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Pipeline

NESC

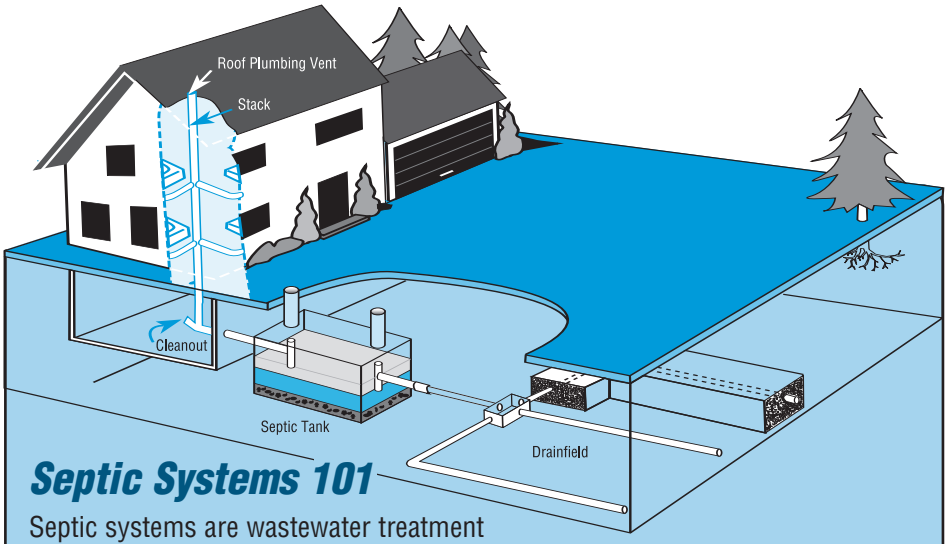
Small Community Wastewater Issues Explained to the Public

Septic Systems and Source Water Protection

Homeowners Can Help Improve Community Water Quality

If your home has a septic system, you are no doubt aware that this is a common way to treat residential wastewater. In fact, septic systems and related forms of treatment that experts call decentralized wastewater treatment systems (septic systems, private sewage systems, onsite sewage disposal systems) are some of the most common waste dispersal methods in the country.

According to the U.S. Environmental Protection Agency (EPA), decentralized wastewater treatment systems collect, treat, and release about four billion gallons of effluent per day from an estimated 26 million homes and businesses. The percentage of homes and businesses served by these systems varies from state to state, from a high of about 55 percent in Vermont to a low of about 10 percent in California. Nationwide, approximately 40 percent of the new homes being built will rely on some kind of onsite system to treat wastewater. (Ground Water Report to the Nation: A Call to Action, 2007)



Septic Systems 101

Septic systems are wastewater treatment systems that collect, treat, and disperse of wastewater generated by your home or business. The wastewater is treated onsite, rather than collected and transported to a centralized community wastewater treatment plant.

A typical septic system consists of two main parts: a septic tank and a soil absorption system, also known as a drainfield, leachfield, or disposal field. Underground pipes connect the entire system.

The septic tank is a buried, watertight container usually made of concrete, fiberglass, or polyethylene. It holds the wastewater long enough to allow the solids to settle out and the fats, oil, and grease to float to the surface. It also allows partial decomposition of the solid materials. Effluent from the middle layer flows out to the drainfield for further treatment in the soil.

Septic systems can contribute to source water contamination for various reasons including improper location of the system, poor design, faulty construction, incorrect operation, and poor or no maintenance of the system.

By following the basic recommendations previously mentioned, you can help ensure that your system continues to function properly.

As many of us migrate further from central cities and occupy homes served by decentralized treatment systems, septic system care is more important than ever. By keeping your onsite system in top working condition, you can save money, increase the value of your home, and also feel good that you've helped your community both now and for future generations.

As the owner of an onsite wastewater system, you may not be aware that you play an important role in protecting your community's water quality. Source water—streams, lakes, rivers, or groundwater—is, as the name suggests, the source of our drinking water, whether we get it from a local water district treatment plant or from a privately owned well. To maintain the most pristine water quality possible, we need to consider the activities that take place in the source water area and make sure that their environmental impacts on nearby waterways are minimal.

