

## Priority Issue #7



### Water quality is vital, but is vulnerable to a multitude of threats.

This Issue was reported as a priority issue in four of the six multi-municipal planning areas: Greater Williamsport Alliance, Lower Lycoming Creek, Muncy Creek and US-15 South. Each of these planning areas stated in their own unique way, that protecting source water was very important.

**Back Story** Water is constantly vulnerable to threats coming from above, below and on the surface of the planet. According to the U.S. Geological Survey, about 71 percent of the Earth's surface is water-covered which translates to more than 326 million trillion gallons with only 1% of all the water on the earth being suitable to drink. The earth suffers from global threats such as droughts and access to safe drinking water. Water borne diseases are a problem in many countries that do not have the means to clean their surface waters of contamination. The inability to safely dispose waste or drill a well for drinking water are other widespread issues found around the world. Access to clean drinking water is essential for a community to survive and prosper. Not only is water necessary to support public health, but reliable water service is also needed to foster development and economic growth. In 2010, the USGS calculated that the United States used about 275 billion gallons of surface water per day, and about 79.3 billion gallons of groundwater per day. Fresh water is used for drinking, cleaning, bathing, recreating, energy generation, manufacturing cooling and food making processes, among many other uses. This knowledge only gives us a glimpse of the importance that water plays in our daily lives. Water is the foundation for human health. Complex ecosystems of plants, animals, insects and all other living things rely on water for sustainability and to thrive. The Figure 1 illustration depicts that, based upon state average, the County of Lycoming receives about 41 inches of precipitation per year and only 13 inches recharges our groundwater aquifers. The remainder of the precipitation either runs directly into creeks and streams or returns back to the atmosphere. At any point along the fundamental steps of the hydrologic cycle, water can be exposed to threats that have potential to reduce its quality.

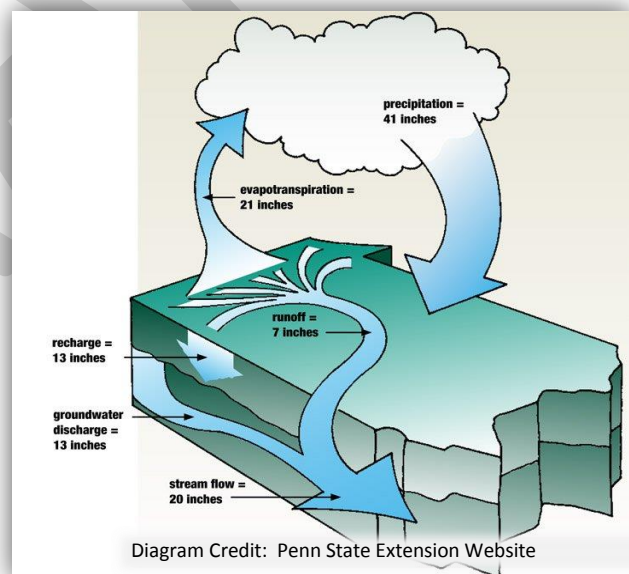


Figure 1: The hydrologic cycle for an average year in Pennsylvania

Lycoming County thrives with an abundance of water in streams, lakes and the Susquehanna River. This includes how residents and visitors recreate and promote tourism in Lycoming County with fishing, boating, skiing, camping, hunting, hiking and biking, all happening on or near water. Also, the natural gas industry has been well supported in Lycoming County due to the ease of access to large volumes of water for fracking natural gas wells.

