Turning the Tide

a citizen's guide to protecting our water resources from runoff pollution

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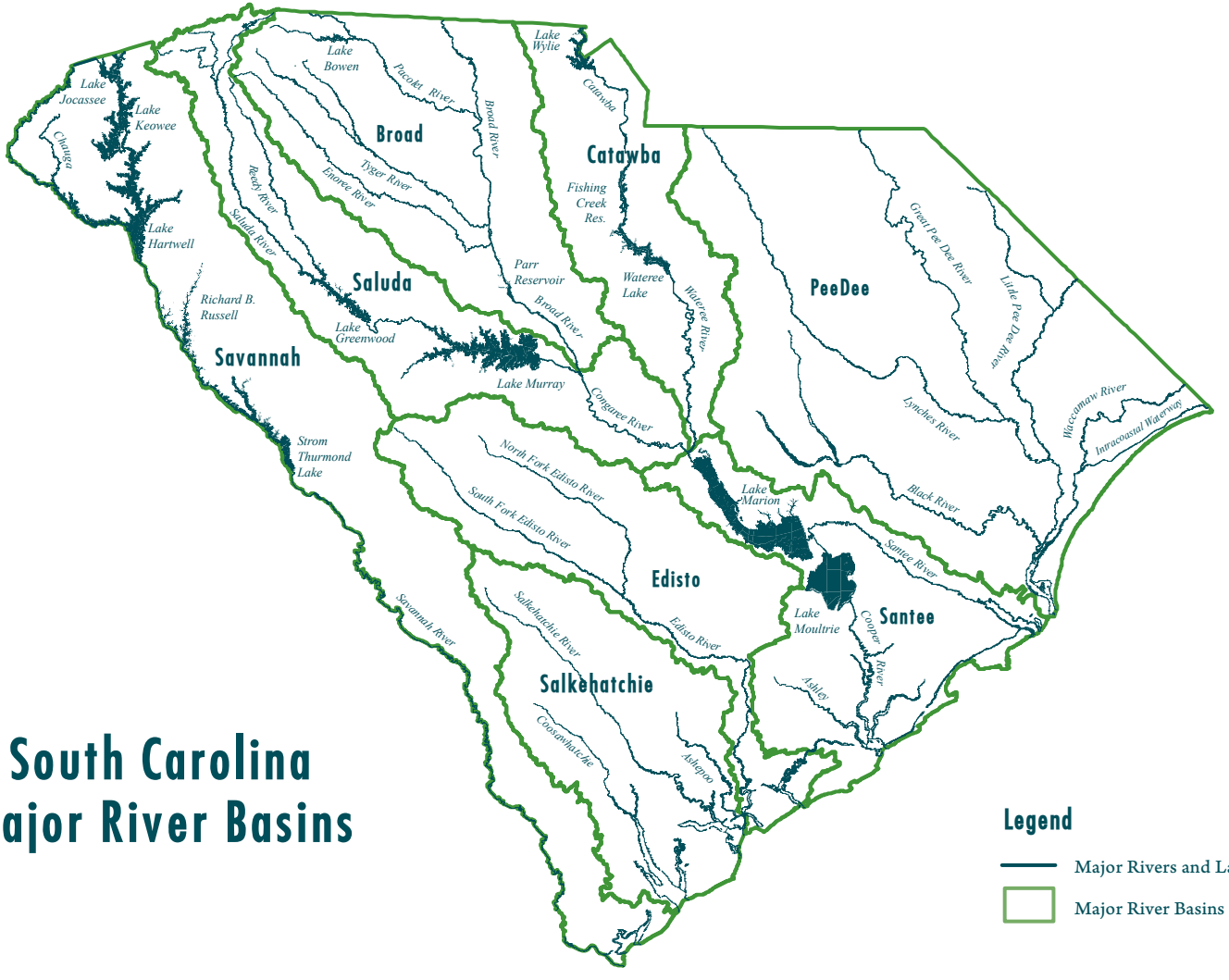


South Carolina Major River Basins

Legend

Major Rivers and Lakes

Major River Basins

Introduction

After the rain…

The next time it rains, imagine what happens when the water hits the ground and flows away. Water flowing across streets and parking lots picks up dirt, trash, oil, grease, bits of rubber tires, animal waste and other things left behind by motor vehicles, people and animals. Rain falling on construction sites, farmland, timberland and bare earth becomes muddy with *sediment*. When not managed properly, golf courses, agricultural fields, home gardens and lawns may add fertilizers and pesticides to *stormwater* runoff. Septic tanks in water-logged areas can contribute sewage to the runoff. And it all mixes together and flows away as *polluted runoff*.

Where does it go?

Directly into our streams, lakes, rivers, ocean, and coastal waters. Very little polluted runoff is treated before it reaches a waterway.

Besides affecting fish and other wildlife, this kind of pollution can also contaminate our drinking water supplies. Since *runoff pollution* comes from so many different sources, it is difficult to regulate. However, *point sources* such as outfalls from sewage treatment plants or industrial facilities have been regulated under state and federal laws since the early 1970s.

Who's responsible for runoff pollution?

Everyone, in one way or another, is likely to be part of the problem. Which means that everyone can also be part of the solution! This handbook is a guide to the major causes of the problem, and what individuals, families and community groups can do to turn the tide against runoff pollution. It's up to us!

DID YOU KNOW?
Runoff pollution is the #1 source of water pollution in South Carolina and the United States.

What's in Runoff Pollution?

- Bacteria
- Trash
- Heavy Metals
- Mercury
- Pesticides
- Fertilizers & *Nutrients*
- *Sediment*
- Motor Vehicle Fluids

Bacteria

Source: Raw sewage from failing septic systems, overflowing sewer lines, pet waste, farm animals and wildlife can all be sources of bacteria.

Effect: Stormwater contaminated from these sources can contain bacteria and viruses that may cause illnesses in people following swimming in contaminated lakes, rivers or the ocean. Illnesses may also occur after the consumption of raw or improperly cooked shellfish from these contaminated areas.

DID YOU KNOW?

Even if the bacteria present are not directly dangerous to humans, they can still cause shellfish beds to be closed to commercial and recreational oyster and clam harvesting. This is because when health officials test water quality, they usually don't try to identify every type of bacteria or virus that might be harmful. Instead, they look for bacteria that are always found in the intestines of mammals (known as Fecal Coliform bacteria). If these bacteria are found, they may indicate the presence of other harmful organisms. Therefore, the areas are closed to oyster and clam harvesting to protect human health.

DID YOU KNOW?

