

Stormwater Management: Water Pollution and Our Own Yards

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This NebGuide describes practices to reduce water pollution and conserve water resources by reducing the amount of pollutants and runoff water that leave a property. This is part of a series.

Protection of water quality is an environmental issue everyone faces. When it rains and snow melts, water runs across and off our property. This runoff water is referred to as stormwater. As stormwater flows across surfaces, it picks up pollutants in its path and eventually deposits them into streams, rivers, ponds, lakes, or other surface water.

It is through stormwater that many pollutants such as sediment, nutrients, bacteria, heavy metals, and others reach surface water. This is called nonpoint source pollution. It cannot be easily traced to one source or one property. Rather, small amounts from many sources and many properties eventually accumulate to amounts that impair water resources.

Nonpoint source pollution is one of the leading causes of water quality degradation. It results in impaired drinking water, excess algal growth, fish kills, decreased aesthetics, reduced recreation and tourism, and more. It is environmentally and economically costly. Virtually everyone contributes to nonpoint source pollution and every homeowner can do something to help reduce it.

Where Does Stormwater Go?

Every property drains to a waterway of some type, regardless of whether the property is located near surface water or not. In urban areas, rainwater runs across rooftops, paved areas, and yards, and is directed to storm drains. In most municipalities, stormwater is discharged into surface water and is not treated to remove pollutants. The same is true

of non-stormwater discharges such as improper connections to the drainage system or illegal dumping.

While the amount of pollutants originating from a single residential lot is small (*Figure 1*), these pollutants combine with pollutants from other lots and from municipal and business properties. Streams, rivers, and lakes are interconnected. Once pollutants reach a waterway, the pollution from one town combines with pollution from other cities, towns, rural areas, and so on. Everyone lives in a watershed, that area of land that drains to a specific body of water, and everyday actions affect water quality in watersheds.

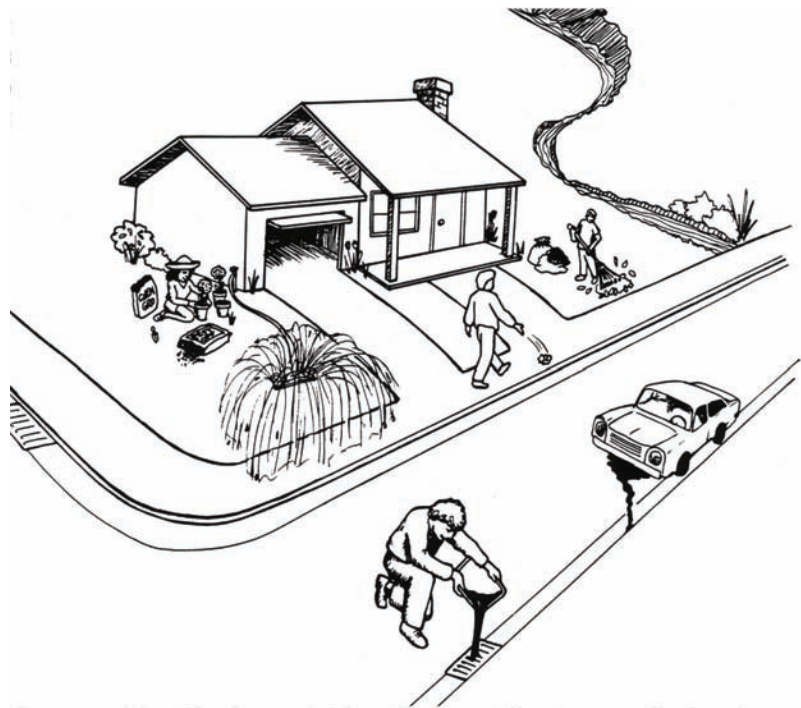


Figure 1. Homeowners can help prevent runoff pollution by keeping contaminants such as oil, pesticides and other wastes, as well as excess irrigation water, out of the street or storm drain, from which runoff water is discharged directly into surface water. (Source: Environmental Protection Agency)

Table I. Common stormwater pollutants and their sources.

