Learn about Stormwater

Source: National Resources Defense Council report "Stormwater Strategies Community Responses to Runoff Pollution". A comprehensive report is available on the NRDC website at: http://www.nrdc.org/water/pollution/storm/stoinx.asp.

What is stormwater pollution?

Stormwater pollution is the untreated contaminated water that drains from the streets of North Augusta, and through the municipal storm drain system during storm events.

The stormwater flows through pipes, ditches and ponds directly to creeks and streams that eventually drain into the Savannah River.

The most common pollutants are:

- trash (fast-food wrappers, cigarette butts and Styrofoam cups)
- toxins (used motor oil, antifreeze, fertilizer, pesticides, sewage overflow and pet waste)

Basically, anything dumped or dropped on the ground or in the gutter contributes to stormwater pollution. Most discarded materials are not biodegradable and can be harmful to all living things in our local streams and waterways. Creatures especially sensitive to pollution are fish, amphibians, aquatic insects, wetland plants, and animals that use the water to survive.

Humans can be affected by stormwater pollution. The Savannah River provides drinking water for North Augusta. The water is pumped to our treatment plant to be cleaned to drinking water quality. Polluted water is harder and more costly to clean costing all citizens more in the long run. We can also become ill if we play in polluted streams or rivers. Eating contaminated fish can also cause health problems. Pollutants accumulate at higher rates further up the food chain. A large fish has accumulated more pollutants from eating many smaller plants or animals that contained contaminants. This is called "bio-accumulation" and each level up the food chain will acquire higher levels of contaminants. At certain levels, health effects can occur. It is important to protect the streams and river from pollution.

Other problems associated with stormwater pollution are increased flooding due to clogged storm drains, stream channel degradation from overflowing or blocked lines, or habitat loss or alteration. Sediment and erosion during flooding or heavy downpours can scour smaller stream channels and dump huge gravel and silt loads into them that can ruin fish and amphibian habitat. These loads can obliterate small streams, springs and wetlands.

All of these activities affect ecosystem functions, biological diversity, public health, recreation, economic activity, and general community well-being.

Categories of Principal Contaminants in Stormwater	
Category	**Examples**
Metals	zinc, cadmium, copper, chromium, arsenic, lead
Organic chemicals	pesticides, oil, gasoline, grease
Pathogens	viruses, bacteria, protozoa
Nutrients	nitrogen, phosphorus
Biochemical oxygen demand (BOD)	grass clippings, fallen leaves, hydrocarbons, human, and animal waste
Sediment	sand, soil, and silt
Salts	sodium chloride, calcium chloride

Sources of pollution

Vehicles:

Driving a car or truck contributes a number of different types of pollutants to urban runoff. Pollutants are derived from automotive fluids, deterioration of parts, and vehicle exhaust. Once these

pollutants are deposited onto road and parking surfaces, they are available for transport in runoff to streams during storm events.

Roads and Parking areas:

In many communities, most runoff comes from paved surfaces like roads, parking lots, roofs, and sidewalks. These surfaces are impervious meaning water can't flow through them but instead it runs off of them. Material accumulates on these surfaces during dry weather conditions. During the first few minutes of a storm, highly concentrated loads of pollution can wash off of these surfaces and into storm drains or ditches directly to streams. Oil, grease, hydraulic fluids, spilled paints and other substances are routinely found on our roadways and parking areas. You can actually see the pollution on sunny days in puddles of water as a sheen or rainbow color floating on the surface..

Lawns & gardens:

Landscaping practices are another potential source of pollutants in urban runoff. Lawn management chemicals including fertilizers used at home and on golf courses, cemeteries, and public parks can add nutrients to runoff. Stream water sampling has shown a direct link between the chemicals found in lawn care products and urban water quality.

One important issue is the quantity of chemicals being applied. Over or improper application at homes and other places is far too common. In one study, experts estimate that residential fertilizer use accounts for one-third of the excess nitrogen entering one community (the Sarasota Bay watershed in southwest Florida). Of particular concern is the application of fertilizers and pesticides just before an intense storm event. Applying at this time creates instant runoff of the chemicals since they may not have had time to become fixed in the soil and surrounding material.

