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EC98-795 Farm*A*Syst Nebraska's System for Assessing Water Contamination Fact Sheet 17: Improving Stormwater Management at Residential Sites

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FACT SHEET 17

Nebraska's System for Assessing Water Contamination Risk

Improving Stormwater Management at Residential Sites

Stormwater is water from irrigation, rain or melting snow that does not soak into the ground. It flows from rooftops, over paved areas and bare soil, and across sloped lawns. As it flows, this runoff can collect and transport soil, pet waste, livestock manure, salt, pesticides, fertilizer, oil and grease, leaves, litter and other potential pollutants. A heavy rainstorm isn't needed to send pollutants rushing toward streams, wetlands and lakes. A garden hose alone can supply enough water.

Even if your homesite is not on a waterfront, natural surface drainage and constructed storm drains and sewers convey runoff from your property to a nearby body of water or stream. **Contrary to popular belief, many storm sewers do not carry stormwater to wastewater treatment plants** (Figure 1).

Polluted stormwater degrades our lakes, rivers and wetlands. Soil clouds water and degrades habitat for fish and water plants. Nutrients such as phosphorus promote the growth of algae, which crowds 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 can make nearby lakes and ponds unsafe for wading and swimming after storms.

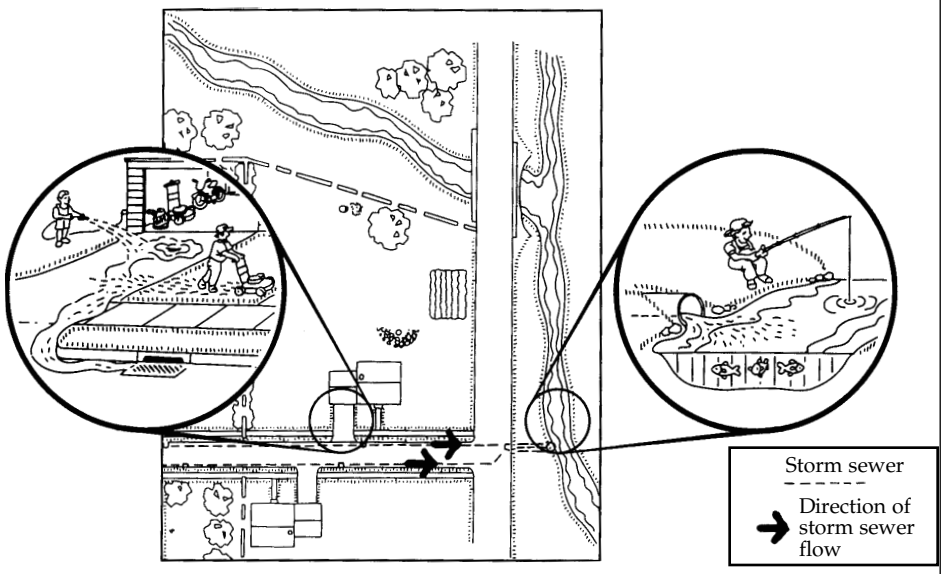

Figure 1. Runoff that flows into storm sewers goes directly to streams and lakes without treatment.

As many people have discovered, stormwater can be a problem closer to home. It can flow down a poorly sealed well or an unused well which has not been properly decommissioned and contaminate drinking water. In areas with porous,

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sandy soils, pollutants in runoff may reach groundwater.

Across the country, public officials are turning their pollution control efforts from wastewater discharges 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). Contaminants are carried by stormwater from every street, parking lot, sidewalk, driveway, yard, garden and any other open area. The problem can be solved only with everyone's help.

1. Reducing Pollutants in Runoff

Stormwater is unavoidable, but its negative effects can be reduced by keeping harmful chemicals and materials out of the runoff. This section reviews potential sources of contamination and offers ways to minimize them.

Where does stormwater go?

The next time you are home during a rain (when lightning is not occurring), head outdoors with your boots and umbrella and watch where the rainwater goes. Or make the best observation possible from inside your residence. On a sketch of your property, draw arrows showing the direction that stormwater flows off driveways, rooftops, sidewalks and yards. A sample map is shown in Figure 2. Does water soak into the ground quickly, or does it puddle in places and flow off lawns and driveways? 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. 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 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,

Common Sources of Stormwater Pollutants

Pollutant	Common sources
Silt, sand, and clay particles and other debris	Construction sites; bare spots in lawns and gardens; wastewater from washing cars and trucks on driveways or parking lots; unprotected streambanks; farm fields
Nutrients	Overused or spilled fertilizers, pet waste, livestock manure, grass clippings and leaves left on streets and sidewalks; leaves burned in ditches
Disease organisms	Pet waste, livestock manure and garbage
Hydrocarbons	Car and truck exhaust; leaks and spills of oil and gas; burning leaves and garbage
Pesticides	Pesticides overapplied or applied before a rainstorm; spills and leaks
Metals	Cars and trucks (brake and tire wear, exhaust); galvanized metal gutters and downspouts

