



# Stormwater Management Workshop

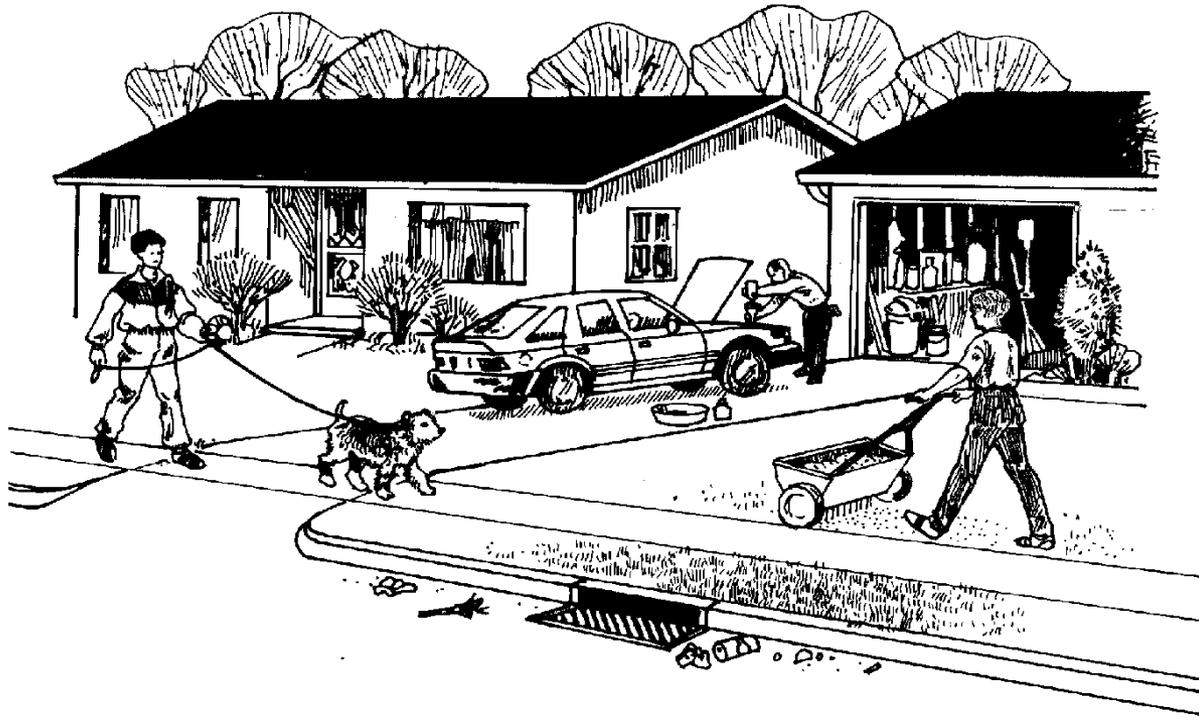
**July 25, 2016**

**Coastal Waccamaw**  
Stormwater Education Consortium



# How to reduce pollution at home or at work

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Recycle or properly dispose of chemicals

Maintain septic systems

Properly dispose of pet wastes

Don't pour detergents & oils from cars down storm drains

# Online Resources



## ▶ Clemson University

[Home-A-Syst](#)

[Coast-A-Syst](#)

[Creek-A-Syst](#)

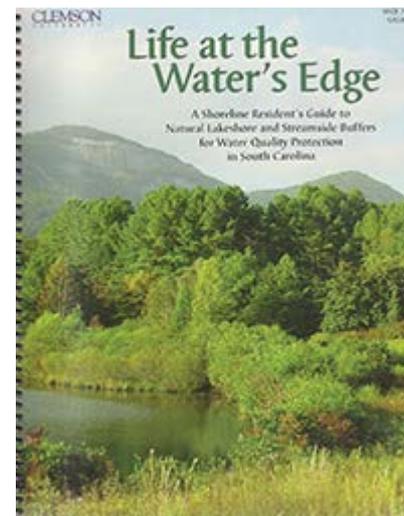
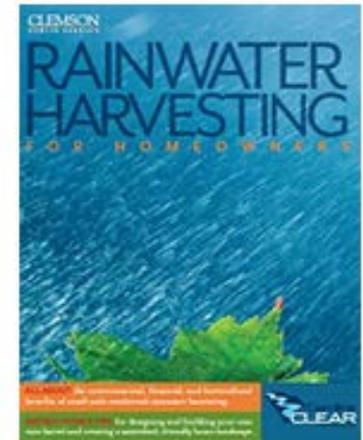
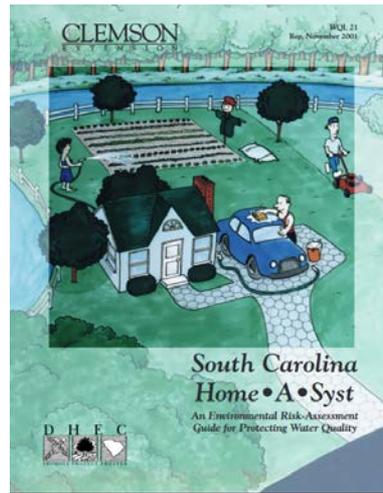
[Farm-A-Syst](#)

[Rain Gardens](#)