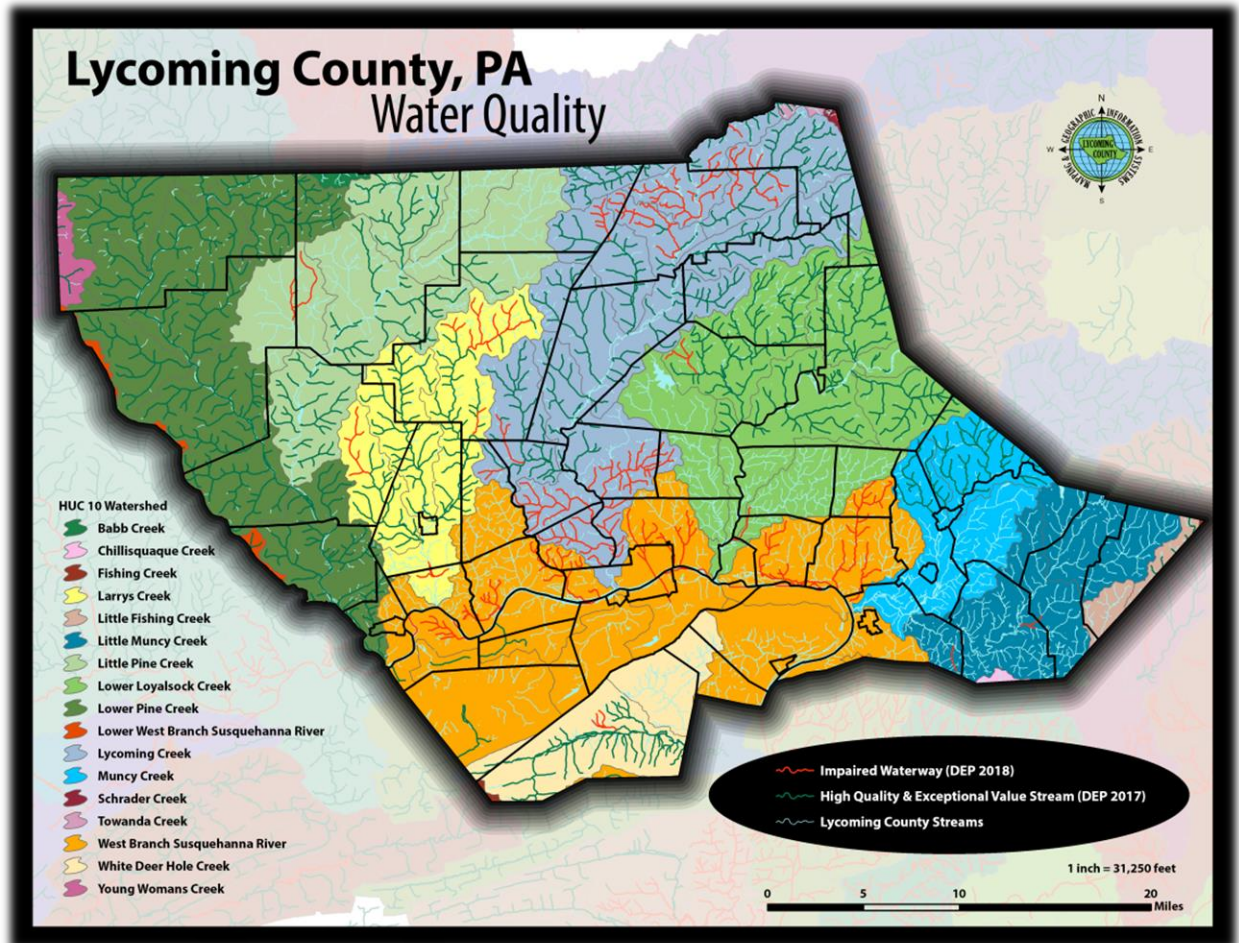


Figure 2: Characterization of Water Quality for Streams in Lycoming

Looking at water as a natural resource in Lycoming County, shown on Figure 2 there are nine major watersheds at USGS’s HUC 10 level: Babb Creek, Little Pine Creek, Larrys Creek, Lycoming Creek, Lower Loyalsock Creek, Muncy Creek, Little Muncy Creek, West Branch Susquehanna River and White Deer Hole Creek. The PA Housing Research Center reported in 2014 that Lycoming County contains 1161 miles of streams that are designated high quality (HQ) and exceptional value (EV) waters, qualifying by their good chemistry and biological makeup. Two of Lycoming County’s EV/ HQ streams are known throughout the State for their exceptional quality: Pine Creek and the Loyalsock Creek. Outdoor lovers flock to Pine Creek to experience its scenic vistas and quality nature experience. The Loyalsock was

recognized as the “2018 PA River of the Year” by the Department of Conservation and Natural Resources (DCNR) and the Pennsylvania Organization for Waterways and Rivers (POWR).

