

MINUTES OF THE THREE LAKES COUNCIL SEPTIC SEMINAR

Held on May 20, 2005, at 7:30 pm, at the South Salem Firehouse

Approximately 40 residents of the three lakes attended this informational meeting sponsored by the Three Lakes Council.

INTRODUCTION: Jack Sinnott, President of the Three Lakes Council, welcomed everyone to the Septic Seminar. He stated that the seminar is offered in keeping with the mission of Three Lakes Council: to improve and safeguard lake water quality and condition, and to inform and educate the community about how to do so. Jack then introduced the two speakers, both of whom have had long involvement with the Three Lakes Council.

Paul Lewis has lived in South Salem since 1946. He was a mechanical engineer with DuPont for 42 years and has served on Lewisboro's Planning Board, Zoning Board of Appeals and the Conservation Advisory Council. He spearheaded the Three Lakes Council Cedar Eden Lake Study and is currently chair of the Lake Preservation Committee.

Ed Delaney retired after 30 years with the Westchester County Health Department where he was supervisor of environmental engineering programs. As such, he was involved with over 6,000 septic systems in our area. We are fortunate that he volunteered to share his considerable expertise regarding septic systems with the Three Lakes Council

SEPTIC SYSTEMS – Ed Delaney

The first speaker was Ed Delaney who welcomed everyone present to the “Wonderful World of Septics”. His talk focused on the basics of septic systems, how they have evolved over the years, and the latest septic system technology.

HISTORY:

-Prior to the 1900s people had outhouses. A hole was dug, and the outhouse was positioned over it. When the pit was filled, a new hole was dug and the outhouse was repositioned.

-In the early 1900s, indoor plumbing was introduced. The effluent went into cesspools that overflowed, creating health problems and smelly situations for “downstream neighbors.”

-In the mid-1930s the health problems caused by cesspools were recognized, and Health Codes were developed to prevent spread of cholera, hepatitis, and typhus. These codes dictated that underground septic tanks be installed

It wasn't until the 1970s and 1980s that people started considering where the effluent goes once it leaves the septic tank, and how it affects the surrounding environment. Only then did they begin to recognize that the tank must be situated away from bodies of water or rock ledges, and that the effluent must go through a filtering medium such as soil or gravel.

The design of your septic system depends upon its age.

The effectiveness of your septic system depends upon its age and its ability to handle the amount flowing into it.

The conventional (absorption) septic systems that most of us have are based upon 90 year old technology. This type of system has four components.

THE FOUR COMPONENTS OF SEPTIC SYSTEMS:

1. COLLECTION – via plumbing leading into a soil pipe, and flowing to the tank.
2. TREATMENT – this occurs in the **septic tank**.*
3. DISTRIBUTION - The **distribution box** receives the treated waste from the septic tank and distributes it to the fields through several outlets. It is vital that the distribution box be dead level or the effluent will only go out through one or two outlets.
4. ABSORPTION – this is the final stage of the process. The effluent goes from the distribution box (or some other device) into gravel fields** (absorption trenches) and eventually into the earth.

*** SEPTIC TANKS**

Tank design and standards have changed over the years. Old tanks were just a single tank with no baffles. More modern tanks have two compartments with top and bottom baffles that prevent solids from flowing out of the tank before they are broken down by microbial action.

Inside your septic tank, solids sink to the bottom and form sludge.
Grease and other components of the effluent rise to the top layer of the tank.

Bacteria turn the solids to liquids, and the gases that are produced rise and escape through the soil pipe and from there through a pipe that goes up through the roof of your home. If the soil pipe is plugged, all action stops

Primary treatment occurs in the septic tank, but the effluent still has some solids, viruses & bacteria, grease, etc. that need to be removed by a professional septic tank cleaning company.

UNDERSTAND THE CONDITION OF YOUR SEPTIC TANK.

Ask the septic cleaner:

How thick was my bottom (sludge) layer?

How thick was my upper layer (grease, etc.)?

What is the condition of the tank itself?

****FIELDS**

There is no interaction between these absorption trenches; all action is vertical. The effluent flows downward. If effluent hits rock it runs straight out (and into the lakes) rather than downward where it is filtered by the soil.

