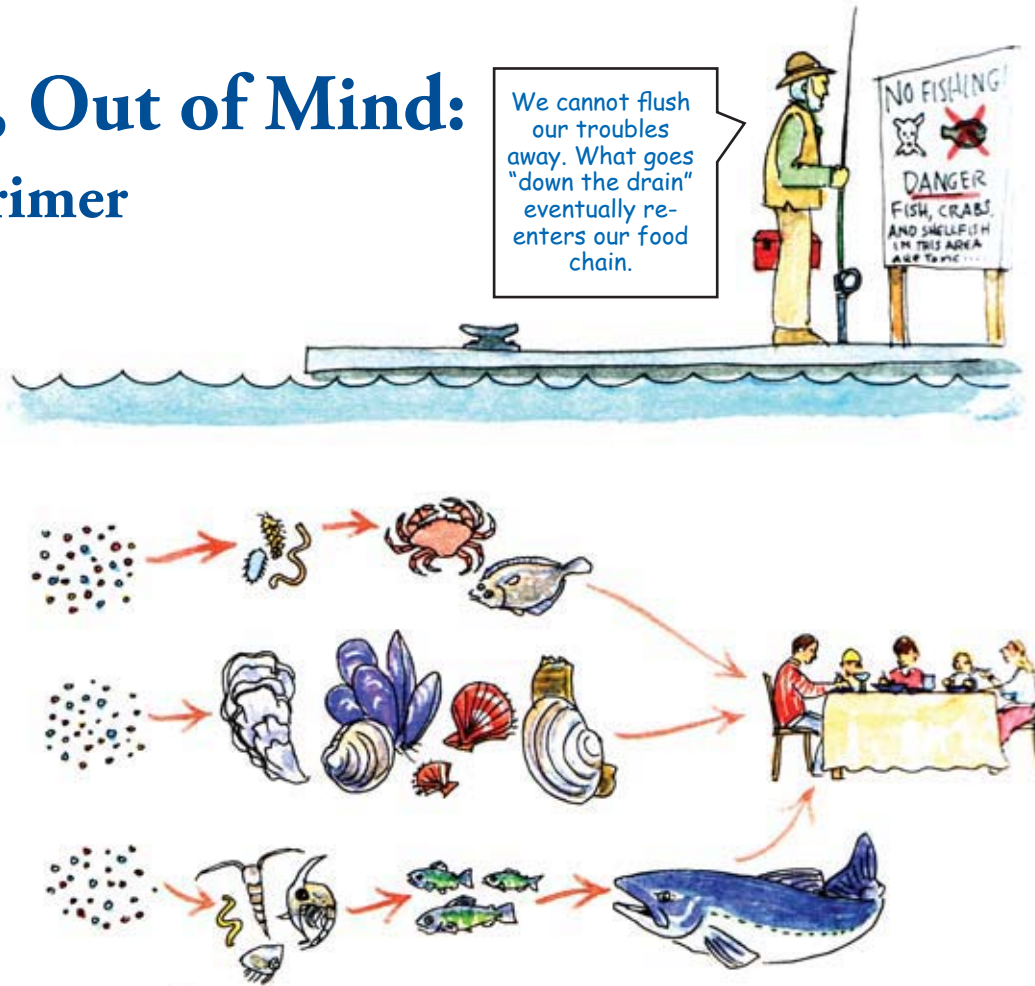


Out of Sight, Out of Mind: A Wastewater Primer

Human wastes carry viruses, bacteria, antibiotics, and nutrients and must be disposed of with care. These bacteria are not suited to survive for long outside the human body; however, the viruses and nutrients can persist. If not carefully disposed of, wastes can contaminate drinking water. The nutrients contained in wastewater, especially nitrogen, can also affect the quality of drinking water and cause a serious decline in coastal marine habitat, wiping out eelgrass and shellfish beds.

Toxic materials, including prescriptions, should never be disposed of in your septic system. They may seep into the groundwater, contaminating drinking water and the food chain.



Wastewater Treatment: A Brief History

Historically, the goal of treatment is to remove the disease-causing pathogens and dissolve the solids enough to be able to dispose of the wastewater in the soil. Human beings have a long history of disposing of their wastes into the ground. This method isolated wastes and allowed natural chemical and biological processes to break down solids and destroy the pathogens. But this only worked as long as the population remained small. The addition of clean water to carry the waste out of the dwelling and into cesspools was a natural next step. However, the water also leached nutrients, viruses, and to a lesser extent, bacteria away from the cesspool, and toward the water sources.



