPPORTUNITIES

✦

FOSTER SUSTAINABLE BUSINESSES

✦

RESTORE AND ENHANCE THE ENVIRONMENT

✦

PLAN REGIONALLY, IMPLEMENT LOCALLY

✦

BE FAIR

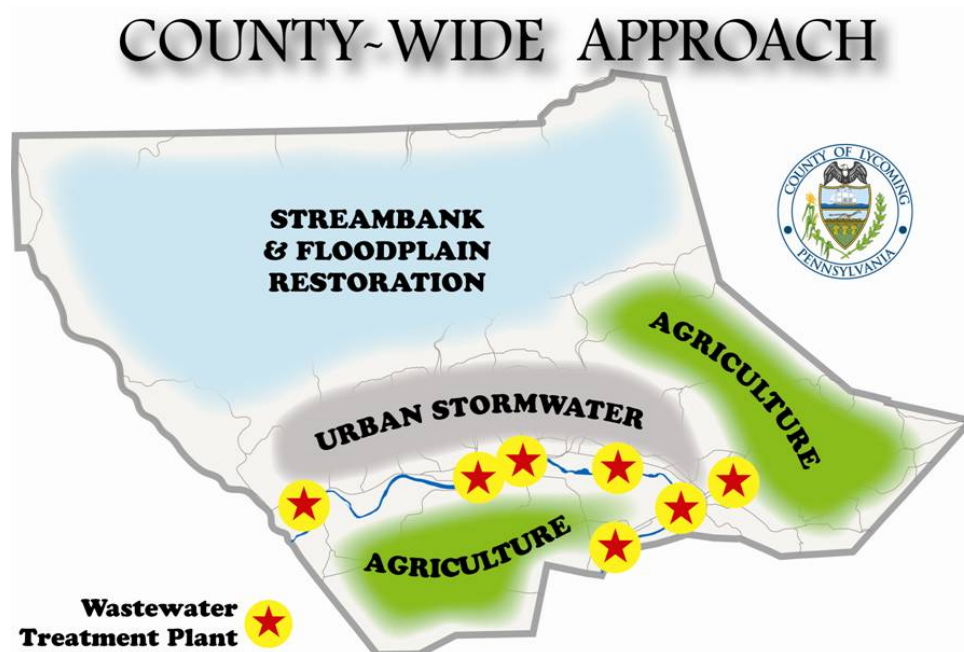
preserve the environment for tourism and recreation; and encourage entrepreneurs to become aggregators of credits and invest in the local economy.

- ✓ **RESTORE AND ENHANCE THE ENVIRONMENT** – Investments in floodplain restoration and riparian buffer BMPs will remove nutrients from waterways and preserve local streams for wildlife.
- ✓ **PLAN REGIONALLY, IMPLEMENT LOCALLY** – The strategy is a Lycoming County-wide approach that encourages regional cooperation among many stakeholders, including municipal authorities, municipalities, conservation organizations, and government at all levels.
- ✓ **BE FAIR** – A regional approach addresses fairness. No single WWTP or municipality created the problems in the Bay. Everyone polluted and now, everyone is working together to take cost-effective actions to address the issue. This strategy focuses on cooperation and collaboration to maximize the benefits for all stakeholders throughout Lycoming County.

Additional information on these principles is provided in Appendix Delta -1: Pennsylvania's Keystone Principles.

Figure 4 below depicts the concept of a truly regional strategy that integrates all of Lycoming County by investing in diverse BMPs. Lycoming County's approach to nutrient credit trading will create opportunities for landowners, farmers, businesses, and municipalities throughout the County to creatively address the nutrient management issue. While the County's landscape is differentiated by a variety of land uses, such as agriculture or housing, any Lycoming County municipality may contain all three types of BMPs; more than one-third of the County's municipalities are at least partially served by municipal wastewater treatment.

FIGURE 4



Source: Lycoming County Planning Department, 2009

THE STRATEGY

RESPONSIBILITIES OF WASTEWATER TREATMENT PLANT OPERATORS

All WWTP operators have fiduciary responsibilities to provide for the long-term needs of their ratepayers, while maximizing the benefits they provide at the lowest possible long-term cost. Each WWTP manager has an engineer responsible for the design of WWTP upgrades to comply with pending Bay effluent cap load regulations and other water quality and regulatory mandates. The Lycoming County Chesapeake Bay Tributary Strategy is not intended to duplicate or supersede the responsibilities of the WWTP engineer.²

Why does a County-based Nutrient Credit Trading Program look promising?

- ✓ **PROJECTED AVAILABILITY OF NUTRIENT CREDITS APPEARS PROMISING.**
A preliminary review of the potential sources of credits generated within Lycoming County appears very promising. There is a potential to generate a significant number of credits within Lycoming County to help point source dischargers comply with their loading caps.
- ✓ **TRADING SUPPORTS PHASED-IN UPGRADES .**
While expected and desired, projected growth in Lycoming County is generally very limited in the service areas of the existing WWTPs. Therefore, there is a good potential to phase-in nutrient upgrades, so existing ratepayers only pay for the nutrient removal capacity the WWTP actually needs. However, it is important to note that many plants have specifically required upgrades, due to the age and condition of existing facilities. These upgrades would be needed, irrespective of nutrient treatment issues.
- ✓ **IT PROVIDES AN ALTERNATIVE TO HIGH-COST NITROGEN REDUCTION TECHNOLOGIES.**
A review of Act 537 planning documents and interviews with engineers provided data confirming that the cost per pound to remove nitrogen through improved technology escalates as the amount of nutrient removal increases (possibly as high as \$22 per pound).
- ✓ **THE AVERAGE COST TO ATTAIN CAP COMPLIANCE FOR PHOSPHORUS IS \$2-4 PER POUND.**
Typically, phosphorous compliance is a simple process of chemical addition for most WWTPs. However, with ferrous costs rising, phosphorus credit trading is becoming more attractive than in the past.
- ✓ **THE AVAILABILITY AND COST PER CREDIT POUND OF TOTAL NITROGEN COULD BE VERY COMPETITIVE.**
In the short term, the purchase of nutrient credits from a private entity, such as Red Barn Trading Company, may be used as a stop-gap measure until this Lycoming County strategy facilitates the implementation of BMPs that can generate credits locally. The actual cost of each credit depends on market forces, such as the demand, surety requirements, and the requested contract length. None of the WWTPs will need credits prior to October 1, 2012.

² All Brinjac Engineering data is contained in appendices provided to Lycoming County under separate cover.

- ✓ **THE COST OF TOTAL PHOSPHOROUS FOR LYCOMING COUNTY IS \$1-4 PER CREDIT POUND.**
The cost to generate phosphorous credits is typically very low. Often, investments in nitrogen credits will directly generate phosphorous credits at no additional cost.
- ✓ **THERE ARE LONG-TERM COSTS AND IMPLICATIONS ASSOCIATED WITH NUTRIENT CREDITS VS. UPGRADES.**
Early data projections from the Lycoming County WWTPs indicate that the annual debt service and operation and maintenance costs associated with the proposed nutrient removal upgrades may exceed \$6 per pound for total nitrogen and total phosphorous removal. Therefore, the real cost of compliance for nutrient removal upgrades for the Lycoming County WWTPs could be substantially higher. WWTPs' Act 537 plans should consider both the up-front construction costs, as well as the actual operation and maintenance expenses.
- ✓ **NUTRIENT CREDIT TRADING HAS PROVEN VERY EFFECTIVE ELSEWHERE.**
New York City saved \$14 billion using a comprehensive regional approach,³ while communities in North Carolina saved approximately \$45 million using nutrient credit trading.⁴ Although formats or structures may be different, this strategy allows a Lycoming County nutrient trading credit program to be developed, based on the needs of Lycoming County WWTPs. The point sources in Lycoming County have expressed an interest in "home grown" credits, if available. Point sources prefer to invest in the local community, rather than in BMPs in other counties or in shipping wastewater solids out of the watershed.

What could each WWTP and municipal authority do?

- ✓ **EVALUATE HOW NUTRIENT CREDIT TRADING MAY REDUCE COSTS FOR EFFLUENT NUTRIENT CAP LOADS.**
In the short term, use of nutrient credits for cap compliance may provide additional time to evaluate evolving, cost-effective nutrient removal technologies. In the long term, nutrient credits may allow upgrades to be phased in, and better identify the point at which nutrient credit trading may become a more effective option in the upgrading process.
- ✓ **EVALUATE IF CONSOLIDATION OF OPERATIONS BETWEEN PLANTS ACCOMPLISHES SAVINGS.**
Lycoming County has several WWTPs within a few miles of each other. Two of these facilities have already initiated the evaluation of regional solutions through the establishment of a single new regional WWTP, located between the two existing WWTPs. Such evaluations will consider the up-front construction costs, plus the annual O&M burden, comparing one new facility versus two or more upgraded plants.
- ✓ **EVALUATE HOW WWTPS CAN SUPPORT A LYCOMING COUNTY STRATEGY.**
Each WWTP should consider the flexibility gained and value offered from the purchase of nutrient trading credits from the County program. Each WWTP may also be capable of generating nutrient

³ Randall, C.W. (2004) *A Lot For Less (Innovative Economical and Technological Strategies for the Implementation of Limit of Technology Nutrient Removal in the Chesapeake Bay Watershed)*, Chesapeake Bay Foundation, p. 9.

⁴ Breetz, Hanna L; Fisher-Vanden, K; Garzon, L; Jacobs J.; Kroetz, K; Terry, R. (2004) *Water Quality Trading and Offset Initiatives in the U.S.: A Comprehensive Survey*, Dartmouth College Hanover, New Hampshire, p. 230.

trading credits through improved operations, or on lands owned by the WWTP or municipal authority.

✓ **PARTICIPATE IN THE VARIOUS WORK GROUPS.**

Work groups are the ideal venue to collaborate regionally, vet information, and share ideas. They include the Point Source Work Group, Non-point Source Work Group, and the Economic Development and Finance Work Group.

✓ **JOIN THE LYCOMING COUNTY EFFORT TO PROMOTE BENEFICIAL REUSE OF BIOSOLIDS.**

Consider evaluation of options for sewage sludge disposal, including anaerobic digestion for energy production, aerobic composting, soil blending, and mine reclamation. These processes should be assessed for cost-effectiveness through the generation of offsetting benefits, including nutrient credits and the sale of auxiliary products.

✓ **EVALUATE OTHER WAYS TO REDUCE THE NUTRIENT LOADS TO RIVERS.**

Spray irrigation alternatives for wastewater effluent can generate credits and increase capacity for a WWTP by redirecting wastewater effluent to a beneficial use.

✓ **COMPREHENSIVELY EVALUATE EVOLVING TECHNOLOGIES.**

As a task associated with this initiative and under separate cover, Lycoming County's wastewater authorities have been provided a summary of the prime technologies that constitute possible conventional-method solutions for nutrient removal at point sources.

✓ **DEVELOP A REGIONAL FUNDS-SEEKING PLAN.**

Assist Lycoming County in developing a County-wide plan to seek state (Act 63 & Act 64) funds, as well as federal economic stimulus dollars.

WASTEWATER TREATMENT PLANT/AUTHORITY-SPECIFIC RECOMMENDATIONS BY PHASES

What are the phases?

Compliance dates are imposed by the PA DEP and are "phased" according to largest contributors to the Bay. Phase 1 (water year starts September 30, 2010 and ends October 1, 2011; Phase 2 (water year starts September 30, 2011 and ends October 1, 2012); and Phase 3 (water year starts September 30, 2012 and ends October 1, 2013). A water year is the period of time over which the WWTP has to meet the 12-month mass load Chesapeake Bay Tributary Strategy cap requirement. Some of the permit holders (Williamsport Sanitary Authority [WSA]) have had compliance years extended because of design and construction schedules.

PHASE 1

September 30, 2010 –
October 1, 2011

PHASE 2

September 30, 2011 –
October 1, 2012

PHASE 3

September 30, 2012 –
October 1, 2013

Which are Phase 1 WWTPs and what should be considered in planning and design?

Phase 1 plants are those identified in the PA DEP Chesapeake Bay Tributary Strategy as requiring nutrient cap load compliance within the 2010 to 2013 timeframe. Those plants include the Williamsport Sanitary Authority's West and Central plants, and the Montgomery Water and Sewer Authority plant.

The use of nutrient credits over the short term may allow additional time to review thoroughly the new technologies and phase-in options.

What can each authority consider as it continues to search for the least-costly options?

Each WWTP in Lycoming County that requires upgrades to meet the effluent limits set forth in its NPDES permit will consider an array of technologies and design alternatives. This Phase II study provided an opportunity for the County and its engineering consultant to suggest some technology concepts for WWTPs to consider. These suggested concepts have been provided directly to each respective sanitary authority for their use and consideration. It is understood that these concepts, along with a number of concepts developed through the WWTPs' own efforts, may be evaluated during the authority's planning, preliminary design, or value engineering phase, or elsewhere throughout the compliance period.

PHASE 1: WILLIAMSPORT SANITARY AUTHORITY (WSA)

How can Lycoming County partners help WSA?

- ✓ Currently, the tributary communities of South Williamsport, Duboistown, Loyalsock Township, and Old Lycoming are working on solving infiltration and inflow (I&I) within their collection systems. These actions take the form of repair or replacement of broken or leaking mains and laterals. Wet weather management tanks are also under design. Progress on this front could reduce peak flows to WSA and create more hydraulic capacity for future growth.
- ✓ Provide non-point source credits to WSA for compliance and future development.
- ✓ Once the Act 537 design loads have been exceeded, develop sewer regulations requiring any new residential, commercial, or industrial growth to have purchased nutrient credits (possibly from the County) before they connect to WSA.

How can WSA help its Lycoming County partners?

- ✓ The purchases of nutrient credits from Lycoming County via the trading program, where cost-effective for WSA, could provide for investments in the County that will have positive impacts on the local environment and the local economy.
- ✓ Explore the potential application of sewage sludge to mining lands as an alternative, beneficial use of biosolids. WSA could evaluate this option with Lycoming County Landfill staff.
- ✓ Consider participation in the evaluation of a regional alternative process to increase the value of the organics available in biosolids.

- ✓ Sell WSA-generated credits to other WWTPs, assuming WSA exceeds treatment requirements, as established in its NPDES permit.
- ✓ Consider taking in Lycoming County septage for processing at WSA. In a permit to another state WWTP, the PA DEP has provided that septage processing at a WWTP can generate credits.

PHASE 1: MONTGOMERY SEWER AUTHORITY (MONTGOMERY)

How can Lycoming County partners help the Montgomery WWTP?

- ✓ The Montgomery WWTP and the Muncy WWTP could combine their waste streams to their mutual benefit. Each WWTP has a pollutant component in abundance, which is needed to complete nitrogen removal. A regional plant would help reduce the cost to remove nitrogen, compared to each WWTP doing it individually.
- ✓ A new, combined plant could be constructed outside the 100-year floodplain; this problem plagues the existing Montgomery WWTP.
- ✓ Provide non-point source credits to the Montgomery WWTP for compliance and future development.