The South Carolina Department of Health and Environmental Control (DHEC) tests the rivers, lakes and streams all over the State. Sometimes these tests show high amounts of bacteria. DHEC puts up a swimming advisory sign where high amounts of bacteria have been found and people commonly swim. For more information, go to the swimming advisory website at www.scdhec.gov/swim

Trash

Source: Paper, plastic containers and wrappers, cans, cigarette butts, yard waste and other kinds of trash are often dumped into drainage ditches or alongside roadways.

Effect: When carried into our waterways by stormwater, this trash can use up oxygen, change *habitats* for aquatic life, and physically damage fish, birds and other animals. Even if trash is buried or burned, harmful chemicals can still be released from dumpsites or as air pollution.

Heavy Metals

Source: Motor vehicle wastes contain a variety of heavy metals such as cadmium, lead and copper, as well as harmful organic chemicals. Used batteries contain zinc, lead and mercury.

Effect: Heavy metals can be harmful to humans and aquatic life.

Pesticides

Source: Farmers, home gardeners and golf course operators often use various chemicals to control pests. Many households use weed killers, pet shampoos, flea collars and no-pest strips containing chemicals that can be harmful to other plants and animals besides the pests of concern.

Effect: These chemicals, if handled or stored incorrectly, can harm wildlife, plants, and pets.

Fertilizers and Nutrients

Source: All plants need *nutrients* to grow and reproduce. Three major nutrients are nitrogen, phosphorus and potassium, and stormwater can collect these nutrients from fertilizers, household chemicals, and pet waste.

Effect: Excess nutrients in streams, lakes and coastal waters can cause algae and aquatic weeds to grow to where they compete with fish and other aquatic life for space and oxygen. When the algae die, the large mass of decomposing algae can consume so much oxygen that aquatic life suffers.

DID YOU KNOW?

If an unsafe level of the nutrient nitrite gets into drinking water, it can cause serious health problems, particularly in newborn babies.

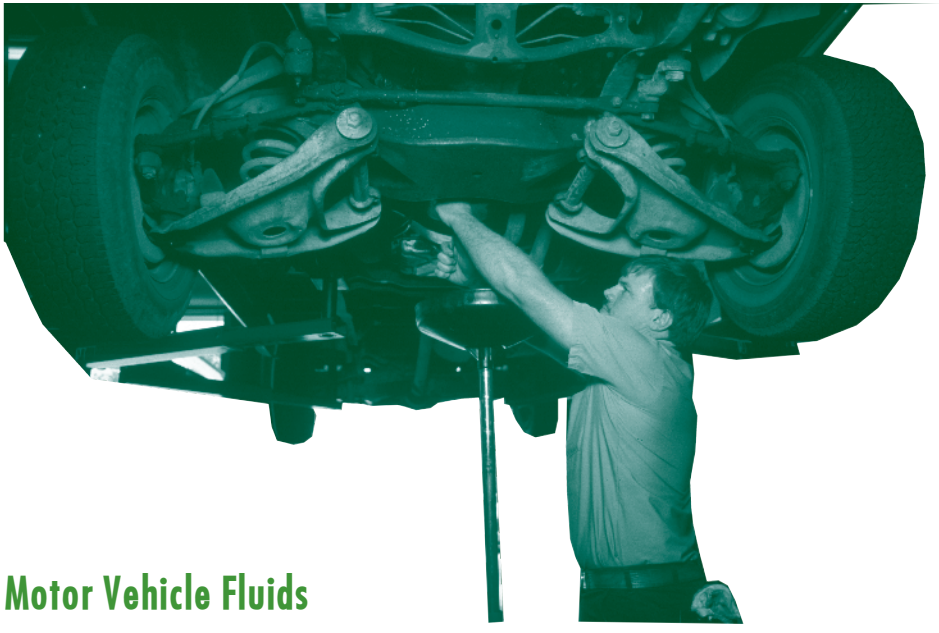
Sediment

Source: *Sediment* can come from improperly managed construction sites, eroding streambanks, or crop and forested lands.

Effect: Accumulated sediments can fill stream channels and increase flooding. Dirt suspended in runoff can increase death among fish eggs and larvae, erode the gills of mature fish, and completely destroy *habitats* used as spawning areas by many fish. Suspended sediment can interfere with light needed by aquatic plant life.

DID YOU KNOW?

Sediment can absorb contaminants like heavy metals, oils, and other substances. Contaminated sediments that settle on the bottom of our streams, lakes and coastal waters can pollute water and aquatic life for a long time.



Motor Vehicle Fluids

Source: Antifreeze, battery acid, brake fluid, gasoline, and motor oil readily accumulate on roads and parking areas, and are easily washed off by rainfall. Some people even get rid of these fluids by pouring them on the ground or down *storm drains.*

Effect: Motor vehicle fluids are poisonous to fish, shellfish and many other forms of aquatic life.

Runoff Pollution: Where Does It Come From? What Can We Do About It?

Lawns and Gardens

Well maintained lawns and gardens can be of real benefit to *water quality* and the local environment. They add beauty, control *erosion*, filter runoff from nearby hard surfaces, reduce dust and help moderate summer heat. But lawns and gardens are often the reason for too much water use and unnecessary application of fertilizers and pesticides.

What Can We Do?

- Reduce soil erosion by planting appropriate plant cover on bare patches of ground.
- Reduce water requirements of your landscaping by selecting plants suited to the local environment with minimal need for extra watering.
- Group plants with similar needs and match plants' water needs with the soil's moisture-holding ability.
- Use drip irrigation, soaker hoses and mulching to reduce water use.
- Limit the amount of lawn to what will actually be used for play and recreation.
- Consider low maintenance groundcovers, or shrubs and trees that slow rain runoff.
- Do not apply pesticides or fertilizer if rain is expected.
- Use only fertilizers that are really needed, based on soil tests and specific needs of your plants.

Lawns and Gardens continued

- Keep fertilizer off driveways and sidewalks where it can be washed into *storm drains.*
- Avoid using fertilizers within 75 feet of a wetland or waterway.
- Try *organic fertilizers* (such as fish emulsion, blood meal, organic mixes or home *compost*).
- Practice *Integrated Pest Management* (see glossary for more details). Beneficial birds and insects that reduce pests, build the soil, pollinate plants, and perform other useful functions.
- If you use a lawn care service, request natural management instead of chemical methods, have your soil tested to know the actual needs, look at the labels of all pesticides used, and follow precautions and directions.
- Install a *rain garden*.
- Contact your County Extension Agent for information on water-wise gardening and integrated pest management
  www.clemson.edu/extension/county/index.html

Some Alternative Ways to Control Pests

- Biological Pest Controls — beneficial insects that attack pest
- Traps — sticky traps, pheromone traps and for slugs, beer in a shallow dish
- Removing pest by hand
- Floating row covers — light weight barriers that keep pests off plants
- Insecticidal Soaps — control soft bodied insects such as aphids, white flies, and thrips
- Natural insecticides — made from certain plants, these should be used sparingly

Hazardous Household Products

- Spot removers
- Furniture polish
- Deodorizers
- Drain Cleaner
- Oven cleaner
- Disinfectants
- Moth repellents
- Ammonia
- Paint and other finishes
- Thinners and solvents
- Batteries containing heavy metals
- Swimming pool chemicals

Household Chemicals

Some household products contain chemicals that can become pollutants if they are poured down home drains, *storm drains*, or outside on the ground.