E.P.A. standards re field depth have changed over the years. Their original recommendation of an 18” depth did not take into account where the water table is. Westchester County increased the requirement to be 5’ away from rock and 4’ from the water table.

Septic systems rely on the soil to remove phosphorus. If water table is too close, or if the soil becomes saturated with phosphorus, the phosphorus will leach into the lakes. This would be considered a septic failure by our standards because it harms the lakes. However, because it occurs beneath ground, the Health Dept. does not recognize it as failure; their definition of failure is what you see above ground (i.e. seepage).

CARE AND MAINTENANCE OF SEPTIC SYSTEMS:

Homeowners do 3 things that HARM their septic systems:

1. They put things in that don't belong.
DO NOT use garbage disposals.
DO NOT put grease down the drain.
DO NOT put chemicals that kill the active bacteria down the drain.
2. They don't maintain their systems.
Have your septic tank cleaned regularly. Check on the condition of the tank and fields.
3. They overload the system by releasing too much water at one time.
This leads to a clogged system.

ALL SEPTIC FIELDS WILL EVENTUALLY FAIL

An anaerobic Bio Mat forms at the bottom of the absorption trench. This serves a useful purpose in treatment, but it can also become our enemy. When it eventually thickens to the point where effluent can't get through it and the system clogs, the effluent can't get to the earth surrounding it. The trench eventually goes into total failure - it can't accommodate any more, it backs up, and it smells.

SEPTIC CODES: When you say you want septic systems "brought up to code," two things must be understood:

1. On Lake Waccabuc, septic systems were put in that met the code at the time, but there have been many different codes in effect over the years, according to when the house was built.
2. Governmental agencies don't evaluate what is going on inside a house. Septic system sizing is based only on bedroom count.

HOW THE PHOSPHOROUS FROM EFFLUENT HARMS THE LAKES – Paul Lewis

Paul Lewis discussed why the phosphorus contained in septic effluent causes the greatest concern for our lakes.

- Septic systems don't filter out phosphorus.
- Phosphorus that reaches the lakes accelerates the growth of weeds & algae.

Developed Land vs. Forest Land

The total acreage of the Three Lake watershed is 2,200 acres.

Five hundred and fifty (550) acres of that land around the lakes is now developed.

The phosphorous coefficient for **forest land** is 0.2 lb/acre/year

The phosphorous coefficient for **developed land** is 1.0 lb/acre/year

That means that there has been a 450 pound increase in the amount of phosphorous generated within our watershed due to the change in land use.

Weeds and algae must have phosphorous to grow; they are phosphorous limited.

The IMPACT of the increased phosphorous load that development has brought is dramatic:

- One pound of phosphorous results in 500 pounds of weed and algae growth.
- This results in over 200,000 lb. of weeds and algae per year.

In addition to the phosphorous loading, Waccabuc is also challenged by its low flow rate. Since the inflow and outflow sources are very close together, the lake has a poor flush rate.

There are four major sources of the phosphorous that reaches the lakes:

Rain - *About 5% of rain that lands on the ground may be absorbed by the forest.*

Natural run-off - *Phosphorous is a major component of plants and animals.
About 1% of our body weight is phosphorous.*

Fertilizers that contain phosphorous - *Fertilizers are labeled with 3 numbers (i.e. 10/10/5).
The middle number refers to the amount of phosphorous. Make sure it is "0".*

Septic system effluent – *human waste, dishwasher detergent, garbage disposals.*

MAJOR SOURCES OF PHOSPHOROUS IN THE SEPTIC EFFLUENT:

Automatic dishwasher detergent - 1.2 grams per load

Human waste – one person generates 1.5 grams per day

Food waste from **garbage disposals** for a family of 3 is .2 grams per day or 6 pounds per year.

In **Twin Lakes**, the Health Department has mandated adding **Orthophosphate** to the water supply to prevent lead and copper leaching from the water pipes into the drinking water. This presents an additional source of phosphorous. On average, each person uses 50 gallons of water per day (flushing, showering, etc.). This means that a person in Twin Lakes statistically generates 0.5 grams of phosphorous per day. How much of this actually reaches the lakes is unknown.

TO REDUCE PHOSPHOROUS INPUT:

● Use only **phosphate free fertilizer if you use any at all.** *Have soil tested at Cornell first – you may not need any fertilizer. Watering with lake water serves two purposes: it provides all the phosphorous your plants need, and it filters phosphorous from the lake water.*

● Use only **phosphate free dishwasher detergent.**

(Available from Trader Joe's or Seventh Generation.)