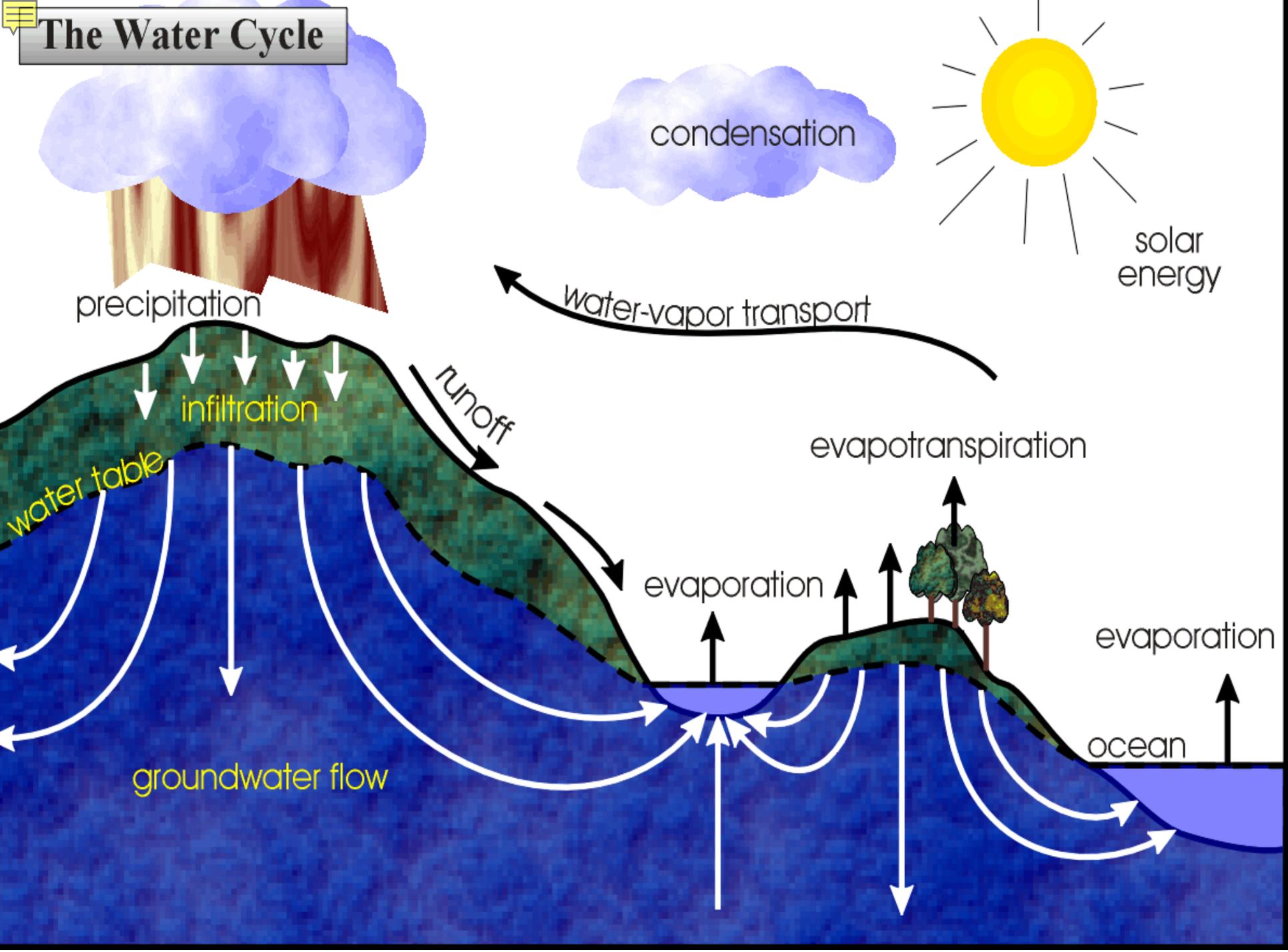
[Rain Water Harvesting](#)

[Stormwater Pond Management](#)