What Can We Do?

- When buying household chemicals, read the labels. Select the least toxic product that will do the job and use only when really needed.
- Use only recommended amounts.
- Clean up any spills with kitty litter and other absorbent materials.
- Don't apply chemicals near *cisterns*, wells or waterbodies.
- Don't mix chemicals together.
- Don't burn or bury leftover chemicals or containers.
- Stuff used cans of paint, thinner, or other finishes and solvents with newspapers and allow them to dry before putting the cans into the trash.
- Never pour household chemicals down drains, storm drains or onto the ground.
- Participate in local programs for hazardous household waste *disposal*; if there isn't such a program, work with local agencies to start one.
- Go to **www.scdhec.gov/recycle** and click on County Recycling Programs for more information about your local recycling programs.

Household Cleaners and Alternatives

For more information, visit EPA's Web site at: www.epa.gov/waste/wycd/catbook/alt.htm

Instead of...	Try...
• Drain cleaner	• Use a plunger or plumber's snake.
• Oven cleaner	• Clean spills as soon as the oven cools using steel wool and baking soda; for tough stains, add salt *(Do not use this method in self-cleaning or continuous-cleaning ovens).*
• Glass cleaner	• Mix 1 tablespoon of vinegar or lemon juice in 1 quart of water. Spray on and use newspaper to wipe dry.
• Toilet bowl cleaner	• Use a toilet brush and baking soda or vinegar. *(This will clean but not disinfect.)*
• Furniture polish	• Mix 1 teaspoon of lemon juice in 1 pint of mineral or vegetable oil, and wipe furniture.
• Rug deodorizer	• Deodorize dry carpets by sprinkling liberally with baking soda. Wait at least 15 minutes and vacuum. Repeat if necessary.
• Silver polish	• Boil 2 to 3 inches of water in a shallow pan with 1 teaspoon of salt, 1 teaspoon of baking soda, and a sheet of aluminum foil. Totally submerge silver and boil for 2 to 3 more minutes. Wipe away tarnish. Repeat if necessary. *(Do not use this method on antique silver knives. The blade will separate from the handle.)* Another alternative is to use nonabrasive toothpaste.
• Plant insecticide	• Wipe leaves with mild soap and water; rinse.
• Mothballs	• Use cedar chips, lavender flowers, rosemary, mint, or white peppercorns.
• Flea and tick products	• Put brewer's yeast or garlic in your pet's food; sprinkle fennel, rue, rosemary, or eucalyptus seeds or leaves around animal sleeping areas.

Solid Waste Disposal

Most households discard food scraps, paper products, wrappers, containers made of glass, plastic, and metals every day. Solid waste is an increasing problem as landfills are becoming more difficult to site and expensive to operate. Runoff seeping through older landfills can carry many *contaminants* from decomposing garbage.

What Can We Do?

- Reduce your consumption of disposable products and products with excessive packaging.
- Buy *biodegradable* or recyclable products whenever possible.
- Make a *compost* pile (see "Composting").
- Never dump grass clippings or other yard waste into or near a waterway or a *storm drain.*
- Participate in recycling programs: www.scdhec.gov/recycle.

Composting

Items that are good to use for composting include:

- grass clippings
- leaves
- fruit and vegetable scraps
- crushed eggshells
- tea bags
- coffee grounds

Two types of composting include:

- **Hot composting**- use when there is a large amount of waste material; produces compost in a month.
- **Cold composting**-use with small amounts of material; takes at least six months to produce compost.

Tip on composting:

- Try to keep your compost pile between 3 ft x 3 ft x 3 ft and 5 ft x 5 ft x 5 ft.
- Smaller piles tend to not hold enough heat while larger piles tend to not get enough air to support bacteria.

For more information about composting, go to DHEC's website at:
www.scdhec.gov/compost

Or go to the EPA's Web site:
www.epa.gov/compost

Water Efficiency

A recent EPA survey showed at least 36 states are anticipating local, regional, or statewide water shortages by 2013. Unnecessary water use not only contributes to local water shortages, but also adds to the volume of wastewater that must be treated by septic tanks or sewage treatment plants. As a result, excessive water use contributes to higher use and more expensive water and sewer services.

What Can We Do? $ = money saving tips

- $ Install high efficiency toilets, which combines high performance with water efficiency.
- $ Check for toilet leaks by putting food coloring into the tank. If colored water appears after 30 minutes without flushing, there is a leak that should be repaired.
- $ Try to buy products with the WaterSense logo, which identifies high performance, water-efficient products. www.epa.gov/watersense
- $ Turn off your hot water heater when going on a trip.
- $ Don't run water continuously when washing dishes, brushing teeth, shaving, etc.
- $ Take short showers instead of baths.
- $ Avoid using the garbage disposal unnecessarily since these devices use large amounts of water and add organic materials to sewage treatment plants.
- $ Install a water-efficient showerhead.
- $ Run dishwashers and clothes washers only when you have a full load.
- $ Reduce the volume of your toilet tank with plastic bottles filled with water (don't use bricks); you'll have to experiment to find the minimum volume needed for satisfactory operation.

DID YOU KNOW?
If a family of four replaced a 3.5 gallons per flush (gpf) toilet made between 1980 and 1994 with a WaterSense labeled toilet, they could save more than $90 annually on their water bill, and $2,000 over the lifetime of the toilet without compromising performance (EPA).

EPA WaterSense

DID YOU KNOW?
The average household faucet flows at a rate of 2 gallons per minute (EPA).

Motor Vehicles

Used oil, antifreeze and other motor vehicle fluids are often dumped into storm drains or roadside ditches. The problem is even worse if we consider the oil, grease and other fluids that leak from poorly maintained vehicles and contaminate runoff from roads, driveways and parking lots. Motor vehicles also add tire particles, copper from brake pads, and air emissions to polluted runoff.

