



RIPARIAN BUFFERS

 **PLANNER'S PORTFOLIO**
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PLANNER'S PORTFOLIO

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Planner's Portfolio Series

The Planner's Portfolio Series is an outreach effort developed by Delaware County Council in order to explore the planning concepts available for communities to take advantage of the unique opportunities across Delaware County.

The pattern on the cover page, and found throughout this series, represents the importance of each individual component in the larger network. The Planner's Portfolio Series explores several of these components and how they can support community character in Delaware County.

For more information, contact the Delaware County Planning Department at 610-891-5200 or visit www.co.delaware.pa.us/planning to see the complete Planner's Portfolio series.

OVERVIEW

The term *riparian buffer* describes an area of perennial vegetation that lies adjacent to a body of water. Establishing a healthy riparian buffer provides countless benefits to a community and the watershed at large. Riparian buffers are important for stormwater management, water quality protection, flood mitigation, wildlife habitat, and they even provide economic benefits. Unfortunately, there is no “one size fits all” guideline to create a buffer due to the unique issues faced in every watershed. The role of the municipality is to encourage restoration and protection of its riparian buffer areas.



Ridley Creek, Chester Park



Ridley Creek, Chester Park, aerial view



Ridley Creek, Chester Park, aerial view

In 2011, the Chester City Shade Commission restored a riparian buffer segment along Ridley Creek within Chester Park. This project was completed with assistance from PA Horticultural Society (PHS), Delaware County Conservation District (DCCD), CRC Watersheds Association, Widener University, Chester City Parks and Recreation, and community volunteers. The above aerial images show a before and after view of the creek’s buffer restoration.

RIPARIAN BUFFERS

FUNCTIONS

Stormwater Management and Water Quality

Riparian buffers are important for both stormwater management and water quality. Riparian trees, shrubs, and other deeply rooted vegetation help to slow and treat overland stormwater runoff through infiltration and transpiration. They act as a filter between developed land and a waterbody by helping to eliminate non-point source pollution, which includes fertilizers, oils, and other waste. In addition, riparian buffers also help to absorb runoff into the soil where it can filter out pollutants before it comes in contact with the water table.

Buffers help to reduce volume and velocity of stream flow that generally contribute to stream bank erosion, which in turn contributes sediment pollution in a waterway. Therefore, slowing and absorbing runoff will also contribute to better bank stabilization and cleaner water.

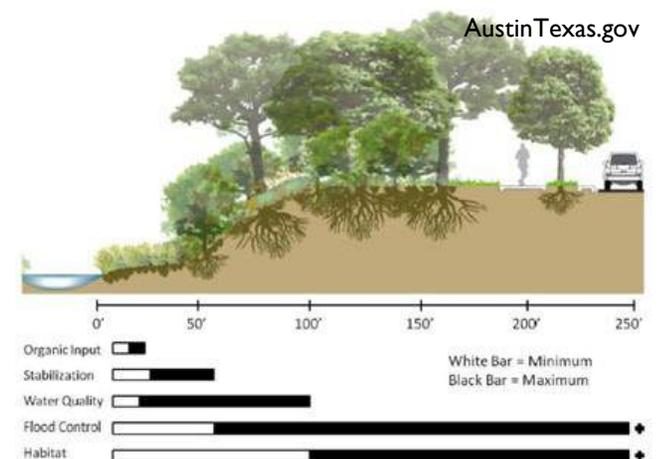
Economic Benefits

Riparian buffers are a crucial factor to not only environmental health, but to economic health as well. High quality buffers can serve as a mitigation tool to prevent property damage in the event of a flood. Additionally, a riparian buffer on private property may increase its property values by providing aesthetic views and reduced flooding risk.

Lehigh Valley Planning Commission published *Lehigh Valley Return on Environment* (2014). This document assesses several natural features and calculates the economic value that they generate. The key findings show wetlands, riparian corridors, and forests provide the highest value per acre. American Rivers published *The Economic Value of Riparian Buffers* (2016) to show the many different public and residential benefits resulting from buffers in communities.

Streambank erosion is one of the many issues caused by lack of riparian buffers. Pimmit Run in McLean Virginia (Above Right) experienced heavy erosion due to increased upstream development. Pennock Woods, a County park in Lansdowne, along Darby Creek (Middle Right) has also experienced heavy erosion. Repairing the erosion and planting a buffer will help create a more stable streambank.

Different sized riparian buffers serve different purposes (Below Right).



