

A Watershed Primer for Pennsylvania

A collection of essays on watershed issues



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Pennsylvania Environmental Council

The Pennsylvania Environmental Council is a statewide, nonprofit, environmental education and advocacy organization devoted to promoting the protection of watersheds, the sustainable use of land and the implementation of environmental innovations. Since its founding in 1970, the Council has worked toward sensible and sustainable answers to the Commonwealth's difficult environmental issues.

The Council brings together the knowledge and viewpoints of civic and environmental groups, businesses, government, and academia to develop common understanding on environmental issues; builds coalitions and partnerships to act on these issues; advocate policies, laws, and regulations that foster sound environmental practices and responsible management of our natural resources; and provides resources, assistance, and education to the general public.

Allegheny Watershed Network

The Allegheny Watershed Network was established in 1996 as a forum for education about watershed issues and networking among the many groups, government agencies, businesses, and educational institutions that are active within the Allegheny River watershed.

Already, the Network has made a great impact throughout the region and state with its publications, conferences, and coordination with other watershed groups—all of which have helped to focus more public attention on the quality and sustainable use of the Allegheny River.

Pennsylvania Department of Environmental Protection

The Department of Environmental Protection's mission is to protect Pennsylvania's air, land and water from pollution and to provide for the health and safety of its citizens through a cleaner environment. It partners with individuals, organizations, governments and businesses to prevent pollution and restore our natural resources.

Introduction

As far as we know, no one has produced a publication like this before. With the help of more than thirty experts on watershed issues, all from Pennsylvania, we have assembled a primer designed to introduce anyone to the benefits, threats, programs, and laws affecting the Commonwealth's rivers, streams and lands.

This document, really a collection of essays by some of those who care most about our watersheds, is not designed to be exhaustive. There are certainly some subjects that are not included. But in these pages you will find discussion and insight into everything from the economic benefits of watershed protection to fund-raising for nonprofits and from abandoned mine drainage to agricultural practices.

This project was spawned from the work of the Allegheny Watershed Network and supported by the Heinz Endowments and the Pennsylvania Department of Environmental Protection. Without their financial help, this primer could not have been published.

The authors, our friends and colleagues, donated their time and knowledge to share what they have learned. They, like us, believe that watersheds are crucially important to protecting, enhancing and conserving Pennsylvania's environment and natural resources.

If you look at the back cover of this publication, you will see a map of the Commonwealth outlining its major watersheds: the Upper Ohio, including the Allegheny and Monongahela; the Great Lakes, with waters flowing to both Lake Erie and Lake Ontario; the Potomac, flowing to D.C.; the Susquehanna, the major source of water and problems for the Chesapeake Bay; and the Delaware, flowing through the backyards of millions of people.

Think of where those waters all flow. Not only do most of them link us to other states, we also send our water to the St. Lawrence Seaway, the Atlantic Ocean and the Gulf of Mexico. Our impacts are great. But so are our benefits. We drink, recreate, and make industrial use of our waters. We also waste, degrade and pollute them—albeit less than we used to.

It is only through concentrated thought, education and action that we can assure the health of our watersheds from forest to farm and macroinvertebrate to man.

We at the Pennsylvania Environmental Council and Allegheny Watershed Network hope that, in reading these essays, you will be inspired to join us and the thousands of other Pennsylvanians working toward improving the health of our watersheds.

Remember, we all live downstream.



WELCOME

*Andrew S. McElwaine, President,
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Pennsylvania may be home to more miles of rivers and streams than any other state save Alaska. It is home to the mightiest river east of the Mississippi, the Susquehanna. Likewise, the Allegheny, Delaware, Monongahela, Swatara, and many more are rich in both natural and human history. The importance of these riverine systems to our own health and safety has long been understood. In 1912, the Pittsburgh Flood Commission, chaired by the late H. J. Heinz, made recommendations to control the Allegheny's habit of inundating the city's business district. Foremost among these was a proposal to reforest the upper Allegheny plateau which had been cleared by logging. The Commission believed that a healthier ecosystem would provide a better environment to do business in.

Heinz's commission provided an early example of what today is called watershed management. The notion that any one parcel of property within an ecosystem can be managed or preserved independent of its surroundings has given way to a more comprehensive view of ecosystem function. Watersheds, the drainage basins of freshwater systems ranging from small headwater streams to extensive rivers, provide a comprehensive means of evaluating and ultimately restoring or protecting ecosystems.

