Unfortunately, Larry had always approached from the side that wasn’t posted, and a natural phenomenon was destroyed before anyone could react.
RIPARIAN BUFFER PROTECTION USING MUNICIPAL ORDINANCES

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APA PA Conference 2015
Pittsburgh, PA
October 2015
Trees are really important – valuable eco-services.

Trees along streams are really, really important – valuable eco-services are magnified in riparian areas.

Enact forested riparian buffer regulations at the municipal level

New model ordinance (ConservationTools.org) addresses both protection and restoration.

An ounce of prevention…a ton of cure.

An MS4 action at minimal cost to municipalities.
Trees provide valuable eco-services.
Trees as the only true Best Management Practice
Loss of Site Vegetation Means Lost Vegetation Functions (Eco-Services)

Precipitation:
Above Ground
  - Interception/Slowing
  - Absorption
  - Evaporation/Transpiration
At Ground
  - Temporary Storage
  - Quality Filtering
Below Ground
  - Infiltration/Permeation
  - Storage
  - Quality Filtering/Uptake

...And this is just the beginning!
The price we pay downstream...
HOW CAN WE REDUCE SOME OF THIS DAMAGE?

....creating a little space between the danger of what we are doing.....and what we are trying to protect
We need to create some space and fill it with trees.....wherever streamside forest has been lost!
BUILDING THE SCIENCE OF BUFFERS FOR DECADES

Importance of Buffers
Importance of Forested Buffers
Importance of Forested Buffers in Headwaters
Can creating the space (buffer) increase a stream’s ability to process stuff that gets into it?
If the buffer contains grass.....the answer is yes but not nearly as well
Not wide enough!

Chemicals used to grow corn will drain into this stream...a source of drinking water for Newark, DE
Riparian Buffer Functions:
Lots of data showing lots of things, depending on study structure.

Erosion control
30 to 98 feet

Water quality
- Nutrients
  49 to 164 feet
- Pesticides
  49 to 328 feet
- Biocontaminants (fecal, etc.)
  30 feet or more

Aquatic habitat
- Wildlife
  33 to 164 feet
- Litter/debris
  50 to 100 feet
- Temperature
  30 to 230 feet

Terrestrial habitat
15 to 330 feet
THE NEWEST SCIENCE

The Stream as a Processing System
Recent Research

**NO** trees results in:

- unstable stream channels
- deep incised channels
- erosion
- negative hydrology and morphology impacts
Forested reaches of streams are wider, shallower.
Wider streams have more “ecosystem” because the ecosystem is on the bottom of the stream.
Forested streams are healthier because of more natural conditions

- Temperature
- Food
- Light
Indirectly, forms stream eco-systems which are more effective processors, are more robust downstream, have more power to remove pollutants downstream, can support stronger biotic systems, etc.

Energy is key – forested buffers convey maximum energy flow from land to water, leading to maximum stream health (potential).
Stream critters who like to eat algae…
but prefer to eat diatoms which grow best in the shade.
Newest Science

Forested streams have:

- more ecosystem
- healthier ecosystems
Newest Science: Forested Buffers in Headwaters Provide Critical Functions

Increased instream processing (direct and indirect) including…

• Increased biogeochemical processing
• Increased photooxidation
• Increased aerobic processing of dissolved organic and inorganic compounds

Major focus on biological interactions
Newest Science: Forested Buffers in Headwaters

Energy is also key

- Forested buffers convey *maximum energy flow from land to water*, leading to maximum stream health (potential)

Biological interactions are critical

- Especially *intense energy transfer from land to water* in headwaters via “fuel” from algae, aquatic mosses, rooted aquatics, trees, understory shrubs, other herbaceous
- Especially rich, abundant insect community in headwaters (Kaplan et al 2008)
Importance of **Forested Buffers in Headwaters**

To maximize instream processing and to maximum positive energy flow opportunities, start from the headwaters down.

Most stream mileage exists as first order streams/headwaters.

“…restoration and preservation of small stream ecosystems should be a central focus of management strategies….”
Pennsylvania streams need Pennsylvania forests.
Putting the Science to Work!

