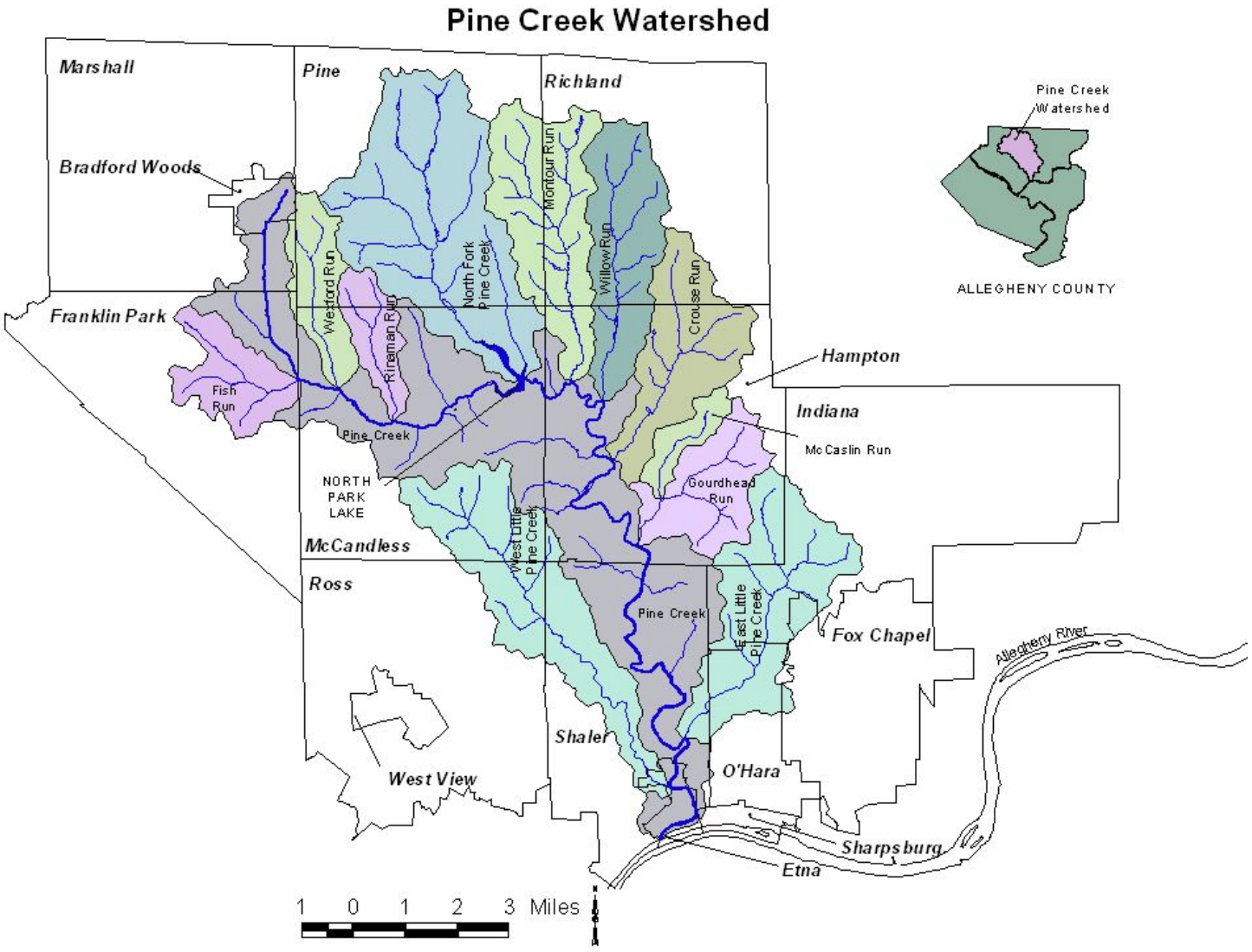
Pine Creek and You: A Partnership for the Future

A Resident's Guide to Promoting a Healthy Watershed

Provided by the North Area Environmental Council
in conjunction with the
Pine Creek Watershed Assessment
2005



This booklet will introduce you to watersheds in general, the Pine Creek watershed, and how you can actively promote a healthy watershed with happy residents.

