

Rappahannock-Rapidan Homeowner's Guide to a Watershed-Friendly Backyard



Rappahannock-Rapidan
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CHAPTER 1. STORMWATER MANAGEMENT

The Trouble with Stormwater

Stormwater runoff is one of the major sources of pollution to our local water bodies and the Chesapeake Bay. Improperly managed stormwater can also flood basements and streets, silt in ponds, and create a swamp in your back yard. While new state stormwater laws regulating new development went into effect in 2011, older homes and subdivisions in the Rappahannock-Rapidan region often have few if any controls.



The roads, driveways, and rooftops in our urban and suburban communities block rainwater from naturally filtering into the soil. This means less groundwater available for the many residents in our region dependent on private or community wells. When unable to filter into the soil, stormwater instead flows into streams and lakes, potentially causing flooding downstream.

Concentrated stormwater moving at high velocity can also erode stream banks and wear channels into lawns.

As stormwater runoff moves over the land, it picks up sediment, nutrients, chemicals, trash and other pollutants, which it then deposits into local water bodies. These pollutants can have harmful effects on aquatic plants and animals as well as degrading the waterway's use for fishing and swimming.

Putting Rain in Its Place

The average Virginia house contributes 62,552 gallons of runoff annually into the local watershed, which is enough to fill seven tractor-trailer tankers with water (Virginia Cooperative Extension, 2011). While local and state governments have programs to manage stormwater on new construction projects, issues can still arise, especially on older sites that may not have been covered by current regulations. If you are experiencing drainage issues, or want to go beyond the minimum state standards to improve your local water quality, you have one goal—decrease your property's stormwater runoff. In order to achieve this goal, you must increase the amount of rainwater filtering through your soil.

DON'T DUMP IT

Storm drains provide pollutants a direct route to local streams. Never dump trash, chemicals or oil into them.

There are many practices available to address stormwater runoff on residential lots. Following is a discussion of four of the most common.

1. Ground cover

Reducing impervious surfaces on your property allows stormwater to naturally filter into the groundwater system. This can mean reducing the size of concrete patios and asphalt driveways, or replacing them with porous paving.



Additionally, ensuring that your yard has a healthy cover of vegetation devoid of bare spots is key to preventing erosion. Any exposed soil is in danger of being carried downstream during the next rainstorm. This is especially critical near waterways, where planting riparian buffers of trees and shrubs should be considered to capture nutrients. Refer to [Chapter 2. Lawn and Garden](#) for more information on watershed-friendly landscaping.

2. Disconnecting downspouts

Disconnecting your home's rainspouts from the sewer system helps to decrease localized flooding and is a relatively easy fix for most homeowners. By redirecting roof runoff to your lawn, garden or other porous surface, you can also slow down runoff velocity and give it a chance to filter into the ground. Adding a splash block will help prevent erosion below the downspout. Soil amendments can be used to increase soil permeability if dealing with compacted clay soils. Runoff should never be directed toward building foundations or onto adjacent property.



3. Rain barrels

Roof runoff can also be captured in a cistern or “rain barrel.” As a bonus, the rainwater can later be used to water your garden or landscaping. Ready-made rain barrels can be purchased from Friends of the Rappahannock, your local Soil and Water Conservation District, or many home improvement and garden stores. Alternatively, you can purchase the necessary hardware in a kit and make your own. Features to look for in a rain barrel include an overflow, screen to catch debris, and a spigot to attach a hose or drip irrigation line.



4. Rain gardens

A rain garden is a shallow planted depression containing a mix of soil and gravel designed to retain, filter and treat stormwater runoff. Rain garden design is dependent on the size of the drainage area to be treated as well as the topography and permeability of the soils in your yard. Placing it in a natural depression where water already flows will make your job easier.



Be sure to call Miss Utility (811) to avoid hitting any utility lines or siting your garden above a line that may need to be dug up. Also, do not locate it above any septic systems or drain fields, nor within 10 feet of your foundation.

Determine the square footage of the roof and paved areas that will drain to the rain garden (i.e. impervious surfaces), as well as the square footage of any pervious surfaces that will drain to it. Then calculate the recommended square footage of your rain garden using the following equation taken from the *Virginia Conservation Assistance Program Implementation and Design Manual* or similar:
$$\text{Rain garden Area} = (\text{Impervious Surface} \times 0.063) + (\text{Pervious Surface} \times 0.0175).$$

If the soil in your yard drains poorly, it will need to be amended with compost and sand. The amended soil should be 18-36 inches deep. To retain soil moisture and reduce weeds, the garden should be topped off with a mulch layer. Adding a six-inch berm of soil or rocks creates a dam to retain the runoff until it can filter through the soil mixture. A perforated pipe or underdrain can also be installed to further assist with infiltration, if necessary.

To prevent mosquitoes from breeding in your rain garden, it should be sized to drain within 48 hours.

