Why should you own a Rain barrel?
Rain Barrels
Stormwater Runoff 101
Non Point Source Pollution
March 31, 2010

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www.clemson.edu/carolinaclear
Sponsors

City of West Columbia
Pepsi Cola
W. P. Law
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# Rain Barrel Planning Committee and Team

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Mary Nevins - RCSC
**** Special Thanks ****

Lexington County Public Works and the Lexington County Extension Staff
Why install a Rain Barrel?

• Saves you $$ by lowering your water bills

• Reduces demand on the water supply

• Makes efficient use of a “free” valuable resource

• Reduces flooding, erosion, and stormwater flows and pollution
Rain Barrels in Action
EPA estimates that the #1 source (80 percent) of surface water pollution is caused by stormwater runoff and has caused pollution of nearly 40% of US waterbodies.
How Storm Water Came to be Regulated

In the 70’s - water pollution control began by regulation of point sources – for example, factories. To control point sources – EPA developed permits for factories.

However...

Most localities have also been facing problems with polluted runoff, especially runoff polluted with sediment; therefore...

A storm water permit was created for larger urban areas in 1990 – Phase I.

Nonpoint source

In 2003, storm water requirements kicked in for medium sized urban areas – Phase II.
New EPA / DHEC Rules and Regulations:  
The Stormwater Phase II Mandate

The Environmental Protection Agency has issued the NPDES (National Pollutant Discharge Elimination System) Phase II Stormwater Mandate as an extension to the Clean Water Act to be met by March 2003. (Started March 1, 2006)

This mandate is applicable to MS4’s (Small Municipal Separate Storm Water Systems) (county and city municipalities) in South Carolina and requires them to meet six minimum control measures
Eight MS4’s in Lexington County

Cayce
West Columbia
South Congaree
Pine Ridge

Springdale
Irmo
Town of Lexington
Lexington County
EPA / DHEC Phase II

Minimum Control Measures

1. Public Education and Outreach
2. Public Participation and Involvement
3. Illicit Discharge Detection and Elimination
4. Construction-Site Runoff Controls
5. Post Construction Runoff Controls
6. Pollution Prevention and Good Housekeeping
Stormwater is pollution caused by water washing over the land picking up contaminants and directly or indirectly depositing them in our waterways.
Natural Conditions

Typical Annual Water Budget

Forested Land Cover

- Interflow: 25.7%
- Groundwater: 36.6%
- Evaporation-Transpiration: 37.4%
- Surface Runoff: 0.3%

Courtesy May, U of W
Developed Conditions

Typical Annual Water Budget

- 25% Evaporation-Transpiration
- 30% Interflow
- 30% Surface Runoff
- 15% Groundwater

Urbanized Land Cover

Courtesy May, U of W
Development Impacts On the Water Cycle

- Forest: 10%
- Rain: 50%
- Urban: 55%
- Runoff: 15%
Watershed Health & Imperviousness

Adapted from Holland et al., 2004
A Watershed is an area of land that drains to a single outlet.
STUDY AREA WATERSHED

Cities/Towns

Rivers

Lakes

Saluda Watershed

Counties
Where does stormwater go?

• Stormwater washes down storm drains on the curbs of roads and leads directly into lakes, rivers, and streams untreated
• It **DOES NOT** go to a water treatment plant
• It can carry pollution directly into natural water resources
What to Look For:

**Polluted runoff from Residential areas**

**Nutrients:** lawn fertilizers & septic system effluent

**Pathogens:** malfunctioning septic systems, pet waste, wildlife

**Sediment:** construction, road sand, erosion from lawns & gardens

**Toxic:** household products, pesticides

**Debris:** litter & illegal dumping

**Thermal:** heated runoff, removal of natural vegetative buffers
WATER that runs off roads and lawns **DOES NOT** get treated. It goes straight to our waterways and beaches.

**REMEMBER, ONLY RAIN DOWN THE STORM DRAIN!**
What to Look For:

Polluted runoff from Commercial & Industrial areas

**Nutrients:** acid rain and car exhaust

**Pathogens:** malfunctioning or overloaded septic systems & lagoons

**Sediment:** construction, road sand, roadside erosion

**Toxic:** auto emissions, industrial pollutants

**Debris:** litter & illegal dumping

**Thermal:** heated runoff, removal of natural vegetative buffers
The Environmental Protection Agency has determined that stormwater runoff (Non Point Source) is the **SINGLE LARGEST CAUSE** of pollution in the United States.

That’s Right….

This is pollution not caused by big industry or chemical companies or paper mills (Point Source) or city and county municipalities but by the “little by little” actions of individual people in the community.
So….

What Really Pollutes Our Waterways?

