Your Septic System: Buying or Selling a House with a Septic System

A properly functioning wastewater system is a critical home asset. This guide is a starting point for evaluating a septic system but is not a substitute for inspection by an engineer, building inspector, or wastewater professional. Inspections may be required by local regulations or the mortgage lender. If the property has a drinking water well, it should also be evaluated. Consult your county health department.

A septic system evaluation should be conducted early in the selling process so that any necessary repairs can be made. Even a professional inspection may fail to identify septic system deficiencies or problems if the house is vacant. The buyer should make certain the evaluation was done when the system was being used normally for the previous thirty to sixty days. Inspections during the winter can be more difficult.

Age of the System

The county health department may have records from construction permits and the certificate of completion that indicate when the system was installed or modified. See contact info on the back of the Your Septic System folder. If these forms are not available from the health department, the system may be very old and need replacement or it may have been installed without the health department's approval. The age of the house will give clues to the condition and type of septic system. Houses built in the last 30 years may be using the original waste disposal system. Older houses may have original or replacement components. Well-maintained systems last for decades, but a replacement fund is a good idea. Have there been additions or plumbing fixture modifications after the septic system installation? If so, is the system still appropriate?

Size of the Septic Tank

Septic systems are designed according to the expected wastewater volume, based on the number of bedrooms and age of fixtures. Is the capacity adequate for the prospective buyers? Are they planning to expand their family or the home?

System Components

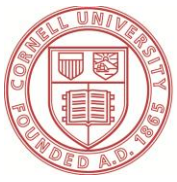
What is the size and type of septic tank (concrete, plastic, or steel)? Does it have access risers? Are gas baffles and effluent screens working properly?

Look at drainage and flooding potential where the septic system is located, especially the absorption area. Does the ground slope toward the septic tank or absorption area? Are there signs of septic system failure such as lush grass, standing water, or odors? Has vehicle traffic compacted the soil over the absorption area?

Try to determine the spatial layout of the septic system components. Are any inappropriate water sources such as roof or sump pump drainage entering the system? Is the system properly separated from drinking water supplies and surface water?

Can the owners provide records of septic tank pumping, inspection, or other maintenance?

The original version of this publication was developed by Cornell Cooperative Extension (CCE) via a grant from the NYS Water Resources Institute with funds provided by the NY State Legislature through the Dept. of Agriculture and Markets. Jo Ellen Saumier of Cornell Cooperative Extension of Rockland County adapted it from a Michigan State University Cooperative Extension Service bulletin. It was revised by A. Galford with input from county and NYS health departments and the CCE Water Resources PWT. This material is based upon work supported by Smith-Lever funds from the National Institute of Food and Agriculture, U.S. Department of Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the U.S. Dept. of Agriculture. Printed 01/2013



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Your Septic System: Building or Remodeling a Home with a Septic System

This guide introduces siting and design requirements for septic systems. Following design criteria will help safeguard your family's health, maintain the value of your property, and protect the environment. In new construction, be sure the system will meet your present and future needs. For example, if you are building a small home with plans to enlarge it as your family grows, design the septic system to accommodate the larger size.

If you are modifying an existing home, consider how alterations will affect the wastewater disposal process. Adding occupants, garbage disposals, or other appliances can increase the volume of wastewater and solids your system must handle. Know where your septic system is located so you do not damage it during other work. Be sure that additions, detached buildings, and paved areas will not be located over your septic tank or absorption area.

Follow Local Regulations

State Department of Health regulations apply to the installation of septic systems, and regulations set by counties and in particular watersheds may be more restrictive. Consult your County Health Department and local code enforcement officer during the design and installation process.

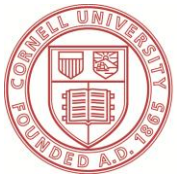
Soil and Site Characteristics

Soil conditions determine the type of system that can be installed. For a traditional septic tank and drainfield system, there must be enough area and depth of the proper type of soil to treat effluent from the septic tank. The system must be outside the ten-year flood zone and not on an excessively steep slope. A percolation test will be conducted to see how long it takes a set volume of water to soak into the soil. Several holes may be dug, filled with water, and tested. The soil absorption system needs to be able to drain water quickly enough to prevent surface contamination, but slowly enough to allow physical, chemical, and biological treatment before the water reaches groundwater below.