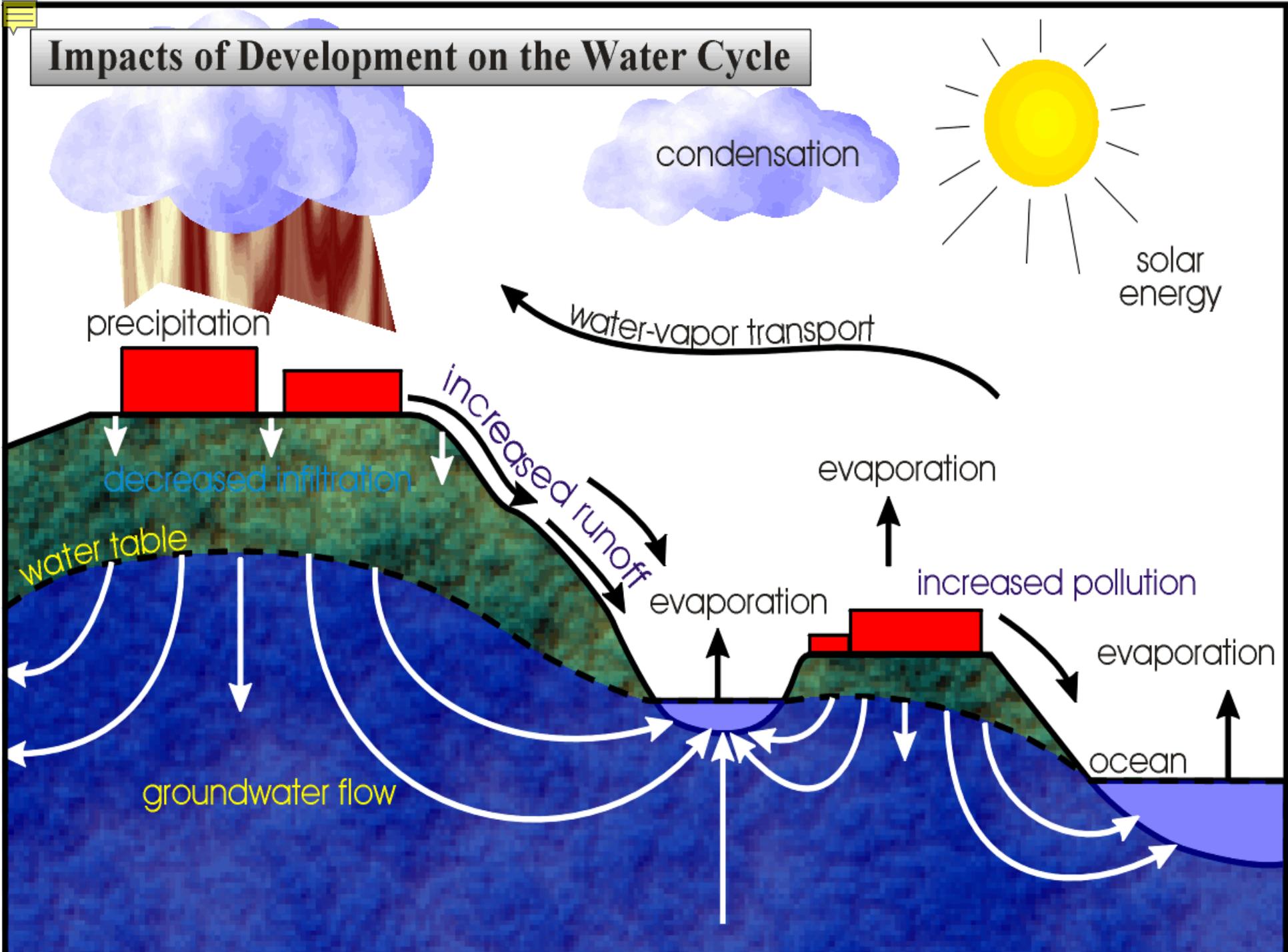
## ▶ [Life at the Water's Edge](#)



# The Water Cycle



# Impacts of Development on the Water Cycle



# Impervious Surfaces



Materials like cement, asphalt, roofing, and compacted soil that prevent percolation of runoff into the ground.



Intensity of Land Use (> 10% IC)  
Amount of Impervious Surface  
Likelihood of Water Quality Problems

# Components of Impervious Cover in the Urban Landscape



# Point Source Pollution



Industrial/Commercial - each  
has its own discharge permit

# Nonpoint Source Pollution



Where does this go?

