

Green Infrastructure in Allentown Parks

**Enhancing Watershed Habitats and
Aiding Stormwater Management**



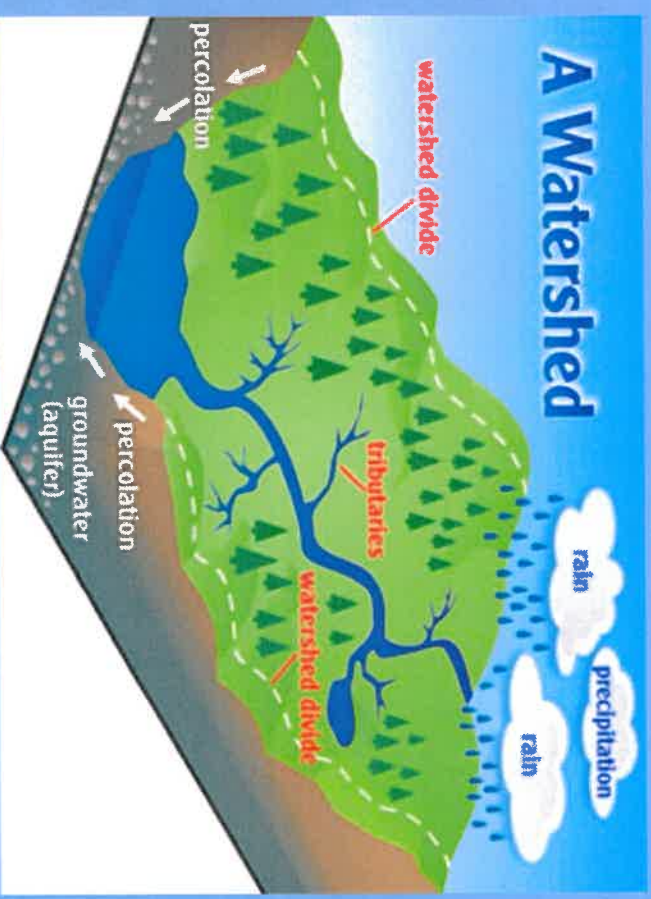
Local Sustainability Class

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Muhlenberg College, Spring 2023

What is a Watershed

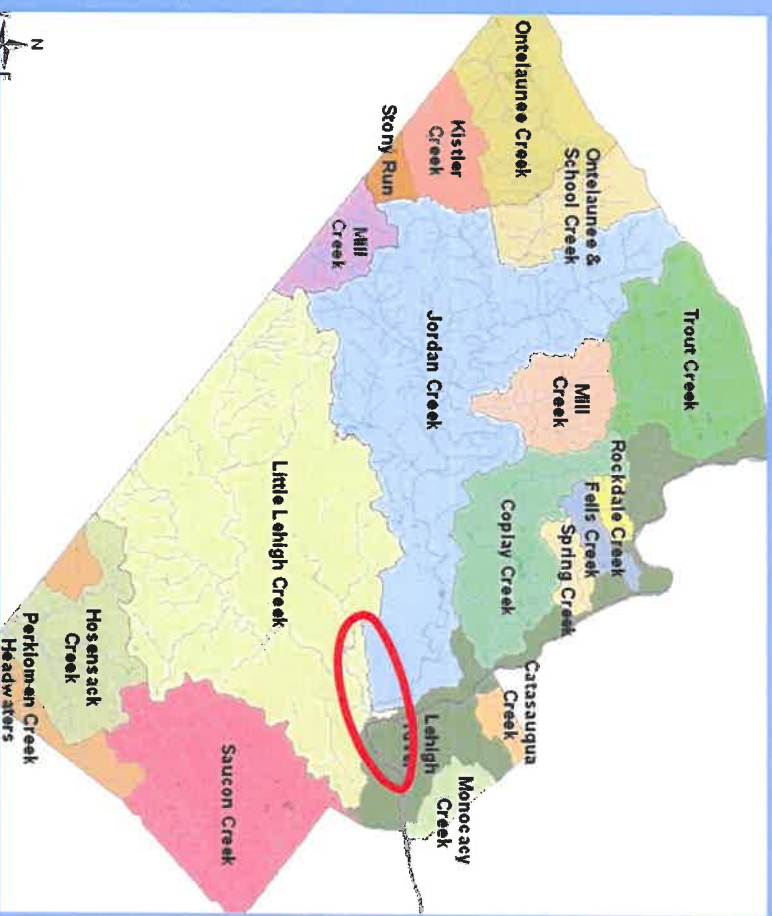
- An area where runoff is channeled into creeks, rivers etc.
 - Eventually goes to lakes, bays, or oceans.
- A healthy watershed prevents flooding and water pollution
- Characteristics
 - Permeable surfaces
 - Loosely packed dirt, marshlands
 - Obstacles on the surface
 - Riparian buffers



Allentown Watershed



Allentown is part of 3 different watersheds.
Our actions impact others and others actions impact our city.



