



KY-A-Syst for the Home
Environmental Stewardship for Homeowners

Household Wastewater: Septic Systems and Other Treatment Methods

Why Should You Be Concerned?

Household wastewater carries dirt, soap, food, grease, and bodily wastes down the drain and out of your house. This wastewater, which starts in sinks, toilets, showers, and washing machines, also can carry nutrients and pathogens. Nutrients can impair water quality, and pathogens can cause disease. Wastewater treatment systems are designed to remove and break down these contaminants before they enter groundwater or nearby lakes, streams, or wetlands. Because wastewater treatment is often out of sight and mind until problems occur, you should know the basics of your household wastewater system and take simple precautions to help prevent future problems and costly repairs.

How Can KY-A-Syst Help?

This publication can help you make choices to protect your watershed and reduce risks to your family's health. After you have read it, walk around your home and property and answer the questions in the boxes, circling the answers that best apply. Your answers will help you identify potential problems.

If you answer a question with choice A, you have few problems with household wastewater treatment. If you answer a question with choice B, there may be a problem. If you answer a question with choice C, you will want to consider making changes. Use the action checklist in this publication to help you.

If you would like further help in assessing your household's wastewater treatment, contact your local office of the Cooperative Extension Service.

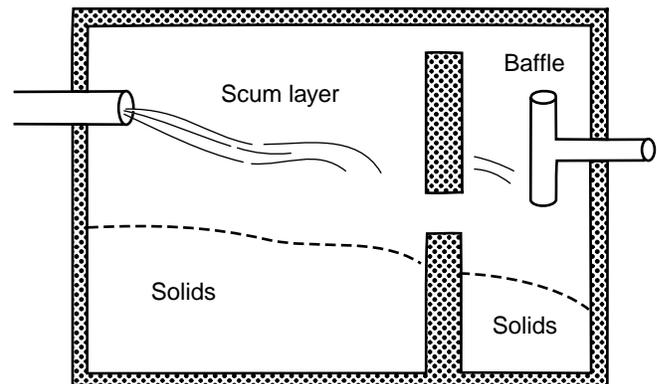
On-Site Wastewater Treatment

This publication is geared primarily to homeowners or renters who have septic systems in their yards. The simplest septic system consists of a septic tank and drain field (also known as a soil absorption field, leach field, or tile field). Other kinds of systems also may be used for on-site wastewater treatment, including mound systems, constructed wetlands, sand filters, and aerobic treatment units. This publication, however, will focus on the more traditional septic tank and drain field system.

Here is how the septic tank system works:

1. Wastewater from your home enters the septic tank (Figure 1).
2. In the tank, solids settle to the bottom, where bacteria feed on the solids and break them down. The baffle prevents solids from leaving the tank until they are broken down.

Figure 1. The septic tank.



3. The liquid then flows through a pipe into a distribution box.
4. The distribution box directs the flow out into the drain field, which consists of underground pipes in shallow beds of gravel or soil (Figure 2).
5. The liquid flows through small holes in the drain field pipes and seeps into the gravel or soil, which filters more waste from the water and reduces harmful pathogens.

Municipal Sewage Treatment

With municipal sewage treatment, wastewater is moved away from your home through sewer pipes. It eventually reaches a wastewater treatment plant, where it is treated before being returned to the environment. Even if wastewater is not treated on your home site, there are still ways you can reduce the impact your wastewater has on your community and the environment. Conserving water and being careful about what you put down the drain are easy ways to help. Using your municipal sewage treatment system wisely saves taxpayer dollars and protects water resources.

What type of wastewater treatment system do you have?

- A. My wastewater goes into a municipal sewage treatment system.
- B. I have an on-site wastewater treatment system.
- C. I am not sure where my wastewater goes.

Locating Your Septic System

Taking proper care of your septic system starts with knowing where it is. If your septic system's location is not in your home records, check with a previous homeowner or the county health department. Once you have located the septic tank, sketch a map of your house and yard. Make note of the distance from the septic tank opening to at least two permanent points (such as the corner of the house foundation or survey stakes on the property line). Keep this map on file along with other maintenance records, and if you sell the house, pass the map on to the new owners.

