

Water Quality Awareness in the South Branch Tunkhannock Creek Watershed

by Lakeland High School Students in Mrs. Kobrick's eleventh grade Chemistry Class

What is a Watershed?

How does all the water get into your lake or river? Where does it come from?

After a rainfall, the water flows through the ground or on the surface to the lowest point such as a stream then the river and eventually to the sea. The landscape around you acts as a catch basin for surface water and is called a watershed.

Watersheds come in all shapes and sizes. They cross county, state, and national boundaries. No matter where you are, you're in a watershed!

What is your Watershed Address?

If you live, work, or play anywhere on the map below, you are in the South Branch Tunkhannock Creek watershed which is a 98.3 square mile drainage basin containing 30 bodies of water that originates at Chapman Lake near Montdale and flows west to its confluence with the Tunkhannock Creek in Wyoming County.

Parts of Lakeland, Lackawanna Trail and Abington school districts are located in the watershed as well as landmarks such as Lackawanna State Park, Joe Terry Civic Center, Greenfield Little League Field, Lakeland High School, Keystone College, and Christy Matthewson Park.

The South Branch Tunkhannock Creek flows into Tunkhannock Creek which flows into the Susquehanna River which empties into the Chesapeake Bay.

Ultimately, the decisions that we make with our land in the Tunkhannock Creek watershed will impact the Chesapeake Bay.

Let's find out how!

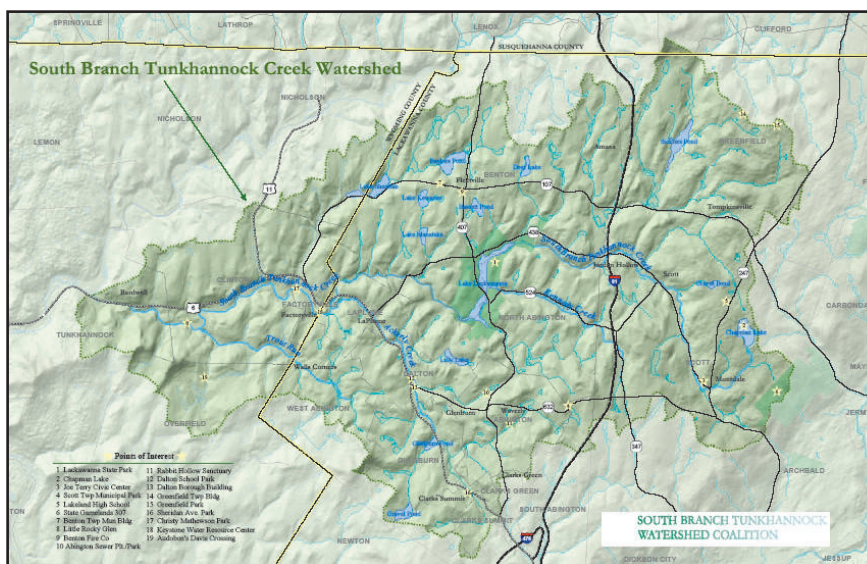
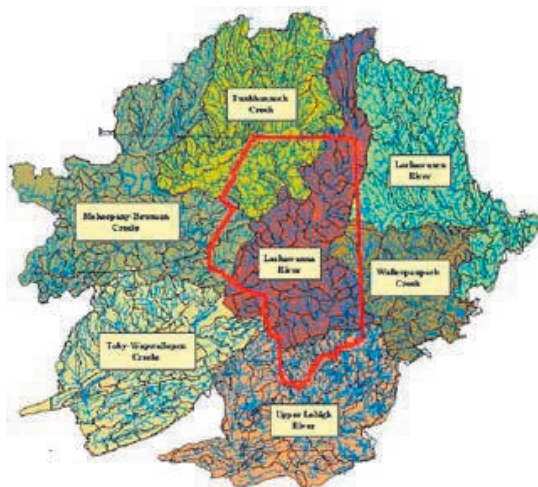
Students from Mrs. Kobrick's eleventh grade chemistry class at Lakeland High School worked with local resource professionals from the Lackawanna County Conservation District, Natural Resource Conservation Service, and Keystone College along with assistance from the South Branch Tunkhannock Creek Watershed Coalition to study factors effecting water quality and quantity in their watershed and ultimately the Chesapeake Bay. The Chesapeake Bay is our nation's largest and most productive estuary. The Bay provides recreational and commercial opportunities for humans and habitat for many animals. However, the Bay has been adversely affected by nutrient and sediment pollution. Many Pennsylvania land use practices affect water quality in the Chesapeake Bay.

How can the actions of Pennsylvanians affect the Chesapeake Bay?