As is the case with any watershed or aquifer, groundwater and surface water sources are vulnerable to a variety of potential contaminants such as improper disposal of hazardous chemicals or infiltration of man-made products including gasoline, oil, road salt, pesticides, or fertilizer runoff. Each year, PA DEP releases a water quality status report in accordance with the Clean Water Act. The most recent report is titled “2016 Final Pennsylvania Integrated Water Quality Monitoring and Assessment Report.” The narrative report contains summaries of various water quality management programs including water quality standards, point and nonpoint source controls, as well as descriptions of programs to protect lakes, wetlands and groundwater quality. PA DEP categorizes surface and groundwater impairments as having a “source” and a “cause”. See the DEP website for the report that shows details of sources and causes of impairment for groundwater, lakes and streams in PA.

Although Lycoming County is recognized as having abundant high quality waterways, some streams or portions of streams are categorized as impaired due to one or more contaminants (see Figure 2). Directly quoted from Lycoming County’s Implementation Plan for the Chesapeake Bay Tributary Strategy-2015, “There are approximately 2,200 miles of streams and 92 water bodies in the County. Roughly eight percent (185.74 miles) of the streams located in the County are listed as impaired. Atmospheric Deposition (68.74 miles), followed by Agriculturally Related Activities (50.99 miles), Small Residential Runoff (25.2 miles) and Acid Mine Drainage (8.23 miles) are the known causes of impairment. There are also 32.58 miles of impairment with unknown sources.” Other streams are still unassessed with no recorded water quality data.

Based upon the 2016 Final PA Integrated Water Quality & Assessment Report, the West Branch Susquehanna River is impaired with metals, siltation, nutrients, thermal modifications, and pathogens. Although impaired, the West Branch of the Susquehanna is a show piece at the heart of Lycoming County, used as a water source for drinking and manufacturing as well a recreational and scenic asset for local boaters, fisherman, and those enjoying the Susquehanna River Walk.

As a result of Lycoming County’s reliance and love for water, many watershed association groups have formed over the years and some have developed plans to help manage the resource. From the Pine Creek Watershed Council’s River Conservation Plan on the west end of the County, to Larry’s Creek Watershed Association’s Coldwater Conservation Plan in the central part of Lycoming County. A complete list of river conservation and coldwater conservation plans are listed in the Appendix \_\_. These conservation plans identify concerns and threats with some discussion about preventative measures, local projects, and advocacy for federal, state and local agency regulation that supports watershed protection for:

1. Neglect of stewardship of the resource
2. Land Use issues including natural gas exploration
3. Waste Disposal including on-lot septic systems and solid waste
4. Erosion & run-off from roads, development & agriculture practices

5. Flooding events leading to streambank erosion/ destabilization and an avenue for contaminants to enter surface and ground water.

Lycoming County has collaborated with many federal, state and local agencies and organizations with the common goal to promote watershed stewardship. Lycoming County will continue to look for opportunities to partner with:

FEDERAL	STATE	REGIONAL	LOCAL
USGS	PA DEP	North Central PA Conservancy	Watershed Associations
US EPA	PA DCED	Chesapeake Bay Foundation	Trout Unlimited- Susquehanna Chapter
US Fish & Wildlife Service	PA DCNR	Chesapeake Conservancy	Lycoming County MS4 Coalition
USDA-NRCS	PA Dept. of Agriculture	Penn State Extension	Lycoming Audubon Society