Unfortunately, EPA research shows that one of the biggest causes of pollution to our waterways is septic systems that are not working as they should.

When a septic system is not properly maintained or fails, untreated domestic wastewater can reach the source water. Bacteria and viruses from human waste can cause dysentery, hepatitis, and typhoid fever and the cumulative effect of numerous failing septic systems can become a major source of pollution. And, the more polluted the source water, the more costly it is to clean for human consumption.

Maintenance Pays

Of course, the best way to deal with a broken septic system is to not let it get broken in the first place. Since it can be difficult for homeowners to know if their systems are slowly failing (as defined by each state), you can greatly reduce that likelihood, and gain peace of mind, simply by having your system regularly pumped and inspected. This preventative measure costs thousands less than does the cost of repairing or replacing a non-functioning system. (See the sidebar on the next page for a suggested pumping schedule.)

The following tips will also help maintain a healthy septic system:

- Do not use caustic drain cleaners on clogged pipes. Instead, use boiling water or a drain snake to open clogs.
- Conserve water to avoid hydraulic overloading of the system. Repair leaky faucets and toilets. Use low-flow fixtures.
- Use bathroom cleaners and laundry detergent in moderation. (Find recommended cleaning products in the NESC brochure titled "Alternative Household Cleaners." Find how to order info on page 8.)
- Your septic system is not a trash can. Do not flush disposable diapers, tampons, condoms, paper towels, cat litter, or cigarettes into the system. These items quickly fill your septic tank with solids, decrease the system's efficiency, and will require it to be more frequently pumped. Trash flushed down the toilet can also clog the pipelines, causing wastewater to back up into your home.
- Avoid dumping grease or fats down the kitchen drain. They solidify and the accumulation may contribute to plumbing and system blockages.
- Keep paint, varnish, thinners, oil, photographic solutions, pesticides and other hazardous chemicals out of your system. Even in small amounts, these items can destroy the biological digestion taking place in your septic system. Do not flush unused medicines. Check with your local health department for disposal recommendations for your area.
- The use of garbage disposals is discouraged. If you have a garbage disposal, use it sparingly. Garbage disposals add unnecessary solids and nutrients to the system.

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Pipeline

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SMART about WATER

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Estimated Septic Tank Pumping Frequencies In Years*

*These figures assume there is no garbage disposal unit in use. If one is in use, pumping frequency may need to be increased.

Tank Size (gals.)	Household Size (number of people)					
	1	2	3	4	5	6
500	5.8	2.6	1.5	1.0	0.7	0.4
750	9.1	4.2	2.6	1.8	1.3	1.0
900	11.0	5.2	3.3	2.3	1.7	1.3
1000	12.4	5.9	3.7	2.6	2.0	1.5
1250	15.6	7.5	4.8	3.4	2.6	2.0
1500	18.9	9.1	5.9	4.2	3.3	2.6
1750	22.1	10.7	6.9	5.0	3.9	3.1
2000	25.4	12.4	8.0	5.9	4.5	3.7
2250	28.6	14.0	9.1	6.7	5.2	4.2
2500	31.9	15.6	10.2	7.5	5.9	4.8

(Source: Pennsylvania State University Cooperative Extension Service.)

- Do not drive over the system or the drainfield. This can compact the soil and break the piping of the system.
- Redirect surface water flow away from your system.
- Plant a 'green belt' or grassy strip between the drainfield and the shoreline if near a water body.
- Periodically check for signs of system failure: areas in the yard that remain moist during dry weather or patches of lush grass or plant growth. If you see signs of failure, schedule an inspection immediately.

Most typical septic systems should be inspected every two to three years but, depending on the system size and the number of people in the home, this frequency could change. Any system with mechanical parts, such as pumps and filters, should be inspected annually. If your tank has never been pumped, or is not accessible, once it is uncovered, put a watertight riser on it for future accessibility.