Similarly, harmful pesticides found in stormwater, such as chloropyrifos, 2,4-D, and diazinon come from golf courses, municipal parks, highway medians, roadsides, and residential lawns and gardens. The percentage of pesticide lost in runoff can be large; one study found up to 90 percent of the herbicide 2,4-D was lost in runoff after being applied a few hours before a storm event.

Since organic matter contains nutrients, raking autumn leaves or grass clippings into gutters or streets for municipal collection or otherwise facilitating the entry of these materials into the storm-sewer system

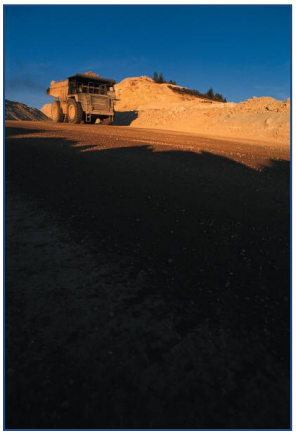
also adds nutrient loads and oxygen-demanding substances to stormwater. Poorly maintained garden beds or lawns can be a source of sediment as well.

Six Pesticides Found Frequently in Stormwater Samples

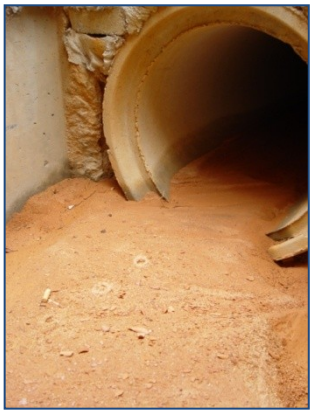
Pesticide Name	Human Health and/or Environmental Effects
2,4-D	Associated with lymphoma in humans; testicular toxicant in animals.
Chlorpyrifos	Moderately toxic to humans; neurotoxicant; can be highly toxic to birds, aquatic organisms, and wildlife.
Diazinon	Moderately toxic to humans; neurotoxicant; can be highly toxic to birds, aquatic organisms, and wildlife.
Dicamba	Neurotoxicant; reproductive toxicity in animals; association with lymphoma in some human studies.
MCPA (Methoxane)	Low toxicity to non-toxic in test animals, birds, and fish; suspected gastrointestinal, liver, and kidney toxicant.
MCPP (Mecoprop)	Slightly to moderately toxic; some reproductive effects in dogs; suspected cardiovascular, blood, gastrointestinal, liver, kidney, and neurotoxicant.

Sources: T.R. Schueler, "Urban Pesticides: From the Lawn to the Stream"; Watershed Protection Techniques, vol. 2, no. 1, Fall 1995, pp. 247, 250 and Extoxnet: Extension Toxicology Network Pesticide Information Profiles, http://ace/orst.edu/info/extoxnet, and Environmental Defense Fund, Scorecard Chemical Profiles, http://www.scorecard.org/chemical-profiles.

Construction Sites:



Construction activity is the largest direct source of human-made sediment loads. Results from both field studies and erosion models indicate that erosion rates from construction sites are typically an order of magnitude larger than row crops and several orders of magnitude greater than rates from well-vegetated areas, such as forest or pastures. Since erosion rates are much higher for construction sites relative to other land uses, the total yield of sediment and nutrients is higher.



Studies indicate that poorly managed construction sites can release 7 to 1,000 tons of sediment per acre during a year, compared to 1 ton or less from undeveloped forest or prairie land.

Construction activity can also result in soil compaction and increased runoff. Like nutrients, soil and sediment are, to a certain degree, a naturally occurring and functional component of all water bodies. Yet human activities usually increase the amount of sediment entering our water bodies to such an extent as to turn sediment into a water quality problem. Smaller streams can be buried by a large sediment load during a storm event. Aquatic animals and insects that lived in the stream can be buried as well.

Box turtle trapped in mud where stream once flowed.

Illicit *(illegal hidden)* Connections to Storm Sewers

Illicit connections from toilets, washing machines, or sinks to storm sewer pipes can add pathogens to stormwater. Pathogens are viruses, bacteria, and protozoa harmful to human health. Coliform bacteria, which come from human waste, is commonly used as an indicator that harmful pathogens may be present in the water.

