IANR NebGuide
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G2052

Protecting Private Drinking Water Supplies: Runoff Management

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This publication is one of six in a series developed to help rural families protect their private drinking water supplies. The greatest protection of drinking water supplies can be achieved by applying principles from all publications in the series.

Runoff is excess water from rain and melting snow that does not soak into the ground. Runoff also may include water from excess irrigation and other sources. It flows from rooftops, over paved areas and bare soil, and across sloped lawns. As it flows across your property, runoff can collect and transport soil, animal waste, salt, pesticides, fertilizers, oil and grease, litter, and other pollutants. Runoff carrying pollutants can enter your well and contaminate your drinking water. Older dug wells are most vulnerable to contamination from runoff infiltration. Any wells with casings or caps that are not watertight or that lack a grout seal in the annular space (the space between the wall of the drilled well and the outside of the well casing) are vulnerable. Improperly abandoned wells on your property can be contaminated by runoff, polluting the groundwater supplying your drinking water well. Some natural treatment occurs as runoff percolates downward through layers of soil (clay, silt, sand, and gravel.) Due to this natural treatment process, pollutants are less likely to move into properly constructed, deep, drilled wells. However, pollutants could move into groundwater that supplies drinking water in shallow wells, especially if located in sandy soil or in areas with a shallow depth to groundwater.

Good management of runoff on your property will help keep the groundwater that supplies your drinking water safe. Begin by completing the following assessment.

Observe the flow of runoff on your property. Using information from your observation, respond to the following statements. Check only those statements that accurately describe your runoff management. Unchecked statements indicate factors that could put your drinking water supply at risk of contamination. Although voluntary, risk factors should be addressed. Attempt to eliminate risk factors when possible. Following the assessment is additional information on each of the topic areas, to help you understand the associated risks.

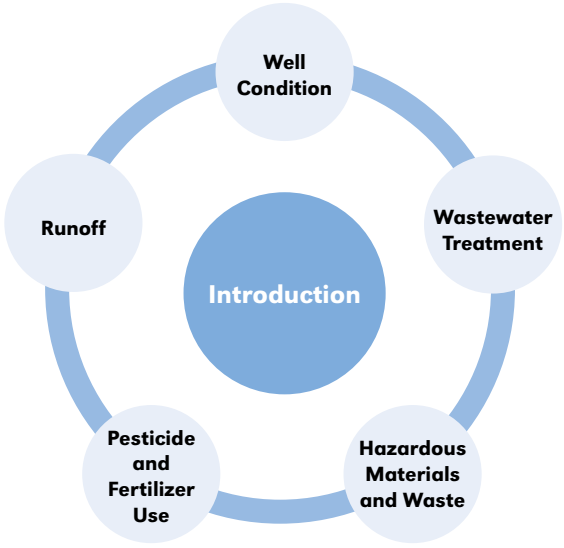

Figure 1. This NebGuide is one of six in a series designed to help rural families protect their drinking water supplies. All are available on the UNL Extension Publications website under the topic Water Management.

Landscaping and Site Management to Reduce Runoff

___ Bare soil in gardens and flower beds is covered with mulch.

___ Gravel, rock, paving blocks, bricks, wood chips, or mulch are used for walkways, patios, and other areas instead of paving.

___ Downspouts on buildings discharge water onto a grassy area or into a rain barrel.

___ Yard is landscaped to slow the flow of runoff and provide areas where water soaks into the ground, such as a rain garden.

___ Runoff does not flow toward the well or pool in the location of the well.

Pollutants in Runoff

___ No automotive oil or fluids are dumped on the ground and no drips occur.

___ Vehicles are taken to a commercial car wash.

___ Pesticides, fertilizers, and other potentially harmful chemicals are stored in waterproof containers in a garage, shed, or basement protected from runoff.

___ Pesticide, fertilizer, and other chemical spills are cleaned up immediately.

___ Pesticides, fertilizers, and other chemicals are applied according to label directions.

___ No pesticide or fertilizer applications are made when heavy rain is forecast within 24 hours.

___ Pet wastes are composted, wrapped and placed in the garbage, or buried away from the well.

___ Grass clippings, leaves, and other yard wastes are swept off paved surfaces and away from water flow routes.

Runoff on Your Property

An essential part of runoff management is minimizing the flow and directing it away from the drinking water well. Create "rain gardens," or other low areas landscaped with shrubs and flowers to encourage water to soak into the ground. If your yard is hilly, terrace slopes to slow the flow of runoff and direct it away from the well. Create a buffer strip of thick vegetation upslope from your well to stop the flow of runoff. "Naturalize" areas with prairie, woodland, or wetland plants.

