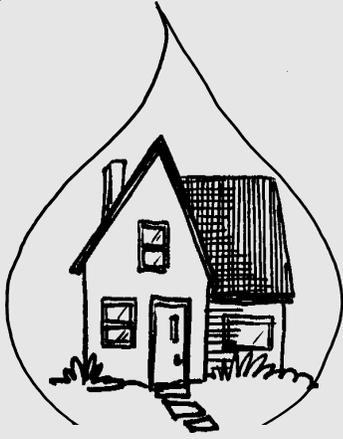


# Home\*A\*Syst

for New Jersey



**This assessment examines potential risks to the environment and your health from stormwater runoff. Two areas are covered:**

## **1. Reducing Pollutants in Runoff.**

**Pollutants can include pesticides and chemicals, pet and animal wastes, automotive wastes, winter salt and de-icers, and grass clippings and yard waste.**

## **2. Landscaping and Site Management to Control Runoff.**

**Some ways to help control runoff are preventing soil erosion, minimizing paved surfaces, providing basement flood protection, providing proper roof drainage, and landscaping.**

**Completing this worksheet will help you evaluate how stormwater affects the environmental quality of your property and properties "downstream."**

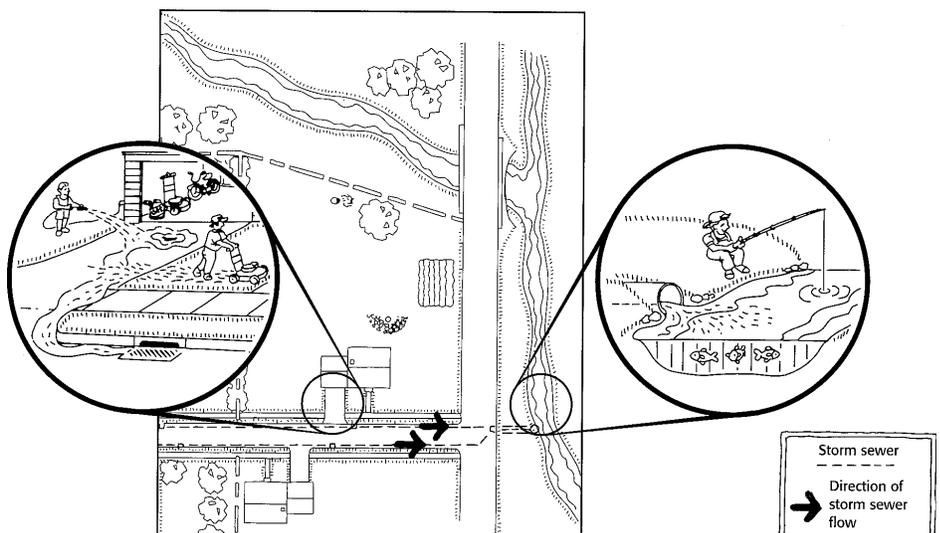
## Stormwater Management

### **What is stormwater, and why should you be concerned?**

Stormwater is water from rain or melting snow that does not soak into the ground. It flows from rooftops, over paved areas, on bare soil and through sloped lawns. As it flows, this runoff collects and transports soil (clay, silt, sand, and organic matter), animal and pet waste, salt, pesticides, fertilizer, oil and grease, leaves, litter and other potential pollutants. You don't need a heavy rain storm to send pollutants rushing toward streams, wetlands, lakes and bays. Your garden hose can supply enough water.

Even if your house is not on the waterfront, storm drains and sewers efficiently convey runoff from your neighborhood to the nearest body of water. Contrary to popular belief, storm sewers do not carry stormwater to sewage plants for treatment (see Figure 1).

Polluted stormwater degrades our lakes, rivers, wetlands bays, and ocean. Soil clouds water and degrades habitat for fish and water plants. Nutrients such as phosphorous promote the growth of algae and other microorganisms, crowding out



**Figure 1. Runoff that flows into storm sewers goes directly to streams and lakes without treatment.**

other aquatic life (the process is called eutrophication). 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 and animal waste can make nearby lakes and bays unsafe for wading and swimming.

As many people have discovered, stormwater can be a problem closer to home, flowing into basements where it can be difficult and costly to clean up. Stormwater also can flow down a poorly sealed well shaft and contaminate drinking water. In areas with very porous soils or geology, pollutants in runoff may reach groundwater.