Watersheds cover a wide variety of media, including surface and ground-water, land and air. Moreover, because flow varies over time and geography, watersheds exist on several levels. (see Jack Williams, et. al., *Watershed Restoration: Principles and Practices*, 1997). For many years conservation has concerned itself with protecting the most essential and ecologically valuable tracts of land and water. Increasingly, however, we are learning that such a strategy is not sufficient. The dynamics of ecosystems are such that a broader vision is called for, and at the level of the watershed there exist productive means of environmental intervention.

With this enhanced understanding of our surroundings, an additional concept has developed, that of ecosystem services. It might seem absurd to place a dollar value on clean drinking water, quality fishing and hunting, or on swimming and boating, but in a world of declining natural resource values, where capital can move in the blink of an eye, it seems critical to do so. The dollar value of watershed services are difficult to calculate, and highly significant. Yet those values are seldom reflected in daily economic life. Surveys by federal agencies have indicated that 81% of stream fish communities have been harmed by human impact, and that one-third of North American freshwater fish species are threatened and/or endangered or are of special concern. The value of ecosystem services, especially where freshwater is concerned, is not yet appreciated.

At the same time that our appreciation for watersheds has dramatically

increased, our understanding of the range of human impacts has also improved. The successes of the Clean Water Act and the Safe Drinking Water Act have given way to a sobering understanding of the dynamic interchange between man and nature. Some twenty-five years ago, outfalls of pollution from industrial and municipal systems—so-called “point sources”—were the Nation’s primary concern. Today the debate is over “non-point sources,” which translates into just about everything else. To put it in the timeless words of Walt Kelly’s Pogo, “we have met the enemy and he is us.” Years of end-of-pipe efforts have paid major dividends. As former U.S. Environmental Protection Agency (USEPA) Administrator William K. Reilly put it, “our rivers and streams may not yet be fishable or swimmable, but at least they are no longer flammable.” Yet “non-point” sources of pollution—agricultural and urban run-off, stormwater events, and more, when combined with loss of riparian zones, stream buffer capacity, and/or groundwater recharge ability, present as potent a threat to our natural resources as toxic waste did a generation ago. The solutions to the more complex nature of “non-point” sources will not be nearly so easy to find as they were for “point sources.” Moreover, the regulatory strategies that defined point-source controls are at best of limited value in managing non-point source pollution. For example, the EPA several years ago attempted to control industrial runoff by treating every trickle of stormwater from an industrial property as if it were a “point-source” deserving of regulatory treatment. The limits of regulation were clearly being reached in terms of protecting watersheds.

Today, in Pennsylvania and elsewhere, new strategies are being pioneered to intervene at a watershed level to restore and protect complex ecosystems. Increasingly these efforts involve voluntary initiatives among community organizations, landowners, local government, and environmental organizations. From French Creek in northwestern Pennsylvania to Ridley Creek in the Philadelphia suburbs, concerned citizens, property owners, and state and local government are collaborating to protect essential systems in ways that also provide for future economic opportunity. Increasingly, investment will only flow to areas where the surroundings enhance the value of the investment. The ecosystem services provided by watersheds in Pennsylvania do just that: enhance our quality of life in ways that allow both economic and environmental quality.

We at the Pennsylvania Environmental Council, for thirty years the state’s leading environmental education and advocacy organization, are proud to be a part of this national effort to define new environmental solutions to long-standing problems. With our colleagues at the Department of Environmental Protection, we are pleased to present you with this Watershed Primer for Pennsylvania. We hope you will find it of value as you strive to enhance your watershed.

THE TIADAUGHTON WATERSHED— HELPING COMMUNITIES GROW GREENER

James M. Seif, Secretary
Pennsylvania Department of Environmental Protection

The 21st Century Environment Commission appointed by Gov. Tom Ridge recommended that Pennsylvania refocus its environmental protection programs on watersheds.

But what does it mean to focus on watersheds? What should be the result of this effort? How do we get there from here? Who can help?

To help illustrate how a watershed approach works, let's visit the fictional Tiadaughton Creek Watershed and see how the people there came to understand that watersheds are not only nature's building blocks, but ours as well.

Today the Tiadaughton Watershed is home to thousands of people who live and work in real, thriving communities that preserve open space, farmland and other amenities to make it a great place to raise families.

The Tiadaughton Creek and its tributaries are highly valued by the community. The creek is recognized as an important contributor to the economic health of the community because it supplies clean water, a major attraction to businesses. It is also a major recreational resource for fishing, swimming and boating, and a major attraction for potential employees.

