FLORIDA
HOME • A • SYST

A Homestead Assessment System
Florida Cooperative Extension Service
Bulletin 314

FOR TEENS!

Chapter 8
Stormwater Management

Objectives:	**For youth to understand the causes and effects of pullutants in stormwater runoff and how to reduce the risks on their property.**
Life Skills:	**Acquiring, analyzing, and using information** **Critical thinking skills** **Decision making**
Keywords:	**Stormwater Runoff, Estuaries, Storm Sewers, Best Management Practices, Swales, Retention, Detention, Detention with Filtration, Hydrocarbons, Microbes**
Materials:	**Notebook** **Pen/Pencil** **Designated materials for activities**

Introduction

Chapter 8 examines potential risks from stormwater runoff to the environment and your health. This chapter covers:

Part 1. Reducing pollutants in runoff
- Pesticides and chemicals
- Automotive wastes
- Leaves and other yard waste
- Pet and other animal wastes

Part 2. Controlling runoff to reduce flood potential
- Preventing soil erosion
- Flood protection
- Landscaping
- Minimizing paved surfaces
- Roof drainage

Completing this chapter's self-assessments helps you find out how stormwater affects the environmental quality of your property and properties "downstream" from your residence. This chapter also gives you tips on reducing stormwater pollution risks.

What is STORMWATER?

Stormwater runoff is rainwater that does not readily soak into the ground. (See Figure 1). This water flows from rooftops, over paved areas, on saturated or compacted soil and through sloped lawns. The flowing runoff collects and transports soil, pet waste, pesticides, fertilizer, oil and grease, leaves, litter and other potential pollutants. You don't need a heavy rainstorm to send pollutants rushing toward streams, wetlands, lakes canals and oceans. Your hose can supply enough water. Even if your home is not on the waterfront, storm drains and sewers can efficiently carry runoff from your neighborhood to the nearest body of water. Drains and sewers can dispose of runoff even if your area does not have retention/detention facilities.

Contrary to popular belief, storm sewers do not carry stormwater to sewage plants for treatment. Storm sewers are pipes laid underground, often below streets. Inlets or drains located

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along curbs and in parking areas collect runoff, which then flows to nearby streams, creeks, ponds, lakes or other bodies of water.

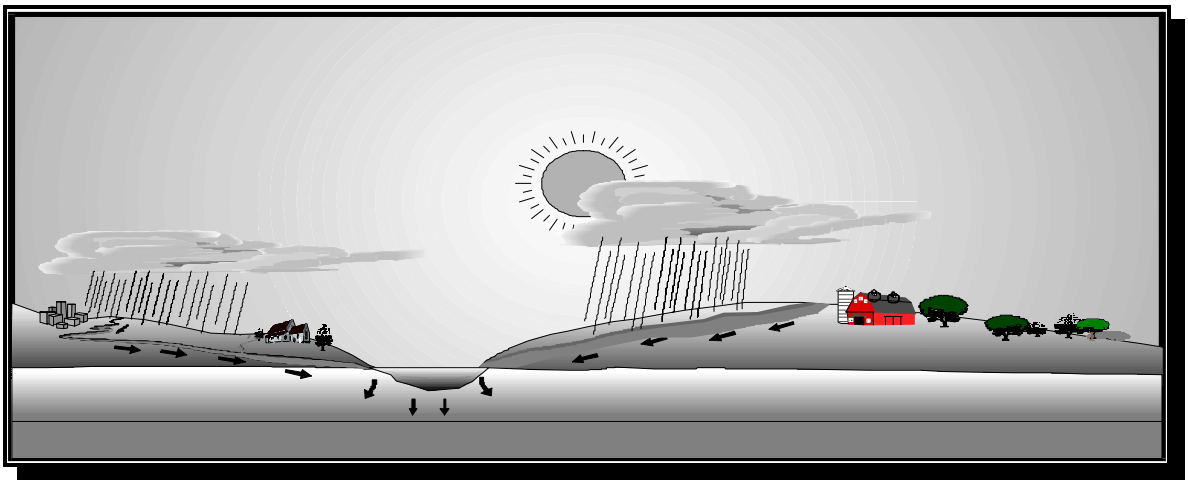
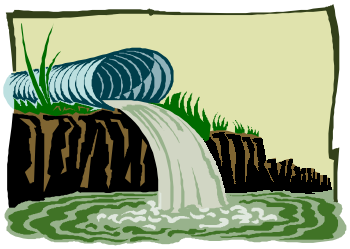


Figure 1: Source of stormwater and its movement toward the groundwater ***(Graphic by Dave Cantlin).***



Why should I be concerned?