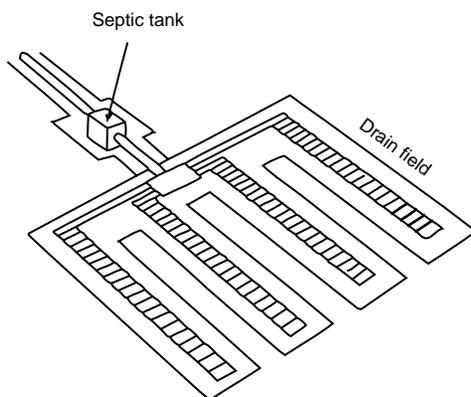
Do you know where your septic system is?

- A. I keep a map with the exact location documented.
- B. I know the location of my septic tank, but it is not recorded.
- C. I do not know where my septic tank is located.

Drain Field Location

To prevent contamination of water supplies, the drain field must be at least 100 feet from any wetland, shoreline, stream bed, or drinking-water well. The greater the distance, the less the chance of contaminating the water supply. If your system is downhill from a well, the well will be better protected than if it is uphill. If your system is closer to your well than is recommended, you should test your well water for nitrates and bacteria more often than you would otherwise. For information on testing of well water, contact your local office of the Cooperative Extension Service or your county health department.

Figure 2. Septic tank and drain field.



How close is your drain field located to a well or surface water?

- A. The drain field is at least 100 feet from any well or surface water.
- B. The drain field is between 50 and 100 feet from a well or surface water.
- C. The drain field is less than 50 feet from a well or surface water.

Septic System Capacity

Both the septic tank and drain field should have enough capacity to treat all the wastewater generated in your house, even at times of peak use. Each state has procedures for calculating wastewater flow and the sizing of on-site treatment systems. Kentucky regulations estimate water usage for a family residence at 120 gallons a day times the number of bedrooms in a home. Septic tanks are required to have a capacity of at least 1,000 gallons for a single family dwelling.

Your system should be designed to handle your home's maximum occupancy. If you use more water than the system is designed for, wastewater will not be treated adequately, or the system will break down. You can reduce the size of the system you need by installing low-flow toilets, low-flow shower heads, and water-saving faucets. You may need to expand the system if you add a bathroom, bedroom, or water-using appliance to your home.

How much wastewater can your system handle?

- A. The tank is designed to handle more wastewater than is required based on the size of the home.
- B. Capacity just meets load requirements, but factors that would indicate the system is overloaded are watched for. Water conservation measures are taken.
- C. Bathrooms, bedrooms, or water-using appliances have been added without re-examining the capacity of the wastewater system's capacity.

Age of Your System

Septic systems should last 15 to 40 years or longer, depending on how well they are designed for the site and how well they are maintained. The older your system, the more likely it is that it does not meet the latest standards. Even a relatively new system can fail if it is located in poor soil, is undersized, or is not properly installed or maintained.

How old is your septic system?

- A. It is five years old or less.
- B. It is between six and 20 years old.
- C. It is more than 20 years old.

Effluent Filters

Solids that do not settle out in the tank can be carried out of the tank with effluent, clogging the drain field and causing the system to fail before it should. Effluent filters on the septic tank outlet capture small particles and prevent them from clogging the drain field, so it is important to clean the filter periodically.

Do you have an effluent filter at the septic tank outlet?

- A. An effluent filter is installed and cleaned regularly.
- B. An effluent filter is installed but not cleaned regularly.
- C. There is no effluent filter installed on the septic tank outlet.

Tank Maintenance

Regular pumping is the most important thing you can do to maintain your septic system. As solids accumulate in the tank, particles are more likely to flow out of the tank and into the drain field. The best way to determine when to pump the tank is to have it inspected annually. A general rule is to have a septic tank pumped by a licensed pumper every three to five years, but how often a tank needs to be pumped depends on the:

- size of the tank.
- amount of wastewater generated by your household.
- amount of solids carried in the wastewater.
- age of the system.

See Table 1 to help you gauge when your septic tank needs to be pumped.