In addition to taking up excess nutrients harmful to aquatic ecosystems, rain garden plants can beautify your yard. While most residential rain gardens are planted solely in perennial flowers and native grasses, larger structures can also support shrubs and even small trees. Care should be taken when selecting plants for your rain garden, because they will have to withstand both periods of drought and wet feet. Native plants tend to be hardier and lower maintenance, making them preferable.



For further information on building a rain garden in your yard, links to technical specifications and rain garden plant guides are provided in the Resources and Contacts section of this chapter. This section also contains contact information for organizations that will install one for you and/or provide cost-share funding for the installation.

Driveway Maintenance Considerations

In the Rappahannock-Rapidan Region, a homeowner's driveway frequently accounts for more impervious cover than the house and sometimes necessitates crossing a stream. In such cases, driveway maintenance should be taken into consideration. There are four aspects to maintaining or repairing a gravel driveway or road:

1. Blading and smoothing is used to smooth out high spots and redistribute materials.
2. Grading and reshaping repairs the shape and drainage of the roadbed.
3. Adding materials is used for resurfacing the roadbed or stabilizing the gravel with binding agents for dust control and strength.
4. Improving drainage looks at the condition of the surface and subsurface drainage systems including culverts, ditches and subsurface drains.

Common Problems include rutting, wash boarding, potholes, flat road, loss of surface material, and poor drainage. Rutting is caused by tire wear and requires reshaping and sometimes improved drainage. Wash boarding is caused by fast moving or heavy traffic and requires blading. Potholes result from heavy traffic with poor drainage and require reshaping and adding material. Flat roads are caused by poor maintenance, heavy traffic or poor design and require reshaping and improved drainage.

Poor drainage can result from poor maintenance practices. Heeling or pushing a ditch is a temporary measure to push material blocking the ditch towards the cut bank. Pulling a ditch removes material and restores the dimensions of a ditch. Hand tools are used to clean out culverts and drains. Ditches that carry runoff directly into streams can lead to excess gravel deposition and channel erosion. Ideally, ditches should be dispersed into undisturbed vegetation and disconnected from the stream channel wherever possible.

Best Management Practices (BMPs) can be integrated with the road and ditch design to reduce erosion, flooding, and maintenance costs. See the Resources Section at the end of this chapter for detailed guides to driveway best management practices.



A poorly shaped road section that allows runoff to flow down the road bed.



Possible Solution: Re-grade the roadbed with a crown, apply proper roadbed materials (gravel base), and install side ditches or rock check dams.

Stormwater Management Resources and Contacts

- *Rappahannock-Rapidan Regional Commission* Partnering with the Friends of the Rappahannock and Virginia Cooperative Extension, the Commission's Backyard Rainscaping program provides technical assistance and cost-share for residential stormwater management practices: www.rrregion.org/rainscaping.html, Environmental Planner (540) 829-7450
- *Friends of the Rappahannock's Rainscaping Retrofits Program*: www.riverfriends.org, (540) 373-3448.
- *Virginia Conservation Assistance Program* (provides cost-share funding for residential stormwater management practices):
 - For Culpeper, Madison, Orange and Rappahannock Counties: *Culpeper Soil and Water Conservation District*: www.culpeperswcd.org, (540) 825-8591
 - For Fauquier County: *John Marshall Soil and Water Conservation District* www.johnmarshallswcd.com (540) 347-3120 x112
- *Virginia Department of Environmental Quality Northern Virginia Regional Office*: Stormwater Program Manager (804) 837-1073
- *Local Government Contacts*:
 - Culpeper County: Planning and Zoning (540) 727-3404
 - Fauquier County: Environmental Program Manager (540) 422-8240
 - Madison County: Erosion Control Administrator (540) 948-6102
 - Orange County: Planning and Zoning Director (540) 672-4347
 - Rappahannock County: County Administrator/Zoning Administrator (540) 675-5330
 - Town of Warrenton: MS4 Stormwater Program Coordinator: (540) 347-6574
- "Rain Garden Design and Construction: a Northern Virginia Homeowner's Guide" www.fairfaxcounty.gov/nvswcd/raingardenbk.pdf
- "Rain Gardens: Technical Guide" www.dof.virginia.gov/infopubs/Rain-Garden-Technical-Guide-2014-05_pub.pdf
- "Virginia Conservation Assistance Program Implementation and Design Manual" vaswcd.org/wp-content/uploads/2015/09/VCAP-Manual-July-2015.pdf
- "Urban Water Quality Management: Rain Garden Plants" pubs.ext.vt.edu/426/426-043/426-043_pdf.pdf
- Piedmont Natives Plant Database (note: includes search function for rain garden plants): www.albemarle.org/nativeplants/
- "Suggested Stormwater Management Practices for Driveways and Roads" culpeperswcd.org/wp-content/uploads/Guide-to-Driveway-Best-Management-Practices.pdf

CHAPTER 2. LAWN AND GARDEN

The Dirt Test

Ideally, lawn areas should be minimized in favor of trees, shrubs and perennials that require less management and provide more environmental benefits. Many people, especially those with young children, want a lush, sprawling lawn for recreation, however. Turf grass is a high maintenance plant that requires proper growing conditions to thrive, so if you want a nice lawn, you need to know how to care for it properly.