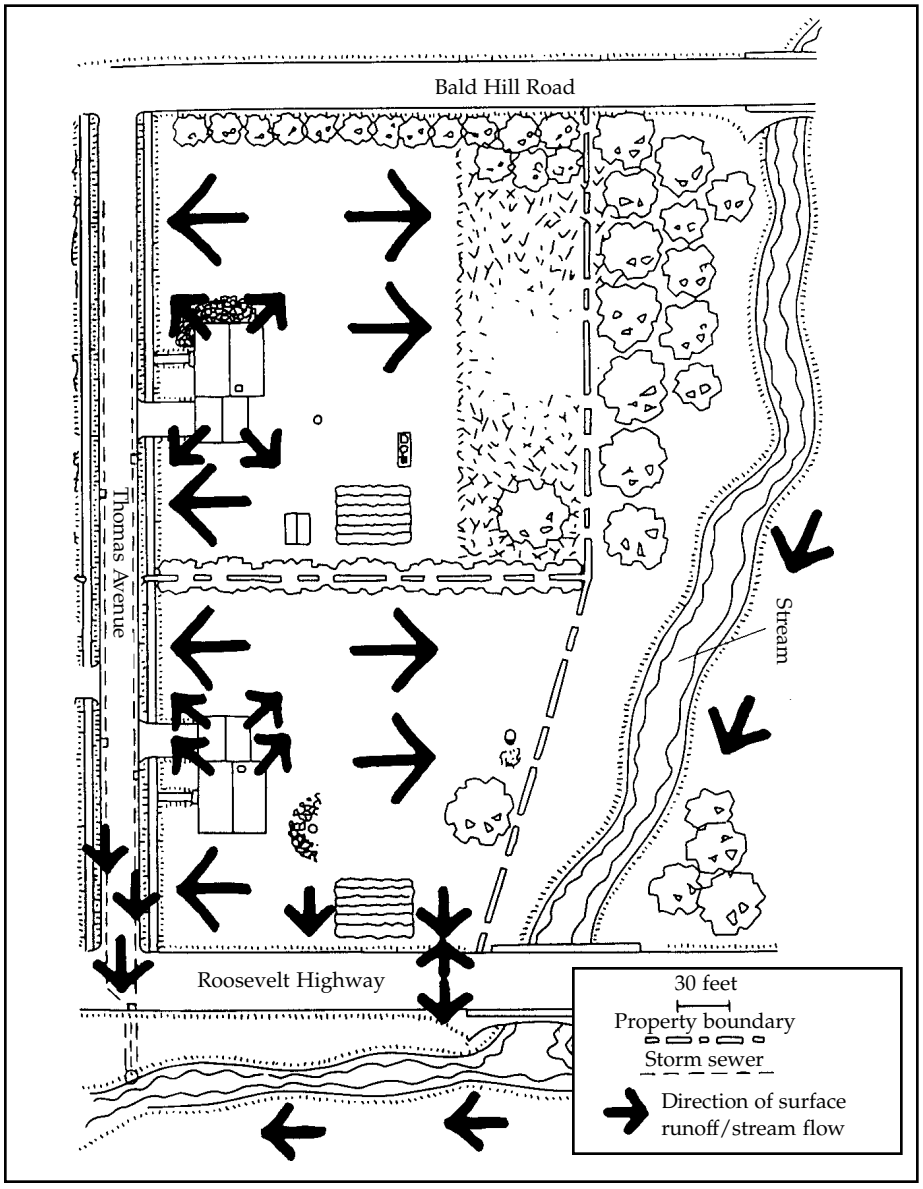

Figure 2. Example map showing direction of surface runoff and stream flow.

brake fluid, and other automotive fluids are easily carried away by a rainstorm. An oily sheen on runoff from your driveway is a sure sign that you need to be more careful. Pans, carpet scraps and matting can catch drips. Routine maintenance can prevent your car from leaking and help identify potential leaks. If you change your own oil, be careful 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 without the help of a rainstorm—your hose provides the water. The dirty, soapy runoff drains directly into storm sewers, carrying oil and other pollutants as it goes. Try washing your car on the lawn or, better yet, take it to a commercial car wash that sends its dirty water to a wastewater treatment plant.

Are fertilizers, pesticides and other chemical products stored outside the reach of stormwater?

