Pipeline

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Decentralized Wastewater Treatment Systems

The town of Pegram sits along the scenic Harpeth River approximately 10 miles west of Nashville, Tennessee. Pegram has a population of about 2,000 people and supports several businesses including a bank, a restaurant, a flower shop, and the locally famous Harpeth Clock and Quilt Company.

In 1997, Pegram faced a difficult situation. Many of the businesses that used septic tanks and drainfields had failing systems. The Pegram Elementary School, as well as several homes, also had failing systems.

Town leaders evaluated their options for providing wastewater treatment service to the area. They initially looked at a centralized system to collect and treat wastewater and dispose of it in the Harpeth River.

This option proved to be impossible because of the close proximity of a neighboring town's drinking water intake. Besides, many of the town's residents were actively working to protect their local environment and did not want to see treated wastewater (effluent) discharged into the river.

The town also looked into installing a centralized collection system and running sewage pipes to Nashville's treatment system. However, the cost for the extensive piping to go the 10 miles was prohibitive, and the cost of having the city of Nashville treat their wastewater would have resulted in high sewer bills for Pegram's residents.

The last option city leaders looked into was installing a cluster system that uses watertight effluent collection pipes, sand-gravel filter treatment, and effluent disposal by subsurface drip irrigation in a nearby farm pasture.

This choice takes what is known as a "decentralized approach," using a combination of processes to treat and dispose of wastewater. The town of Pegram decided that a cluster system, using new watertight interceptor (septic) tanks at each home or business and a watertight collection system running to a treatment facility, was the most feasible way for them to

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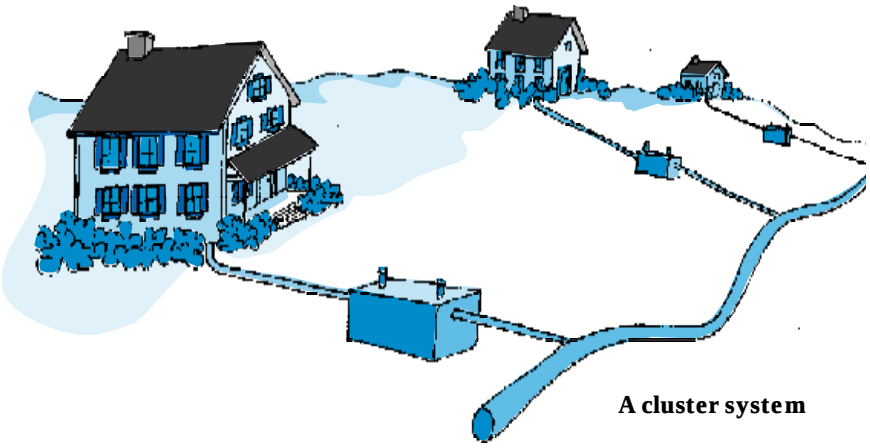

A cluster system

Key Terms

An **onsite system** is a natural system or mechanical device used to collect, treat, and discharge or reclaim wastewater from an individual dwelling without the use of community-wide sewers or a centralized treatment facility. A conventional onsite system includes a septic tank and a drainfield. Other types of alternative onsite systems include at-grade systems, mound systems, media filters, small aerobic units, and pressure distribution systems.

A **cluster system** is a wastewater collection and treatment system that serves two or more dwellings, but less than an entire community. Individual septic tanks or aerobic units may pretreat wastewater from several homes before it is transported through low cost, alternative sewers to a treatment unit that is relatively small compared to centralized systems.

A **decentralized system** is an onsite or cluster wastewater system that is used to treat and dispose of relatively small volumes of wastewater, generally originating from individual or groups of dwellings and businesses that are located relatively close together. Onsite and cluster systems are commonly used in combination.

Adapted from the *Response to Congress on use of Decentralized Wastewater Treatment Systems*.

Why Decentralize?

The decentralized approach to wastewater treatment is seen as beneficial for a number of reasons.
This approach:

- saves money by deciding on a preventive strategy (such as assessing a community's needs and conditions) to manage wastewater before a crisis occurs, thereby avoiding unnecessary cost;
- allows homeowners to continue to use their properly functioning septic systems;
- enables better watershed maintenance by eliminating the large transfers of water from one watershed to another that happens with centralized treatment;
- may be the most cost-effective treatment strategy for rural communities with sparse populations; and
- is appropriate for varying site conditions including ecologically sensitive areas—treatment methods can be tailored to suit different site conditions.

What's Right for Your Town?

When town leaders face having to upgrade wastewater treatment, the first choice usually is to build a centralized collection and treatment facility. However, centralized collection and treatment may not be the right answer for every community's wastewater disposal needs. (See table on page 3.)

Small and rural communities often cannot afford these expensive facilities, and their populations may be too spread out to make centralized treatment a realistic option. Additionally, some existing onsite systems may function effectively, so they don't need to be replaced.

In circumstances like these, decentralized wastewater treatment is often the best solution for wastewater management. Decentralized treatment involves using a combination of treatment technology options, both traditional and innovative, where they are most appropriate in a community. Conventional onsite systems, alternative onsite systems, cluster systems for groups of homes and businesses, and some use of centralized treatment can all be included when considering decentralized community wastewater management. The decentralized system is then managed (with varying degrees of control) to ensure each component functions properly.