Adding fertilizer or lime without knowing what is at the root of your lawn issues can burn your grass, and send excess nutrients and chemicals into local waterways while unnecessarily draining your wallet. Therefore, the first step to growing a green, healthy lawn is conducting a soil test.



For a small fee, there are several organizations in the region who will do this for you, such as Fauquier County Master Gardeners and Friends of the Rappahannock. Alternatively, you can take the sample yourself and send it to the Virginia Tech Soil Testing Laboratory. Free soil sample boxes and information sheets are available from your local Virginia Cooperative Extension office, as well as some agribusinesses and garden centers. Be sure to follow [Virginia Tech's sampling instructions](#) to ensure accurate results (see Resources and Contacts Section at the end of this chapter).

A routine soil test includes analyses for soil pH, phosphorus, potassium, calcium, magnesium, zinc, manganese, copper, iron and boron. Recommendations on fertilizer and lime application for specific plants are provided in the test report. Currently, Virginia Tech charges \$10 for the routine test. Soluble salts and organic matter tests are available for an additional fee.

Your local Cooperative Extension Agent is available to answer any questions regarding interpretation and application of the soil test results. Please refer to the Resources and Contacts Section at the end of this chapter for details. For proper maintenance of your lawn and garden, soil tests should be repeated every 2-3 years.

Fertilizers: a Little Goes a Long Way

Some form of fertilizer is usually needed to maintain a healthy lawn. Not fertilizing can result in a thinner stand of grass, leading to erosion issues. Healthy lawns will also have less disease, insect and weed problems, reducing the need for pesticide applications.

Consult your soil test report to determine how much fertilizer to apply. All fertilizer packages have three numbers present on the package indicating the percentage of nitrogen, phosphorus, and potassium present by weight (e.g. the N-P-K ratio). Look for a fertilizer that contains slow release nitrogen, ensuring a steady supply of the nutrient to your plants instead of all at once.

Lawns in the Rappahannock-Rapidan Region typically consist of fescue, which is a cool-season grass. It is best to apply fertilizer to such grasses in the fall to promote healthy root growth, while fertilizing cool-season grasses in the spring can make your lawn more susceptible to summer disease and drought.

Additionally, organic matter may be the best soil amendment you can add to your lawn, whether you make it yourself or purchase it from a garden center. Apply ¼ inch of compost to your lawn annually to improve the quality and texture of your soil. For instructions on how you can turn your yard and kitchen waste into free compost, refer to the Virginia Master Gardener Publication, "[Backyard Composting](#)," listed in the Resources Section at the end of this chapter.

Simply leaving grass clippings and leaves on your lawn provides free fertilizer as they decompose. Periodic mowing to chop up a modest amount of leaves prevents matting, but make sure that ample grass shows through them. Alternatively, chopped leaves can be used as mulch in your garden.

MOW HIGH

Set your mower blade to 2 1/2 – 3 inches, never removing more than 1/3 of the grass blade. This avoids stressing the plant, shades out weeds and promotes root growth.

Dealing with Little Pests

Pesticides are chemicals used to kill or repel weeds (herbicides), insects (insecticides), or fungi (fungicide). These chemicals can be poisonous when used incorrectly. Always follow label instructions carefully and store out of reach of children and pets.

Pesticides can cause unintended harm to beneficial plants and animals, such as bees, ladybugs and fish. They can also leach into the local groundwater. Never spray chemicals near water, and avoid spraying on windy days or near paved surfaces.

For the reasons noted above, you may want to try less invasive means of pest control first. Start by taking measures to prevent pest problems before they start. Select plants that are suited to this region, such as native plants, and those appropriate to the microclimate you will be planting them in (e.g. shade versus sun, wet versus dry). Be sure individual plants are sturdy, have well-developed root systems, and otherwise appear to be in good health before buying. Stressed plants are more likely to be susceptible to pests. Buying insect- and disease-resistant varieties is another option to decrease your chances of serious pest problems, although it will not eliminate the risk entirely.

If despite your best efforts your plants exhibit signs of distress or infestation, be sure to accurately identify the pest prior to taking action. Your local cooperative extension agent can assist you in identification.

One less-invasive option to control pests is to attract beneficial birds, insects, and bats who prey on pests. “[A Virginian’s Year-Round Guide to Yard Care](#),” which is among the resources listed at the end of this chapter, provides a list of common beneficial insects, the pests they eat, and illustrations to identify them.