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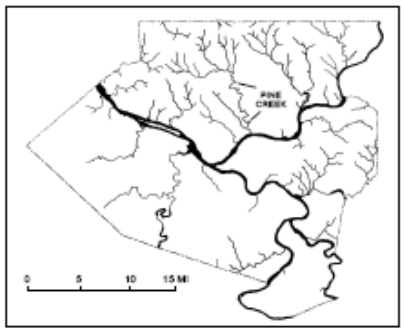
Watershed – (*noun*) an area of land that drains into a common water body such as a stream, river, lake, or ocean; also referred to as a drainage basin or catchment area.



Whether we realize it or not, we ALL live in a watershed. In urban areas it can be hard to tell where a watershed is because most water is carried to local streams or rivers through underground pipes.

Since a watershed is identified by the body of water to which it drains, you can be standing in several watersheds at the same time. For example, someone living along East Little Pine Creek is a resident of that watershed, as well as the watersheds for the larger Pine Creek, Allegheny River, Ohio River, and Mississippi River to which East Little Pine Creek ultimately drains.

Most of us don't think much about the Pine Creek watershed often, until there are heavy rain storms when it can be at the center of all our attention. The floods of 1986, 1987, and 2004's "Hurricane Ivan" have heightened the significance of the word "watershed" for many Pine Creek residents.

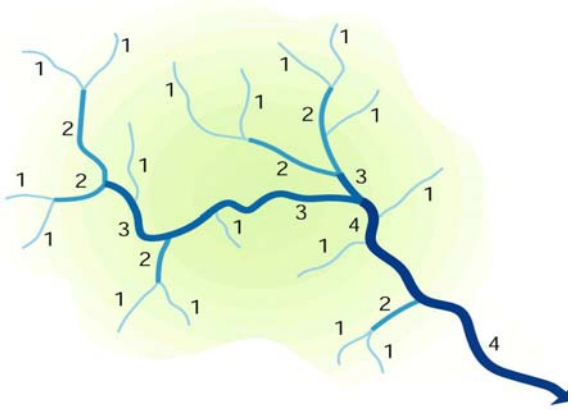
"Why should I care about a HEALTHY watershed?"

Being aware of how the Pine Creek watershed functions can be valuable to residents and businesses for several reasons:

- A healthy stream system can be enjoyed recreationally, can support a healthy natural biological community, and can function in a non-destructive way during heavy rain events.
- There are ways to reduce the risk of flooding that also enhance water quality and a watershed's recreational value at the same time.
- Costs associated with flooding affect every one of us through federal, state and local tax dollars required to address emergency management and repairs.
- Our drinking water is taken from either an aquifer, stream or river. Dirty water costs more to purify than cleaner water.
- Recreational users can be directly impacted by stream health through contact with bacteria or other contaminants.
- Better fish populations due to good water quality increase the recreational opportunities of a stream system and can increase revenue of service industries and businesses that surround it.
- A healthier watershed and clean streams become a source of pride for the community and may increase property values. Streams that are polluted or full of litter are unattractive and have a negative impact.

"How do streams work?"

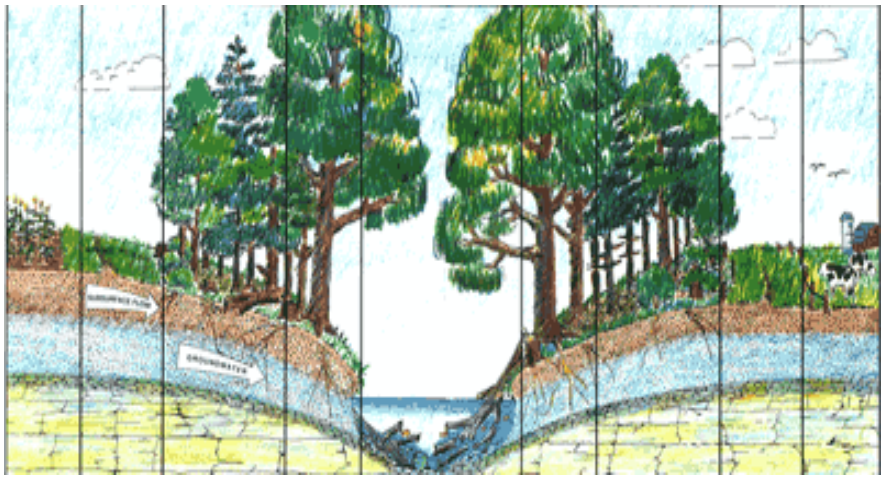
Stream Orders in River Continuum Hierarchy



