



PennState Extension

Managing Stormwater: It Starts at Home!

Master Watershed Steward Program, York County



PennState Extension

By Jodi Sulpizio,
Natural Resources Educator

Objectives

- Background information & terminology
- Chesapeake Bay Watershed today
- How pollution affects watersheds
- Homeowner Best Management Practices (BMP's)

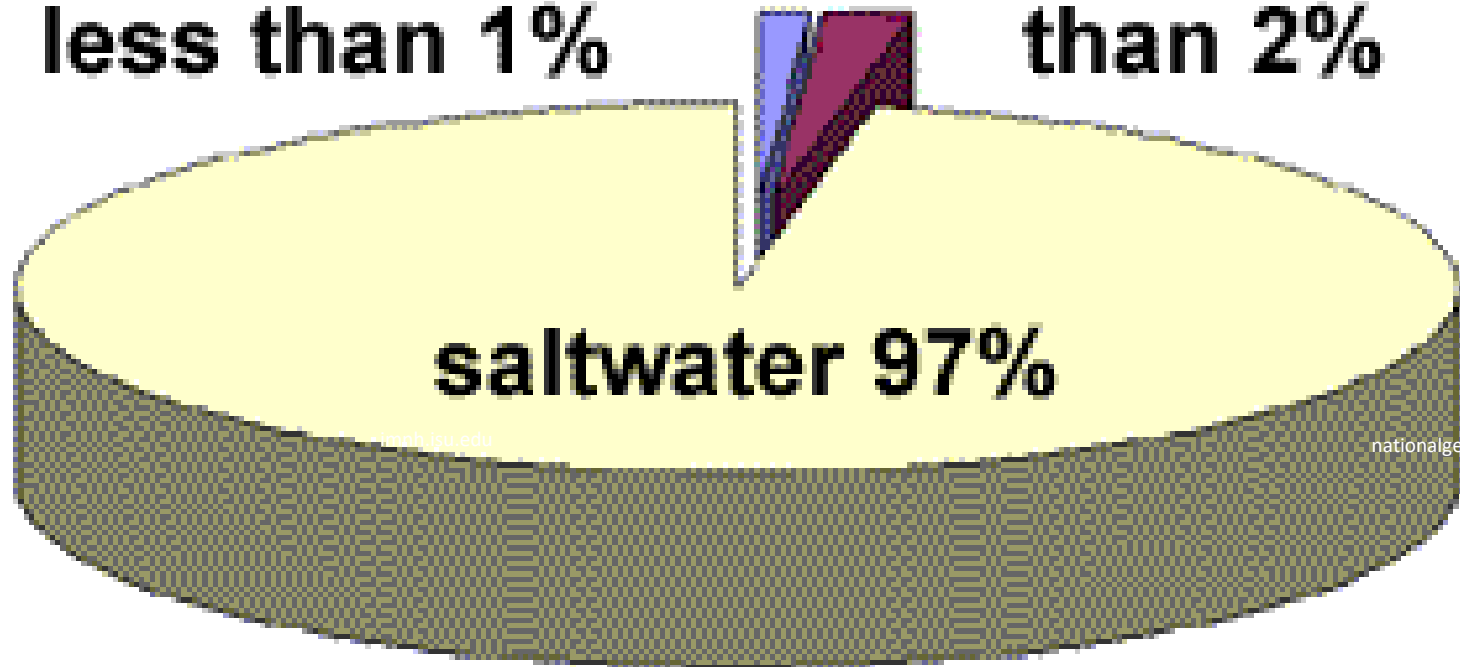


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Earth's Water Supply

**fresh water--
less than 1%**

**ice--more
than 2%**

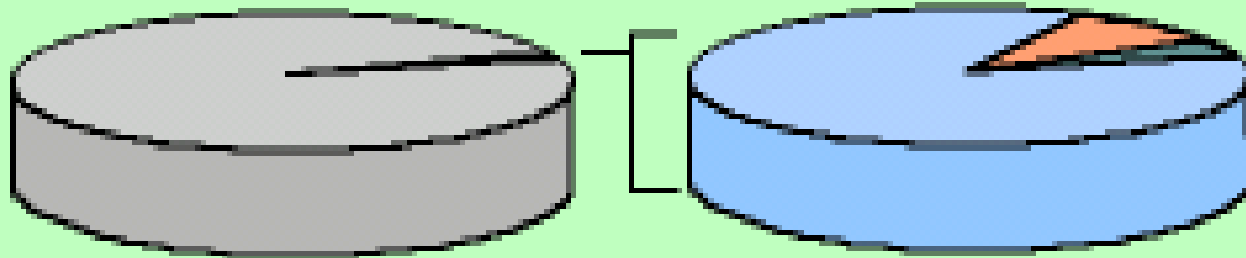


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nationalgeographic.com

THE EARTH'S WATER SUPPLY

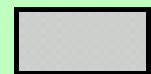


Total volume of water

Water usable by humans



Usable water- 0.3%



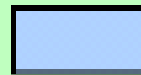
Unusable water- 99.7%



Rivers



Fresh-water lakes



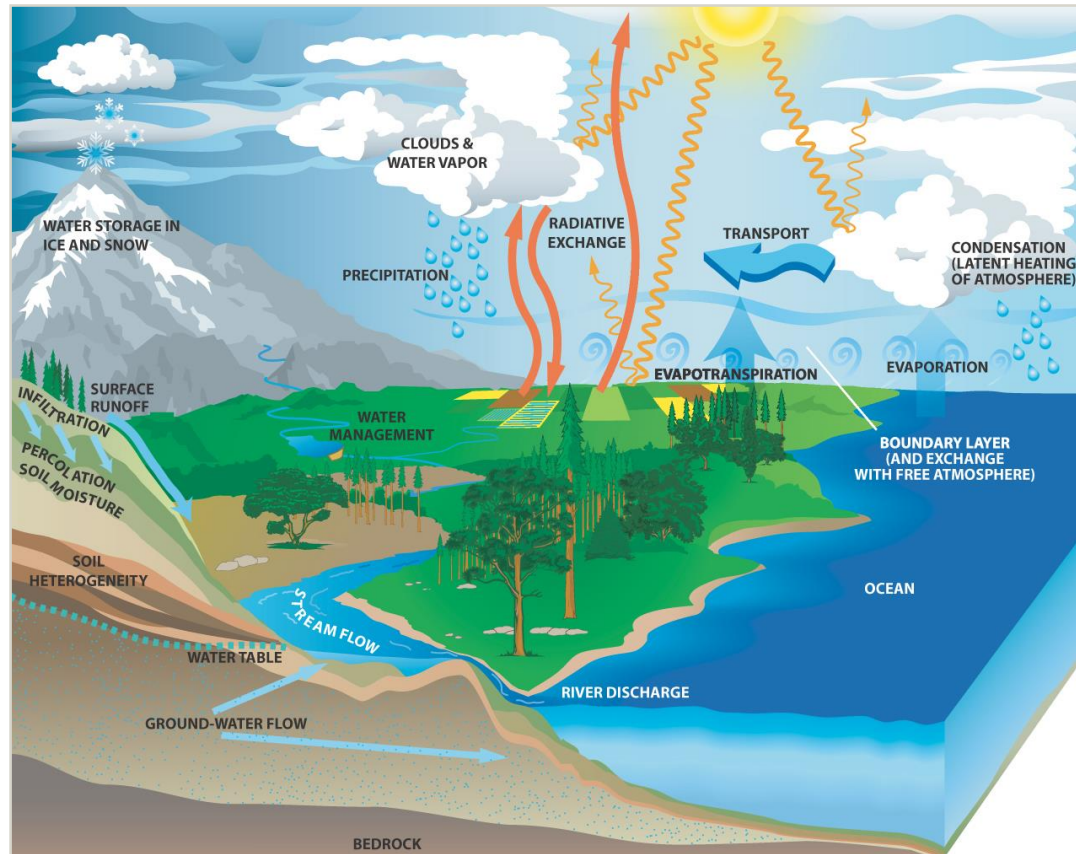
Ground water

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Hydrologic Cycle

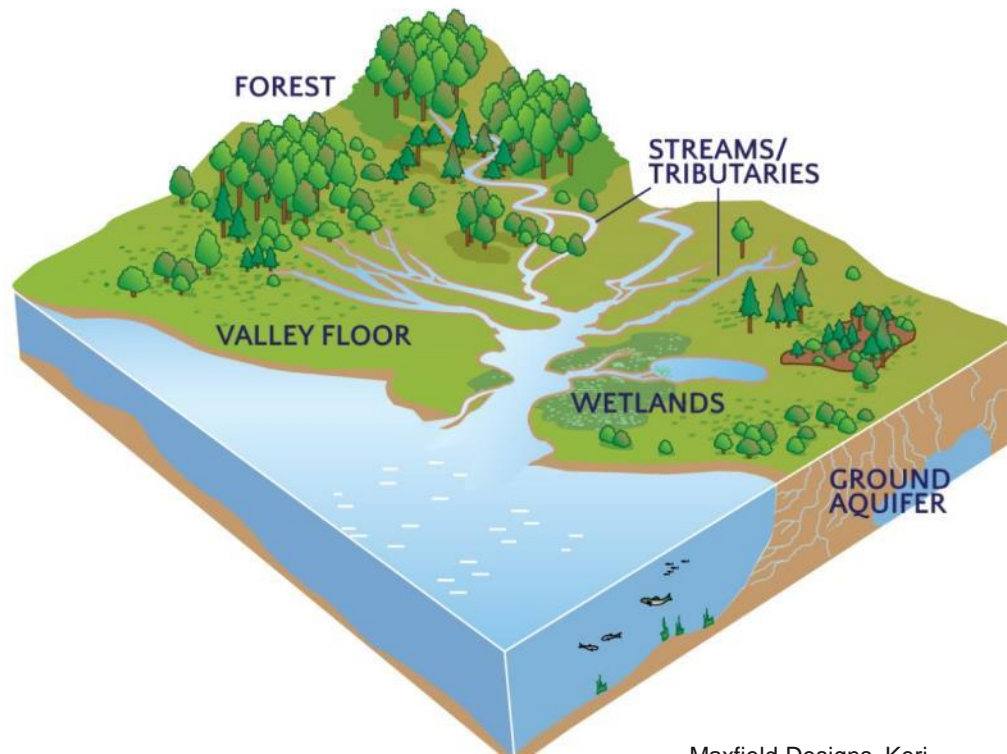
The continuous movement of water on, above, and below the surface of the Earth.



solcomhouse.com

What is a Watershed?