Polluted stormwater degrades our lakes, rivers, wetlands and ocean bays. Soil clouds water and degrades the habitats of fish and water plants by filling in estuaries. Nutrients, such as phosphorus promote the growth of algae, which crowd out other aquatic life. Toxic chemicals such as antifreeze and oil from leaking cars, carelessly applied pesticides, and zinc from galvanized metal gutters and downspouts, threaten the health of fish and other aquatic life. Bacteria and parasites from pet waste and improperly managed septic systems can make nearby lakes and bays unsafe for wading and swimming after storms. Stormwater can be a problem right at home when it flows into residences where it can be difficult and hazardous to clean up. Stormwater also can flow down a poorly sealed well shaft and contaminate drinking water (groundwater). These pollutants, often in minute concentrations such as parts per billion, are not detected by taste or odor, but nevertheless are a threat to human health.

Stormwater was recognized in the late 1970s as the major source of pollutant loadings to Florida's rivers, lakes and estuaries. As a result, the state's stormwater rule was implemented in 1982. This rule requires all new development to use best management practices (BMPs) to minimize erosion and retain sediment during construction, and to treat stormwater after construction is completed. The BMP's most commonly used in Florida include:

1. Swales - the grassed, shallow ditches along many streets.
2. Retention - areas that store stormwater so it can soak back into the ground or evaporate.
3. Detention - wet ponds, with a littoral zone that has wetland plants, which detain stormwater and slowly release it after the storm.
4. Detention with filtration - wet ponds that have a filter, typically made of sand through which the stormwater passes before it is released after a storm.

Stormwater pollution cannot be collected and treated centrally in the same way as pollution from point sources, such as wastewater treatment plants. Stormwater pollution does not come from a few sources. Rather, stormwater carries pollution from every street, parking lot, yard and garden. Solving the problem requires everyone's help.

Three ways you can reduce the risks posed by stormwater are to:

- Keep pollutants out of stormwater.
- Reduce the amount of runoff.
- Maintain your development's stormwater management system.

Where does stormwater go?

The next time you are home during a storm, head outdoors and watch where the rainwater goes. Sketch of your property: draw arrows showing the direction that stormwater flows off driveways, rooftops, sidewalks and yards. (Instructions for making a homesite sketch are in Florida Home•A•Syst Chapter #1, Homesite Assessment.) Does water soak into the ground quickly, or does it puddle in places and flow off lawns and gardens? Your soil type affects water "infiltration" (soaking into the ground). As you might expect, water infiltrates sandy soil quickly but has a hard time seeping into fine-grained silt or clay soils. Note how far it is to the nearest storm sewer, ditch, wetland, stream or body of open water.

Where do pollutants come from?

	Pollutant	Common Sources
	Silt, sand, and clay particles and other debris (*sediment*)	Construction sites Bare spots in lawns and gardens Cars and trucks washed on driveways or parking lots
	Nutrients (*phosphorus*, *nitrates*, etc.)	Fertilizers overused or spilled Pet and livestock waste Grass clippings and leaves

	Pollutant	Common Sources
	Disease organisms	Pet waste and garbage
	Hydrocarbons (*toxic chemicals*)	Car and truck exhaust Leaks and spills of oil and gas Burning leaves and garbage and other organic wastes
	Pesticides and herbicides (*toxic chemicals*)	Applications before rainstorms Spills and leaks
	Metals (*toxic chemicals*)	Cars and trucks (exhaust, brake and tire wear) Galvanized metal gutters and downspouts

PART 1. Reducing pollutants in runoff

Stormwater is unavoidable, but you can reduce its effects by keeping harmful chemicals and materials out of the runoff. Part 1 reviews the major potential sources of contamination, and offers ways to minimize them. At the end of Part 1, fill out the self-assessment to help you identify stormwater risks on your property.

A. Are household products stored outside the reach of stormwater?

Most households store lawn and garden products —weed and insect killers, fertilizers, etc. Rain, stormwater or floodwater reaching these products can transport them into surface water and your well. Try not to use chemical and garden fertilizers or pesticides. For alternative methods of fertilizing lawns and controlling pests, call your county Extension office. Even better, make your yard into a "Florida Yard" which uses native plants that don't need as much fertilizer, pesticides, and water. (See page 136 for information on how you can get a copy of the Florida Yards and Neighborhoods Handbook.)

Pool chemicals, salt for water softeners, and lots of other chemical products also can cause trouble if they are washed away. Keeping such products in waterproof containers, and storing them high up and out of the potential path of runoff or floodwater is important. Buy only what you need for a particular application and be sure to use up all of the product(s). Return outdated, unwanted chemicals to an approved recycling site.

Use and handling. Safe storage is only the first step in preventing contaminated runoff. When you spill chemicals, quickly stop them from spreading and clean them up. This is particularly important on paved surfaces. Clean up dry spills by promptly sweeping them and reusing if possible. For small liquid spills, first stop the leakage; build a small dike out of soil around the spill area to keep the spill from spreading. Soak up the spill with absorbent material like kitty litter or sawdust. For a spilled pesticide, collect that and the absorbent. Then apply this at less than the label rate to a site listed on the pesticide label. For spilled oil, use an absorbent, oil pads or oil socks (see Chapter 4, Liquid Fuels).