The on-site wastewater treatment system must be separated from water sources and property features, as summarized in the table below (minimum distances; check current local regulations). Note that shoreline property owners should try to maximize separation distances to reduce the risk of surface water pollution.

Minimum Separation Distances from Wastewater System Components (in feet; excerpts from Table 2 of NYS Dept. of Health Appendix 75-A Wastewater Treatment Standards - Individual Household Systems http://www.health.ny.gov/regulations/nycrr/title_10/part_75/appendix_75-a.htm#a4)

System Component	Well	Stream, Lake, or Wetland	Dwelling	Property Line
Septic tank	50	50	10	10
Distribution box	100	100	20	10
Absorption area	100	100	20	10



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In areas where conditions are *not* suitable for a traditional septic tank and soil absorption drainfield, alternatives may be used. These systems are introduced in the publication Alternative and Advanced On-site Wastewater Treatment Systems.

Septic Tank Size, Design, and Installation

New York State Department of Health regulations mandate minimum sizes and surface area for septic tanks. See the table below for basic guidelines, and consult the full reference for details on septic system models and installation and what counts as a possible bedroom. County sanitary codes and watershed regulations may also apply. Note that these are minimum capacities; installing a larger tank allows for better separation of scum and solids from wastewater, resulting in fewer solids entering the absorption area and prolonging the life of your system. A larger tank may also require less frequent pumping and allow for future expansion of the home. Garbage grinders or disposals are not recommended for use with septic systems because they increase the necessity of pumping. The required minimum septic tank size increases with a garbage disposal. Use of a two-compartment tank or two tanks in series improves settling of solids from effluent and is required for some drainfield types; the total volume capacity applies.

Minimum Septic Tank Capacities
(from Table 3 of NYS Department of Health Appendix 75-A Wastewater Treatment Standards - Individual Household Systems http://www.health.ny.gov/regulations/nycrr/title_10/part_75/appendix_75-a.htm#a6)

Bedrooms	Minimum Tank Capacity (gallons)	Minimum Liquid Surface Area (sq. ft.)
1-3	1000	27
4	1250	34
5	1500	40
6	1750	47

Most septic tanks are made of pre-cast concrete, cast-in-place concrete, fiberglass, or polyethylene. Steel septic tanks can be installed in New York State if they are certified for corrosion resistance but tank coatings must be refinished if damaged.

Consider asking your contractor to include such useful features as risers, junction boxes, and observation ports to make future maintenance easier.

Effluent passes from the septic tank through pipes to a distribution box or similar device, and from there to trenches or other structures in the absorption area. The design specifications for the absorption area depend on the results of your percolation test, estimates of your household water usage, soil characteristics, and other factors. See state and local regulations for details.

Document the layout of the new septic system for future reference and record information about the installer(s). Once your waste disposal system is in use it will need regular maintenance. Keep records of what service is performed, when, and by whom.

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Alternative and Advanced On-site Wastewater Treatment Systems

Some properties lack the volume and type of soil needed for a conventional septic system composed of a septic tank and soil absorption drainfield. This is common in many regions of New York State. On shoreline properties, thin rocky soils, steep slopes, and small lot sizes combine to create a wastewater treatment challenge. The original septic system on a property may have reached the end of its design life or failed early without enough room for replacing it with the same type of system.

An on-site wastewater treatment system (OWTS) may be possible but require the use of multiple or modified tanks and/or modified absorption area technologies. These "alternative", "advanced", or "enhanced" systems have undergone much recent technological and regulatory change, reflected in changes in NYS Dept. of Health regulations in 2010 and the revised Residential OWTS Design Handbook in 2012. Consult your county or district health department for options on challenging sites (contact info on the back of the Your Septic System folder).