The land area that contributes runoff to a particular point along a waterway.



Maxfield Designs, Keri
Maxfield

Chesapeake Watershed Today

- 64,000 sq. miles
- Population of 18.1 million
- 57% forested (24 million acres)
- 45% forests & wetlands threatened by development
- >100,000 miles of streams, creeks & rivers thread through watershed
- 51 billion gallons of freshwater flow into Bay every day



Pollution in the Chesapeake Bay Watershed

- 74% of tidal Chesapeake Bay is partially or fully impaired by toxic chemicals
- 5 million tons of sediment/year
- 334 million pounds nitrogen/year
- 20 million pounds phosphorous/year
- Stormwater runoff fastest growing form pollution in Bay



Tropical Storm Lee



Chesapeakebay.net

Susquehanna River: A satellite view of the Susquehanna River near Harrisburg, Pennsylvania, on September 10 shows the high levels of sediment that are being carried toward Chesapeake Bay.
This natural-color image is from the Advanced Land Imager (ALI) on NASA's Earth Observing-1 (EO-1) satellite.



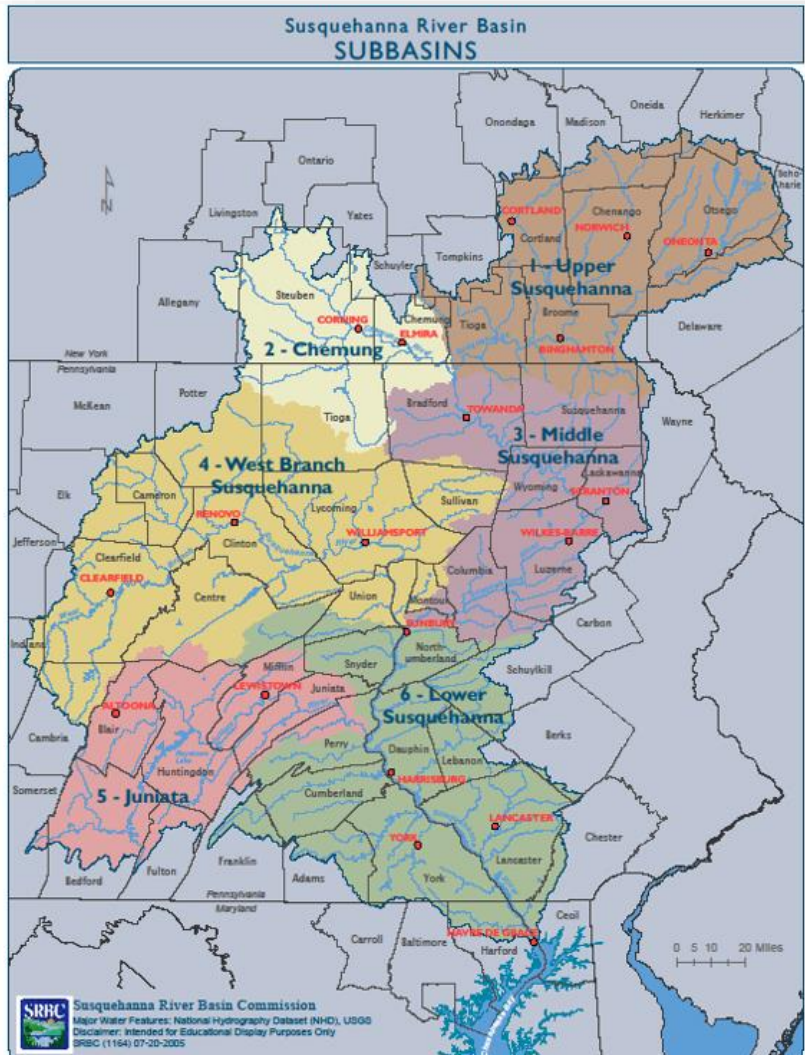
PA Watersheds

- **Three major watersheds in PA are: Delaware, Susquehanna & Ohio**
- ***Pennsylvania has more than 84,000 miles of waterways***