Using more pesticides and fertilizers than you need invites pollution problems. Timing of applications is also important. Avoid applying pesticides and other chemicals if you expect rain within 24 hours. See Chapter 5, Yard and Garden Care for more information on using these yard and garden products.

B. Is stormwater carrying away any car or truck wastes?

A rainstorm can easily carry away oil stains on your driveway, and outdoor spills of antifreeze, brake fluid and other automotive liquids. Runoff from your driveway that has an oily sheen is a sure sign you need to be more careful. Pans, carpet scraps and matting can catch drips. Routine maintenance prevents your car from leaking and identifies potential leaks. If you change your own oil, be careful to avoid spills and collect waste oil for recycling. Many service stations, car dealers and auto supply stores now take used oil for recycling. Oily car parts and fluid containers should be stored where rain and runoff cannot reach them. Never dump used oil, antifreeze or gasoline down a storm drain, in a ditch or on the ground. These wastes will end up in a nearby lake or stream or they may pollute the groundwater that supplies your drinking water.

Used oil is flammable and toxic. Hazardous ingredients are hydrocarbons (like benzene) and heavy metals. When released on land, used oil tends to move through the soil, stressing soil microbes and other small organisms. Loss of these reduces nutrient cycles and can stress the plant foundation of the food chain. On water, oil spreads on the surface and eventually settles as a tar-like substance on the bottom. The oil stresses plants, microbes, shellfish and other organisms by clogging their breathing mechanisms, interfering with temperature regulation, and may accumulate in some tissue such as muscle.

Washing your car in the driveway creates runoff problems even without a rainstorm. Your hose provides the water. The dirty, soapy runoff drains directly into sewers, picking up oil and other pollutants as it goes. Try washing your car on the lawn. Or better yet, take it to a commercial car wash or spray booth that sends its dirty water to a wastewater-treatment plant.

C. Do you keep animal wastes from becoming a pollution problem?

Droppings from dogs and cats, and from commonly-kept animals like rabbits, goats and chickens, can be troublesome in two ways. First, pet wastes contain nutrients that can promote algae growth if the wastes enter streams and lakes. Second, animal droppings are sources of disease. Children are more likely to catch a disease from pet waste because it may be in their play areas (sandboxes and swings).

The chances of stormwater contamination increase if pet wastes are concentrated in animal pen areas or left on sidewalks, streets or driveways where runoff occurs. Droppings should be buried if local laws allow, flushed along with human wastes down the toilet or put in a securely closed bag in the trash (especially used cat litter). If you have a lot of animals you can install an underground pet-waste digester (at pet stores) that works like a septic tank. Before buying one, check your local laws because these may restrict the digester's use, design or location. For more information on pet waste and disposal methods, order the free document **Pet Waste and Water Quality** from University of Wisconsin-Extension Publications (to see the publications, video and CD-ROM section at the end of this chapter).

D. Do you keep yard and garden plant wastes out of stormwater?

If left on sidewalks, driveways or roads, grass clippings and other yard wastes will wash away with the next storm. Although leaves and other plant debris accumulate naturally in streams and lakes, you and other residents can contribute excess amounts of plant matter, especially in areas with many homes. This can lead to water that is overfertilized and unsuitable for recreation (like swimming, boating, fishing).

Burning is not an environmentally friendly alternative. Hydrocarbons and nutrients (like phosphorus and nitrogen) released by burning leaves contribute to water and air pollution. Rain washes smoke particles out of the air and runoff picks up dust and ashes left on pavement or in ditches. Avoiding the problem is easy — sweep clippings back onto the grass, use leaves as landscape mulch and compost leaves on your property to recycle nutrients for later use. Never place grass clippings, yard wastes or trash in swales or storm sewers.

Assessment 1-- Reducing Pollutants in Runoff

Use the following chart to rate your stormwater pollution risks. For each question, put the risk-level number (1, 2 or 3) in the column labeled "*Your Risk*." Although some choices may not describe your situation exactly, choose the response that best fits. Refer to Part 1 above for more information to complete this chart.

	1. Low Risk / Recommended	**2. Medium Risk /Potential Hazard**	**3. High Risk / Unsafe Situation**	**Your Risk**
Storage of pesticides, fertilizers, and other potentially harmful chemicals	Stored in waterproof containers in garages or sheds out of reach of rainfall or stormwater or above flood water. Buy only what you need so you don't have to store leftovers.	Stored in waterproof containers but within reach of flood water.	Stored in non-waterproof containers outdoors or within reach of flood water.	
Handling and use of pesticides, fertilizers, and outdoor chemicals	Keep absorbent, like cat litter, on hand for spill cleanup. Clean up spills right away, especially on paved surfaces. Apply minimum amounts according to the label and control the watering-in of fertilizers immediately after their application. Delay applications to avoid rain.	Don't delay applications to avoid rain. Sometimes use products in amounts higher than labels recommend.	Don't clean up spills Use products in amounts higher than labels recommend all the time. No absorbent material on hand.	