How can the Montgomery WWTP help its Lycoming County partners?

- ✓ By partnering in a regional WWTP, the Montgomery WWTP could join neighboring Muncy WWTP to reduce the impact on ratepayers by providing a solution that may ultimately save O&M costs over the life of the WWTP.
- ✓ The Montgomery WWTP may be a net purchaser of nutrient trading credits from Lycoming County. This can provide for investments in the County that will have positive impacts on the local environment and the local economy.

What are Phase 2 WWTPs and what should they consider in planning and design?

Phase 2 plants are those identified in the PA DEP Chesapeake Bay Tributary Strategy as requiring nutrient cap load compliance within the 2011 to 2012 time frame. These plants include Jersey Shore Borough, Lycoming County Water and Sewer Authority, and Muncy Borough Municipal Authority. Because these plants have additional time to meet compliance, they also have additional opportunities to evaluate the evolution of new technologies and benefit from work being done by Phase 1 plants. Nutrient credit trading, regional solutions, total maximum daily load (TMDL) limits, and funding opportunities should be considered for compliance.

PHASE 2: BOROUGH OF JERSEY SHORE WWTP (JERSEY SHORE)

How can Lycoming County partners help the Jersey Shore WWTP?

- ✓ Provide non-point source trading credits for purchase.
- ✓ Provide point source credits for purchase.

How can the Jersey Shore WWTP help its Lycoming County partners?

- ✓ The Jersey Shore WWTP may be a purchaser of credits from other point sources (Lycoming County Water and Sewer Authority, Williamsport Sanitary Authority, and Hughesville-Wolf Sewer Authority).
- ✓ Jersey Shore may be a net purchaser of nutrient trading credits from Lycoming County. This can provide investments in the County that will have positive impacts on the local environment and the local economy.

PHASE 2: LYCOMING COUNTY WATER AND SEWER AUTHORITY (LCWSA)

How can Lycoming County partners help LCWSA?

- ✓ In the long term, LCWSA may need credits to address future growth. The County could provide these non-point source nutrient credits.

How can LCWSA help its Lycoming County partners?

- ✓ Given the current hydraulic load, LCWSA may be able to offer nutrient credits to Lycoming County partners. LCWSA will be upgraded and operational before most WWTPs are functional and meeting compliance requirements.
- ✓ Consider a regional mine reclamation project, using biosolids as an alternative disposal for sludge.

PHASE 2: MUNCY BOROUGH MUNICIPAL AUTHORITY (MUNCY)

How can Lycoming County partners help Muncy?

- ✓ Credits from LCWSA and the Hughesville-Wolf WWTPs could be used by Muncy at a regional WWTP or at a new WWTP at the existing site.
- ✓ A new, regional WWTP could reduce O&M costs, would be out of the floodplain, and would have space for future expansion to address capacity increases related to growth.

How can Muncy help its Lycoming County partners?

- ✓ Join with Montgomery Borough to construct a new regional WWTP to save O&M costs, and to allow for better treatment efficiency with the two waste streams.
- ✓ Muncy could be a net purchaser of nutrient credits for growth, including any expansion of treatment needed for Kelloggs. This can also provide for investments in Lycoming County that will have a positive impact on the local environment and the local economy.
- ✓ If a regional solution is pursued, the old WWTP could serve as a “pretreatment unit” to reduce loadings to the new regional WWTP. Alternatively, the old WWTP could be sold/developed as a “frac water” treatment site unit, complete with screening, trickling filter, clarification, and solids handling.

PHASE 3: HUGHESVILLE-WOLF TOWNSHIP MUNICIPAL AUTHORITY (HUGHESVILLE-WOLF)

What should the County’s only Phase 3 plant consider in its planning and design processes?

Phase 3 plants are those identified in the PA DEP Chesapeake Bay Tributary Strategy as requiring nutrient cap load compliance within the 2012 to 2013 timeframe. There is only one Phase 3 plant in Lycoming County and that is operated by the Hughesville-Wolf Township Municipal Authority (Hughesville-Wolf). Because this plant has until 2013 to meet compliance requirements, it provides additional opportunities to evaluate the evolution of new technologies and to benefit from the work being done by Phase 1 and 2 plants.

Total maximum daily load (TMDL) issues likely will be resolved by this time frame; County trading programs should be functional; and other opportunities, such as mine reclamation and land application, should be more realistic.

How can Lycoming County partners help Hughesville-Wolf?

- ✓ The County could provide non-point source trading credits to Hughesville-Wolf in support of future growth and development, as needed.
- ✓ County partners may be a viable market for credits from Hughesville-Wolf.

How can Hughesville-Wolf help its Lycoming County partners?

- ✓ Hughesville-Wolf could pursue the certification of its point source trading credits with the PA DEP and have these available for other Lycoming County WWTPs.
- ✓ Hughesville-Wolf management may purchase County-based non-point source trading credits, when available, to handle future growth. This can also provide for investments in Lycoming County that will have a positive impact on the local environment and the local economy.



WHAT SHOULD THE POINT SOURCE WORK GROUP FOCUS ON DURING 2009?

- ✓ Provide input on the implementation of a regional nutrient trading strategy that would benefit all members.
- ✓ Consider and provide estimates as to the quantity of nutrient credits that may be needed short- and long-term to assist meeting compliance needs. Table 1 below documents current TN load estimates among WWTPs and authorities in Lycoming County.

TABLE 1 – CURRENT TN LOAD ESTIMATES AMONG LYCOMING COUNTY WWTPS/AUTHORITIES

Facility Name	Design Flow (mgd)	TN Cap Load at Design Flow @ 6 mg/L	Current Flow (mgd)	Current TN Effluent
Hughesville-Wolf Township Joint Municipal Authority	0.675 Phase III	12,329	0.402	9,644
Borough of Jersey Shore	1.05 Phase II	19,178	0.572	52,549
Montgomery Water & Sewer Authority	0.85 Phase I	15,525	0.594	104,681
Muncy Borough Municipal Authority	1.4 Phase II	25,570	0.601	15,822
Lycoming County Water & Sewer Authority	1.5 Phase II	27,397	0.573	24,338
Williamsport Sanitary Authority-West	3.92 Phase I	77,547	2.7 (3.4)	141,000
Williamsport Sanitary Authority-Central	8.4 Phase I	153,423	6.20 (7.2)	359,000
TOTAL		330,969		707,034

- ✓ Monitor and evaluate impacts of the TMDL issues on each partner.
- ✓ Evaluate and discuss issues related to rate structure, loan/grant information, and associated application processes.
- ✓ Evaluate the feasibility of forming a regional “association” that includes all point sources as members. The purpose would be to discuss solutions to growth and development issues, frac wastewater treatment from the Marcellus Shale gas extension, TMDL, and nutrient credits.
- ✓ Discuss coordination of infrastructure upgrades to maximize the service and benefits of each facility.
- ✓ Coordinate nutrient credit demands with potential nutrient credit supplies and credit sources.
- ✓ Help develop the management structure for a nutrient credit trading program.
- ✓ Identify new opportunities to provide cost-effective sewage treatment infrastructure in the long term, consistent with economic development strategies.

- ✓ Identify the numerous environmental benefits related to flood control, stormwater, carbon sequestration, etc.
- ✓ Consider exploration of innovative strategies, including land application of effluent, anaerobic digestion, soil blending, fertilizer production, power production, and mine reclamation.
- ✓ Develop a regional strategy to coordinate and communicate which stakeholders apply for grants in the first round of the H₂O PA Act 63 grant funding, including the following items:
 - How much grant funding is being requested?
 - Is the grant for design, construction, and operation?
 - What is the match (in value and source)?
 - Share information on cost-effective process control changes and upgrade plans.

ESTABLISHING A LYCOMING COUNTY NUTRIENT CREDIT TRADING PROGRAM

BEST MANAGEMENT PRACTICES (BMPs) DEFINED

Best management practices are tools used to address specific resource concerns or pollution problems. The following section discusses BMPs that are both useful and practical for the generation of nutrient credits. When applied to agricultural land, urban land, streams, and floodplains, these BMPs can reduce non-point sources of pollution. Each BMP implemented has a defined unit value and a defined duration (or length of time the credit can be captured).

The table below provides an initial estimate of the number of credits that potentially might be generated, given minimal constraints in regard to landowner cooperation, staff resources, and funding. This summary recognizes the most likely, highest volume sources of BMP credits. It is not, however, an exhaustive list of all potential BMPs. Each BMP listed must be further defined and vetted during Phase III of the County's strategy. It is also understood that BMP-generated credits can only be sold or traded after the seller has achieved baseline compliance established by the PA DEP. Currently, BMPs for stormwater management and floodplain restoration are being considered by the PA DEP. Lycoming County can apply for these types of credits, once these practices have been certified by the PA DEP.

TABLE 2 - SUMMARY OF BEST MANAGEMENT PRACTICES AND POTENTIAL NUTRIENT CREDITS GENERATED

BMPs for Nutrient Credits	NITROGEN CREDITS 2010	NITROGEN CREDITS 2011	NITROGEN CREDITS 2012	NITROGEN CREDITS 2013	NITROGEN CREDITS 2014	NITROGEN CREDITS 2015
<i>Agricultural BMPs</i>						
No-Till Agriculture TOTAL	31,750	105,973	180,191	186,946	193,696	200,446
Conservation Tillage Agriculture TOTAL	13,000	34,470	55,915	58,915	64,135	69,355
Cereal Cover Crops (on conservation tillage, early planting)	24,000	56,940	89,880	108,880	127,880	147,080
Commodity Cover Crops (on conservation tillage, early planting)	4,500	11,500	18,000	21,000	24,000	27,000
Land Retirement (Conventional Tillage to Grassland)	10,000	30,000	45,000	45,000	45,000	45,000
Poultry Manure Export	11,000	11,000	11,000	18,000	25,000	25,000
Swine Manure Treatment and Export	0	11,000	11,000	22,000	33,000	88,000
Streambank Fencing with Off-stream Watering	300	600	1,100	1,400	1,800	2,200
<i>Urban BMPs</i>						
Stormwater Retrofits - Wet Ponds and Wetlands	400	800	1,200	1,400	1,600	1,800
Floodplain Restoration	0	0	5,500	11,000	16,500	22,000
<i>Forested Riparian Buffers</i>						
Forested Riparian Buffers	18,000	40,000	66,500	76,500	86,500	96,500
<i>Nitrogen</i>	112,950	302,283	485,286	551,041	619,111	724,381
	2010	2011	2012	2013	2014	2015

Source: LandStudies, 2008



See Appendix LandStudies – 1: Summary of BMPs and the Potential Credits Generated within Lycoming County from Implementation on a Yearly Basis.

Agricultural BMPs

The agricultural BMPs described below reduce nutrient and sediment non-point sources of pollution from cropland and pastures, they qualify to generate nutrient trading credits. Appendices LandStudies -- 2 and 3 show agricultural land distribution and stream segments located in agricultural land, respectively. Streams that flow through agricultural land and are listed on the PA DEP’s impaired streams list are distinguished in orange (See Appendix LandStudies – 10: Impaired Streams and Causes of Impairment). These maps give a broad understanding of the distribution of agricultural land, streams, and floodplains that could benefit from BMP implementation. A summary of these maps is provided in Table 2 below. See the report section titled “Stream and Floodplain BMPs” for further information regarding impaired streams and stream and floodplain restoration.

TABLE 3 - SUMMARY OF ACREAGES PLOWED AND FIELD (HAYLAND AND PASTURELAND) AGRICULTURAL LANDS AND THE LENGTH OF STREAMS RUNNING THROUGH THESE LAND USES

AGRICULTURAL LAND AND STREAMS IN LYCOMING COUNTY			
Land Type	Acreage	Stream Length (mi)	Impaired Stream Length (mi)
Field	36,734	270	10
Plow	89,733	86	6

Source: LandStudies, 2008

The agricultural BMPs that show the most cost-effective promise for Lycoming County are listed in Table 3 below. Cost-effective BMPs are defined here as those for which (1) there is significant opportunity for implementation in the County; (2) there appears to be broad interest in implementing the BMPs; and (3) the implementation costs are low, compared to the nutrient credits that can be generated from implementation.

TABLE 4 - Ag BMPs INCLUDED IN LYCOMING COUNTY CHESAPEAKE BAY NUTRIENT MANAGEMENT STRATEGY

AGRICULTURAL BEST MANAGEMENT PRACTICES IN THE COUNTY PROGRAM
• No-till agriculture
• Conservation tillage agriculture
• Cover crops
• Streambank fencing with stream crossings, where appropriate

Source: LandStudies, 2008

Who establishes the baseline and verifies the annual implementation of BMPs on farms?

Typically, the Lycoming County Conservation District (LCCD) verifies if baseline requirements are met, as well as the annual implementation of BMPs on each Lycoming County farm. Roles and responsibilities should be discussed and assigned by the Non-Point Source Work Group.

NO-TILL AGRICULTURE AS A BMP

What is no-till agriculture?

No-till refers to planting a crop directly into the previous crop, cover crop, or residue. The seed is inserted into a slot created by the no-till planter or drill. No tillage is performed between harvest and planting. Overall, less than 30 percent of the soil surface can be disturbed in a no-till system, according to the United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS). The Chesapeake Bay Foundation suggests that 50 percent residue cover must be maintained on the soil.



Photo courtesy USDA/NRCS.
This image shows the use of no-till agriculture.

A successful no-till program will also keep the soil covered with a cover crop or crop residue, and maximize the time living roots are present in the soil. No-till presents unique challenges and requires new management strategies that differ from conventional tillage. Farmers transitioning to no-till can find help available through the NRCS, the LCCD, and the Penn State Cooperative Extension Service.

What are the benefits of no-till agriculture?

Specific benefits of no-till agriculture to the environment and to the farmer are described in detail in Appendix LandStudies – 4: Benefits of No-Till Agriculture. In summary, no-till provides the following benefits:

- ✓ **REDUCES NON-POINT SOURCE POLLUTION TO THE CHESAPEAKE BAY**
Less sediment and nutrients enter surface waters, thus improving water quality locally and within the Chesapeake Bay watershed.
- ✓ **FINANCIAL SAVINGS FROM REDUCED FUEL COSTS, LESS MAINTENANCE, LESS LABOR**
Fewer tractor passes means significant fuel savings. Moreover, the cost of purchasing and maintaining tillage equipment is eliminated, and labor costs are reduced. See Appendix LandStudies – 5: Conventional vs. Conservation Tillage Energy Use, Cost Estimator for a discussion of the potential diesel fuel savings from no-till and conservation tillage agriculture.
- ✓ **IMPROVED SOIL HEALTH**
No-till soils have greater organic matter content, more beneficial organisms, and better tilth (cultivated land or the state of aggregation of a soil, especially in relation to its suitability for crop growth).
- ✓ **NUTRIENT TRADING**
The sale of nutrient credits from BMP implementation is a financial return to the farmer.

How are nutrient credits generated from no-till agriculture?