fish.state.pa.us

Susquehanna Watershed

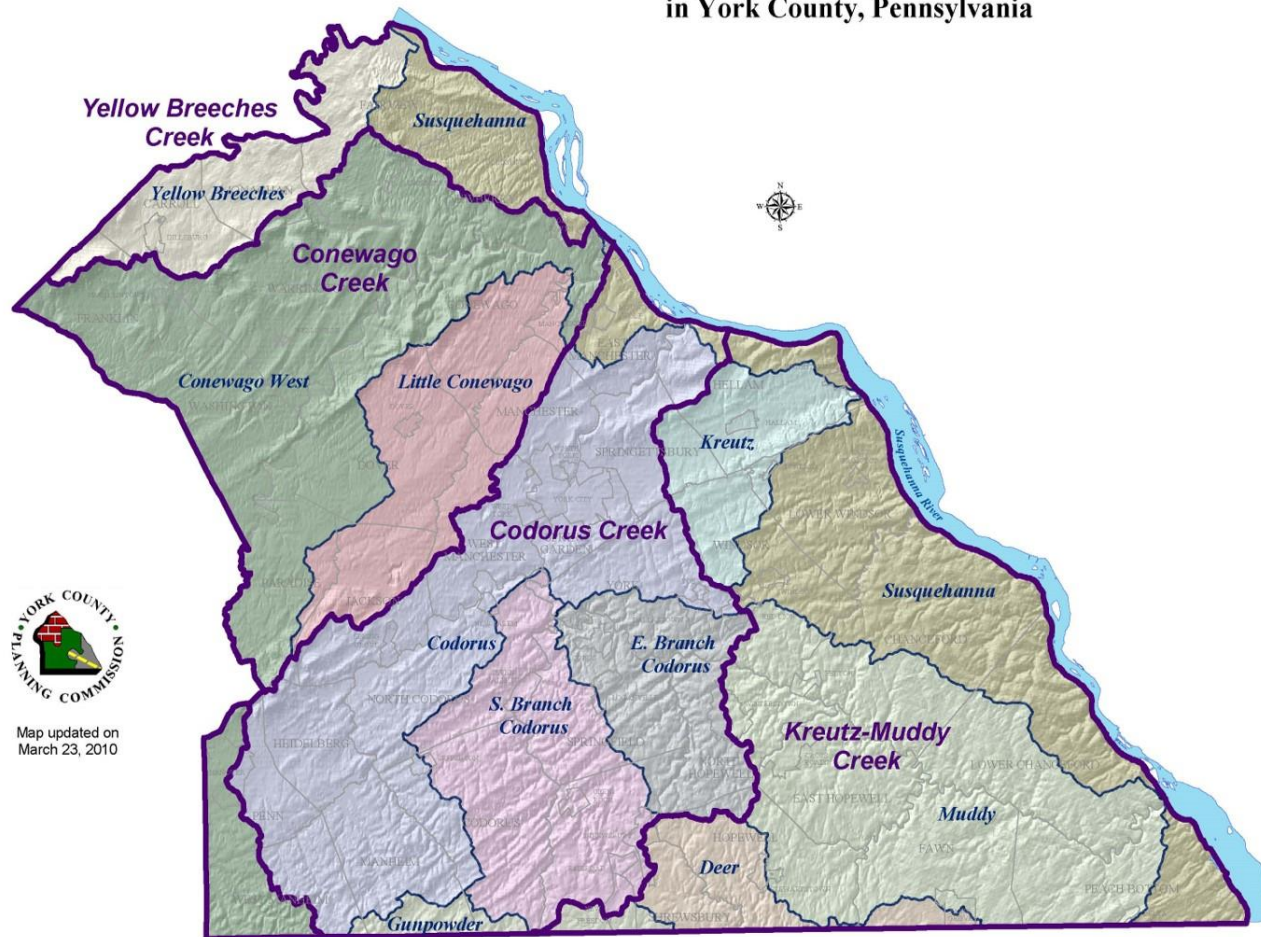


Susquehanna River Facts

- 49,000 miles of streams creeks & rivers
- 3 million people rely on river for drinking water – 446 million gallons per day
- 27,510 sq. miles land drain into river
- 444 miles long
- Largest non-navigable river in Eastern U.S.
- Provides 50% of freshwater to Chesapeake Bay
- 69% of watershed forested. Continues to decline.

Watersheds in York County

Stormwater Management Watersheds in York County, Pennsylvania



Map updated on
March 23, 2010

What is stormwater?

Stormwater runoff is simply rain or melting snow that “runs off” of the land and into storm drains and creeks.

Stormwater is...

- The result of excess runoff from impervious surfaces.
- The # 1 pathway of pollutants entering our local waterways



Sources of Water Pollution

Direct Discharge into H₂O

Point Source

- Dumping toxins
- Industrial facilities
- Sewage treatment plants



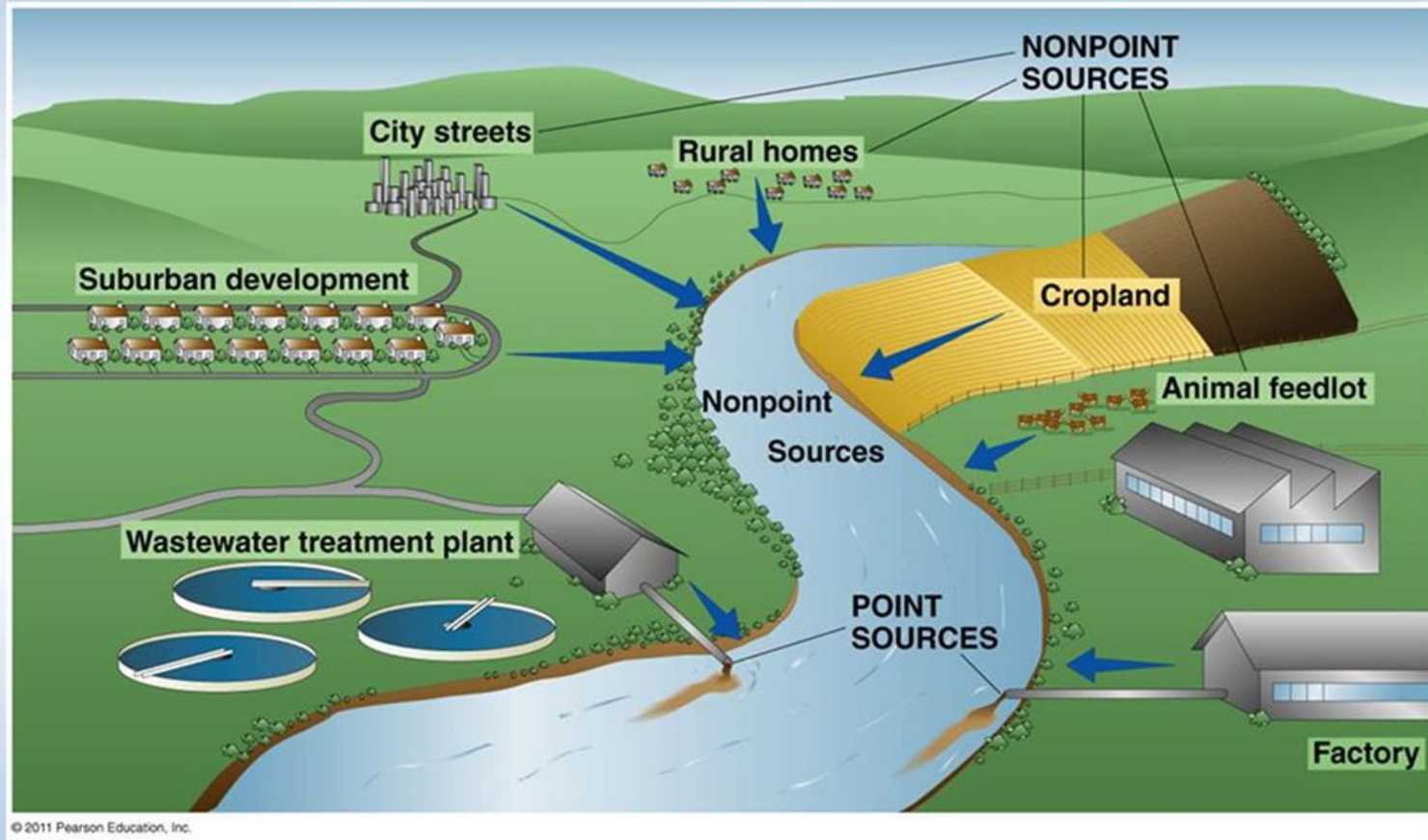
Non-Point Source

- Urban Runoff
- Agricultural Runoff



Indirect Discharge into H₂O

Point and nonpoint sources



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Point or Non-Point Source Pollution??



