



Chapter 7. Managing Stormwater around Your Home

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

1. Reducing pollutants in runoff

- ◆ Pesticides and fertilizers
- ◆ Pet and other animal wastes
- ◆ Automotive wastes
- ◆ Winter deicers
- ◆ Grass clippings and yard waste

2. Controlling runoff

- ◆ Preventing soil erosion
- ◆ Minimizing paved surfaces
- ◆ Basement flood protection
- ◆ Roof drainage
- ◆ Landscaping

What is stormwater and why should you be concerned?

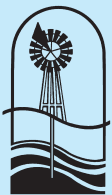
Stormwater is water from rain or melting snow that does not soak into the ground. It flows down slopes and roads, along ditches or from rooftops, over paved areas, across bare soil, and through sloped lawns and fields. As it flows, this runoff collects and transports soil, pet waste, salt, pesticides, fertilizer, oil and grease, yard waste, litter and other potential pollutants. You don't need a heavy rainstorm to send pollutants rushing toward streams, wetlands and lakes—your hose can supply enough water. Even if your house is not on the waterfront, storm drains or storm sewers carry runoff from your neighborhood to the nearest stream, wetland or body of water. Contrary to popular belief, most storm sewers do not carry stormwater to sewage plants for treatment. Often they flow right into the water you enjoy for swimming and fishing.

Polluted stormwater lowers the quality of Michigan's lakes, rivers and wetlands. Soil clouds water and degrades habitat for fish and water plants. Nutrients such as phosphorus and nitrogen from fertilizers and animal wastes 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, waterfowl and other animal waste can affect nearby inland lakes and streams. As many people have discovered, stormwater can be a problem closer to home, flowing into basements, where it can be difficult and hazardous to clean up. Stormwater can also flow down an abandoned well or poorly sealed well casing (pipe) and contaminate drinking water.

In Michigan and across the country, public officials are turning their pollution control efforts from wastewater discharges to stormwater management in urban and rural areas. The problem cannot be treated in the same way as water pollution from discharge pipes. This pollution does not come from a few sources. It is carried by stormwater from every street, parking lot, yard and garden. The problem can be solved only by an individualized and collaborative effort from everyone.

There are two ways to reduce the risks posed by stormwater:

- ◆ Keep pollutants out of stormwater.
- ◆ Reduce the amount of stormwater runoff.



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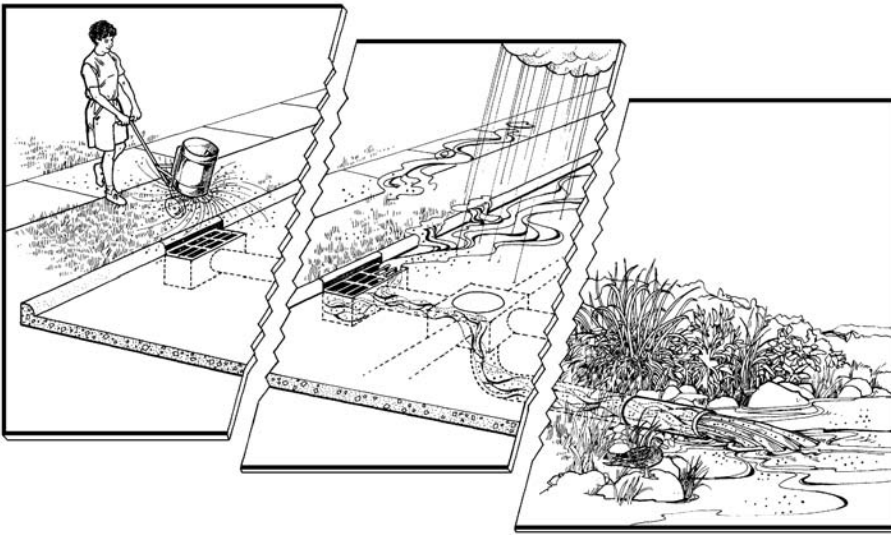


Figure 1: Chemicals used near storm drains (storm sewers) can be carried by rain runoff into the drain and on into the nearby lake or stream.

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 the sketch of your property in Chapter 1, “Site Assessment,” draw arrows showing the direction that stormwater flows off driveways, rooftops, sidewalks and yards. 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. Infiltration is preferred, but infiltrating storm water still needs to be kept as pollutant-free as possible. During your walk, note how far it is to the nearest storm sewer, ditch, wetland, stream or body of open water.

Part 1 – Reducing Pollutants in Runoff

Stormwater is unavoidable, but its effects can be reduced by keeping harmful chemicals and materials out of the runoff (Figure 1). 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 to help identify stormwater risks on your property.

Are household products stored out of the reach of stormwater?

