

2. Non-point Source Pollution

Living on the Landscape and How We Affect Our Shared Water Resources

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*“Water is the most critical resource issue
of our lifetime and our children’s lifetime.
The health of our water is the principle
measure of how we live on the land.”*

~Luna Leopold

For many people, the term “water pollution” conjures up an image of a river with litter-strewn banks and chemical pollutants discoloring the river. A walk along our imagined river’s edge may reveal a source of pollution such as a discharge pipe from an industrial manufacturing facility releasing chemical wastes.

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Scientists interested in cleaning up and restoring this river would classify the discharge pipe as a **point source of pollution**. In the case of a point source of pollution a person can literally point to and readily identify the origin of a pollution problem, which, in the case of our river, would be the discharge pipe releasing chemical wastes.

Since the inception of the Federal Clean Water Act of 1972, much progress has been made in reducing the impacts of point sources of pollution. Today, many formerly severely contaminated rivers and lakes in the U.S. have recovered significantly due to clean-up efforts that included elimination or better control over point sources of pollution.

Discharges from stormwater and sediment control basins and sewage treatment plants to streams, lakes and wetlands are examples of point sources of pollution found in Pike County. While environmental regulations exist to minimize their impact, these sources of pollution still present a potential source of water degradation to the County’s state-designated High Quality and Exceptional Value water resources.

Non-point Source Pollution

In recent years, efforts at maintaining and restoring water quality have increasingly focused on another type of pollution known as **non-point**

source pollution, which, according to a 1998 PA Department of Environmental Protection (PA DEP) report, now accounts for over 75% of Pennsylvania’s total water pollution problem. In addition, the U.S. Environmental Protection Agency estimates that non-point source pollution is now the single largest cause of degradation of our nation’s water resources.

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Non-point source pollution demonstrates the direct connection that exists between human activities on the land and how we affect our shared water resources. Originating from many diverse, scattered sources across our watersheds, non-point source pollution is often a less obvious source of water degradation. While the cumulative effects can pose a challenge to maintaining Pike County’s surface and groundwater resources, the good news is, there are many measures that residents, communities and municipal officials can take to help control this pollution problem.

Listed below are examples of locally occurring sources of non-point source pollution and steps that can be taken to lessen or prevent their impacts.

Stormwater Runoff

Stormwater runoff – created when rain or snowmelt accumulates and runs across the surface of the land – occurs naturally in undeveloped watersheds. However, increasing land development, particularly where land use regulations and planning for stormwater management are inadequate or lacking altogether, creates increasing volumes of stormwater impacting Pike County’s natural resources, residents and communities.

Stormwater moving across the human-built landscape picks up and transports non-point source pollutants including soil sediment, fluids leaked from automobiles, road de-icing agents, lawn and garden chemicals, pet and livestock waste, and debris. As a consequence residents, community associations and municipalities must cope with pollution of surface waters and in some cases contaminated community drinking water supplies.

The most effective strategy for managing stormwater is to prevent it from being created in the first place. Options in stormwater management exist for residents, community associations and municipalities. See Chapter 4, “Stormwater Management,” for more information.

Erosion and Sedimentation

Erosion and sedimentation – the wearing down of soil layers and the movement of soil particles from one place to another – are naturally occurring processes. However, rates of erosion and sedimentation increase in Pike County’s developing watersheds as land development activities, particularly residential and commercial development, expose bare soil to the erosive forces of stormwater runoff.

Soil sediment in stormwater is frequently carried and deposited in a nearby stream, river, pond, lake or wetland. The impacts of sediment pollution to these surface waters include loss of fish and other aquatic life and accelerated rates of aquatic plant growth. Excess soil sediments also pollute public water supplies increasing treatment costs.

Developing and following an Erosion and Sediment Control Plan (E&S Plan) – a requirement for both small-scale and large-scale land development projects in Pike County’s Special Protection watersheds – is a highly effective way to minimize soil erosion from land development sites. For more information on developing an E&S Plan, and controlling erosion and sedimentation pollution, refer to Chapter 5.

On-lot Sewage Treatment Systems

In Pike County, as throughout much of rural Pennsylvania, wastewater produced by households is typically treated and disposed of by on-lot sewage treatment systems. In effect, each homeowner has his or her own small-scale sewage treatment plant on site and it is the homeowner’s responsibility to ensure the proper use and functioning of their system.