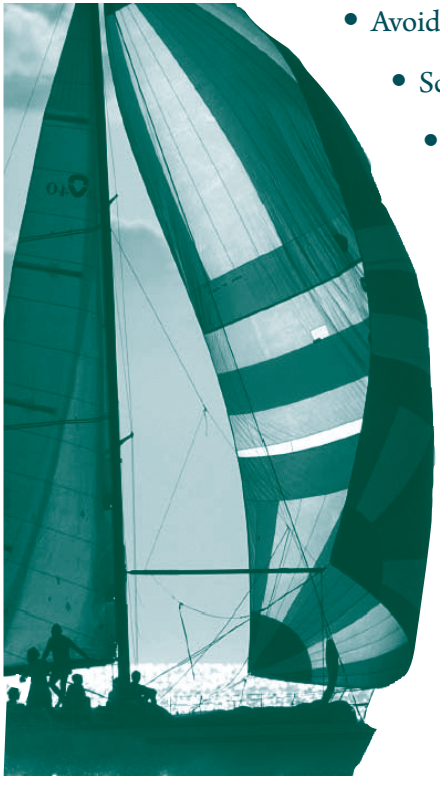
What Can We Do?

- Maintain motor vehicles and repair leaks promptly.
- Dispose of used motor oil at oil recycling centers. www.scdhec.gov/recycle
- Arrange with local service stations or recycling centers to take your used antifreeze.
- $ Avoid gas tank overflows during refueling.
- Wash your car at a car wash where the wash water is either recycled or goes to a wastewater treatment plant.

Boats

Recreational boaters use a variety of cleaners, finishes and anti-fouling compounds and may sometimes discharge garbage, sewage and petroleum products into our waterways. Boats can create excessive wakes that contribute to shoreline erosion and increase sediment loads to adjacent waterways.

What Can We Do?

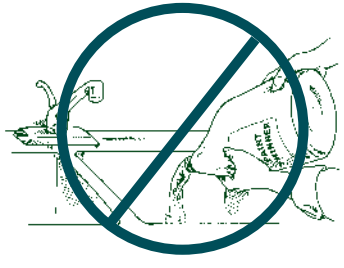


- Avoid producing a wake within 500 feet of shore.
- Scrub boats with brush and water instead of routinely using soap or detergent.
- If cleansers are needed to remove stains, use phosphate-free detergents.
- Don't use toxic polishes and stain removers.
- Avoid gas tank overflows during refueling.
- Do not discharge boat sewage directly into waterways.
- "Stow it, don't throw it"; bring trash ashore for recycling or disposal.
- Use a drop cloth when scraping boat hulls to catch toxic chips of paint or anti-fouling.
- Support marine operators who use porous paving and adopt other runoff control practices.
- Use low emission engines.

Septic Systems

A properly operating septic tank system can be a safe and effective means of disposing of household wastewater. The whole process depends upon bacterial action and soils that can absorb the outflow. If the drain field is damaged or the soil becomes saturated, nearby wells and surface waters may become contaminated with sewage products including bacteria, solids and oxygen-consuming materials.

What Can We Do?



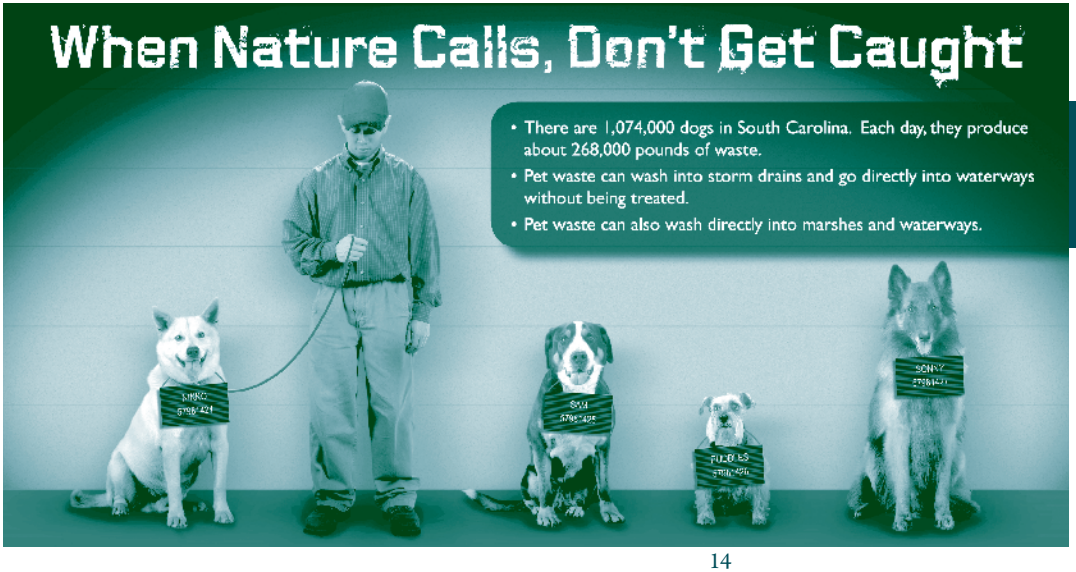
- Keep heavy vehicles and plant roots away from drain field pipes.
- Avoid putting household chemicals down the drain that could destroy helpful bacteria in the septic tank.
- Conserve water and stagger water-intensive uses (like laundry) that could overload the system.
- $ Have the system inspected annually and pumped out every three to five years (maintenance is always cheaper than repairing a problem).
- When possible, avoid using garbage disposals that add unnecessary solids and grease to the system.
- Keep oils, fats and grease, coffee grounds, cigarettes, facial tissues, paper towels, sanitary napkins, tampons and disposable diapers out of the system.
- Use toilet paper that decomposes quickly.
- Be alert for bright green grass growing over the drain field that could indicate sewage seepage near the surface.
- Divert runoff from the drain field area to reduce the likelihood of soaking the soil.
- For more information, go to DHEC-OCRM's website at: **www.scdhec.gov/septic** and DHEC's Onsite Wastewater Management program at: **www.scdhec.gov/wastewater**.

Pet Waste

Pet waste is high in bacteria as well as *nutrients* and can contribute to the closure of beaches and shellfish beds. Sometimes pet owners do not believe that their one dog could make much difference, but when the wastes from all the pets in a community are added together, the impact is significant. Not only can pet waste impact our water resources, but it can also create a health hazard for you and your children.

What Can We Do?

- Clean up after pets and dispose of wastes in the trash, toilet or bury it.
- Use a commercially available pet waste composter.
- Hire a pet waste removal company.
- Never leave pet waste on streets, sidewalks or driveways.



DID YOU KNOW?
An average size dog produces about a quarter pound of waste everyday.