Agricultural Non-point Source Pollution

Spraying



Tilling



Increases
sediments, nutrients,
and pesticides in our
waters

Fertilizer



Grazing



Run-off

Urban Non-point Source Pollution



Development

Impervious Surfaces



Increases sediments,
nutrients, and
pollutants in our
waters

Run-off



**Increasing
Population**



Results of Increased Stormwater Runoff

- Increase in frequency of peak stream flow rates and flooding
- Alteration of floodplains
- Stream bank erosion
- Stream siltation
- Aquatic habitat changes
- Costly water treatment
- Decrease in groundwater recharge
- Transport of pollutants to waters
- Threats to human health



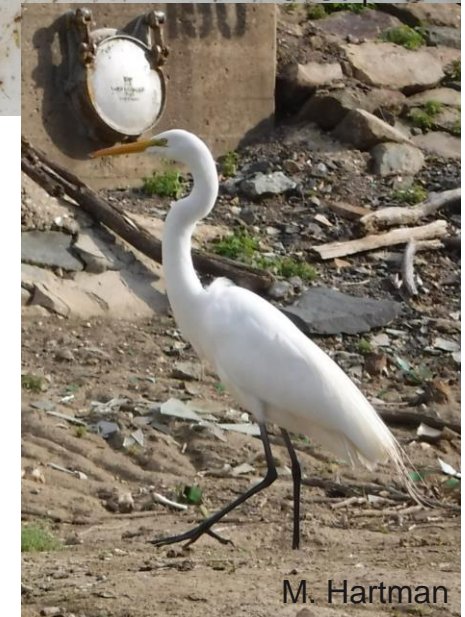
Increased Stormwater = Increased Flooding

- **More frequent floods**
- **Flash floods**
- **More severe flooding**
- **More Erosion**

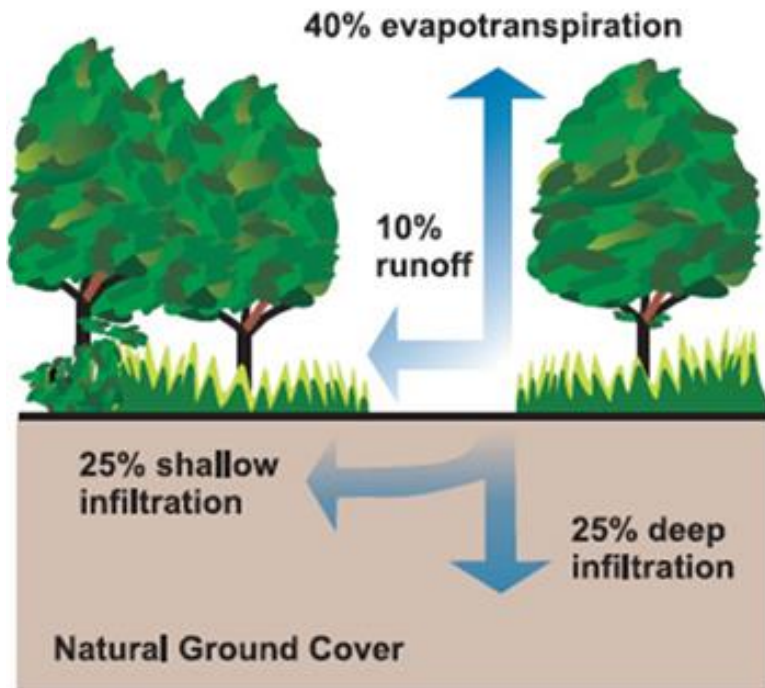


↑ Flooding = ↑ Pollution = ↓ Aquatic Life

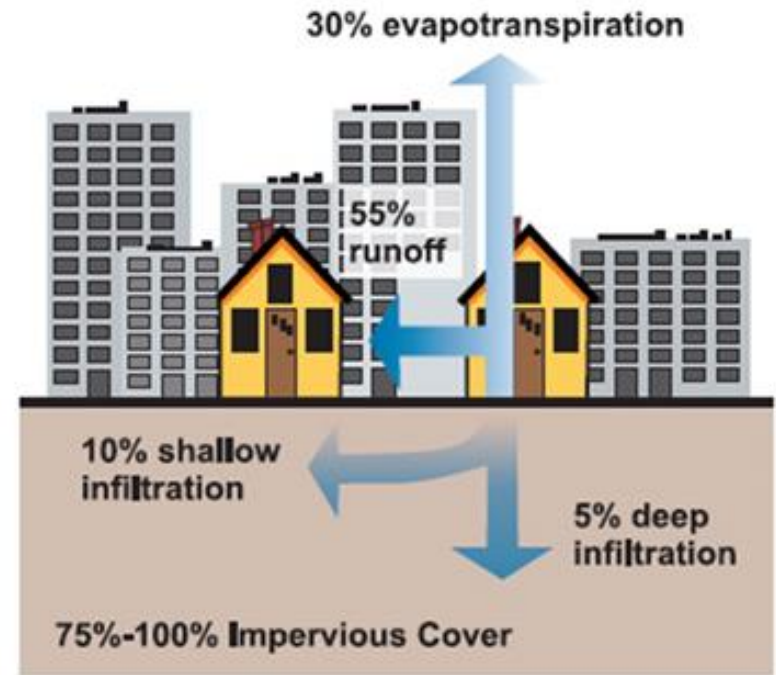
- Important links in aquatic food chains.
- Higher diversity = healthier ecosystem!
- Everything is connected!



Pre and Post Development



water.epa.gov



water.epa.gov

How has stormwater runoff affected York County waters?