Flood Protection

Riparian buffers are often the first line of defense from flooding in developed areas. They provide a location for water to go when streams naturally overflow their banks. It is far better for a stream to overflow to a vegetated floodplain area than to an area containing structures that can be damaged or washed away. As such, planting a buffer is also a useful tool in hazard mitigation.

Wildlife Habitat

Riparian buffers can have a tremendous positive impact on local and migratory wildlife. They provide unique opportunities for shade, nesting, and protection due to their plant diversity. Native buffer plantings also offer food for wildlife, which should be kept in mind while choosing the buffer vegetation. For example, certain plant species attract pollinators, like bees, making them a great ecosystem investment for the community.

Aquatic ecosystems thrive with the addition of a riparian buffer. Trees provide shade over the water, which helps to maintain cooler temperatures during warmer weather. Improved water quality also helps to support a stable population of macro invertebrates (bugs) to feed other aquatic wildlife, such as fish. Extended branches and leaves provide cover for fish and amphibians.

Fragmentation of habitat is a concern for many threatened wildlife species. Stabilization and enhancement of existing buffers and restoration of riparian buffers in developed areas can have a significant impact on the connection of habitats. Providing an uninterrupted area of habitat will help wildlife species move safely between areas for resources.



Morton Morton House, Darby Creek



Morton Morton House, Darby Creek

Morton Morton House, a historic building located in Norwood Borough, Delaware County, is located on the Darby Creek. In 2014, the Norwood Borough Shade Tree Commission worked with DCCD, the Eastern Delaware County Stormwater Collaborative, and community volunteers to help restore the buffer.

MUNICIPAL PROTECTION

Land Use Policies and Regulation

Delaware County 2035, the County's Comprehensive Land Use Policy Plan, discusses the benefits of riparian buffers along a stream corridor. With the exception of parks, schools, and other publicly owned land, most riparian areas are located on or adjacent to private land. It is important for the municipal comprehensive plan to identify riparian buffers, and other functional natural and recreational resources as important components of a community's "green infrastructure." The plan can also help provide direction and recommendations to private landowners within a buffer zone.

The Pennsylvania Municipalities Planning Code (Act 247) enables municipalities to regulate natural land uses and environmental features, such as riparian buffers, to protect the health, safety, and welfare of the community. Once the feature is defined, a municipality can employ tools to protect it for a public purpose. These tools include zoning ordinances and subdivision and land development ordinances (SALDOs).



Before restoration, Delaware County Conservation District



Before and After Restoration, American Rivers



During restoration, Delaware County Conservation District



After restoration, Delaware County Conservation District

The removal of the 12th Street Dam in Darby Borough (shown on right) provided the perfect opportunity to restore the riparian area along the Darby Creek. The project was completed by American Rivers, Princeton Hydro, and Gleim Environmental. A similar project was completed along Darby Creek in Kent County Park (above) was also completed by American Rivers using Athos Oil Spill funds in 2004. A third dam was removed in nearby Hoffman Park as well.

Regulatory options include:

- Creating a Riparian Buffer Overlay Zoning District that designates a definitive area within which specific resource conservation standards apply. The overlay can also cross over multiple zoning districts in order to create seamless protection.
- Identifying a riparian buffer setback in order to restrict development within a specific distance from the top of the streambank.
- Adopting a “no mow” ordinance (reverse of a mowing requirement) to prohibit mowing within a designated distance from a stream bank to allow for natural vegetation to take hold and encourage the buffer to occur naturally.

What Municipalities Can Do Beyond Regulations

Municipalities have a great opportunity to influence the extent and type of riparian buffers in their communities. The first place to start is on public property where the municipality or a cooperating school district can educate by example. Next, a municipality could work with large property owners, such as institutions, hospitals, corporations, etc. Providing opportunities for public education to homeowners will further help to spread awareness of riparian buffers.

Protection of riparian areas on private property may require extra effort on the part of the municipality. Conservation of the space can happen in several ways besides the aforementioned ordinances. A conservation easement may also be used to restrict development in a riparian buffer in exchange for tax benefits to the landowner. Installing a riparian buffer requires partnerships; therefore, coordinate with local EAC’s, watershed associations, and other organizations to plan your restoration project.

Helpful Tips For Municipalities to Restore Riparian Buffers

- Provide educational information to residents
- Encourage your Environmental Advisory Commission to sponsor a restoration project
- Find and create incentives for landowners
- Establish connections with community groups
- Work with your local watershed association
- Create interpretive signage identifying buffer areas



Schohaire Creek Buffer Restoration



Oak Ridge National Laboratory

Signage can be created by municipalities to educate and inform communities. Interpretive signage (far left) typically explains what a riparian buffer is and the restoration process. Regulatory signage (close left) prevents the riparian area from being mowed or sprayed with chemicals.