Agricultural agencies in Lycoming County estimate that 50 percent of row crops are currently no-tilled. This would equate to 19,750 acres of corn silage, corn grain, and soybeans, although this acreage in no-till must be verified by the agricultural agencies on a parcel-by-parcel basis. Acres currently being no-tilled are eligible to generate nutrient credits, once baseline compliance is established and the credits are calculated and certified.

This positive trend of no-till implementation suggests farmers are finding no-till beneficial for the soil and crop production. Increases in no-till acreage in Lycoming County are expected to continue; however, conversion rates could slow, as the remaining pool of farmers may have a more conventional mindset. Appendix LandStudies – 6: Implemented and Available Agricultural BMP Acreages summarizes the current acreages of row crops in which agricultural BMPs already have been implemented, the acreages available for new agricultural BMP implementation, and the projected goals for total acreages for agricultural BMPs in Lycoming County.

CONSERVATION TILLAGE AGRICULTURE AS A BMP

Conservation tillage refers to planting and growing crops with reduced tillage or disturbance of the soil surface. Conservation tillage equipment disrupts more of the soil surface than no-till, but moves and turns over less soil than conventional tillage. The goal of conservation tillage is to increase residue cover and reduce topsoil erosion. Full row width tillage is considered conservation tillage, as long as the soil surface is protected. Thirty percent of the soil surface should be covered with residue after planting. The implemented and available acreages for conservation tillage are shown in Appendix LandStudies – 6: Implemented and Available Agricultural BMP Acreages.



*Photo courtesy Lynn Betts, USDA/NRCS.
This image shows the full width of
conservation tillage.*

Conservation tillage encompasses a variety of tillage implements, including chisels, field cultivators, disks, sweeps, and blades. Environmental benefits increase as disturbance decreases. Therefore, the least-invasive equipment and the fewest number of tillage passes are recommended. Plows cannot be used in a conservation tillage system.

What are the benefits of conservation tillage agriculture?

- ✓ **FINANCIAL SAVINGS**
The reduction of fuel and maintenance costs directly relates to the type and amount of conservation tillage used. See Appendix LandStudies – 5: Conventional vs. Conservation Tillage Energy Use, Cost Estimator for a discussion of the potential diesel fuel savings from conservation tillage agriculture.
- ✓ **REDUCES EROSION**
Conservation tillage causes less inversion of the soil surface than plowing, leaving more residue to protect topsoil.
- ✓ **NUTRIENT TRADING**
Generating and selling nutrient trading credits can help cover the cost of seed and cover crop establishment.

How are nutrient credits generated from conservation tillage agriculture?

Agricultural agencies in Lycoming County estimate that conservation tillage is used to establish 20 percent of planted row crops. This equates to 7,900 acres of corn silage, corn grain, and soybeans. Acres currently in conservation tillage are eligible to generate nutrient credits, once baseline compliance is established and the credits are calculated and certified. The goals for new acreage implementing conservation tillage are shown in Appendix LandStudies – 6: Implemented and Available Agricultural BMP Acreages.

COVER CROPPING AS A BMP

A cover crop is vegetation planted to serve numerous environmental or agronomic purposes. These purposes include erosion control, increasing organic matter, improving soil structure, fixing atmospheric nitrogen, capturing nitrates, managing water, and controlling weeds. The time of year, climate, and reason for planting the cover crop will dictate what cover crop is selected. Popular cover crops include legumes (such as clovers and hairy vetch) and grasses (such as cereal rye, ryegrass, oats, wheat, and barley). Often called commodity cover crops, they may be harvested or not harvested, depending on the farmer's management practices.

What are the benefits of cover cropping?

- ✓ **REDUCED EROSION**
Cover crop root mass holds soil in place, and surface vegetation reduces erosion caused by direct impacts of rain and surface runoff. Conserving topsoil is important to create a sustainable operation for future generations of farmers.
- ✓ **IMPROVED SOIL HEALTH**
Growing cover crops adds to soil organic matter. The additional root systems also improve soil structure.



Photo courtesy of Jeremy Singer, USDA.
This image shows cover crop no-tilled into corn silage residue.

✓ **REDUCED FERTILIZER NEEDS**

Cover crops use the available nutrients for growth before they leach or runoff, preventing nutrient loss to ground and surface water. When cover crops decompose, the nutrients are released into the soil for use by the following crop, thereby reducing fertilizer needs. Legumes used as cover crops fix atmospheric nitrogen, which then becomes available for subsequent crops. Legumes may not be practical, depending on climate and timing.

✓ **WEED SUPPRESSION**

Cover crops compete with weeds for space, sunlight, and nutrients, thereby reducing the number of weeds that thrive. The mulching effects of cover crops are especially important in a no-till system, where weeds cannot simply be plowed under. This mulching effect also conserves soil moisture in a no-till system.

✓ **Nutrient trading**

Generating and selling nutrient trading credits can help cover the cost of seed and cover crop establishment.

How are nutrient credits generated from cover cropping agriculture?

Agricultural agencies in Lycoming County estimate that 4,000 acres of cover crops were planted in 2008, following corn silage. Another 2,000 acres of winter wheat were planted as a commodity cover crop for grain harvest. These acreages are available for nutrient credit generation, if they are continued. The current planted acreages of corn silage, corn grain, and soybeans could potentially benefit from a fall cover crop planting. Cover crops need to be planted within seven days after the published first frost date to generate nutrient credits. Cover crops generate credits on conventional and conservation till cropland. *Cover cropping on no-till land is not eligible to generate nutrient credits.* No-till requires soil cover, whether it is from crop residue or cover cropping. The benefits of no-till and keeping the soil covered are taken into account in the no-till credit calculation. Appendix LandStudies – 6: Implemented and Available BMP Acreages summarizes the current acreages of row crops in which agricultural BMPs already have been implemented, and the acreages available for new agricultural BMP implementation.

POULTRY MANURE EXPORT AS A BMP

Since poultry manure operations often produce more nutrients than can be spread on available application acres, a nutrient credit is formed by transporting this excess manure outside of the Chesapeake Bay watershed. Manure export is an economically feasible way to generate both nitrogen and phosphorous-based nutrient credits. The PA DEP currently recognizes manure transport as one of the 26 different agricultural BMPs that may be certified for credit generation. Currently, it does not appear that Lycoming County has excess poultry manure; all such product is used on local farms. This BMP will continue to be reviewed for potential future implementation.

SWINE MANURE TREATMENT AS A BMP

Swine manure treatment is a process whereby the swine manure is put through a mechanical/chemical separation system that divides the nutrient-rich solid from the liquid waste stream. The nutrient-laden solid then can be exported outside of the Chesapeake Bay watershed. The PA DEP currently recognizes swine

manure export as one of the 26 agricultural BMPs. Again, no excess manure is available for exportation at this time.

STREAMBANK FENCING AND OFF-STREAM WATERING AS BMPs

Streambank fencing is a simple BMP farmers can use to improve stream water quality. Livestock trample banks, over-graze vegetation, and excrete waste into or adjacent to streams. Fencing controls livestock access, thereby reducing erosion and nutrient pollution, and allowing bank stabilizing vegetation to grow. There is a 35-foot fencing setback from the top of the streambank to generate nutrient trading credits.



*Photo courtesy Jeff Vanuga, USDA/NRCS.
The image above is an example of a fencing stream buffer.*

High tensile fence is an effective and economic way to control livestock access. Some maintenance is required after the fencing is installed. The fenced area occasionally may be mowed to control unwanted weeds. If invasive species propagate, it is important to control them mechanically or chemically before they reach seed head. Many cost-incentive programs exist to help offset the cost of establishing fencing. If using cost-share, it is important to pick a program that has establishment and maintenance requirements the farmer is willing to follow.

Off-stream watering facilities provide livestock with access to drinking water without having to cross or enter a stream. The construction of off-stream watering facilities, with or without streambank fencing, can generate nutrient credits.

What are the benefits of streambank fencing and off-stream watering?

✓ REDUCED SEDIMENT AND NUTRIENT POLLUTION

Protected, vegetated banks erode less and therefore, reduce sediment and nutrient pollution. Stream bank fencing creates a vegetated stream corridor that prevents cattle from excreting waste directly into or adjacent to streams. Vegetation also filters pollutants from surrounding agricultural land uses. Water quality is improved, both on the farm and within the watershed.

✓ IMPROVED CATTLE HEALTH

Managing to reduce muddy, heavy-use areas often reduces foot problems and mastitis in livestock. Drinking water quality is improved if cows rely on the stream as a water source. Off-stream watering facilities can also improve livestock health.

✓ NUTRIENT TRADING

Generating and selling nutrient credits can help cover the cost of fencing, crossings, and the decreased acreage available for crop generation or foraging.

How are nutrient credits generated from streambank fencing and off-stream watering?

The acreages of riparian areas now excluded from livestock by streambank fencing were not available through Phase II efforts. It is anticipated the agricultural outreach program suggested in this report will enable the identification of those farms and associated acreages where streambank fencing and off-stream watering facilities have been implemented.

These BMPs can generate nutrient credits for farms where they have already been implemented, if the implementations have occurred since 2005. Any new farms where these BMPs are implemented can also generate nutrient credits. Streambank fencing can also be used to create a riparian buffer inside the excluded area. Riparian buffers and nutrient credits are discussed under the stream and floodplain restoration BMP section of this report.

DEFINING AN AGRICULTURAL BMP IMPLEMENTATION STRATEGY

A draft agricultural outreach program has been developed and suggested in this report for implementation in Phase III of the Lycoming County Chesapeake Bay Nutrient Management Strategy. The overall purpose of the outreach program is to identify specific farmers and farms where agricultural BMPs have already been implemented or could be implemented. The outreach program will identify the benefits of these BMPs and associated nutrient credits that can be generated. The Non-Point Source Work Group participants should review and finalize the outreach program and identify specific implementation steps. The potential exists for nutrient credit generation from farms already implementing no-till, conservation tillage, cover crops, streambank fencing, as well as from farms that will choose these BMPs in the future.

What are the outreach program goals?

- ✓ Educate farmers and organizations, agencies, and consultants that work with farmers about the nutrient credit trading program.
- ✓ Identify farmers interested in the trading program and who are currently implementing BMPs.
- ✓ Identify farmers interested in implementing BMPs and generating credits.
- ✓ Promote implementation of new BMPs on farms.
- ✓ Provide technical assistance to farmers willing to implement new BMPs.
- ✓ Generate nutrient trading credits through implemented BMPs.

The draft outreach plan can be found in Appendix LandStudies – 7: Agricultural Outreach Guidance, Best Management Practice Implementation Strategy. This draft outreach program should be reviewed and finalized by the Non-Point Source Work Group participants.

URBAN STORMWATER AS BMPs

These BMPs reduce nutrient and sediment pollution in stormwater that runs off from developed areas, such as cities, boroughs, and suburban townships. Developed areas with disturbed and impervious landscape will have increased amounts of runoff after precipitation events. Less water is naturally absorbed into the soil; thus, more water pools and travels downhill, often picking up additional sediment and pollution along the way. Ultimately, this empties into streams.

RAIN GARDENS and BIOSWALES, IMPERVIOUS SURFACE REDUCTION, and WET PONDS AND WETLANDS are the urban stormwater BMPs with the most promise for Lycoming County.

Urban stormwater BMPs include the following:

- ✓ **WET PONDS AND WETLANDS** – These are designed to collect stormwater, so pollutants settle and filter; this protects downstream channels and remains permanently wet between storm events.
- ✓ **DRY DETENTION** – This includes ponds and structures that moderate stormwater flows, gradually releasing water and becoming dry between storm events.
- ✓ **INFILTRATION/FILTERING PRACTICES** – These capture and temporarily store water, so it is naturally filtered to remove pollutants and recharge groundwater. Rain gardens are examples.
- ✓ **IMPERVIOUS SURFACE REDUCTION** – This increases the amount of surface area able to naturally absorb and filter stormwater by using methods such as pervious pavement.

BIOSWALES AND RAIN GARDENS AS BMPs

What are bioswales and rain gardens?

Rain gardens are fabricated structures that resemble shallow depressions in the landscape. Planted with



Photo courtesy of American Public Works Association. The image at left depicts a residential rain garden.

vegetation, they collect stormwater runoff from developed areas and allow it to soak into the ground through rocks and soils that serve as filtering media. Bioswales are landscaped areas with gently sloped sides, and are designed to collect and direct water draining from a given area. They remove nutrients and sediment from the water. A bioswale may contain plants, rocks, or other materials designed to slow the flow of water and

filter it. Both rain gardens and bioswales are examples of filtering practices. Both structures have the added benefit of encouraging groundwater recharge.

What are the benefits of bioswales and rain gardens as BMPs?

Bioswales and rain gardens are highly customizable BMPs that can be designed to fit the particular demands of a site. They can be created in “left over” strips of areas of land too small or otherwise unsuitable for development. Bioswales can be placed around the perimeter of a parking lot to collect and filter runoff that often contains a multitude of contaminants from automobiles. Bioswales and rain gardens create pockets of vegetation that can offer habitat in otherwise inhospitable areas. Native plants can be used to promote

biodiversity and better withstand droughts. Bioswales and rain gardens can be used to create more attractive features in public areas than many conventional stormwater management techniques.

IMPERVIOUS SURFACE REDUCTION AS A BMP

What is impervious surface reduction?

Impervious surface reduction describes techniques that reduce the total area of impervious cover, meaning that stormwater is managed where it falls. This reduces runoff and filters nutrients and sediments. New technologies, such as pervious pavement and concrete, have made it possible to create sidewalks, parking lots, and driveways that allow water to filter through and naturally recharge groundwater, rather than running off. Green roofs contain plants that absorb water and release it back into the atmosphere, rather than sending it down rain gutters. Also, rain barrels are used to collect water from rooftop drainage systems, and allow it to be recycled for gardening or other uses.



Photo courtesy of US Concrete.

What are the benefits of impervious surface reduction as a BMP?

These BMPs encourage stormwater infiltration, thus naturally recharging groundwater supplies and reducing volume during storm events that may contribute to flooding. On-site management of stormwater using such methods reduces the need to build and maintain larger, costlier structures often used in conventional stormwater management.

WET PONDS AND WETLANDS AS BMPs

What are wet ponds and wetlands?

Wet ponds and wetlands are fabricated structures that collect stormwater and hold it, allowing the contaminants to be filtered and settle. They are permanently wet, although standing water may not always be present in the case of wetlands.

What are the benefits of a wet pond or wetland as a BMP?

Wet ponds and wetlands allow for natural groundwater recharge, as well as filtration of nutrients and sediments. Because they mimic natural ponds and wetlands, they can provide habitat, especially when native plants are present. They can also provide recreational or aesthetic benefits to the public, while interpretive signage can offer education.

DEFINING AN URBAN STORMWATER BMP IMPLEMENTATION STRATEGY

The key to implementing stormwater BMPs is to identify and coordinate with entities that have control over the development and maintenance of large developed land areas in Lycoming County's urban and suburban

municipalities. These groups include major developers (both residential and commercial), government entities, and institutions, such as colleges, schools, and hospitals. Providing information about BMPs, their benefits, and how they can generate revenue is the first step.