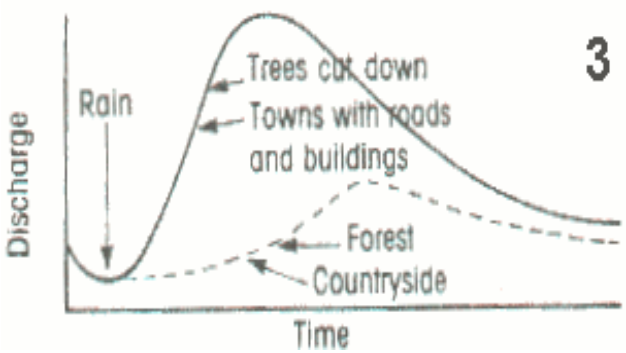
Streams like Pine Creek and its tributaries are commonly categorized by what is called the River Continuum Concept which ranks streams and rivers based on their sequence in collecting water. In this model, the smallest streams that collect water are called 1st order streams. These are also called "headwater" streams. When two first order streams combine to create a larger stream, that is called a 2nd order stream, etc. The Pine Creek watershed has many first and second order streams.

The area along a stream is called the Riparian Zone. Riparian zones are very important to the health of the watershed (especially in headwater streams) because it is here that water can be absorbed into the ground or filtered through leaf litter and other plant material before entering the stream. A well vegetated riparian area also provides shade, and is the first link in the food web that supports the birds, fish and other wildlife that make Pine Creek an aesthetic and recreational asset in the area.

Forested Riparian Zones



Rain storms have a significant effect on streams in Western Pennsylvania. The hilly topography and clay soils of the area cause water to run off quickly and increase flooding. Another factor contributing to flooding is land use choices that increase impervious surfaces like parking lots, roads and buildings and reduce dense vegetated areas (forests, meadows, etc.) in favor of manicured landscapes.



Because less water is absorbed in developed areas, flooding can increase downstream. Generally, streams in areas with a lot of development fill higher and faster because of the increased water shed, or "discharged", from the land, as seen in this graph.

As development progresses within a watershed, several changes can occur rapidly. During rain storms, stormwater run off from hard surfaces causes erosion of stream banks because more water is running through them faster than before development. The dirt carried by the water settles to the bottom of the stream where the current slows, which causes channel filling and increases the risk of flooding in these areas.

While modern policies regulate the amount of water that may be shed by a development, it is impossible to duplicate pre-development water absorption and slowing by vegetation and exposed ground.

Urban Erosion

Detention Pond

Many changes have occurred to the Pine Creek watershed since its early settlement by Europeans over 200 years ago. A brief history of the watershed highlights the enormous changes that have occurred in the watershed, and how critical our attention to watershed issues can be...

Pine Creek: Past, Present, and Future

The Pine Creek watershed is spread across several ridges and valleys typical of the western Pennsylvania landscape. The northern part of the watershed, the headwaters, has rolling hills with considerably gentler topography than is found near the mouth of the stream where severe slopes drop into shadowed valleys.

Before the European settlement of the Pine Creek watershed began in the 1700's, Seneca Indians occupied the countryside with a main camp near downtown Pittsburgh and several transitory camps spread throughout the area. Since the Native Americans lived from food and resources hunted, fished and gathered from the woods, rivers and streams of the area, the landscape was virtually undisturbed. The indigenous communities were very mobile, traveling on a matrix of trails, several of which have become current roads and highways. Mount Royal Boulevard was originally one such route and a trail known as the Venango Path become Franklin Road.

Sharpsburg's Chief Guyasuta Statue

European settlers first came to the Pine Creek watershed area to establish trade, acquiring pelts and other materials that were valuable to markets in the eastern US and in Europe. George Groghan, an Irish immigrant, was among the early European settlers of the area. He came to trade with the Native Americans and purchased land in the area in 1749, established a base near the mouth of Pine Creek, which ultimately served a trading network extending into New York, West Virginia, Kentucky , and Illinois. His inventory of 130 canoes, a multitude of rafts, as well as hundreds of horses and mules reflects the importance of regional waterways in trade.