ZONES OF A RIPARIAN BUFFER

In order to efficiently protect the waterway, a three zone concept is generally practiced when creating riparian buffers. The establishment of zones helps provide different solutions for different issues within the streambank. Each zone provides its own benefits, and the widths can be flexible to fit the needs of the stream. The size of each zone is dependent on many different factors, including adjacent land use and stream bank quality. Contact your local watershed organization to discuss the issues you would like a riparian buffer to address.

Zone 1—Unmanaged Forest

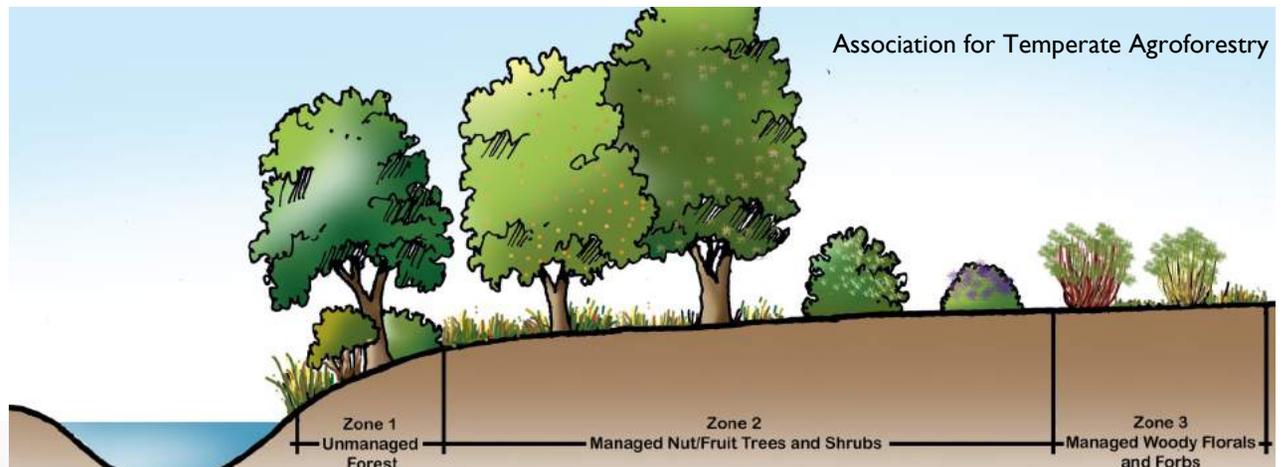
Zone 1 is located closest to the stream bank and extends approximately 15 feet inland. Its purpose is to provide bank stabilization and help mitigate flooding and erosion by planting heavily rooted trees and shrubs. These plants tolerate wet conditions. Vegetation should be large enough to provide shade over the water to help cool temperatures in warm weather. The area is generally left unmanaged.

Zone 2—Managed Trees and Shrubs

Zone 2 is located inland directly behind Zone 1. This area helps slow down runoff as well as absorb excess nutrients and water. This area can be used for passive recreation activities like walking trails. The vegetation in Zone 2 should be a mixture of grasses, trees and shrubs.

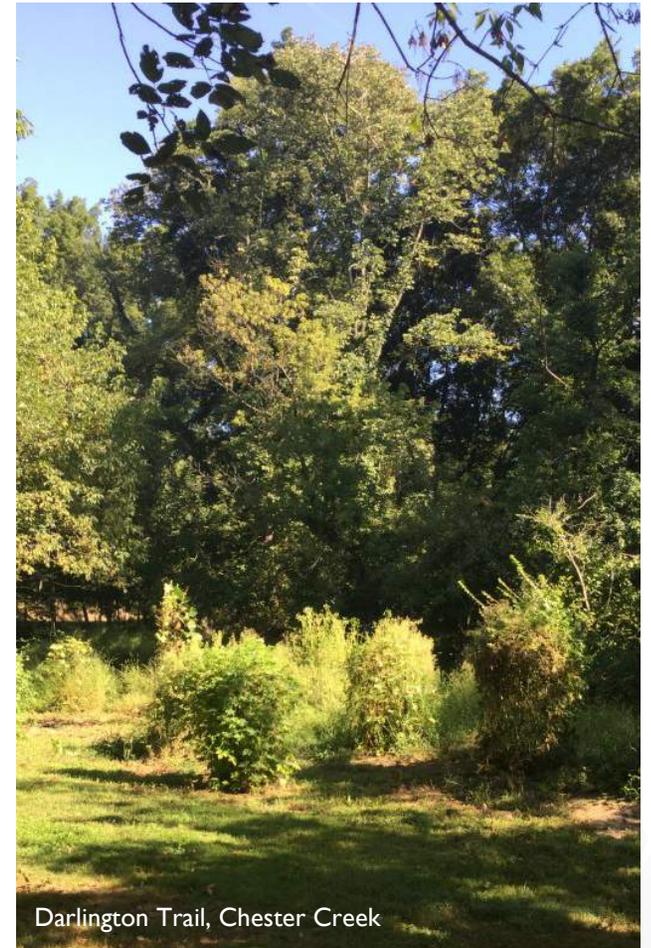
Zone 3- Managed Woody Florals and Grasses