Most households store lawn and garden products such as weed killers, insect killers and fertilizers. If stormwater or floodwater reaches these products, it can transport them into surface water and groundwater. 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 flood water is important. You can avoid storage problems by buying only what you need for a particular task and then using up the product.

Do you use and handle chemicals safely?

Safe storage is only the first step in preventing contaminated runoff. When mixing chemicals, try to do it within a

washtub so spills will be contained. If you spill chemicals, act quickly to contain and clean up the spill. This is particularly important on paved surfaces. Using more pesticides or fertilizers than you need invites problems. Always read and follow label directions. Timing of applications is also important. For instance, some pesticides require moisture for activation. If the soil is dry, some water in the form of rainfall or irrigation following application will be needed to activate the pesticide. On the other hand, if the soil is at or near saturation, any additional moisture has the potential to leave the area as runoff. Runoff can occur under any soil moisture conditions during a heavy rain. DO NOT apply pesticides and chemicals if heavy rain is expected within 24 hours.

Do you use road salt or other deicing products?

Road salt and deicers 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 into streams and lakes. Salt in high concentrations is harmful to wildlife and plants. Use less to keep these chemicals out of natural systems. If you use too much, clean up the excess. Consider using sand or kitty litter as less toxic alternatives. Chipping ice off pavement is an even better choice, although care must be taken not to damage the pavement surface.

How are animal wastes kept from becoming a pollution problem?

Droppings from dogs and cats and from other commonly kept animals like exotic birds, rabbits, goats and chickens can be troublesome in two ways. First, pet and livestock wastes contain nutrients that can promote the growth of algae if they enter streams and lakes. Second, animal droppings can be a source of disease. The risk of stormwater contamination increases if pet wastes are allowed to accumulate in animal pen areas or left on sidewalks, streets, or driveways where runoff can carry them to storm sewers or surface water. Droppings that are not mixed with litter or other materials should be flushed down the toilet. Or, if local laws allow it, droppings may either be buried or wrapped and put in the garbage for disposal.

Are yard and garden 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 (Figure 1). 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 unattractive or green with algae and unsuitable for recreation. Bacterial degradation of these organic wastes can significantly reduce oxygen levels in shallow waters during summer months, leading to fish kills. Avoiding the problem is easy—sweep clippings back onto the grass, and compost leaves and garden wastes on your property to recycle nutrients (Figure 3).

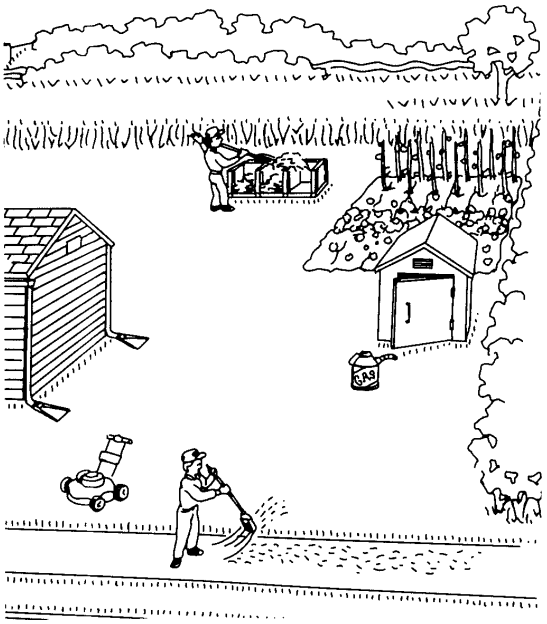

Figure 3. Sweeping grass clippings onto the lawn and composting help to keep yard waste out of storm sewers.

2. Landscaping and Site Management to Control Runoff

Some stormwater risks can be controlled by making changes to buildings, paved surfaces, the 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?

Areas of bare soil often exist in vegetable and flower gardens, on newly seeded lawns and around construction projects. Even on gentle slopes, water from rain and snow can remove large amounts of soil and carry 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. If you are working with a contractor, insist that precautions are taken to control runoff and erosion during construction.

Can you eliminate paved surfaces or install alternatives?

Concrete and asphalt roads, driveways, and walkways prevent rainwater from soaking into the ground. When you have the choice, consider alternative materials such as gravel or wood chips for walkways. Avoid paving areas such as patios. Where you need a more solid surface, consider using a "porous pavement" made from interlocking concrete blocks/pavers or rubber mats that allow spaces for rainwater to seep into the ground. If an area must be paved, keep it as small as possible.

Some cities and municipalities limit the total paved area allowed on property. Check with your planning and zoning department about minimum porous area requirements that might exist.