To attract birds to your garden, several key needs must be met:

- 1) Provide cover for birds to hide and take shelter from the weather, as well as nesting sites. While nesting preferences vary between species, twiggy shrubs and small trees are a good start, particularly those that bear edible fruit. Bird houses are another option, but be sure to select a design appropriate for the species you are trying to attract. Proper installation of bird houses and feeders is also key to avoid attracting predators, or competing non-native species. Basic bird house instructions can be found on the Virginia Department of Game and Inland Fisheries website at www.dgif.virginia.gov/habitat/habitat-at-home/making-bird-house.asp. More detailed, species-specific instructions are listed in the resource section at the end of this chapter.
- 2) Provide water for drinking and bathing. Adding a fountain or other means of circulation, or changing it weekly will deter mosquitoes from breeding in your birdbath or pond.
- 3) Keep at least one feeder filled with a quality seed blend even in the warmer months. Non-melting suet cakes are another good option that appeal to birds such as titmice and woodpeckers.

Landscaping with Native Plants

Native plants are a low maintenance alternative to common horticultural varieties and are increasingly popping up at garden centers as consumer demand for them rises. Because native plants evolved here, they do not require irrigation, pesticides and fertilizers to thrive.



Additionally our native flora provide food and shelter for native wildlife, including pollinators, which are adapted to these plant species. Planting natives also promotes biodiversity and stewardship of our natural heritage.

Keep in mind low maintenance does not mean no maintenance, especially at the outset. Invasive weeds can outcompete native seedlings. Mulching new plantings can help control weeds, or for larger prairie plantings, mow before weeds reach 6-12 inches.

As with any plant, be sure to select a native that is appropriate to your site conditions. There are many resources available to guide you in selecting native plants appropriate for your property, including native plant online databases and directories of nurseries that sell native plants. Please refer to the resource section at the end of this chapter for further information.

Controlling Invasives

According to the Virginia Department of Conservation and Recreation, “Invasive plants are species intentionally or accidentally introduced by human activity into a region in which they did not evolve and cause harm to natural resources, economic activity or humans.” Common examples include kudzu, tree of heaven, Japanese honeysuckle and English ivy. While virtually no one would intentionally propagate kudzu on their property, many still plant English ivy and other invasive plants, unaware of the dangers they present. Therefore, it is critical to refer to the Virginia Invasive Plant List, before you purchase plants or transplant a cutting from a neighbor. It is important to note that most non-natives are not invasive, and pose no serious danger to the environment or economy.

Without control, invasives can quickly outcompete native plants, kill trees, and can even cause property damage or interfere with power lines. Aquatic invasive plants, such as hydrilla, can also impede boat traffic, fishing and swimming. To avoid spreading invasive plants and their seeds, stay on designated trails when hiking in parks, and thoroughly clean your boots, pets and boats before leaving an area where invasives plants occur.

While prevention is the best strategy for dealing with invasive plants, there are several management options if you are faced with an infestation:

- Mechanical control (i.e. pulling, cutting, girdling, mowing, rototilling)
- Chemical Control (i.e. herbicides)
- Restoration to Natural Processes (i.e. prescribed burning, re-introduction of grazing animals, flooding)

All of these methods have pros and cons and none will work in every situation. Management of serious infestations over large areas should only be undertaken with the help of a professional to minimize environmental and safety risks. For more information on invasive species control refer to the resources at the end of this chapter or contact your local Virginia Cooperative Extension Agent.



Lawn and Garden Resources and Contacts

- *Fauquier County Cooperative Extension's Green Grass Program:* (540) 341-7950 x1,
- *Local Cooperative Extension Horticulture Agents/Master Gardener Program:*
 - Fauquier and Rappahannock Counties: (540) 341-7950 x3
 - Culpeper, Madison and Orange Counties: (540) 727-3435 x355
- *Virginia Native Plant Society, Piedmont Chapter:* vnps.org/piedmont/
- *Mid-Atlantic Invasive Plant Council:* www.maipc.org
- "A Virginian's Year-Round Guide to Yard Care" www.dcr.virginia.gov/soil-and-water/document/yardcare.pdf
- "Soil Sampling for the Home Gardener" www.pubs.ext.vt.edu/452/452-129/452-129_pdf.pdf
- "Explanation of Soil Tests" www.pubs.ext.vt.edu/452/452-701/452-701_pdf.pdf
- "Home Lawn Fertilization in Virginia: Frequently Asked Questions" www.pubs.ext.vt.edu/430/430-003/430-003.html
- "Backyard Composting" www.pubs.ext.vt.edu/HORT/HORT-49/HORT-49-PDF.pdf
- Virginia Native Plant Society's "Regional Native Plant Nurseries": <http://vnps.org/conservation/plant-nurseries/>
- Virginia Nursery and Landscape Association's "Guide to Virginia Growers" and Native Plant Search Tool: www.vnla.org/Grower-Guide
- DCR's Native Plants for Conservation, Restoration and Landscaping Project www.dcr.virginia.gov/natural-heritage/nativeplants; Piedmont-specific Native Plant Brochure: www.dcr.virginia.gov/natural-heritage/document/pied-nat-plants.pdf
- Piedmont Natives Plant Database: www.albemarle.org/nativeplants/
- "The Virginia Gardener Guide to Pest Management for Water Quality" pubs.ext.vt.edu/426/426-615/426-615_pdf.pdf
- "Get Ready for Spring: Make a Bird House" www.dgif.virginia.gov/habitat/wild-in-the-woods/make-a-bird-house.pdf
- "Providing Water in Your Habitat at Home" www.dgif.virginia.gov/habitat/wild-in-the-woods/providing-water-in-your-habitat-at-home.pdf
- "Bird Feeding Basics" www.dgif.virginia.gov/habitat/wild-in-the-woods/bird-feeding-basics.pdf