Lehigh County Watersheds

Issues in our local parks

- All of our parks are surrounded by impervious pavement
- Not enough permeable surfaces
 - Uniform, hard packed grass can have the same effect as pavement



Flooding



Causes:

- Runoff
- More water in streams & strong storms
 - Fast water
- Non-complex creeks



Issues:

- Impacts stream habitat and water quality
 - More erosion
 - Sediment loading
 - High costs to manage



https://www.allentownpa.gov/Portals/0/Images/Flooding_Golf_Course_1.jpg

https://www.allentownpa.gov/Portals/0/Images/Flooding_10th_Street_Bridge_2.JPG

Creek De-Channelization



What is channelization?
What is de-channelization?



<https://freshwatermanagement.wordpress.com/2015/10/04/how-effective-was-the-management-and-restoration-of-kissimmee-river/>

The Benefits



Allentown Municipal Golf Course

- Stormwater collection
 - Allentown,
 - Whitehall,
 - Upper Macungie
- Flooding induced damage and closures
- Downstream sedimentation issues
- Dredging costs



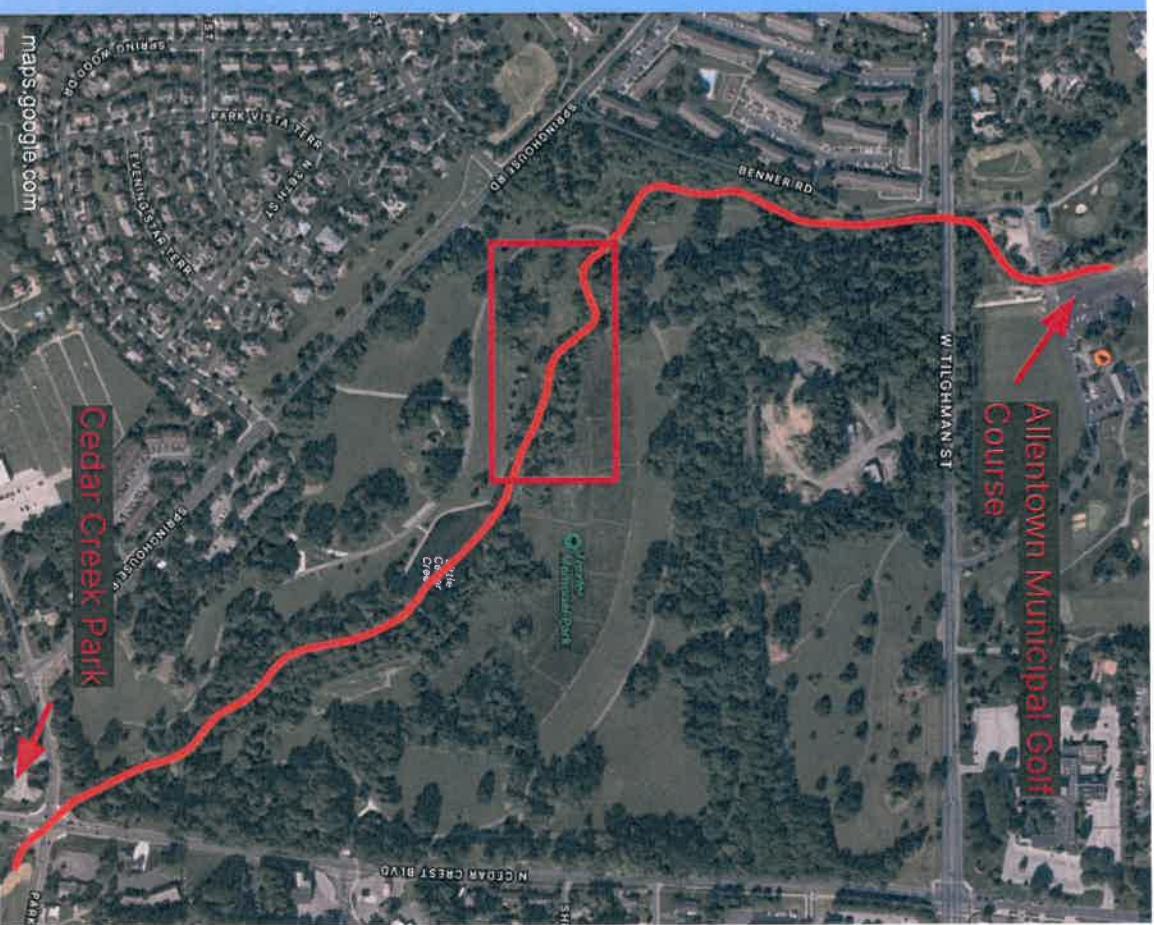
Bank Restoration

Map of Cedar Creek running through Trexler Park.

Why is creek bank restoration important?

- Stabilize riverbanks
- Prevent erosion & nutrient loading

"The Three Key Benefits of Stream Restoration."
www.ws beng.com/the-three-key-benefits-of-stream-restoration/.



Solution 1 \$200,000

Coir logs with native plant seeds placed on the banks that can root themselves and act as the new bank.



Solution 2 \$42,000*