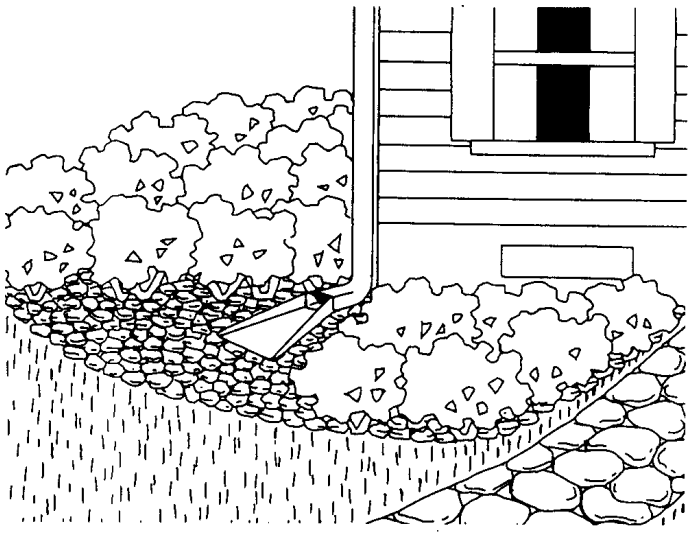

Figure 4. Roof drainage should be directed to the lawn or a flower bed and away from the foundation and paved surfaces.

Does roof water flow onto pavement or grass?

Your house roof, like pavement, sheds water. If downspouts from roof gutters empty onto grassy areas, the water will have a chance to soak into the ground. Aim downspouts away from foundations and paved surfaces (Figure 4). For roofs without gutters, plant grass, spread mulch, or use gravel under the drip line to prevent soil erosion and increase the soil'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?

If possible, take an active role in planning your site design before home construction begins, taking soils, topography, and drainage into consideration. Many times, alternatives to wide, paved driveways and sidewalks, and preserving any natural drainage ways will provide economic advantages to the new homeowner.

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 to encourage water to soak into the ground. If your yard is hilly, you can terrace slopes to slow the flow of runoff. If you have a large lot, consider "naturalizing" areas with prairie, woodland, or wetland 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 vegetation along the waterfront (Figure 5). Good sources for ideas are your local Cooperative Extension and Natural Resources Conservation Service.

CONTACTS AND REFERENCES

Who to call about stormwater management...

Your Natural Resources District or Natural Resources Conservation Service office.

Your local University of Nebraska Cooperative Extension office.

Nebraska Department of Environmental Quality, P.O. Box 48922, Lincoln, NE 68509-8922 (402) 471-2186.

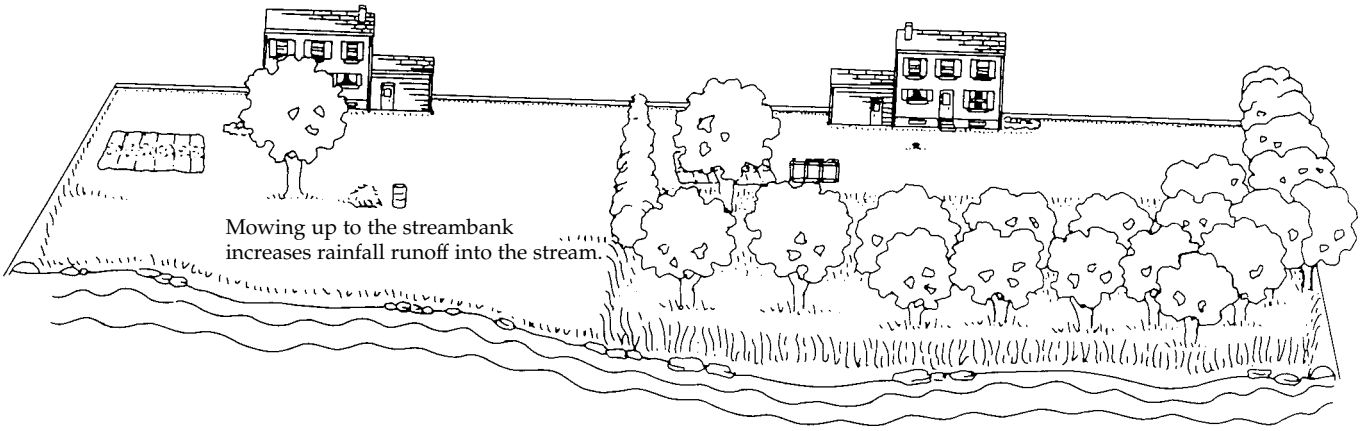

Figure 5. To help prevent erosion, leave an unmowed buffer strip of thick vegetation along streambanks and lakeshores.

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