

Stormwater Management: Pesticide Use in the Lawn and Garden

Erin C. Bauer, Entomology Lecturer

Clyde L. Ogg, Extension Educator

This NebGuide explains how the proper use and application of lawn and garden pesticides can prevent potential water contamination from stormwater runoff.

Well-maintained lawns and gardens can create a beautiful, functional landscape around your home and provide shelter for a variety of wildlife. Through good cultural and integrated pest management (IPM) practices, the outdoor greenscape in the urban environment can remain healthy and thriving.

Along with proper plant selection and care, controlling pests in your lawn or garden is an important part of maintenance. Many cultural practices complement IPM control methods, such as:

- planting varieties resistant to pest damage, disease, and drought;
- mowing turf at proper heights;
- efficient and appropriate watering practices; and
- judicious use of pesticides.

Pesticide use should be limited where possible, but when necessary, use them responsibly. Always read and follow the pesticide label instructions before applying, such as with insecticides or herbicides, to reduce the risk of exposing humans or nontarget animals. Take care to protect the environment, which includes the proper use of pesticides to prevent contamination of water resources.

An important aspect of prevention is managing areas where stormwater runoff may come in contact with pesticides and carry them to nontarget sites. Since amounts and intensity of rainfall can vary greatly from storm to storm, it's important to plan for the effects of runoff in the worst conditions and develop best practices for preventing runoff impacts.

Regardless of an applicator's role (commercial applicator, homeowner, or municipal employee), using pesticides properly and safely will go a long way in preventing contamination of the stormwater runoff that can pollute water resources.

Identify Vulnerable Areas

When applying pesticides to the lawn or garden:

- Keep in mind vulnerable areas such as sandy soil, sink-holes, wells, streams, ponds, or storm sewers, and avoid pesticide applications on sites near these areas.
- Be aware of potential runoff from sloping driveways or lawns into storm drains or backyard ponds.
- Observe the layout of the land. Sloping areas are far more prone to carrying stormwater runoff to nontarget areas than flatter areas, and areas with heavier vegetation may buffer nontarget sites better than areas with little vegetation.

You may be able to create buffer strips near sensitive areas to absorb runoff and decrease the potential for water contamination. Buffer strips are areas of vegetation installed/maintained near or around a water source that are designed to capture pollutants, sediments, etc., before they reach the water source.

Another possible way to "capture" stormwater runoff and prevent it from going to nontarget locations is to build a rain garden near vulnerable areas. A rain garden is a sunken, planted area that is designed to soak up excess rainwater. A strategically placed rain garden can greatly decrease the potential for contamination in other areas. Nebraska Extension has a series of publications on rain gardens at <http://extensionpubs.unl.edu>.

Pesticide Selection

Choose pesticide formulations that are less likely to leach, drift, or run off the application site with stormwater to help prevent water contamination in sensitive areas. Pesticides with high water solubility, low adsorption (ability to bind to soil and plant surfaces), and moderate-to-high persistence are more likely to cause water contamination. Read the pesticide product label for warnings about its potential to contaminate water, and follow label instructions about how to properly apply the product to avoid these problems. Contact your local Nebraska Extension office or the chemical manufacturer if you have questions or would like more information about selection of pesticides.

Timing of Pesticide Applications

When applying pre-emergent herbicides, time the application in anticipation of rain. Many other pesticides should not be applied if rain is in the forecast for the next 24 hours because stormwater runoff can pick up recently applied pesticides, become contaminated, and then flow into vulnerable areas. Other weather-related factors should also be considered. Avoid applications in windy conditions due to increased pesticide drift. Be sure to apply pesticides as recommended for best control.

Always make the recommended number of applications per year, and be sure to follow all label directions. If you apply too much pesticide at a time (over-application) or apply more times a year than recommended, you increase the chance of pesticides being picked up by stormwater runoff and reaching nontarget sites. Contact your local Extension office if you have questions or would like more information about the timing of pesticide applications.

Handle Pesticides Carefully

Part of protecting water is handling pesticides properly and carefully according to the label. Many labels will have environmental hazard statements regarding water, such as “Do not apply directly to water or to areas where surface water is present ...” or “Do not contaminate water supplies when cleaning equipment or disposing of equipment washwaters.” Similar warnings about groundwater also can be found on the label.