	1. Low Risk / Recommended	2. Medium Risk /Potential Hazard	3. High Risk / Unsafe Situation	Your Risk
Car washing	Cars and trucks taken to a commercial car wash or spray booth.	Cars, trucks or other items washed on a lawn or gravel drive.	Cars, trucks or other items washed on driveways, streets or other paved areas.	
Automotive wastes	Always clean up oil drips and fluid spills with absorbent material. Keep dirty car parts and other vehicle wastes out of stormwater runoff.	Don't clean up drips. Pile car parts and other vehicle wastes on unpaved areas outside.	Used oil, antifreeze and other wastes dumped down the storm sewer, in a ditch or swale or on the ground.	
Pet and animal wastes	Bury animal and pet wastes (droppings) away from any garden, well, ditch or swale or children's play area. OR dispose of in toilet or underground pet digester.	Animal wastes left to decompose on grass or soil. Wastes scattered over wide area.	Animal wastes left on paved surfaces, or concentrated in pen or yard areas, or dumped down the storm drain or in a ditch or swale.	
Grass clippings, leaves and other yard waste	Sweep clippings, leaves and other yard wastes off paved surfaces and onto lawns or landscape planters away from water-flow routes. Use leaves and other yard wastes composted or used for mulch.	Leaves and other yard wastes piled on the lawn next to the street or in swales for collection. Leaves or garbage burned outdoors away from paved areas, ditches or swales.	Grass clippings, leaves and other yard debris left on driveways, streets, and other paved areas where they will be carried off by stormwater. Leaves burned.	

Responding to Risks

Your goal is to lower your risks. Turn to the Action Checklist on pages 133 to record medium and high risk practices you identified above. Use the guidelines in Part 1 to help you reduce your risks

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PART 2-- Landscaping and site management to control runoff

Some stormwater risks can be controlled by changes to buildings, paved surfaces, landscape and soil surfaces. This section reviews some easily addressed problems, as well as major landscape alterations you might want to consider.

A. Are there areas of bare soil around your home?

You can find areas of bare soil in vegetable and flower gardens, newly-seeded lawns, steeper slopes and around construction projects. Even on gentle slopes, water from rain can remove large amounts of soil and deliver it to wetlands, rivers, and lakes. Planting grass or other ground covers is the best way to stop erosion. Putting a straw or chip mulch over gardens or newly seeded areas will slow erosion. Straw bales, diversion ditches, and commercially available silt fences around construction sites can help slow runoff and trap sediment on-site.

B. Can you eliminate paved surfaces, or install alternatives?

Concrete and asphalt roads, driveways and walkways prevent rainwater from soaking naturally into the ground. When you have the choice, consider alternatives such as gravel, wood-chip or brick walk and driveways or patios. Where you need a more solid surface, consider using a "porous pavement" made from porous concrete, interlocking cement blocks, pavers, grass blocks or rubber mats that allow spaces for rainwater to seep into the ground. If you do pour concrete, keep the paved area as short and narrow as possible. Consider a porous type of blacktop if you choose asphalt.

C. Is your ground floor protected from stormwater seepage or flooding?

Stormwater on the ground floor of your home can be a hazard in two ways: first, when the water carries chemical contaminants or disease organisms into your home, and second, when the water picks up stored chemicals and carries them into the sewer or ground. Windows and doors are common entry points, and should be sealed against leaks. It is best if window and door sills are at least a foot above ground level. You can protect windows at ground level or below with clear plastic covers available in building supply stores. Your yard should be sloped away from the house foundation to prevent water from pooling near the house and leaking inside.

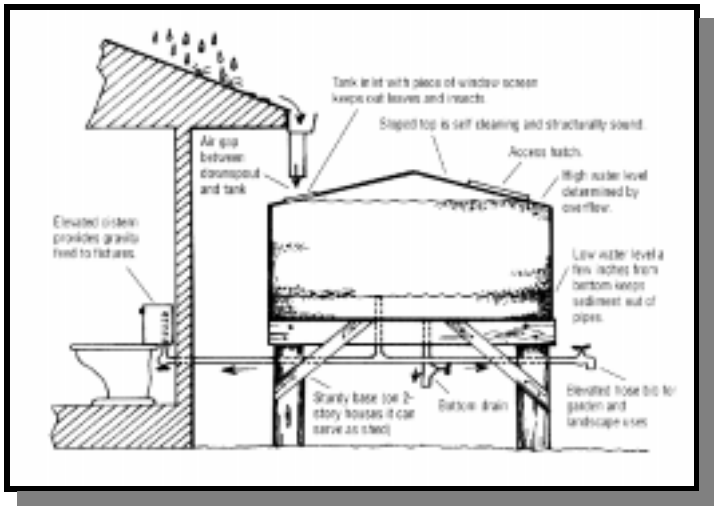


Figure 2. Traditional Florida cistern ***(courtesy of Alan Garner, UF/IFAS SP191, Florida Yards and Neighborhoods Handbook)***