Some of the treatment principles employed in these systems and examples of techniques include:

- Increasing the surface area on which bacteria live
  - Use high surface area materials
  - Spread small volumes of wastewater across a wide area
- Increase the treatment time before wastewater is released to the absorption area
  - Distribute effluent gradually using timed doses
  - Recirculate wastewater through treatment components multiple times
- Promote the growth of aerobic (oxygen-using) bacteria in the system
  - Add oxygen to the storage tank by bubbling air into it
  - Add oxygen to the storage tank by physically mixing the tank contents
- Artificially create absorption areas with deeper and different soil
  - Pump effluent up to mounds or other artificially built systems

These systems can achieve remarkable effluent water quality but they present some challenges.

- Custom engineering, installation, and permitting.
- Some components require electricity for pumps, aeration, control panel, alarm system, etc.
- Service contracts for inspection, parts, and pumping are a good idea and often required for permitting.

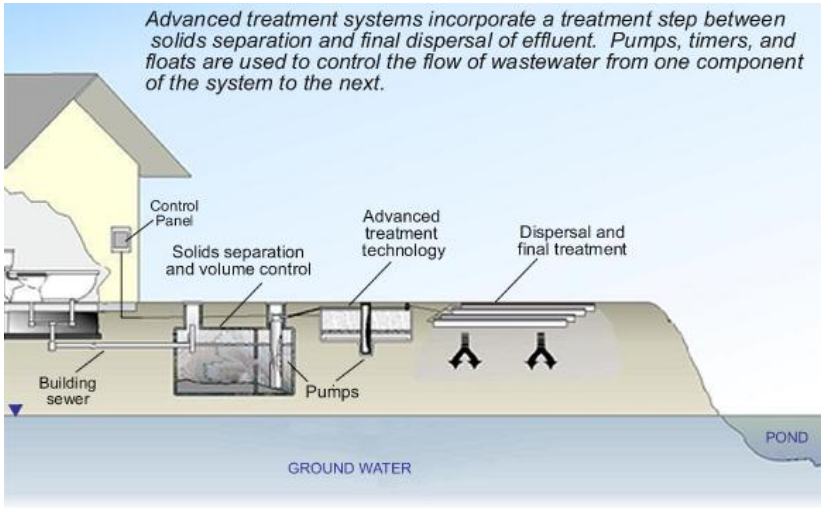

Figure courtesy of University of Rhode Island Onsite Wastewater Resource Center
http://www.uri.edu/ce/wq/RESOURCES/wastewater/Onsite_Systems/Advanced/index.htm

Written by Amy Galford, Extension Associate, College of Human Ecology, Cornell University. This material is based upon work supported by Smith-Lever funds from the National Institute of Food and Agriculture, U.S. Department of Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the U.S. Dept. of Agriculture. Printed 01/2013.

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Your Septic System: Septic System Failure

A septic system is considered to be "failing" when it fails to treat and distribute wastewater effectively, and fails to prevent biological and nutrient contamination of your drinking water well and nearby lakes and streams. The septic system can fail when any part of the system is not operating properly, although it is often the absorption area that cannot function.

Health and Economic Effects of a Failing System

The most serious effect of a failing system is the spread of serious disease from untreated wastewater. Mosquitoes and flies that spread infectious diseases can breed in areas where wastewater reaches the surface. Household chemicals can be poisonous to humans, pets, and wildlife if they are not treated. There will also be environmental impacts.

Replacing your entire septic system could cost $5,000-$15,000 or more. Regular maintenance and protection of your septic system is much less expensive than replacing the drainfield or entire system. USDA offers some low-interest loans to low-income homeowners in rural areas.

Why Septic Systems Fail

Most septic systems will fail eventually. These systems are designed to have a useful life of 20 to 30 years under the best conditions. Older septic tanks with concrete or metal parts degrade over time. Eventually the soil in the drainfield becomes clogged with organic material. Many other factors can cause the system to fail well before the end of its "natural" lifespan. Pipes blocked by roots, soils saturated by high water tables, crushed distribution pipes, improper location, poor original design, or poor installation can all lead to major problems. **The most common reasons for early failure are misuse or inadequate maintenance by homeowners.** When a system is not pumped regularly, solids build up in the septic tank, then flow into the drainfield and clog it.