A New Model Riparian Buffer Ordinance for Pennsylvania’s Municipalities!
THE “STATE” OF PENNSYLVANIA’S STREAM BUFFER PROTECTIONS
PA Buffer Regulations (pre-2015)

Chapter 102, Erosion and Sedimentation Control:

“no disturbance” buffer
For projects requiring PCSM permit
Required for Special Protections Waters (HQ and EV)
  About 30% of all PA streams
  All perennial/intermittent streams, lakes, ponds, reservoirs
Minimum 150 foot average buffer width
Maintain native vegetation with 60% canopy
If Non-Attaining/Impaired, then must restore full buffer
Multiple Exceptions
The bad news: PA Act 162 reduced these requirements via the Clean Water Act
PA Buffer Regulations (current)

For HQ/EV streams, riparian buffers and forested riparian buffers

- are now an option rather than a requirement
- have been reduced in width from 150’ to 100’

However - developers must

- demonstrate “functional equivalency” for alternative BMPs
- demonstrate offset buffers are as close as feasible to original site
The good news: Act 162 did not “pre-empt” local regulatory authority!
So....municipalities can get tough on protection!

Within a Zoning Ordinance
- Overlay district
- Protection standards

Within a SALDO
- Design standards

Within a Stormwater Ordinance
- Riparian buffer requirements

*Capitalize on the “water quality” momentum!*
Reasonable restrictions need not fear regulatory takings!

Legislative authorization through:

• Pennsylvania Constitution
• Municipalities Planning Code

(-4 CMs!)
Pennsylvania’s Constitution states…..

“The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania’s public natural resources are the common property of all the people, including generations to come.”
Section 603(b):
“Zoning ordinances may permit, prohibit, regulate, restrict and determine…..

(1) Uses of land, watercourses and other bodies of water;

(2) Protection and preservation of natural and historic resources and prime agricultural land and activities.
• PA MPC Article VI – Zoning; Section 603(c)(7):
  • “Zoning ordinances may contain provisions to promote and preserve.....environmentally sensitive areas.”

• PA MPC Article VI – Zoning; Section 603(d):
  • “Zoning ordinances may include provisions regulating the siting, density, and design of residential, commercial, industrial and other developments in order to assure the availability of reliable, safe and adequate water supplies...”

• PA MPC Article VI – Zoning; Section 603(g)(2):
  • “Zoning ordinances shall provide for the protection of natural....features and resources.”

• PA MPC Article VI – Zoning; Section 604:
  • “Zoning ordinances shall be designed to promote and facilitate the......preservation of the natural, scenic and historic values in the environment and preservation of forests, wetlands, aquifers and floodplains.”
Section 605:

Municipalities are authorized to enact subdivision and land development ordinances which include:

(2) Provisions for insuring that:

   (i) the layout or arrangement of the subdivision or land development shall conform to the comprehensive plan and to any regulations or maps adopted in furtherance thereof;
Pennsylvania Case Law

Lancaster County Model Conservation Zoning District and Natural Resource Protection Standards, 2010

Fronefield Crawford, Esq.

“For municipalities to regulate sensitive natural features:

The PA legislature must have authorized such;

Regulations cannot be arbitrary or unreasonable;

Regulation cannot deprive the owner of all reasonable use of his property.”
Jones v. Zoning Hearing Board of the Town of McCandless

Court upheld performance zoning that preserved steep slopes, forests, floodplains and streams;

Chrin Brothers Inc. v. Williams Township Zoning Hearing Board

Court upheld ordinance provisions that prohibited clear-cutting on steep slope areas and floodway areas, and limited clear-cutting, so that substantial forest canopy will remain after logging activities.
Help for Pennsylvania’s municipalities

Riparian Buffer Protection Via Local Regulation
A Guide For Pennsylvania Municipalities

Introduction
Forested or, to a lesser extent, otherwise vegetated lands: bordering streams, lakes and other water bodies protect water quality and other public benefits. Pennsylvania municipalities should consider the protection and restoration of riparian buffers with their land use regulations.

Overview

Background
Riparian Buffer Defined

Services Provided by Buffers

The Problem

The Science Behind Riparian Buffer Protection 2
Cascades in the Aquifer
Buffer Erosion and Planting Requirements 15
Modifications To Riparian Buffer Standards 16
Case Studies 16
Hallwood’s Riparian Buffer Overlay Zoning District 16
Shelby’s Critical Environmental Areas 18
Related Resources at ConservationTools.org 19

A Scientific Foundation for Shaping Riparian Buffer Protection Regulations

Estimate which specific elements of cost-effective riparian buffer protection will provide the greatest benefits for our communities.

Overview

Summary

Pennsylvania’s streams, rivers, wetlands, and other natural water bodies are a major part of our state’s "life blood" and at one time, virtually all were in a naturally undisturbed landscape that contributed to their high quality. Riparian buffers, particularly when they are effectively green cover, provide habitat and stream corridor impact buffer to surrounding areas. Riparian buffer protection is essential to the health of the entire aquatic system.