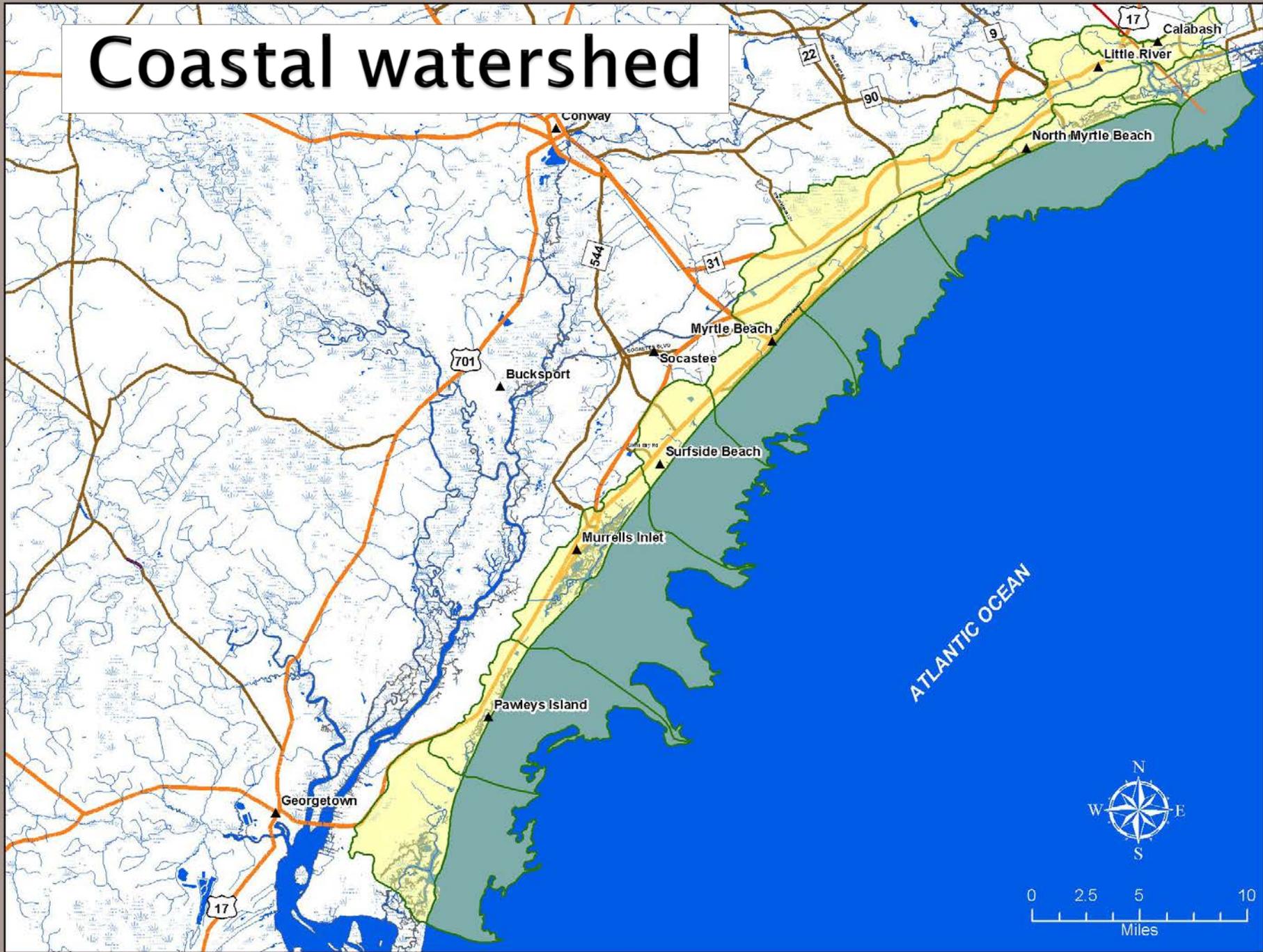
# Stormwater Pipes



Pipe Inflow at HCP2025



# Coastal watershed



END OF THE LINE





# HOW CAN COMMUNITIES PROTECT THEIR WATERSHEDS?



8. Watershed Stewardship



1. Watershed Planning



2. Land Conservation



7. Non-Stormwater Discharges

## The 8 Tools of Watershed Protection



3. Aquatic Buffers



6. Stormwater Management



5. Erosion & Sediment Control



4. Better Site Design



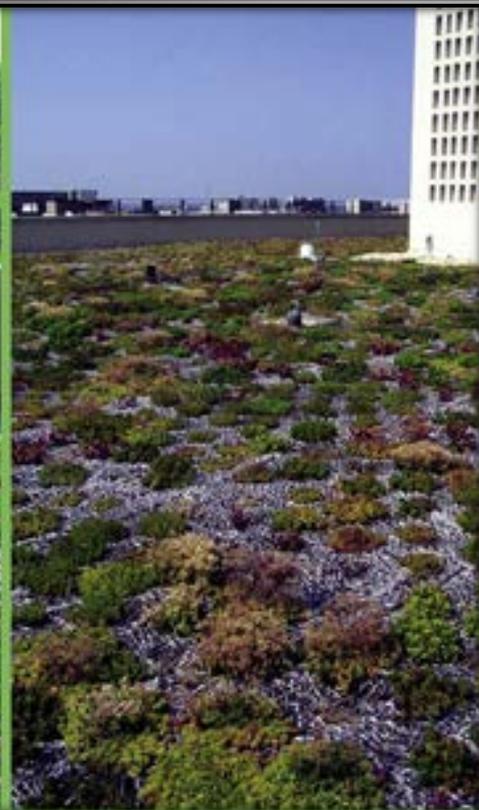
# Better Site Design aka Green Infrastructure