The Native American presence in the three rivers area came to an end on October 23, 1784 when the Six Nations of the Iroquois sold the land north of the Ohio River and west of the Allegheny River to the State of Pennsylvania and were relocated to New York State. Because of the "depreciated" value of Colonial currency due to the Revolutionary War (1775 - 1783), those lands were used like money to pay active soldiers for their service and were known as the "Depreciation Lands."

Later settlement around Pine Creek involved small local farm settlements, with many of their names still familiar, such as "Undercliff", "Sharp's Hill", "Glenshaw", and "Elfinwild". Many early settlers' names are familiar as well, such as James Sharp (1826 - Sharpsburg) and Thomas Mercer Marshall (1820s – Marshall Twp.). Throughout this period, Pine Creek played a major part in the area's development.

Pittsburgh 1817

"the Blacksmith" by
Jefferson David Chalfant

John Shaw, an early Shaler resident, bought 600 acres when he arrived around 1800. He built a sawmill and gristmill right along the stream. Remnants of the mill site are still visible. His son, Thomas, later built a sickle factory, using power from the stream as well, and steel imported from Russia. Settlers had to place their order two years ahead! Local distilleries, slaughterhouses, hotels, and blacksmiths' shops scattered the main corridor of what we now call Route 8 as well.

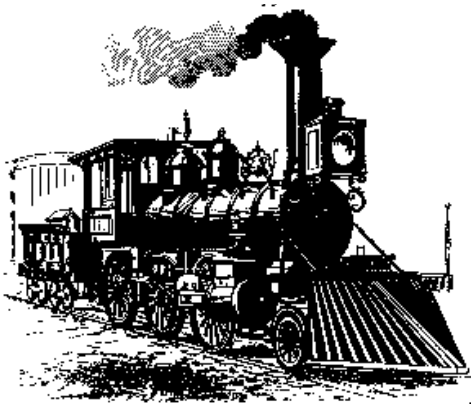
It's hard to imagine the challenges of life in an area with steep slopes and only horse drawn carriages to navigate the terrain. Paved roads, bridges and other refinements were decades away. The Butler Plank Road, an old Native American trail to Lake Erie, was not even surveyed until 1852. Stone for the original road was quarried locally, but got rutted too easily because of its soft sandstone, so planks were finally installed in the 1870s. At the time, it took 14 hours to travel from Etna to Butler, a distance we now travel in about an hour! Even in the mid-1800's transit was difficult. Since there was not a road along the lower reaches of Pine Creek, coal mined from near the Spencer Lane area was hauled up Glenshaw Avenue to Mount Royal Boulevard to eventually reach the iron works in Etna.

Water transit was vital in the region's early days. In the early 1800's boatbuilding was the region's third largest industry behind iron and textiles. Pittsburgh residents pushed officials hard to keep up with other cities by building a canal from Philadelphia to Pittsburgh. By 1838, with the canal in place - including areas where boats were hauled over the mountains on trains, travel to and from Philadelphia was cut from 15 days to 3 ½ days. The canal, which crossed the mouth of Pine Creek, served a wide array of business and facilitated increased commerce with Ohio and Kentucky to the west.

After the canal was completed, larger industries developed along the rivers, such as the Etna Iron Works (later Spang Chalfant Co.) (1850), Heinz horseradish plant and glass factory in Sharpsburg (1849) and Vesuvius Nail and Iron works (Sharpsburg 1846). The logging, oil and coal booms also became major markets for water transit. The Drake oil well of 1859 launched the oil boom, with storage and refineries set up in O'Hara Township. The Pennsylvania Railroad viewed the canal as competition, and eventually maneuvered to buy and close the canal in 1861. It filled the canal and built tracks along much of the canal's earlier route.

View from Grant's Hill 1840
Courtesy of Pittsburgh History & Landmarks Foundation

The continued expansion of transportation led to dramatic changes in the Pine Creek watershed. Construction of the narrow gauge Pittsburgh, New Castle and Lake Erie Railroad in the 1870's extended access to the stream's northern reaches. The PNC&LE was eventually taken over by the Baltimore and Ohio railroad and converted to standard gauge which eventually evolved into the Harmony Bus Route. The Pine Creek railroad was begun as part of the narrow gauge Allegheny and Harmony railroad. Rail development also increased access to interior forests and contributed to the rapid deforestation of the state. Two trolley lines, the Butler Short Line and the Pittsburgh, Harmony, Butler and New Castle Railway also expanded the reach of travel, but ultimately gave way to newer modes of travel.