Riparian Buffer Defined

Riparian buffers are vegetated strips of land along water bodies that provide various benefits to the aquatic and terrestrial environments. Riparian buffers have been shown to improve water quality and other environmental benefits.

Overview

Summary

Pennsylvania Land Trust Association (PALTA) and the Brandywine Conservancy

Last updated on April 25, 2018

Last updated on May 14, 2018
Model Riparian Buffer Protection Overlay District

Proposed Regulations For Use In A Municipal Zoning Ordinance

Edition of April 25, 2014

Section 100. Purpose and Intent. The specific purposes and intent of this article are to:

A. Conserve, protect, and restore natural riparian resources through scientifically supported processes.

B. Maintain and improve surface water quality by reducing the entry of detrimental substances, including nutrients, sediment, organic matter, pesticides, and other harmful substances that reach watercourses, wetlands, and surface and subsurface water bodies.

C. Reduce the entry of detrimental substances by restricting development and uses in riparian areas that intercept surface water runoff, wastewater, subsurface flow and deep groundwater flows from upland sources and where the processes of filtration, deposition, absorption, adsorption, plant uptake, sediment and phosphorous attenuation, denitrification and infiltration may occur; encouraging sheet flow and minimizing, mitigating and preventing concentrated flows of storm water runoff across riparian areas, and securing increased channel and bank stabilization that avoids stream bank erosion and associated water quality, quantity and flow harms.

D. Attenuate flooding and reduce soil loss.

E. Reduce adverse aquatic health impacts due to changes in the temperature of receiving waters (both temperature increases and temperature decreases) as a result of storm water runoff, loss of vegetative shading and direct discharges to water bodies.

Find the latest edition of this model at ConservationTools.org
NEW MODEL ORDINANCE:

What Does It Do?
Preserves existing riparian buffers

Forested Riparian Buffers (existing)

Top of Bank

100 – 0’

Limited Disturbance

100 – 0’

Minimum of 60% native tree canopy in riparian buffer

BRANDYWINE CONSERVANCY
Impacted Riparian Buffer (Existing)

Restoration to minimum 60% native tree canopy in riparian buffer

Restores impacted riparian buffers
CONSERVANCY MODEL APPLIES TO WETLANDS

AND CAN BE MODIFIED FOR WIDE FLOODPLAINS AND STEEP SLOPES.
Modifications to Buffer Requirements

Municipalities can get tough on protection provided........

- A “safety valve” exists for unique/unforeseen circumstances
- Simpler modification process proposed
- Requested at the time of conditional use, special exception, or variance approval, or subdivision or land development approval
- Limited to minimum adjustment necessary to allow relief while adhering to riparian buffer purposes
RIPARIAN BUFFER ANALYSIS
Riparian Buffer Zones
Riparian Restoration Opportunities

Legend
- Township boundary
- Roads
- Streams
- Riparian Buffer Restoration Opportunities
- Wetlands
- Woodlands
- Water bodies
- Tax parcels

West Bradford Chester County
William Penn Foundation/Delaware River Watershed Project

Brandywine/Christina basin

Free technical assistance for riparian buffer implementation

• 10 municipal assessments
• 5 municipal ordinance updates
• MS4/TMDL credits
WPF Cluster Project Area

Initial Outreach:

- Breakfast meeting - all Chester County municipalities in the Brandywine Christina Cluster
Additional Municipal Outreach

- Letters/mailings
- Info Flyers
- Phone calls
- Presentations
  - Board of Supervisors
  - Planning Commissions
10 Municipalities for Assessments

- Evaluation of local codes
  - Zoning
  - SALDO
  - Stormwater Ordinance
- Summary of assessment in memo to Townships
10 Municipalities for Assessments

Summary of Assessment Findings:
- General buffer widths
- Wetland margins
- Restoration requirements
- Covenants/management plans
Potential Riparian Buffer Ordinance Adoption

7 potential adoptions
45 out of 50 Chester County municipalities in the Brandywine-Christina have MS4s.

43 out of the 45 are required to submit individual MS4 permits.