Most households keep lawn and garden products such as weedkillers, insecticides and fertilizers in storage. If stormwater or floodwater reaches these products, it can transport them into surface water and your well. Pool chemicals, salt from water softeners and a wide variety of other chemicals and 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 are important. You can avoid storage problems by buying what you need for a particular use and then using it according to the instructions on the label.

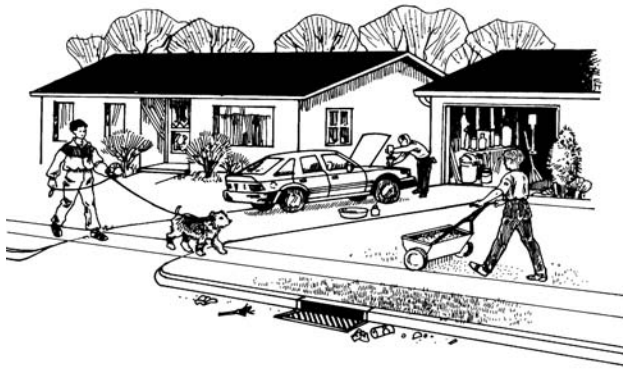
Use and handling. Safe storage is only the first step in preventing contaminated runoff. When you spill chemicals, act quickly to contain and clean up the spill. This is particularly important on paved surfaces. Granular



fertilizers and pesticides should be swept off of paved surfaces into the yard. Never wash or dump paint, fertilizers, pesticides or other chemicals into the storm drain. Using more pesticides and fertilizers than you need invites pollution problems. Timing of applications is also important. Avoid applying pesticides and chemicals if heavy rainfall is expected within 24 hours. See Chapter 9, "Caring for Your Yard and Garden," for more information on using these yard and garden products.

Are any motor 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 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 or on the ground. These wastes will end up in a nearby lake or stream, or they may pollute your drinking water.



Washing your car in the driveway creates runoff problems without the assistance of 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.

Boats and campers with wastewater collection systems should be drained at designated wastewater disposal sites, not on the ground or into storm sewers, where they can contaminate surface water.

Do you use road salt or other deicing products?

All road salt and deicers eventually wash off of 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 and lakes. 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 or gravel as less toxic alternatives. Chipping ice off pavement is another good choice.

How do you keep animal wastes from becoming a pollution problem?

Droppings from dogs and cats and from commonly kept animals such as rabbits, goats and chickens can be troublesome in two ways. First, pet wastes contain nutrients that can promote the growth of algae if they enter streams and lakes. Second, animal droppings are sources of disease organisms. 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. Droppings should be buried if local laws allow, flushed along with human wastes down the toilet or placed in the trash (depending on local rules).

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 by letting their clippings and other plant debris go down the storm drain. This can lead to water that is overfertilized and unsuitable for recreation. This risk is especially high in urban areas because of the large areas of hard surfaces enabling more runoff.

Burning is not an environmentally friendly alternative. Hydrocarbons and nutrients 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 problems with plant waste is easy—sweep clippings back onto the grass, and compost leaves on your property to recycle nutrients for later use. Many communities have plant material pickups and provide wood chips and compost for gardening.

✓ Assessment 1 – Reducing Pollutants in Runoff

Use the following assessment to rate your stormwater pollution risks. For each question, write your risk level (low, medium or high) in the column labeled “Your risk.” Although some choices may not correspond exactly to your situation, choose the response that fits best. Refer back to Part 1 if you need more information to complete this assessment.

	Low risk/ recommended	Medium risk/ potential hazard	High risk/ unsafe situation	Your risk
Storage of pesticides, fertilizers and other potentially harmful chemicals	Stored in waterproof containers in garage, shed or basement above reach of stormwater.	Stored in waterproof containers but within reach of stormwater.	Stored in non-waterproof containers outdoors or within reach of stormwater.	
Handling and use of pesticides, fertilizers and outdoor chemicals	Spills or misapplications cleaned up properly and immediately, particularly on paved surfaces. Amounts applied according to label. Applications timed to avoid rain.	Applications applied when rainfall is imminent or predicted.	Spills or misapplications not cleaned up. Products used in amounts higher than label recommendations.	
Vehicle washing	Cars, trucks, campers, etc., taken to a commercial car wash or spray booth.	Cars, trucks or other vehicles washed on a lawn or gravel drive.	Cars, trucks or other vehicles washed on driveways, streets or other paved areas.	
Motor wastes	Oil drips and fluid spills cleaned up. Dirty car parts and other vehicle wastes kept out of stormwater runoff.	Drips not cleaned up. Car parts and other vehicle wastes piled on unpaved areas outside.	Used oil, antifreeze and other wastes dumped down the storm sewer, in a ditch or on the ground.	

A boxed risk level indicates level required for Residential Environmental Assurance Program certification.