The different types of urban stormwater BMPs may be targeted to the most suitable areas. Bioswales, rain gardens, and impervious surface reduction BMPs are ideal for Lycoming County's designated growth areas, where modern suburban-style retail and business parks are likely to be developed. Information will be prepared that can be provided as part of economic development packages given to potential businesses for these large sites.

Lycoming County has identified several dozen brownfield sites, including a large corridor adjacent to the West Branch of the Susquehanna River in Williamsport, where a major planning effort is now underway. Appropriate information should be provided to interested developers of these sites, especially where contamination is suspected, to encourage on-site infiltration, if deemed safe and appropriate, rather than runoff of potentially polluted stormwater.

Rain gardens and rain barrels also can be designed for residential use, including the collection of water discharged from rain gutters. In recent years, at least 12 small rain gardens have been constructed in Loysock Township to manage stormwater in new residential development. Information incorporating local examples and tailored to residential and institutional sites, particularly multi-family housing, will be developed and provided by Lycoming County staff to local builders and residential land developers. Coordination with local garden clubs and other appropriate groups will be initiated to reach existing homeowners. The support of the Lycoming County Conservation District and Penn State Cooperative Extension Service could be requested to help reach out to schools where any of the BMPs discussed in this section could be implemented. This could generate revenue and improve stormwater management, while allowing on-site demonstrations to teach students about environmental science concepts. Older students could participate in the installation of BMPs, either through classes or student organizations, ultimately reducing labor costs.

STREAM AND FLOODPLAIN RESTORATION BMPs

The key to implementing stormwater BMPs is to identify and reach out to entities that have control over the development and maintenance of large developed land areas in Lycoming County.

These BMPs reduce nutrient and sediment pollution from eroding streambanks and protect streams from surrounding land uses. These BMPs include the following:

- ✓ **FLOODPLAIN RESTORATION** – removal of legacy sediment nutrients
- ✓ **RIPARIAN BUFFERS** – forested and grassed
- ✓ **CREATED AND RESTORED WETLANDS** – through floodplain restoration.

Floodplain restoration is a stream restoration process that improves flood attenuation functions and removes legacy sediments from erosion. This physical removal of sediments nearly eliminates streambank erosion in the restored stream segment, thereby reducing sediment and nutrient loading to the Chesapeake Bay.

Potential floodplain restoration projects have been identified during Phase II of the Lycoming County Chesapeake Bay Nutrient Management Strategy. Riparian buffers and created/restored wetlands are included as part of the floodplain restoration approach. Additionally, there are other sites in Lycoming County where forested or grassed riparian buffers have been implemented or are planned for implementation. Those riparian buffer sites are treated in a subsequent BMP section of this report.

What are legacy sediments?

Modern development activities and agricultural practices are often blamed for polluted waterways and unstable streams. However, another portion of the problem, especially in the Chesapeake Bay region, goes back to the agricultural period of the 18th century through the early 20th century. During this time, erosion from large-scale forest clearing and poor farming practices deposited millions of tons of soil into local streams, valleys, and floodplains.

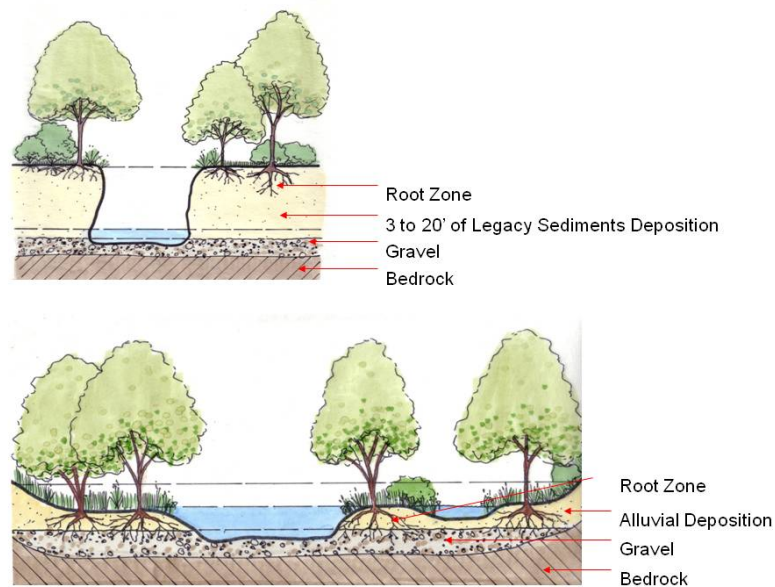
Concurrently, hundreds of mills and dams along Pennsylvania waterways slowed stream flow, causing the deposition of tons of sediment in the backwater areas of the dams. These sediments, deposited throughout our stream and river valleys within the past two centuries, are called “legacy sediments.”

How can we deal with legacy sediments?

As mill dams either have collapsed or have been intentionally removed, streams began “cutting down” (deepening the stream channel by removing material from the stream bed) through accumulated legacy sediments. Today, stream channels are still cutting rapidly through thick stacks of legacy sediments. When the stream channel eventually cuts down vertically to its historical elevation, the stream begins to undercut the high banks created by the fine legacy sediments. The large volume of sediment trapped in the valley bottoms for several centuries has become a major source of suspended sediment and nutrient pollution in local streams and in their downstream-receiving water. This erosion of the streambed and streambanks results in tons of sediment moving downstream to the Chesapeake Bay.

Floodplain restoration reverses the impacts of legacy sediments. Floodplain restoration returns the stream and its floodplain to its historical elevation through the physical removal of legacy sediments. Once completed, the stream channel is reconnected to its floodplain. Floodplain restoration offers both environmental benefits and nutrient credit trading opportunities. See the diagram below for a comparison of a floodplain affected by legacy sediment and a restored floodplain.

FIGURE 5 — FLOODPLAIN AFFECTED BY LEGACY SEDIMENT (TOP) AND A RESTORED FLOODPLAIN (BOTTOM)



Source: LandStudies, 2008

What are the benefits of floodplain restoration?

Legacy sediments generally contain moderate-to-high concentrations of nitrogen and phosphorus. These sediments erode easily and contribute a significant pollutant load to local streams, to the West Branch of the Susquehanna River, and ultimately, to the Chesapeake Bay. Removing the legacy sediment and establishing a stable stream channel effectively eliminates this pollutant source. The created and restored wetlands associated with the floodplain restoration further remove nitrogen through denitrification processes. Denitrification involves the removal of nitrate (the common form of nitrogen typically dissolved in water) from saturated soils by natural soil bacteria, which convert it to atmospheric nitrogen. This process occurs in wetlands.

The restored floodplain also traps incoming sediments from upstream sources. Wetland and riparian vegetation filters incoming nutrients, adding to the long-term benefit of sediment and nutrient reduction. Additional environmental benefits of floodplain restoration are described in Appendix LandStudies – 8: Environmental Benefits of Floodplain Restoration.

How are nutrient credits generated from floodplain restoration?

One criterion for a floodplain restoration project is that the floodplain is lowered through the removal of legacy sediment to its historical elevation. For nutrient trading purposes, these removed sediments must have nutrient concentrations that are high enough to justify the expense of their removal. Typical nutrient concentrations in legacy sediments are 2.5 pounds of nitrogen per ton of sediment, and 2.0 pounds of phosphorus per ton of sediment.

Nutrient credits can be generated through floodplain restoration for the following load reduction processes:

- ✓ Reduced streambank and streambed erosion
- ✓ Created and restored wetlands
- ✓ Riparian buffers (typically forested buffers)
- ✓ Land use conversion

Protocols for calculating nutrient credits have been established for wetlands and buffers, and are available and published by the PA DEP. However, calculation of credits for reductions in streambed and streambank erosion have not yet been established and approved by the PA DEP. The Lycoming County Chesapeake Bay Nutrient Management Strategy project team is presently proposing an interim credit calculation protocol to the PA DEP for approval. This interim protocol likely would be in effect until field studies are completed on the PA DEP pilot projects. These field studies and the associated permanent credit calculation protocols likely will not be completed until 2012 or later.

Since floodplain restoration is a one-time BMP implementation, the nutrient credits the team will propose to the PA DEP for floodplain restoration will be for a 20-year period. Based on current data and initial coordination with the PA DEP, a 20-year credit period appears appropriate.

Floodplain restoration projects typically take two to three years, from the point of site identification to completion of the restoration construction. The nutrient credit projections provided in Phase II utilize typical floodplain restoration specifications for completed projects in Pennsylvania. Floodplain restoration specifications for the Lycoming County sites identified in Phase II will be determined in the feasibility assessments in Phase III, starting in 2009.

DEFINING A FLOODPLAIN RESTORATION BMP IMPLEMENTATION STRATEGY

Potential floodplain restoration sites have been identified in Phase II of the Lycoming County Chesapeake Bay Nutrient Management Strategy. Additional sites will be identified in Phase III. Feasibility assessments should be carried out in Phase III on the most promising sites that have been identified.

These feasibility assessments need to consider (1) landowner interest; (2) legacy sediment nutrient concentrations; (3) engineering opportunities and constraints for legacy sediment removal; (4) preliminary calculations for nutrient credits, stormwater credits, wetlands creation, and carbon credits; and (5) the estimated cost of the floodplain restoration project and other project funding sources. The highest priority restoration sites can then be identified and pursued.

Another source of floodplain restoration information to be investigated involves the Lower Lycoming Creek Flood Damage Reduction Project — a 36-month effort involving the County, local municipalities, and the U.S. Army Corp of Engineers. It provides detailed information on potential floodplain restoration opportunities.

For Phase II, the project team identified several potential floodplain restoration sites for further assessment in Phase III. The team identified these sites through a process that included these activities:

- ✓ GIS analysis of streams and associated land uses in Lycoming County
- ✓ Local knowledge of streams and legacy sediments in the County



- ✓ Analysis and identification of mill dams in the County
- ✓ Analysis through GIS of impaired streams in the County
- ✓ Aerial flight reconnaissance of the streams in the southern half of the County
- ✓ Field reconnaissance trips through the southern half of the County, with targets identified through the other site identification steps.

All streams in Lycoming County are shown on the map in Appendix LandStudies – 9: Lycoming County Streams. The PA DEP maintains a list (called the 303-d list) of streams throughout the state that are impaired

**TABLE 5 - PA DEP 303D LIST:
 CAUSES AND LENGTHS OF STREAM IMPAIRMENT IN LYCOMING COUNTY**

Cause of Impairment	Stream Length (Miles)
Abandoned Mine Drainage	17.3
Agriculture - Siltation	31.5
Atmospheric Deposition	64.1
Crop Related Agriculture	6.5
Grazing Related Agriculture	3.5
Habitat Modification	2.5
Small Residential Runoff	37.4
Unknown	61.6
Urban Runoff/Storm Sewers	4.9
Total Impaired Stream Length	229.3 miles

or do not meet their designated or existing uses. Uses may include aquatic life, fish consumption, recreation, and potable water supply. Once placed on the 303-d list, a total maximum daily load (TMDL) is established for the stream segment by the PA DEP. A TMDL is the allowable amount of a pollutant that can be released into a water body, while still meeting water quality standards. TMDLs include pollution from point and non-point sources, along with a margin for safety. The map in Appendix LandStudies – 10: Impaired Streams and Causes of Impairment shows all impaired stream segments and causes for impairment in Lycoming County. These impaired segments could be potential sites for floodplain restoration, buffer implementation, or other BMPs that generate nutrient credits and reduce non-point source pollution.

Analysis of historic maps identified 251 historic mill dams in Lycoming County. See Appendix LandStudies – 11: Historic Mill Dam Locations, and Appendix LandStudies – 12: Index of Historic Mill Dams in Lycoming County. The highest concentrations of mill dams appear along Muncy Creek and its tributary, Sugar Run, as well as Little Muncy Creek and its tributary, Beaver Run. Mill dams were also common on Mill Creek and Larry’s Creek. The locations of mill dams are potential sites for the presence of legacy sediments.

Eight potential floodplain restoration sites were identified in Lycoming County in Phase II. These sites are shown on the Lycoming County maps in Appendix LandStudies – 13: Potential Lycoming County Floodplain Restoration Sites for Generating Nutrient Credits. The feasibility assessments of these and additional sites to be completed in Phase III will provide the specific data and information for site-specific calculations of nutrient credits.

RIPARIAN BUFFERS AS BMPs

A riparian buffer is a strip of permanent vegetation that runs adjacent to the stream, requires minimal maintenance, and filters pollutants from surface water runoff and shallow groundwater flow. The buffer can be as simple as allowing natural vegetation to grow (invasive species should be controlled), or can consist of planting specific grasses, shrubs, trees, or a combination. Buffer width requirements vary if a cost incentive program is used. The nutrient trading program requires a minimum buffer width of 35 feet from the top of the bank. Riparian buffers can be implemented as a separate BMP or as part of a streambank fencing or floodplain restoration project.

**TABLE 6: BUFFER LENGTH AND ACREAGE BY INSTALLATION YEAR
 (ALL BUFFERS 35FT WIDTH MINIMUM)**

DATA FROM PA DEP STREAM RELEAF WEB SITE			
<i>Year</i>	<i>Acres</i>	<i>Miles</i>	<i>Number of Projects</i>
2005	95	6.3	11
2006	469	32.1	46
2007	436.2	30.1	48
2008	222.6	8.5	12
Total	1222.8	77	117

Source: LandStudies, 2008

Lycoming County has an active history of riparian buffer installation. The Conservation Reserve Enhancement Program (CREP), a federal program dedicated to the retirement of environmentally sensitive land, reports that 583.4 acres of stream buffer have been installed through that program in Lycoming County since 2005.

The PA DEP maintains a database of installed buffers from all programs and organizations, including the CREP program. This information can be accessed on PA DEP’s Stream Releaf Web site located at: <http://www.dep.state.pa.us/dep/deputate/watermgmt/wc/Subjects/StreamReLeaf/default.htm>.

This Web site lists only the buffers that were reported to the PA DEP, which does not verify the accuracy of reports through field visits.

How are nutrient credits generated from riparian buffers?

Both forested and grassed riparian buffers earn nutrient credits for projects implemented since 2005 and for new projects yet to be completed. Nitrogen removal efficiencies are greater for forested buffers, but phosphorus removal efficiencies are the same for grassed and forested buffers.

The riparian buffers implemented since 2005 should be analyzed, and the nutrient credits calculated and certified by the PA DEP. One issue that must be addressed, however, is whether projects that have been funded by either federal or state funding programs are eligible for nutrient



Photo courtesy www.pgc.state.pa.us/crep. The image above shows a Conservation Reserve Enhancement Program stream buffer, as well as stream bank fencing.

credits. The sale of nutrient credits is a potential financial gain to landowners for projects implemented on their lands using public funds. This issue is equally important for past and future BMP projects.

An additional step that needs to be taken is the maintenance needs of buffers already installed. Nutrient credits must be verified annually, even for one-time BMP implementations, such as riparian buffers. Each of the riparian buffers installed since 2005 will need to be verified for nutrient credits. This will necessitate that the health of the planted trees or grasses needs to be determined, and replacement grass seeding or tree planting may need to be completed before credits are certified.

