Managing Stormwater: It Starts at Home!

Master Watershed Steward Program, York County

By Jodi Sulpizio,
Natural Resources Educator
Objectives

• Background information & terminology
• Chesapeake Bay Watershed today
• How pollution affects watersheds
• Homeowner Best Management Practices (BMP’s)
Earth’s Water Supply

- Fresh water: less than 1%
- Saltwater: 97%
- Ice: more than 2%
THE EARTH’S WATER SUPPLY

Total volume of water

- Usable water - 0.3%
- Unusable water - 99.7%

Water usable by humans

- Rivers
- Fresh-water lakes
- Ground water
The continuous movement of water on, above, and below the surface of the Earth.
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
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**
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.
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

**Point Source**
- Dumping toxins
- Industrial facilities
- Sewage treatment plants

**Non-Point Source**
- Urban Runoff
- Agricultural Runoff
Point and nonpoint sources
Point or Non-Point Source Pollution??
Agricultural Non-point Source Pollution

Spraying

Tilling

Fertilizer

Grazing

Run-off

Increases sediments, nutrients, and pesticides in our waters

Source: YCPC
Urban Non-point Source Pollution

- Impervious Surfaces
- Development
- Increasing Population
- Run-off

Increases sediments, nutrients, and pollutants in our waters

Source: YCPC
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!

J. Sulpizio
M. Hartman
Pre and Post Development

![Diagram comparing pre-development and post-development impacts on water infiltration and evapotranspiration. The left side shows natural ground cover with 25% shallow infiltration, 25% deep infiltration, and 40% evapotranspiration, resulting in 10% runoff. The right side shows post-development with 10% shallow infiltration, 5% deep infiltration, 75%-100% impervious cover, and 30% evapotranspiration, resulting in 55% runoff.](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

MAP 1
Impaired Waters* in York County, PA

Legend
- Impaired Water*
- Stream
- Water Feature
- Municipal Boundary
- Watershed Boundaries
- Roads
  - US Route
  - PA Turnpike
  - Interstate

* Impaired due to nutrients and/or sediment
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)
BMPs are physical devices or changes in behavior that will control the volume, rate and/or quality of stormwater runoff.

- Water Conservation
- Stormwater Runoff Reductions
- Reduce Pollution
- Lawn Care
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
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
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
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
  o Eliminate water in basement
  o Reduces flooding

• Improved health

• Improve water quality

• Provide wildlife habitat

• Save $
  o Less chemicals
  o 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

Best Management Practices
- Rain Garden
- Native Meadow
- Riparian Buffer
- Pervious Pavers
- Tree Planting
- Rain Barrel

The Homeowner's Guide to Stormwater
How to develop and implement a stormwater management plan for 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.