Modern wastewater systems contain two components: the tank and the soil absorption field. The septic tank was a step forward from the cesspool because it provided a watertight tank to store the solid wastes and release the liquid slowly to infiltrate into the ground. Separating the solids from the liquids is called primary treatment. It helped prolong the life of the soil absorption system by removing grease and solids that once clogged the soil around cesspools.

Eventually many densely settled areas needed wastewater management. Wastewater was collected and piped to a facility that separated the solids from the liquids, killed almost all of the human waste bacteria, while using other bacteria to further digest the waste, and released a clear effluent into the ground. This process is known as secondary treatment. Chatham chose that route when we built our Wastewater Treatment Plant off Sam Ryder Road. Chatham's only sewered area is the downtown area and along Crowell Road to serve Chatham's middle and high schools. In the rest of town, private and commercial users have underground septic systems on site. The septic tank contents, pumped from Chatham septic systems, are brought to one of several municipal septage treatment facilities in Barnstable, Chatham, Orleans or Yarmouth that treat the solids from our systems. The treated residue is pumped to huge leaching fields where it flows through the groundwater, eventually ending up in Nantucket Sound or Cape Cod Bay.

Backyard disposal: The septic system and how it works

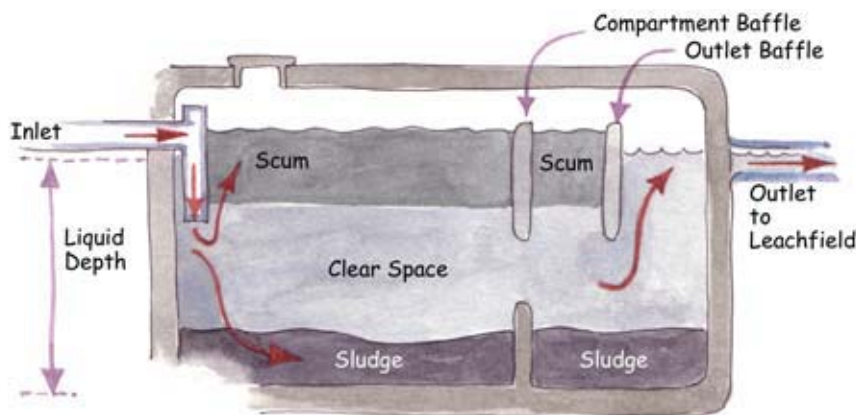
The septic system is an adequate disposal technique where housing density is low and groundwater does not carry the dissolved contaminants into bays and ponds.

However, septic systems are still used by the vast majority of homes in the region even though population densities are increasing. Newer systems consist of the tank – a cement or fiberglass container with a T-shaped outlet pipe that keeps the floating grease layer in the tank – and a soil absorption system that infiltrates the liquid portion of the wastes into the ground. Older systems, cesspools and leach pits perform similar functions. The Board of Health oversees these systems and enforces the State sanitary regulations under Title 5, as well as local regulations.