The turn of the century saw accelerated change in the region with the arrival of the automobile and with Bell Telephone starting in Glenshaw in 1903. Early on there was one car per 9,500 people and less than 10 miles of paved road in the region. Roads were eventually paved to handle the growing traffic. The creation of North Park in 1927 reflected the increased mobility.

Increased commerce and development took its toll on the streams and rivers of the area. By 1912, concern over flooding, the acidity of the water, and inconsistent river flows led to the publication of a visionary document titled the Heinz Report. This report by the Flood Commission of Pittsburgh concluded that floods were increasing in frequency and height, and that protection of the interior forests of the state as well as establishing reservoirs were necessary for flood control.

Pittsburgh 1931

This was decades before the devastating 1936 flood that was 40 feet above flood stage. The Heinz Report's recognition of the value of forests in flood prevention was extremely progressive and contributed to the eventual formation of the Allegheny and Monongahela National Forests. The report also helped prompt the construction of the numerous reservoirs that regulate flows in western Pennsylvania's waters today. Water quality issues were also addressed locally. In 1931 Shaler Township started to install sewer and water lines that served parts of Shaler, Hampton, Indiana and O'Hara Townships.

Suburban development in Allegheny County continues to expand. Construction of I279 in the 1970's has contributed significantly to development in the upper reaches of the watershed. Now Allegheny County has one of the worst urban sprawl problems in the entire country. Many people commute up to 20 miles into Pittsburgh to work, with more and more farmland converted to residential and commercial development as a result. From 1987 to 1997, there was a 37% decrease in the acreage of farmland in Allegheny County, despite a 1.5 percent decrease in population between 1990 and 2000.

Pine Creek Sep. 17, 2004

Increasing regulations parallel greater development. Many municipalities now have regulations for managing stormwater in new developments to reduce the risk of flooding and protect stormwater quality. With some municipalities at only 50% development capacity currently, stormwater management is critical.

North Hills YMCA Sept. 17, 2004

As development continues in the watershed, every resident and business owner needs to be aware of their role in the system. There are several ways residents can help to reduce negative impacts in the Pine Creek watershed...

"So what can I do??"

1. PREVENT POLLUTION

Keep Dirt Out of the Water

Erosion is a major contributor to flooding. Dirt that is eroded from the land by rain and carried to the stream can contribute to flooding by partly filling in the stream channel, which can cause flooding, which causes more erosion, etc. Dirt in a stream can also suffocate the animals living there. If you are doing **any** project that involves moving dirt, take steps to keep dirt out of the stream.

- Make sure your contractor complies with local guidelines for installing a silt fence or other erosion controls during any earthmoving project.
- Sprinkle hay or straw over exposed dirt to keep rain from washing it away
- Seed any exposed dirt quickly to create an erosion "shield" of grass.

Silt fence

Be Careful With Fertilizers

Fertilizers in a stream kill fish and the other animals in the water. Even small amounts can be a problem. If fertilizer is getting to the stream instead of staying on your yard or garden, it is a wasting your money too. To use fertilizers in a stream-friendly way:

- Use biodegradable or organic fertilizers.
- Use as light an application as possible, especially on sloped property.
- Apply only when it can be absorbed before a rainstorm (two days before rain is expected is a good rule of thumb)

Wash Your Car, Not the Stream

Soaps and detergents contain some of the same chemicals as fertilizers, which makes them bad for streams. So, to make sure you have both a clean car and healthy streams:

- Park your car on grass or gravel to wash it. The water will be filtered as it goes through the ground.
- Use organic or biodegradable soap or detergent.
- Or wash your car at a commercial carwash that filters and recycles water.

Pick Up After Your Dog

Dog waste can contribute to high levels of bacteria in a stream. Please pick up after your dog and dispose of the waste in an appropriate manner.