Hard Surfaces

Hard surfaces such as paved roads, driveways, rooftops and parking lots are common in most communities. Stormwater flows over these hard surfaces picking up pollutants along the way. Unlike forests and fields, which allow rainwater to soak into the ground, these hard surfaces cause rainwater to flow rapidly into ditches and storm drains – and directly into our waterways.

What Can We Do?

Keep Surface Runoff Clean

- Follow suggestions for septic tanks, pet waste, motor vehicles, farms, and lawns and gardens.
- When designing for large paved surfaces, use *Best Management Practices* such as *permeable pavers, grassed swales,* and conservation of natural areas.

Reduce Surface Runoff

- Limit paved or other impervious surfaces on your property and consider alternatives to solid concrete.

Allow Runoff to be Absorbed

- Plant *rain gardens,* which can absorb and filter runoff from hard surfaces.
- For more information about DHEC's Stormwater Program, go to: www.scdhec.gov/stormwater

Are you a DUMPER?

Avoid dumping anything down a storm drain. Grass clippings and leaves not only clog your storm drain potentially causing flooding, but also create an excess of nutrients in a waterbody leading to other water quality problems. These items don't belong in a storm drain:

- Paint
- Oil and Grease
- Cleaning supplies
- Soap and car residue from washing a car
- Grass clippings & leaves
- Pet waste
- Fertilizers and Pesticides

Benefits of a Rain Garden

A rain garden can:

- Filter containments in runoff pollution
- Reduce the potential of home flooding
- Improve aesthetics
- Recharge local groundwater

Farms

Poor farming practices can result in runoff contaminated with sediment, nutrients, pesticides, bacteria and oxygen-consuming substances. That is why it is especially important for farms to properly manage animal wastes and the application of chemicals. Agriculture is an important activity in South Carolina, but when it's improperly managed, it can be a source for runoff pollution. This contamination can be reduced by improved land management and by constructed systems that contain or reduce pollutants at their source.

What Can We Do?

- Plant vegetation at the base of steep slopes and in drainage ditches to slow the rate of runoff and trap pollutants.
- Keep heavy equipment off exposed soil during rainy periods.
- Practice conservation tillage, a variety of techniques such as inter-cropping that avoid leaving large areas of exposed soil for extended periods.
- Construct detention ponds and basins to slow runoff and trap sediment.
- Control animal grazing to prevent pasture overgrazing.
- Drag pastures frequently to spread manure and promote uniform grazing.
- Leave *wetlands,* stream banks, channels and streamside vegetation in their natural condition to provide a *buffer* between cultivated areas and waterways.
- Adopt the principles of *Integrated Pest Management* (see glossary for details).
- Locate feed and nutrient storage facilities away from streams and drainages.
- Provide storage facilities (this may be as simple as a canvas cover over a manure pile) that prevent collected animal wastes from washing away.
- Apply liquid manure during dry months when there is less chance of water contamination and during the active growing season when nutrient uptake by plants is at its maximum.
- Fence animals away from streams.
- Follow an approved waste management plan.

Forestry

Forested *watersheds* act as filter systems for runoff. They are important to drinking water supplies, recreation and fisheries. Careless forestry practices can cause runoff pollution. Road building, harvesting, logging and pesticide application can pollute water with sediments, chemicals and organic materials unless precautions are taken to control such contamination.

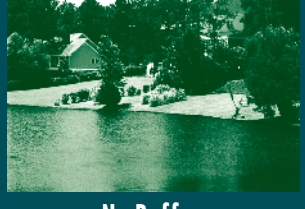
What Can We Do?

- Plan and construct roads to minimize disturbed area and control sediment loss.
- Minimize stream crossings by roads.
- Establish *buffer* strips (generally 40 to 100 feet wide) along streams.
- Revegetate and close roads that are no longer needed.
- Consider special logging, harvesting, storage and hauling techniques that minimize soil disturbance.
- Follow "South Carolina's Best Management Practices for Forestry" during all activities.
- Hire contractors that use forestry best management practices.
- Visit the South Carolina Forestry Commission website at www.trees.sc.gov for more information about BMPs and free forest management advice.

Nature's Natural Filters: Buffers

A buffer is an area of trees and shrubs next to a water resource that helps filter out pollutants while providing habitat for aquatic wildlife. Plants also keep soil from getting washed into the waterway.

Buffer



No Buffer

DID YOU KNOW?

98% of timber harvests use Best Management Practices to protect water quality in South Carolina (SC Forestry Commission).

Air Emissions

Rainwater can be contaminated before it even hits the ground if it falls through polluted air. *Acid rain* is the most familiar example of this type of contamination. Air pollution with sulfur and nitrogen compounds results primarily from burning fossil fuels, especially coal and oil. These fuels are burned for electricity production and motor vehicle transportation.

What Can We Do?

Practice Energy Efficiency!

ASK ABOUT ENERGY STAR

$ Look for Energy Star Products; use less energy and save money! www.energystar.gov

$ Turn off lights and electronics when not in rooms.

- Consider using appliances that do not require electricity or fossil fuel (such as manual can openers and push-type lawn mowers).
- Pay attention to energy-efficiency ratings on new appliances and automobiles.

$ When possible, walk or bicycle instead of driving.

$ Keep doors and windows closed when air conditioners or heaters are in use.

$ When building a new home or renovating, investigate how to make your home energy efficient.

$ Keep refrigerators closed as much as possible.

$ Set thermostats to 68 degrees in winter and 78 degrees in summer.

- Do not burn household trash.
- Turn off your car engine if you are stopped longer than 30 seconds (except in traffic).
- Every three months, vacuum the coils on the bottom or rear of refrigerators to remove dust.
- Investigate using solar and wind power sources.
- For more information, visit DHEC's Bureau of Air Quality website at: www.scdhec.gov/baq

DID YOU KNOW?

Some fish in South Carolina may contain mercury. If you fish in local waters, please visit DHEC's website at www.scdhec.gov/fish to learn the types and amount of fish that is safe to eat or call 1-888-849-7241 for a free booklet.