Note: see next page for additional resources

Lawn and Garden Resources and Contacts (continued)

- “Guide to Feeding Wild Birds” (contains species-specific information) www.dgif.virginia.gov/habitat/habitat-at-home/feeding-wild-birds.pdf
- “Pollination Partners” www.dgif.virginia.gov/habitat/wild-in-the-woods/pollination-partners.pdf
- Virginia Department of Conservation and Recreation, Natural Heritage Program’s Invasive Species website (includes Virginia Invasive Plant Database, Species-specific Fact Sheets and other information on controlling invasives) www.dcr.virginia.gov/natural-heritage/invspinfo

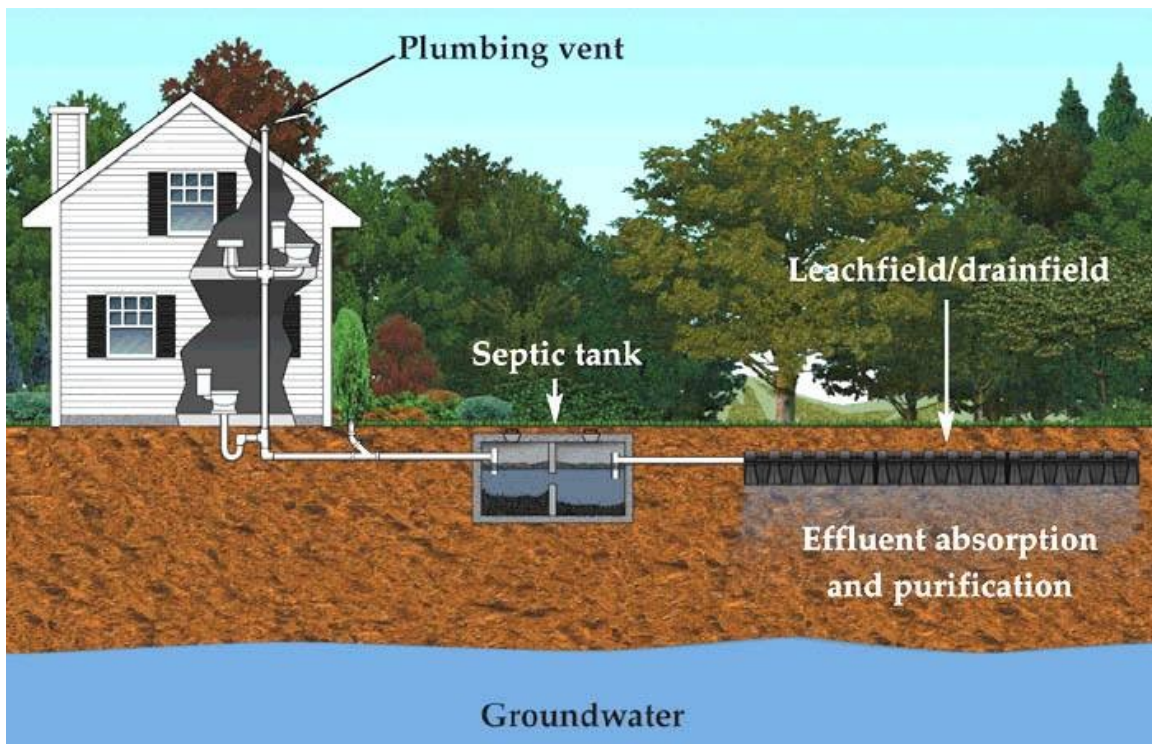


CHAPTER 3. SEPTIC SYSTEM MAINTENANCE

Locating Your Septic System

Septic systems treat wastewater from homes not connected to public sewer systems, and are common in rural areas. If you have well water and/or your neighbors have a septic system, you likely have a septic system buried in your yard. The main components of a conventional septic system are the septic tank and drainfield.

Locating the components of your underground system can be difficult, since the tank's location is usually not marked. Note where your drain pipe leaves the house and follow it into your yard. A search in this area may reveal the septic tank inspection ports and shallow depressions marking the trenches. If you cannot find any signs of your system, contact the local Virginia Department of Health office, which has building records on file.



Why Maintenance Makes Cents

While spending \$200-300 having your septic tank pumped out may seem expensive, it is a fraction of the cost to replace a failed system, which can range between \$3000-\$7000. Additionally, a system in need of repair or replacement lowers the home's resale value. Cost-share funding is available for septic system maintenance in impaired watersheds that have a Total Maximum Daily Load (TMDL) Implementation Plan. Funds pay for 50% of the approved costs including pump-out, repairs, replacements and new systems or drainfields. Contact your

local Soil and Water Conservation District to determine whether you qualify (see contacts at the end of this chapter).

