

Small-Scale Septic Systems: Their Threat to Drinking Water Supplies and Options for Local Government

Failing septic systems pose a significant public health threat, contributing high levels of nitrogen, phosphorous and coliform bacteria to groundwater and surface water. For communities, failing septic systems can also depress property values, lower residents' quality of life, and result in mandated costly installations of municipal sewer systems and public waterworks.

Septic Systems and Groundwater

Over 40% of Michigan households use septic systems. Conventional septic systems are a cost-effective option for wastewater treatment if soil and environmental conditions are suitable. However, when conditions are not suitable, septic systems pose a significant threat to drinking water and other water sources.

Septic systems fail when they cannot effectively process wastewater. Indicators of system failure include: detection of pathogens and nutrients in drinking wells or surface waters; unpleasant odors, soggy soil or liquid waste flow over land surface; and an increase in weed or algae growth in the water near shore. Sometimes, however, the signs of system failure are not readily identifiable.

Septic systems fail for a number of reasons.

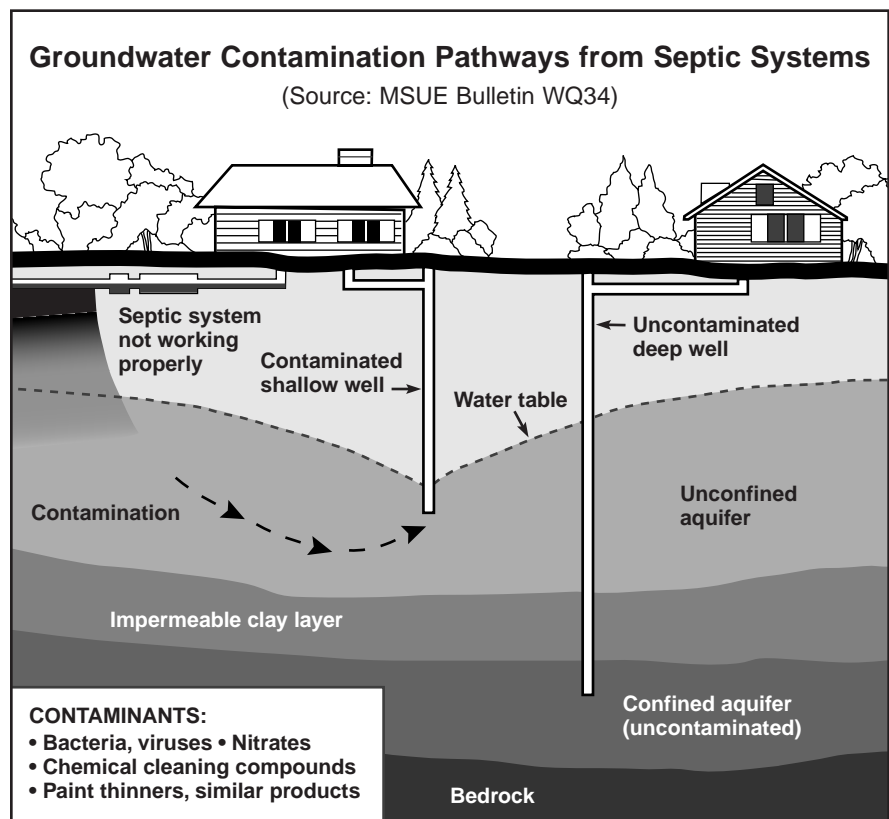
1. A system may be functioning but is located over an unprotected aquifer or fractured limestone.

2. A system may not have been pumped on a regular basis or maintained properly.
3. Improper disposal of household chemicals such as paint thinners into a system.
4. Use of septic tank cleaning additives.
5. Residences outgrow their septic system's capacity.
6. Septic systems are located less than 100 ft. from surface waters or less than 50 ft. from drinking water wells.
7. Septic systems are spaced too closely to each other.

Septic systems most often fail because they were built in unsuitable areas. Poor siting is the leading cause of septic system failure.

Regulatory Authority

County health departments have the primary regulatory authority over the siting and design of municipal and residential sewage systems with wastewater flows less than 10,000 gallons/day. Systems with wastewater flows greater than 10,000 gallons/day are regulated by the Management Waste Division, MI. Department of Environmental Quality.



The criteria used by county health departments for approving sewage systems are contained in the local sanitary codes which are loosely based on state health codes. Local codes are developed by the county board of health and approved by the county board of commissioners. Where there is no county board of health, then the county commissioners must develop and approve local sanitary codes.