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

Your house roof, like pavement, sheds water. Aim downspouts away from foundations and paved surfaces. When downspouts empty onto grassy areas, the water has a chance to soak into the ground. For roofs without gutters and downspouts, plant grass, spread mulch, or use gravel under the drip line to cushion the impact and increase the soil's capacity to absorb water. Consider using cisterns or rain barrels to catch rainwater and use it to water lawns and gardens in dry weather.

Pollutants in Runoff

Some runoff is unavoidable, but its negative effects can be reduced by keeping harmful chemicals and materials out of its path. Vehicles and other home and farm equipment are potential sources of harmful chemicals. Oil on driveways and outdoor spills of antifreeze, brake fluid, and other automotive fluids are easily carried in runoff. An oily sheen on runoff from your driveway is an indication of these pollutants in the water. If your vehicle seems to be leaking fluid, try to catch drips with pans, carpet scraps, or matting and perform maintenance as soon as possible. Routine maintenance on vehicles can identify and eliminate leaks. If you perform routine maintenance on your vehicles, collect waste oil for recycling and store oily parts and fluid in containers where runoff cannot reach them. Never dump vehicle fluids or contaminated water on the ground.

Washing vehicles in the driveway with a hose provides enough water to form runoff. The water carries detergents, oil, and other pollutants. Washing vehicles on the lawn reduces the movement of pollutants. Better yet, take vehicles to a commercial car wash that collects and either treats and recycles the wastewater or sends it to a wastewater treatment facility.

Most rural residents use and store lawn and garden fertilizers and pesticides, such as herbicides and insecticides. A variety of other chemical products, such as swimming pool chemicals and deicing salt, also can cause trouble if they are washed away and transported into groundwater. Keep these products in waterproof containers and store them up high and out of the potential path of runoff. Better yet, avoid storage problems by buying only what you need for a particular task and using up the product rather than storing the product for a year or more.

Many chemicals need to be mixed with water before being applied. Spills of the concentrated product can be carried in runoff. If chemicals are spilled, act quickly to contain and clean up the contamination. Spread an absorbent material such as cat litter on liquid chemical spills. Collect the mixture, wrap it, and take it to a household hazardous waste collection or put it in the garbage. Remove contaminated soil and dispose of properly. Better yet, mix chemicals within or over a washtub so spills will be contained.

When using pesticides and fertilizers, always read and follow label directions, applying the correct amount as specified. Some products require moisture for activation. If the soil is at or near saturation, meaning many of the soil pore spaces are filled with water, any additional moisture applied for activation has the potential to leave the area. Runoff can occur under any soil moisture conditions during a heavy rain. Do not apply pesticides or other chemicals if heavy rain is expected within 24 hours. Always follow label directions for the best overall results.

Road salt and deicers eventually wash off paved surfaces where they can be picked up and transported by runoff. Consider using sand or cat 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. Prompt snow removal will decrease the need for using deicers.

Dogs, cats, rabbits, goats, and chickens are often kept on acreages, farms, and ranches. Droppings from these animals contain nutrients (nitrate) and bacteria. Do not let pet wastes accumulate in animal pen areas or on sidewalks or driveways where runoff can carry them off. Pick up droppings and compost them separately from other yard wastes, wrap them and put them in the garbage, or bury them at a location away from the well. Check local codes and regulations to verify that these options are approved in your area and situation.

Yard and garden wastes left on sidewalks and driveways can wash away with runoff. Sweep clippings back onto the grass, and compost leaves and garden wastes on your property to recycle nutrients and improve soils.

Acknowledgments

This publication is the result of a collaborative effort between the University of Nebraska–Lincoln Extension, the Nebraska Department of Environmental Quality, the Nebraska Department of Health and Human Services, the Nebraska Well Drillers Association, and the Nebraska On-site Waste Water Association, all of whom place a high priority on protecting Nebraska's drinking water resources.

This publication was modified from the University of Nebraska–Lincoln Extension publications EC98-796, "Farm*A*Syst: Stormwater Management at Residential Sites," and EC 98-795, "Farm*A*Syst: Improving Stormwater Management at Residential Sites" which were adapted from material prepared for the Wisconsin and Minnesota Farm*A*Syst programs.

Partial funding was provided by the Nebraska Well Drillers Association, the Nebraska On-site Waste Water Association, and the Water Well Standards and Contractors' Licensing Board.

This publication has been peer reviewed.

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Issued June 2011