Maintaining your septic system also provides health and environmental savings. Poorly treated sewage from a failing system can seep into the groundwater, bringing with it bacteria, viruses and toxic chemicals. This pollution not only affects well users, however. As the contaminated groundwater makes its way into local streams and lakes, other users suffer. For example, swimmers can contract diseases ranging from eye and ear infections, to acute gastrointestinal illness and hepatitis. The downstream ecosystem also suffers, particularly aquatic plants, animals and shellfish, but also land animals such as pets that drink the contaminated water. Cleanup of the contamination is exceedingly difficult and far more expensive than prevention.



Sewage overflow due to failed septic system.

The frequency of pumping required for your system depends on how many people live in your home and the size of the system. As a general rule of thumb, however, have your system inspected every 1 to 3 years and your tank pumped every 5 years.

Plant only grass over and near your septic system to avoid roots from nearby trees or shrubs clogging and damaging the drainfield. Don't drive or park vehicles on any part of your septic system. Doing so can compact the soil in your drainfield or damage pipes, tank, or other septic system components. Divert roof down spouts and other sources of water away from the septic system. Excessive water keeps the soil in the drainfield from naturally cleansing the wastewater.

What Not to Flush

Septic systems were designed to treat human waste, not toxic chemicals and garbage. Such materials can clog or If you have a septic system, never dispose of the following in your sinks or toilets:

- Coffee grounds
- Cat litter
- Cigarette butts
- Condoms
- Dental floss
- Diapers
- Feminine hygiene products
- Pharmaceutical drugs
- Gasoline
- Oil
- Pesticides
- Antifreeze
- Paint
- Other household chemicals

Septic System Resources and Contacts

- *Virginia Health Department, Rappahannock-Rapidan Health District*: Environmental Health Manager (540) 347-6363
- *Culpeper Soil and Water Conservation District* (Septic system cost-share assistance for Culpeper, Orange, Madison and Rappahannock Counties): www.culpeperswcd.org/residential-cost-share-program (540) 825-8591
- *John Marshall Soil and Water Conservation District* (Septic system cost-share assistance for Fauquier County): www.johnmarshallswcd.com 540-347-3120 x3
- “A Homeowners’ Guide to Septic Systems” (SepticSmart) www.epa.gov/sites/production/files/2015-06/documents/septicmart_longhomeownerguide_english508_0.pdf
- VDH Listings of Septic System and Private Well Service Providers www.vdh.virginia.gov/EnvironmentalHealth/Onsite/ServiceProviders
- Maryland Cooperative Extension’s Septic System Maintenance website (contains FAQs, tips and other useful information for homeowners) extension.umd.edu/learn/septic-systems-and-their-maintenance

CHAPTER 4. PET WASTE MANAGEMENT

Why Pet Waste Stinks

Animal waste can pose several environmental and health issues. It contains nutrients and pathogens (disease-causing organisms) which can pollute water, making it unsafe and undesirable for drinking, swimming, boating, fishing, shell fishing, scenic value and aquatic life. Pet waste can get washed into lakes, streams or storm sewers by rain or melting snow. Storm sewers typically drain directly into our lakes and streams, carrying many pollutants into the water. When pet waste is washed into lakes or streams the waste decays, robbing the water of oxygen and sometimes releasing ammonia. This combination of low oxygen levels and ammonia with warm temperatures can kill fish.

Pet waste also contains nutrients that accelerate the growth of algae, making the water cloudy and green, unattractive for swimming, boating and fishing. Most importantly, pet waste can pose health dangers to humans and animals. Pets, children who play outside and adults who garden are most at risk for infection from some of the bacteria and parasites found in pet waste. Pet waste can attract flies that can carry and transmit disease. Diseases that can be transmitted from pet waste to humans include:



- **Campylobacteriosis**- A bacterial infection carried by dogs and cats that frequently cause diarrhea in humans.
- **Salmonellosis**- The most common bacterial infection transmitted to humans by other animals. Symptoms include fever, muscle aches, headache, vomiting and diarrhea.
- **Crptosporidium**- A protozoan parasite carried by dogs, cats, mice, calves and many other mammals. Common symptoms include diarrhea, stomach cramps, nausea and dehydration. May be fatal to people with depressed immune systems.
- **Toxocariasis**- Roundworms, usually transmitted from dogs to humans, often without noticeable symptoms, but may cause temporary vision loss, a rash, fever or cough.
- **Toxoplasmosis**- A protozoan parasite carried by cats that can cause birth defects such as mental retardation and blindness if a woman becomes infected during pregnancy. It is also a problem for people with depressed immune systems. Symptoms include headache, muscle aches, and lymph node enlargement.