Across the country, public officials are turning their pollution control efforts from wastewater discharges (called point sources of pollution) to stormwater management in urban and rural areas. Stormwater pollution cannot be treated in the same way as water pollution from discharge pipes, because it comes from many sources (see table below). This pollution, called **nonpoint source pollution**, is carried by stormwater from every street, parking lot, yard and garden. The problem can only be solved with everyone's help.

Pollutant	Common Sources
Silt, sand, and clay particles, and other debris	Construction sites; bare spots in lawns and gardens; cars and trucks washed on driveways or parking lots.
Nutrients	Overused or spilled fertilizers, pet waste, grass clippings and leaves left on streets; leaves burned in ditches (illegal in NJ).
Disease organisms	Pet waste; garbage; improperly functioning septic systems.
Hydrocarbons	Car and truck exhaust; leaks and spills of oil and gas; burning leaves and garbage (illegal in NJ).
Pesticides	Pesticides overapplied or applied before a rainstorm; spills and leaks.
Toxic Metals	Cars and trucks (exhaust, brake, and tire wear); galvanized metal gutters and downspouts.

## Part 1 --Reducing Pollutants in Runoff

Stormwater is unavoidable, but its effects can be reduced by keeping harmful chemicals and harmful substances out of the runoff. This section reviews the major potential sources of contamination, and offers ways to minimize them. At the end of Part 1, fill out the assessment chart to help identify stormwater risks on your property.

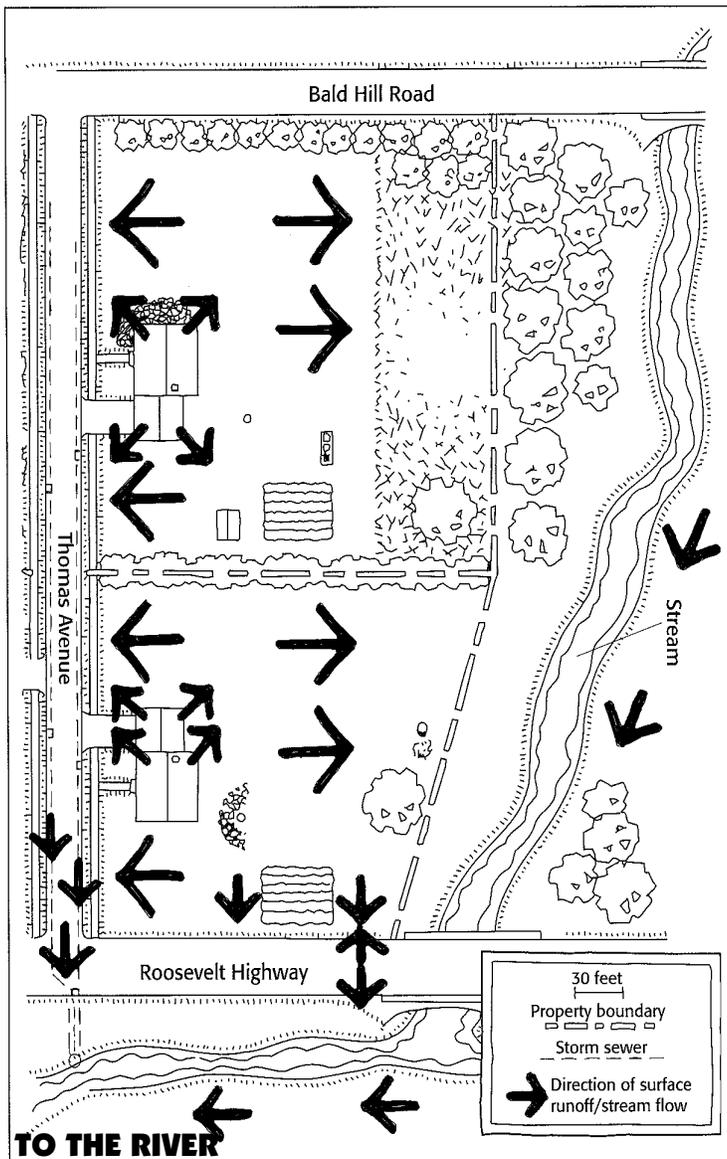
### Where does stormwater go?