SEA Program, City of Seattle

# Stormwater Planter





# Green Roof

Vegetation

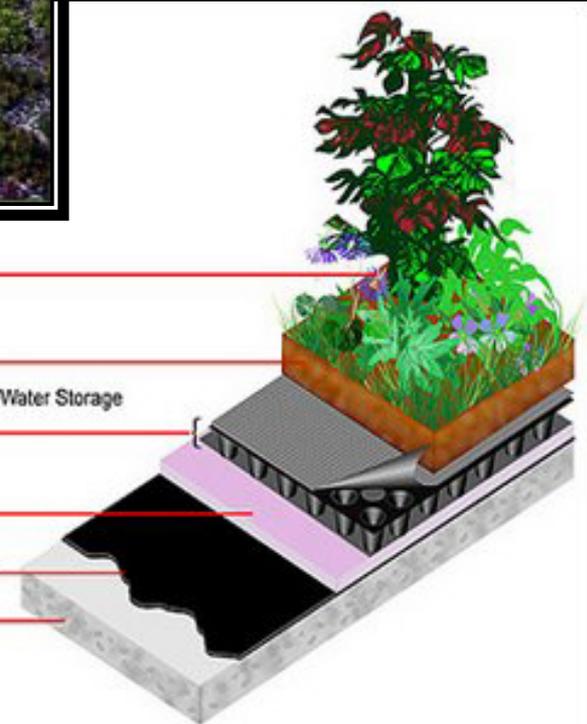
Growing Medium

Drainage, Aeration, Water Storage  
and Root Barrier

Insulation

Roofing Membrane

Structural Support



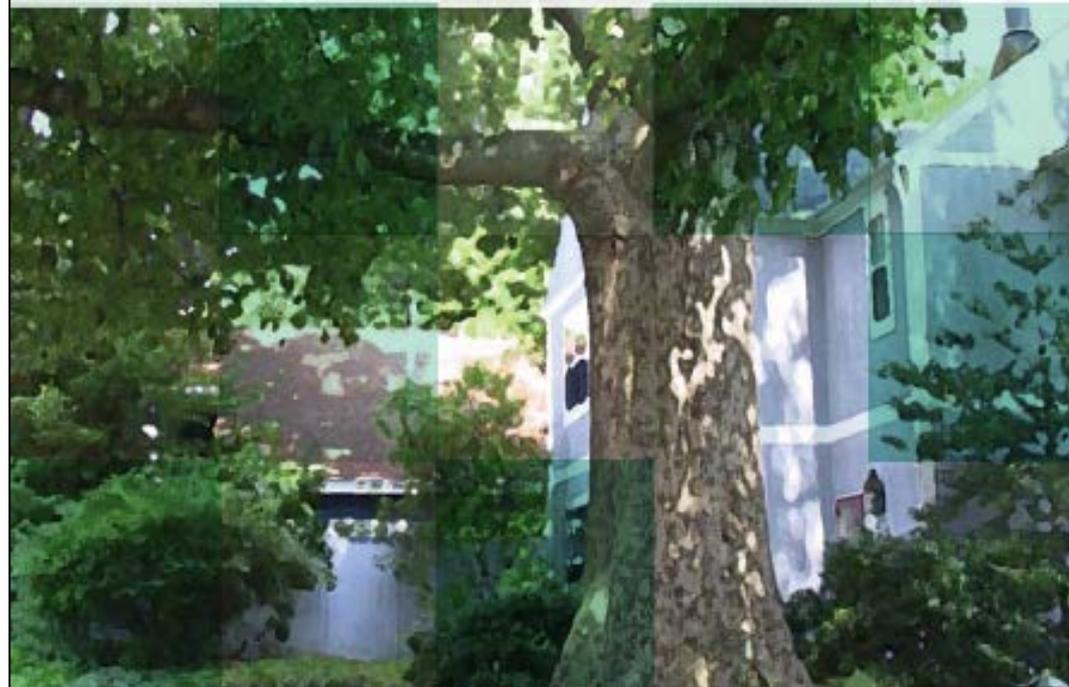


# TREES

- ▶ Air Quality
- ▶ Sun Shading
- ▶ Wildlife Habitat
- ▶ Stormwater
  - Filter contaminants
  - Prevent soil erosion
  - Remove water

## Urban Watershed Forestry Manual

Part 1: Methods for  
Increasing Forest Cover in a Watershed



United States Department of Agriculture  
Forest Service  
Northeastern Area  
State and Private Forestry  
NA-TP-04-05  
July 2005