Continuing to work with EPA and PADEP to allow municipalities to receive credits towards MS4 and TMDL requirements for adopting riparian buffer ordinances.
Beyond Forested Buffers: Riparian Corridors in Suburban and Urban Contexts

Environmental Planning & Design, LLC
What Do You Do When Your Riparian Corridor Has Already Been Developed

- Incorporate a set of best practices that are ‘tailor fit’ to the stream’s context
- Approach the stream as an important amenity worthy of not only conservation but of celebration and engagement
Many of the Commonwealth’s Waterways Are Similar: One Watershed Consisting of Diverse Landscapes and Development Patterns
Upper St. Clair’s McLaughlin Run

Overview
222 acres
68 parcels
19,000+ residents in USC
R-1, R-L1, RM, R4, C-1
Municipal Parks, Light Industrial, Residential, Education, Retail and Office
Upper St. Clair’s McLaughlin Run
Key Challenges

In many instances, the Corridor is constrained on both sides of the stream bank within 50 to 75’
Numerous (nearly 20) property owners adjoining both sides of the stream
Multiple constraints exist including floodplains, hillsides, nearby road access and narrow lot widths
An existing and somewhat eclectic mix of land uses along McLaughlin Run Road
Promote better implementation of how buildings relate to one another and/or relate to the road
Establish continuous linkage(s) throughout the McLaughlin Run Road Corridor for connections between/among private development and civic spaces
Overarching Objectives

Permit safe development within a commercially valuable yet ecologically sensitive and somewhat unsettled environment
Conserve the riparian edge of McLaughlin Run and address the morphology ‘health’ issues of the stream
Encourage mixed use development to better balance the Township’s land use mix
Promote better standards or guidelines for the relationship between buildings, the stream and the road
Establish a string of strategically positioned access points along McLaughlin Run Road in order to mitigate flood hazards and to minimize traffic long-term congestion
Require connections between/among private development and civic spaces such as a stream side trail
Approach

Used stream morphology as the organizing structure of the ordinances provision

Employed an incentives-based system to induce and encourage property owner/developer to ‘raise’ the bar

A balance between the ecological objectives and the property owner’s right to realize a “reasonable” use of their properties

The Littoral Zone extends from the high water mark, which is rarely inundated, to shoreline areas that are permanently submerged.
Overlay Boundary

Northern: 61 acres
Central: 49 acres
Southern: 112 acres

Northern: 36 parcels
Central: 14 parcels
Southern: 18 parcels
TOTAL: 68 parcels
Key Zoning Standards

A. For new development or redevelopment of a lot, a maximum of twenty-five percent (25%) of the required number of parking spaces shall be permitted between the McLaughlin Run Road right-of-way and the front building facade.

B. For development which uses impervious paving within parking areas, one (1) 4 ½” cal. native deciduous tree shall be planted on the lot for every five (5) parking spaces provided. For development which uses pervious paving, one (1) 3” cal. native deciduous tree shall be planted on the lot for every ten (10) parking spaces provided.
Key Zoning Standards

C. Storm water management bioretention, also know as “rain gardens,” shall be a part of development within the Corridor Overlay. Properly designed facilities shall capture, retain, and infiltrate the 1/8” to 1” rain events. Runoff from a 1” rain in 24 hours shall drain within 1 to 2 days maximum. In designing for 10- to 25-year storms, an integrated system of bioretention shall be integrated into the land development. The purpose of the system shall be to mitigate peak flows and reduce downstream nuisance flooding. Construction of systems shall be in accordance Township construction standards.

D. As enabled by the Municipalities Planning Code, Section 503(11), a landowner and/or developer shall construct pedestrian open space/trail improvements within the Overlay’s defined Trail Setback. Connections to existing or proposed trail segments on adjacent lots shall be made. If the landowner and/or developer elects not to construct said improvements, the provisions of the following Fee-in-Lieu Requirements shall apply.
E. Shared Parking. For landowners and/or developers that utilize shared parking, the Township may grant the following:

- Increased permitted building coverage of an additional 10%
- Multiple buildings permitted to be constructed on one (1) lot
- Building spacing minimum (of multiple buildings) of 15’ 130.24.6.7.4. Maximum building height increase of 35%
- Defined setbacks reduced by 30%

F. Shared Access. For landowners and/or developers that utilize shared lot access, the Township may grant the following:

- Multiple buildings permitted to be constructed on one (1) lot
Incentives and Inducements

Upper Floor Construction
Building Materials
Special Architectural Features
Higher Quality Landscaping
Special Storm Water Management
Shared Parking
Shared Access
Approval Process

The overlay imposes conditional use status

A sketch plan is required 1st for the Planning Commission

A combined preliminary and final plan submission is available to the applicant; a draft site plan is required 2nd for Staff review

A final site plan is submitted to Planning Commission

Public hearing requirement as per the conditional use
Questions?

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