The next time you are home during a storm, head outdoors with your boots and umbrella and watch where the rainwater goes. On a sketch of your property, draw arrows showing the direction that stormwater flows off driveways, rooftops, sidewalks and yards. (There are instructions for making a homesite sketch on page 13 in the Home Site Assessment worksheet.) 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 soils quickly but has a hard time seeping into fine-grained silt or clay soils.

During your walk, note how far it is to the nearest storm sewer, ditch, wetland, stream, or body of open water. Note whether runoff flows onto your land from adjacent streets, lands, or stormwater systems. If you live at or near the bottom of a hill, you may have special problems. Be sure to go out during more than one rain shower to get a good understanding of runoff flow during small and large storms.

### Are any car or truck wastes being carried away by stormwater?

Oil stains on your driveway, and outdoor spills of antifreeze, brake fluid and other automotive fluids are easily carried away by a rainstorm. If the runoff from your driveway has an oily sheen, this is a sure sign of your need to be more careful. Pans, carpet scraps and matting can catch drips. Routine maintenance prevents your car from leaking and identifies potential leaks. Be careful if you change your own oil to avoid spills and collect



**Figure 2. Map showing direction of surface runoff and stream flow.**

waste 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, in an old tree stump, or on the ground. These wastes will end up in a nearby lake, stream or river, or they may pollute your drinking water.

Washing your car in the driveway creates runoff problems without the assistance of a rainstorm. Your garden hose provides the water. The dirty runoff drains directly into storm sewers, picking up oil and other pollutants. Try taking your car to a commercial car wash or spray booth which sends its dirty water to a wastewater treatment plant.

### **Are household products stored outside the reach of stormwater?**

Most households keep lawn and garden products weed-killers, insect-killers, fertilizers, and so on in storage. If stormwater or floodwater reaches these products, it can transport them into surface water and your drinking or irrigation well. Pool chemicals, salt for water softeners, and a wide variety of other chemical products also can cause trouble if they are washed away. Keeping such products in waterproof containers, and storing them up high and out of the potential path of runoff or floods is important. You can avoid storage problems by buying what you need for a particular use and then using it up. Leftover household hazardous products should be taken to approved collection facilities. See the Home-A-Syst worksheet on Household Hazardous Waste for more information on household hazardous waste collection programs.

### **Do you use and handle chemicals safely?**

Safe storage is only the first step in preventing contaminated runoff. When you spill chemicals, act quickly to contain and clean up the spill. This is particularly important on paved surfaces. Using more pesticides and fertilizers than you need invites pollution problems. Timing of applications is also important. Avoid applying pesticides and chemicals if rain is expected within 24 hours. See the Home-A-Syst worksheet on Yard and Garden Care for more information on using these yard and garden products.

### **Do you use road salt or other de-icing products?**

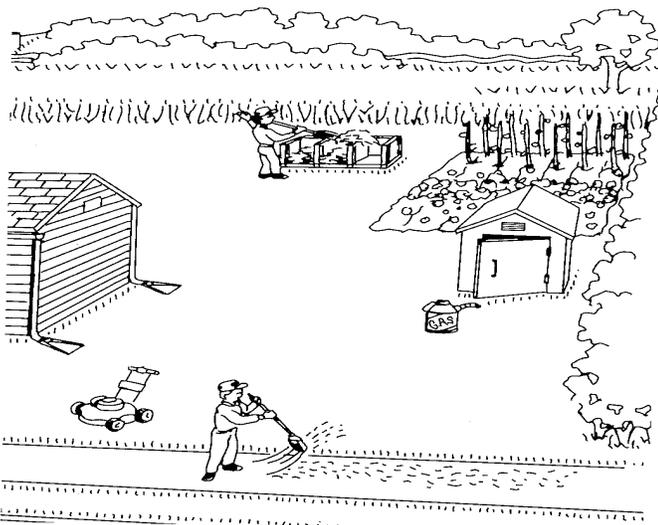
All road salt and de-icers eventually wash off paved surfaces and end up in the soil or water. From your driveway or sidewalk, salt can readily flow to storm drains and then into streams, lakes and rivers. Salt in high concentrations is harmful to wildlife and plant life. Use less to keep these chemicals out of natural systems. If you use too much, clean up the excess. Consider sand as a less toxic alternatives.