DEFINING A RIPARIAN BUFFER BMP IMPLEMENTATION STRATEGY

A first step to take in Phase III is to determine the nutrient credits available for the 1,222 acres of riparian buffers already installed in Lycoming County. Nutrient credits for these projects are largely determined by the land uses for both the footprint where the riparian plantings occurred and the land that is up-gradient of the installed riparian buffer. Therefore, nutrient credit calculations are completed on a project-by-project basis, and will likely require the involvement of the watershed associations and others responsible for these projects.

New riparian buffer projects can be identified in Phase III by using several approaches. Watershed associations are key stakeholders that can provide prospective restoration sites for riparian buffers. These watershed associations can function as effective liaisons between landowners who have installed or are interested in installing buffers, and the nutrient trading program. Landowners who participated or wish to participate in CREP and other stream buffer programs can be contacted through the agricultural outreach program described previously.

The Advisory Committee and the three work groups for the Lycoming County Chesapeake Bay Nutrient Management Strategy also may be effective forums to identify potential riparian buffer restoration sites and secure funding to implement the buffers.

LAND USE CONVERSION AS A BMP

The conversion of 4,996 acres of Lycoming County row crops in to grassland, completed through the CREP program, may qualify for nutrient credits. Since this land is still in agriculture, the land use conversion protocol for calculating nutrient credits may be applicable to generate nutrient credits. The agricultural tillage method used on these lands (prior to conversion to grassland) is important to determine the number of nutrient credits. Therefore, the credit calculations must be done on a farm-by-farm basis. These conversions will need to have been done since 2005 to qualify for credits.

Once the applicability of these land use conversion projects has been determined in Phase III, future land use conversion projects should be pursued, following the policy protocols determined in discussions with the PA DEP. It is important to note that it is not the intention of the Commonwealth to promote the conversion of lands from agricultural uses (e.g., for development) to generate nutrient credits.

How many credits can be generated and when?

See Appendix LandStudies – 1: Summary of BMPs and the Potential Credits Generated from Implementation on a Yearly Basis. The number of credits shown for the BMPs is an estimate of the potential number of nutrient credits that could be generated over time. These estimates of nutrient credit potential assume landowner interest in credit trading, landowner compliance with land use trading requirements, sufficient capacity for calculating and certifying credits, and ready purchasers of nutrient credits. The formal calculation of nutrient credits requires site-specific information, which will be gathered in Phase III. The gathering of site-specific information requires the consent and involvement of the landowner. The specifics of how Lycoming County’s nutrient trading program will operate, and the involvement of the Advisory Committee, Non-Point Source Work Group, and other program stakeholders, need to be established and operating before meeting with BMP project landowners. These actions are necessary to gather more accurately the requisite information to calculate nutrient credits for submittal to the PA DEP.

The projected number of BMPs over time is based on a set of assumptions regarding:

- ✓ The applicability of already-implemented projects qualifying for nutrient credits
- ✓ The availability of funding for implementing new BMPs
- ✓ The availability of a financing strategy to sustain the credit trading program, so these credits can be calculated and certified
- ✓ The judgments of various agency representatives and restoration experts on what is feasible over time for new BMP implementations.

New BMP implementations in the first three years currently assume a successful funding approval for the National Fish and Wildlife Foundation (NFWF) grant application submitted by Lycoming County in November 2008, as well as other funding sources, to jump-start BMP implementations.

MATCHING NUTRIENT TRADING CREDITS WITH DATE-SPECIFIC LOAD REDUCTION REQUIREMENTS

Appendix LandStudies – 1: Summary of BMPs and the Potential Credits Generated from Implementation on a Yearly Basis provides a timeline for the potential number of nutrient credits that could be generated over time, given the assumptions discussed above. We will establish specific nutrient credit targets over time in Phase III, as the assumptions made in this appendix are addressed and the time-specific credit needs of the point sources are established.

The number of potential nutrient credits identified in this appendix are best estimates for planning purposes. Based on our preliminary review of all available data, the amount of credits potentially available in Lycoming County may be enough to substantially meet the needs of the seven County WWTPs. The costs for nutrient credits must be made with project-specific data in Phase III, and as surety concerns and supply-and-demand dynamics unfold.

The cost-effectiveness of purchasing nutrient credits compared to the “knee-of-the-curve” costs for hard infrastructure upgrades at the WWTPs will be carefully considered by the municipal authority engineers and staff. From a confidence perspective, as public and private funding is secured for implementing new BMP

projects in Lycoming County, and methods of surety acceptable to WWTPs are developed, the nutrient trading program will be increasingly viewed as more sustainable. This will allow the municipal authorities to make financially sound decisions regarding various WWTP infrastructure upgrades by considering the incorporation of nutrient credits to help meet nutrient cap compliance.

WHO SHOULD DO WHAT IN THE NUTRIENT CREDIT TRADING PROGRAM?

A common theme for BMP implementation strategies described previously is the involvement of the Advisory Committee and its Non-Point Source Work Group in crafting and guiding next steps. The assistance of expert consultants may be necessary for nutrient credit calculation and certification purposes, and for the implementation of BMPs. The implementation of the manure export BMPs and the floodplain restoration BMPs (and associated wetlands restoration/creation BMPs) are specific efforts that require expert assistance. Securing the funding needed for implementing BMPs in the Lycoming County program may also require expert consultant assistance.

The implementation of the no-till, conservation tillage, cover crop, and streambank fencing BMPs may be accomplished through the efforts of Lycoming County, the Lycoming County Conservation District (LCCD), the Natural Resources Conservation Service (NRCS), the USDA's Farm Service Agency, Penn State Cooperative Extension Service, the Chesapeake Bay Foundation, and others associated with the Non-Point Source Work Group.

The watershed associations can work with the LCCD and NRCS, in coordination with the Non-Point Source Group and Lycoming County to help implement forested and grassed riparian buffers. Urban stormwater retrofit BMPs can be addressed by Lycoming County and municipalities for past and planned BMP projects.

The following section documents some preliminary recommendations for the primary team members for these BMPs in Phase III. During this phase, the focus will be on:

- ✓ implementation of the Nutrient Management Strategy by generating interest in the nutrient trading program
- ✓ identification of land with currently implemented BMPs
- ✓ promotion of BMP implementation
- ✓ securing the public and private funds to help launch the trading program and provide maximum flexibility in managing the construction phase of the WWTPs and tributary collection systems.

What should Lycoming County government do?

Lycoming County should provide the oversight and guidance needed to implement the nutrient credit trading program. The County should work closely with the Non-Point Source Work Group and the PA DEP to develop nutrient trading procedures that will be efficient and effective. The program must be practical to entice participants and maintain a good reputation throughout the County. Lycoming County also needs to work closely with the Non-Point Source Work Group to implement an agricultural outreach strategy that educates farmers, agencies, and organizations that could be key players in the nutrient trading program. (A list of target organizations is included in Appendix LandStudies – 7: Agricultural Outreach Guidance, Best

Management Practice Implementation Strategy.) Finally, the County should work with the Economic Development and Finance Work Group to develop and pursue a comprehensive funding strategy for trading and construction costs, and establish an operational structure to sustain the program.

What should the Lycoming County Conservation District (LCCD) do?

The LCCD and other farm-related organizations have contact with agricultural producers through technical assistance, conservation planning, cost-share contracts, and the Act 38 Nutrient Management Program, among other programs. These agencies currently promote, plan, and help implement BMPs on farms through on-farm visits, educational field days, and literature.

These groups should be used to promote BMPs and the nutrient trading program. These agencies can present nutrient trading as another tool available to help farmers pay for BMP implementation, or to make an existing BMP more lucrative. They should have a detailed understanding of nutrient trading to explain how the program applies to producers at their specific operations and in consideration of their management goals.

Typically, the responsibility of verifying baseline and threshold requirements, along with the annual implementation of BMPs for the trading program, falls to the local Conservation District. Roles and responsibilities should be discussed and assigned by the Non-Point Source Work Group.

A draft Agricultural Outreach Plan has been developed by the Delta team (including LandStudies, Inc.) to generate interest within the agricultural community. Goals of this effort include educating farmers and organizations, agencies, and consultants who work with farmers about the nutrient trading program; promoting BMP implementation; providing technical assistance to farmers willing to implement BMPs; and generating nutrient trading credits through implemented BMPs. The LCCD and the Non-Point Source Work Group should have a primary role in finalizing and implementing an outreach program. See detailed suggestions for outreach guidance in Appendix LandStudies – 7: Agricultural Outreach Guidance, Best Management Practice Implementation Strategy.

What should the Non-Point Source Work Group do?

The Non-Point Source Work Group should define the roles each stakeholder will play in the organization and promotion of the nutrient trading program. Effective promotion of BMP implementation and the nutrient trading program are imperative for the nutrient trading program's success.

Program roles that must be assigned include: creating a pilot trading group; determining who will contract trades and verify that threshold and baseline conditions are met; who will create and submit credit generation proposals to the PA DEP, including calculations to show nutrient reductions; who will verify credits; who will keep records of generated credits, DEP approval, and approved credit transfers; determining what groups will be responsible for education and outreach; and how much responsibility should be placed on the credit generators and purchasers. The Non-Point Source Work Group also must address how the program will become self-sustaining. See the next section for "Paying for a Sustainable Strategy" for a more detailed discussion.

Finally, the Non-Point Source Work Group must report to the full Advisory Committee and ensure this larger body fully understands the issues, opportunities, and recommendations of the Non-Point Source Work Group.

PAYING FOR A SUSTAINABLE STRATEGY

WHAT MAKES A NUTRIENT MANAGEMENT STRATEGY SUSTAINABLE?

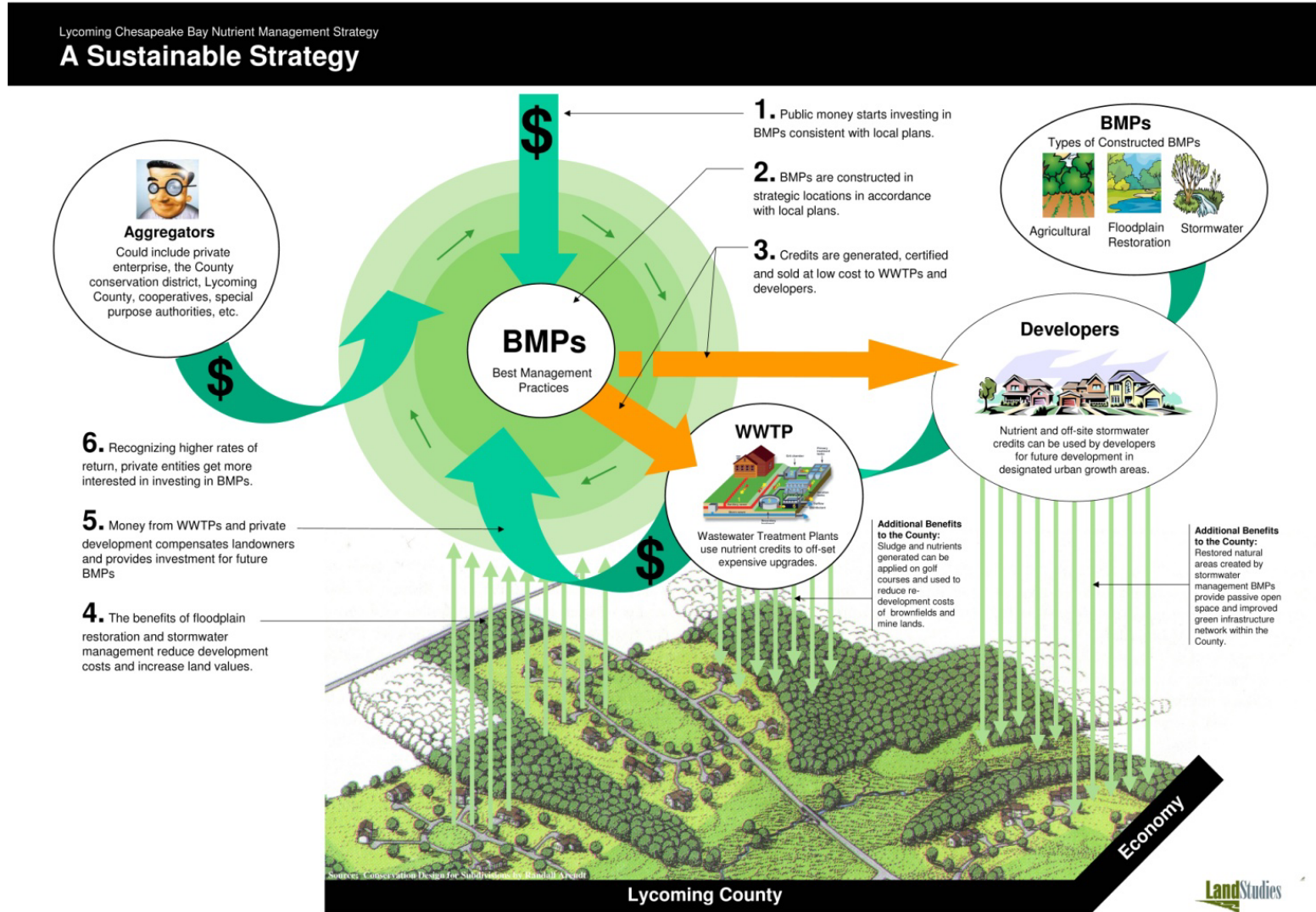
A sustainable strategy will provide for local economic growth in the form of new, renewed, and expanded businesses in Lycoming County. A sustainable strategy enables economic expansion to pay for additional sewage treatment demanded by this growth, while making investments that benefit Lycoming County. A sustainable strategy depends on the willingness of the WWTPs to buy nutrient credits locally.

What are the steps to a sustainable strategy?

- ✓ First, public funds are used to jump-start investments in BMPs.
- ✓ Then, landowners use BMPs to generate nutrient credits.
- ✓ WWTPs may purchase these credits and reinvest savings into sewage treatment plant technology upgrades to address growth.
- ✓ Private entrepreneurs invest in BMPs and sell credits for a profit.
- ✓ As money is invested back into BMPs, more local Lycoming County projects will be completed that wisely manage our resources, thus improving the local environment, raising the value of the land, and benefiting the local economy.
- ✓ Over time, more revenue is invested into BMPs and WWTPs, which keeps rates lower for customers and allows for continued growth and economic development.
- ✓ In the long term, economic growth may also necessitate growth in the overall volume capacity at some plants.

This sustainable strategy concept is graphically depicted in Figure 6 on the following page.

FIGURE 6: A SUSTAINABLE STRATEGY



Source: LandStudies, 2008

What is the role of public funding sources?