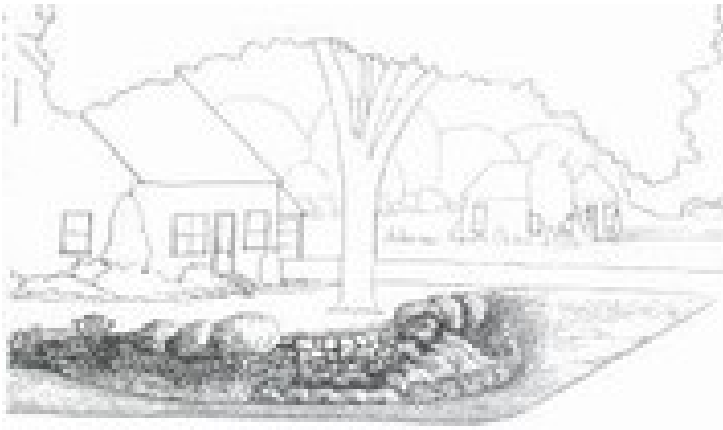
2. REDUCE RUN-OFF

Install a Rain Barrel or Two

Having your down spouts drain into rain barrels reduces stormwater going to the stream and provides you with a great chlorine-free source of water for your garden. There are several designs, each with an overflow outlet. Some rain barrels can even be linked in a series to give you added capacity. Think of how much water could be held back if everyone had a rain barrel or two!!

Develop a Rain Garden

Rain gardens can offer a wonderful way to help reduce flooding while enjoying a beautiful variety of plants, and welcoming some new songbirds and other desirable wildlife. There are easy ways to prevent undesirable insects, provide the lovely sound of a trickling fountain, and reduce the amount of mowing. A rain garden such as this can be part of new construction or put in later.



Create a Riparian Buffer (if you live along a stream)

Riparian buffers are areas along a stream bank that contain a variety of woody (trees and shrubs) and non-woody plants (grasses and flowers). Riparian buffers are very helpful because they:

- Help shade the stream and keep it cool, which is good for animals living in it, and provide food for those animals.
- Absorb water before it reaches the stream.
- Slow down any water that does go into the stream.
- Filter pollution from the water.
- Larger riparian areas offer a variety of recreational uses.

3. BECOME INFORMED AND INVOLVED

Learn where YOUR stormwater goes

Some houses have gutters that drain to combined sewer and sanitary systems that can overflow during rainy weather. Others lead to separate storm and sanitary sewer systems. Reducing rain water entering combined systems is especially important in preventing bacteria contamination of streams,

Help Clean Up a Local Stream

Litter and debris can be deadly to animals that live in the stream. Not only can it be harmful to the animals living in or near the stream, but it can also contribute to flooding if it interferes with stormwater management. To help keep litter out of local streams, contact your local conservation organization to learn about scheduled stream clean-ups, or organize a neighborhood litter pick-up day in your own neighborhood.

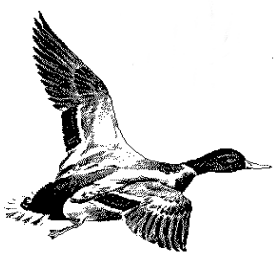
Become a Stream Monitor

A monitoring program began in the Pine Creek watershed in 2003. The volunteer monitors have checked the chemical and biological quality of sites throughout the Pine Creek watershed for over two years. If you are interested in becoming a Pine Creek Monitor, contact the North Area Environmental Council (see listing on the back cover) to learn the current status of the program and about opportunities to become involved. There are numerous ways you can help.

Become Engaged in Local Policy Decisions

Watershed conservation depends a lot on local ordinances. Ordinances can regulate everything from tree removal on steep slopes, riparian buffer protection, and erosion control to grading practices. If you are interested in finding out how your local municipality protects the watershed, learn about the local ordinances in your municipality. Ordinances are updated every few years with public input. Many ordinances can be found on your local municipal web site. A summary of policies in the Pine Creek Watershed is available in the Pine Creek Watershed Assessment at www.pecwest.org.

- Learn what the current issues are and how they are enforced.
- Think about potential improvements.
- Participate in local meetings to share your thoughts.



"Who is in charge of protecting the Pine Creek Watershed?"

Watersheds present interesting regulatory challenges because water flows across local political boundaries, and our understanding of the ecology of watersheds and related issues is constantly changing.