Symptoms of Septic System Failure

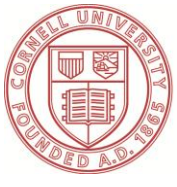
Slowly draining sinks, bathtubs and toilets. The drains in your house will empty slowly despite the use of plungers. Dark, foul smelling sewage may back up into drains or toilets. Unpleasant odors around the house may indicate a problem with septic system drainage or with the household plumbing ventilation.

Surface emergence of wastewater. Sometimes you will notice spongy or soggy areas or standing water on the ground above or near your tank or drainfield. There may or may not be a foul odor.

Lush green grass over the drainfield, even during dry weather. Often, this indicates that an excessive amount of liquid and nutrients from your system is moving upward through the soil instead of downward, as it should. While some upward movement of liquid from the drainfield is normal, too much indicates a problem.

Nitrate, nitrite, or coliform bacteria in your well water. These may indicate that wastewater from the septic system or another source of surface contamination is reaching the well. Drinking water wells should be tested annually for these substances. Use a testing lab certified by the New York State Department of Health. On the directory look for potable water testing labs in your county or an adjacent county.
http://www.wadsworth.org/labcert/elap/comm.html

See the publication Considerations for Shoreline Property Owners for additional symptoms in those settings.



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What to Do if Your System Fails: Immediate Actions

First, call your local health department. Health department staff have the expertise to assess your situation quickly and offer advice. See contact information on the back of the Your Septic System folder.

Fence the septic system area. If liquid waste seeps to the surface, keep people and pets away.

Exercise caution in working near an opened septic tank. Toxic and/or explosive gases may be present.

Have your septic tank pumped. This will help the problem temporarily, especially when it is combined with drastic water conservation. If the drainfield is still in good condition and the septic tank is large enough for the wastewater volume leaving the household, pumping may be an effective solution.

Conserve water in your home. This is particularly effective if your system has not failed completely. It can help lessen the problem for a short time. See the publication on Water Conservation for tips.

What to Do If the System Fails: Long-Term Options

Replace the drainfield or entire system. This type of work only should be performed by a qualified professional and according to local regulations. Contact your county health department to see what changes require a permit. See the publication Building or Remodeling a Home with a Septic System for tips and design features to include.

Increase the size of the drainfield. This may help if the original drainfield was too small for the size of your family or if the soil does not allow water to percolate very well, provided that the tank size is adequate.

Conserve water in your home on a long-term basis. See the Water Conservation publication for tips.

If periodically saturated soils are a source of problems, consider installing perimeter drains. This involves installing tile drains underground at a distance around the drainfield to help lower soil water levels. It works in some but not all situations and requires the assistance of a qualified professional. The location should also be evaluated by your local health department.

Incorporate advanced or alternative treatment technologies. On small lots, property near shorelines, or land with inadequate soil for a traditional drainfield, other technologies may be used as part of your on-site wastewater treatment system. See the publication on Alternative and Advanced OWTS.

If septic system failures are common in your area, consider participating in the development of a small community cluster system or other on-site wastewater treatment system (OWTS) alternative. These intermediate systems are designed for small communities and some rural areas and can be more cost-effective than a conventional sewage treatment plant.

Connect to a municipal sewage system, if one is available. Consider the balance between initial and long-term costs versus reduced worry and lowered maintenance.

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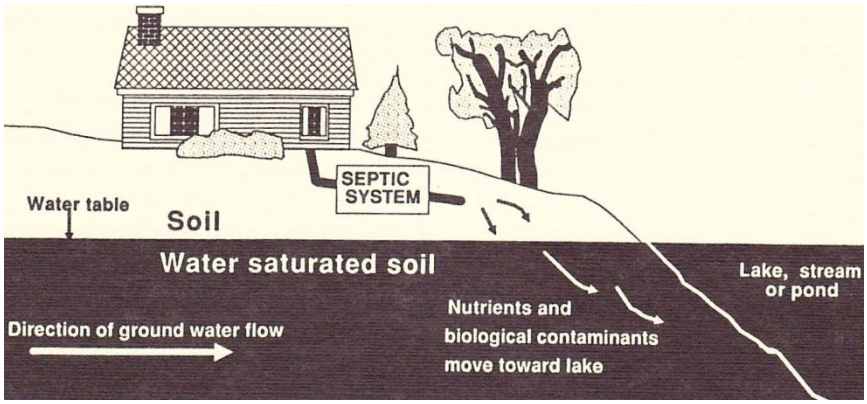
Your Septic System: Considerations for Shoreline Property Owners