Table 1. Recommended years between septic tank pumpings.

Tank Size (gallons)	Number of People in Your Household					
	1	2	3	4	5	6
500	5.8	2.6	1.5	1.0	0.7	0.4
1,000	12.4	5.9	3.7	2.6	2.0	1.5
1,500	18.9	9.1	5.9	4.2	3.3	2.6
2,000	25.4	12.4	8.0	5.9	4.5	3.7

Source: Karen Mancl, *Septic Tank Maintenance* (AEX-740), Ohio Cooperative Extension Service, 1988.

When was your septic tank last pumped and/or inspected?

- A. The septic tank is pumped regularly as determined by an annual inspection, or it is pumped about every three to five years. Records are kept on all inspections and pumpings.
- B. The septic tank is pumped, but not regularly. Inspections are not done regularly, and record keeping is not consistent.
- C. The septic tank has not been pumped. There is no record of the last inspection.

Protecting Your Drain Field

A septic system depends on good soil conditions for treatment and disposal of effluent, because water must be able to percolate through the soil at a reasonable rate. Compacted soil does not have enough oxygen for soil microbes to digest wastes efficiently. To prevent soil compaction and damage to sewage system pipes, avoid:

- driving vehicles on the drain field.
- construction over the drain field.
- planting trees and shrubs with deep roots over the drain field.

Do you protect your drain field?

- A. Vehicles and other heavy objects or activities are kept from the drain field area.
- B. Occasionally, the drain field is compacted by heavy objects or activities.
- C. Vehicles, livestock, heavy objects, or other disturbances are permitted in the drain field area.

Noticing Signs of Trouble

If you have noticed foul odors in your home or in your yard, you may be having problems with your septic system. Other signs of septic system problems are:

- a slow or backed-up drain.
- spongy ground.
- lush plant growth near a drain field.
- repeated intestinal illnesses in your family.

You should respond quickly to any problems you observe, and you may need to modify your system to help avoid future problems. Remember, what may seem to be the least expensive option now may not be economical in the long run. Try to make your decisions based on lowering risks to your health and the environment.

Does your septic system show signs of trouble?

- A. Household drains flow freely. There are no sewage odors inside or outside. Soil over the drain field is firm and dry. Well water tests negative for coliform bacteria.
- B. Household drains run slowly. Soil over the drain field is sometimes wet.
- C. Household drains back up. Sewage odors are noticeable in the house or yard. Soil is wet or spongy in the drain field area. Well water tests positive for coliform bacteria.

Solid Wastes in Your System

Your wastewater treatment system is not a substitute for the trash can or compost pile. You should dispose of tissues, diapers, baby wipes, sanitary napkins, tampons, cigarette butts, dental floss, hair, and other solid waste along with regular garbage, not down the toilet. Since these materials do not break down easily, they will cause your septic tank or the settling tanks in a municipal treatment plant to fill up faster.

Using a food grinder (garbage disposal) in the kitchen sink adds solids to your wastewater treatment system. Excess grease, fats, and coffee grounds can clog your system. Consider composting food waste and even some paper waste. Information from your local office of the Cooperative Extension Service can start you on your way to successful composting.

What types of solid wastes do you deposit in your septic system?

- A. There is no garbage disposal in the kitchen. No grease or coffee grounds are put down the drain. Only toilet tissue is put in the toilet.
- B. There is moderate use of a garbage disposal, and some solids are disposed of down the drain.
- C. There is heavy use of a garbage disposal, and many solids are disposed of down the drain. Many paper products are flushed down the toilet.

Household Chemicals and Septic Systems

Wastewater treatment systems are not designed to neutralize a wide variety of household chemicals. Paints, solvents, acids, drain cleaners, oils, and pesticides can pass through your system and contaminate the groundwater. In addition, large volumes of water-soluble cleaners, bleach, and solvents that are designed to unclog your septic system can harm the septic tank microbes that break down solids and possibly contaminate your drinking water supply.

Are hazardous household chemicals poured down the drain?

- A. No solvents, fuels, or other hazardous chemicals are poured down the drain.
- B. Hazardous chemicals are poured down the drain occasionally.
- C. Strong cleaning chemicals that end up in wastewater are used heavily.