Students identified and researched seven ways that our local environment in the South Branch Tunkhannock Creek watershed affects the Chesapeake Bay.

These factors include:

- homeowner impacts
- erosion control and stormwater
- illegal dumping



- nutrient management in agriculture
- open space conservation
- riparian buffers and wetlands
- roles that citizens play in the watershed

Homeowner Impacts

Angel Frazier, Sarah Briggs, Joey Dearie

There are several different ways that homeowners can protect their watershed. They include proper lawn care and landscaping, properly washing your vehicle, disposing of pet waste, and disposing of trash.

Lawn care and landscaping is an important part of protecting your watershed. The way you treat your lawn can affect your watersheds. Using too many herbicides, pesticides, and fertilizers can cause the pollutants to drain into the watershed after a heavy rain storm. There are natural ways to fertilize your lawn without using any chemicals and it is a good idea to help your lawn in a way that doesn't hurt your watershed.

When cutting grass, cut down to three inches and no more; this is when grass is at its healthiest. The length of the grass is important because it helps to slow down runoff. After cutting your grass, do not bag your lawn clippings, leave them on the lawn. The nutrients will make your lawn naturally healthy. Landscaping can help prevent runoff because the roots will absorb the excess rainfall. This can be done by planting trees and shrubs around the lawn.

Not only is lawn care and landscaping important, but properly washing your vehicle is also important in the prevention of watershed pollution. When washing your car, a hose that turns off when unattended is advisable as it will save water from collecting in drain pipes.

Also, when you wash your car, wash it on gravel or some other unpaved surface. The gravel or unpaved surface will filter the water of all unwanted materials and prevent them from flowing into the drain pipes. Properly disposing of the waste that comes from your car, such as from oils and other fluids, is important as well. Never dump these types of liquids down the stormdrain; chemicals are not something you want in your watershed.

Pet waste and trash produce chemicals also and are another source of pollution for the watershed. When taking your pet for a walk, carry a little plastic bag with you at all times. If pet waste is left on the ground, it can collect in any of the drain systems around you and get into your watershed. If possible, after bagging the waste, flush the pet waste down the toilet so it can be properly disposed of as sewage treatment. Properly disposing of your trash is also a way to reduce pollution because, once the trash breaks down, the resulting chemicals end up in your watershed.

Taking care of your yard, cleaning your vehicle, and getting rid of pet waste and trash are some ways to prevent watershed pollution. Always remember, help Mother Nature help you!



Erosion and Sediment Control

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A large part of the earth's disturbance activities are land development, forestry, mining, and highway construction which can produce a huge amount of sediment. Sediment levels from these types of activities can be as high as 10 to 20 times greater than that created even by farming. Sediment is soil that is out of place and ends up on the bottom of bodies of water. A large quantity of soil in the water can be very harmful to the fish and vegetation. Fish have gills that extract much needed oxygen out of the water and if there's a large amount of sediment in the water, the gills will become congested when the water becomes too clouded.

Soil also carries many other pollutants such as heavy metals, pesticides and excess nutrients that are spread by the action of water. These pollutants start at the source, but also flow way down stream too. This accelerated erosion is mostly caused by surface mining, poorly managed farmlands, construction sites, urban stream lands and logging roads.

There are five ways you can prevent sediment from running into your local streams.

- Erect a silt fence. A silt fence is a fine black mesh of synthetic fiber or fiber cloth held up by two stakes. The bottom of the cloth must be in the ground at a depth of at least 6 inches.
- Use straw or a hay bale to prevent soil from running off into the stream. The straw should be tightly bolted together, set into trenches at least 4 inches deep and firmly staked into the earth.
- Create a sedimentation basin to trap sediment and prevent runoff. A sedimentation basin resembles a pond and is normally fitted with an outlet.
- Construct a collection ditch. Collection ditches prevent sediment runoff from bypassing perimeter control measures, which are barriers that prevent sediment from leaving a site by filtering sediment runoff, and divert it to a sediment trap or basin.
- Seeding or mulching. Seeding and mulching can be done in any yard. It is required for temporary and permanent soil erosion control. This will hold the soil in place so it won't be carried away by runoff.

Soil is not just dirt. It is a mixture of minerals that keeps the ground aerated. Without soil, trees would not be able to grow and give oxygen that we all need to survive. None of us wants to be drinking what has been washed off of a construction site or what has come out of improperly managed cow pastures. That is why we need to control the amount of sediment that is washed into our fresh water. By using these techniques we can help control the amount of sediment that gets into our water supply everyday and help to keep our drinking water free of pollutants and our soil rich in nutrients.