D. Does water from roofs flow onto pavement or grass?

Your house roof, like pavement, sheds water. If downspouts from roof gutters

empty out on grassy areas, the water will have a chance to soak naturally into the ground. Aim your roof downspouts away from foundations and paved surfaces. Called impervious or hard-surface areas, they prevent or slow down water from entering the soil. This causes the water to run off the surface in greater amounts at faster speeds. For roofs without gutters, you can plant grass, spread bark mulch or use gravel under the drip line to prevent soil erosion and increase the ground's capacity to absorb water. Consider using a cistern (rain barrel) to catch rain water for watering lawns and gardens in dry weather. A cistern filters and stores rainwater collected from the roof (Figure 2). For more details on cisterns, refer to UF/IFAS Fact Sheet AE-64, ***Cisterns to Collect Non-Potable Water for Domestic Use*** on UF/IFAS CD-ROM Disk #10 (see page 135 for ordering information).

E. Can you change the layout of your landscape to reduce runoff?

An essential part of stormwater management is keeping water from leaving your property or at least slowing its flow as much as possible. Many home lawns are sloped to encourage water to run off onto neighboring property or streets (see Figure 3 below). Instead, you could provide low areas landscaped with shrubs and flowers, adapted to temporary wet conditions, where water is encouraged to soak into the ground. If your yard is hilly, you can terrace slopes to slow the flow of runoff and make mowing and gardening easier. If you have a large lot, consider "naturalizing" areas with prairie, woodland or wetland plants. If your property adjoins a canal, lake or stream, one of the best ways to slow and filter runoff is to leave a buffer strip of thick natural vegetation along the waterfront (See Figure 4 on page 131). A good source for ideas is your county Extension office, Natural Resource Conservation Service, Soil and Water Conservation District or water management district.

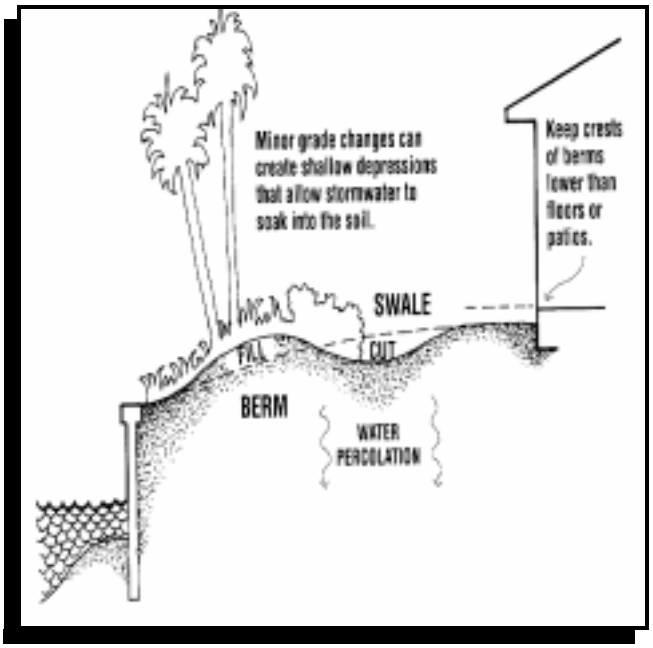


Figure 3. Berm and swales can slow and percolate stormwater runoff that would ordinarily rush into streets, storm drains and surface waters. ***(Courtesy of Alan Garner, UF/IFAS SP 191, the Florida Yards and Neighborhoods Handbook)***

Figure 4. A buffer strip of thick, natural vegetation along the waterfront is one of the best ways to slow and filter runoff if your property is on a lake or stream. ***(Courtesy of Alan Garner, UF/IFAS SP 191, the Florida Yards and Neighborhoods Handbook)***

Assessment 2-- Managing Runoff Around Your Home

For each question below, put the number of your risk level (1, 2 or 3) in the column labeled *"Your Risk*." Select the answer that is most like your situation. Refer to Part 2 above for more information to complete this chart.