Zone 3 lies farthest from the stream bank. This area is generally made up of grassland or wildflowers. In the event of neighboring agricultural land use, tall grasses are preferred to help absorb pesticides and other runoff.





Darlington Trail, Chester Creek



Darlington Trail, Chester Creek

The Darlington Trail, located along Chester Creek in Middletown Township, was the site of multiple restoration projects during 2014-2015. This project was finished with the support of Middletown Parks and Recreation, DCCD, CRC Watersheds Association, Boy Scouts of America Order of the Arrow, and community volunteers. Plantings along Chester Creek (above left and right) have created a more stable streambank. An aerial image (bottom left) provides a view of the creek aft the addition of a riparian buffer.



Darlington Trail, Chester Creek

BUFFER TYPES AND WIDTHS

Recommended buffer widths can vary depending on the location within a stream (headwaters vs. downstream), the purpose for the buffer (stream bank stabilization, water quality, etc.), the specific needs of the stream, local wildlife, and adjacent land use. Most municipalities within Delaware County require a 50 foot riparian buffer be installed as part of new development or redevelopment. As previously noted, most sources of information and manuals classify buffers into zones, each of which has a designated purpose and associated width and planting strategy. Several other riparian buffer projects completed within Delaware County are featured within this document. Other projects include Drexel Lodge Park (Newtown Township), Saul Wildlife Sanctuary (Rose Valley Borough), and the North Brook Riparian Area near Community Park at Haverford Reserve (Haverford Township). Consult your local watershed associations to help determine the specific needs for your riparian area.

Riparian Buffer Resources

Delaware County Watershed Organizations

- Chester Ridley Crum (CRC) Watersheds Association
<http://www.crcwatersheds.org/>
- Darby Creek Valley Association
<http://www.dcvva.org/>