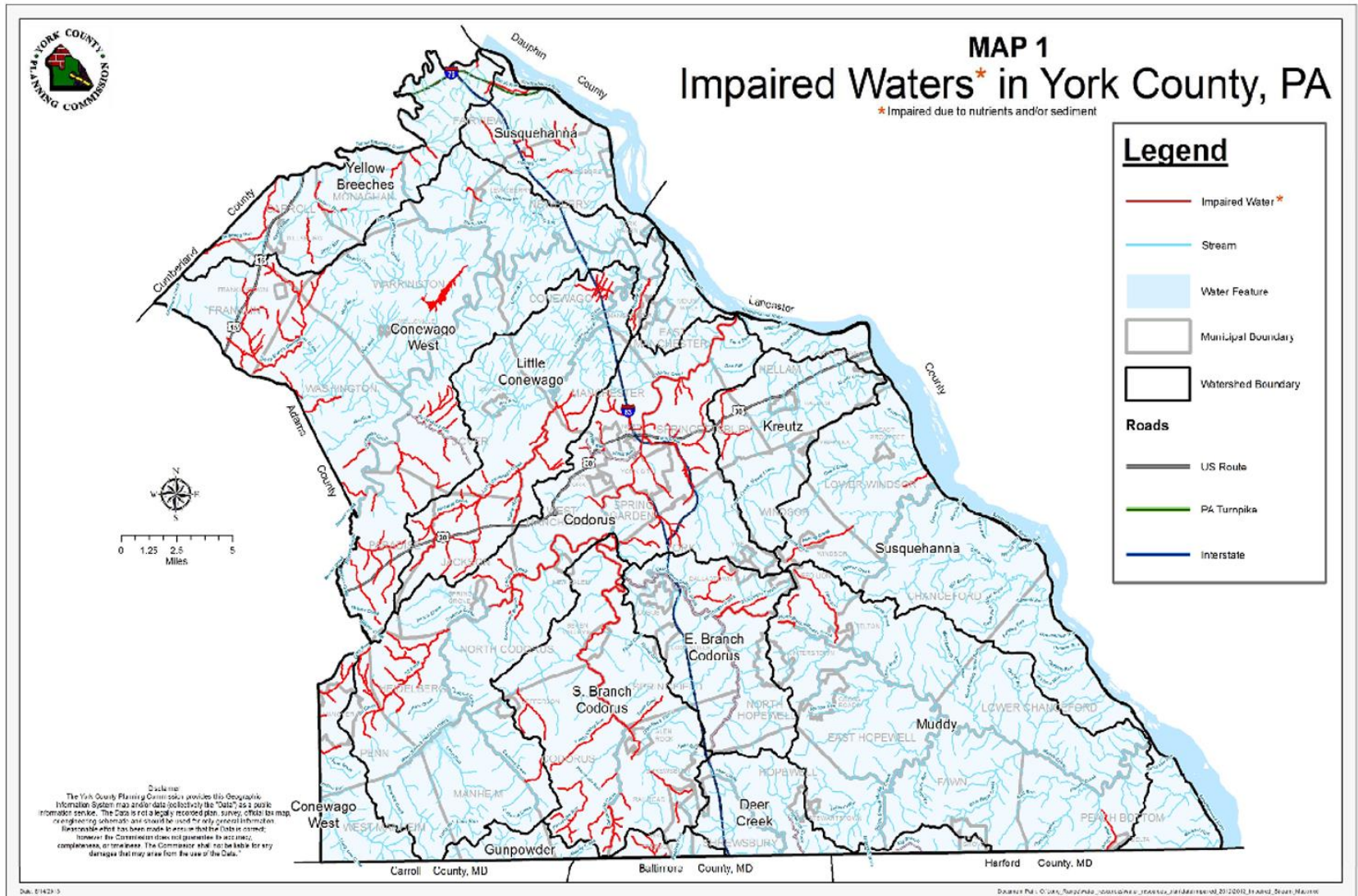


PA DEP has listed CLOSE TO HALF of all York County streams as impaired

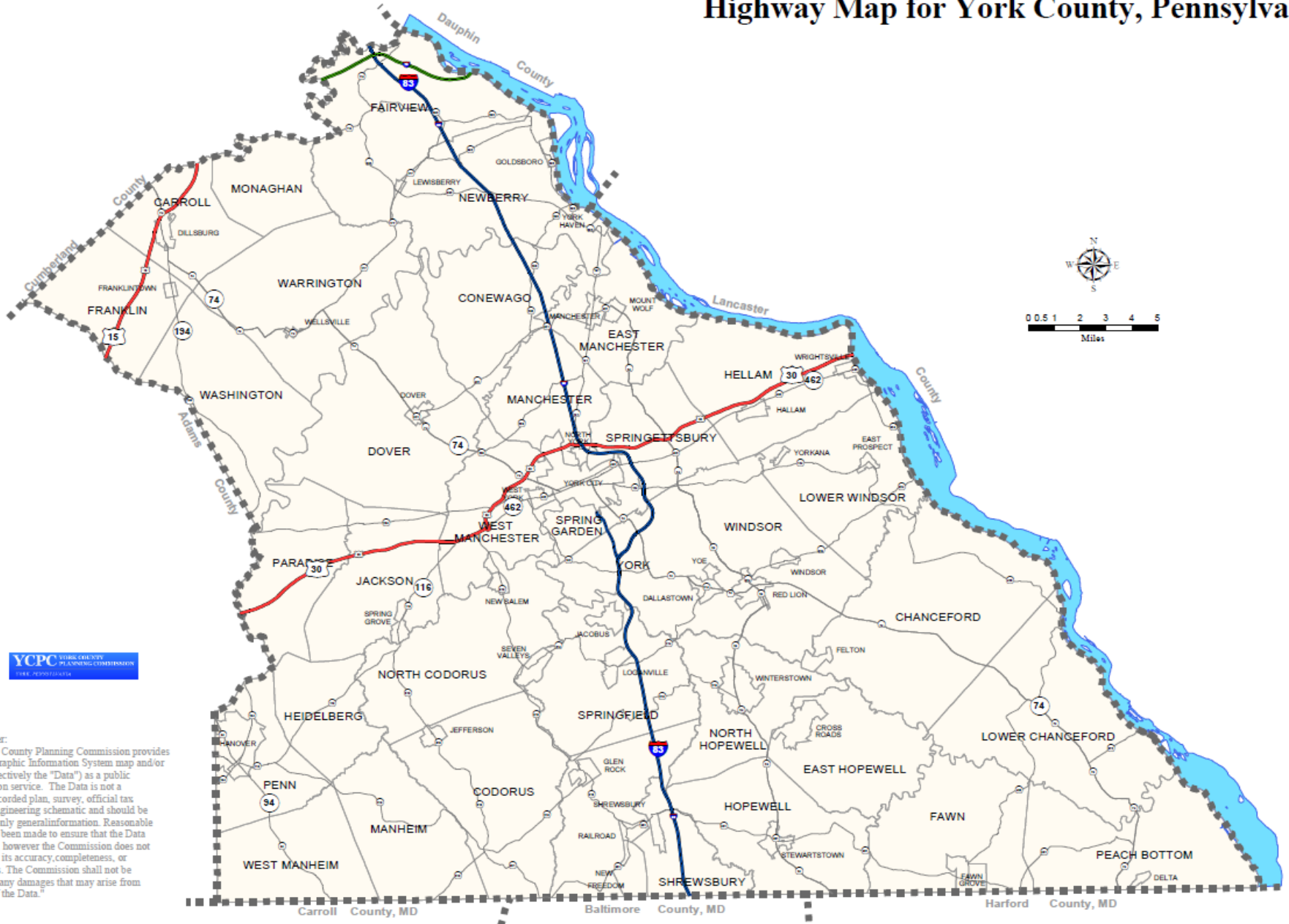
Typical York County Stream



Impaired Streams in York County

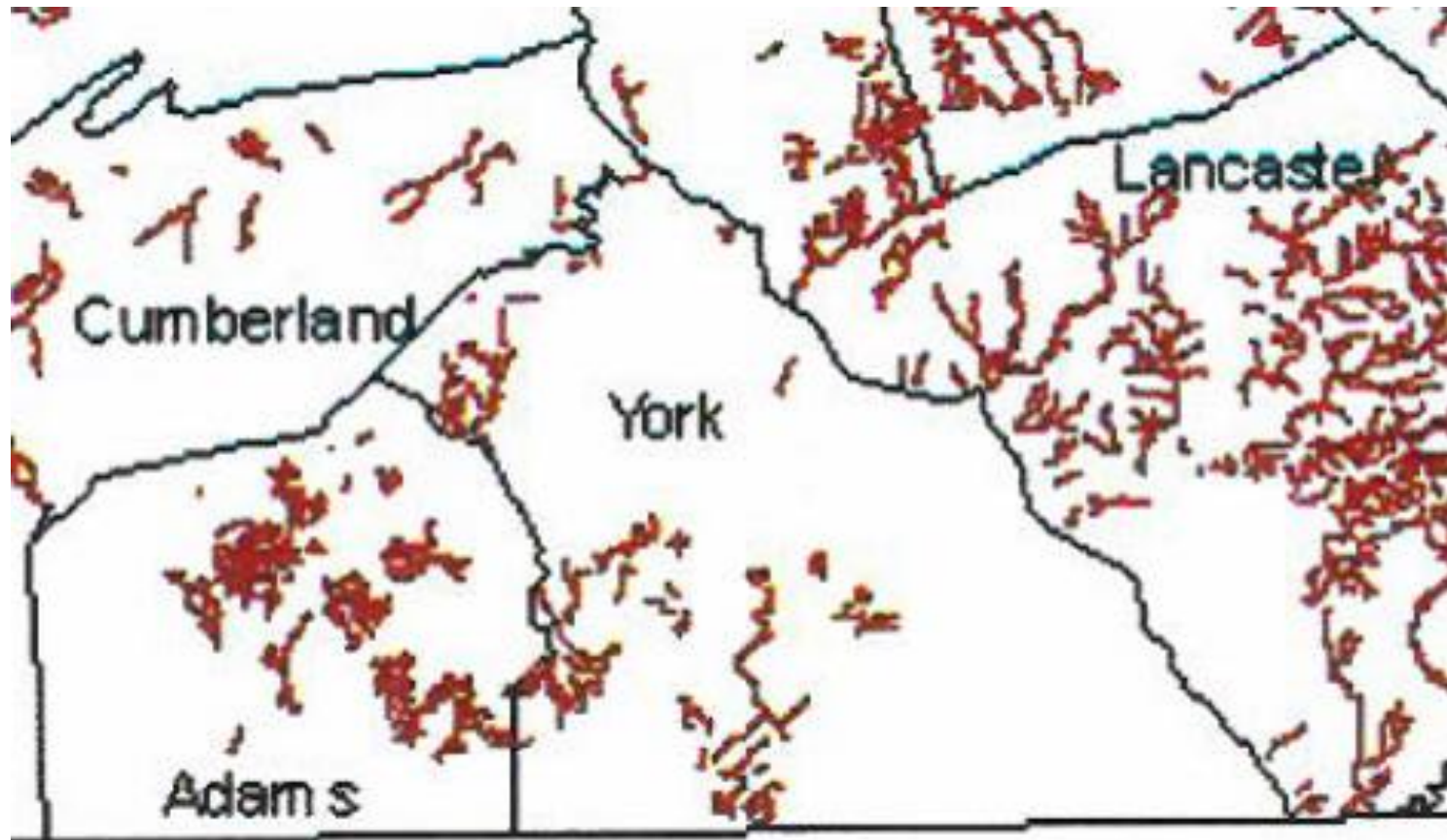


Highway Map for York County, Pennsylvania



Disclaimer:
The York County Planning Commission provides this Geographic Information System map and/or data (collectively the "Data") as a public information service. The Data is not a legally recorded plan, survey, official tax map, or engineering schematic and should be used for only general information. Reasonable effort has been made to ensure that the Data is correct, however the Commission does not guarantee