Illegal Dumping

Craig Chopko, Paul Matisko, Kevin Phillips, and Dominick Bednash

What is illegal dumping? Illegal dumping is disposal of waste in an area where doing so is not permitted. It can also be called "open dumping," "fly dumping," or "midnight dumping," because materials are often dumped in open areas, from vehicles along roadsides, and late at night. Usually dumpsites include household garbage and large items such as appliances, couches, and tires. Construction companies may also take their leftover garbage and dump it. Illegal dumping and littering are intolerable. Many people, organizations, and government agencies have worked for many years to conduct cleanups and to educate the community about cleanups. Locally, we are looking for solutions through education, enforcement and collaboration.

Why do people illegally dump? People who illegally dump usually have limited access or knowledge of affordable waste disposal facilities or recycling programs. In lower income areas, people may also have difficulty affording the fees. In areas with a large amount of people renting apartments, the problem may be worse because people may feel less connected to their community or have no landlord to help them take care of the problem. Residents of rural areas, where it is common to illegally dump, might not be aware of the laws or impacts on the environment. Because no one wants waste on their own property, people who illegally dump typically do so on property that belongs to someone else. Also, addressing illegal dumping may be a low priority to law enforcement officials who are dealing with other issues.

What are the effects of illegal dumping? Illegal dumping affects the earth in many ways. If chemicals are spilled into the water it can harm or even kill the animals in the water or animals drinking from it. The pollution in the water also kills the vegetation on the sides of the streams and rivers. When people dump their garbage along roadsides, railroads, and other areas of land it affects the safety of animals and humans. Things like glass, metal, and chemicals can be very harmful. Illegal dumping also makes our communities look bad. Refrigerators and tires on the sides of roads and banks are unsightly and lower property values. Illegal dumping has many negative effects and has to be stopped.

What can we do to stop it? Illegal dumping gets bigger every year. It is getting to a point where it is polluting the environment. If you witness someone dumping, you can report it to the local police. Another approach is to get together with your community and have a cleanup. You may be able to get help through a cleanup association such as PA CleanWays, a nonprofit organization that fights littering and illegal dumping and sponsors individuals wanting to remove garbage from an illegal dumpsite. The COALS program (Clean Our American Lands and Streams) through the Department of Environmental Protection is active in Lackawanna County and has planned an illegal dumpsite cleanup at the Bull Hill Trail at Lackawanna State Park on Thursday April 26, 2007 with assistance from Lackawanna Trail High School, the Lackawanna County Conservation District, the Lackawanna State Park, and the South Branch Tunkhannock Creek Watershed Coalition. It's pretty simple; if you do something small by just picking up a piece of trash, or by not littering yourself, you can make the community that much more superior and clean.



Illegal dumpsite on the Bull Hill Trail at the Lackawanna State Park to be cleaned up by volunteers with funding from the COALS program on April 26th

Nutrient Management in Agriculture

Kyle Miller, Cara Lewis, Melissa Borys, Joe Potis

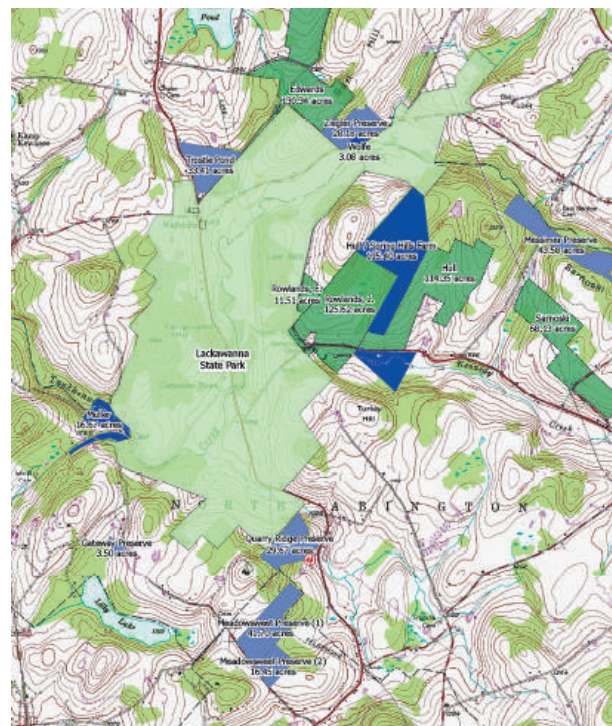
Have you ever realized the impact that excess nutrients have on our water's purity? Nutrient management is defined as managing the source, rate, form, timing, and placement of nutrients. There are approximately 59,000 farm families and 7.7 million acres of farm land in Pennsylvania. The average dairy farm consists of 64 lactating cows, 41 heifers, 10 dry cows, and 17 calves, with about 69.7% of tillable land.