Water contamination results from either nonpoint source or point source pollution. Pesticide applications that drift, leach, or are carried by stormwater runoff to nontarget sites and contaminate water are considered nonpoint source pollution. In these cases, the problem usually is found later and although an original source might be suspected, it isn't necessarily known.

Point source pollution, on the other hand, indicates that the pollution place is specific and known and occurs in “real time.” For example, someone over-applying liquid pesticide and then seeing it flow into a backyard pond would be generating point source pollution.

Proper adherence to the pesticide label will help prevent accidental spread of pesticides and nonpoint source and point source pollution. In addition, do not apply pesticides if a rain storm is in the forecast. This practice alone can greatly reduce the risk of nonpoint source pollution from stormwater runoff.

To prevent other point source pollution, avoid spills when possible. When spills occur, clean them up immediately to prevent further contamination. In addition, the following practices will help eliminate point source pollution:

- **Mixing and Loading Pads** (Figure 1). Use mixing and loading pads to prevent pesticides from entering the soil. Mixing and loading pads are areas set up for the express purpose of mixing and loading pesticides, and should be made of impermeable material, such as glazed tile, sealed concrete, or heavy plastic. The mixing/loading pad can be permanent or temporary. The pad must have barriers on all sides high enough to contain any pesticide or water within the mixing area.

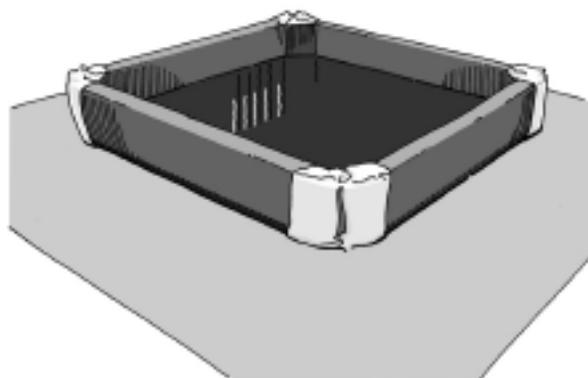


Figure 1. Set up permanent or temporary mixing/loading pads that are made of impermeable material (i.e., glazed tile, sealed concrete, or heavy plastic) and have high side barriers to contain pesticides and water within the mixing area.

- **Back-siphoning** (Figure 2). Back-siphoning occurs when a hose that is being used to fill a spray tank reverses its flow, carrying pesticide back into the water supply. If a reduction in water pressure occurs when a hose is extended below the surface of a spray mixture, back-siphoning can