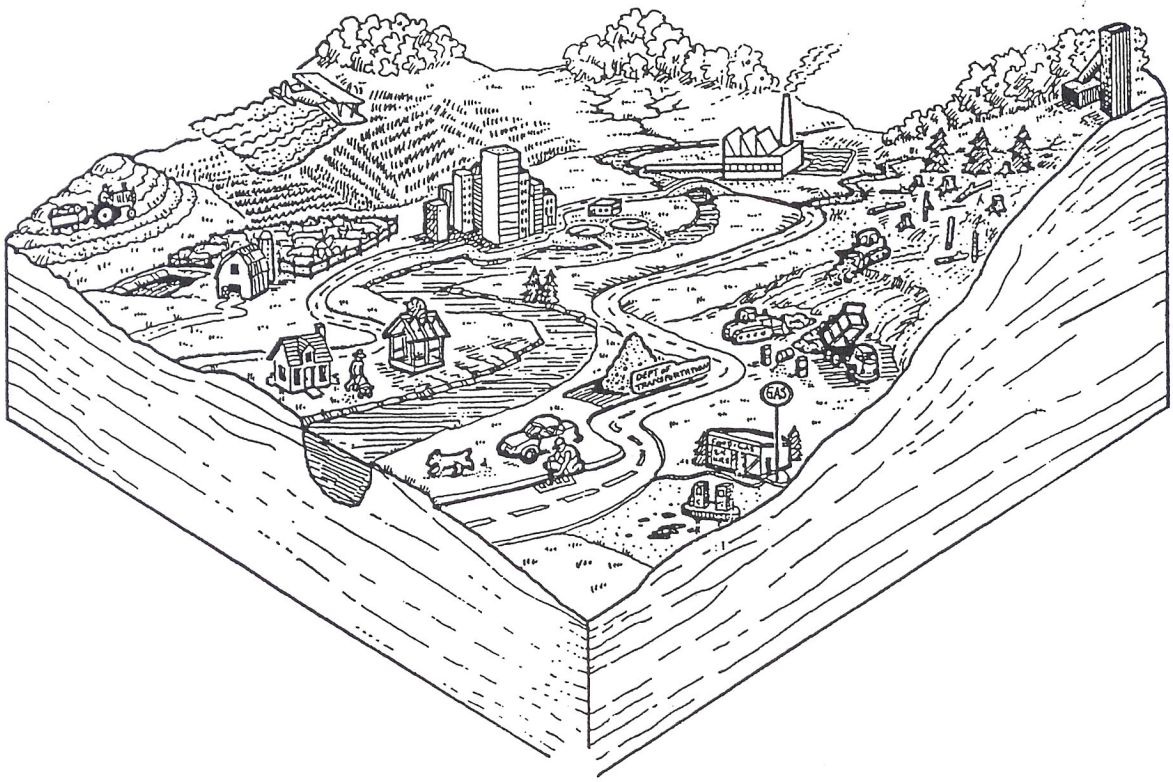
	1. Low Risk / Recommended	**2. Medium Risk / Potential Hazard**	**3. High Risk / Unsafe Situation**	**Your Risk**
Bare soil in lawns and gardens	Bare spots in the lawn promptly seeded and topped with a layer of straw or mulch. Bare soil in gardens covered with mulch.	Grass or other ground cover is spotty, particularly on slopes.	Spots in lawn or garden left without mulch or vegetation for long periods.	
Bare soil during construction	Bare soil seeded and mulched as soon as possible (before construction is complete). Sediment barriers used until grass covers soil.	Soil left bare until construction is completed. Sediment barriers installed and maintained to detain muddy runoff until grass covers soil.	Soil left bare and no sediment barriers used.	

Pollution Runoff
Application Activity #2

Materials: Red marker or pen

Procedures:

- Observe the potential sources of pollution runoff in the illustration on the next page and circle them with your pen.
- Write a brief statement to identify how this can cause pollution and how to prevent it.



Adapted from the Water Sourcebook, Tennessee Valley Authority, May 1994.

Applying Your Knowledge -
Managing Runoff Around Your Home (Chart 8.2)

	1. Low Risk / Recommended	2. Medium Risk / Potential Hazard	3. High Risk / Unsafe Situation	Your Risk
Paved surfaces	Paved surfaces minimized. Alternatives such as wood chips, bricks, wooden planks or paving blocks used for walkways, patios and other areas. Gravel trenches along driveway and patio.	Some small areas paved for patios, driveway or basketball.	Paved surfaces used extensively (driveways, walkways, patios, porches, decks or pool skirting).	
Roof drainage	Downspouts and drip lines direct roof drainage onto lawn or garden where water soaks into the ground.	Some downspouts and drip lines discharge water onto paved surfaces or grassy areas where water runs off.	Most or all drip lines or downspouts flow onto paved surfaces. OR downspouts connect directly to storm drains or swales.	
Landscaping and buffer strips	Yard landscaped to slow the flow of stormwater and provide areas where water soaks into the ground. Unmowed buffer strips of thick vegetation along streams or lake shores.	No areas landscaped to encourage water to soak in, but yard is relatively flat and little runoff occurs. Mowed grass or spotty vegetation adjacent to stream or lake.	No landscaping to slow the flow of stormwater, especially on hilly, erodible properties. Eroding stream banks or lake shores.	