Cow manure is plentiful in nutrients. It is important to control where these nutrients end up, so there are less negative effects on the environment. When the manure breaks down or gets saturated with rain water, the nutrients are absorbed through the soil and are soaked into the surface water and groundwater that makes up our watershed. This watershed supplies us with our fishable, swimmable, and drinkable water. If these nutrients from the manure get into our water supply it can pollute and contaminate it. Excess nutrients cause an overgrowth of algae in the water, called algae blooms. Algae blooms deplete oxygen supplies and block sunlight needed by aquatic plants and animals. Many agencies, on the local, state and national level are concerned about the amount of nutrient pollution because of the negative impacts excess nutrients have on the Chesapeake Bay.

Nutrients can be helpful to the crops if they are distributed properly among the plants on the farm. However, if these nutrients are not managed properly they can be very harmful. One effective way of managing the cow manure is storing it in tanks or under an enclosed area or, if the cows are pastured, implementing a rotational grazing program. If a farmer tills the land, spreading the nutrient rich manure on the crops adds the nutrients to the fields when the plants need it to grow. If a farmer implements no-till practices, similar precautions can be taken to control nutrient levels, such as using cover crops. Implementing Best Management Practices such as rotational grazing, no-till and cover crops can make a significant difference in the quality of local watersheds and appropriately managing nutrients is key. Other similar BMPs can be outlined in a Comprehensive Nutrient Management Plan (CNMP) which combines conservation practices with management activities. A CNMP can be any plan that helps protect the quality of the soil, water, and livestock and will help ensure soil fertility as well as minimize the cost to farmers. Planning out a CNMP will include resource evaluation, the proper timing of nutrient application, crop needs, and also the use and cost of nutrient tools and equipment. Most of the required BMP methods are cost efficient, if not free. These methods consist of nutrient analysis, keeping good records of the type of soil, crop yield, and placement of crops. The Natural Resource Conservation Service and Lackawanna County Conservation District in Mayfield can help interested landowners with the development of a nutrient management plan.

Chesapeake Bay Fast Facts:

- Pennsylvania contributes an estimated 36 percent of the nitrogen and 25 percent of the phosphorus



entering the Bay.

- In the upper portion of the Bay, about 3/4 of the nitrogen and 1/2 of the phosphorus comes from Pennsylvania.
- Animal manures and commercial fertilizers can pollute local waterways if applied in excess of crop needs. Over half of the nitrogen and the phosphorus entering the Susquehanna River comes from agricultural runoff. Improper fertilization of residential lawns and gardens, malfunctioning septic systems, and industrial activities, also cause nutrient pollution.

Open space preservation

Samuel Carrion J.R. and William Smith

Open space is any undeveloped land. You can find open space in many places in and around Scott Township and the South Branch Tunkhannock Creek watershed. We should protect open space to protect the animals and wild plants that live here as well as to reduce flooding and provide areas for watershed residents to recreate.

Runoff is water that runs over the surface of the land instead of soaking in. Paving areas creates impervious surface area that increases the amount of runoff that affects creeks, lakes, ground water, and the health of watersheds by increasing flooding. Also, pavement, rooftops, sidewalks, and any other impervious surfaces can impact our watershed because they promote runoff and prevent the soil from naturally filtering out pollutants such as silt, heavy metals, oil, and other things that can damage our watershed. Runoff is not filtered and carries with it many pollutants from parking areas, fertilizers from lawns, and creates a higher temperature causing thermal pollution.

Another reason to protect open space is the animals that live there. Without open space the animals that live there won't have a home (habitat). Animals like foxes live in the ground and use open space to raise their young. Birds are other animals that live in the open space in trees. Without trees and open space, most of the animals that live here will die out or relocate. When their habitat is destroyed, animals are forced to move closer to humans, which has some undesired effects such as bears foraging for food in garbage cans, birds building nests in rain gutters, and snakes making a home in a basement.

Open space is also valuable for places to recreate. People enjoy activities such as hiking, biking, hunting, fishing, and walking. Residents of the watershed have many areas to recreate including the Lackawanna State Park and Little Rocky Glen. The proximity to open space also increases property values for residents of the watershed.

The Countryside Conservancy is a private, non-profit organization actively working with landowners in the South Branch Tunkhannock Creek watershed to preserve land of conservation value for the public benefit. A primary focus is protecting the land surrounding Lackawanna State Park to create a conservation hub of land that is protected for public use. To date, the conservancy has protected seven hundred and fifty acres.