If your system is already failing, have it inspected by a professional and repaired or replaced as soon as possible.

A Healthy Septic System is an Investment

Your home represents a significant investment. For most of us, our house is the single biggest item we'll ever purchase and, consequently, represents a significant proportion of our net worth. Simply put: a failing septic system will lower your property value and may even make selling your home a problem. No one wants to buy a house with a stinky, soggy yard.

Functioning onsite systems, on the other hand, can add value to your home and good water quality will benefit your property value. This fact was borne out in a study conducted by Bemidji State University in Minnesota, where homes on lakes with good water quality were more valuable and had seen their value rise more quickly than those on lakes with marginal or poor water quality. (See the sidebar on page 4 for more information about water quality and land value in Minnesota.) As you would expect, people pay more for building sites and homes along clean stretches of water.

Another economic benefit of maintaining your onsite system is that it helps ensure the clean, safe drinking water, which is an essential ingredient of a healthy and viable community. Contamination of drinking water sources can cause a community significant expense and affect public health. Remember, it will cost you less in the long run if you can prevent contamination of your drinking water source rather than incur the high cost of treat-

Water Quality Adds Value to Lakefront Property

Minnesota's 10,000 fresh water lakes are essential to the economic well-being of the state – culturally, economically, and ecologically. They are assets worthy of environmental protection. The challenge is determining the best way to protect the lake water quality with the high rate of development along their shores. Good environmental policies are more effective and less expensive than restoration efforts.

While the overall quality of Minnesota lakes may be good, lakeshore development continues to degrade lake quality. A 2003 study, conducted by the Mississippi Headwaters Board and the Bemidji State University, investigated the effect of water quality on property values to help legislators formulate the best public policies. The quality of the surrounding water was shown to play a significant role in the price of property. Water quality was determined to have a positive relationship with property prices. In other words, the more pristine the water, the more potential homeowners were willing to pay to live there. The economic benefits of water quality were shown to be a good incentive for promoting effective protection policies.

ing the water or locating and developing alternate water sources. Reducing contamination to groundwater reduces the cost of drinking water.