Responding to Risks

As before, your goal is to lower your risks. Turn to the Action Checklist on page 133 to record medium and high-risk practices. Use the guidelines in Part 2 to help reduce your risks.

ACTION CHECKLIST

Go back over assessments 1 and 2 to look for the high and medium risks you identified. Write them below. For each medium and high risk, write down the improvements you plan to make. Use recommendations from this chapter and other sources on pages 134-138 to decide on actions you are likely to complete. A target date will keep you on schedule. You don't have to do everything at once, but try to take care of the most serious risks as soon as you can. Often it helps to tackle the less costly actions first.

Write Down High and Medium Risks	**Describe how you will reduce your risks**	**Set a target date for action**
Sample: Pet wastes left in areas where runoff occurs.	Bury wastes away from gardens, wells, ditches or areas where children play.	One week from today: (September 5, 1997)

For more information on *stormwater management,* please ☎ . . . .

WHAT	WHO	PHONE NUMBER
Landscape management	Your county Extension office (horticulture agents), Florida Department of Environmental Protection (FDEP) or water management district.	Look in the county and state governmental listings in your phone book. Water management districts: South Florida (407) 686-8800 Southwest Florida (352) 796-7211 St. Johns River (904) 329-4500 Suwannee (904) 362-1001 Northwest Florida (904) 539-5999
Stormwater management in general	Your county environmental protection, public works or stormwater department; Florida Department of Transportation (FDOT), FDEP or water management district.	Look in the city, county and state governmental listings in your phone book. See water management district numbers under landscape management entry above⇑.
Used motor oil and other automotive products	Gas stations, auto-supply stores, Florida Department of Transportation (FDOT), FDEP, your county's environmental protection department or your water management district.	Look in county and state governmental listings, and yellow pages of your phone book. See water management district numbers under landscape management entry above ⇑.

For publications, videos and CDs on *stormwater management,* please ✍ or ☎ for....

Check the UF/IFAS web site for IFAS publications and other materials: http://hammock.ifas.ufl.edu.

Extension for-sale publications catalog: http://ifas.ufl.edu/~mediaweb/edmedia.html.

Check FDEP's (http://www.dep.state.fl.us/index.html) and U.S. EPA's (http://www.epa.gov) web sites, too, for downloadable/printable documents.

For Extension publications below, check with your county Extension office - the UF/IFAS FAIRS CD-ROM or the UF/IFAS Publications Center, PO Box 110011, Bldg. 664, Gainesville, FL 32611-0011; for free and for-sale publications $10.00 and under: (352) 392-1951; for-sale publications over $10.00: (800) 226-1764. Cost of FAIRS CD-ROM: $50 in state; $65 out of state. MasterCard and VISA accepted.

Cisterns to Collect Non-Potable Water for Domestic Use. UF/IFAS Fact Sheet AE-64. June 1993. Print from UF/IFAS CD-ROM #10 at your county extension office.

Enviroscaping Tool Box (UF/IFAS SP 206) contains 13 documents on landscaping, Florida climate, trees and ground covers for north, central and south Florida, four videos on landscaping design, maintenance and on-site yard-waste disposal plus two software programs. Check with your county extension office, particularly horticulture extension agents. Documents are on UF/IFAS CD-ROM Disk #10.

Florida's Aquatic Plant Story. SV 315. 24-minute video describes the benefits of native aquatic plants, problems of some exotics and aquatic plant management ($15.00).

Florida's Estuaries: A Citizen's Guide to Coastal Living and Conservation. SGEB 23. Explains importance of estuaries and presents information on how individuals, and groups, can help protect these valuable areas. Reminds you that people's can harm, and sometimes help, the state's estuaries; 25 pp. ($2.00)

Florida LAKEWATCH. SP 137. Limnological data for 345 Florida lakes collected in 1992 by citizen volunteers of the Florida LAKEWATCH program; 345 pp. ($7.00)

Florida LAKEWATCH video. SV 438. 12-minute video introduces Florida LAKEWATCH, a volunteer organization that monitors the water quality of lakes, rivers and bays. ($15.00)

Florida Yards and Neighborhoods: a guide to environmentally friendly landscaping. SP 191. Planning, plant selection, pest management and environmentally friendly landscape practices to help protect Florida's lakes, rivers, ponds, estuaries and other surface water. 56 pp. ($3.00).

Publications from the Florida Department of Environmental Protection: Order from FDEP, 2600 Blair Stone Road, Tallahassee, FL 32399-2400.