its accuracy, completeness, or timeliness. The Commission shall not be liable for any damages that may arise from the use of the Data.

Impaired by Agriculture



Historic Approach to Stormwater Mgmt

**Move water off the site as quickly
as possible!**



What can we do to reduce negative land use impacts and non-point source pollution?

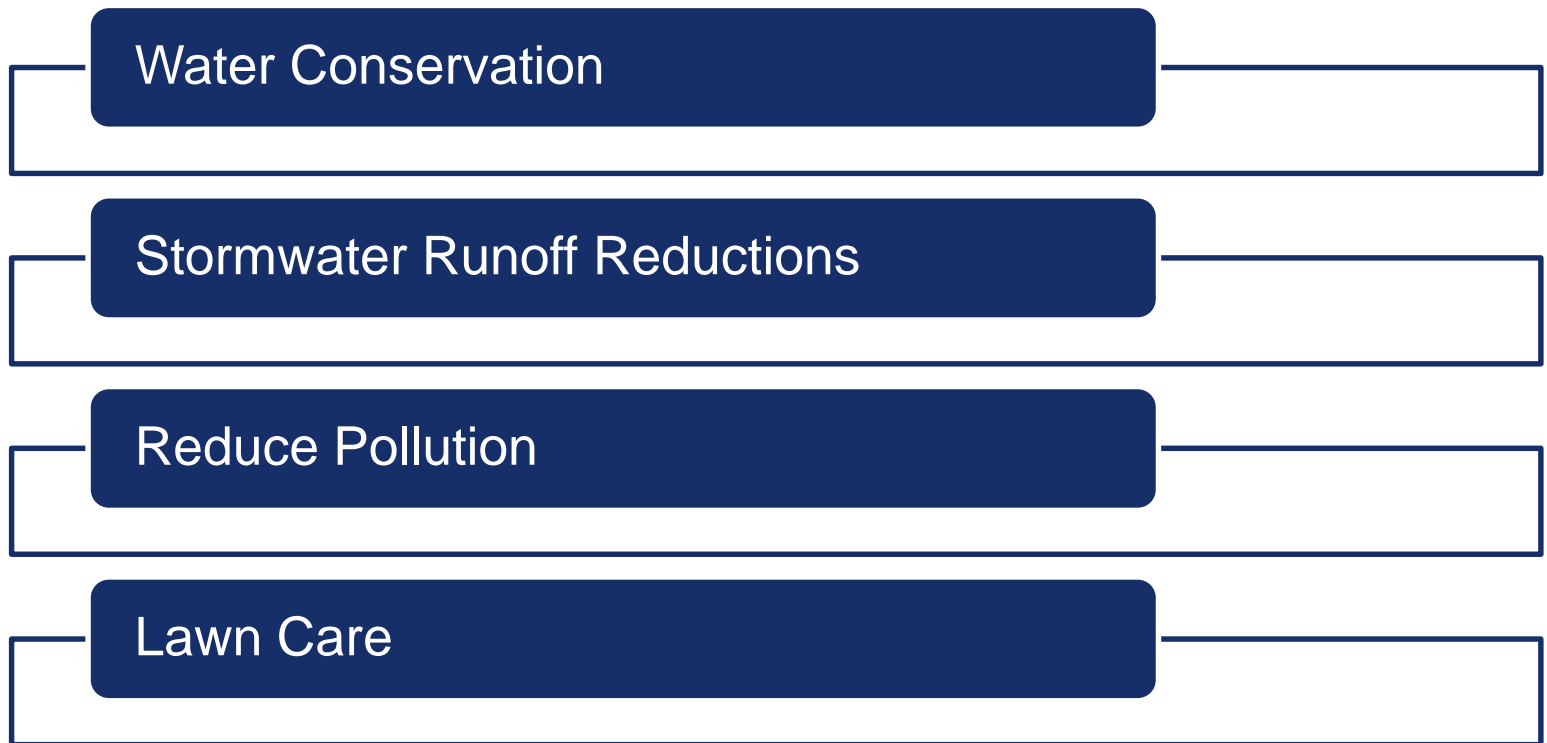
Decrease/counteract impervious surface and stormwater runoff through use of:

Best Management Practices (BMPs)



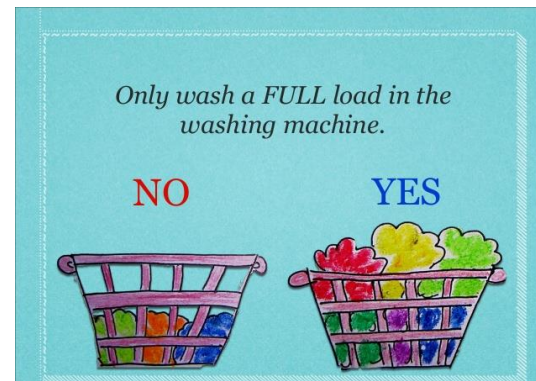
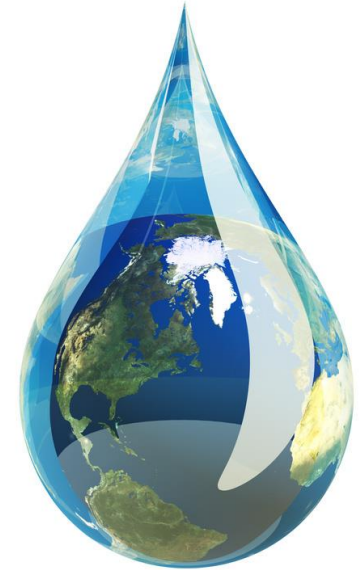
Homeowner BMPs

BMPs are physical devices or changes in behavior that will control the volume, rate and/or quality of stormwater runoff.