## How are your animal wastes kept from becoming a pollution problem?

Droppings from dogs and cats, and from commonly-kept animals like horses, rabbits, goats and chickens, can be troublesome in two ways. First, pet wastes contain nutrients which can promote the growth of algae when they enter streams and lakes. Second, animal droppings are carriers of disease-causing microorganisms. The risk of stormwater contamination increases if pet wastes are concentrated in animal pen areas or left on sidewalks, streets, or driveways where runoff occurs. Some municipalities have “pooper-scooper” ordinances which require you to pick up your pet wastes. Droppings that are not mixed with litter or other materials should be flushed down the toilet. Or, if local laws allow, droppings may either be buried or wrapped and put in the garbage for disposal.

## Are yard and garden plant wastes kept 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, homeowners 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. Avoiding the problem is easy sweep clippings back onto the grass, and compost leaves on your property to recycle nutrients for later use.



**Figure 3. Sweeping grass clippings onto the lawn and composting help to keep yard waste out of storm sewers.**

## Assessment 1 --Reducing Pollutants in Runoff

Use the chart on the following page 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 correspond exactly to your situation, choose the response that best fits. Refer to the information above if you need more information to complete this chart.

### **Responding to Risks**

Your goal is to lower your risks. Turn to the Action Checklist on page 25 to record medium and high risk practices. Use the recommendations in Part 1 to help you make plans to reduce your risks.

## 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.

### **Are there areas of bare soil around your home?**

You can find areas of bare soil in vegetable and flower gardens, newly seeded lawns, and around construction projects. Even on gentle slopes, water from rain and snow 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.

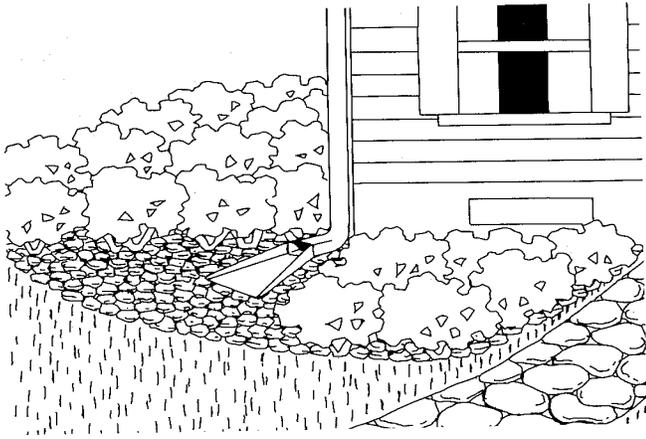
### **Can you eliminate paved surfaces, or install alternatives?**

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 or

## ASSESSMENT 1-- Reducing Pollutants in Runoff

	<b>LOW RISK</b>	<b>MEDIUM RISK</b>	<b>HIGH RISK</b>	<b>YOUR RISK</b>
<b>Storage of pesticides, fertilizers, and other potentially harmful chemicals</b>	Chemicals are stored in waterproof containers in a garage, shed, or basement that is protected from stormwater.	Chemicals are stored in waterproof containers but within reach of stormwater.	Chemicals are sorted in non-waterproof containers outdoors or within reach of stormwater.	
<b>Handling and use of pesticides, fertilizers, and outdoor chemicals</b>	Spills are cleaned up immediately, particularly on paved surfaces. Minimum amounts of chemicals are applied according to label instructions. Applications are delayed to avoid rain.	Applications are not delayed to avoid rain.	Spills are not cleaned up. Products are used in higher amounts than is recommended on the label.	
<b>Car washing</b>	Cars and trucks are taken to a commercial car wash or spray booth.	Cars, trucks, or other items are washed on a lawn or gravel drive.	Cars, trucks, or other items are washed on a driveway, street, or other paved area.	
<b>Automotive wastes</b>	Oil drips and fluid spills are cleaned up. Dirty car parts and other vehicle wastes are kept out of reach of stormwater runoff.	Drips and spills are not cleaned up. Car parts and other vehicle wastes are left on unpaved areas outside.	Used oil, antifreeze, and other wastes are dumped down the storm sewer, in a ditch, or on the ground.	
<b>Pet and animal wastes</b>	Animal and pet wastes are flushed down the toilet; buried away from gardens, wells, ditches, or areas where children play; or wrapped and placed in the garbage for disposal. *	Animal wastes are left to decompose on grass or soil. Wastes scattered over a wide area.	Animal wastes are left on paved surfaces, concentrated in pen or yard areas, or dumped down a storm drain or in a ditch.	
<b>Grass clippings, leaves, and other yard wastes</b>	Grass clippings, leaves, and other yard wastes are swept off paved surfaces and onto lawns away from water flow routes. Leaves and other yard wastes are composted.	Leaves and other yard wastes are piled on the lawn next to the street for collection.	Grass clippings, leaves, and other yard wastes are left on driveways, streets, and other paved areas to be carried off by stormwater. Yard waste is burned on-site (illegal in NJ).	