<i>Pollutant</i>	<i>Common Sources</i>
Sediment (sand, silt, clay particles)	Bare spots in lawns and gardens, construction sites, streambank erosion, sloping areas, farm fields, wastewater from washing vehicles
Nutrients (nitrogen, phosphorous, others)	Over-application or spilled fertilizer, pet waste, livestock manure, grass clippings, leaves
Pesticides	Over-application or spilled material, leaks, sprayer wash-out
Disease-causing Organisms (bacteria, viruses)	Pet waste, livestock manure, garbage
Hydrocarbons	Engine exhaust, fuel and oil spills and leaks, vehicle tire wear, burning plastics
Metals	Vehicle brake and tire wear, engine exhaust, metal gutters and downspouts, scrap piles

Pollution from Residential Property

Many pollutants can leave residential properties in runoff: sediment, nutrients, chemicals, pathogens, vehicle-related waste, heavy metals, and more (*Table I*). Whether these materials pollute water or not depends on how their use, storage, and disposal are managed; and how property is designed and managed, especially lawns, landscapes, and impermeable surfaces.

Environmental Benefits of Lawns and Landscapes

Lawns and landscapes can be a source of pollution, but well-designed and properly managed landscapes minimize pollution potential as well as provide many benefits.

Planted areas — greenspace — protect the environment by stabilizing soil to reduce soil erosion, slowing and reducing runoff, filtering pollutants, and cooling the air. When rain falls on greenspace, the amount of runoff water is reduced through natural retention. Rainwater soaks into planted areas where plant roots, the soil structure, and soil microbes filter many pollutants before they reach surface or groundwater. Increased infiltration helps replenish groundwater resources. Trees and shrubs cool the space around buildings, lowering energy demands. Plants absorb and remove certain air pollutants to improve air quality. Parks, natural areas, and residential landscaping increase property values, provide wildlife habitat, and increase potential for recreational activities.

Because of these many benefits, the use of greenspace to manage stormwater and reduce water pollution is on the rise. Municipalities refer to greenspace as green infrastructure that uses trees and other vegetation to manage and mitigate stormwater naturally, rather than through storm drains that discharge to surface water.

Reduce Water Pollution at Home

Pollution from runoff begins in small amounts; but can accumulate to levels that impair water quality. The opposite also can be true. The accumulated effects of individuals taking small-scale actions can have a large-scale benefit on water quality.

Homeowners can help reduce water pollution by using practices that reduce the amounts of runoff water and pollutants leaving their property. First, recognize any property is part of a larger ecosystem. Everyone lives in a watershed with all property interconnected to water, even if it is not near a stream or lake. Second, develop private sites and design landscapes with the health of the watershed in mind. Retain and/or plant more vegetated areas. Reduce the area of impermeable surfaces such as sidewalks, driveways, and patios, or consider using porous pavers or similar material. Select native and adapted plants and plant them in suitable locations for their growing requirements. Third, understand which lawn and landscape care products and management practices support sustainable landscape methods. Finally, focus on methods that reduce or slow runoff water from a property and on practices that reduce the amount of pollutants leaving a site.

Reduce and Slow Runoff Water

A lower volume of slower moving water is less likely to cause flooding and streambank or soil erosion, and will collect and carry fewer pollutants in the flowing water. To reduce the volume and velocity of runoff water leaving a property, increase the amount of pervious areas (surfaces that allow water to move into the soil such as planted areas or porous pavement); increase the number of obstacles water encounters, including shrubs and shade trees; and divert runoff water away from impervious areas onto vegetated or other pervious

surfaces. Doing this will help runoff water soak into the soil for plants to use and for roots and soil to filter pollutants. This is referred to as bioretention. Following are some best management practices used to collect and temporarily hold runoff water from residential and business properties.