Bio materials like tree roots, livestakes, and native vegetation for a 6 foot bank.



Solution 3 \$107,000*

Structural materials like riprap and concrete blocks. Woody plants; rock riprap; stream cross veins; stream barbs.





Riparian Buffers

Plants that border waterways in managed landscapes

Designed to capture stormwater runoff, treat nutrients/ pollutants, and hold together sediment while providing habitats.

- Proven to provide economic & environmental value



The Science Behind the Need for Riparian Buffer Protection



Types of Riparian Buffers

Forested Buffers: Woody plants

Native wet tolerant trees & shrubs

- Roots trap sediment & slow the flow of stormwater



Grass buffers: Native grasses, wildflowers, or gardens (agricultural or residential areas)



Wide buffer = greatest impact

Implementing Riparian Buffers

Consider...

- Hydrology
- Prior land use
- Slope of the land
- Desired water quality benefits

Helps determine the total buffer width

- Recommendation: work with people that are familiar with riparian restoration and buffer implementation.

Low Maintenance → Weed control and mowing



Marshland

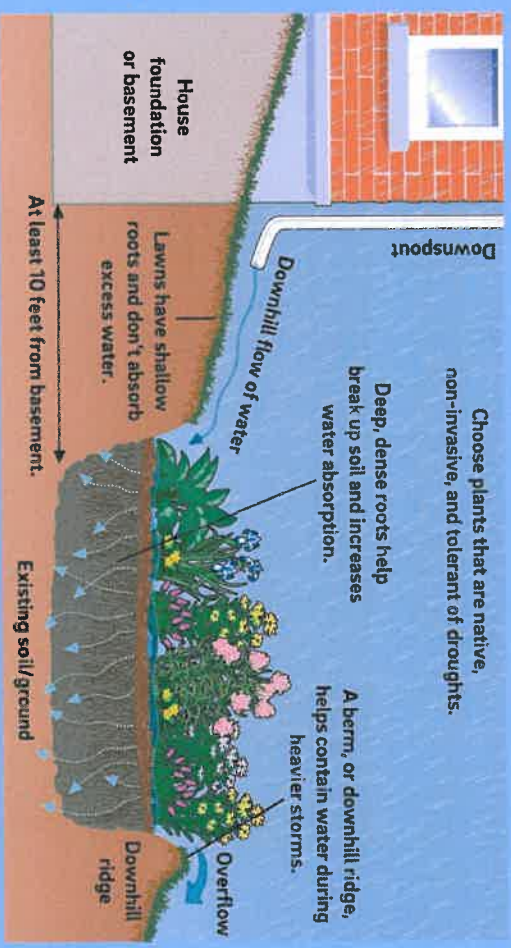
- A marsh is a type of wetland area where water covers ground for long periods of time. Dominated by grasses/herbaceous plants.
- Marshes are a declining habitat in PA
- Marshes are misunderstood for mosquitos & disease, but are crucial for filtering nutrients/pollution from the water.



