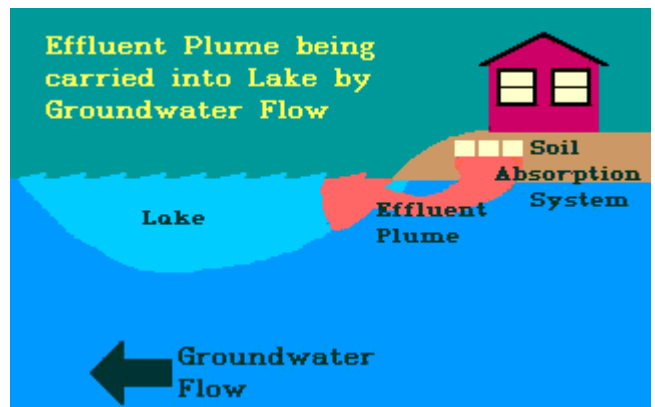


## Lakeshore Septic System Basics

Adequate treatment of household waste from camps is critical to maintaining lake health. While it is not the only potential source of pollution to a lake, a poor septic system can introduce both nutrients and pathogens to a lake. The effects may be especially noticeable locally in the form of increased plant and algae growth offshore of a camp. This handout will describe how septic systems work, how to tell if one is working, and how to maintain a system for long life and lake health.

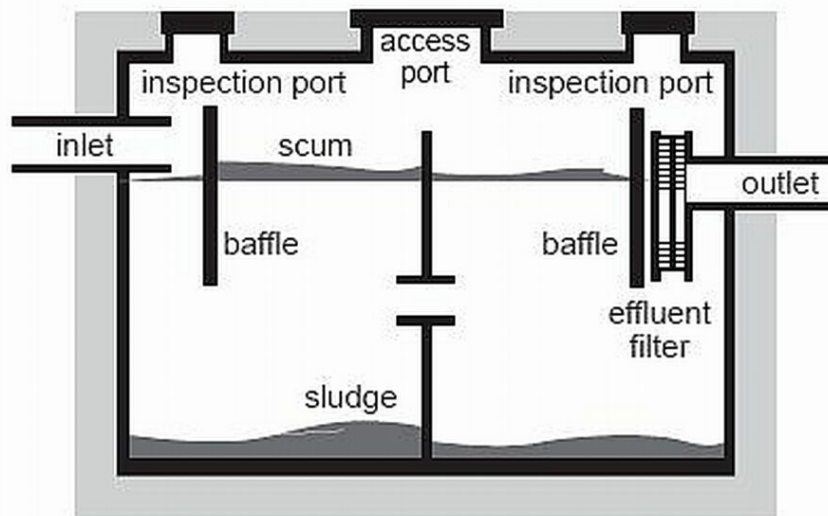
### Potential threats from lakeshore septic systems:

1. Pathogenic (disease-causing) bacteria – if a system is not working correctly and leachate is directly entering the lake, you and others may be exposed to high bacteria levels and potentially disease-causing organisms. (Note that such a system may not show any on-shore indications of malfunction.) This can happen under several conditions including when the soil below the leachfield is too shallow or too porous and leachate quickly joins the groundwater. Along a lakeshore groundwater is usually flowing toward the lake and entering the lake water through the lakebed.
2. Nutrient enrichment – a poor system may be creating a local in-lake spot of high nutrients (phosphorus and nitrogen) resulting in a dense patch of plants and/or algae. (Again, note a system may have this problem and not show any on-shore signs).
3. Surfacing leachate. A wet muddy spot on the lawn, perhaps only during wet periods, or an area of excessive grass growth are signs of a surfacing leach field. The soil around the leachfield is not porous enough and doesn't allow leachate to filter through soil. This condition can also occur when the leachfield becomes clogged due to inadequate maintenance.



