

Pollution Prevention

**Ways for Businesses to Reduce their
Stormwater Pollution**

Presentation

- **Background**
 - PEC
 - Water Cycle
 - Watersheds
- **Current Issues**
 - Development impacts
 - Stormwater Issues
 - Pollutants
- **Solutions**
 - Identifying Pollutants
 - Housekeeping and Cleanup
 - Property Improvements
- **Green Stormwater Infrastructure**
 - Examples
 - Benefits
- **Other Guides and Resources**

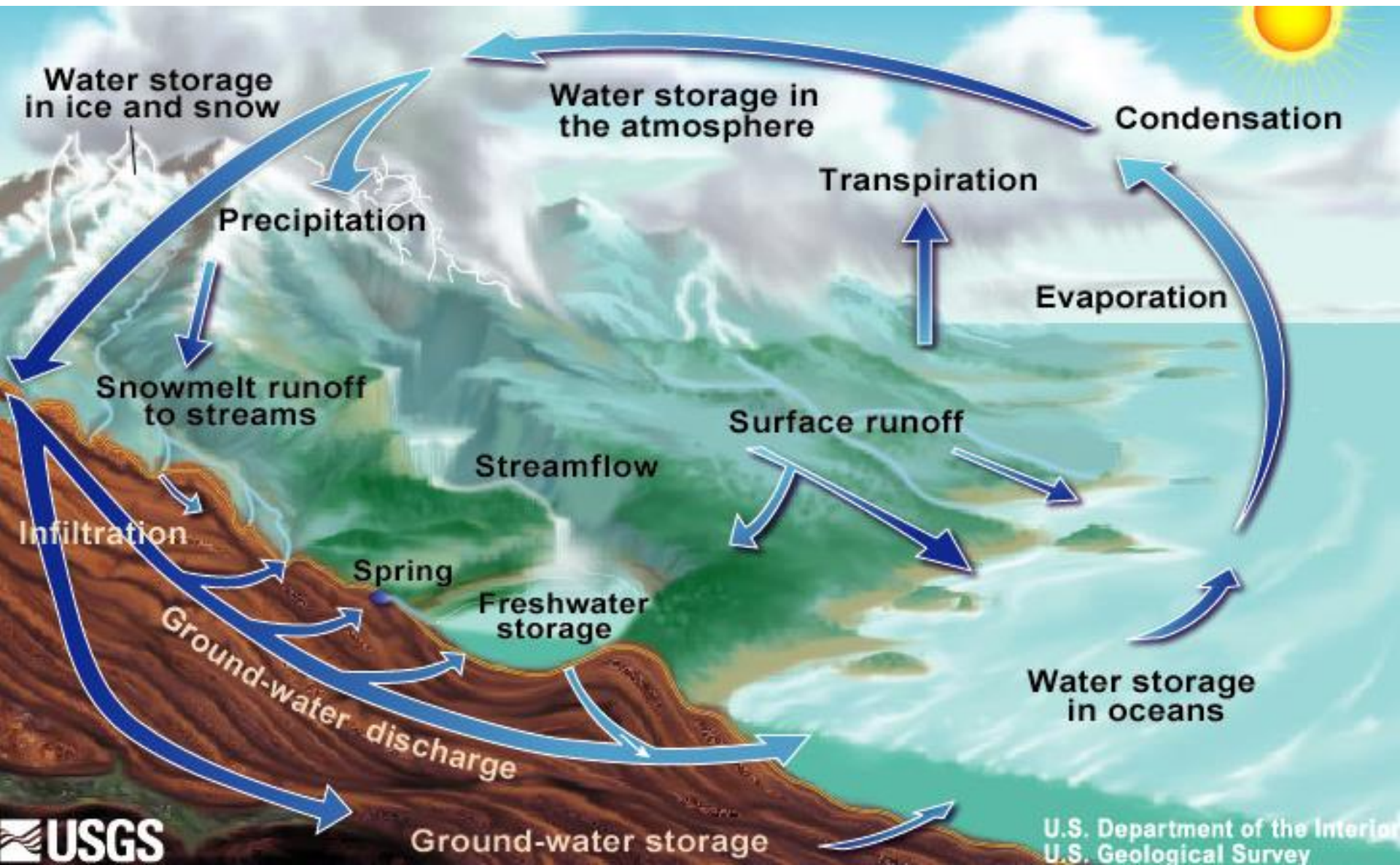
Pennsylvania Environmental Council

The Pennsylvania Environmental Council (PEC) protects and restores the natural and built environments through innovation, collaboration, education and advocacy.