Note: Amway dishwasher detergent now contains phosphorous.

State law has banned phosphorous from laundry detergent; they are all phosphate free.

● Install incinerating or composting toilets.

- Use less water (low flow pressure devices).
- Use the garbage can, NOT a garbage disposal unit.

REMOVE PHOSPHOROUS before it reaches the lakes by:

- Increasing the distance between the septic fields (absorption trenches) and the lake.
Soil is very efficient at binding with the phosphorous. However, as the medium becomes saturated, the effluent plume will creep away from the fields before being bound. Eventually it can reach the lakes if the fields are too close to the lakeshore or water table.
- Filtering out the phosphorous.
Most septic systems do not filter out phosphorous. However, the White Knight company is testing an aerobic system* called KnuRD that is designed to filter out phosphorous. The filter would need to be replaced periodically. *

*Conventional septic systems are anaerobic. Aerobic systems, such as the White Knight, include a bubbler that aerates the system. These systems, which offer secondary treatment, may be necessary in systems that are close to the lakes or for older systems where the soil has reached the saturation point.

The White Knight KnuRD system, currently in the test phase, is the only system promising to filter out phosphorous. Reports are that it should be marketed in the not-to-distant future.

- Reducing rapid surface run-off.
 - Reduce impervious surfaces. Do not pave driveways.
 - Use infiltrators for roof or hillside runoff. They reduce surface flow and put the runoff into the ground where the soil can bind with the phosphorous.
 - Use buffer plantings – they consume phosphorous and slow the flow of runoff.

MAINTENANCE: (Ed Delaney)

Ed stressed that **homeowner involvement is required for all alternative options.**

If you install one of the new aerator systems, such as the White Knight, regular maintenance every 6 months by the installer is required. NY State is going to require maintenance contracts.

The Number One cause of septic failure is Bio Mat.

The Number Two cause of failure is overwhelming the system with volume.

Therefore:

- Check all inflow sources for leaks.
- Check for leaking fixtures. A pinhole sized leak can flood your septic system.
- Don't use garbage disposals. They load the septic with increased amounts of phosphorous and nitrogen, plus grease, etc.
- Don't drain hot tubs, footing drains or sump pumps into the septic.
They will overwhelm it. Also, stagger laundry loads over several days.

HIGH TECH OPTIONS:

●FLUSHMATE is a toilet that uses less water yet flushes effectively. The system traps air as it fills with water. It uses the water supply line pressure to compress the trapped air inside. The compressed air is what forces the water into the bowl, so instead of the “pulling” or siphon action of a gravity unit, the pressure-assist unit “pushes” waste out. This vigorous flushing action cleans the bowl better than gravity units. Flushes use only 1 gallon of water, and the toilet flushes in 4 second. The only disadvantage is that it is noisy. These units cost around \$350. For information go to their website: flushmate.com.

The COLLECTION SYSTEM is where most of the high tech options are:

●WHITE KNIGHT systems can be used to retrofit your existing system. If you formerly needed 200’ of fields, you now need only 70’. If you use this aerobic system, no biomat forms. The system requires maintenance every 6 months. The cost (including installation) is about \$5,000 - \$6,000, depending upon the amount of excavation required. Maintenance is about \$200/year. These units can’t be installed in NYS without maintenance contracts.

●KLARGESTER is a compact treatment plant that is an option for some lake neighborhoods where cottages don’t have enough space for fields. However, they are a bit of a double-edged sword in that they could also end up allowing people to build on lots now considered unbuildable if not there are not permit controls. A way around potential problems is for the Town to force an applicant to prove that there is room on the site for a conventional system before permitting it. Otherwise, the system could induce over-development.

Other options:

FILTER SOCKS (messy to clean)

ZABEL FILTER – a plastic container with a filter that is pulled out and hosed down periodically.

PRESBY SYSTEM - an aerobic leaching system used through out New England.

HINT: To increase the longevity of your fields, use flower pots to plug one or two of the 6 outlets from the distribution tank to let them rest Do it once a year (on your birthday!)

Respectfully submitted,
Jean Lewis, Secretary