In addition to granting permits for on-site septic systems, local health departments oversee the use and management of septic systems in a number of ways.

1. They regulate the management of on-site septic systems when either failure has occurred that threatens drinking water supplies or a nuisance has been reported.
2. They evaluate septic systems for real estate transfers.
3. They evaluate replacement or upgraded septic systems.
4. They evaluate the performance of on-site systems at the owner(s) request.
5. They test residents' well water at their request.
3. Establishing and enforcing safe isolation distances (no less than 50 feet) between septic systems and drinking water wells;
4. Requiring connections to available main sewer systems when available;
5. Establishing septic system management districts (can be special assessment, special use or special drainage districts) where residents must follow a septic tank pumpout and maintenance schedule;
6. Amending the local building code to require the use of water conservation appliances, shower heads and toilets in new homes;
7. Developing stringent regulations for siting and construction of septic systems particularly where soil and environmental conditions are inappropriate;
8. Cluster zoning using septic system density restrictions;
9. Working with county officials to develop local sanitary codes which do not sacrifice drinking water quality especially in areas where soils are unsuitable for on-site systems; and
10. Instituting large lot zoning at the county level to ensure enough land for the drainage (absorption) field.

When contamination of private and public drinking water sources has occurred due to septic system failures, local officials do have options. The most common are to build a municipal treatment facility or to connect all residences to a municipal sewer.

These may not be the most cost-effective options for your particular situation. Another option is to explore the feasibility of alternative wastewater treatment and collection technologies. These include

1. sand filters,
2. non-sand filters,
3. mound systems,

4. aerobic treatment units,
5. small diameter effluent sewers,
6. grinder pump systems,
7. vacuum sewers,
8. cluster systems, and
9. re-circulating sand filters.

The installation costs for alternative systems range from \$2,000 to \$20,000 depending upon the system and the site. While these technologies are more expensive to install and maintain than conventional septic systems, their effluent contains significantly fewer pathogens and chemicals than effluent from a conventional system. By releasing fewer contaminants into the ground, natural processes can over a period of years remove the contaminants from the effluent. Also, the cost of alternative systems might still be less expensive than building a municipal treatment facility or hooking everyone up to a main sewer.

A significant drawback to alternative systems is that most are not permissible under existing local health codes and so require a variance. This can change if county, township and municipal officials work together to craft sanitary codes and regulations that accept alternative systems for some areas where conventional systems are unsuitable. Local government officials should note, however, that **there are also minimum site requirements for alternative on-site systems. These systems will not work for all areas where conventional systems are unsuitable.** Certain areas which are environmentally fragile are simply unsuitable for any type of on-site septic system.

How Can Local Governments Reduce the Threat of Septic System Failure?

Public officials at the county, township and municipality can use zoning, subdivision regulations, special purpose ordinances and educational campaigns to **prevent** contamination of public and private drinking water sources from septic systems. Such actions include:

1. Educating their constituency about the threat to drinking water from failing septic systems;
2. Establishing and enforcing safe setback distances (no less than 100 feet) for septic systems from lakes, ponds and rivers;

Other Information Sources

- 1 "Maintaining your Septic System" (WQ13) available at the MSU Extension Bulletin Office at 108 Agriculture Hall, MSU, tel: (517) 355-0240. Cost is \$ 0.30 per copy.

- 2 "What To Do If Your Septic System Fails" (WQ14) available at MSU Extension Bulletin Office at 108 Agriculture Hall, MSU, tel: (517) 355-0240. Cost is \$ 0.30 per copy.
- 3 "Buying or Selling a Home? What to Find Out About Your Water and Septic Systems" (WQ15) available at the MSU Extension Bulletin Office, 108 Agriculture Hall, MSU, tel: (517) 355-0240. Cost is \$ 0.15 per copy.
- 4 "Septic Systems and Water Quality" (brochure). For copies, please contact The Tip of the Mitt Watershed Council, Tel: (616) 347-1181.
- 5 "A Guidebook for Local Officials on Small Community Wastewater Management Options" (EPA 430/9-87-006), US Environmental Protection Agency. Please write to request a copy from US EPA, Office of Municipal Pollution Control, Municipal Facilities Division, Washington, D.C., 20460.
- 6 Questions on local sanitary codes or alternative on-site septic systems can be directed to your local health department.

Local Government and Drinking Water Protection Fact Sheet Series

Requests for copies of this fact sheet or any others in this series should be directed to the main offices of the MAC, MML, MTA, MSPO or MALPH.

All fact sheets are free.

Questions or comments regarding any of the fact sheets in this series can be directed to:

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