# Stream Corridor Restoration



Inaugural EPA  
Region 4 Rain  
Catcher Award  
August 2014

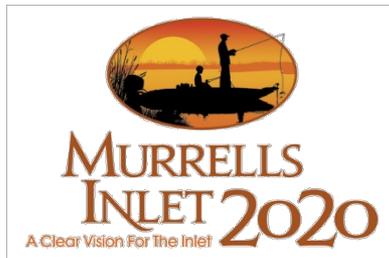


Crabtree Canal

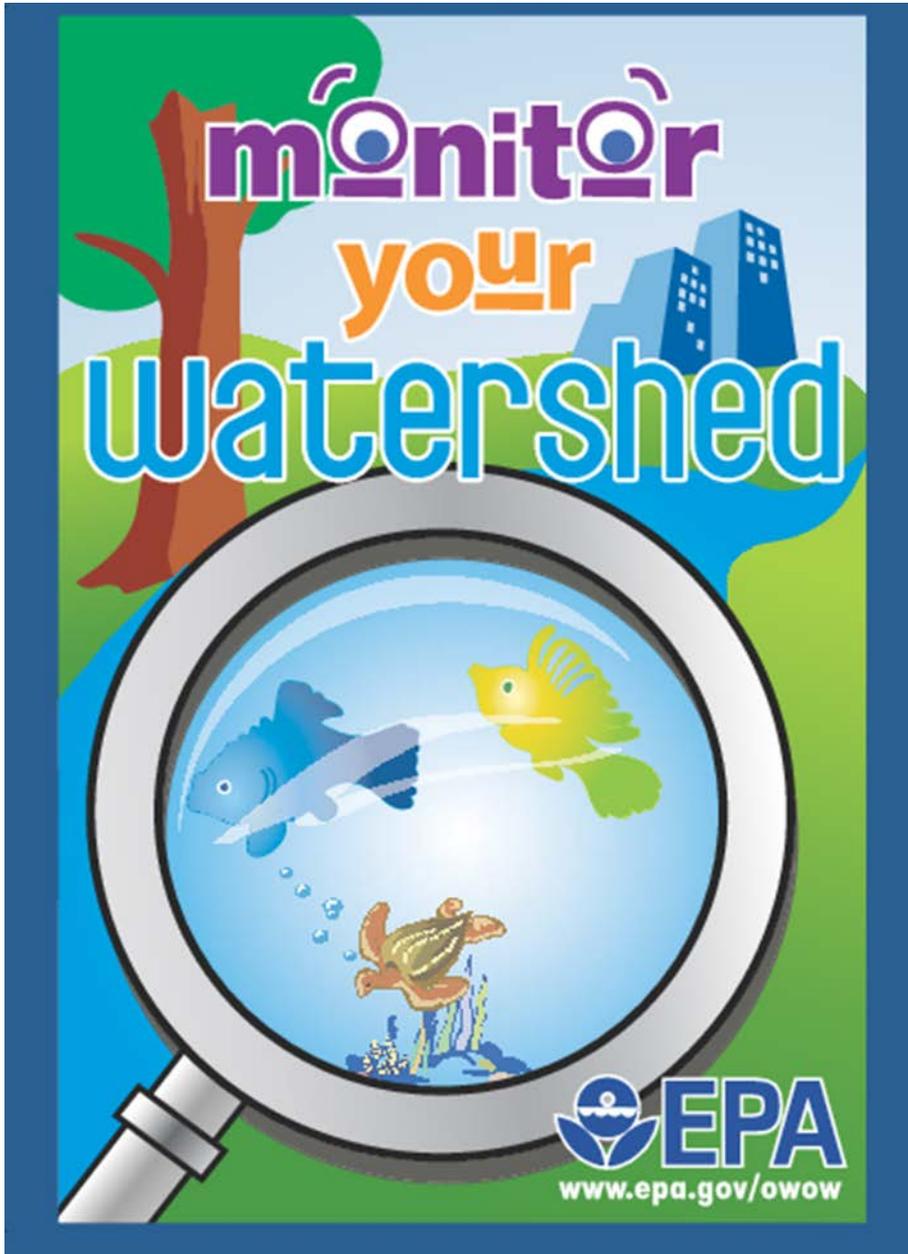
# Stormwater Education

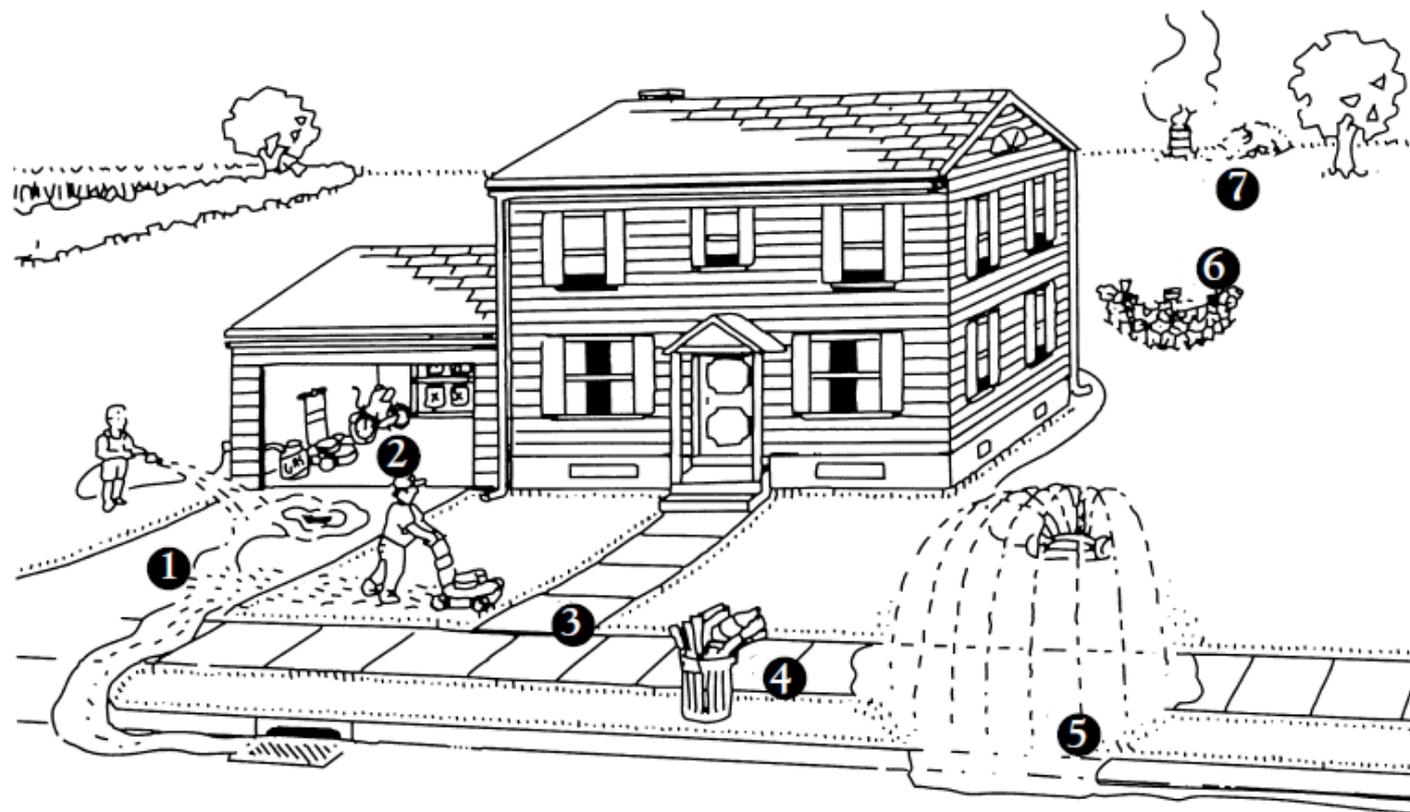
**WACCAMAW**  
WATERSHED  
ACADEMY

**Coastal Waccamaw**  
Stormwater Education Consortium



# Public Involvement





**1** Washing spilled motor oil and grass clippings into storm drains

**2** Storing gasoline and other hazardous chemicals near children's toys

**3** Paving walkways instead of using porous material so that runoff increases

**4** Not separating garbage for recycling

**5** Improperly adjusting sprinklers so that water is wasted

**6** Planting flowers that may require fertilizers and pesticides around the well cap

**7** Burning garbage, which adds toxins to air that eventually settle on the ground

# Common Stormwater Pollutants

<b>Pollutant</b>	<b>Common sources</b>
Silt, sand and clay particles and other debris	Construction sites; bare spots in lawns and gardens; wastewater from washing cars and trucks on driveways or parking lots; unprotected streambanks
Nutrients	Overused or spilled fertilizers; pet waste; grass clippings and leaves left on streets and sidewalks; leaves burned in ditches
Disease organisms	Animal waste and garbage
Hydrocarbons	Car and truck exhaust; leaks and spills of oil and gas; burning leaves and garbage
Pesticides	Pesticides over-applied or applied before a rainstorm; spills and leaks
Metals	Cars and trucks (brake and tire wear, exhaust); galvanized metal gutters and downspouts