Table 1: Partner Agencies

In 2010-2011, USGS and PADEP conducted an assessment of baseline surface and groundwater conditions in Lycoming County’s Lycoming Creek Watershed: 31 main stem and tributary water samples and 14 ground water samples. To continue tackling the assessment of private water well supplies, Lycoming County Planning partnered with the USGS and PADCED in 2015 to conduct a snap shot of the groundwater quality in Lycoming County through random sampling and testing of 75 private wells. The majority of private wells serve single-family residences in rural areas. The results from this testing showed existing geology and land use influences in our ground water, some samples exceeded primary or secondary maximum contaminant levels (MCLs) for arsenic, iron, manganese, total dissolved solids (TDS), chloride, pH, bacteria, or radon-222. The USGS “Groundwater Quality for 75 Domestic Wells in Lycoming County, PA 2014” can be found on the USGS website.

**Priority Issue Overview** The PA Municipalities Planning Code, MPC §301 (b) states that “the comprehensive plan shall include a plan for the reliable supply of water, considering current and future water resources availability, uses and limitations, including provisions to adequately protect water supply sources.” If it is understood how much water there is, how water moves through the hydrologic cycle, and how the community obtains and uses water, it can be accepted that there is a great responsibility to ensure that abundant, good quality water remains for the continued use of Lycoming County residents and businesses present and future. Threats to our surface and ground waters can be described in two pollution categories:

- Point source- attributable to a single identifiable site. Examples include: failing private septic systems that can introduce disease-causing microorganisms, man-made products including gasoline and oil spilled down a drain or improper disposal/ discharge of industrial wastes.
- Non-point source- occurs from rainfall or snowmelt moving over and through the ground picking up a variety of contaminants like road salt, pesticides, or fertilizer runoff as well as particulates collected from the atmosphere through precipitation.

**Stormwater:** Stormwater runoff is inevitable and creates a county-wide issue when it picks up soil, debris, and contaminants. Wherever precipitation encounters the earth's surface, a percentage filters through the soil into the groundwater and the remainder flows over land as stormwater run-off to surface waters. When water runs over a surface in a sheet flow and spreads over a large area, it is considered a potential non-point source. Developed lands with impervious surfaces generally take stormwater and direct it through structures creating point source discharges. In 2011, Lycoming County Commissioners adopted the Lycoming County Stormwater Plan to be in compliance with PA Act 167 and to guide stormwater management within the County. The PA Department of Environmental Protection required each of the County's 52 municipalities to enact Stormwater Management ordinances that were consistent with the County's plan. Pennsylvania has also committed to have its National Pollution Discharge Elimination System (NPDES) permitted Municipal Separate Storm Sewer System (MS4) municipalities reduce sediment by 10% by 2025 through the implementation of a required Chesapeake Bay Pollution Reduction Plan and following six "Minimum Control Measures":

1. Public education and outreach
2. Public participation
3. Illicit discharge detection and elimination
4. Management of construction site runoff
5. Management of post construction site runoff (new development and redevelopment)
6. Good housekeeping in municipal operations.

The public can contribute towards these measures by playing their part with adhering to "only rain down the storm drain" and following property maintenance best practices such as using minimal lawn fertilizers, automotive fluid receptacles and properly managing water run-off from their homes, driveways and patios with water infiltration techniques to reduce erosion and sedimentation entering storm sewers, drainage ditches and streams. Watershed specific stormwater plans are needed to better define the amount of stormwater management required to offset development and give stormwater the opportunity to be cleansed prior to entering our surface and ground waters.

**Flooding:** Flooding is a two-fold concern in Lycoming County. The force of moving water can collapse fuel and chemical pipelines and tanks and collects man-made items and garbage, causing point source pollution. The flood waters also pick up contaminants while moving across the land including chemicals, fuel, nutrients and large amounts of organics and sediment that contribute to non-point sources of pollution. Implementing stormwater best management practices and maintaining forested open space are crucial for stormwater absorption and groundwater recharge, which reduce the severity of flooding for downstream properties and the Lycoming County urbanized communities of Williamsport, Jersey Shore, Montoursville, South Williamsport, Duboistown, Muncy and Montgomery.