- Direct downspouts away from paved areas and onto areas such as relatively flat or slightly sunken lawn areas, grassy swales, landscape beds, or rain gardens.
- Use natural drainage patterns, site grading, and/or berms to channel rainwater away from impervious surfaces and onto vegetated areas.
- Collect rain water in rain barrels, cisterns, stormwater planters, or other rain harvesting methods.
- Plant and maintain dense, healthy plant cover, especially on slopes. Shrub and tree leaves intercept and slow rainfall, and plant roots use soil moisture allowing for increased infiltration of water.
- Plant practical turf areas. Avoid planting high-maintenance turfgrass on steep slopes, in deep shade, or in areas un conducive to healthy turf growth or reasonable maintenance access. Instead, select adapted or native turfgrasses or other ground covers. Increase the use of properly sited landscape beds to reduce large expanses of turfgrass, thus potentially reducing irrigation and pesticide inputs.
- Keep impervious, non-plant surfaces to a minimum. Where feasible, use permeable surfaces such as bricks, cobblestones, gravel, turf pavers, porous pavement, mulch, or others.
- Manage soils to increase infiltration of water and healthy root growth. Amend soils with organic matter prior to planting or by topdressing and using organic mulches after planting. Avoid creating soil compaction and correct existing compaction. For example, core aerate lawns on a regular basis.
- Install well-engineered, vegetated eco-roofs on structurally sound roofs.
- Use water conservation practices. Avoid water running off during irrigation and avoid overwatering. Saturated soils increase the potential for water runoff.

Keep Pollutants Out of the Path of Runoff Water

Be aware of materials and products used around the home and landscape that are pollution sources (*Table I*). Keep pollutants out of the path of stormwater by storing, handling, using, and disposing of them only as needed and recommended. Following are several best management practices to use.

- Keep fertilizer granules, pesticide granules, and yard waste (grass clippings, tree leaves, pulled weeds, land-

scape soil) off paved and other impermeable surfaces. Sweep them into a dustpan, or use a leaf blower, to redistribute them onto targeted sites (i.e. the lawn), and out of the path of runoff water. Do not hose them into the street.

- Apply fertilizers based on soil test results and calibrate spreaders to ensure application of the correct amount. Avoid over applying products, thus increasing the risk of runoff pollution. Consider using low/no phosphorous fertilizer. In many areas, supplemental phosphorous is unnecessary.
- Use integrated pest management (IPM) practices. Positively identify the cause of plant damage and the best control methods before treating. Apply pesticides at the correct time and recommended rate to control harmful pests. Read and follow all label directions for application, storage, and disposal. Select the least toxic pesticide that will effectively control identified pests. Use adapted, pest-resistant plants.
- Store and dispose of household hazardous waste (pesticides, paint thinners, cleaning products, oil, anti-freeze, etc.) according to label direction and out of reach of storm or flood waters. Do not dump old or excess products into the sink or toilet, street gutter or ditch, storm drain, or onto the ground. Clean up spills immediately.
- Recycle, reuse, or reduce plant waste. Leave grass clippings on lawns or compost them. Chip woody waste for compost or to use as mulch.
- Clean roof gutters and street curbs of tree leaves, grass clippings, sediment, litter, and other debris. Tend to a storm drain in your neighborhood to keep it clear of plant waste and other debris.
- Pick up litter and clean oil drips and fluid spills from pavement.
- Scoop pet feces, secure in bag and place in the trash for disposal.
- Wash cars at a commercial carwash, not in the driveway. Although it may seem like a good idea to use the water, it is unwise to drive cars onto lawns to wash them. Doing so causes wear and tear on turfgrass, and creates soil compaction that can lead to additional runoff of water, and potentially damage turfgrass from vehicle fluid leaks and washing chemicals.
- Maintain plant cover on slopes to stabilize soil. Protect bare soil from erosion during construction and when completing landscape renovation projects by using straw bales, compost blankets, or commercial silt fencing. Promptly seed bare areas in the lawn and place mulch on bare garden soils. Do not stockpile soil, mulch, or other bulk materials on impervious surfaces during landscape projects.

- If residing on a lake or stream or have a pond, do not plant turfgrass right up to the water's edge. Instead, install a vegetated buffer area of native and adapted low-maintenance plants (grasses, forbs, trees) that will intercept and filter pollutant runoff, improve wildlife habitat, and add an aesthetic feature to your property.

Summary

Everyone contributes to nonpoint source pollution. By using sustainable site development and appropriate landscape design principles along with best management practices, the amount of stormwater runoff and pollutants that leave properties can be reduced, thus helping to protect water quality.

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**Index: Water Management –Water Quality
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