Conserving Water

If you reduce the flow of wastewater through the septic tank, you allow more time for solids to settle out, providing less chance of solid particles being carried into the drain field. Less water in the drain field means better aeration for the soil microbes at work in your system. Here are a few ways to reduce the volume of water you use:

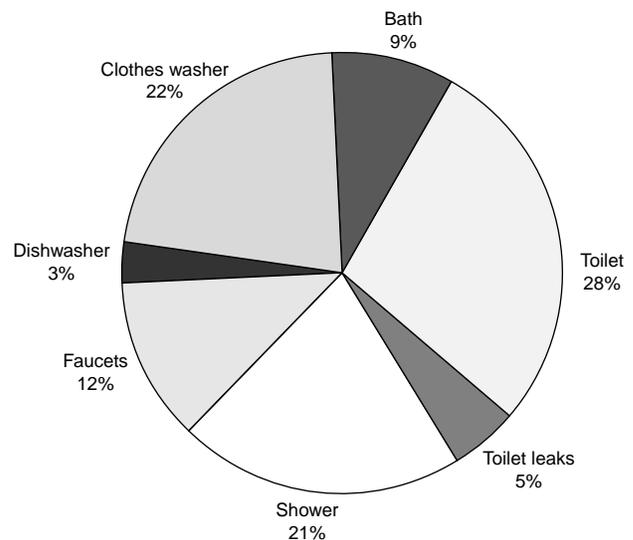
- Install low-flow toilets.
- Take shorter showers.
- Repair leaks immediately.
- Run the washing machine or dishwasher only when full.
- Turn off water when brushing your teeth or shaving.
- Spread out laundry and other major water-using activities over a day or week.

Figure 3 shows average household water usage.

Do you use water-conserving fixtures and practices in your home?

- A. Water-conserving fixtures and practices are always used. Drips and leaks are fixed immediately.
- B. Some water-conserving steps are taken (such as using low-flow shower heads or fully loading the washing machine and/or dishwasher).
- C. Standard high-volume bathroom fixtures are used. No effort is made to conserve water. Leaks are not repaired.

Figure 3. Average household water usage.



Source: John Woodwell, *Water Efficiency in Your Home*, Rocky Mountain Institute, 1995.

For More Information About . . .

- **Installation of On-Site Wastewater Treatment Systems**
 - Kentucky Department for Public Health (call 502-564-7818).
 - Local health department (check local listing).
- **Septic System Maintenance**
 - *Maintaining Conventional Septic Systems* (AGR-166) by W.O. Thom and Pat Keefe, University of Kentucky Cooperative Extension Service.
 - *Homeowner's Septic System Guide and Record-Keeping Folder*, Kentucky Division of Water (call 502-564-3410).
 - Local health department (check local listing).
- **Household Wastewater Assessment**
 - *Assessing and Reducing the Risk of Groundwater Contamination from Household Wastewater Treatment* (IP-44) by Mark Dravillas and Tom Ilvento, University of Kentucky Cooperative Extension Service.
- **Water Conservation**
 - *Conserving Water at Home* (IP-2) by Linda Heaton, Tom Ilvento, and Joe Taraba, University of Kentucky Cooperative Extension Service.



Home "A" Syst

What Is the KY-A-Syst for the Home program?

The KY-A-Syst for the Home program is a series of publications that can help you be a good environmental steward and protect the health and well-being of your family. KY-A-Syst for the Home publications provide problem-solving information and list agencies that can help in specific areas.

Action Checklist

Look back at the assessment questions, and make sure you have answered all questions. Record all B and C responses and list the improvements or changes you plan to make. You can use recommendations from this publication or from other sources to help you decide on action you are likely to take. Write down a date to keep you on schedule. Read back through the questions from time to time to see if any responses have changed, and take any action needed to address new concerns.

Write all B and C responses below.	What can you do to reduce risk?	Set a target date for action.
<i>Sample:</i> There is moderate use of a garbage disposal, and some solids are disposed of down the drain.	Take out garbage disposal.	Within two months.

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