**Agriculture:** At 158,462 acres of land used for agricultural purposes, there is a significant farming presence in the County that is in part, contributing towards nutrient and siltation stream impairments. Traditionally, a percentage of the agriculture community has not been aware or have not participated in using progressive agriculture best management practices that promote soil health, soil retention, animal and manure containment, erosion control, stormwater management, water management, stream

riparian buffer protection, or forest management. Over the past 10 years, and most recent as within the last two years, the PA state regulatory agencies are coordinating to reduce agriculture's footprint as a major contributor to non-point source pollution across Pennsylvania. Lycoming County began a DEP-approved Nutrient Credit Trading program in 2012 that has the potential to reward farmers for going over and above minimum best management agricultural practice standards. The U.S. EPA has mandated the Chesapeake Bay states to reduce the amount of sediment, nitrogen and phosphorus discharged into our waterways. DEP has stepped up the requirements for its National Pollution Discharge Elimination System Permits and is conducting more farm inspections through DEP staff and Conservation District staff for verifying that farmers are implementing best management practices found within the required agriculture conservation plans and manure management plans. NRCS assists Conservation District staff by working with farmers who need conservation plans. At times, the number of plans needed to be written out numbers the qualified individuals to write the plans, adding farmers to a waiting list to come into compliance. USDA-NRCS, DEP, Conservation District staff and Penn State Extension are working to provide the needed tools and education to the agriculture community for minimizing negative impacts to Lycoming County's water quality.

**Land Use:** Land use plays a major part in Lycoming County's water quantity and quality. Two land use concerns have been raised since the adoption of the 2006 County Comprehensive Plan specifically in the rural areas: intensive land use of natural gas extraction activities and failing on-lot septic systems. Land uses become intensive when the use overcomes nature's ability to handle environmental impacts through natural systems, requiring man made solutions to minimize the impact.

**Natural gas extraction activities:** For decades, prior to 2006, Lycoming County had experienced only shallow well or conventional oil and gas exploration on a small scale with very little known environmental impact. Outside of a handful of intensive agricultural operations and a seven mile long, 35-tower, wind power electric generation facility, Lycoming County has not experienced a large scale intensive land use that has affected much of the rural areas of the County. Over the past 12 years, the County has seen unconventional natural gas drilling-related activities rise, increasing the number of avenues for contaminants to enter surface and ground water supplies as point source and non-point source pollution:

- Potential natural gas and frac fluid migration during the gas horizontal gas well drilling, well casing or hydraulic fracturing stages
- Potential spills from transportation frac chemicals, lubricants, fuel and drilling flowback fluid or produced water that contains injected chemicals plus naturally occurring materials such as brines, metals, radionuclides, and hydrocarbons
- Erosion and sedimentation from large scale earth disturbances of well drilling pads, compressor station and metering pads, water impoundments, access roads, pipelines, and staging areas
- Air contaminants from flare-offs, compressor stations and diesel truck traffic.

Figure 3 depicts some of the types of intensive development where contamination is possible including a natural gas drilling pad, compressor station, water impoundment and access roads.



Photo Credit: Lycoming County PCD

*Figure 3: Non-Conventional Natural Gas Development in Lycoming County*

Nearly 2,000 conventional natural gas drilling permits have been issued in Lycoming County since January of 2006. DEP has issued numerous violations over the 12 year time frame that have included frac fluid containment issues, diesel fuel spills and well casing integrity.

Failing on-lot septic systems: In Lycoming County, 75% of its land mass is rural countryside and not served by public sewer, leading residential development to rely on individual on-lot septic systems for sewage disposal. An improperly functioning septic system may cause point source pollution to nearby streams and groundwater aquifers with pathogen contamination indicated by the presence of E. coli bacteria. According to PA DEP, a land owner may be experiencing a failing septic system if there is:

- Sewer odors in the house and/or drinking water
- Illness, often to household visitors
- Sponginess around septic tank, distribution box or dosing tank and absorption area
- Surfacing raw sewage.