• Oil leaks from vehicles
• Drips of spilled gasoline
• Plant and lawn fertilizers
• Lawn and garden pesticides
• Pet waste
• Soaps and detergents from washing cars
• Oil dumped in ditches or drains by do-it-yourselfers
• Cigarette butts, litter and debris
• And……Mr. Number 1 ?
And you thought that you had a BAD day!
What About Sidewalks?

Problems ...
- Can be “heat islands”
- Can collect, concentrate, and convey stormwater

Solutions ...
- Only as wide as necessary
- Strategically located
- Pavement alternatives
- Non-black paving materials
WATER that runs off roads and lawns DOES NOT GET TREATED. It goes straight to our streams and lakes.

REMEMBER, ONLY RAIN DOWN THE STORM DRAIN!

TAKE CARE! Drains to a stream or lake near you!
What About Rooftops?

Problems ...

- Significant contributor to total imperviousness of a site
- Shingles become “heat islands”

Solutions ...

- Define “lot coverage” as all impervious surfaces
- Non-black materials
- Route guttered water through Rain Barrels & vegetated buffers
- Green roof technology
WHEN YOU’RE FERTILIZING THE LAWN,

REMEMBER YOU’RE NOT JUST

FERTILIZING THE LAWN.

Nitrates

Soil Test &
Apply Correctly

You fertilize the lawn. Then it rains. The rain washes the fertilizer along the curb, into the storm drain, and directly into our lakes, streams and Puget Sound. This causes algae to grow, which uses up oxygen that fish need to survive. So if you fertilize, please follow directions and use sparingly.

A cooperative venture between the Puget Sound Action Team, Department of Ecology, King County and the cities of Bellevue, Seattle and Tacoma.
When you’re washing your car in the driveway, remember you’re not just washing your car in the driveway.

All the soap, scum, and oily grit runs along the curb. Then into the storm drain and directly into our lakes, streams and Puget Sound. And that causes pollution, which is unhealthy for fish. So how do you avoid this whole mess? Easy. Wash your car on grass or gravel instead of the street. Or better yet, take it to a car wash where the water gets treated and recycled.

A cooperative venture between the Puget Sound Action Team, Department of Ecology, King County and the cities of Bellevue, Seattle and Tacoma.
One quart of motor oil can contaminate 250,000 gallons of drinking water

Oil & Hydrocarbons

Do-it-yourselfers spill or dump more oil in one month than any other major tanker disaster
You should not swim or eat fish in 40% of the nation’s waterways.

Ecoli

IF YOU THINK PICKING UP DOG POOP IS UNPLEASANT, TRY SWIMMING IN IT.

Pet Waste Pollutes Our Rivers, Lakes & Streams

WWW.CLEANWATERCAMPAIGN.COM
Debris includes plastics and other trash that threaten aquatic life and detract from recreational and aesthetic values.

Sources: illegal dumping, street litter, boating waste
Thermal stress is an elevation in water temperature that can harm native species while helping nonnative species to spread.

Sources: runoff from heat-absorbing impervious surfaces, removal of streamside vegetation, shallow water impoundments, decreased base flow.
Feel Overloaded?
What can we do?
Permiable concrete
Excess Runoff

> 1 inch of rain
Filtering Practices – Bioretention

Center for Watershed Protection (www.cwp.org)
Filtering Practices: Rain Gardens

- For any impervious surface (rooftop, parking lot, driveway)
- Allows collection of stormwater and infiltration
- Plants and microbes do the work of pollutant removal
- Can be attractor for wildlife (e.g. birds and butterflies)
- Appealing landscape feature
Rain Gardens
Get involved!

So, What can you do?

Get involved!
Rain Gardens

Rain gardens are landscaped depressions that receive stormwater runoff and allow the runoff to slowly infiltrate into the groundwater table. As well as intercepting stormwater runoff that could have added to potential flooding problems, the rain garden allows nature to play a role, removing some of the pollutants that would have otherwise affected downstream water quality. During infiltration, plants use excess nutrients for growth, sediment is trapped in the garden and biological and physical processes remove pathogens. Dissolved metals and nutrients bind or adsorb to soil particles and are removed temporarily out of the system. Rain gardens also create important habitat for bees, butterflies and birds.
Does your yard measure up?

Nine Major Principles

1- Right Plant, Right Place

2- Water Efficiently

3- Mulch

4- Recycle

5- Fertilize Appropriately

6- Control Yard Pests Responsibly

7- Reduce Stormwater Runoff

8- Attract Wildlife

9- Protect the Waterfront
Rain barrels
Get creative!

- Pressurize
- Accessorize
- Beautify
"Because We All Live Downstream"
The path to clean water begins in your backyard!

Working Together To Reduce Stormwater Pollution in Lexington County and South Carolina
Questions?

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www.clemson.edu/public/carolinaclear/lcsc
(OR JUST GOOGLE CAROLINA CLEAR)
That’s why you should own a rain barrel.