



Home & Environment

Septic System Failure and Environmental Impacts

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When properly designed, maintained, and used, septic systems can provide adequate treatment for most pollutants. According to the U.S. Census Bureau, approximately 23 percent of the estimated 115 million occupied homes in the United States are served by septic systems. More than one-third of new homes and over half of the mobile homes in the U.S. depend on septic systems. Here in Kentucky, approximately 40 percent of the homes have septic systems. This is common in the southeast, where there are more septic systems per capita than any other region of the country.

Comprehensive data to measure the true extent of septic system failure are not currently collected by any single organization. Although estimates of system failure rates have been made by various states, no state had directly measured its own failure rate and definitions of failure vary. Most available data are the result of incidents that directly affect public health or are obtained from homeowners' applications for permits to replace or repair failing systems.

Massachusetts has the most comprehensive statewide program to identify septic system failures. This time-of-transfer inspection identified a 20 percent failure rate based on an inspection of each septic system prior to home sale. The Massachusetts program, however, only identifies failures according to code and does not track groundwater contamination that may result from septic system failures.

A study of two Indiana counties suggest that nearly one in three of all septic systems built between 1950 and 1990 required repairs. But since 1990, when the state septic system code was updated, less than 3 percent of new septic systems required repairs, significantly fewer than in previous decades. The most commonly reported cause of septic system failure is soil wetness (seasonally high water table). Other common causes were under-sized systems, system age, and limited space for the soil treatment area.

Improved septic system designs and more stringent oversight have resulted in fewer failures, but homeowners may mistakenly believe their septic systems are working properly so long as the toilets flush and there is no foul odor in the yard or adjacent ditches. However, septic systems fail in other, less obvious ways, so homeowners should learn to recognize the most common types and causes of septic system failures.

If 20 percent of Kentucky's septic systems are failing, approximately 7.6 billion gallons of raw sewage are discharged into the environment annually.

Types of Failures

There are four basic categories of septic system failure.

Sewage Backflow

Sewage backflow—when the septic system rejects sewage until it backs up into a home—is the most commonly reported failure category. Such failures are obvious and typically command a homeowner's immediate attention. Because they are usually noticed and addressed so quickly, sewage backflow failures seldom cause much harm to the environment. However, if the system is not quickly repaired, it can become a health hazard.

Sewage in the Yard

Another common category of septic system failure is when poorly treated sewage surfaces on the surface of the yard, in nearby ditches, on the neighbor's lawn, or elsewhere in the immediate environment (see Figure 1). When it occurs in densely populated neighborhoods, such failures are usually obvious. Sewage in the yard can degrade surface water and is a health hazard.

Decline in Water Quality

A home's plumbing and septic system drainfield may appear to be working properly and nobody in the neighborhood will notice foul odors or excess wetness around the drainfield. But with this category of septic system failure, water supply sampling indicates a significant degradation in groundwater quality. Frequently, a downhill neighbor's water supply well will be affected, not the water supply of the failing system's owner. Such failures are not obvious, and homeowners may perceive that their septic systems are working satisfactorily.

Gradual Environmental Degradation

There is little scientific evidence indicating that septic system failures are causing Kentucky's waters to degrade at such a rate that it would pose a problem to this or the next generation. However, computer modeling and long-term monitoring indicate that septic system use in certain areas of the U.S. will result in gradual environmental degradation. This is a very difficult problem to identify, especially without extensive and costly long-



Figure 1. An example of a failing septic system. Effluent can be seen surfacing on top of the lawn at left. (Photo by Kelli Hart)

term monitoring. Because such septic system failures are difficult to identify and quantify, there are no regulations regarding them.

Environmental Impacts

A septic system's effect on the environment can be difficult to measure. We can estimate that every failing septic system can discharge about 63 thousand gallons of untreated wastewater into Kentucky's environment per year. That means that if 20 percent of Kentucky's septic systems are failing, approximately 7.6 billion gallons of raw sewage are discharged into the environment annually.

Untreated wastewater contains excessive nutrients (nitrogen and phosphorus) that can harm native plant and fish populations in Kentucky's surface waters. Wastewater's excessive organic matter content also can choke off the oxygen supply in streams and rivers. Microbial populations in these surface waters can exceed the U.S. Environmental Protection Agency's body contact standards, abruptly halting recreational use of beaches, lakes, and streams.

Common Causes of Failures

One of the most critical factors in septic system performance is the nature of the soils used for the septic system soil treatment area. Other common causes of failure include improper design, and poor system use, management, and maintenance by the homeowner.

Minimize failures by carefully and deliberately considering all aspects septic system construction—site selection, design, installation, maintenance, and use.

Hire reputable individuals to design and install your septic system. County health departments can provide you with the names of installers who work in your county. After contacting a septic system professional, ask for references from previous customers and contact these homeowners to ask them about their septic system's performance.

Once built, be sure to maintain the septic system. Use water conservatively, avoid driving over the septic system, and have your septic tank pumped and cleaned every three to five years (for most 3-4 bedroom single family homes.)

When Problems Occur

If your septic system needs repair, it is imperative that you contact your local county health department and report the situation. The county health department can help you identify the problem and provide a list of professionals in the area who can assist you. In addition to helping you, health departments use reports of failing systems to develop future septic system designs that will better function in Kentucky soils.

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