Construction

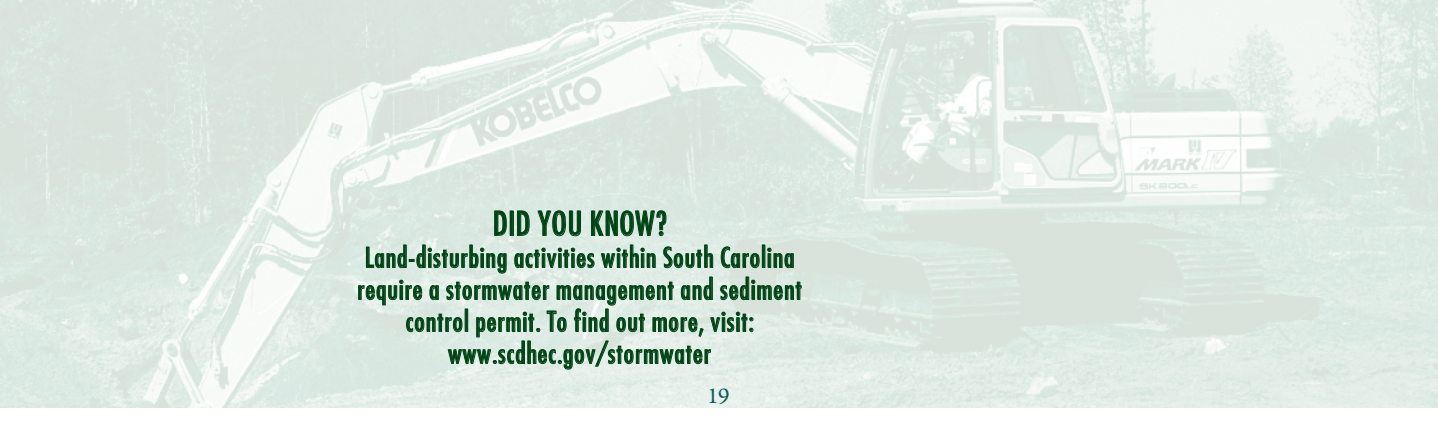
When land is cleared for building or road development, loose sediment and other materials washed from work sites can pollute our waterways. Sediment in runoff not only damages stream *habitat* but also can carry with it pesticides, cleaning solvents, cement wash, asphalt, and motor oil.

What Can We Do?

- During construction, leave and protect as much native vegetation as possible. Take extra measures to protect existing trees.
- Use and maintain recommended construction Best Management Practices (BMPs) such as sediment fences, hay bales, and sediment detention ponds.
- Protect bare soil with mulch, and plant vegetation for long-term coverage.
- Leave or plant buffers of trees and shrubs along waterways.
- Schedule grading for dry weather.

Some Alternatives to Solid Concrete

- Bricks
- Interlocking pavers
- Flat stones
- Gravel
- Crushed stone or shell
- Bark chips
- Precast concrete lattice pavers
- Wood or recycled plastic lumber decks



DID YOU KNOW?
Land-disturbing activities within South Carolina require a stormwater management and sediment control permit. To find out more, visit: www.scdhec.gov/stormwater

Why Should We Care?

Protection of Drinking Water Sources

Our drinking water comes from either groundwater wells or surface waters such as rivers and lakes. Protection of these water resources is essential to keeping water treatment costs down and our drinking water safe.

Recreational Uses

We use rivers and lakes to fish, swim, jet ski, boat, water ski, and other recreational activities. Polluted water can make it unsafe for swimming if too much bacteria is present. Pollution may also harm aquatic life.

Aesthetics

Who wants to look at or smell polluted water? Preventing runoff pollution will help keep our water resources safe and beautiful not to mention increasing property values. Improved water quality has been linked to higher property values.

Wildlife Habitat

Lakes, rivers, and streams are home to many different living organisms. Just like us, many animals rely on these water resources to live.

By doing the small things in your daily routine (see checklists), you can help keep our water clean.

Be Part of the Solution!

The checklists on the following pages are quick guides to helping you prevent runoff pollution. The more items on this list you currently follow, the more you are part of the solution. If you aren't doing these behaviors already, it's never too late to start.

Landscaping

- ☐ Avoid using fertilizers within 75 feet of a wetland or waterway.
- ☐ Do not fertilize if heavy rain is expected.
- ☐ Consider organic, non-chemical fertilizers (such as blood meal, organic mixes or compost made from your own garbage).
- ☐ Practice Integrated Pest Management.
- ☐ Encourage beneficial birds and insects that reduce pests, build the soil, pollinate plants and perform other useful functions.
- ☐ If you use a lawn care service, request natural management instead of chemical management methods, have your soil tested to determine actual requirements, examine labels of all pesticides used and ensure that required precautions and application methods are followed.
- ☐ Contact your County Extension Agent for information on xeriscaping and integrated pest management.
- ☐ Reduce soil erosion by planting appropriate plant cover on bare patches of ground.
- ☐ Reduce water requirements of your landscaping by xeriscaping - selecting plants suited to the local environment with minimal need for supplemental watering.
- ☐ Reduce water requirements by using drip irrigation or soaker hoses and by mulching planting beds.
- ☐ Limit the amount of lawn to what will actually be used for play, recreation, etc., and consider rock gardens or shrubs and trees that also provide habitat for insect eating birds.
- ☐ Group plants with similar requirements; place plants that need more water in naturally wet areas; match plants' water requirements with soil's moisture-holding capacity.
- ☐ Use only fertilizers that are really needed, based on soil tests and the actual requirements of your plants.
- ☐ Keep fertilizer off driveways and sidewalks where it will be washed into storm drains.
- ☐ Use pervious pavers.

Boats

- ☐ Don't produce wakes within 500 feet of shore.
- ☐ Scrub boats with brush and water instead of routinely using soap or detergent.
- ☐ If cleansers are needed to remove stains, use phosphate-free detergents.
- ☐ Avoid toxic polishers and stain removers.
- ☐ Avoid refueling overflows by determining the amount of fuel needed based upon estimated fuel consumed and the capacity of the fuel tank.
- ☐ Avoid discharging boat sewage into waterways.
- ☐ Do not discharge chlorine-treated waste from marine toilets in waters less than 20 feet deep.
- ☐ Bring trash ashore for recycling or disposal.
- ☐ Use a drop cloth when scraping boat hulls to catch toxic chips of paint or antifouling.

Solid Waste & Animal Waste

- ☐ Never dump grass clippings or other yard waste into or near a waterway.
- ☐ Participate in recycling programs.
- ☐ Clean up after pets and dispose of wastes in the trash or toilet.
- ☐ Reduce your consumption of disposable products and excessive packaging.
- ☐ Make a compost pit.

Hazardous Household

- ☐ When buying household chemicals, read the labels, select the least toxic product that will do the job and use only when absolutely necessary.
- ☐ Try alternatives to harsh chemicals.
- ☐ Use only recommended amounts.
- ☐ Keep litter or other absorbent material handy to clean up spills.
- ☐ Don't apply chemicals near cisterns, wells or waterbodies.
- ☐ Don't mix chemicals together.
- ☐ Don't burn or bury left over chemicals or containers.
- ☐ Stuff used cans of paint, thinner or other finishes and solvents with newspapers and allow to dry before putting the cans into the trash.
- ☐ Never pour household chemicals down drains, storm drains or onto the ground.
- ☐ Participate in local programs for hazardous household waste disposal; if there aren't any such programs, work with local agencies to start one.