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...Assessment 1 continued

	Low risk/ recommended	Medium risk/ potential hazard	High risk/ unsafe situation	Your risk
Pet and animal wastes	Animal and pet wastes (droppings) are flushed or buried away from any garden, well, ditch or area where children play.	Animal wastes left to decompose on grass or soil. Wastes scattered over wide areas away from ditches, play areas, well or storm drain.	Animal wastes left on paved surfaces or concentrated in pen or yard areas or dumped down the storm drain or in a ditch.	
Grass clippings, leaves, mulch and other yard waste	Clippings, leaves and other yard wastes swept off paved surfaces and onto lawns away from water flow routes. Leaves and other yard wastes composted.	Leaves and other yard wastes piled on the lawn next to the street for collection. Leaves and other yard wastes burned outdoors away from paved areas or ditches.	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 on paved areas or in ditches.	

A boxed risk level indicates level required for Residential Environmental Assurance Program certification.

Responding to risks

Your goal is to lower your risks. Turn to the Action Checklist at the end of this chapter to record the medium and high risks you have identified. 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, landscaping 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, in 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 straw over newly seeded areas or chip mulch over gardens 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 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, brick pavers or rubber mats with spaces that allow 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 three ways: the water can carry chemical contaminants or disease organisms into your home; the water can pick up chemicals stored in your basement and carry them into the sewer or ground; and the water creates electrocution risks. 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 or plant areas, the water will have a chance to soak naturally into the ground. Aim your roof downspouts away from foundations and paved surfaces. Keeping gutters clean helps move water to intended absorption areas. 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 rainwater 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 have slopes that encourage water to run off onto neighboring property or streets. Instead, you could provide a **rain garden**, a low maintenance perennial garden that is designed to catch stormwater and allow it to soak into the ground. It is planted in a wet spot, a place where water naturally flows, or a place where water can be diverted. A rain garden, when installed correctly, should not have standing water for more than a day; it is not a pond. Building a successful rain garden involves a good location, some soil work and the right plants. See "Resources" at the end of this chapter.



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 native plants. If your property adjoins a lake or stream, one of the best ways to slow and filter runoff is to have a buffer strip of thick natural vegetation along the waterfront. A good source for ideas is your local MSU Extension or conservation district office.



✓ Assessment 2 – Managing Runoff around Your Home

In the assessment, write your risk level (low, medium or high) 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 assessment.

	Low risk/ recommended	Medium risk/ potential hazard	High risk/ unsafe situation	Your risk
Bare soil in lawns and gardens	Bare lawn spots promptly seeded and topped with a straw layer. Bare garden soil 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 or remodeling	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.	
Paved surfaces	Paved surfaces minimized. Alternatives such as wood chips or paving blocks used for walkways and other areas.	Some small areas paved for patios or basketball.	Paved surfaces used extensively.	
Basement protection	Stormwater diverted from basement windows by window well covers and other devices. Yard is sloped away from foundation, and downspouts direct roof drainage away from house.	No special water diversion methods installed, but stormwater has never entered basement.	Water diversion methods attempted. Stormwater runoff has entered basement or flows near the foundation.	
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.	
Landscaping and buffer strips	Yard landscaped to slow stormwater flow and provide areas where water soaks into the ground. Unmowed vegetation buffer strips present along streams and lakeshores.	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. Stream banks or lakeshores eroding.	
A boxed risk level indicates level required for Residential Environmental Assurance Program certification.				

Responding to your risks

As before, your goal is to lower your risks. On the Action Checklist below, record medium and high risks you have identified. 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. Record them below. For each medium and high risk listed, write down the improvements you plan to make. Use recommendations from this chapter and other resources to decide on an action you are likely to complete. A target date will help 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.

Write all high and medium risks here.	What can you do to reduce the risk?	Target date for action:
Fertilizer and pesticides stored on soil floor in storage shed.	Put fertilizer bags in plastic covered storage bins, put on shelf out of hazard of flooding.	One week from today: May 15

Resources

Landscape management

Contact your local Michigan State University Extension office for information on landscape management. Contact the Department of Environmental Quality Environmental Response Division for information on non-point source pollution. Contact the Natural Resources Conservation Service or local drain commissioner for information on stormwater management techniques.

Websites and publications

“Lakescaping for Wildlife and Water Quality.” MSU Extension Bulletin WQ57

“Landscaping for Water Quality.” 2004. Jane Secord (ed.), Center for Environmental Study, Grand Rapids, Mich. Available at www.deq.state.mi.us/documents/deq-wb-nps-Landscaping-for-Water-Quality.pdf

Stormwater-related publications available from the West Michigan Environmental Action Council, 1007 Lake Drive SE, Grand Rapids, MI 49506; 616-451-3051; www.wmeac.org

www.RainGardens.org

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