\* Be sure to check local regulations regarding burying or landfilling pet and animal wastes.



**Figure 4. Roof drainage should be directed to the lawn or a flower bed and away from the foundation and paved surfaces.**

wood chip walkways. Avoid paving areas such as patios. Where you need a more solid surface, consider using a “porous pavement” made from interlocking cement blocks or rubber mats that allow spaces for rainwater to seep into the ground. If you must pour concrete, keep the paved area as short and narrow as possible.

**Is your basement protected from stormwater seepage or flooding?**

Stormwater in your basement 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 chemicals stored in your basement and carries them into the storm drain or ground. Basement windows or doors are common entry points, and should be

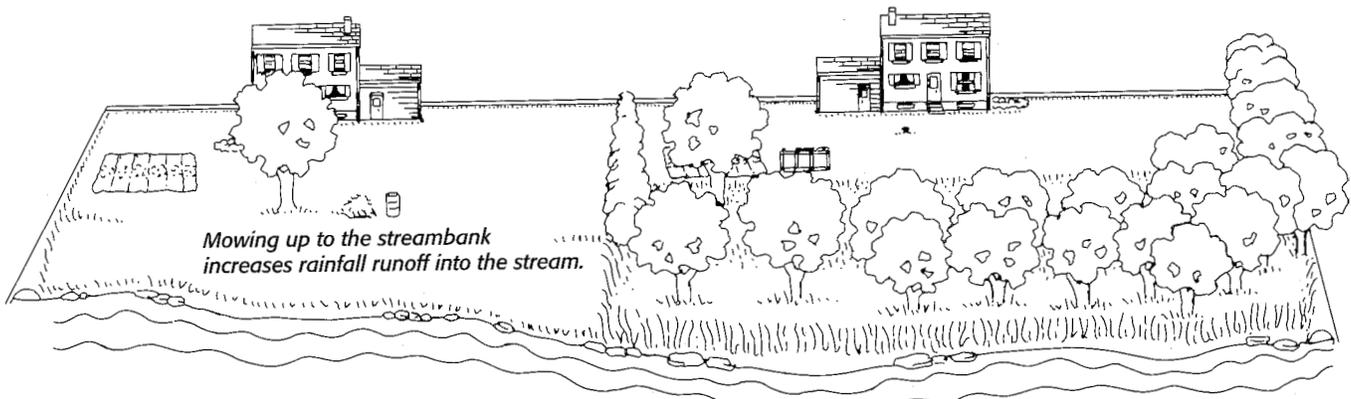
sealed against leaks. It is best if window and door sills are at least a foot above ground level. If windows are at ground level or below, they can be protected with clear plastic covers available in building supply stores. Window wells that extend above ground level can help divert stormwater. Your yard should be sloped away from the house foundation to prevent water from pooling near the house and leaking into the basement.

**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. 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 cisterns or rain barrels to catch rain water for watering lawns and gardens in dry weather.