Septic Systems

- ☐ Keep heavy vehicles and plant roots away from drain field pipes.
- ☐ Avoid putting household chemicals down the drain that could easily destroy septic tank bacteria.
- ☐ Conserve water; stagger water-intensive uses (like laundry) that could overload the system.
- ☐ Have the system inspected annually and pumped out every three to five years.
- ☐ Consider giving up garbage disposals that add unnecessary solids and grease to the system.
- ☐ Keep out of the system: oils, fats and grease, coffee grounds, cigarettes, facial tissues and paper towels, sanitary napkins, tampons and disposable diapers.
- ☐ Use toilet paper that decomposes quickly.
- ☐ Be alert for bright green grass growing over the drain field that could indicate sewage effluent near the surface.
- ☐ Divert runoff from the drain field area to reduce the likelihood of saturating the soil.

Motor Vehicles

- ☐ Maintain motor vehicles; repair leaks promptly.
- ☐ Take used motor oil to a recycling center that accepts oil.
- ☐ Arrange with local service stations or recycling centers to take your used antifreeze.

Water Efficiency

- ☐ Check for toilet leaks by putting food coloring into the tank. If colored water appears after 30 minutes without flushing, there is a leak that should be repaired.
- ☐ Turn off water and your hot water heater when going on a trip.
- ☐ Run dishwashers and clothes washers only when you have a full load.
- ☐ Don't run water continuously when washing dishes, brushing teeth, shaving, etc.
- ☐ Consider eliminating your garbage disposal, as these devices not only consume large amounts of water, but also add organic materials to sewage treatment systems.
- ☐ Install a water-conserving showerhead.
- ☐ Reduce the volume of your toilet tank with plastic bottles filled with water (don't use bricks!); experiment to find the minimum volume needed for satisfactory operation.
- ☐ Take short showers instead of baths.

Glossary

Acid Rain
unusually acidic rainwater due to sulfur dioxide and nitrogen oxide in the air

Anti-fouling
process of removing algae, plants, and other microorganisms that have accumulated on a submerged structure such as a boat

Aquifer
large concentration of groundwater similar to an underground lake

Best Management Practice (BMP)
a method, activity, maintenance procedure or other management practice for reducing the amount of pollution entering a water body

Biochemical Oxygen Demand (BOD)
the amount of oxygen needed by living organisms in a body of water. High BOD can indicate that the waterbody may be polluted

Biodegradable
able to be broken down by living organisms

Buffer
an area of trees, shrubs and herbaceous vegetation located upslope from a waterbody; helps filter pollutants

Carcinogen
a substance known to cause cancer

Chemical Oxygen Demand (COD)
oxygen consumed by chemicals introduced into a waterbody

Cistern
a basin for holding liquids. Often built to store or catch rainwater

Combined Sewer Overflow (CSO)
a pipe that discharges untreated wastewater during storms from a sewer system that carries both sanitary wastewater and stormwater; overflow occurs because increased flow caused by stormwater runoff exceeds the capacity of the system

Combined Sewer System
a system to collect and treat wastewater where domestic and industrial wastewater is combined with storm runoff; stormwater is treated in this type of system, but the system may be overloaded by runoff from major storms, resulting in discharge of untreated sewage

Compost
fertilizer made with non-meat food scraps, leaves, grass clippings, soil and water

Contaminant
a substance that adversely affects the environment

Cumulative Effects
the collective impact on the environment due to a series of individual actions, projects, or contaminants

Detention
collecting and holding back stormwater for delayed release to receiving waters.

Disposal
methods by which unwanted materials are relocated, contained, treated or processed.

Dissolved Oxygen
oxygen present in water and therefore available to fish and other aquatic life.

Glossary

Downspout
a pipe that carries rainwater from roof gutters.

Downspout Extension
a pipe that connects to a downspout and carries rainwater away from a home.

Erosion
wearing away of rock or soil through the gradual detachment of soil or rock fragments by water, wind, ice and other mechanical and chemical forces.

Entrophication
over enrichment of water by phosphates and/or nitrogen, which causes organisms to reproduce at increased rates.

Fecal coliform bacteria
bacteria normally found in the intestinal tracts of warm-blooded animals; these bacteria are normally harmless to humans, but are used as indicators of the presence of sewage that may contain harmful bacteria and viruses

Grassed swales
open shallow channels that slow runoff and allow rainwater to be absorbed.

Groundwater
underground water supplies stored in aquifers; rainwater soaks into the ground and is filtered as it flows down until it is collected at a point where the ground is not permeable.

Habitat
the specific area of environment in which a particular type of plant or animal lives.

Herbicide
a substance used to destroy or inhibit growth of vegetation.

Integrated Pest Management
Select appropriate pesticides, time the application to be most effective with the smallest dose, use pest-resistant crops, and encourage natural controls such as pest predators.

Land-disturbing activity
clearing, grading, and excavating that result in land disturbance of equal to or greater than one acre and less than five acres (but not for single-family homes which are not part of a subdivision development).

Leachate
water or other liquid that has washed from a solid material such as a layer of soil or debris; leachates may contain contaminants.

Nonpoint Source Pollution (runoff pollution)
contamination that comes from a variety of sources rather than from a specific point such as an outfall pipe.

Nutrients
chemicals required by plants or animals for growth; most commonly known nutrients include: nitrogen, phosphorus and potassium.

Glossary

Organic Fertilizer
nutrients in the fertilizer comes from the remains or a by-product of an organism.

Pathogens
microorganisms that cause disease.

Permeable pavers
helps prevent runoff by allow rainwater to be absorbed.

Photodegradable
able to be broken down by sunlight

Point Source Pollution
contamination that comes from a specific definable source such as a factory.

Pollution
an undesirable change in the physical, chemical or biological characteristics of air, land or water that is detrimental to human life, desired activities or other species considered important by humans.

Polychlorinated Biphenyls (PCBs)
chemicals used in electrical transformers; now banned in the United States, but still cause widespread contamination from previous use.

Rain Gardens
a grouping of plants planted in a low-lying area in the ground designed to absorb and filter rainwater runoff from hard surfaces.

Sediments
soil particles carried into water bodies.

Septage
the sludge and scum materials that are pumped out of a septic tank.

Storm drain
a system of gutters, pipes or ditches used to carry stormwater from surrounding lands to streams, lakes or coastal waters.