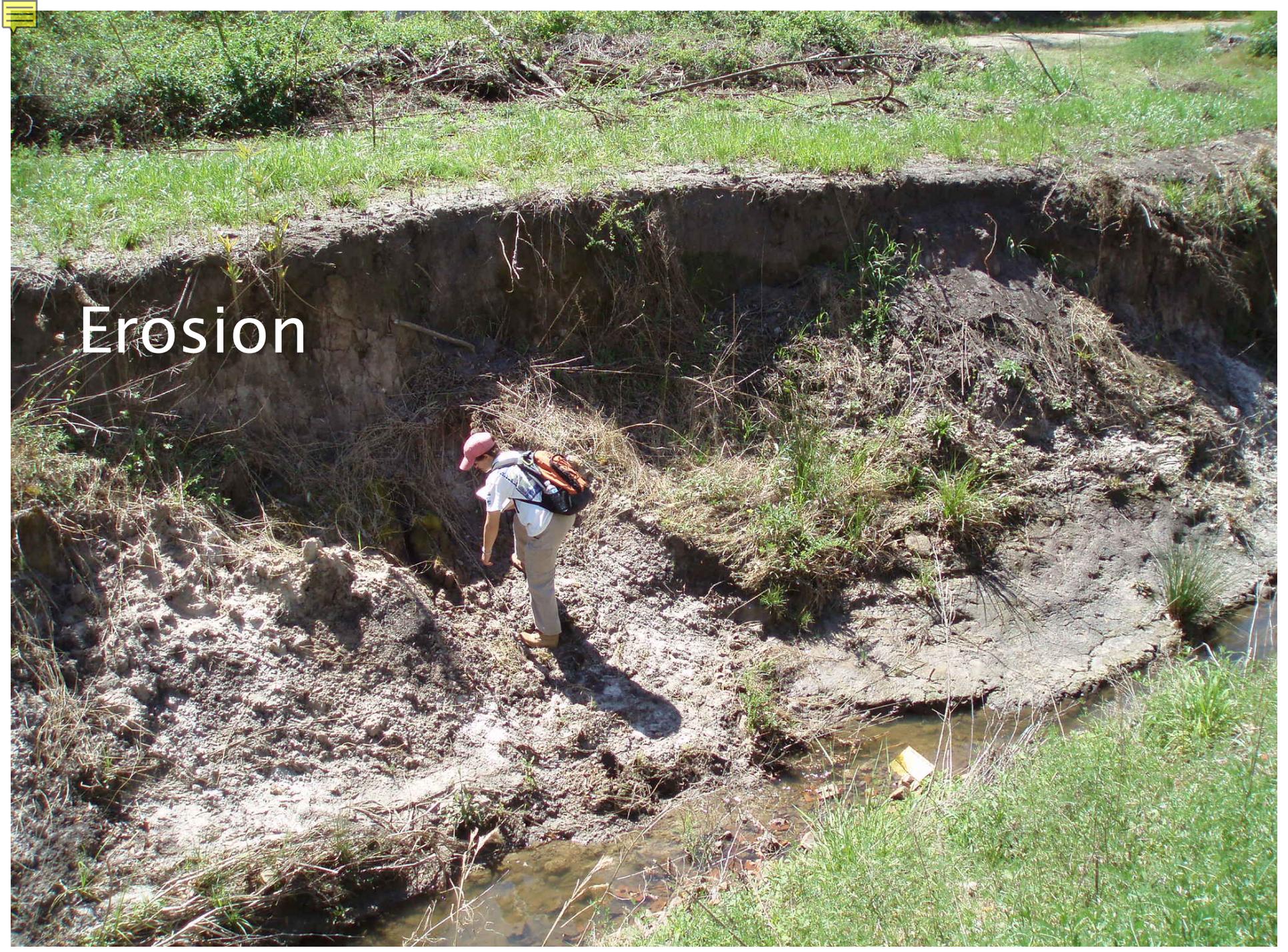


Sediment



Turbidity

# Erosion



# Reducing Pollutants in Runoff

- ▶ Are any car or truck wastes being carried away by stormwater?
- ▶ Are household products stored outside the reach of stormwater?
- ▶ Do you use and handle chemicals safely?
- ▶ How can you keep animal wastes from becoming a pollution problem?
- ▶ Are yard and garden wastes kept out of stormwater?

**Assessment 2.1**

# Landscaping and Site Management to Control Runoff

- ▶ **Are there areas of bare soil around your home?**
  - Planting grass or other ground covers is the best way to stop erosion.
- ▶ **Can you eliminate paved surfaces or install alternatives?**
  - Consider alternative gravel or wood chips for walkways. Avoid paving areas such as patios. Instead consider using a “porous pavement” made from bricks, interlocking cement blocks or rubber mats.
- ▶ **Does roof water flow onto pavement or grass?**
  - For roofs without gutters, plant grass, spread mulch, or use gravel under the drip line. Consider using cisterns or rain barrels.
- ▶ **Can you change the layout of your landscape to reduce runoff?**
  - Landscape low areas with shrubs and flowers to encourage water to soak into the ground.