### How it works:

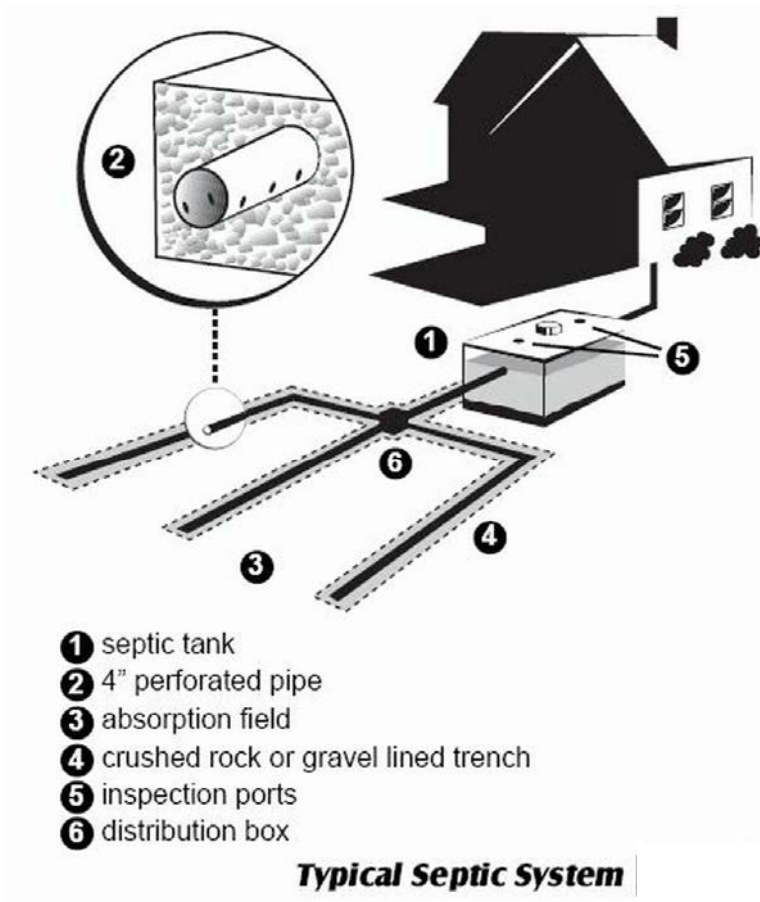
A typical septic system contains two major components: a septic tank and the absorption field (leachfield). Often a distribution box is included as part of the system to separate the septic tank effluent evenly into a network of distribution lines that make up the absorption field. The septic tank is watertight and buried. All septic tanks have baffles (or tees) at the inlet and outlet to ensure proper flow patterns.



**Cross-section of a two-compartment septic tank**

Household septic tanks usually have a minimum 1000 gallon capacity. The size of the tank is determined by the number of bedrooms in the dwelling or the uses of the building. The primary purpose of the septic tank is to separate the solids from the liquids and to promote partial breakdown of contaminants by microorganisms naturally present in wastewater. The solids, known as sludge, collect on the bottom of the tank, while the scum (oils and greases) floats on the top of the liquid. The sludge and scum remain in the tank and need to be pumped out periodically.

Liquids pass out of the tank through an effluent filter, designed to prevent solids greater than 1/8 inch in diameter from getting into the leachfield. Keeping solids out of the absorption field not only prevents clogging, but also reduces potentially expensive repair or replacement costs and helps ensure the ability of the soil to effectively treat the septic tank effluent.



The effluent is passed on to the absorption field through a connecting pipe and a distribution box, which ensures the effluent is evenly distributed to the parallel pipes of the leachfield. The absorption field contains a series of perforated pipes that trickle out effluent into the surrounding trench. The trench is composed of gravel or crushed rock and provides surface area on which biological, chemical and physical breakdown material in the effluent occurs. After that, leachate enters the native soil and is further treated in the soil. An adequate depth of soil below the leachfield is required to ensure effective treatment before the liquids reach groundwater.

### Reasons a system may not be working well:

1. You have an old “system” that does not meet current design or site standards and thus is not effectively treating the waste.
2. You have a system that has not been maintained (i.e. regular tank pumping). When solids and greases are not regularly pumped out of the septic tank, they eventually get into the leachfield and clog it, often causing surfacing.
3. Woody vegetation has been allowed to grow up in the leachfield area, thus disrupting the flow or cracking the leachfield pipes resulting in leaks.
4. The system has been misused through the introduction of excessive organic material (from garbage disposals), or through the disposal of chemicals that have killed the working bacteria of the system.
5. You used a septic tank additive that, while clearing out the tank, moved solids into the leachfield and clogged it.

The water usage of the camp has increased beyond the capacity of the septic system. Maybe the camp has been increased in size or converted to year-round use or maybe washing machines, dishwashers or a hot tub have been added, taxing an old system through excessive flows. If the flow into the septic tank exceeds its ability to settle solids and float greases, these materials get introduced to the leachfield and clog it.