PEC believes in the value of partnerships with the private sector, government, communities and individuals to improve the quality of life for all Pennsylvanians.



The Water Cycle



Natural vs. Urban Watersheds

Natural



Rain soaks into the ground
Trees soak up rainwater

Urban

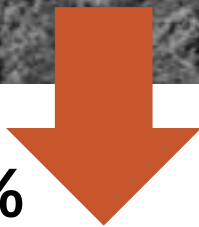


Rain hits rooftops, streets & parking lots, can't soak in, and runs off
Runoff goes into the sewers

Development Impacts



10% Runoff



**50%
Infiltration**



55% Runoff



**15%
Infiltration**

Development Impacts



**Estimated Groundwater Lost to Runoff
1982-1997**

Atlanta: 56.9 to 132.8 billion gallons

Boston: 43.9 to 102.5 billion gallons

Seattle: 10.5 to 24.6 billion gallons

Development Impacts



Decreased Quality

Nutrients

Sediment

Pathogens

Organic Materials

Toxic Contaminants

Deicing Constituents

Debris

Thermal Stress

Stormwater Issues



Stormwater Issues



Green Stormwater Infrastructure

Systems that mimic natural processes in order to infiltrate, evaporate, and/or reuse stormwater.



Property Improvements



Infrastructure improvements can reduce the amount of runoff from your property, decreasing the pollutants entering the system.

Property Improvements



Porous Pavement

Property Improvements



Green Roofs

Property Improvements



Rain Gardens

Property Improvements



Tree Trenches

Property Improvements



Downspout Planters

Property Improvements



Bioswales

MAY 16 2001

Property Improvements

How Bioswales Work



Benefits of Green Infrastructure

- Increased rents and property values
- Increased retail sales
- Energy savings
- Stormwater fee credits and other financial incentives
- Reduced infrastructure costs
- Reduce costs associated with flooding
- Reduced water bills
- Reduced crime
- Increased mental health and worker productivity for office employees

Benefits of Green Infrastructure



- Landscaping adds approximately **7%** to the average rental rate for office buildings
- Consumers are willing to spend **8-10%** more, visit more, or travel farther to shop where there is attractive landscaping or green streets

Benefits of Green Infrastructure



- For a medium-sized office building rental in Philadelphia this could mean an additional **\$72, 150** in rental income per year
- For a mid-sized retail center this could mean over **\$1 million** in increased annual sales

Benefits of Green Infrastructure



- Landscaping and trees increase residential property values **2-5%**
- Green roofs may add **16%** to the average multifamily unit rental rate

Pollution



Make it Your Business

- ① What are the Pollutants?
- ② What Causes Pollution?
- ③ How to Prevent Pollution

Common Pollutants



Effects of Pollutants

**Excess Nutrients Leading
to Algae Blooms**



**Excess Sediment Impairs
Fishes Habitats**



Effects of Pollutants



**Heavy Metals can Pollute
Food Sources**

Effects of Pollutants



**Pollution of Downstream
Drinking Water**

Business Activities Causing Pollution

	Bacteria	Heavy Metals	Excess Nutrients	Oil & Grease	Erosion & Debris	Toxic Chemicals
Engine Maintenance	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Food Service & Production	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Gas Stations	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Washing Equipment	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Waste Handling	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Landscaping	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Paved Areas	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Pollution Cause



Pollution Prevention



Trash Disposal

- Keep dumpsters in good condition with lids closed
- Make sure all containers are leak-proof
- Keep dumpsters away from roof gutter downspouts to prevent rusting of container and leaking

Pollution Cause



Cleaning

Pollution Prevention

Avoid hosing down dirty paved areas



Dry Cleanup Methods

- Sweep or Vacuum
- Keep outdoor areas litter-free
- Use absorbent products to clean up chemical or oil spills
- In large areas use a street sweeper or professional cleaning machine service. Contractors are required to dispose of wastewater at approved facilities
- When necessary, seek non-toxic, eco-friendly alternatives to cleaning chemicals