Pointless Personal Pollution. Florida Department of Environmental Protection brochure. Stormwater/Nonpoint Source Management Section, 2600 Blair Stone Road, Tallahassee, FL 32399; (904) 488-0782.

Save the Swales. brochure; (904) 488-0782

Stormwater Management - A Guide for Floridians. (904) 488-0782

What Floridians Should Know About Used Oil Pollution, 1989. (904) 488-0300.

Publications from the U.S. Environmental Protection Association: Order from U.S. EPA, Public Information Center, 401 M Street, SW, 3404, Washington, DC 20460, (202) 260-7751 or U.S. EPA National Center for Environmental Publications and Information, 11029 Kenwood RD, Cincinnati, OH 45242, (513) 891-6561.

Coastal Management Measures Guidance Fact Sheet. January 1993. Download/print from U.S. EPA web site: http://www.epa.gov/OWOW/NPS/manual.html.

Community Action Guide. 94 pp. handbook that provides a step by step "take charge" guide for cleaning up local streams, planting wetlands and trees. Contact Brian LeCouteur, Department of Environmental Programs. (202) 962-3393.

Do's and Don'ts Around the Home. November 1996. Goo, Robert. From the EPA Journal article, November-December 1991, EPA-22K-1005. Download/print from U.S. EPA web site: http://www.epa.gov.OW/NPS/dosdont.html.

Economic Benefits of Runoff Controls, EPA 841-S-95-002. September 1995. Download/print from U.S. EPA web site: http://www.epa.gov.OWOW/NPS/runoff.html.

Managing Nonpoint Source Pollution from Boating and Marinas, Pointer #9. EPA 841-F-96-004I. Download/print from U.S. EPA web site: http://www.epa.gov.OWOW/NPS/facts/point9/htm.

Managing Nonpoint Source Pollution from Households, Pointer #10, EPA 841-F-96-004J. Download/print from U.S. EPA web site: http://www.epa.gov.OWOW/NPS/facts/point10.htm.

Managing Urban Runoff, Pointer #7, EPA 841-F-96-004G. Download/print from the U.S. EPA web site: http://www.epa.gov.OWOW/NPS/facts/point7.htm.

Nonpoint Source Pollution: The Nation's Largest Water Quality Problem, Pointer #1, EPA 841-F-96-004A. Download/print from the U.S. EPA web site.

Protecting Coastal Waters from Nonpoint Source Pollution, Pointer #5, EPA 841-F-96-004E. Download/print from U.S. EPA web site.

Recycling Used Oil, U.S. EPA/530-SW-89-039C. June, 1989.

Recycling Used Oil, What Can You Do, U.S. EPA/530-SU-89-039B, June 1989.

University of Wisconsin Extension Publications: Order from University of Wisconsin-Extension Publications, Room 170, 630 W. Mifflin St., Madison, WI 53703; (608) 262-3346.

Cleaning Up Stormwater Runoff (GWQ016). Free.

Pet Waste and Water Quality (GWQ006). Free.

Storm Sewers: The Rivers Beneath Our Feet (GWQ004). Free.

Publications from Other Sources:

A Citizen's Guide to Stormwater Ponds. Southwest Florida Water Management District brochure, Resource Projects Department (800) 423-1476.

Conserve Water, Do Your Part. Southwest Florida Water Management District. Download/print from Florida Department of State web site: http://www.dep.state.fl.us/swfwmd/SWFdyp.html.

We All Live Downstream. 30-minute video by the Oregon State University Extension Service. Examines urban and rural runoff and the problems it creates for surface and groundwater; explores how residents and government officials are trying to reduce nonpoint source pollution; and offers tips that can help Americans protect their drinking water sources. ($30.00). Order from Agricultural Communications Office, Oregon State University, A422 Administrative Services Building, Corvallis, OR 97331-2119.

For more information

This Florida Home•A•Syst assessment does not cover all potential risks related to stormwater which could affect health or environmental quality. It is meant to serve as a starting point for identifying and addressing the most apparent risks. Other Home•A•Syst chapters can help you examine and address your most important environmental concerns.

Carl DuPoldt, environmental engineer, Natural Resource Conservation Service, Somerset, New Jersey and Carolyn Johnson, water quality education specialist, University of Wisconsin-Extension, Milwaukee, wrote the original Stormwater Management document for the National Farm•A•Syst/Home•A•Syst Office's Home•A•Syst - An Environmental Risk-Assessment Guide for the Home at the University of Wisconsin. Randy Brown, UF/IFAS SWSD chair and land-use specialist; Eleanor Foerste, Osceola County extension agent; and Susan W. Williams, UF/IFAS associate in soil and water science and Florida Home•A•Syst coordinator, revised the material for Florida. Eric Livingston, Florida Department of Environmental Protection Stormwater/Nonpoint Source Management, and Craig D. Cameron, retired municipal water purification and monitoring professional, served as technical reviewers.

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