Stormwater
water that is generated by rainfall; it often collects pollutants as it flows over the land.

Toxins
chemical substances that can cause cancer or other harmful effects.

Turbidity
a measure of the amount of material suspended in water.

Water quality
a term that reflects the condition of water, which is affected by natural processes and human activities.

Watershed
the geographic region or area of land in which water all drains into a particular body of water.

Wetlands
habitats where the influence of surface or groundwater has resulted in development of plant or animal communities adapted to aquatic or occasionally wet conditions.

Contact Information & Links

Clemson Cooperative Extension
Clemson University
Clemson, SC 29634
www.clemson.edu/extension
(864) 656-3311

To find your local county's Clemson Extension office, visit www.clemson.edu/extension/county/index.html

Clemson- Department of Pesticide Regulation Clemson University
511 Westinghouse Road
Pendleton, SC 29670
Pesticide Info Program:
http://entweb.clemson.edu/pesticid/general.htm
(864) 646-2150

Department of Natural Resources (DNR)
1000 Assembly Street
Columbia, SC
www.dnr.sc.gov

Mailing Address:
PO Box 167
Columbia, SC 29202

DNR- Conservation Districts:
To find your local county conservation district, visit:
www.dnr.sc.gov/conservation

DNR- Marine Resources Division
217 Fort Johnson Road
Charleston, SC
(843) 953-9300

Mailing Address:
PO Box 12559
Charleston, SC 29422

For contact information of other DNR programs, visit:
www.dnr.sc.gov/admin/phone

Environmental Protection Agency (EPA)
Protecting Water in the Southeast:
www.epa.gov/region4/water

SC DHEC- Bureau of Air Quality
2600 Bull Street
Columbia, SC 20201
www.scdhec.gov/baq
(803) 898-4123

SC DHEC- Bureau of Water
2600 Bull Street
Columbia, SC 29201
www.scdhec.gov/water
NPS website:
www.scdhec.gov/runoff
(803) 898-4300

Contact Information & Links

SC DHEC- Land & Waste Management
8911 Farrow Road
Columbia, SC 29203
www.scdhec.gov/eqc/lwm
(803) 896-4000

SC DHEC- Ocean and Coastal Resource Management (OCRM)
www.scdhec.gov/ocrm

OCRM- Main Office
1362 McMillan Ave, Suite 400
Charleston, SC 29405
(843) 953-0200

OCRM- Beaufort
104 Parker Drive
Beaufort, SC 29906
(843) 846-9400

OCRM-Myrtle Beach
927 Shine Avenue
Myrtle Beach, SC 29577
(843) 238-4528

SC DHEC- Onsite Wastewater Management
8500 Farrow Road
Columbia, SC 29203
www.scdhec.gov/wastewater
(803) 896-0641

SC Forestry Commission
5500 Broad River Road
Columbia, SC 29212
www.state.sc.us/forest
(803) 896-8800

Mailing Address:
PO Box 21707
Columbia, SC 29221

SC Sea Grant Consortium
287 Meeting Street
Charleston, SC 29401
www.scseagrant.org
(843) 953-2078

Watershed Groups in SC
www.epa.gov/water/states/SC

Coastal Conservation League (CCL)
http://coastalconservationleague.org

CCL- Charleston Office
328 East Bay Street
PO Box 1765
Charleston, SC 29402
(843) 723-8035
info@scccl.org

CCL- Legislative Office
935 Main Street, #1
Columbia, SC 29201
(803) 771-7102

CCL- North Coast Office
709-B Front Street
PO Box 603
Georgetown, SC 29442
(843) 545-0403

CCL- Rivers Project Office
2231 Devine Street, Suite 100
Columbia, SC 29205
(803) 771-7114

Contact Information & Links

CCL- South Coast Office
902 North Street
Beaufort, SC 29901
(843) 522-1800

Friends of Lake Keowee Society (FOLKS)
4065 Keowee School Road
Seneca, SC 29672
www.keoweefolks.org
(864) 882-3655

Friends of the Edisto (FRED)
PO Box 5151
Columbia, SC 29250
www.edistofriends.org
marshall@edistofriends.org

Lake Hartwell Association
PO Box 312
Fair Play, SC 29643
www.lakehartwellassociation.org
(864) 224-5253

United States Department of Agriculture (USDA)
www.usda.gov

USDA- Headquarters
1400 Independence Avenue, S.W.
Washington, D.C. 20250

USDA- Regional Forest Services
4931 Broad River Road
Columbia, SC 29212
(803) 561-4000

USDA- Water Quality Information Center
www.nal.usda.gov/wqic

For USDA service centers in South Carolina, visit:
http://offices.sc.egov.usda.gov/locator /app

To report chemical spills, oil spills, or fish kills:
Call DHEC's toll-free 24-hour emergency response line at 1-888-481-0125.

Contact your local municipality (government) for activities going on in your area:

S.C. DHEC - Regional Offices

Environmental Quality Control (EQC)

For a clickable map of the all SC DHEC- EQC Regional Offices, visit: www.scdhec.gov/regions

Region 1:
Anderson EQC Office
2514 Belton Hwy
Anderson, SC 29621
(864) 260-5569

Greenwood EQC Office
613 South Main Street
Greenwood, SC 29646
(864) 223-0333

Region 2:
Greenville EQC Office
301 University Ridge, Suite 5800
Greenville, SC 29601
(864) 241-1090

Spartanburg EQC Office
900 South Pine Street, Suite 2A
Spartanburg, SC 29303
(864) 596-3800

Region 3:
Columbia EQC Office
PO Box 156, Building #5
State Park, SC 29147
(803) 896-0620

Lancaster EQC Office
2475 DHEC Road
Lancaster, SC 29720
(803) 285-7461

Region 4:
Florence EQC Office
145 E. Cheves Street
Florence, SC 29506
(843) 661-4825

Sumter EQC Office
PO Box 1628 / 105 Magnolia Street
Sumter, SC 29151
(803) 778-6548

Region 5:
Aiken EQC Office
206 Beaufort Street, NE
Aiken, SC 29801
(803) 641-7670

Orangeburg Area
Contact: (803) 268-7303

Region 6:
Myrtle Beach EQC Office
927 Shine Avenue
Myrtle Beach, SC 29577
(843) 238-4378

Region 7:
Charleston EQC Field Office
1362 McMillan Avenue, Suite 300
Charleston, SC 29405
(803) 953-0150

Region 8:
Beaufort EQC Office
104 Parker Drive
Burton, SC 29906
(843) 846-1030

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Bureau of Water, Outreach Program
2600 Bull Street
Columbia, S.C. 29201-1708

(803) 898-4300
www.scdhec.gov/water

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