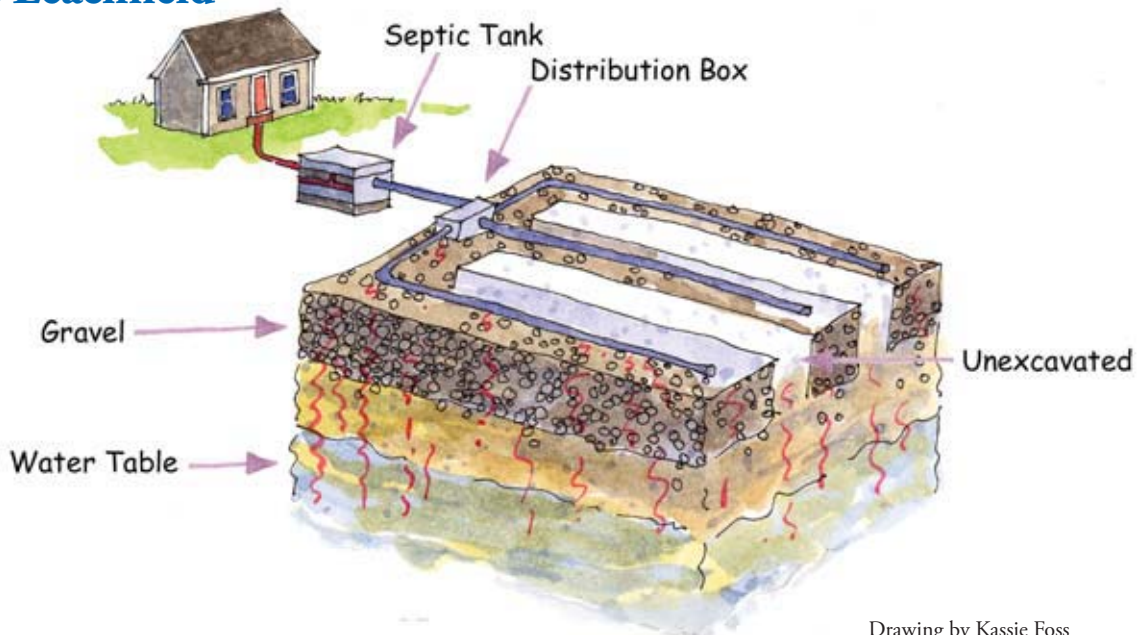
Typical Septic Tank



Of the approximate 6,700 housing units surrounding our waters, the vast majority utilize backyard wastewater systems. Chatham residents and businesses release well over 1,000,000 gallons of wastewater into the environment each day.



Septic Leachfield

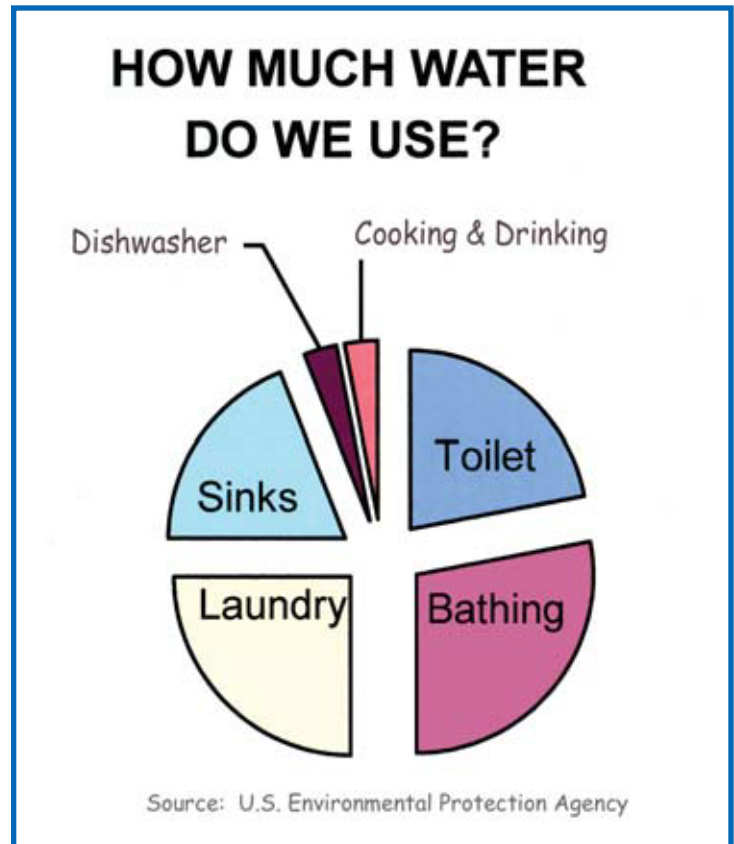


Drawing by Kassie Foss

Septic system leach fields effectively eliminate almost all bacteria and many viruses. The effluent leaving the tank contains tens of thousands of fecal bacteria, but after percolating through four feet of soil, the bacterial count is reduced to one per gram of soil. Nutrients like nitrogen are not completely removed during their transit through a typical septic system. So they proceed into the groundwater and eventually into the coastal waters. The septic system serving a family of three releases enough nitrogen to contaminate hundreds of gallons of marine water on a daily basis.

Excess nitrogen entering a salt pond or bay in the form of nitrate leads to:

- Phytoplankton blooms, causing cloudy or greenish coloring
- Excess growth of macro algae, sea lettuce
- Decline or outright loss of eelgrass beds.
- Increase in decayed plant material at bottom
- Decrease of shellfish like scallops and soft-shell clams.
- Odors from decay of excess vegetation. As the density of housing development increases, so does the risk of nitrates contaminating nearby wells.