Studies have found high levels of coliform bacterial in stormwater. Illicit sanitary connections can also add nutrients such as nitrogen and phosphorus to stormwater. Human waste also contributes to biological oxygen demand (BOD) in our waters.

Also, leaking sanitary sewer lines located near storm sewer lines can pose the same problems as illicit connections. Businesses that illicitly connect pipes containing wastewater from industrial processes to the storm sewer system rather than to the sanitary sewers can add metals, solvents or other contaminants to stormwater

Uncovered storage of materials:

Rain can erode piles of uncovered bulk material, such as sand, loose topsoil, or trash if left uncovered. This can add sediment, oils or other pollutants to nearby water bodies. Likewise, precipitation can wash contaminants off leaking or dirty objects left outdoors such as oil drums, paint cans, herbicide/pesticide containers, trash containers, or other items that are not sealed. Store materials inside covered areas when possible. If not possible, make sure to cover the items with a tarp to prevent stormwater from carrying contaminants to rivers and streams.

Pets and wild animals:

Waste from domestic and wild animals is a source of pathogens, nutrients and increased BOD (biological oxygen demand) in stormwater.

In one study, the Northern Virginia Soil and Water Conservation District estimated that each day, dogs leave 180,000 pounds of waste on the ground in Fairfax County, Virginia, alone. Waste from birds such as pigeons, geese, and gulls that are attracted to human activity can also be a problem. Wild geese that congregate in large numbers on cultivated turf adjacent to bodies of water also contribute to pathogen, nutrient and BOD loadings.

Animal waste does contribute to stormwater pollution. In cities that have high population and high density housing (many homes very close together), animal waste becomes a bigger and more significant problem. North Augusta is no exception. Confined animals in fences and waste collecting in the yard creates a problem. There are many ways you can help limit the amount of impact including, never dump kitty litter outside (bag it and toss it in the trash), if you have fenced animals, have a waste plan. Collect the waste and put it in the garbage or buy a waste disposal system (underground device) to collect waste and process it. You can find them at pet stores.

Littering:

Not only does stormwater frequently receive no treatment, it also often does not even have the benefit of simple filtering or screening for visible objects. As a result, paper cups, cigarette butts, virtually anything made of Styrofoam, newspaper, and other materials that people toss on the ground are carried into storm sewer systems -- and eventually into our waterways.

Truck beds are notorious for litter as wind picks up any trash there and floats it down to the street next to a stormdrain. If you see litter on the ground, pick it up and throw it in the trash. It is the simplest and most effective way to prevent stormwater pollution to our streams, wetlands, and rivers. Again.., just pick it up and toss it in the can and potential problem is gone.

Frequently asked questions:

Q: What is a catch basin?

A: A catch basin is a curbside, box-like receptacle that drains water from the street gutter to the underground storm drain pipe. They are entry points to the storm drain system. This system was designed to prevent flooding on city streets.

A Catch Basin or Storm drain Inlet

Q: Are sewers and storm drains the same thing?

A: No. They are two separate drainage systems. Wastewater from homes, industry, etc. travels through the sewer system where it is treated at sewage treatment plants before reuse or discharge into the ocean. Runoff from streets, parking lots, yards, etc. enters the storm drain system, receives no treatment, and flows directly to the Savannah River.

Q: How often do catch basins and storm drains get cleaned out?

A: The city's Stormwater Department, currently cleans basins by hand on as needed basis. A Jetter Vacuum truck purchase was approved by North Augusta City Council in the 2006 budget and has been ordered. This equipment will be used to clean North Augusta's catch basins, debris basins, and open channels throughout the City. All catch basins will be cleaned annually; those in areas receiving high loads of generated trash from illegal dumping will cleaned more frequently. Clogged catch basins will be cleaned immediately when reported by the public prior to the rainy season.

Q: Why doesn't the City install filters or screens in front of catch basins?

A: The City has installed several types of pollutant abatement devices on certain catch basins around the city. In some instances, these devices can become clogged with trash during a rain event, so their use is limited.

Q: What kind of pollutants are found in the storm drain system?

A: Paint thinner and paint products, motor oil, pesticides, Styrofoam cups, paper, human and animal feces, antifreeze, golf balls, dirty diapers and dead animals are but a few of the pollutants found in the system on a daily basis.