It may seem like one dog depositing a small amount of animal waste would make little difference to the environment, but studies have shown that the cumulative impact of waste from all the pets, livestock and wildlife within a watershed can have a significant impact on water quality and may endanger the health of humans. The Environmental Protection Agency estimates that a typical dog excretes three quarters of a pound of waste per day—or 274 pounds per year. Put another way, less than one ounce of dog waste could contaminate the average sized pool.

Note: The actual volume of dog waste depends on the dog and its diet. Working dogs that are fed high protein, high energy diets of concentrated feed will produce less waste than less active dogs that are fed a less concentrated feed.

Fortunately, there are some simple things that can be done to help keep the environment safe and clean. Responsible pet waste management is quick, easy and inexpensive. Start by picking up your pet's solid waste by using a scooper or plastic bag. Pet waste should be collected from your yard daily. It should not be deposited or left nearing drinking water wells, storm drains, surface water bodies, or children's play areas.

While no solution is perfect, the following options are recommended for disposing of pet waste:

1. Flush pet waste down the toilet

It will be sent to either a sewage treatment plant or a septic system. Both are designed to treat human waste. To avoid plumbing or serious septic system issues don't flush debris such as rocks, sticks or cat litter. Cat feces may be scooped out and flushed down the toilet, but used litter should be put in a securely closed bag and then disposed of in the trash.

2. Bury pet waste in the yard

Dig a hole or trench that is:

- At least 5 inches deep
- Away from vegetable gardens
- Away from any lake, stream, ditch, or drinking water well
- Preferably in grass or wooded area

Microorganisms in the top layer of soil will break down the waste.



3. Throw pet waste in the trash

Wrap pet waste carefully in a sealed bag so it will not spill during trash collection. While cat feces can be managed using options 1 or 2, used cat litter should be disposed of in the trash. Do not flush cat litter down the toilet or bury it in the yard.

Dog yards and runs should never be located near a drinking water well (including your neighbors) or immediately upslope of a surface water body. Select an area that is level and well vegetated away from vegetable gardens and children's play areas. Collect and dispose of pet waste using one of the three methods mentioned regularly.

SPREAD THE WORD

Encourage your homeowners association or community to install a pet-waste bag station in your neighborhood, local park, or other popular dog walking areas. You can also ask your local veterinarians and pet shelters to provide bag holders for new pet owners.

Beyond Scooping

1. Composting Pet Waste

Another simple and inexpensive method for disposing of dog waste is by composting it. The compost can help enrich the soil while reducing the amount of waste deposited in landfills. Composting is the controlled breakdown or degradation of organic material into a product known as humus. Dog waste composting is a natural process that requires air, water, organic matter, microbes and a little human intervention. Cat waste, however, may carry parasites that are harmful to human fetuses. We do not recommend adding cat waste or cat litter to your compost. Pet waste should be composted separately and not mixed in with an existing compost pile.

Composting dog waste can provide the following benefits:

- Removes raw dog waste from the environment where it can pollute groundwater and streams. Composting can reduce the volume of dog waste by 50%.
- Destroys pathogens and produces a safe soil amendment.
- Eliminates transporting dog waste to a disposal facility. This saves time, money, energy, and landfill space.
- Produces a quality soil additive that improves both the physical condition and fertility of the soil.

Once the dog waste is composted it can have many uses. It is an excellent source of organic matter that can be added to your flower garden or potted plants. It helps improve soil structure which contributes to good aeration and increases moisture holding capacity. It can also be used as a mulch material and as a soil additive for revegetation, lawn establishment and planting beds. It should not be used on vegetable gardens but can be used on ornamental plants and around trees and shrubs.

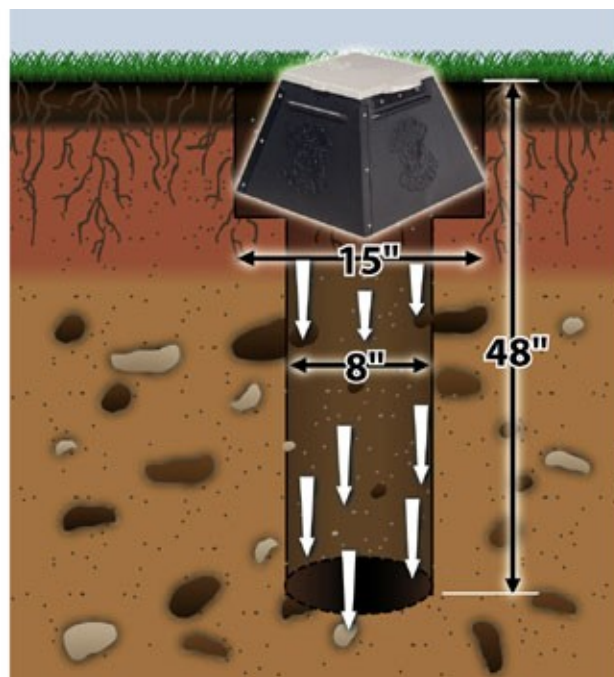
As compost has a relatively high salinity, it is not recommended for germinating seedlings. When used in a potting mix or flower beds, a 25 percent compost blend is recommended. Small particles have a greater surface area than large particles. The finer your composting ingredients are chopped, the hotter your compost will be and the faster it will progress.