Water Conservation in Home

- Turn off tap!
- Wash only full loads – dishwasher & washing machine
- Fix leaks
- Shorter showers
- Use low flow plumbing
- Install water saving device – front load washing machine



Reducing Stormwater Runoff

Homeowner BMPs

- Downspout disconnection
- Rain gardens
- Vegetated swale
- Native species
- Riparian buffers
- Scoop the poop
- Green/pervious driveways
- Amended soils
- Service septic system
- Properly dispose of hazardous household items



Rain Barrels



Ian Mackenzie-The rain barrel-BY2.0

Pervious Pavement & Pavers



Kristen Kyler., PSU



Plant Trees

- soil stabilization
- save energy
- improve air & water quality
- provide habitat
- better quality of life
- neighborhood stability
- aesthetic values
- increase property value
- reduce noise
- good for business



Riparian Buffers



Matthew Royer, PSU

Native Meadows



Jennifer Fetter, PSU

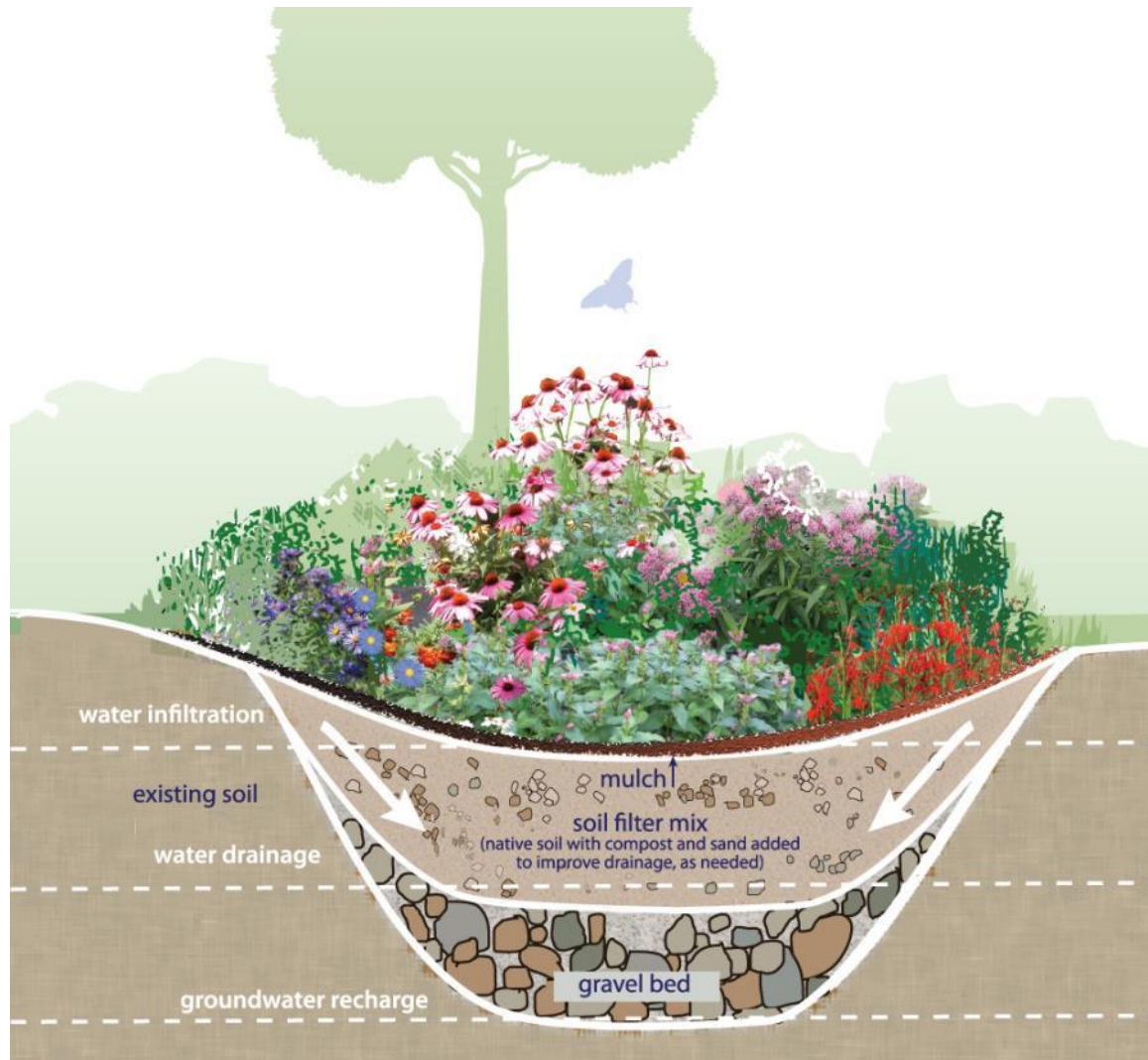


Jim Wellendorf



Kristen Kyler, PSU

Rain Gardens



Maxfield Design, Keri Maxfield

Reducing Pollutants

- Don't dump into drains
- Pick up pet waste
- Use less salt in winter
- Don't litter
- Reduce, reuse, recycle
- Minimize use of driveway sealants
- Compost or mulch leaves
- Recycle oil/antifreeze
- Fix leaks
- Use commercial car washes



Wise Lawn Care

- Cut 3" or higher
- Irrigate early in morning
- Don't over water (5-7 days)
- Test soil and develop nutrient management plan
- Maintain dense vegetative cover
- Retain clippings & leaves on lawn
- Fertilizing:
 - Don't over fertilize & use phosphorus free fertilizer
 - Don't fertilize before spring green up or after it's dormant
 - Don't fertilize within 15' of water body
 - Sweep fertilizer off of paved surfaces



eras.biz

Challenges

- Fertilization and lawn care behaviors are deeply rooted and hard to change.
- Strong neighborhood pressures and norms often outweigh environmental or water quality considerations.
- **EDUCATE!**



Wise Gardening

- Don't guess, soil test!
- Limit lawn fertilizers, herbicides & insecticides
- Use natural fertilizers & time it right
- Use permeable hardscaping
- Plant trees!
- Water wisely
- Disconnect downspouts
- Build a rain garden
- Plant stream banks
- Plant with natives!



Installing BMP's - Benefits to You

- Decrease damage to property
 - Eliminate water in basement
 - Reduces flooding
- Improved health
- Improve water quality
- Provide wildlife habitat
- Save \$
 - Less chemicals
 - Less gas for lawn mower



Work with Neighbors

- Stormwater does not see boundaries.
- We all live down stream. We all need to work together.
- Revision of local ordinances may be necessary.
 - ✓ “Weed” ordinances.
 - ✓ Pooper scooper ordinances.
 - ✓ Zoning and construction standards.



“An ounce of prevention is worth a pound of cure.”