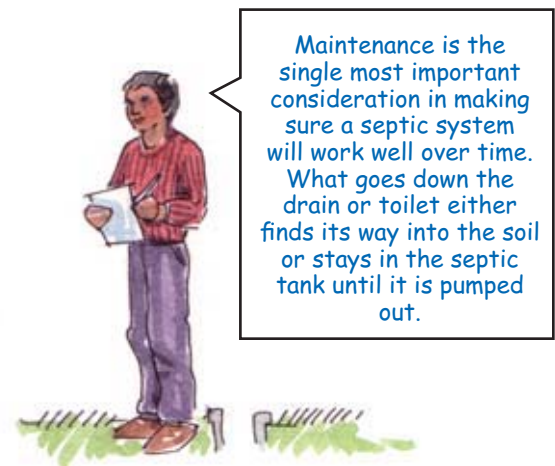
Excess phosphorous (phosphates) from household wastewater joins the groundwater and flows to our freshwater lakes and ponds where it stimulates:

- Plant growth
- Depletion of oxygen
- Decay at the bottom

As the density of housing development increases, so does the risk of nitrates and phosphates contaminating nearby Town and private wells.

Take Care of your Septic System:

- **Have it pumped out regularly:** The system should be pumped regularly to remove the sludge and the floating scum. The frequency depends on how you use your system and what goes down the drain. All systems should be pumped every three to five years to avoid septic system failure.
- **Conserve water:** Reducing the flow through your system will reduce the movement of solids and scum into the soil absorption system.
- **Don't overload the system:** A dripping faucet or a leaky toilet can add hundreds of gallons of water to the system each week. If you are going to have a large gathering, rent a portable toilet to reduce the demand on your septic system. Stagger your washing machine and dishwasher use to spread out the flow.
- **Don't install or use a garbage disposal:** These devices add large amounts of grease and organic matter to the system and will shorten the life of your soil absorption field.



- **Don't kill the bugs:** Flushing chemicals down the drain can kill bacteria in your septic tank. When these bacteria stop working, the sludge accumulates and is more likely to escape the tank and clog your leaching system.
- **Don't flood the soil absorption system:** Roof drains and stormwater runoff should be diverted away from your system to prevent periodic flooding.
- **Don't compact the soil absorption area:** Don't park your car on or drive over the system. The compaction of the soil from the weight of the vehicle will reduce the system's capacity.
- **Compost it:** Don't use the sink as a garbage disposal. This will add solids and grease to the tank that may exceed the ability of the bacteria to digest it. Compost what you can and dispose of greasy waste in your regular trash.
- **Don't flood the system with Hot Tub water:** Releasing a large volume of hot, chlorinated water into the septic system will kill the bacteria that are busily breaking down the waste. If you must drain your hot tub or spa, allow several days for the water to cool and the chlorine levels to dissipate and then slowly drain it onto the ground in a manner that will not impact your neighbors or natural resources (i.e., don't drain into wetlands).



A septic system pump-out and sludge disposal usually costs a few hundred dollars. Replacing a septic system may cost well over \$20,000!

Advancing Beyond the Septic System

Excessive nutrients flowing from septic systems in our densely populated town have led to significant decreases in water quality in Chatham. With guidance from the Chatham Department of Health and Environment and coordination by Friends of Chatham Waterways, over 150 volunteers have tested and sampled our water quality for eleven years at 25 stations in Chatham's saltwater estuaries. Data gathered by Chatham Water Watchers, our water-quality monitors, has been used by Massachusetts authorities to determine the amount of nitrogen that must be removed from each estuary to restore ecosystem health. At the same time, our freshwater lakes and ponds have been tested to determine where phosphorus levels must be reduced to restore their health. Chatham relies on clean, productive, and aesthetically pleasing waterways for tourism, recreational swimming, fish and boating, as well as for commercial and recreational fishing and shellfishing. Failure to reduce and then control nitrogen loads will result in replacement of highly productive eelgrass habitats with algae that smothers the bottoms of water bodies, reduces dissolved oxygen concentrations, causes fish kills, and widespread occurrence of unpleasant odors and scum. These environmental impacts greatly reduce commercial and recreational use of our bays and coastal waters.

The Federal Clean Water Act mandates that we clean up this form of pollution of our waterways. The Massachusetts DEP and EPA have issued mandates for the amount of nitrogen that must be removed from each of Chatham's embayments and salt ponds. The Town recently completed a town-wide Comprehensive Wastewater Management Plan (available on the Town's website) that details the problems, evaluates alternatives, and recommends a cost-effective, environmentally sound solution.

Increasing sewered areas plus expanded centralized treatment capacity are the best ways to eliminate nitrogen currently coming from septic systems and phosphorus from household waste. Citizens are being asked to support Chatham plans to implement those remedies to save our waterways from excessive nutrient pollution. Friends of Chatham Waterways encourages you to volunteer with Chatham Water Watchers (P.O. Box 472, Chatham MA 02633).

Malfunctioning septic systems means no shellfish for dinner tonight.