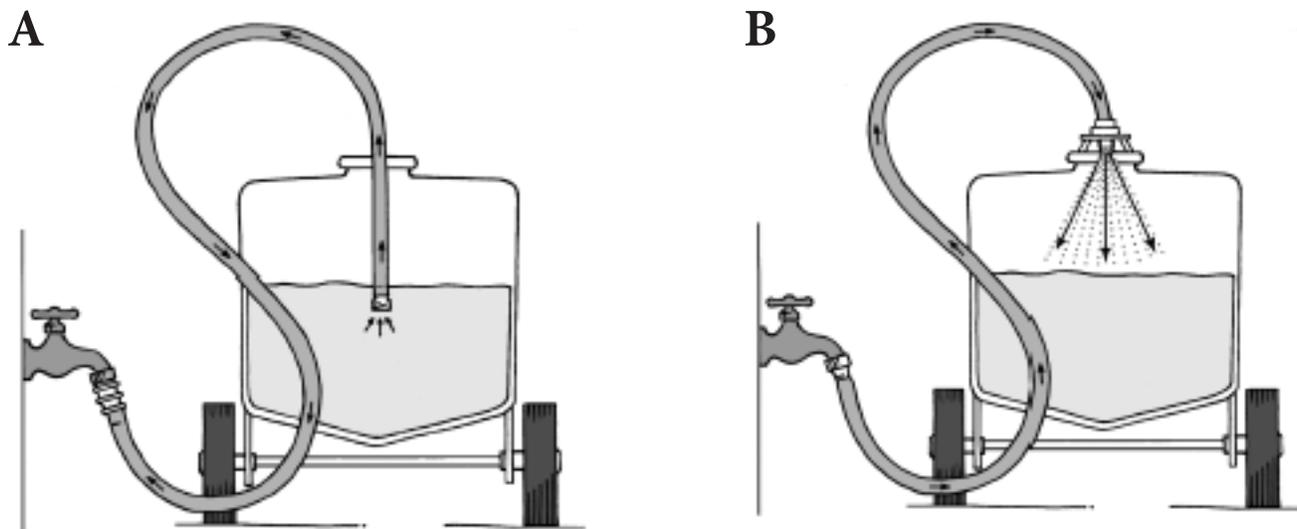


Figure 2. Back-siphoning (A, left) of pesticide spray can contaminate a water supply. To prevent this, leave an air gap between the surface of the liquid and the hose (B, right), or use an anti-siphoning device.

occur. Keep an air gap between the hose and the pesticide to avoid back-siphoning, or use anti-siphon devices on garden hoses.

Storage of Pesticides

Always handle, dispose, and store pesticides according to the label. Store pesticides in locations away from water sources and in places not easily flooded after a heavy rainfall. Make sure the storage building is in good repair, doesn't leak, and has sturdy shelving. Store pesticides out of reach of children and out of potential paths of runoff or flood water. Buy only the estimated amount you'll need in a season to avoid storing larger quantities for a longer period of time.

Pesticide Spill Management

Promptly clean up any spills that may occur in storage areas, during mixing and loading, or at the application site. Quick action can prevent excess unwanted pesticide from moving to nontarget sites.

Proper pesticide spill management includes following the "3 Cs": Control, Contain, and Clean-up (Figure 3).



Figure 3. When cleaning up a pesticide spill, follow the 3 Cs: Control, Contain, and Clean-up. Always wear the proper personal protective clothing and equipment, such as gloves, when handling a pesticide spill.

Control: In order to prevent a pesticide spill from contaminating nontarget sites, it must first be controlled. This means stopping the pesticide spill from getting worse. Examples might include up-righting any overturned containers or bags or repairing a leaking hose on a spray rig.

Contain: After controlling the spill, contain the pesticide so that it can't spread beyond the area where the accident occurred. Both liquid and granule spills can be problematic. A liquid pesticide can move to a nontarget location fairly quickly, and rainfall can make stormwater runoff an issue. Excess granules left at a spill site can later be carried by stormwater to water resources. Therefore, prompt containment of pesticide spills is extremely important.

If the spill accident happens near water or does get into water, contact the Nebraska Department of Environment and Energy (state agency responsible for protecting environmental resources) at (402) 471-2186 or (877) 253-2603 and the Nebraska Department of Agriculture (state agency responsible for pesticide regulations) at (402) 471-2351. For emergencies, contact the Emergency Highway Help Line for the Nebraska State Patrol at (800) 525-5555.

Cleanup: After the pesticide is contained, it should be cleaned up according to the label. Whether it's a commercial pesticide or one available for homeowner use, always protect yourself with the appropriate personal protective equipment (PPE) as recommended on the label when cleaning up a spill. When faced with a pesticide spill, there are many phone numbers you can call for assistance. The pesticide label should provide a 24-hour emergency help line, or you can contact the Nebraska State Patrol.

Specific cleanup recommendations include:

- **Hard surfaces, such as concrete.** Do not use a garden hose to wash spilled pesticide off of a driveway or sidewalk into a street. Use absorbent material, such as kitty litter, to absorb liquid pesticides. After absorption is complete, sweep the material and dispose of it in a plastic drum or similar container. Carefully sweep dusts and granules and dispose of similarly. You may need to neutralize the area using 30 percent bleach in water or hydrated lime (do not use together) and work into the area using a broom. Then use new absorbent material to clean up this solution, and dispose of it in the same container as for the pesticide.
- **Soil, compacted gravel, or turf areas.** Shovel up the contaminated area, including the top 2 to 3 inches of soil if applicable, and place in a plastic drum or similar container for disposal. Then cover the area with 2 inches of lime followed by fresh topsoil or gravel.
- **Discard any disposable PPE** and clean all equipment (away from water sources) that could have been contaminated during the spill cleanup process. Always read the label for directions about proper disposal methods.
- **Consider keeping a "spill kit" available** that contains emergency numbers, PPE, shovel, bleach or lime, bag of absorbent material, and disposal drums. Store the kit where it is easily accessible in the case of a spill.