Influences on the streams can come from specific pollutant sources ("point discharges") like the outlet pipe for a specific industry or from broad-reaching sources (non-point discharges) like agricultural lands or streets and parking lots. Both require regulations to protect stream health. Furthermore, old sewer and stormwater pipes in the region were designed in a way that intentionally allowed sewage to be released to the region's streams and rivers in wet weather periods to prevent overloading sewage treatment plants.

There are agencies and laws in place that address these issues. Different levels of government are responsible for protecting water quality, managing stormwater, and regulating land use in western Pennsylvania. The most immediate source of control is the local municipality in which the stream is located.

LOCAL GOVERNMENT

Most municipalities have ordinances for both land-use and development, including for stormwater management. Those ordinances are designed to complement a document that provides a "vision" for the long-term development of the municipality, called a "Comprehensive Plan." Related ordinances may be in place to regulate earth-moving (grading ordinance), tree removal, or flood plain protection. Municipal ordinances may differ significantly between communities, which can cause challenges in a watershed like Pine Creek which encompasses land in fourteen municipalities. To learn more about your local ordinances, contact your local municipal office or check the municipal website to see if they are posted there.

COUNTY AND STATE GOVERNMENT

Municipalities draw on input and guidance from higher level government on many aspects of watershed protection. Many municipalities have the Allegheny County Conservation District review plans submitted for development to see that adequate measures for soil and erosion control are included. The Allegheny County Conservation District is actually a State agency, and is a valuable resource for local governments. The Allegheny County Government is helpful in providing model ordinances and also may be involved in plan reviews.

On the state level, the Pennsylvania's Department of Environmental Protection (PA DEP) (has regional watershed managers who serve as valuable liaisons on watershed issues. Other state agencies involved in watershed issues are the Department of Conservation and Natural Resources (PA DCNR) and the PA Fish and Boat Commission. Flooding-related matters come under the umbrella of the Pennsylvania Emergency Protection Agency (PEMA).

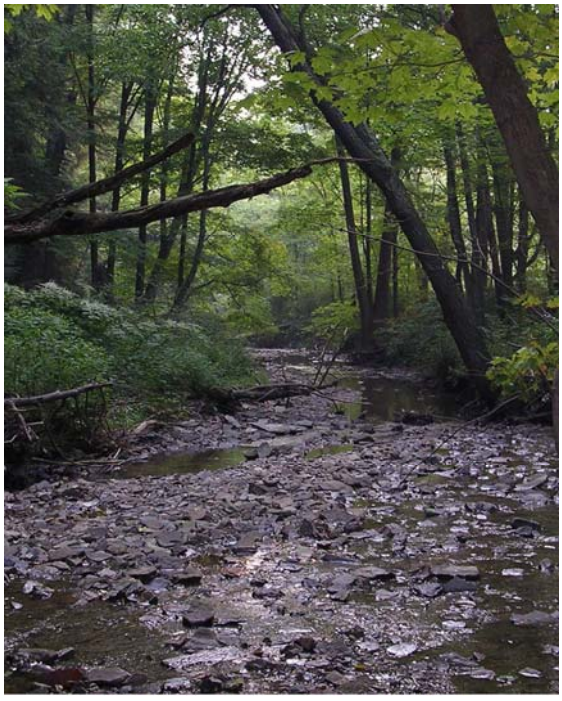
FEDERAL GOVERNMENT

The Federal Government is the highest authority concerned with watershed issues. The US Environmental Protection Agency (EPA) sets many overall standards for water quality and pollution. The EPA may work in collaboration with state and local authorities to see that its guidelines are implemented. The Army Corps of Engineers (US ACE) is another agency interested in waterways, but it focuses on dams, and larger waterways used for shipping or flood control. The Federal Emergency Management Agency (FEMA) deals with floods and other emergencies.

Several major laws are in place that relate to water quality standards for watersheds such as Pine Creek. Act 167 relates to stormwater management and is currently undergoing an update for the Pine Creek Watershed. This law regulates how stormwater is controlled on new development and is based on extensive engineering information. Other laws or guidelines that are in place related to water quality are:

MS4 – Municipal Separate Storm Sewer System
NPDES – National Pollutant Discharge Elimination System
TMDL – Total Maximum Daily Load

Researching these laws on the internet is a great way to get oriented to water quality issues.