Causes of Pollution



Pollution Prevention



Engine Maintenance

- Fueling and engine maintenance should be done:
 - under cover
 - on a hard surface that can be easily cleaned
- Dispose of Oil and Grease Properly

Causes of Pollution



Supply Storage



Pollution Prevention



Supply Storage

- Cover all outdoor storage containers with leak-proof lids
- Use heavy-duty well-anchored plastic tarps
- Put in back-up protection to catch leaks from storage containers
- Do not place storage containers in the direct flow of rainwater

Causes of Pollution



Toxic Materials



Pollution Prevention



Toxic Materials

- Dispose of all toxic materials properly including:
- Do NOT put toxic materials down storm drains
- Purchase necessary chemicals in limited quantities so that storage for long periods is not needed
- Recycle Products whenever possible visit www.earth911.com to find out what you can recycle

Pollution Prevention



Label
Stormwater
Drains

Pollution Prevention

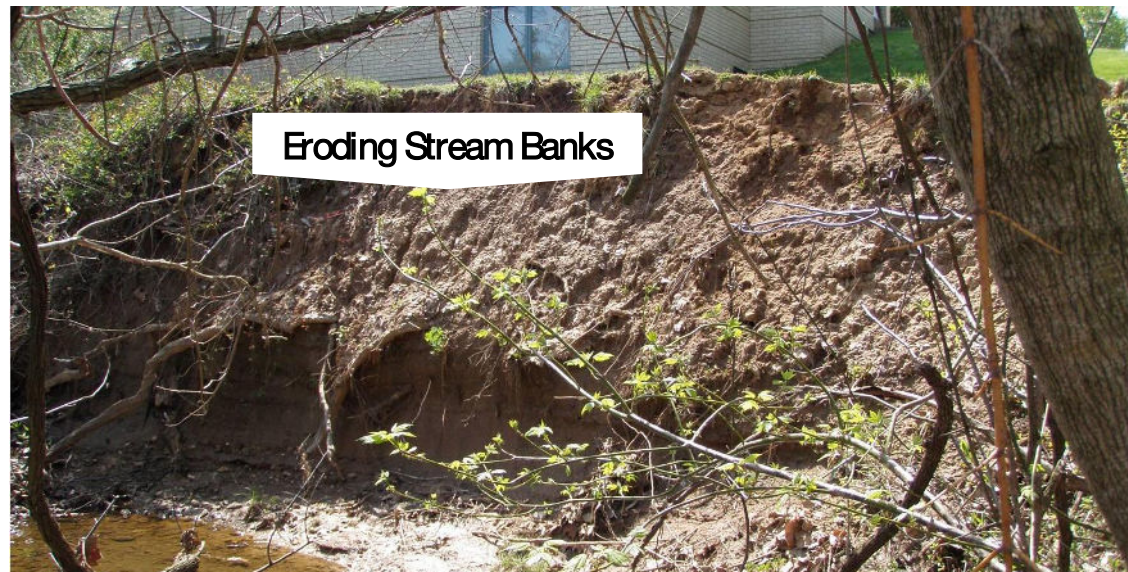
Train Employees on Pollution Prevention and Spill Procedures



Pollution Prevention



Look for
Signs of
Pollution &
Identify
Causes



Pollution Prevention



**Check
Stormwater
Drains,
Downspouts
and Gutters**



**Clear Any
Debris**

Other Resources

GREEN GUIDE for PROPERTY MANAGEMENT

A guide to help large property owners
identify innovative green projects
to reduce stormwater pollution.



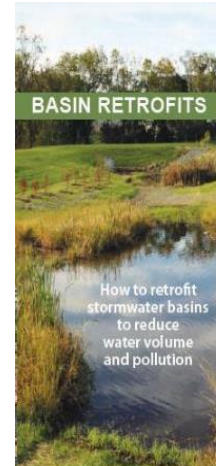
CLEAN WATER PARTNERS

Make it your business to reduce
water pollution and flooding.



BASIN RETROFITS

How to retrofit
stormwater basins
to reduce
water volume
and pollution



How to Create a Meadow in Southeastern Pennsylvania the Basics