The most important aspect of on-lot sewage treatment system maintenance and care is pumping a septic tank frequently enough to prevent system failure.

When properly used and maintained, on-lot systems can provide years of treatment of household wastewater and act as a safeguard for both environmental and human health. However, poor maintenance and improper use increase the risk of an on-lot system malfunctioning or even failing entirely, increasing the risk of contamination of community groundwater supplies.

The most important aspect of on-lot sewage treatment system maintenance and care is pumping a septic tank frequently enough to prevent system failure. On-lot systems, including their maintenance and proper use, are covered in more detail in Chapter 3.

Lawn and Garden Chemicals

Lawns and garden chemicals, including pesticides, herbicides (weed killers) and fertilizers, are all potential non-point source pollutants that can contaminate both surface and groundwater. While the amount of lawn and garden chemicals applied to a single lawn or garden may seem insignificant, the cumulative impacts within a watershed can raise concerns. There are several options available to residents and communities to reduce or eliminate the need for lawn and garden chemicals including the following:

- Have lawn and garden soils tested before applying fertilizers. The results of an inexpensive and simple **soil test**, available from your local Penn State Cooperative Extension Office, will provide the levels of soil nutrients present in a lawn or garden and the proper amounts of fertilizer needed, reducing the risk for pollution of surface and groundwater through over-application.
- Apply pesticides or herbicides according to label directions to avoid personal health hazard and over-application.
- Dispose of pesticides through the PA Department of Agriculture's **Chemsweep Program**. See resources for more information at the end of the chapter.
- Adopt **IPM (Integrated Pest Management)** strategies designed to minimize or eliminate the need for chemical applications to lawns and gardens.
- Learn **organic gardening** techniques including the use of “bio controls” that are generally less toxic and degrade more quickly causing less environmental impact.

For more information on IPM and organic gardening, refer to Resources for More Information at the end of this chapter. In addition to providing many other benefits, a buffer of trees and shrubs (Chapter 9) maintained along streams, ponds or wetlands, can intercept and greatly reduce the amount of fertilizers and other non-point source pollutants that would otherwise enter these surface waters in stormwater runoff from yard areas.

Automobile Fluids

For do-it-yourselfers who change their own automobile fluids, including motor oil, proper disposal practices should be followed. One gallon of used motor oil poured on the ground, down a household

One gallon of used motor oil can contaminate up to two million gallons of water!

drain, stormwater drain or an abandoned well can contaminate up to 2 million gallons of water! Automobile parts stores or service centers often accept used motor oil for recycling. Also, care should be exercised in storing and pouring gasoline to avoid spills. MTBE, a chemical constituent of gasoline, has been detected in water supply wells in Pike County.

While the fluids leaking from an individual car may not seem significant, thousands of cars within a watershed can create problems. Toxic automobile fluids, including gasoline, motor oil, grease and antifreeze that leak onto parking lots, roads and driveways are picked up in stormwater runoff and carried to lakes, streams or wetlands. Whenever feasible, repair leaks.



When used or disposed of improperly, household hazardous wastes, including paint products, lawn and garden chemicals, and auto fluids can pollute surface and groundwater

Household Hazardous Wastes

In addition to lawn and garden chemicals and automobile fluids discussed above, other examples of **household hazardous wastes (HHW)** include paints and paint products, drain cleaners, commercial household cleaning products and old batteries. HHW are hazardous (corrosive, flammable, toxic, etc.) by nature, but because households produce them in relatively limited quantities, they are not regulated under federal or Pennsylvania state laws. According to the PA DEP, each person in Pennsylvania generates an average of four pounds of HHW each year that, if carelessly managed, can create an environmental and public health hazard.

The following are PA DEP guidelines for managing HHW:

1. The best way to manage HHW is to avoid creating it in the first place. Start by selecting the least toxic product to do the job and then use only as much as is needed.
2. After using a product, give the remainder away to a friend, neighbor, or community group that can use it.
3. If the product isn't usable, or you can't give it away, take it to a community HHW collection program.
4. If your community doesn't have a HHW collection program you may put it in your regular trash, provided:

- a. You have complied with any disposal instructions on the label.
- b. There are no freestanding liquids. If water-based, allow the liquid to evaporate. If not water-based, absorb the liquid with vermiculite, cat litter, saw dust or other absorbent material.
- c. You have carefully packaged any residue to prevent leakage while the material is being transported to a disposal facility.
- d. You have only a small quantity. Divide larger quantities and dispose of them over several collections.