**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. Instead, you could provide low areas landscaped with shrubs and flowers 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



**Figure 5. To help prevent erosion, leave an unmowed strip of thick vegetation along streambanks and lakeshores.**

## ASSESSMENT 2 --Managing Runoff Around Your Home

	<b>LOW RISK</b>	<b>MEDIUM RISK</b>	<b>HIGH RISK</b>	<b>YOUR RISK</b>
<b>Bare soil in lawns and gardens</b>	Bare spots in lawn are promptly seeded and topped with a layer of straw or mulch. Bare soil in gardens is covered with mulch.	Grass or other ground cover is spotty, particularly on slopes.	Spots in the lawn or garden are left without mulch or vegetation for long periods.	
<b>Bare soil during construction</b>	Bare soil is seeded and mulched as soon as possible (before construction is completed). Sediment barriers are used until grass covers soil.	Soil is left bare until construction is completed. Sediment barriers are installed and maintained to detain muddy runoff until grass covers soil.	Soil is left bare and no sediment barriers are used.	
<b>Paved surfaces</b>	Paved surfaces are minimized. Alternatives such as wood chips or paving blocks are used for walkways, patios, and other areas.	Some small areas are paved for patios or a basketball court.	Paved surfaces are used extensively.	
<b>Basement protection</b>	Stormwater is diverted from basement windows by window well covers and other devices. Yard is sloped away from the foundation. Downspouts direct roof drainage away from the house.	No special water diversion methods are installed, but stormwater has never entered the basement.	No water diversion methods are attempted. Stormwater runoff has entered the basement or flows near the foundation.	
<b>Roof drainage</b>	Downspouts and drip lines direct roof drainage onto a 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 discharge onto paved surfaces, or downspouts are connected directly to storm drains.	
<b>Landscaping and buffer strips</b>	Yard is landscaped to slow the flow of stormwater and provide areas where water soaks into the ground. Unmowed buffer strips of thick vegetation are left along streams or lakeshores.	No areas are landscaped to encourage water to soak in, but yard is relatively flat and little runoff occurs. Mowed grass and spotty vegetation exists adjacent to a stream or lake.	There is no landscaping to slow the flow of stormwater, especially on hilly, erodible properties. Stream banks or lakeshores are eroding.	

large lot, consider “naturalizing” areas with native plants. If your property adjoins a 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. A good source for ideas is your local office of Rutgers Cooperative Extension or the local Soil Conservation District office.

### **Assessment 2 --Managing Runoff Around Your Home**

For each section on the assessment table on the previous page, put the number of your risk level (1, 2, or 3) in the column labeled “Your Risk.” Select the answer that best matches your situation. Refer to the information in Part 2 above if you need more information to complete this chart.

### ***Responding to Risks***

As before, your goal is to lower your risks. Use the Action Checklist on page 25 to record medium and high risk practices. Use the recommendations in Part 2 to help reduce your risks.

## **ACTION CHECKLIST**

Go back over the assessment charts and look for the high and medium risks you identified. Write them on the chart on page 25. For each medium and high risk, write down the improvements you plan to make. Use recommendations from this worksheet and other resources 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 eliminate the most serious risks as soon as you can. Often it helps to tackle the inexpensive actions first.



## Who to contact for more information about stormwater.

**Landscape management.** Contact your county office of Rutgers Cooperative Extension for information on landscaping, preventing or controlling nonpoint source pollution, and stormwater management techniques.

**Publications and Resources.** Contact NJ Department of Environmental Protection, Office of Environmental Planning, CN 418, Trenton, NJ, 08625, (609) 633-1179 for the following stormwater publications:

*What's a Watershed?*

*What is Groundwater?*

*How Does Urbanization Change a Watershed?*

*Bay Book: A Guide to Reducing Water Pollution at Home*, 1993, by the Alliance for the Chesapeake Bay, 6600 York Rd., Baltimore, MD 21212, (800) 662-2747.

Stormwater-related publications available free from University of Wisconsin-Extension Publications, Room 170, 630 W. Mifflin St., Madison, WI 53703, (608) 262-3346.

*Storm Sewers: The Rivers Beneath Our Feet (GWQ004)*,

*Cleaning Up Stormwater Runoff (GWQ016)*

*Car Care for Cleaner Water (GWQ019)*

*Pet Waste and Water Quality (GWQ006)*

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This Home\*A\*Syst assessment does not cover all potential risks related to stormwater which could affect health or environmental quality and economic impacts. It is meant to serve as a starting point for identifying and addressing the most apparent risks. There are other Home\*A\*Syst worksheets on a variety of topics to help homeowners examine and address their most important environmental concerns.

This worksheet was written by Carl DuPoldt, Environmental Engineer, Natural Resource Conservation Service, Somerset, New Jersey and Carolyn Johnson, Water Quality Education Specialist, University of Wisconsin-Extension, Milwaukee.

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