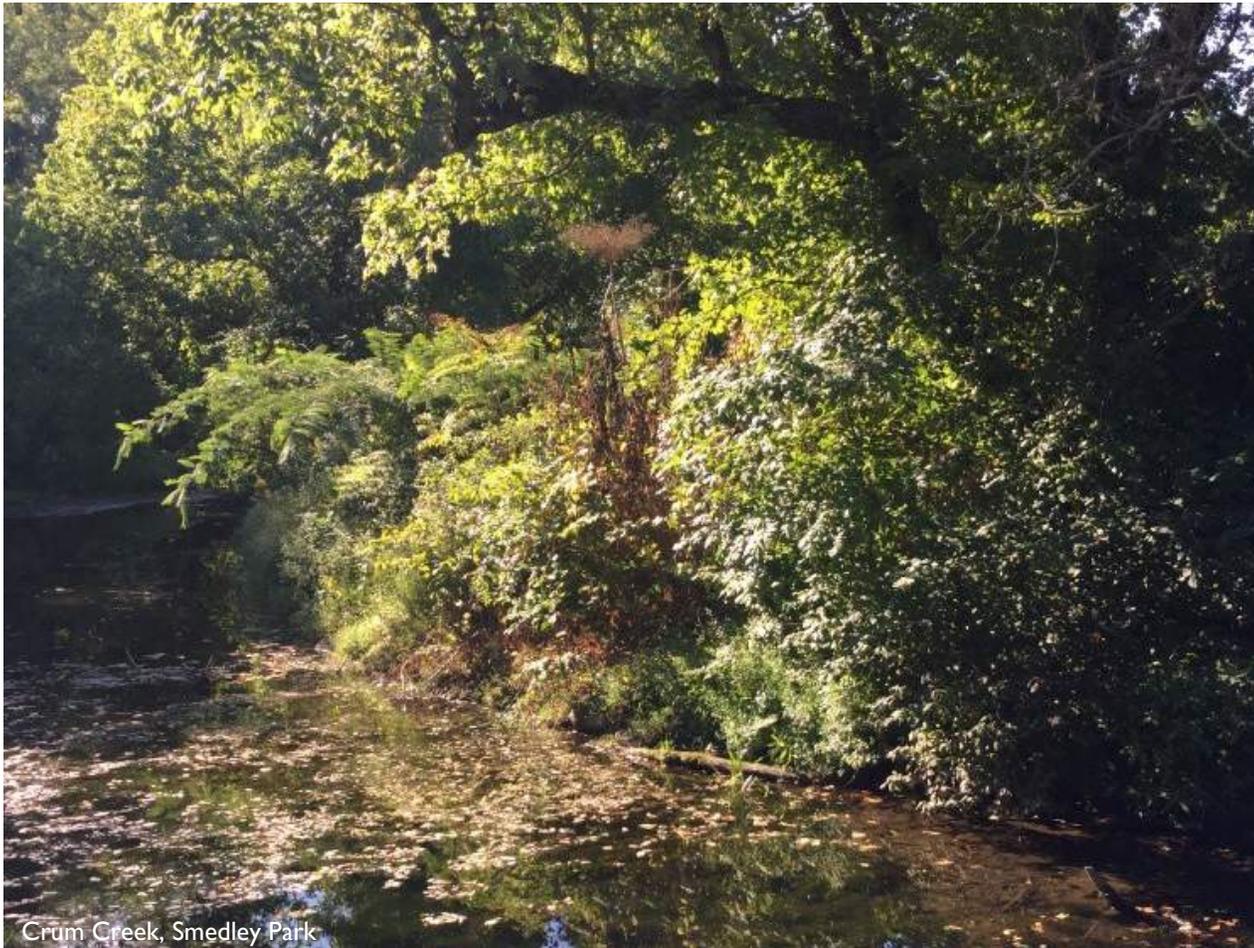
Other Contacts

- Delaware County Conservation District (DCCD)
<http://www.delcocd.org/>
- PA Department of Environmental Protection (PA DEP)
<http://www.dep.pa.gov/>
- PA Department of Conservation and Natural Resources (PA DCNR)
<http://www.dcnr.state.pa.us/>
- Pennsylvania Horticultural Society (PHS)
<https://phsonline.org/>