Quality of Life

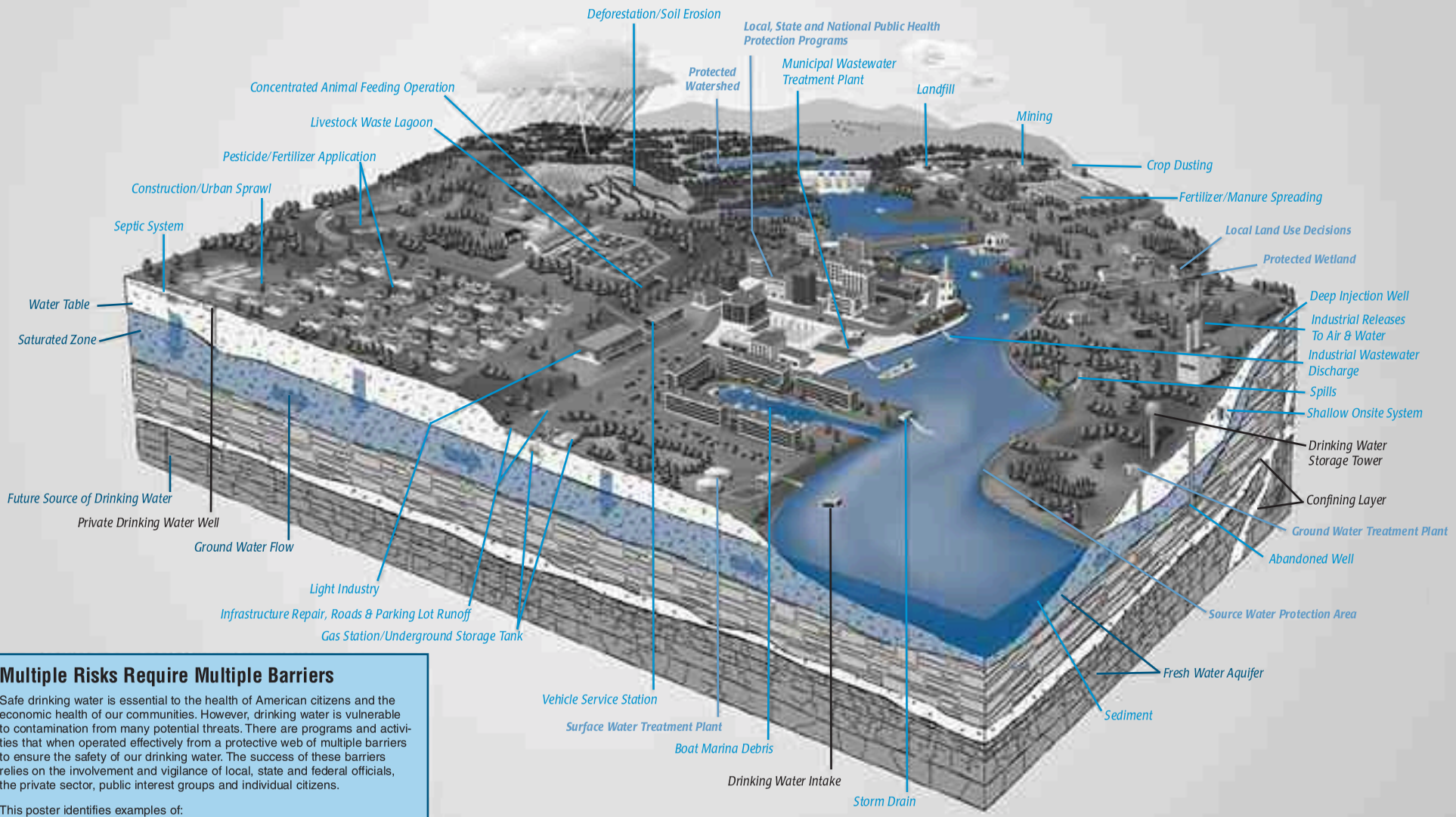
A non-working septic system can pollute your own yard and surrounding waters—like the lake where you like to put in your bass boat on a pretty Saturday morning or that rocky little creek where your grandkids like to catch crawfish. Imagine launching your boat onto a sea of green, foamy algae caused by excess nitrates in the water from a leaking septic tank. And you probably wouldn't want the kids splashing around in that creek if the water was murky from untreated sewage.

The following example describe how inadequate septic system maintenance can change the whole picture.

Shelburne Beach, Vermont, is a local swimming beach on a central portion of Lake Champlain in the town of Shelburne, Vermont. Bacteria leaking from residential septic systems caused excess E. coli in a nearby tributary, resulting in occasional beach closures. As a result, state officials placed the offending one-mile unnamed tributary on its section 303(d) list for E. coli in 1998. (Section 303(d) of the Clean Water Act requires states to develop a list of waters not meeting water quality standards or having impaired uses. Listed waters must be prioritized, and a management strategy or total maximum daily load must subsequently be developed for all listed.)

The town identified six residential septic systems along the stream as the most likely sources and local officials encouraged the homeowners to correct the deficiencies in their septic systems. Between 1998 and 2001, all six homeowners rebuilt their systems by installing new tanks and drainfields. Subsequent monitoring data showed that the stream and beach consistently met water quality standards, and the tributary was removed from the state's 303(d) list in 2004.

Safe Drinking Water Act – Protecting America's Public Health



Multiple Risks Require Multiple Barriers

Safe drinking water is essential to the health of American citizens and the economic health of our communities. However, drinking water is vulnerable to contamination from many potential threats. There are programs and activities that when operated effectively from a protective web of multiple barriers to ensure the safety of our drinking water. The success of these barriers relies on the involvement and vigilance of local, state and federal officials, the private sector, public interest groups and individual citizens.