Crouse Run Nature Reserve

??? Where can I find more information? ???

To learn more, explore the following web sites or contact the references provided on the back cover. Even if a web site is from a different state, the information it provides is appropriate for general reference.

Watersheds — General	
US Geological Survey	http://ga.water.usgs.gov/edu/watercycle.html
Environmental Protection Agency	http://www.epa.gov/owow/
Environmental Protection Agency	http://www.epa.gov/watertrain/smartgrowth/
Stormwater	
Ohio State University	http://ohioline.osu.edu/aex-fact/0442.html
Flooding and flood maps	
Federal Emergency Management Agency	http://www.fema.gov/fhm/hm_main.shtm
Rain Gardens	
Rain Garden Network	http://www.raingardennetwork.com/
Applied Ecological Services, Inc.	http://www.appliedeco.com/RainGardens.cfm
Clean Water Campaign	http://www.cleanwatercampaign.com/what_can_i_do/raingarden.html
University of Wisconsin	http://clean-water.uwex.edu/pubs/raingarden/rgmanual.pdf
Rain Barrels	
3 Rivers Wet Weather Demonstration Program	http//www.3riverswetweather.org/d%5Fweather/d%Fstorm2.stm
Riparian Buffers	
Connecticut River Joint Commission	http://www.crjc.org/buffers/Introduction.pdf
Combined Sewer Overflows	
Combined Sewer Overflows	http://3riverswetweather.org/d_weather/d_know.stm

Agency web sites

Allegheny County Conservation District	accd.pghfree.net
Allegheny County	www.county.allegheny.pa.us
PA Department of Environmental Protection	www.dep.state.pa.us
PA Department of Conservation and Natural Resources	www.dcnr.state.pa.us
PA Fish and Boat Commission	www.fish.state.pa.us
PA Emergency Protection Agency (PEMA)	www.pema.state.pa.us
US Environmental Protection Agency (EPA)	www.epa.gov
US Army Corps of Engineers (US ACE)	www.usace.army.mil

Several regional non-profit organizations have a strong interest in the Pine Creek watershed or related issues and can tell you about current events answers questions. Among them are (alphabetically):

North Area Environmental Council	412.364.7006	
Penn Future	412.258.6680	www.pennfuture.org
Pennsylvania Environmental Council	412.481.9400	www.pecwest.org
Pennsylvania Resource Council	412.488.7490	www.wpc.org
Pine Creek Land Conservation Trust	724.935.1935	
Three Rivers Second Nature (3R2N)	412.268.3454	www.3r2n.cfa.cmu.edu
Three Rivers Wet Weather	412.578.8375	www.3riverswetweather.org
Western Pennsylvania Conservancy	412.288.2777	www.paconserve.org

CREDITS: Photos and images

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Forested riparian Zones — USDA
Hydrograph - www.kesgrave.suffolk.sch.uk
Page 3: Detention pond — Center for Stormwater Protection www.stormwatercenter.net
Urban erosion — Mary Wilson
Page 4: Guyasuta statue — http://akvalley.com/history/native/guyasuta/guyasuta.shtml
Page 5: Pittsburgh 1816 — http://www.wqed.org/erc/pghist/units/WPAhist/wpa3.shtml
The Blacksmith — Jefferson Davis Chalfant
Canal boat — http://www.pa-canal-society.org/
Page 6: View from Grant's Hill 1840 — Courtesy of Pittsburgh History & Landmarks Foundation
Logging — http://rangerschool.esf.edu/wanakena/logging_photos.htm
Page 7: Pittsburgh 1931—http://www.wqed.org/erc/pghist/units/WPAhist/wpa5.shtml
Pine Creek flood at North Park Spillway — Gary Rigdon
North Hills YMCA flooded — Harry Lyon
Page 8: Silt Fence — http://www.ieca.org/Resources/Article/ArticleSFInstallationEfficacy.asp
Page 9: Rain barrel — http://www.cleanairgardening.com/rainbarrels.html
Rain garden graphic—http://www.maplewoodmn.govoffice.com/index.asp
Rain garden photo —http://clean-water.uwex.edu/pubs/raingarden/
Riparian buffer Planting — http://www.delawareriverkeeper.org/calendar.html
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Pine Creek monitoring — Clyde Hare
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