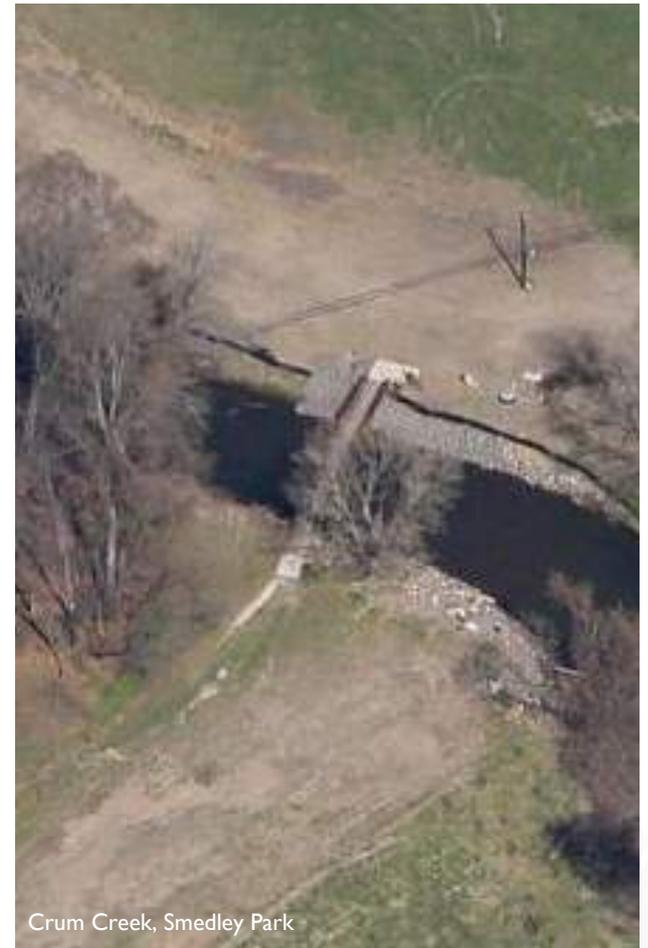


Ridley Creek State Park

Wikipedia



Crum Creek, Smedley Park



Crum Creek, Smedley Park

Smedley Park, located along Crum Creek in Nether Providence Township, has been the site of numerous tree plantings run by CRC Watersheds Association. Partners involved in this project include PHS, Aqua PA, DCCD, Master Gardeners, Delaware County Community Corrections, Villanova University, and several school groups. Interpretive signage (bottom right) is placed strategically in front of a bridge crossing Crum Creek to provide information on riparian restoration. An aerial view (top right) provides a look at the streambank before the riparian buffer was created.



Crum Creek, Smedley Park

PLANNING A BUFFER

Identify Current Conditions

The beginning step when creating a healthy riparian buffer is to evaluate the site ownership, land use, and current conditions. This includes looking at its relationship to the FEMA 100 year (1%) floodplain, areas subject to erosion and frequent flooding, and identification of invasive plants. It is also important to take into account adjacent land uses and land cover in order to identify types of runoff going into the water source. Additionally, the Natural Heritage Inventory should be consulted before any construction takes place in order to find out if any endangered or threatened plant or animal species will be affected.

Determine Goals

Since riparian buffers can offer a number of benefits, it is important to establish the goals for the area. If the area is prone to flooding and erosion, the goal for the buffer should be to provide better bank stabilization and flood mitigation. An area lacking in green space or shade may want creation of more wildlife habitat for native species. If the water source is downhill from a farm or industrial site, pollution filtration may be an important goal to prevent water contamination. These goals should be discussed and decided on by all stakeholders.

Determine Funding

Grants are available through several different agencies. Southeast PA TreeVitalize Watersheds, PA Department of Conservation and Natural Resources (DCNR), and PA Department of Environmental Protection (DEP) Growing Greener have previously provided grants for riparian buffer projects within Delaware County. Contact your local watershed association to devise a plan for financing your riparian buffer.

Chester Park, Morton Morton House, Darlington Trail, Smedley Park, and Kent Park restoration projects were made possible by the TreeVitalize Watersheds Grant Program and the Plant One Million Campaign, managed by the Pennsylvania Horticultural Society with funding from the PA Department of Environmental Protection's Growing Greener Program, as well as Aqua PA for projects located within its source water protection zones. Smedley Park received additional funding in 2016 from PA Department of Conservation and Natural Resources (DCNR) Community Conservation Partnership Program (C2P2), which is being administered through CRC Watershed Association.

The Darby Creek 12th Street Dam project was funded primarily by the Natural Resource Damage Assessment settlement from the Athos I oil spill. Additional funding came from the PA Department of Environmental Protection's Growing Greener Program and the National Fish and Wildlife Foundation.



Kent County Park, before restoration



Kent County Park, after restoration

Kent County Park, located in along Darby Creek in Upper Darby Township, is the site of a dam removal project as well as riparian restoration. The park is a trailhead for the Darby Creek Greenway. Partners for this project include PHS, Aqua PA, DCCD, Delaware County Parks and Recreation, SEPA RC&D, Delaware County Community Corrections, Villanova University, Natural Lands Trust, and PECO.

Maintenance of the Riparian Buffer

Each planting zone will require different maintenance needs. Maintenance is critical to ensure that the buffer is healthy and functioning properly. For example, Zone 1 may need to be checked for vines or other invasive species, and Zone 3 may need to be mowed periodically. A maintenance schedule should be prepared that identifies the unique needs of the different types of vegetation. This schedule should also include who will be responsible for maintaining the buffer, as well as who is financially responsible for upkeep. In the event that the area is protected under a conservation easement, documentation should outline who will be in charge of maintenance and upkeep.

Importance of Native Vegetation

In order to maintain a healthy and sustainable buffer, choosing the proper types of vegetation is crucial. Native plants are preferred, as they will help conserve Pennsylvania’s plant heritage. Conditions like soil type and sun exposure should be taken into account before choosing plants. It is best to plant vegetation that needs full sun first, and vegetation that can be shaded last. Consult PA DCNR’s website for more information about the appropriate types of vegetation for your riparian buffer.



OTHER PLANNER'S PORTFOLIOS:



COMPLETE STREETS

April 2016



FUNDING SOURCES

April 2016



GREEN INFRASTRUCTURE

JULY 2016



Court House and Government Center
201 West Front Street
Media, Pennsylvania 19063

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