“Conservation Hubs:” building on what’s already been protected

Wetlands

Laurie Obloshny and Kristin O'Heren

A wetland is defined as a transitional environment between upland and fully aquatic environments. Wetlands have very important functions. Wetlands purify and filter water, trap sediments, act as a natural flood protector and erosion reducer, and provide habitat for aquatic and terrestrial plants and animals. In a sense, wetlands are the earth's kidneys. Wetlands support and maintain more life than any other terrestrial ecosystem on earth. Plants, animals and micro-organisms call these swampy areas home.

Plants provide shelter and food for many of the animals in the wetlands. Some plants have adapted to the wetlands by growing so their leaves float on the top of the water. Some can live completely under the surface of water like milfoil that has roots to anchor itself to the bottom. The coontail is submerged underwater but not rooted. These same plants also provide food for the aquatic animals. The animals eat the leaves that fall from these plants and trees and also use the plants as a shelter. Some animals may lay their eggs in the stems of these plants. Over 109 species of amphibians, 209 animals listed on the endangered species list, and 80% of American bird populations live in wetlands.

Finally, microorganisms are essential in maintaining and preserving wetlands. To the naked eye, microorganisms are invisible but they have a very critical role in these environments because they are the primary producer in the wetlands, acting as a decomposer and recycler of nutrients. For example, blue-green algae trap and store sunlight in the form of chemical energy. Energy is needed for all these organisms to survive but many cannot do this on their own. The blue-green algae are used as food, and as an indirect source of solar energy. These simpler elements put nutrients back into the ecosystem. Wetlands are a positive and beautiful aspect of nature. Just because the water appears shallow, does not mean the roots do not run deep.



The role of a local citizen

Kimberly O'Heren

The role of a local citizen in environmental protection is one of the hardest jobs humans have. Although some people don't give a thought to what they are doing to the water quality, and some people don't care to know what is in the water they drink, it is important for all of us to understand the importance of water quality. In this article, I would like to help you understand just how much you can affect your water quality and how much others are affected by your actions.

So just how much do we affect the quality of our water? We affect water quality through our everyday actions. Anything that is not disposed of properly ends up in your watershed, as well as the water you drink in your home and maybe even at work. Think about all the things that are disposed of improperly each day by being left on the roadside, thrown out a car window or dropped on the street. Then, multiply that number by three hundred and sixty five days in a year, and then by a lifetime. What number did you come up with? It can be almost too large a number to comprehend. Now, you must realize that all of these discarded items may be part of your drinking water. For example, when people get rid of old televisions, washers, and dryers by putting them on the side of the road, all of the chemicals and dirt from these appliances end up in your watershed. Every thing has to go somewhere and the things that don't break down in the soil eventually end up in our water.

The destruction of wetlands is all too common. Most people can't even tell if the land they are building on is a wetland or if it is a habit for many animals. I know you may be thinking that wetlands don't exist in your area, but they do. It is important to protect the wetlands because wetlands affect your water quality. Many wetlands remove pollutants from surface runoff and small streams by retaining sediments and the toxic pollutants attached to those sediments, such as heavy metals and pesticides. As a homeowner, business owner or citizen, you can consciously reduce the amount of water you use, eliminate fertilizer usage or test your soil to be sure that you are using the proper amount, and install a rain barrel to collect the runoff from your roof so that it does not become polluted stormwater. Farmers can use various best management practices such as rotational grazing, no-till practices, ground covers, and stream bank fencing to reduce the amount of sediment and nutrients entering the watershed. Not only will this improve the South Branch Tunkhannock Creek watershed but also the

Susquehanna River and the Chesapeake Bay.

There is a watershed organization called the South Branch Tunkhannock Creek Watershed Coalition that does a great job of helping to protect the quality of your watershed. This organization is non-profit; they don't get paid to clean your water, they are actually volunteering to keep your water clean. They are everyday people, many with full-time jobs, that feel very strongly about environmental improvement and spend their free time monitoring water quality, holding informational seminars, and preparing grant applications in order to get funding for watershed improvement. So far in 2007, the watershed group has sponsored a Wildflower seminar, a showing of the movie "An Inconvenient Truth", and a Monarch Butterfly seminar. The group does chemical testing at several places in the watershed one Saturday each month and collects stream macroinvertebrates twice a year. To learn more about how to protect your water, you can go to a meeting on the first Monday of every month at 7:00 p.m. at the Countryside Conservancy's office at Keystone College.

For more information regarding the South Branch Tunkhannock Creek Watershed Coalition or for any information regarding environmental issues in your area, please contact the Lackawanna County Conservation District at 570-281-9495 or www.lccd.net for more information.



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