This poster identifies examples of:

1. *Surface and groundwater sources of drinking water*
2. *Potential threats to these drinking water sources*
3. *The multiple barriers that together protect our nation's public health.*

Safe Drinking Water Hotline - (800) 426-4791 Safewater Web Site - www.epa/gov/safewater

EPA United States Environmental Protection Agency EPA 816-H-02-003 January 2002

Adapted by the NESC from the *Safe Drinking Water Act – Protecting America's Public Health* Poster.
The original full-color poster an be downloaded or ordered from *www.epa.gov/safewater/publicoutreach/landscapeposter.html*

Conserving Water Prolongs Septic System Life

Overloading a septic system can cause it to malfunction. Here are some steps to reduce water consumption in the home:

1. Use dishwashers and clothes washers only when fully loaded.
2. Take short showers instead of baths and avoid letting faucets run unnecessarily.
3. Replace old water fixtures with new water-efficient showerheads, faucets, and toilets. Look for the new WaterSense rating given by the EPA. This rating system helps consumers identify high-performance, water-efficient products that can reduce water use in the home and help preserve the nation's water resources. You can find EPA's WaterSense rated products at *www.epa.gov/watersense/index.htm*.
4. Repair and replace any leaking fixtures immediately. (Nearly 14 percent of the water a typical homeowner pays for is never even used—it leaks down the drain.)

Untreated flow from your septic system has the potential to contaminate groundwater, too. Chris Swann, a watershed planner with the Center for Watershed Protection, warns, "Septic system failure delivers a significant amount of pollutants to local water bodies, especially in coastal and lake shoreline areas. The threat of bacterial contamination becomes very important. Many reports of disease outbreaks are linked to groundwater contamination by septic system effluent." Swann stresses that improved management protocols and tougher performance standards for new development are critical to reducing the negative effects of onsite systems.

The negligent homeowner who allows his or her onsite system to contaminate the local environment can affect the entire community. Increased bacteria levels in groundwater, lakes and streams can present a public safety issue. Any contact with untreated human waste can pose a significant risk to public health. Untreated effluent from failing systems in local water bodies adversely impacts wildlife and aquatic populations.

Everyone deserves to live in a healthy environment and having your septic tank routinely pumped and inspected can help achieve the goal of a clean community.

Related Pipeline Issues

Pharmaceuticals and Personal Care Products: An Overview, Winter 2007

Septic Systems–A Practical Alternative for Small Communities, Summer 2004

How to Keep Your Water 'Well,' Summer 2002

Watershed Management, Fall 2006

Maintaining Your Septic System-A Guide for Homeowners, Fall 2004

Archived issues of Pipeline can be downloaded at *www.nesc.wvu.edu/pipeline.cfm* or ordered from NESC. See back cover for details.

Additional Resources

"Protecting Your Groundwater Source," *On Tap*, Spring 06 *www.nesc.wvu.edu/pdf/dw/-groundwater/OT_SP06_PROTECT.pdf*

"Making an Impact: The Watershed Approach" by Caigan M. McKenzie, *Small Flows Quarterly*, Fall 2006, *www.nesc.wvu.edu/pdf/-ww/publications/smallflows/magazine/SFQ_FA06.pdf*

Groundwater Remediation Saving the Source by Kathy Jesperson, NESC Editor, *On Tap*, Fall 2003, *www.nesc.wvu.edu/pdf/dw/groundwater/remediation_OT_FA03.pdf*

"Ground Water Report to the Nation: A Call to Action," Ground Water Protection Council, 2007, *www.gwpc.org/-CallToAction/*

Reprint Info

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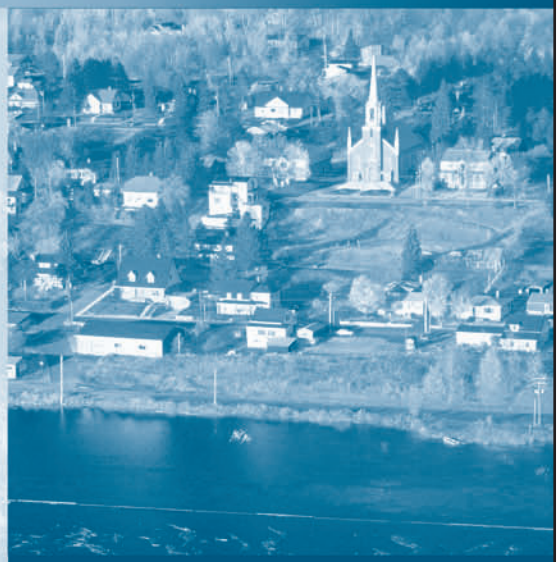
SMART about WATER