Because of this threat to drinking water, Pennsylvania, through Act 537, has made each municipality ultimately responsible for the disposal of all sewage generation within its boundaries. PA Code 71.73 requires municipalities to initiate a program to ensure proper maintenance of on-lot septic systems and to promote system efficiency and longevity. Municipalities should be aware that state officials are considering enforcing PA Code 71.73 with a mandate for all municipalities to comply with the regulation by adopting on-lot sewage management system ordinances. About 25% of Lycoming County's municipalities have adopted an on-lot sewage management system ordinance and only a portion of them are being enforced. These ordinances are not in place or not being enforced because of a lack of

understanding of the importance and many local officials take the approach that the regulations are an over-reach of the municipality.

To be effective, an on-lot sewage management system ordinance must be approved by PA DEP and include requirements for the:

- Removal of septage or other solids from treatment tanks once every three years or other as needed interval
- Diversion of stormwater away from the treatment facilities and absorption areas and protection of the absorption areas from physical damage
- Use of water conservation devices to reduce hydraulic loading to the sewage system
- Operation and maintenance of electrical, mechanical and chemical components of the sewage facilities; collection and conveyance piping, pressure lines and manholes; alarm and flow recorder devices; pumps; disinfection equipment and related safety items
- Other requirements as stated in PA Code 71.73.

Each on-lot sewage management system ordinance should also indicate that only a certified Sewage Enforcement Officer can perform the inspections. This gives the highest chance for problems to be found and opportunity for landowner education prior to a potential septic system failure. Many times sewage pumpers/ haulers or permit/ zoning officers are contracted with the municipality but do not have the proper training to conduct inspections and often miss:

- Deteriorating septic holding and dosing tanks
- Broken septic tank clean-outs, baffles and piping
- Malfunctioning alarms.

Municipalities that also require on-lot septic system back-up or replacement area soils testing for development significantly reduce the chances of the need to extend sewer coupled with the enormous task of installing infrastructure and the additional financial burden to the municipality and its affected residents. Often this requirement is part of the on-lot sewage management system ordinance and added to municipal or county subdivision and land development ordinances.

**Source Water Protection:** Through the U.S.EPA's mandate to the states from the Safe Drinking Water Act, the PADEP Northcentral office has provided financial and technical assistance to public water systems in Lycoming County to help establish source water protection (SWP) plans. Source water protection begins with watershed stewardship. This can be accomplished with SWP plans that: identify actual and potential sources of contamination to the source; allow communities to effectively educate the public on the importance of their drinking water source; serve as the first step for long-term sustainable planning for the future of the community; and provide a comprehensive action plan in case of an emergency.

Through PA Code, Title 25, Chapter 109, PADEP requires public water systems to meet clean drinking water standards and consistent with an approved SWP, the provider reports water quality data to its users. See the Infrastructure chapter of this document for more information on public water systems in



Lycoming County. Although PADEP regulates the cleanliness of the water provided by public systems, there are no state requirements for construction, maintenance and treatment of private water systems under a specific size and usage. Lycoming County residents located in rural areas rely on water supplied through natural occurring springs or manmade cisterns and private wells. In total, 85% of private water systems are drilled wells, 6% are hand-dug wells, and 9% are springs or cisterns. Because there is no ownership of water, the “reasonable use” of water is allowed. There is little protection for existing private water sources where the deepest well and the biggest well pump often wins.

The PA State Water Plan recognizes that “the state forest provides an abundance of high quality forest products and represents a two million acre water treatment plant and air purification system. The Plan recognizes the function of state forest lands on municipal and private water supply, and states “Future land use and development within both existing and potential watersheds must be compatible with water production.” The Plan expressed the need to be more diligent in locating certain land uses away from public water supply areas and not developing steep slope and ridge tops to reduce the chance for erosion and soil instability. Also, stormwater management, soil conservation measures, and riparian buffers are key tools for maintaining surface water quality. In short, source water protection is needed now more than ever before throughout the entire County. Efforts to protect source water yield numerous benefits:

- It helps keep the supply of public water more cost affordable because clean water is simpler and less expensive to treat
- Implementing proactive source water protection measures will also reduce system operation and maintenance costs
- A dependable and clean water source also enhances the community’s potential to attract new development
- Clean, high quality water helps existing users.