Freshwater marsh - PA Natural Heritage Site
<https://www.naturalheritage.state.pa.us/community.aspx?=16007>

Rain Gardens

- A depressed area of land that collects rainwater; can be made up of perennials and grasses
- Prevent runoff, which then soaks into the ground.
- Absorbing water to offset the effect of large amounts of impermeable surfaces
- Recharge ground water



www.thisoldhouse.com/gardening/21016338/how-to-build-a-rain-garden-to-filter-run-off
<https://www.perkiomewatershed.org/rain-gardens>



Where Specifically?

Allentown Municipal Golf Course: Site observations by EPA site visit on

July 15, 2021

Fund some or part of this green infrastructure work.

Why?

- Improve water quality
- Reduces erosion and flooding in Golf Course and Downstream
- Enhance aesthetic views, native plants, good publicity
- Attracts members
- Positively impacts downstream

Picture for Allentown Golf Course
 Areas highlighted by the EPA plan that can be improved with Green Infrastructure.

12



Existing Ponds. Improve water quality and flood storage volume

13



Existing Ponds. Improve water quality and flood storage volume

15



Improve flood storage with dry or wet basin area or reconnect floodplain

16



Stream flow reappear downstream of ponds and springs. Enhance riparian corridor





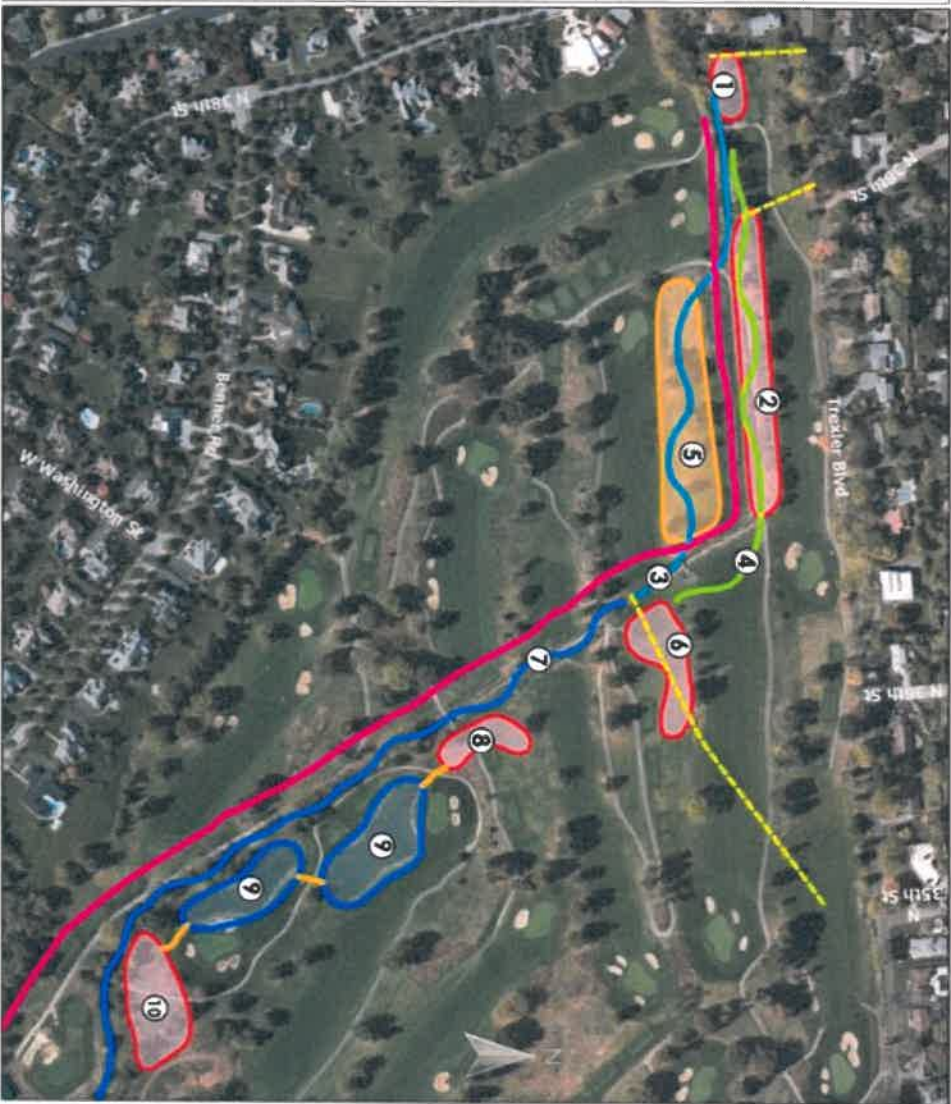
EPA Smart Sector Site Visit Observations