### Testing your septic system:

1. Learn where it is and what kind of system you have. Have it inspected for proper function. Septic pumping companies are experts at locating systems! They will examine the condition of the interior baffles and inlet and outlet to determine if they are functioning well. Also, once you know the size of the tank, you will know the number of users the system is designed to handle.
2. Based on the location of the tank, the location of the leachfield can be estimated. Use this information to estimate whether or not there is adequate setback from the lake shoreline and elevation above groundwater. For instance if your leachfield is in an area where the ground surface is 1 ½ feet above the lake level, it is probably not possible to have the needed separation distance from the bottom of the leachfield and the groundwater. Request a copy of “*Adirondack Aquatic Institute Septic System Self Evaluation*” (from the Lakes and Ponds Section) that will lead you through an assessment of your septic system. This is a no-cost way to determine the “risk factor” of a septic system and help you decide if it needs to be replaced.
3. Observe plant and algae growth offshore of your property. If you have noticeably more than your neighbors, it’s possible your septic system is a factor. Note, however, that this can also be a sign of other nutrient sources such as lawn fertilizer, driveway runoff etc., or increased sunlight due to removal of shoreland trees.
4. Bacteria testing in the lake has a very limited ability to verify the proper working of your septic system. For instance, leachate may be surfacing in a discreet location and unless you test right there when flows are occurring you may get a low concentration. Testing your well water for bacteria is a good idea if the separation distance between septic system and well are not met.
5. Dye testing is somewhat more effective test, however, it will only catch the worst systems. It is possible for a septic system to be polluting the lake by slowly introducing nutrient-rich wastewater into groundwater and thus into the lake, and pass a dye test simply because it takes more than 48 hours for this occur. Most plumbers can supply you with dye tablets and instructions, however, be aware that a poor system may pass this test.

### How to Take Care of a Septic System:

1. Learn where your system is and sketch out its location with measured distances from stationary objects such as the corner of the camp. Keep records of maintenance and inspection activities, as well as the original design specs if you have it.

2. Have your septic tank pumped and inspected at least once every three years. If your tank is small or the use is high, you may need to do it more often. The pumping company can advise you based on the tanks condition when it is pumped.
3. Do not use septic additives. They are not necessary and may damage your system necessitating expensive repair. It is not necessary to “seed” the tank after pumping.
4. Conserve water to avoid overloading the system. Use low-flow fixtures and appliances. Institute additional conservation measures when you have a full house. Space your laundry washing out over the week. Excessive flow to the septic tank can cause flushing of solids into the leachfield, resulting in clogs and failure.
5. Keep roof drains, basement sump pumps and other rainwater or surface water out of the septic system.
6. Do not use caustic drain openers. Instead use boiling water or a drain snake. Likewise use commercial bathroom and kitchen cleaners in moderation.
7. Avoid the use of a garbage disposal. It puts many solids into the septic tank and means you should have it pumped out perhaps twice as often.
8. A septic system is not a trash can. Do not put grease, oil, disposable diapers, sanitary napkins or tampons, paper towels, cat litter, paint, or pesticides into your system.
9. Plant only grass or other herbaceous plants over your leachfield and keep trees and shrubs away from the edge. Roots can invade the leachfield pipes and cause them to clog or crack.
10. Do not drive or park on the leachfield. It compacts the soil and might crack an underground pipe.



#### **Vermont’s New On-site Septic Regulations:**

As of July 1, 2007 the phase-in of the new septic system regulations will be complete. For the first time, all new septic systems in Vermont will be required to obtain a state permit. For lakeshores, these regulation mean:

- Septic systems will have to be permitted if the use of a camp changes from seasonal to year-round. This may or may not require an upgrade of the system to meet standards.
- Septic systems will have to be upgraded to meet standards if camps are expanded to include new bedrooms or plumbing.
- Any work done on a septic system will require its upgrade to meet state standards, however, when working on an existing system, owners are entitled to a “best fix” permit to deal with difficult locations.
- All new land subdivisions will require a suitable site and design of a septic system meeting state standards (unless the owner signs off ever being able to develop it).
- New “alternative” septic system designs are being reviewed and allowed on an on-going basis by the Wasterwater Management Division of VTDEC. These alternatives will allow systems specialized for shallow soil or small sites, facilitating retrofitting of some shoreland systems.

For more information, contact the permit information specialist in your ANR District Office, or the DEC Regional Engineer. Information about alternative systems currently approved can be found at <http://www.anr.state.vt.us/dec/ww/Innovative.htm>.

For more information or to obtain other topics in the Lake Protection Series, contact the Lakes and Ponds Section at (802) 241-3777 or visit [www.vtwaterquality.org/lakes.htm](http://www.vtwaterquality.org/lakes.htm).