**Assessment 2.2**

# Stormwater Treatment Practices



Buffers



Pervious Pavement



Bioretention



Rain Gardens

# Managing Household Waste Products

- ▶ Follow label directions.
- ▶ Avoid the following practices:
  - Dumping oils, paints, pesticides or any other household chemicals on the ground, on roads or down storm sewers
  - Dumping products in a wetland, stream or any other body of water
  - Washing chemicals off the driveway with a hose
  - Spraying pesticides on a windy day
  - Burning containers in a barrel or outdoor fire
- ▶ Use up or share leftovers.
- ▶ Horry County SWA has a hazardous waste collection program at the county landfill on Hwy 90 on the 3rd Saturday of each month from 8AM–3PM or Monday–Friday by appt.
- ▶ Use a less hazardous alternative, buy only what you need and store safely.

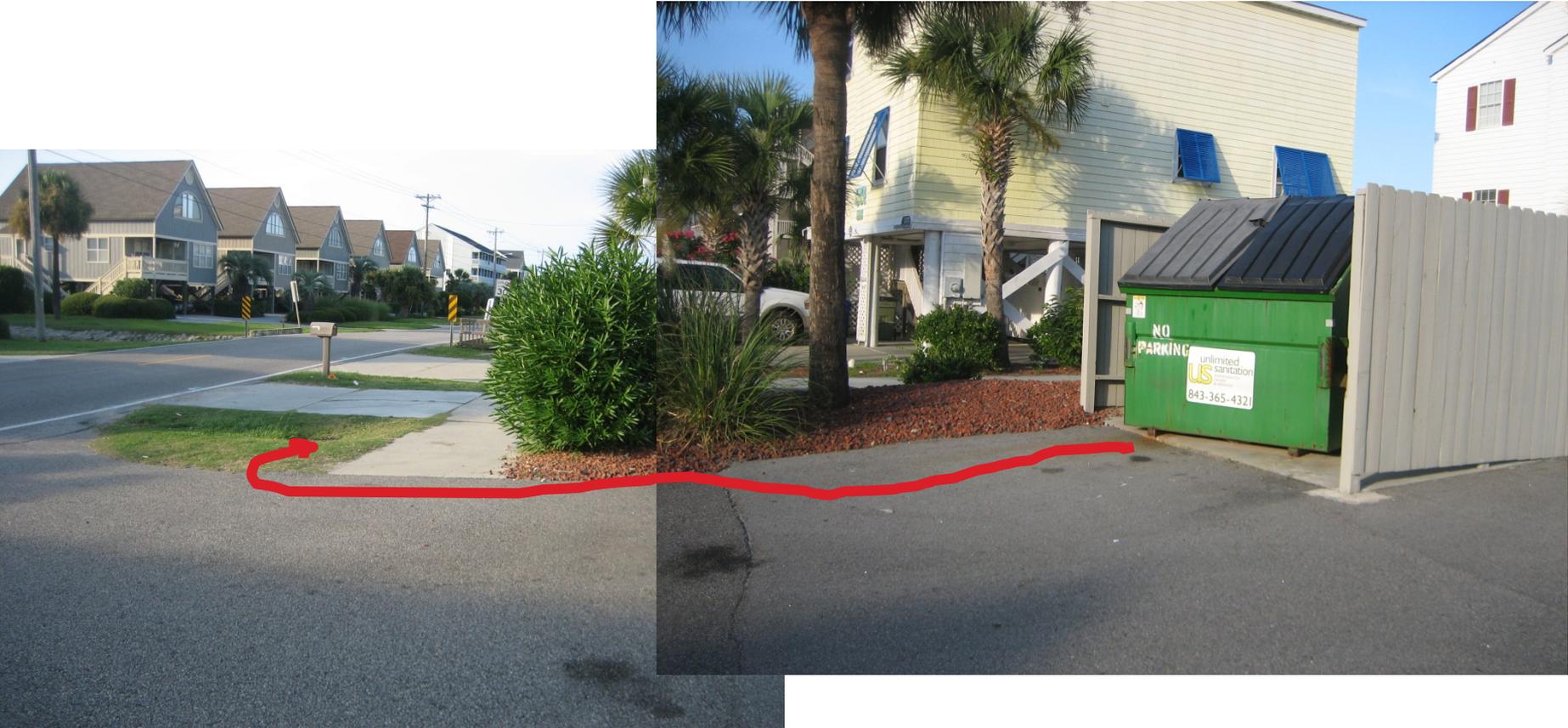
**Assessments 3.1, 3.2, 3.3**

# Yard and Garden Care

- ▶ Apply the proper amount of fertilizer according to the results of a soil test.
- ▶ Apply pesticides wisely.
- ▶ Practice integrated pest management (IPM).
- ▶ Water wisely
- ▶ Grow drought-tolerant plants.
- ▶ Cut your grass to the proper height.
- ▶ Recycle your grass clippings for a healthier lawn and environment.
- ▶ Use a human-powered mower for small lawns.
- ▶ Aerate your lawn regularly.
- ▶ Make compost

**Assessments 6.1 & 6.2**

# Close the lid



*We all live downstream ...*



**IF YOU THINK  
PICKING UP  
DOG POOP IS  
UNPLEASANT,  
TRY DRINKING IT.**

Pet waste washes into storm drains,  
polluting our rivers, lakes and drinking  
water sources. Get the scoop.

[www.Earth911.org](http://www.Earth911.org) | 1-877-EARTH911