Equipment Maintenance and Cleaning

Before applying a liquid pesticide, carefully check the application equipment for leaks or faults that would prevent correct pesticide application. Worn or clogged nozzles or hoses could result in a misapplication and increased likelihood of pesticide drifting to an unintended site. Always check nozzles and spray equipment before making any pesticide application.

When applying liquid pesticides, drift is always a possibility. Prevent drift by using spray equipment that produces large water droplets. Large droplets are less likely to drift than smaller droplets. See the equipment manufacturer's information for more details about the particular size of droplets produced by your application equipment. The pesticide label may also provide further information about drift management.

Uncalibrated, granule-application equipment can over-apply pesticide granules, thereby increasing the risk of transfer off the targeted area (Figure 4). Always calibrate granule spreaders properly, and use a spreader with an edge guard, if possible. The edge guard prevents granules from flying onto nontarget areas while applying the pesticide and offers an additional safeguard against misapplication.

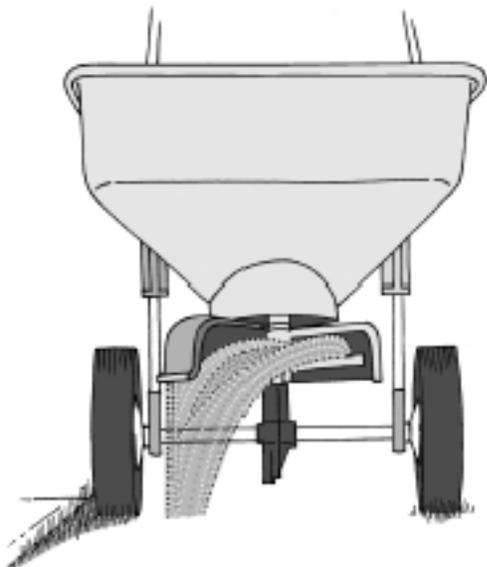


Figure 4. Use a rotary spreader with an “edge guard” to prevent pesticide granules from flying onto nontarget sites.



Figure 5. Use a broom or leaf-blower to move excess granules, that may get onto the driveway or sidewalk back into the grass or other targeted site. This prevents stormwater runoff from carrying the granules into storm drains or other water sources.

Clean all application equipment after use, according to label directions, and clean it at the application site whenever possible. The solution created from rinsing equipment, which consists of water and left over pesticide, is called rinsate. Apply rinsate to sites defined on the label and carefully follow all label instructions.

Do not discharge water used to clean application equipment into the street, along roads, or into storm drains. This rinsate could contaminate other water sources.

Do not leave uncleaned equipment in the open where pesticide residue could be washed off during the next rain.

Mixing/Loading and Application

Always mix and load pesticides at least 50 feet away from all water sources, and if possible, mix and load at the application site. Avoid mixing and loading if rain is in the forecast. Use a mixing and loading pad, as described earlier, to prevent potential contamination of the soil and movement of pesticides into water. Be especially cautious if mixing/loading near a well. Groundwater can easily be contaminated if pesticides enter the well.

When using granular formulations, avoid applying granules to sidewalks, driveways, or other hard surfaces (*Figure 5*). If granules do land on these areas, remove them. Sweeping often leaves granules in cracks and crevices, so a leaf-blower may

work best to move granules back onto a targeted site. Should rainwater reach the sidewalk before cleaning, it could carry granules into storm sewers or other nontarget areas. Pesticide granules lying on the sidewalk are a danger to pets, children, or wildlife, which may find them attractive.

Proper Disposal

- Always dispose of pesticide containers and leftover pesticides appropriately.
- Apply rinsate only onto labeled sites, and never directly apply to areas near water, wells, ponds, sinkholes, etc.
- Keep sidewalks, driveways, and streets clean and free of pesticides. Stormwater flowing from sewers could carry pesticides into water sources.

By following the pesticide label instructions for proper mixing, loading, and handling procedures, pesticides can effectively be applied to minimize stormwater runoff, drift, or accidental pesticide spills without compromising surface water or groundwater quality. In addition, applicators should be aware of weather conditions when making pesticide applications, and should use IPM practices and tested cultural practices wherever possible. Through such practices, and in combination with good design standards, the backyard greenscape can be well maintained and cared for while also preserving the quality of our environment, especially water resources.

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