If you live on shoreline property, maintaining your septic system requires more care than maintaining a similar system located elsewhere. Soil and water conditions near the shoreline, including thin or rocky soils, clay soils, and high water tables, may make a traditional septic system less efficient at treating waste. Remember that most wastewater treatment happens in the soil of the absorption area. Septic systems on shoreline property are often close to both groundwater and surface waters, and drainfields are sometimes saturated during high water periods, such that partially treated wastewater is likely to enter adjacent lakes and streams. Also, as shorelines erode, the distance between the septic system and the shoreline decreases.

Water pollution can occur even though your system appears to be working well and complies with local health department codes. The system must be customized to the specific site and may need to employ more advanced treatment technology.

The Effects of Septic System Wastes on Lakes and Streams

Nutrients (especially phosphorus) from inadequate septic systems play a major role in causing excessive weed and algae growth in lakes and ponds. Just a small amount of additional phosphorus in a lake or pond can increase the growth of algae and/or aquatic weeds. When overgrown algae and plants die rapidly and decompose, oxygen is removed from the water, which threatens fish and other aquatic animals. Excessive weed growth also makes boating, fishing and swimming less enjoyable.



Wastewater from your septic system that reaches adjacent surface waters also increases the chance that wildlife, swimmers, and downstream users are exposed to infectious bacteria and viruses that are associated with wastewater.

Signs That Contaminants are Reaching the Water

In addition to the symptoms of septic system failure described in the publication Septic System Failure, look for these symptoms to tell if waste from your system is reaching surface water:

Excessive weed or algae growth in the water near your shore. Other nutrient sources such as sediment and lawn fertilizer runoff or the resuspension of shallow sediments could also lead to this type of problem. Septic systems, however, are often prime suspects as sources of nutrients.

Unpleasant odors, soggy soil or sewage flow over the land surface. These symptoms often indicate failure and the need for drastic action such as replacement of the system. Under these conditions, wastewater could travel directly into nearby surface waters instead of being treated in the soil.

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Water test results indicate the presence of biological contamination.
These tests may indicate the presence of harmful bacteria, viruses, or protozoa in the water. Although wastes from septic tanks are not the only source of these contaminants, they are likely suspects. Contact your local health department for more information on testing programs (see contact info on the back of the Your Septic System folder).

An increase in infections or illnesses associated with swimming in the area. These are most often minor ailments, such as ear or eye infections, but could be major diseases, such as dysentery or hepatitis.

Indicator dye put into your septic tank reaches lakes or ponds.
Special dyes may help to trace problems.

How to Prevent Problems

The basic maintenance for all septic systems (regular pumping and maintenance, water conservation, and protecting the drainfield) is even more important near surface waters. In addition to the tips described in other publications in this series, consider these measures:

Participate in a community sewage system, if available. Municipal sewer systems may not be accessible at a reasonable cost, but multiple-home "cluster" systems may be an option. Talk with your neighbors, lakeshore association, and health department about shared maintenance contracts and other possible community solutions. Before selecting a larger-scale, community-based solution, be sure that it will yield the anticipated results. Many factors contribute to excessive weed growth and other water quality effects.

Replace or upgrade your septic system. Although this alternative is costly, sometimes it is the only alternative, especially when your system is undersized because of conversion of a seasonal residence for year-round use. If you're building a new home, construct the septic system as far away from the shoreline as possible. Design the system to meet your present as well as future needs. If you are building a small summer home with plans to enlarge it for year-round use when you retire, design the system to accommodate that increased future use.

Install an "alternative" or "advanced" treatment system. A septic system is one type of on-site wastewater treatment system (OWTS). See the publication on Alternative and Advanced On-site Wastewater Treatment Systems for more information on these systems, which use modifications of traditional septic tanks or drainfields to improve treatment efficiency and protect groundwater. Installation of these systems requires close cooperation with your local health department, an experienced contractor, and the manufacturer. Some systems require electric power to operate.