Signs proudly tell visitors they are entering the Tiadaughton Creek Watershed.

The people of Tiadaughton Creek Watershed understand the direct connection between their economic health and the environmental health of the watershed because of an ongoing educational effort supported by local government, area schools, a progressive business community, the county conservation district and other county, state and federal agencies. But in the beginning, residents learned about their watershed in small steps.

The local high school science teacher began a water sampling program as a field project so her students could learn some basic scientific principles in an exciting way. The results of the sampling were written up in the school paper, and the students were profiled in the local newspaper and TV station.

The county conservation district began to get inquiries from local dairy farmers on how they could lower their cost of keeping cows healthy because dairy prices were dropping. District staff recommended fencing streams and putting in streamside forest buffers to keep cows clean, out of the stream, and to prevent exposure to disease. It worked! Soon other farmers became interested in doing the same things with financial help arranged by the district through the State Conservation Commission.

A local coal operator began to remine an abandoned surface coal mine in a way that eliminated an acid mine discharge that made a tributary to Tiadaughton Creek turn red. Red Run was renamed Kittanning Run after the mining was finished.

Local anglers quickly recognized that eliminating mine discharges had big benefits for fishing. They helped organize the Tiadaughton Creek Watershed Association, which used a little money and lots of volunteer sweat to do projects like constructing wetlands to permanently treat mine water seeps. The Coalition for Abandoned Mine Reclamation and the local Department of Environmental Protection (DEP) District Mining Office helped.

People from all over the community began joining the association, including local business people, contractors, public officials and citizens, all bound together by their common interest in fishing and getting rid of old polluted mine water.

As each of these successful steps was taken, community interest grew in doing more.

The manager of a local manufacturing plant, who was also an angler, became interested in how he could reduce wastewater going into the stream. He invited DEP staff to do a pollution prevention site visit and was surprised to learn about a new technology that would enable the plant to recycle wastewater back into its industrial process and entirely eliminate the plant's discharge to Tiadaughton Creek. Because the manager was active in the local Chamber of Commerce, he convinced other local business leaders to investigate pollution prevention ideas that would benefit the creek.

Using DEP's Environmental Compliance Reporting System website, the Chamber developed a profile of the kinds of air, water and waste issues faced by businesses in the watershed.

From these profiles, the Chamber was able to design business-to-business counseling services targeted specifically on the pollution prevention problems faced by its members, supported by DEP's Pennsylvania Environmental Assistance Network.

Through these efforts, the local Chamber not only helped businesses become more competitive, they were able to contribute in a major way to protecting the watershed. In one case, a local plant decided not to close because of the savings from its pollution prevention program.

The local sewage authority became interested in more effective ways of removing nutrients from its wastewater after hearing about a new technology at an environmental conference sponsored by the Pennsylvania Municipal Authorities Association. Now, instead of building a bigger treatment plant, the new technology allows the same size plant to treat more sewage while doing a better job of removing nutrients.

The authority also eliminated potentially harmful chemicals going into their treatment plant through a cooperative program with local industries. As a result, the biosolids produced as a byproduct of the treatment process are recycled and used as a soil conditioner.

County conservation district staff noticed that unpaved roads in the

watershed were causing sedimentation and erosion problems in tributaries to the Tiadaughton. With the help of the State Conservation Commission, the district organized an education program for the township road supervisors to show them how changes in maintenance procedures and projects they could do to correct problems would result in a big improvement in water quality.

A local senior citizens center formed a Senior Environment Corps and took on a service project to monitor stream quality and helped work with the local high school students on their project.

The seniors then began to promote the recycling of oil by do-it-yourself oil changers who too frequently contribute to groundwater pollution by improperly disposing of oil. One member, who owned a service station, volunteered to be a collection point for the community. Soon projects followed to expand the local recycling program to include household hazardous wastes and other materials as well as the cleanup of a local tire pile using grants from DEP.

Almost by accident, officials from several municipalities who became involved with their neighbors in the watershed association discovered their common interests. They quickly realized they could do even more through a coordinated effort by each of the local governments in the watershed.

The three townships and one borough that covered the watershed decided to do a joint watershed “visioning” process that involved asking residents how they wanted their community to grow. They used a grant from the Department of Community and Economic Development (DCED), along with assistance from the county and the Pennsylvania Center for Rural Development, to do the project.