Allentown Municipal Golf Course



Suggested Enhancements

- 1 Stormwater improvement (storage/dissipate energy)
- 2 Option 1 - Utilize old streambed and expand for stormwater storage (dry or wet).
- 3 Option 1 - Stream Location
- 4 Option 2 - Stream Location
- 5 Improve floodplain wetland and stream buffer. Possible basin as part of option 2.
- 6 New stormwater basin from Terrel Blvd drainline (dry or wet).
- 7 New channel alignment, restore base flows, improve floodplain connection and sinuosity.
- 8 New stormwater storage (dry or wet).
- 9 Deepen existing ponds to increase storage, aerate, and add riser on low point (south end of pond).
- 10 Reconnect floodplain dry basin wet meadow area.



Location:
Allentown Municipal Golf Course
3400 Tighman St.
Allentown, PA 18104

EPA Representative:
Tim Wilton, Mike Monosilno, Todd Lulle
Site Visit Date: July 15, 2021

Notes: Site observations were made during a site visit on July 15, 2021. The site visit was conducted to allow the EPA Region 3 Smart Sector Team an opportunity to observe concerns and gather an understanding of the environmental challenges that golf courses and their superintendents are managing.

Map Date: 8/2021
Map Scale: 1:2500
Map Author: EPA Region 3
Map Date: 08/2021



Costs and Possible Partial Funding Sources

Two Programs that can aid in this infrastructure.

- Grant programs
 - The Pennsylvania's DEP's Stream Bank Fencing Program and the Partners for Fish and Wildlife Program.
- Loan Programs - offering a loan for \$75,000 provided by the State Treasury.

Programs can be combined to receive optimal benefits.



Our Ask

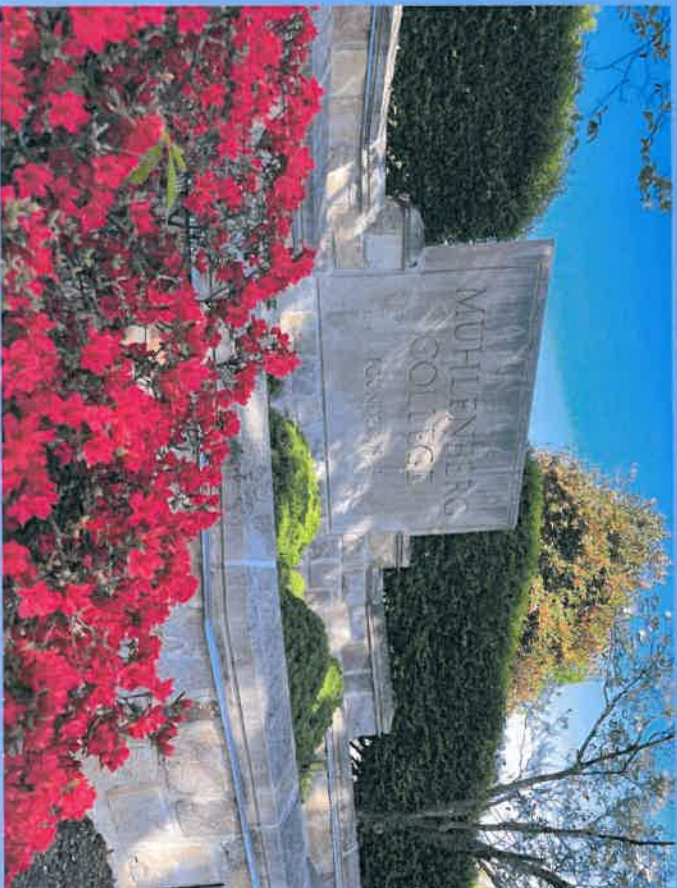


- Prioritize green infrastructure and habitat restoration by funding restoration efforts in Allentown Parks.
- Utilize existing plans and their funding recommendations
 - (EPA, Parks Dept staff)





**Thank you for your time!
Any questions?**



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- What is a Watershed
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