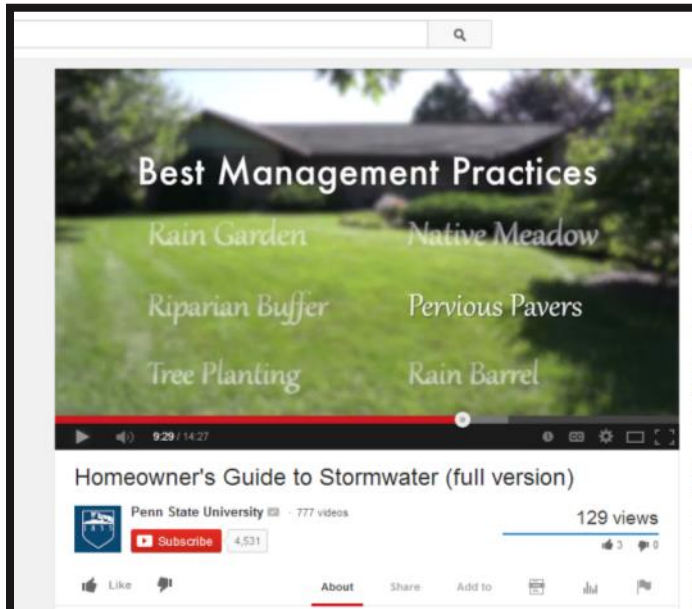
Benjamin Franklin

Homework

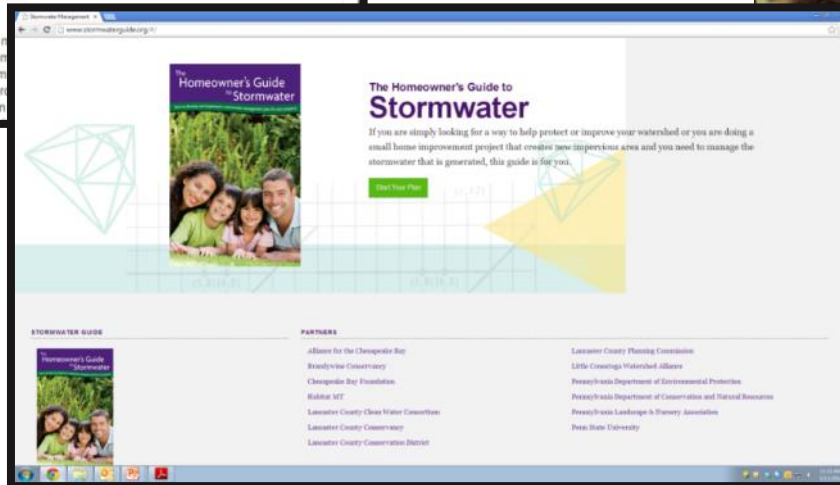
- Assess stormwater on your property!
- Make some changes!
- Plant a tree!

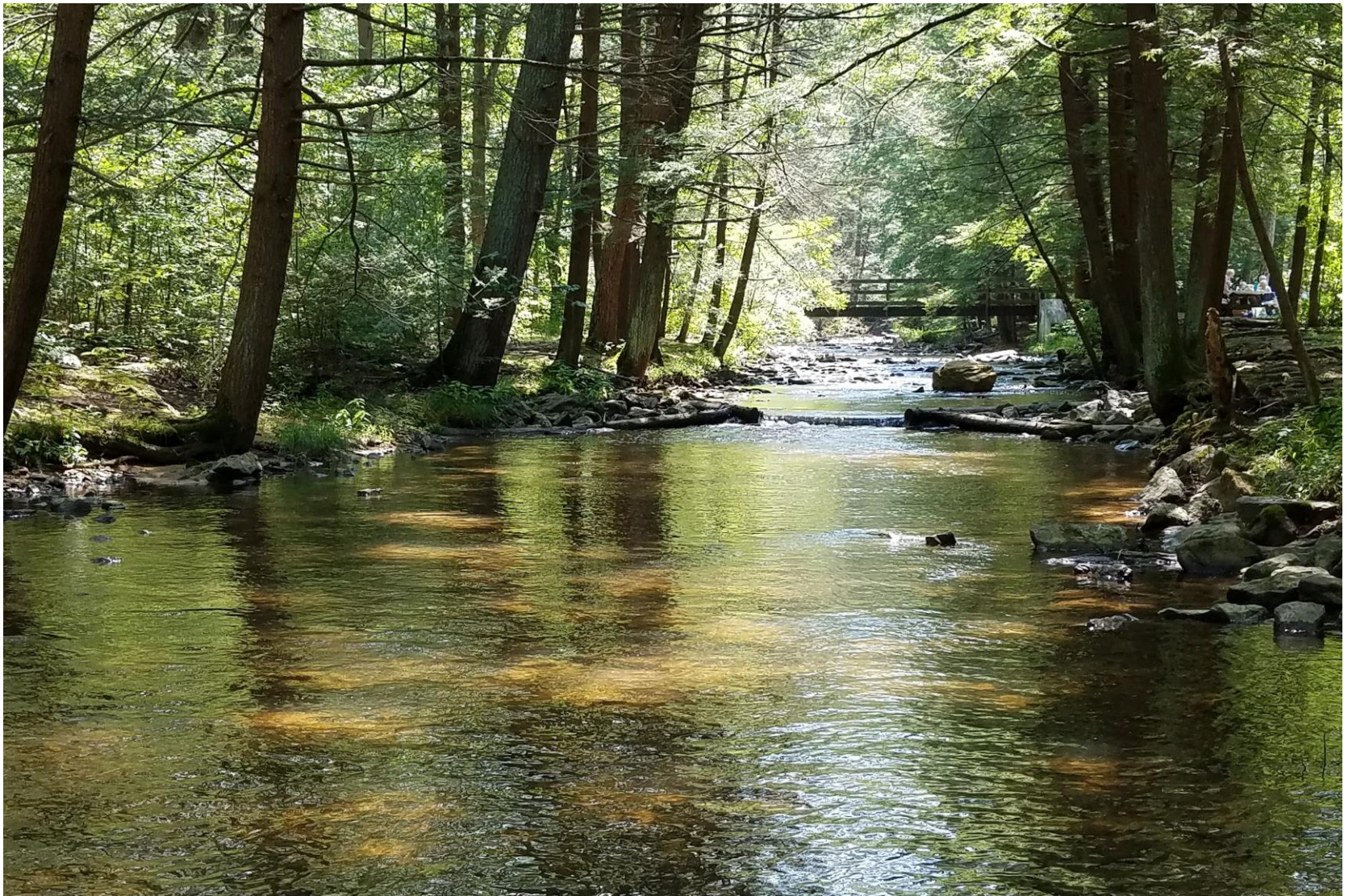


Homeowner's Guide to Stormwater



Published on Jan 30, 2014
This video is a supplement to the paper-based booklet from the Little Conestoga Partnership titled "The Homeowner's Guide to Stormwater." Your host, Kristen Kyler, Program Manager for the Lower Susquehanna Initiative, will guide you through the process to success in managing stormwater on your property.





“Only if we understand, can we care. Only if we care, will we help.”

Jane Goodall

Questions?

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References:

- Jodi Sulpizio, Penn State Extension
- York County Planning Commission, John Seitz and Lindsay Gardner
- York County Conservation District, Gary Peacock
- Steve Lentz, Penn State Master Gardener and Master Watershed Steward
- Chesapeake Bay Program
- Penn State Master Watershed Steward Curriculum
- Homeowner's Guide to Stormwater BMP Maintenance: What You Need to Know to Take Care of Your Property
- The Homeowner's Guide to Stormwater.