There are health risks involved with composting. The process requires strict attention to detail to achieve a suitable mix and oversight to assure that the temperatures reached within the composted material are adequate to destroy harmful pathogens (refer to "Composting Dog Waste" listed in the resources at the end of this chapter for detailed instructions). All compost contains mold and fungus spores which may cause an allergic response in sensitive individuals. Keep animals, particularly puppies and pregnant females away from the compost area to prevent transmitting any disease to other dogs, livestock and wildlife.

2. Pet Waste Digesters

You can also install an in-ground pet waste disposal system or digester, which works like a small septic tank. Pet waste digesters may be a suitable alternative when site conditions are favorable. An enzyme powder and water are used to assist with the breakdown of the pet waste.

Pet waste digesters require a deep hole and do not function well in heavy clay or compacted soils, or at temperatures below 40° F. During winter months, an alternative disposal method will be needed. A pet waste digester system should not be located near a drinking water well, storm drain, surface water or vegetable garden. Additionally, pet waste digesters and straight burial are not recommended at sites where there is a high water table within 18 inches or less from the ground surface.



Non-domestic Pets

For horse owners and other livestock owners, it is recommended their manure and bedding waste be sheltered from the weather and kept away from drinking water wells or other nearby surface waters. Do not allow rainfall or snowmelt to mix with the pile and wash it off-site. Depending on the amount of manure and bedding waste accumulated on a daily basis and the amount of land you have access to, it may be necessary to outsource the animal waste for proper disposal. The USDA Natural Resources Conservation Service and your local Conservation District can provide more information and assistance on the following:

- Livestock manure can be a valuable source of plant fertilizer and soil organic matter if applied correctly. When it is over-applied or applied at the wrong times, it can be a source of ground and surface water pollution.
- Protection for the manure from weather and runoff from roofs, driveways and other areas is critical. Prevent leaching of nutrients and pathogens into the groundwater by lining the storage area. Never locate a manure storage area near a drinking water well, storm drain or surface water.
- Composting the manure can produce high organic matter that provides a stable, nutrient enriched soil.
- Ideally, locate pens and corrals in areas that are level and well vegetated to prevent concentrated sources of nutrients and pathogens that can pollute water resources. If space allows, rotate animals from one pen to another and plant a less palatable grass mixture to help maintain some degree of vegetative cover. This will also reduce erosion and runoff. Surround the outside of the animal pen with a good vegetative buffer and pick up solid waste regularly.



Waterfowl can also contribute to disease and water pollution. Feeding waterfowl encourages more birds than natural food supplies can support. These large flocks can deposit large quantities of waste in and around surface waters. Uneaten food and excess waste from waterfowl can degrade water quality and make it unsafe for humans and other wildlife. Leftover food can attract rats and other opportunistic wildlife that can carry and transmit disease. It's best not to feed ducks and geese. Instead, visit www.wildlifecenter.org to learn what helpful activities you and your family can do to help keep you, the environment and wildlife healthy.

Pet Waste Management Resources and Contacts

- *Rappahannock-Rapidan Regional Commission's Pet Waste Management Program*: (540) 829-7450
- *Culpeper Soil & Water Conservation District* (For technical assistance with the management of dog waste and livestock manure): (540) 825-8591 www.culpeperswcd.org
- *John Marshall Soil & Water Conservation District* (For technical assistance with the management of dog waste and livestock manure): (540) 347-3120 x3 www.fauquiercounty.gov/government/departments/jmswcd
- *Virginia Department of Environmental Quality, Northern Virginia Regional Office* (For information on cost-share funding programs): TMDL Coordinator, 804-450-3802
- *USDA Natural Resources Conservation Service* (For technical assistance with the management of dog waste and livestock manure): (804) 287-1691 www.nrcs.usda.gov/wps/portal/nrcs/site/va/home
- *Virginia Department of Health, Office of Epidemiology* (Provides bacterial monitoring and information on swimming advisories): Waterborne Illness Coordinator (804) 864-8128 www.vdh.virginia.gov/epidemiology/DEE/BeachMonitoring/
- *Wildlife Center of Virginia*: (540) 942-9453 www.wildlifecenter.org
- "Scoop the Poop: A Quick Guide to Pet Waste Management" www.rrregion.org/pdf/publications/environment/tmdl/RRRC_Pet_Waste_Brochure.pdf
- "Composting Dog Waste" www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_035763.pdf
- "Horse Manure Management" pubs.ext.vt.edu/406/406-208/406-208_pdf.pdf
- Virginia Pet Waste Management BMP Specifications (see PW-1 and PW-2) www.deq.virginia.gov/Portals/0/DEQ/Water/NonpointSource/DEQTMDLGuidelines-Specifications.pdf



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