NESC's Newest Project Helps Small Communities Protect Water



"An ounce of prevention is worth a pound of cure," Benjamin Franklin famously stated more than 250 years ago. This simple philosophy describes a new environmental project—SMART About Water—designed to protect drinking water quality.

Funded by a $3 million grant from the U.S. Environmental Protection Agency (EPA), SMART About Water is being orchestrated by West Virginia University's National Environmental Services Center (NESC) in partnership with the Rural Community Assistance Partnership (RCAP). The program is designed to provide training and technical assistance about source water and wellhead protection planning to small and rural communities during 2008 and 2009 and will focus on untreated wastewater from failing septic and sewer systems, the largest contributor to water quality degradation.

According to EPA, communities derive several important benefits when they protect their source water:

- If source water is contaminated, it threatens public health.
- The better the water is when it reaches the treatment plant, the easier and cheaper it is to treat.
- The cost of dealing with contaminated groundwater ranges from 30 to more than 200 times the cost of wellhead protection.
- Clean water and healthy ecosystems are vital in terms of quality of life for both humans and animals.

Although water quality has improved in the three decades since passage of the Clean Water and Safe Drinking Water Acts, pollution problems linger. Previous efforts concentrated on reducing point source pollution, such as from industrial sites. Water quality issues now are related to the cumulative effect of nonpoint source pollution—untreated wastewater, agricultural fertilizers and pesticides, stormwater runoff, and roadway pollutants—that impact the physical, chemical, and biological health of nearby waters.

Visit the SMART About Water Web site at: *www.nesc.wvu.edu/-SMART/* for more information about this project.

A Project of the National Environmental Services Center at West Virginia University, with the Rural Community Assistance Partnership, under a Cooperative Agreement of the U.S. Environmental Protection Agency, Office of Ground Water and Drinking Water

RELATED NESC PRODUCTS

Homeowner's Septic Tank Information Package

This package is one of NESC's most popular products. Included in the package are homeowner septic tank information brochures, newsletters, and fact sheets. This information is packaged in a handy, onsite system record-keeping folder that the homeowner can use to track system maintenance, sketch the layout and position of the system, and record permit and local health department information.

WWPKPE28 .....$2.25

Homeowners Onsite System Recordkeeping Folder

Another useful product available from NESC. This folder provides a place to record and store information about your septic system and its maintenance. On the cover are sections for permit and local health department information. Inside are tips for locating your system, a safety checklist, and a section for recording the names, addresses, and certification numbers of your systems designer, installer, and pumper.

WWBLPE37.....$.45

"Alternative Household Cleaners" Brochure

This fact sheet provides less-toxic alternatives for several cleaning and home improvement jobs around the house.

GNFSPE109.....$.35

EPA's Source Water Protection Practices Bulletin Managing Septic Systems to Prevent Contamination of Drinking Water

This fact sheet discusses ways to prevent septic systems from contaminating sources of drinking water. It can be downloaded at www.nesc.wvu.edu/pdf/ww/septic/epa_septicwater_protection.pdf or ordered from NESC.

FSGN237 .....$1.00

Groundwater Protection Starts at Home Poster

This poster shows how household hazardous waste can contaminate groundwater. The back of the poster contains notes about household hazardous waste and disposal, as well as information about how to set up a household hazardous waste disposal program.

DWPSPE40..... Free

How to Order NESC Products

To place an order, call us toll free at (800) 624-8301 or (304) 293-4191. or send email to info@mail.nesc.wvu.edu. *Be prepared to give the item number and title of the product you wish to order. Shipping charges will apply.*

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