Governor Rendell's *Sustainable Water Infrastructure Task Force Report*, released November 1, 2008, concluded that additional state subsidies will be necessary to address the immediate needs for infrastructure improvements, but only to the extent that local resources are inadequate. This gap financing approach, using a mix of low-interest loans/grants, is anticipated to provide enough subsidies to make required infrastructure improvements without resulting in rates that exceed a state affordability target. The affordability target could be user rates of up to 1.5 percent of median household income for systems not already charging the equivalent of the full cost of service for water and wastewater in most communities. Federal and state subsidies provide both seed money for infrastructure projects and incentives for projects that promote sustainability and permit compliance.

What are the public funding opportunities?

ACT 63 OF 2008 – H2O PA

OVERVIEW

Pennsylvania Act 63, adopted July 9, 2008, provides up to \$800 million in grant funding for water, sewer, stormwater, flood protection, and dam safety projects over the next 10 years. Of this funding pool, \$665 million is dedicated to water, sewer, and stormwater projects, specifically. The program is administered by the Pennsylvania Commonwealth Financing Authority (CFA) with technical assistance provided by the PA DEP and the Pennsylvania Infrastructure Investment Authority (PENNVEST).

ELIGIBILITY CRITERIA AND FUNDING LEVELS (WATER/SEWER/STORMWATER PROJECTS)

- ✓ Applicants can include the Commonwealth, an independent agency, or one or more municipalities/municipal authorities.
- ✓ Local share must be at least 50 percent of the total CFA award.
- ✓ Grants will be awarded for eligible projects of \$500,000 or more, but will not exceed a total of \$20 million for any single project.
- ✓ A minimum of 50 percent of grants for water and sewer projects (\$332.5 million) must be for regional systems or projects that will consolidate two or more systems.
- ✓ Priority will be given to eligible applicants currently subject to a federal or state court or agency order, consent decree, or new permit discharge requirements imposed after January 1, 2007.
- ✓ Lycoming County is one of 65 Pennsylvania counties eligible for the \$665 million allocated for water, sewer, and stormwater projects (Allegheny and Philadelphia Counties are ineligible).
- ✓ Priority is given to projects that are determined to be “shovel ready,” or ready to construct.
- ✓ Deadline for the first application was February 13, 2009.

Lycoming County is among the 65 Pennsylvania counties eligible for \$665 million allocated for water, sewer, and stormwater projects.

RECOMMENDATIONS

WWTP operators should review the CFA's Act 63 program guidelines, particularly the application evaluation section, and consider regionalization options, cost-effectiveness, ability to secure funding, and proactive implementation of practices to promote system sustainability.

ISSUES

It is anticipated that the *Keystone Principles* (See Appendix Delta – 1: Pennsylvania's Keystone Principles) will guide the grant decision-making process. Thus, the \$665 million in Act 63 grant funding for water, sewer, and stormwater projects may be fairly and equitably distributed around the Commonwealth. Under this scenario, few projects are likely to receive the maximum \$20 million award.

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ACT 64 OF 2008 – WATER AND SEWER SYSTEMS ASSISTANCE ACT

OVERVIEW

Under Pennsylvania Act 64, the Commonwealth is authorized to borrow up to \$400 million, which PENNVEST can then issue as grants and loans for drinking water, sewer, stormwater, or non-point source projects (\$200 million in grants and \$200 million in loans) to municipalities, municipal authorities, and public utilities.

ELIGIBILITY CRITERIA AND FUNDING LEVELS

- ✓ Eligible applicants include municipalities, municipal authorities, and public utilities.
- ✓ Infrastructure projects (drinking water, wastewater, and stormwater -- up to \$11 million for one municipality, or \$20 million for two or more).
- ✓ Purchase or trading of nutrient credits (to be determined).
- ✓ Control of non-point sources of pollution (e.g., acid mines, brownfields, and on-lot systems) up to \$11 million for one municipality, or \$20 million for two or more.
- ✓ The consolidation or regionalization of two or more water supply systems, sewage disposal systems, or stormwater systems managed or operated as an integrated system, regardless of whether or not the system is physically interconnected.
- ✓ No new requirements or special applications are needed for communities to access this funding. PENNVEST's application and implementation process will remain the same for this funding. However, PENNVEST will look to move actual cash to communities as quickly as possible, so applicants should be prepared to settle with PENNVEST on their funding offer as quickly as possible.
- ✓ PENNVEST anticipates using most and perhaps all of the \$200 million in grant capacity to help more economically challenged communities across the Commonwealth.

RECOMMENDATIONS

PENNVEST has traditionally reviewed all sources of revenue for an applicant, along with user rates and existing debt, and applies an “affordability” test. Grants are usually reserved for applicants with user rates that are already high. The prevailing thought is that a monthly sewer rate should be affordable if it is less than 1.5 percent of median household monthly income. Communities whose rates are above the 1.5 percent threshold are more likely to receive external (federal and/or state) income.

ISSUES

Any grant received under the H₂O PA (Act 63) program could preclude an applicant from also receiving a grant under Act 64. However, low-interest loans and economic stimulus funds will likely be available, due to project needs. Many of Lycoming County’s WWTPs may not have had projects that were shovel-ready by PENNVEST’s February 16, 2009, deadline for approval at the April meeting, and may need to target their applications at the next PENNVEST meeting, sometime later in 2009.

NATIONAL FISH AND WILDLIFE FOUNDATION CHESAPEAKE BAY STEWARDSHIP FUND

OVERVIEW

The National Fish and Wildlife Foundation (NFWF), in partnership with the EPA and the Chesapeake Bay Program, will award grants of between \$200,000 and \$1 million each to support innovative, cost-effective, sustainable approaches to dramatically reduce or eliminate nutrient and sediment pollution to the Chesapeake Bay and its tributaries. Up to \$12.9 million will be awarded during the upcoming funding round.

ELIGIBILITY CRITERIA

Projects should be implemented entirely within the Chesapeake Bay watershed. In addition, projects must include a minimum 1:1 non-federal match, which may include cash and in-kind contributions. A 1:1 match means that at most, half of the project funding may be provided by NFWF, and at least half of the project funding must be provided by the applicant or applicant’s partners.

Eligible applicants include:

- ✓ Nonprofit 501 (c) organizations, universities, and local or state governments (i.e., state conservation agencies, counties, townships, cities, boroughs, conservation districts, planning districts, drainage districts, or other units of local government)
- ✓ Organizations located outside the Chesapeake Bay watershed may apply, if their projects will be conducted within the watershed.

Note: individuals, federal agencies, and for-profit firms are not eligible for grants under this program.

RECOMMENDATIONS

Lycoming County has completed the qualifying pre-proposal for an NFWF grant, which focuses on implementing BMPs in Lycoming County, and quantifying those BMP benefits in units of sediment and nutrient load reductions to the Bay. NFWF will issue invitations to submit full proposals by mid-January 2009. It is recommended that Lycoming County submits a full proposal to NFWF if the pre-proposal is accepted by NFWF.

OTHER FUNDING OPPORTUNITIES

Additional public funding opportunities for point source and non-point source projects can be found in Appendix Delta – 2: Public Funding Opportunities.

In addition, the EPA published the *Guidebook of Financial Tools: Paying for Environmental Systems* in August 2008 (www.epa.gov/efinpage/guidebook.htm). This reference resource will be reviewed by the project team prior to coordination with the work groups during Phase III (2009).

How does the County best position itself to garner these funds?

Lycoming County needs to be united in its goal to reduce the long-term costs associated with implementing Pennsylvania’s Chesapeake Bay Tributary Strategy, including the wet weather compliance-driven upgrades to various collection systems. The County’s objective is to reduce the financial impact on water/sewer ratepayers, property owners, and businesses through a cooperative approach with all six municipal authorities (seven WWTPs) and other separately owned collection systems working on parallel paths toward this common goal.

The County’s objective is to reduce the financial impact on ratepayers, property owners, and businesses through a cooperative approach with all WWTPs working on parallel paths toward this common goal.

On October 10, 2008, Lycoming County and its consultants briefed representatives of the PA DEP North-Central Regional Office, and obtained their full support for a county-based regional initiative. Moreover, on October 22, 2008, Lycoming County briefed PA DEP Water Program representatives in the Harrisburg headquarters, and obtained their support and commitment to help establish and manage the implementation of a county-based nutrient management program in 2009.

With the PA DEP’s support of a regional compliance approach, Lycoming County should coordinate and support funding requests and provide funding application assistance for both point source and non-point source projects. This

should be done to maximize public funding opportunities and generate nutrient trading credits to help offset compliance costs.

Concerns

With limited public funding available, the question is how the County’s WWTPs should pursue a county-wide strategy that seeks the most cost-effective alternatives for compliance. A County-wide strategy should not result in “winners and losers,” where only a few WWTPs receive public funding, while others are left to shoulder the full burden alone. These questions should be addressed in 2009 by the Advisory Committee and Point Source Work Group.

REALITIES

- ✓ *The Governor's Sustainable Water Infrastructure Task Force Report* found that at least \$36.5 billion in capital repairs and upgrades for water and sewer are needed statewide over the next 20 years.
- ✓ *The Legislative Budget & Finance Committee's Chesapeake Bay Tributary Strategy Compliance Cost Study* recently found that the nutrient-related capital cost estimate for the body of "significant municipal dischargers" is \$1.4 billion.
- ✓ The \$665 million in Act 63 grant funding for water, sewer, and stormwater projects likely will be distributed around the Commonwealth. That includes a large geographic area outside the Chesapeake Bay watershed. Lycoming County only represents about 1.2 percent of the population in the 65 counties that are eligible for Act 63 funding.
- ✓ WSA's two plants alone are required to provide 10 percent of the Phase 1 nutrient reductions required from 2002 levels in Pennsylvania. Combined with Montgomery, the three Phase 1 plants together are required to contribute 12 percent of the required nitrogen reduction.
- ✓ The most important reality is that Lycoming County is the only county in Pennsylvania to develop a county-wide strategy to comprehensively and regionally address the CBTS challenge cost-effectively. A price cannot be assigned to the value of this unique approach when considering its impact on potential funding decisions.

What are the opportunities for private investment?

Private entities have the opportunity to earn a profit from investments in BMPs that generate the sale of credits. A robust trading system may help ensure continued economic growth where there is volume capacity available. Creating a public/private partnership will promote the generation of BMPs and therefore, availability of credits within the market. Attractively priced credits also can lower the long-term cost of development, thus providing a competitive advantage for developers in Lycoming County.

How will Act 537 affect private investments?

Required by the Commonwealth by statute, Act 537 Plans are the official sewage facility plans for a WWTP. An Act 537 Plan determines the wastewater needs of the service area and evaluates alternatives to address those needs. If a new business decides to locate in Lycoming County and its wastewater needs were not calculated into the Act 537 Plan, the WWTP may not have the proper capacity to serve the new business. In that case, the business would have to locate elsewhere or use technology to eliminate its nutrient discharges; the result would be costly. Alternatively, the purchase of long-term nutrient credits by the new business may represent a realistic solution.

In short, open communications and cooperation between WWTPs' representatives, the local Chamber of Commerce, and leaders of the business community will go far to create the most accurate Act 537 Plans. In turn, cost-effective solutions benefit WWTPs and allow for economic growth. While to-date, the Act 537 planning process in Lycoming County has effectively matched growth corridors with sewage infrastructure

capacity, the dynamics of economic change and the Marcellus Shale gas opportunities make this an issue of ongoing concern.

What role should Lycoming County's economic development strategy play?

The entire County's (government, authorities, business community) economic development strategy should focus on ensuring continued economic growth, while staying within the nutrient caps of WWTPs. The key will be accurate planning for capacity needs, which can be facilitated best by open communications between economic development leaders and WWTPs. However, economic development should play more than reactive roles. This "sustainable strategy" for nutrient credit trading provides the private sector with an opportunity to invest in BMPs and sell credits for a return on investment. Well-planned and appropriately-timed economic development initiatives can help facilitate the provision of cost-effective sewage treatment infrastructure.

RECOMMENDATIONS

1. Lycoming County should actively seek out prospects that are interested in BMP investment.
2. The County should encourage economic development in a balanced manner — aggressively pursuing revitalization efforts in already-developed locations, such as brownfields.
3. Zoning and land use ordinances should be reviewed to ensure that growth management is consistent with the County Comprehensive Plan, as well as the local multi-municipal plans, and provide a viable option for developers.
4. Growth areas should be reviewed to ensure their locations meet new industry needs, but in a manner consistent with a cost-effective wastewater management strategy.
5. Business and industrial park tenants should communicate capacity needs with WWTPs. For its part, the Chamber's Industrial Properties Corporation (IPC) should seek out businesses that can generate credits or have waste streams that can be reused by other proximity industries.

How will nutrient loading caps affect business and industrial parks?

Some of Lycoming County's business and industrial parks are not yet built-out; large tracts of developable land are still available. Certain industries have the potential for becoming large wastewater producers. If the WWTP does not have the capacity (in both nutrient treatment and overall capacity) to serve a potential prospect, the business may choose to locate elsewhere. Economic development leaders must continue to communicate industry trends to WWTPs, so capacity can be addressed accordingly. Economic developers also should try to attract businesses that would be willing to invest in BMPs to generate credits to sell to the WWTPs — a private investment to ensure that the public WWTP has the capacity to support new business. Appendix Delta – 3: Lycoming County Brownfields Map depicts the location of Lycoming County industrial parks and sewer service areas.

How can brownfield redevelopment benefit the Bay and Lycoming businesses?

Federal and state governments provide incentives to build in brownfields. According to the EPA, these are "sites of real property, where expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." Due to these incentives, it is likely development will occur at these sites. Redevelopment disturbs less land than developing a pristine,

undeveloped greenfield, leading to less nutrient and sediment loads in the Chesapeake Bay. Brownfields are typically located in developed areas; therefore, sewer capacity may already exist. However, the redeveloped site may have different sewer needs than the previous site. WWTPs should be aware of this redevelopment trend and plan for capacity at prioritized brownfields redevelopment sites. Lycoming County has prioritized several brownfields sites that are targeted for reinvestment based on location, size, potential for reinvestment, proximity to roads or other infrastructure, and proximity to other developments. As these brownfield sites are revitalized, there is a potential for each site to install urban BMPs, thus becoming a credit generator. These sites and the sewer service areas are depicted at Appendix Delta – 3: Lycoming County Brownfields Map.