They found the people in the watershed wanted to—

- Promote development that preserves open space and farmland;
- Encourage the redevelopment of land that was already developed;
- Encourage new development in clusters to promote ease of access to local business and public services;
- Restore and protect the Tiadaughton Creek by developing a greenway and streamside buffer system along the creek and major tributaries; and
- Identify and protect other sensitive environmental features and habitats.

With the help of the local college, the Natural Lands Trust and their “Growing Greener” Community Planning Initiative and the Tiadaughton Creek Watershed Association, the municipalities took the results of the visioning process and began to draft a comprehensive plan covering the entire watershed, as well as local ordinances to implement the plan.

The community used a grant from the Department of Conservation and Natural Resources (DCNR) to inventory local natural areas and environmental features using computerized geographic information provided with the help of DEP.

From the manual of best land use practices from the Governor's Center for Local Government Services, the community put together land development ordinances customized to their local watershed needs.

To promote redevelopment of the towns in the watershed, municipal leaders designated local Keystone Opportunities Zones to attract businesses to already developed areas.

Officials also completed an inventory of all brownfield sites in the watershed with a grant from DEP's Land Recycling Program and did detailed environmental assessments on several properties with the help of a DCED grant. One company had already occupied one of the sites and two others have good prospects.

Following through on other recommendations from the visioning process, the municipalities asked the county to develop a stormwater management plan for their watershed, with financial help from DEP.

They also updated their local Act 537 Sewage Facilities Plan to help implement their comprehensive plan and zoning with a grant from DEP.

A multi-year plan for the development of the greenway, streamside buffer system and other recreation facilities was started with help from DCNR, the county conservation district and the watershed association.

Local officials, the county farmland preservation program and the Department of Agriculture worked with local farmers to help create three new Agricultural Security Areas to protect local farms from development.

As part of a regional economic development strategy, local officials completed a study of how methane gas from a local landfill could be used not only to generate electricity, but also to serve a new industrial park built on a closed section of the landfill.

The community was able to attract two new industries to the site, including one plant that uses cardboard, glass and aluminum taken to the landfill for recycling in its product packaging and manufacturing process. This became the county's first "eco-industrial park," where the "waste" products of one operation became the raw materials for another.

Each of the communities in the watershed adopted policies that promoted buying products made from recycled content which they implemented by using some of the recycling performance grant money received from DEP under Act 101.

The township also bought vehicles powered by clean burning natural gas, following the lead of a local bakery that received a grant from the DEP to convert its delivery fleet to natural gas and install a refueling station.

Their "green" philosophy carried over to building construction, too. A new community center was built from the ground up using green building techniques that saved energy, used recycled materials in construction and provided a healthier environment for people using the building.

There was also a renewed interest in saving the older buildings in town as part of a historic preservation program. With the help of DCED's Main

Street Program and the nonprofit group Preservation Pennsylvania, the communities were able to offer help to businesses to restore their buildings and preserve the character of their town.

As part of a program to monitor the results of their efforts, the watershed association created the “Tiadaughton Creek Watershed Report Card” which annually measures the environmental health of the watershed.

The four municipalities also helped organize the annual Tiadaughton Creek Watershed Awards to recognize individuals, businesses, farmers and students who did projects that helped improve the environment in the watershed.

Recently, the *GreenWorks for Pennsylvania* TV program produced by the Environmental Fund for Pennsylvania profiled the efforts in the Tiadaughton Creek Watershed, highlighting how other communities could do the same thing.

The people of Tiadaughton Creek Watershed have been happy to share their story with others and opened a website on the Internet, courtesy of a local business, to give the public regular updates on watershed activities.

It took the people of Tiadaughton Creek a long time to discover their connection to the watershed. But through education, partnership and involving residents in shaping their own future, communities along Tiadaughton Creek are working to fulfill their vision of how their watershed should grow.

It also took the work of county, state and federal partners to provide technical and financial help in ways that support local choices, not overwhelm them.

Although this watershed is fictitious, there are now dozens of examples of how people all across Pennsylvania have done the same things—French Creek, Crawford County; Dennis Creek, Franklin County; Babbs Creek, Tioga County; Letort Spring Run, Cumberland County; Swatara Creek in Schuylkill and Lebanon Counties; and many more.

Fortunately, you have the advantage. You can learn from people in watersheds like these so that your path to growing greener can be taken more easily.

But don't wait until it's too late.