### **Integrated Water Resources Management**

Water, in its various forms, affects so many different aspects of daily life. Pennsylvania’s “State Water Plan Principles” (2009) state, “...land development, flooding, stormwater, wastewater, groundwater recharge, irrigation and water supply and withdrawals are elements of the same interconnected system.” To be good stewards of the resource, the future of water management in Lycoming County should be consistent with the PA State Water Plan and looked at in a more holistic view, using integrated water resources management (IWRM). From the American Water Resources Association (AWRA), IWRM is “the coordinated planning, development, protection, and management of water, land and related resources in a manner that fosters sustainable economic activity, improves or sustains environmental quality, ensures public health and safety, and provides for the sustainability of communities and ecosystems.”

**Key Implications** Lycoming County has an abundant natural resource of good quality and quantity of water, both surface and ground water. A vast number of ecological services from our water resource will be lost if the County does not protect it and execute the most fundamental responsibility—to

provide for the health, safety and welfare of County citizens. If this issue is not addressed, negative impacts are likely to occur:

- Both public and private water systems will run an increased risk of contamination from preventable sources of pollution
- The required treatments to combat these contaminants will become more complex
- The resulting costs to provide clean and safe water will increase
- If contamination escalates, water suppliers run the risk of being forced to shut down wells and identify new sources of water
- Replacement well locations are finite and limited by geography and geology
- There are significant penalty costs associated with non-compliance of regulatory requirements.

There is a need to ensure that source water protection plans are in place, reviewed regularly, updated as needed, and implemented for the urbanized sectors served by public water authorities and sometimes smaller private water systems. Degrading the quality or abundance of water will compromise the quality of life within Lycoming County and the world around it.

### **Projects of Countywide Significance for this Issue**

#### **LYCOMING COUNTY INTEGRATED WATER RESOURCES MANAGEMENT INITIATIVE**

This project will be implemented in coordination with public water suppliers, public and private water users, Academia, PADEP, municipalities, etc... with various options for implementation. The project is in response to all the points of discussion related to the county-wide threats to water quality. A comprehensive County-wide integrated water resources initiative can accomplish the following:

1. Take inventory of existing source water protection plans and work with DEP and water providers to understand the level of implementation and need for improvement.
2. Support the 2017 multi-municipal planning efforts in establishing new source water protection plans where needed across the County.
3. Support education of local officials and public through social media, tv, newspaper, schools in adopting an integrated water resources management approach in planning for all projects and initiatives from infrastructure projects to land development and transportation projects.
4. Promote best management practice education of private water well owners.
5. Support the gathering of existing water quality data and obtaining new data.
6. Review Act 537 plan recommendations.
7. Support and advocate for legislative action for private well water quality and construction standards.

8. Support the Lycoming County Conservation District with efforts for reduction in non-point source pollution.

#### **UPDATE THE COUNTY STORMWATER PLAN**

The Stormwater Act 167 specifies that the County shall review and if necessary, revise the adopted and approved stormwater study area plan a minimum of every five years. The Watershed Advisory Committee can be called upon to review the adequacy of the County Stormwater Plan to determine if the Plan is adequate for minimizing the runoff impacts of new development. The Committee would then advise the County to the need for revision. If no revisions are to be made, the County would then adopt a resolution stating the Plan has been reviewed and meets the provisions of Act 167 and forward the resolution to PA DEP.

#### **SUPPORT MUNICIPAL STORMWATER ORDINANCE REVIEW & UPDATE PROCESSES IN LYCOMING COUNTY**

A stormwater ordinance is only as good as a municipality is willing to enforce the requirements. Stormwater regulations must be reasonable, practical, and regularly reviewed/updated to make sure that development is sufficiently being offset with stormwater management controls and best management practices that are cost effective and consistent with the local watershed stormwater plan.

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