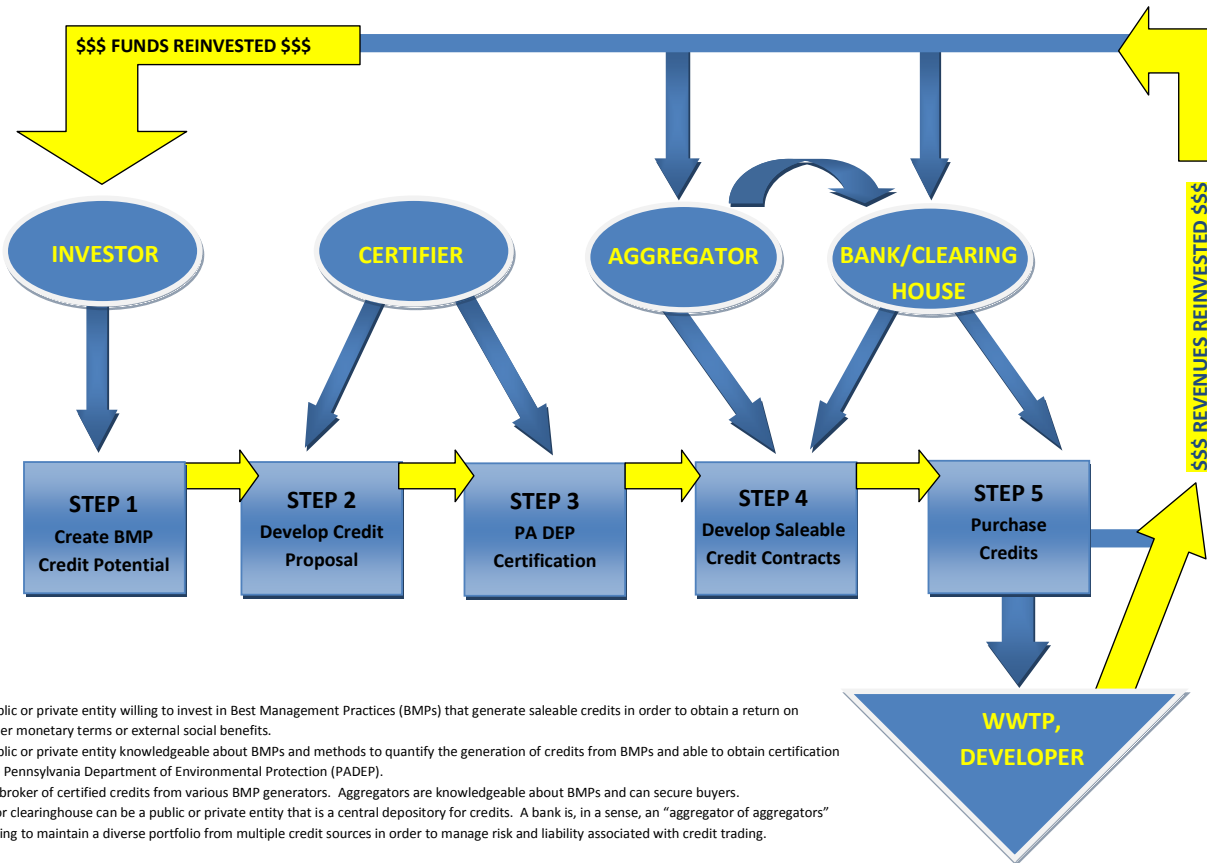
How will the nutrient credit trading strategy be managed?

A viable, sustainable nutrient credit trading system will be based on several free-market principles, including the opportunity for BMP generators to reap financial rewards for their efforts; competition within the marketplace to provide credits at a cost-effective price for point-source consumers; and the incentive to attract private investment into the market to further stimulate the generation of nutrient trading credits among non-point source and point-source dischargers. Ultimately, the nutrient credit trading strategy should be transparent, simple, flexible, and quick to respond to changing market conditions in Lycoming County and beyond.

Key actors will emerge to help facilitate the development and growth of the nutrient credit trading program in Lycoming County. (See Figure 6 above.) These actors will include, among others: investors in BMPs; generators of nutrient credits (both point and non-point sources); aggregators or “brokers” of nutrient credits between buyers and sellers; a clearinghouse or “bank” that potentially could provide a central point of exchange to buy, sell, guarantee, and reduce the risks associated with nutrient credits; private investors willing to invest in BMP generators in exchange for a share of the financial rewards or tax benefits; and a potential vehicle, such as a special purpose authority or private-public partnership. The latter could offer financial incentives to help reduce the cost of implementing BMPs to stimulate the generation of credits in the marketplace. Also, see Appendix Delta – 5: A Sustainable Nutrient Credit Marketplace.

FIGURE - 7

THE CREDIT TRADING SEQUENCE



Source: Delta Development Group, Inc.

What is the role of the aggregator?

An aggregator or broker is an entity that can collect and compile credits from individual sources. Aggregators then seek buyers for credits they have assembled, most likely point source dischargers, developers, or other third-parties. An aggregator is likely to be an entity that understands BMPs, especially non-point source BMPs. An aggregator is motivated by profit and/or environmental stewardship to help grow the supply of nutrient trading credits to meet market demand for such credits, especially from WWTPs. It is critical to attract aggregators to the market to encourage the growth of BMP generators. This collaborative effort will facilitate a robust nutrient credit market in Lycoming County.

Who can be the aggregator?

An aggregator could be a private enterprise, such as Red Barn Trading Company; a public entity, such as a county conservation district; or a private-public partnership, such as a cooperative or special-purpose authority. The key is that an aggregator must demonstrate extensive knowledge of BMPs, and the ability to find and secure buyers of credits generated by BMPs.

What is the role of the clearinghouse or credit “bank”?

The role of a clearinghouse or credit “bank” could be to serve as a central depository of credits. The clearinghouse or bank could buy credits from BMP generators and aggregators, then sell them to potential end users, such as WWTPs, developers, and certain industries (point source dischargers). The advantage of a local clearinghouse or bank is that it may provide a convenient, one-stop point for buyers and sellers of credits. It may also help to mitigate the risks associated with nutrient credits by functioning similarly to a mutual fund, i.e., it would hold a diverse portfolio of credits from multiple credit sources or aggregators. In turn, this may help stimulate demand for credits, especially from WWTPs that may seek greater stability and certainty within the marketplace.

Who can be the clearinghouse or “bank”?

The clearinghouse or bank could be a private entity, a special-purpose authority, a public agency (such as the PA DEP or PENNVEST), or a nonprofit, consumer-owned cooperative. The key principle is that a clearinghouse or credit bank would have the ability to be an “aggregator of aggregators” to help mitigate potential risks associated with nutrient credits by diversifying its portfolio by type and source of credits.

Who is the market regulator?

For any market-driven trading system to function properly, there must be a degree of confidence in its “currency.” In this case, the nutrient credits are the currency upon which buyers and sellers place their confidence. Within the nutrient credit trading program, the PA DEP serves as the default regulator, in that it must certify, verify, and register all nutrient credits before they can be used.

How can greater private investment be stimulated as part of the strategy?

It will be essential to attract private capital and investment to ensure the long-term sustainability of the nutrient credit trading strategy. A potential strategy to stimulate the supply of credits is to create a revolving loan fund or grant program that will help target financial incentives, such as low-interest loans and/or grants to generators of BMPs. This may lower the BMP generators' entry costs into the marketplace to offer credits. Also, the emergence and presence of a strong demand for nutrient credits, especially from WWTPs, is central to the ability to attract private investment.

What are the legal concerns of managing a nutrient credit trading strategy?

Legal, competitive bidding requirements have long been a concern of wastewater treatment facility operators. Competitive bidding is not well suited to nutrient credit trading, because not all nutrient credits are "equal," and the value of credits may depend on a number of factors. These factors include the short- or long-term nature of commitments made by the entity creating the credit to continue the practices that generate such credits, and risks that such activities may not produce sufficient credits in a particular year. In many cases, the projects required to generate credits must be funded up-front, and the terms of the arrangements must be negotiated. As a result, agencies undertaking the purchase of credits may need considerable flexibility in the procurement process to develop and negotiate viable trading deals. However, the PA DEP's legal interpretation is that the bidding provisions of the Municipal Authorities Act or the Procurement Code are not applicable to nor preclude the purchase and sale of nutrient credits by municipal authorities. Appendix Delta – 4: Nutrient Credit Trading Program Accounting Concerns provides a more detailed discussion of additional legal issues related to cap-and-trade programs.

What liability concerns are associated with a nutrient credit trading strategy?

A WWTP must meet its NPDES permit requirements, including specific nutrient cap load requirements at the end of each water year. If a WWTP uses nutrient credits to meet those requirements, it must have assurance that the BMPs producing the credit are functioning properly and are certified as such by the PA DEP. Monetary penalties associated with non-compliance can be substantial, and municipalities and municipal authorities are risk adverse to such scenarios. Thus, minimizing or eliminating such a liability is critical to plans for and the design of sewage facilities infrastructure that is dependent on nutrient credits.

This issue has been a way of life for dealing with the cap-and-trade programs associated with carbon sequestration in the agricultural industry. The agricultural industry is a significant generator of credits used to help carbon dioxide dischargers meet their emission standards in accordance with the federal Clean Air Act. In October 2008, Duke University's Nicholas Institute for Environmental Policy Solutions developed a policy brief that provides a concise summary of the liability issues associated with using cap-and-trade programs.⁵

⁵ Murray, Brian C., Olander, Lydia P., *Addressing Impermanence Risk and Liability in Agriculture, Land Use Change, and Forest Carbon Projects*. Nicholas Institute for Environmental Policy Solutions, Duke University, October 2008.

Liability can be addressed in four tiers: (1) seller; (2) buyer; (3) negotiations between buyer and seller; or (4) the trading system. Review of information to-date and conversations with WWTP operators indicates that typically, WWTPs are not willing to assume any liability as the buyer. That leaves the other three tiers as possible options for managing liability and risk. Sellers typically provide legal agreements that contractually bind them to supply the credits, when needed. They may further secure that agreement with insurance held by a third party, and may self insure by holding credits in reserve. For example, Red Barn Trading Company, a private entity that currently operates in the free market, only releases for sale half of its PA DEP-certified credits.

In a negotiated contract, the buyer and seller reach an agreement possibly to share liabilities, depending on their needs and the associated cost structure. In the “system” tier, the PA DEP Nutrient Credit Trading Program provides another level of liability and risk management. To this end, the PA DEP allows a nutrient credit aggregator/seller to be a co-permittee on the NPDES permit, thus further reducing the liability of the WWTP. The PA DEP certifies, verifies, and registers every credit and maintains its own reserve.

What are the accounting concerns of managing a nutrient credit trading strategy?

Despite the fact that marketplaces for emissions cap-and-trade credits have been around for more than 15 years, accounting procedures for credit purchases have been inconsistent, and voluntary market participants continue to wait for clear guidance from accounting standards setters. The good news is that with regard to nutrient credit trading, both the Financial Accounting Standards Board (FASB) and the Government Accounting Standards Board (GASB) have been made aware of efforts to establish these markets within the Chesapeake Bay watershed, including specific efforts in Lycoming County. These boards also have been provided copies of the PA DEP policy on nutrient credit trading, and were sent a recent news article on Lycoming County’s planning efforts.

In addition, FASB has indicated it is already aware of nutrient credit trading programs within the watershed, and has reinstated a program to provide comprehensive accounting guidance for emissions programs. Although GASB has no project underway, staff indicated they would advise Delta if the FASB were to take any position on the nutrient trading issue going forward. The GASB also indicated it will soon publish

Private Credit Trading Company Addresses Risk and Liability

Red Barn Trading Company, Inc. (Red Barn) insures its ability to sell and deliver on long-term credit contracts through a combination of sound contracts, self insurance, liability insurance, bonding, and a built-in 10 percent reserve ratio required by the Pennsylvania Department of Environmental Protection (PA DEP).

Here’s How it Works ...

- * Red Barn only releases half of its certified nutrient credits onto the open market. That way, for every credit sold, there is one held in reserve, if needed. Red Barn has the ability to spread risk over 600 farm clients located within the Chesapeake Bay watershed.*
- * Red Barn holds legally-binding contracts with non-point sources (farmers) for the exclusive rights to the certified credits for the same terms and length of time as the credit sales contract with the point sources. In many cases, Red Barn will hold an easement on the property associated with the credit generating the best management practice (BMP).*
- * Red Barn holds liability insurance and bonding that help mitigate risk management associated with long-term credit contracts. Liquidated damages of a breach in contract would satisfy the purchase of credits needed in the water compliance year.*
- * The PA DEP holds a 10 percent retirement ratio in reserve for every credit transaction. Essentially, the PA DEP is retiring credits and banking them to be used in unforeseen circumstances that have a negative impact on the credit trading policy.*

a new standard on intangible assets that might provide helpful accounting guidance regarding nutrient credit purchases for public operators. Appendix Delta – 4: Nutrient Credit Trading Program Accounting Concerns provides a detailed discussion of the accounting issues related to general cap-and-trade programs and specific nutrient offset credits programs.

WHAT SHOULD THE ECONOMIC DEVELOPMENT AND FINANCE WORK GROUP ADDRESS IN 2009?

As a follow-up to the strategy development and implementation, the Economic Development and Finance Work Group should address the following:

1. Focus on the development of a sustainable operational structure for the nutrient credit trading program that is responsive to WSA's request for bids for nutrient credits in August 2009.
2. What is the potential impact of the *absence* of a viable nutrient credit trading program on economic development in Lycoming County? Is having no credit trading program an option?
3. What role should government – local and/or state – play in promoting the establishment and growth of a viable nutrient credit trading strategy in Lycoming County?
4. Should a special authority, such as a revolving loan and/or grant fund, be established in Lycoming County to lower the cost of BMP implementation and, hence, stimulate the generation of nutrient credits?
5. Is there a distinct advantage or disadvantage to having a strong, central clearinghouse or credit bank operate in the Lycoming County marketplace?
6. Is the business and development community generally aware of the Pennsylvania Chesapeake Bay Tributary Strategy (CBTS) and its potential impacts on economic growth in the county? If not, who should take the lead in building the educational awareness of the issue?
7. Are the County's economic development strategies, local Act 537 plans, and land use priorities (such as brownfields redevelopment, etc.) aligned to accommodate CBTS implementation?
8. Consider investigating tax credits for private businesses and individuals who choose to invest in BMPs. A model program could mirror the current Resource Enhancement and Protection (REAP) program, or the types of tax credits offered through the Neighborhood Assistance Program operated by the Pennsylvania Department of Community and Economic Development.

NEXT STEPS

The year 2009 will be a landmark year in which our progress to-date leads to substantive benefits. The willingness of stakeholders throughout Lycoming County to take on this very serious issue and transform it into an opportunity for investing in Lycoming County's future should be exciting for all. So, what are some of the keys to moving forward in 2009?

MANAGING THE LYCOMING COUNTY NUTRIENT MANAGEMENT STRATEGY

To date, the Lycoming County commissioners, through staff of the Lycoming County Planning and Community Development Department, have managed the day-to-day activities that have led to the comprehensive, three-component strategy presented in this report. During this past year, consulting assistance from Delta Development Group, Brinjac Engineering, LandStudies, and Red Barn has been integral to accomplishing significant progress. As we move into Phase III - implementation during 2009, much of the impetus will come

The County will continue to help guide the ship, but the actions of the stakeholders will propel the ship to its destination.

from not only County government, but as importantly, from the Lycoming County CBTS Advisory Committee, the Point Source Work Group, the Non-Point Source Work Group, and the Economic Development and Finance Work Group.

The Lycoming County commissioners, with assistance from planning staff, will continue to provide leadership and resources to maintain daily momentum. However, we anticipate that those volunteering their time to serve

on the Advisory Committee and three work groups will assert themselves and their representative organizations to help implement specific actions. Simply put: the County will continue to help guide the ship, but the actions of the stakeholders will propel the ship to its destination. In addition, the continued policy, technical, and financial support from various federal and state agencies will play a critical role as implementation begins in 2009.