Small-scale Livestock Operations

State regulations require large-scale livestock operations to follow **Nutrient Management Guidelines**, including establishing practices to minimize contamination of surface or groundwater caused by nutrients, such as nitrates, and disease-causing microorganisms, such as bacteria, originating from animal waste. Although small-scale livestock operations are often exempt from state regulations, residents and businesses that include even a limited number of horses, llamas, goats, sheep, cows or other livestock should consider voluntary efforts to manage and contain animal waste to reduce the potential for water pollution and to minimize the threat to human health.

Options to minimize pollution problems created by small-scale livestock operations include:

- Avoiding stockpiling of manure next to streams and other surface waters.
- Maintaining a vegetative buffer along streams adjacent to livestock areas to help minimize nutrient runoff.
- Directing soil and waste laden runoff away from surface waters and water supply wells.

Owners of small-scale livestock operations can contact the Pike County Conservation District for more information on managing animal waste.

The most effective option for managing non-point source pollution is to prevent it from occurring in the first place.

Summary

Controlling non-point source pollution presents many challenges. For instance, the presence of fecal coliform bacteria in a water supply well

may render community drinking water unsafe to consume. The question then becomes, ‘what is the source of the bacteria?’

Fecal coliform bacteria can originate from a variety of sources including on-lot sewage disposal systems, small-scale livestock operations and pet wastes. This is the dilemma of non-point source pollution: although a pollution problem may exist, it is often difficult to identify a particular source as the culprit. And removing non-point source pollutants from surface and groundwater can be as difficult as identifying the source.

The actions of each individual, family and community, doing their part to reduce non-point source pollution, can add up to significant protection and improvement of local water resources for both current and future needs.

Ultimately, the most effective option for managing non-point source pollution is to prevent it from occurring in the first place. The actions of each individual, family and community, doing their part, can add up to significant protection and improvement of local water resources for both current and future needs.

Action Steps for Controlling Non-point Source Pollution

- ☞ Limit use and properly dispose of household hazardous wastes and encourage local officials (Appendix B) to adopt a household hazardous waste disposal program.
- ☞ Have your on-lot sewage disposal system (Chapter 3) inspected and the tank pumped regularly.
- ☞ When considering the application of lawn and garden chemicals, determine whether they are really necessary and what alternatives are available. When applying, use judiciously and follow label directions.
- ☞ Dispose of used motor oil properly at a recycling center and, whenever feasible, repair automobile fluid leaks.
- ☞ Use less toxic alternatives to products that generate household hazardous waste. Buy only as much product as needed, give the remainder to someone else who can use it, recycle the rest or dispose of it properly.
- ☞ In addition to providing many other benefits, a riparian buffer (Chapter 9) or corridor of vegetation, maintained along streams,

ponds and wetlands, can intercept and greatly reduce the amount of fertilizer and other non-point source pollutants that would otherwise enter these surface waters via stormwater runoff.

☞ Support efforts of local municipal officials to control non-point source pollution through land use regulations that address stormwater management, groundwater protection, and on-lot sewage system maintenance.

Resources for More Information

Ecological Landscaping Association: www.ela-ecolandscapingassn.org/

Organic Gardening: www.organicgardening.com/

Non-point Source Education for Municipal Officials, University of CT: nemo.uconn.edu/

PA DEP, Household Hazardous Wastes: www.depweb.state.pa.us/dep/site/default.asp. Select “Search” and “HHW.”

PA DEP, select “Non-point Source Pollution”: www.dep.state.pa.us/info.htm

Pennsylvania Integrated Pest Management Program: paipm.cas.psu.edu/

Pike County Conservation District: www.pikeconservation.org

US EPA, What is Non-point Source Pollution?:

www.epa.gov/owow/nps/whatis.html

PA Dep’t. of Agriculture Chemsweep Program: www.agriculture.state.pa.us.

Search “Chemsweep.” Free program available to residents and businesses for the disposal of unwanted pesticides. Download, complete and submit application form or call 570-836-2181 for information.

PA DEP, Hotline for more information on recycling and disposal of household hazardous waste: 800-346-4242.