Consider a waterless toilet. Incinerating or composting toilets greatly reduce the volume of wastewater that must be treated. Talk to your local health department about waste disposal options and permits.

Add appropriate plants between your drainfield and the shoreline. This involves planting areas of small shrubs and trees to help intercept and absorb some of the nutrients before they reach the shoreline. Roots may also stabilize the shoreline and reduce erosion that can contaminate the stream and expose the far end of the drainfield. Make sure roots will not damage the drainfield.

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Your Septic System: Water Conservation

Water conservation has many environmental and economic benefits including reducing demand on surface and groundwater resources and saving energy that goes into water treatment and delivery. If you live in an area serviced by a public drinking water system, water conservation may reduce your bill. If you have a private drinking water well, water conservation can extend its life and may be essential after drought.

Septic system owners who conserve water can help to prevent water pollution, especially after flooding or if your system shows signs of failing. Overloading a septic system reduces its ability to treat wastewater, risking nutrient and bacterial contamination of nearby lakes, streams, and drinking water sources including wells.

A few water conservation tips are presented below. The U.S. EPA WaterSense program has many more ideas and water usage calculators. http://epa.gov/watersense

Water Use Indoors

The first step in understanding how to conserve water in your home is to know where water is used. A family of four uses about 400 gallons per day at home, mostly indoors. Toilets, bathtubs and showers, and washing machines are usually the biggest sources of household wastewater.

Use water conserving fixtures in repairs and new construction. See the EPA WaterSense program website for information on certified products.

Avoid flushing your toilet unnecessarily. Trash that can go in the wastebasket should not be flushed down the toilet. This saves water and reduces the amount of solids in the septic tank.

Save water and energy when using your dishwasher and clothes washer. New washing machines and dishwashers have many energy and water saving options. Use those settings to adjust the load size to save water, or run full loads on older machines. For the sake of your septic system, spread loads out across the week. This will help solids and grease separate properly in the septic tank and allow the absorption area to keep up with the volume of effluent.

Repair leaks in your faucets and toilets. A leaky faucet can waste 10 gallons or more per day. Repairing a faucet is usually as simple as changing an inexpensive washer. Leaky toilets can waste hundreds of gallons per day. Leaky toilets often can be repaired by adjusting the float arm or plunger ball. To find out if your toilet leaks, put a little food coloring in the tank. If color appears in the bowl without flushing, you have a leak that should be repaired.

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Take short showers instead of baths. A five-minute shower uses 10-25 gallons of water, while a bath needs 50 to 60 gallons.

Install low flow, water-saving shower heads. This plumbing device reduces the amount of water flowing through your shower by up to 50 percent, but increases its velocity.

Install sink faucet aerators. These devices restrict the amount of water going through your faucet by up to 50 percent but add bubbles so the flow of water appears the same.

Modify older toilet tanks. Toilet dams for older high-volume flush toilets reduce the amount of water flowing out of the toilet but do not affect its flushing ability. Never use a brick to accomplish the same effect – particles from it could harm your plumbing; a sealed plastic container filled with water is a better option.

Water Use Outdoors

Watering lawns and gardens and washing cars account for most of the water used outdoors. Although this water will not go through your septic tank, it is important to protect the absorption area from excess water so that it can properly treat your household wastewater. The other benefits of water conservation also apply.

Water your lawn and garden only when necessary. Water your lawn when it begins to show signs of wilting – when the grass does not spring back when you step on it – rather than on a regular schedule. Consider using a drip irrigation system in your garden. Your lawn may turn brown in the middle of the summer, but this does not mean that it is dead. Rather, the grass is dormant and will grow when rain and cooler weather return. Mowing the grass too short can cause roots to die back. The Cornell Turfgrass Program has more information on lawn care http://www.hort.cornell.edu/turf

Use plant varieties that are well adapted to your locality and soil conditions. Less suitable varieties may need greater amounts of fertilizer and/or water just to stay alive. Contact your local Cooperative Extension office for recommendations or referrals to Master Gardeners.

Attach a pistol-type sprayer to the end of your garden hose. It enables you to adjust the flow rate of flow and temporarily shut off the water while you are between tasks.

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