OBJECTIVES FOR 2009

- ✓ **ESTABLISH THE POTENTIAL SAVINGS THAT MAY BE REALIZED.**
Ultimately, Strategy implementation should result in long-term savings and less pinch on local ratepayers. These potential savings should be identified and become the force that drives implementation during 2009.
- ✓ **ESTABLISH AND MAINTAIN THE CHESAPEAKE BAY WEB SITE.**
The County's Chesapeake Bay Strategy Web site will serve as an important information conduit to anyone who visits it, not least of which will be the Advisory Committee and three work groups, as they deliberate options. It will be imperative to provide timely, accurate, and resourceful information and links on this site. This will require consistent dedication of staff time and resources.

- ✓ **MAINTAIN AND SUPPORT THE ADVISORY COMMITTEE AND WORK GROUPS.**

It is important to maintain and support the Advisory Committee and associated work groups, which include the Point Source Work Group, the Non-Point Source Work Group, and the Economic Development and Finance Work Group). Their input and assistance will be critical to implementation actions, starting in 2009.
- ✓ **SECURE A GRANT FROM THE NATIONAL FISH AND WILDLIFE FOUNDATION HERITAGE PROGRAM.**

A grant from this program would help to initiate the implementation of BMPs at select locations to demonstrate how BMPs not only generate credits, but add value to the local environment and local economy. Those locations may include, but are not limited to the County Farm. This is a working farm owned by the County and operated for generations by a local farming family. The County Farm is adjacent to the Lysock View Complex, where the Lycoming County Conservation District and local offices of the federal and state Departments of Agriculture are located. Conservation and agriculture experts literally work on the farm's doorstep and will contribute to the success of any planned BMP demonstration project. The County Farm could generate credits, while concurrently modeling the BMPs in an educational forum.
- ✓ **NUTRIENT CREDIT TRADING PROGRAM INFORMATION IS NEEDED.**

It is necessary to provide stakeholders (especially the WWTPs and vendors who may be able to provide both short- and long-term credit contracts) with accurate, up-to-date information about the Nutrient Credit Trading Program. The goal is to improve the flexibility of WWTPs to meet their compliance requirements.
- ✓ **EXPLORE AN INVESTMENT FRAMEWORK FOR BMPs.**

The County should explore how public and private investments can create a framework for investing in BMPs, certifying and aggregating nutrient credits, banking and selling the credits, and ultimately, reinvesting revenues back into the Lycoming County economy. Nutrient credit buyers are looking for a local entity to generate and certify the credits and to help ensure that liabilities and risks are minimized.
- ✓ **DEVELOP A COMPREHENSIVE FUNDS-SEEKING STRATEGY.**

The County Advisory Committee, with assistance from the Economic Development and Finance Work Group, should help facilitate coordination on funding strategies that consider BNR needs of all WWTPs and wet weather upgrades to municipal collection systems, ultimately seeking to secure an appropriate level of state and federal grants and low-interest loans.

ADVISORY COMMITTEE NEXT STEPS

The Lycoming County Chesapeake Bay Tributary Strategy Advisory Committee (Advisory Committee) met for the first time on November 21, 2008. The meeting summary can be reviewed on the County's Chesapeake Bay Strategy Web site. The Advisory Committee co-chairs are Lycoming County Commissioner Jeff Wheeland and Regional Director of the PA DEP Robert Yowell. Members of the Advisory Committee were selected by the County commissioners to represent a cross section of stakeholders, and are recognized as community

leaders who are knowledgeable about local dynamics. The Advisory Committee provides advice and counsel to the County commissioners, but has no formal decision-making authority.

ADVISORY COMMITTEE ROLES AND RESPONSIBILITIES

- ✓ **AMBASSADORSHIP**
Advisory Committee members should serve as ambassadors in support of the continued evolution of the Strategy and its implementation, to the benefit of all Lycoming County residents.
- ✓ **MODIFY**
Advisory Committee members should provide input and recommendations regarding potential modifications to the County's approach to this issue.
- ✓ **MONITOR**
Advisory Committee members should provide input to and monitor the County's CBTS Web site.
- ✓ **ADVOCATE, FACILITATE**
Advisory Committee members should serve as advocates and facilitators to help secure public and private investments for Strategy implementation.
- ✓ **COMMUNICATE**
Provide recommendations on how to reach all stakeholders, and provide recommendations on the membership of the Work Groups and input on issues each work group should address.

POINT SOURCE WORK GROUP ROLES AND RESPONSIBILITIES

The Point Source Work Group has met four times between November 2008 and February 2009. Christine Maggi-Weigle of the Lycoming County Water and Sewer Authority serves as the current chairperson. Membership includes representatives of the WWTPs of Jersey Shore Borough, Williamsport Sanitary Authority, Lycoming County Water and Sewer Authority, Montgomery Sewer and Water Authority, Muncy Borough Municipal Authority, and Hughesville-Wolf Township Joint Municipal Authority (managers, engineers, and board members, if operated by a municipal authority).

What are specific recommendations for the Point Source Work Group in 2009?

1. **SHARE INFORMATION.**
As each organization continues to evaluate design and management options in search of the most cost-effective long-term approach, it will be important to share information about planning, design, and construction schedules, successes, failures, and critical issues. No organization should have to reinvent the wheel or repeat others' failures, so to speak. Doing so costs time and money.
2. **COOPERATE AND COLLABORATE REGIONALLY.**
Each organization should consider how to help its neighbors and communicate how neighbors could return the help. This could include the consolidation of operations, joint financing, or point-to-point credit trading, to note a few possibilities.

3. NURTURE UNITY.

Everyone wants to reduce costs and secure as much financial support as possible, especially in the current economy. This environment can pit neighbor against neighbor and create winners and losers. This regional Nutrient Management Strategy is founded in cooperation; a unified voice best achieves long-term benefits for all.

4. MONITOR THE PA DEP/EPA TOTAL MAXIMUM DAILY LOAD (TMDL) PROCESS.

It is fully anticipated that EPA, under direction from the courts, will begin to develop TMDL for the Chesapeake Bay and the Susquehanna River tributaries. At this time, we do not anticipate that this will substantially impact the effluent concentration limits or nutrient cap loads under which WWTPs will be required to operate. Nevertheless, this work group should be vigilant and address this issue together, as may be warranted.

5. COMMUNICATE WITH THE ADVISORY COMMITTEE AND OTHER WORK GROUPS.

Networking with members of the Advisory Committee and other work groups will be important, so everyone clearly understands the important issues the Point Source Work Group must address. Minimally, each member should be diligent in clearly communicating with the chairperson and Lycoming County staff about meeting proceedings, critical issues, and follow-up actions. That way, staff can better ensure that pertinent information is transmitted to the Advisory Committee and other work groups.

6. ESTABLISH NUTRIENT CREDIT NEEDS.

A key item of concern is the near- and long-term credit needs from point sources (WWTPs) and how the non-point sources can help meet those needs.

NON-POINT SOURCE WORK GROUP ROLES AND RESPONSIBILITIES

The Non-Point Source Work Group was organized and met in early 2009. Members are appointed by the Lycoming County commissioners and represent a cross section of stakeholders, including the agricultural community, watershed associations, municipalities that have stormwater management programs, conservation agencies (including the Lycoming County Conservation District, Natural Resources Conservation Service, and Penn State Cooperative Extension Service), and others. This work group is chaired by Mark Davidson of the Lycoming County Conservation District.

What are specific recommendations for the Non-Point Source Work Group in 2009?

✓ **ADVISE THE COUNTY IN ITS RESPONSE TO THE WSA BID REQUEST TO BE ISSUED IN AUGUST 2009.**

As Lycoming County's largest plants test the credit market, the challenge to the County and its strategy partners will be to provide an appropriate response to the bid request. This will be critical in demonstrating that the program is cost-effective and can produce adequate credits with adequate surety.

✓ **DEFINE NEW OPPORTUNITIES FOR BMPs THAT GENERATE CREDITS AND BENEFIT LYCOMING COUNTY.**

The current economic downturn, combined with the immediate need to deal with staggering wastewater infrastructure needs, the deregulation of the electric utility industry, and the pending development of Marcellus Shale gas reserves, has created a lot of anxiety. Collectively, these things can impact a community's ability to move forward with rational actions. This

strategy could take what is now a perceived crisis and turn it into a long-term investment strategy for Lycoming County's future.

✓ **COOPERATE AND COLLABORATE REGIONALLY.**

Each organization should consider how to help its neighbors and communicate how neighbors could return the help. This concept should include how BMP implementers and WWTPs can help each other.

✓ **NURTURE EDUCATION ABOUT BMPs AND CREDIT GENERATION.**

This Lycoming County Nutrient Management Strategy has the potential to generate long-term environmental and economic benefits for the County. This story needs to be told and become a way of doing business in Lycoming County. The Non-Point Source Work Group will play a critical role in moving this concept forward.

✓ **MAINTAIN COORDINATION AND COLLABORATION WITH THE OTHER WORK GROUPS.**

The Non-Point Source Work Group needs to educate the other work groups and the Advisory Committee about BMP opportunities in Lycoming County, so they can better understand the benefits and need for public and private investments in BMPs.

✓ **ADDRESS SPECIFIC NON-POINT SOURCE BMP AND CREDIT TRADING ISSUES:**

- Who should be responsible for education and how?
- From the Non-Point Source Work Group's perspective, what are the keys to a self-sustaining nutrient credit trading program?
- Who can and should facilitate trades?
- Who can and should take new BMP credit generation proposals to the PA DEP?
- Who can and should verify credits generated from BMPs?
- Who can and should serve as the credit clearinghouse?
- Who deals with record keeping?
- What are the key issues hindering BMP implementation at this time, and how can the work groups' efforts resolve those hindrances?
- Where can the state and federal governments help in BMP implementation, and how can that message be communicated effectively?

ECONOMIC DEVELOPMENT AND FINANCE WORK GROUP ROLES AND RESPONSIBILITIES

The Economic Development and Finance Work Group met in early 2009. Members were appointed by the Lycoming County commissioners and were selected to represent a cross section of stakeholders, including representatives of the Chamber of Commerce, business community, industry, the financial service industry, local government, and others.

What is recommended for the Economic Development and Finance Work Group in 2009?

1. DEFINE THE NEW OPPORTUNITIES.

The Economic Development and Finance Work Group brings key business leaders together. It should examine how the County CBTS may become an opportunity to stimulate rational actions

to the benefit of all Lycoming County residents, especially during a period of economic downturn. The ultimate question to be addressed is: can this Nutrient Management Strategy take what is now a perceived crisis and turn it into a long-term investment strategy for Lycoming County's future?

2. COOPERATE AND COLLABORATE REGIONALLY.

Each organization should consider how to help their neighbors and communicate how neighbors could return the help. This could include the consolidation of operations, joint financing, or credit trading, to note a few possibilities.

3. NURTURE UNITY.

With the current economic downturn, everyone wants to reduce costs and secure as much financial support as possible. This regional nutrient management strategy is founded in cooperation and speaking with a unified voice to achieve long-term benefits for all. The Economic Development and Finance Work Group, and the larger "community" it represents, should communicate the need to think regionally to reduce sewage treatment costs and ultimately, to provide Lycoming County with a competitive economic advantage.

4. ADDRESS SPECIFIC FINANCING AND ECONOMIC DEVELOPMENT ISSUES.

- What role should public and private financing play in implementing a nutrient credit trading program that benefits Lycoming County?
- Evaluate the viability of creating a special authority that could administer a revolving loan or grant funding program to lower the cost of BMP implementation and hence, stimulate the generation of nutrient credits.
- Evaluate the advantages and disadvantages of having a central clearinghouse/aggregator or credit bank to operate in the Lycoming County market.
- Establish what needs to be done to make the business community aware of this Lycoming County Nutrient Management Strategy and its potential impact on economic growth in Lycoming County. Who should take the lead in building this educational awareness?
- Establish a coordinated approach to ensure that economic development strategies, local Act 537 Plans, and local land use planning priorities are consistent with this Nutrient Management Strategy and vice versa.
- Evaluate the viability of creating a Lycoming County-based tax credit program for those who invest in BMPs. This program could model the Commonwealth's Resource Enhancement and Protection (REAP) program, operated by the Pennsylvania Department of Agriculture, or the Neighborhood Assistance Program, operated by the Pennsylvania Department of Community and Economic Development.
- Establish a strategy to maximize communications from the business and finance community to facilitate support for public funding for this County-based strategy. This would include the immediate need for WWTPs and tributary communities to secure funding under Pennsylvania Acts 63 and 64.



CONCLUSIONS

POTENTIAL SAVINGS OF A LYCOMING COUNTY-BASED NUTRIENT MANAGEMENT STRATEGY

Based on reviews of data and information from an on-going Act 537 planning process, the projected cost of meeting all federal mandates for tributary community collection systems, as well as WWTPs, is estimated to be approximately \$217 million. This estimate includes costs for CBTS compliance, using full WWTP upgrades and no nutrient credit trading. Based on work performed in developing this Lycoming County Nutrient Management Strategy, it is estimated the use of nutrient credit trading has the potential to significantly reduce both the construction and annual operational and maintenance costs. Each WWTP will need to consider and estimate the projected cost savings of implementing nutrient trading as part of its design concept. This will be a critical piece of information that should be communicated to all stakeholders and may be critical for future investors.

CHALLENGE 101: TURNING CRISIS INTO LONG-TERM OPPORTUNITY

It will be costly to improve water quality in the Susquehanna River and the Chesapeake Bay through significant reductions in the discharge of nutrient pollution. However, there are potential opportunities to minimize costs and make long-term investments that will benefit Lycoming County residents, the environment, and the local economy.

Pennsylvania's Chesapeake Bay Tributary Strategy allows the use of nutrient credit trading in meeting NPDES permit compliance schedules. Nutrient credit trading is very similar to cap-and-trade or pollution offsets, which are currently used by industries to help meet air quality emission standards. The cap-and-trade concept has been part of the air quality emissions environment for more than 15 years. Cap-and-trade mechanisms seem to be the way of the future, as our society struggles to meet environmental quality needs in a cost-effective manner.

While nutrient credit trading is a newer and evolving concept, it provides real opportunities to invest in BMPs that benefit the environment and economy of Lycoming County, while minimizing the costs associated with reducing nutrient pollution in waterways. Nutrient credit trading is often subject to user anxiety, misperceptions, and misinformation. The concept of WWTPs using nutrient credit trading to meet NPDES cap load limits certainly warrants serious consideration. This report provides guidance and information on strategic concepts and alternatives Lycoming County should consider, as it assumes the challenge of cost-effectively meeting nutrient discharge limits.

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The projected cost of meeting all federal mandates, including Chesapeake Bay Tributary Strategy compliance, and using full WWTP upgrades and no nutrient credit trading, is estimated at \$217 million.

It is also estimated that the use of nutrient credit trading has the potential to reduce costs by approximately 5-25 percent, or \$10 million-\$56 million.