Two Options Usually Considered

In the time since wastewater treatment has been an issue, only two options were ordinarily considered, the previously mentioned centralized systems and conventional septic systems. Onsite systems have been used for centuries, evolving from simple outhouses to cesspools to septic tanks and drainfields to the more advanced treatment units available now.

A conventional septic system, consisting of a tank and drainfield, treats wastewater at its source. But, older septic systems that were built without thought of adequate soil depth and/or that have not been properly maintained can fail, leading to surface and groundwater contamination. This potential for failure most often results from neglect of maintenance or inappropriate drainfield siting. Nevertheless, this process remains an option where soils are suitable.

Centralized systems require a network of collection pipes (sewers) leading from all homes and businesses

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Introduction

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achieve their wastewater treatment goals.

All of the businesses in town were required to hook into the cluster system, while homes had the option of connecting, depending on whether or not their existing septic systems worked properly.

Taking this decentralized wastewater treatment approach was not only financially realistic, but Pegram was able to build the system and serve the businesses, as well as many of the failing home systems. The project was financed through available town funds and through revolving loan funds from the state of Tennessee.

Many towns find themselves in circumstances similar to Pegram's. They may need to upgrade or replace most of their wastewater treatment processes. And, they may find that running extensive sewer lines or building a single, centralized treatment facility cannot be done for any number of reasons.

This issue of *Pipeline* discusses decentralized wastewater treatment systems and how they can meet both public health and environmental protection goals in areas where centralized treatment is impractical or not cost-effective. Management and funding issues are presented plus the various treatment options that may be part of a decentralized system.

Readers are encouraged to reprint this issue or any *Pipeline* articles in flyers, newspapers, newsletters, or educational presentations. We ask that you include the name and phone number of the National Small Flows Clearinghouse (NSFC) on the reprinted information and send us a copy for our files.

If you have questions about reprinting articles or about the topics discussed in the newsletter, please contact the editor at (800) 624-8301 or (304) 293-4191.

Hypothetical EPA rural community technology costs

Technology option	Total capital cost	Annual O&M* cost	Total annual cost (annualized capital plus O&M)	Average monthly cost per household
Centralized systems	$2,585,600 – $4,176,590	$33,110– $44,830	$241,480 – $381,410	$149 – $235
Alternative SDGS** collection and small cluster systems	$666,040	$8,120	$61,800	$38
Onsite systems	$567,940	$14,920	$60,690	$37

Note: The rural community consists of 450 people in 135 homes.

*O&M means operation and maintenance

** SDGS stands for small-diameter gravity sewers

(Adapted from the Environmental Protection Agency, 1997—extrapolated to year 2000 costs)

What's Right for Your Town?

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to a central wastewater treatment facility. Urban and suburban areas with high population densities (more than three to four dwellings per acre) would probably be better served by centralized wastewater collection and treatment, but these facilities may be cost prohibitive for more sparsely populated, rural communities. Centralized treatment facilities also face increasing environmental constraints on discharging effluent into surface waters.

Septic systems have often been considered a temporary solution to be used only until public sewerage became available. So when deciding between options, many people consider onsite systems to be "second class" or the less desirable choice for treating wastewater.

Although opinions are changing, this prejudice against onsite systems still exists today. However, onsite systems are available now that treat wastewater more thoroughly than septic tanks. When operated under a management program, these systems can be used as a true alternative to large treatment plants.

Decentralized Systems Offer Flexibility

A decentralized system employs a combination of onsite and/or cluster systems and is used to treat and dispose of wastewater from dwellings and businesses close to the source. Decentralized wastewater systems allow for flexibility in wastewater management, and different parts of the system may be combined into "treatment trains," or a series of processes to meet treatment goals, overcome site conditions, and to address environmental protection requirements.

Managed decentralized wastewater systems are viable, long-term alternatives to centralized wastewater treatment facilities, particularly in small and rural communities where they are often most cost-effective. These systems already serve a quarter of the population nationwide and half the population in some states. They should be considered in any evaluation of wastewater management options for small and mid-sized communities.

So, how does a community decide which management approach is right for its wastewater treatment? Community leaders first need to ask some questions and then create a management plan. What circumstances are causing a reevaluation of present wastewater treatment? Are local septic systems failing? Is residential development stifled because of a lack of adequate wastewater treatment facilities? An organized plan will help managers clearly define the problems, review the possibilities, and assess the costs associated with each potential solution.

Many options now exist for wastewater treatment and disposal in rural areas and small communities. Each technology has advantages, as well as limitations, so a treatment technology must be selected specifically to meet local conditions and treatment objectives. Similarly, every community's own financial, physical, and regulatory factors must be evaluated to find the best technology for their circumstances.

Onsite systems now include a number of alternatives that surpass conventional septic tank and drainfield systems in their ability to treat wastewater. Alternative onsite processes, such as sand filters, peat filters, aerobic treatment units, pressure distribution systems, drip irrigation, and disinfection systems, can be employed in a wide

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range of soil and site conditions. Alternative systems require more monitoring and maintenance, making a strong case for these systems to be managed.

Small satellite treatment plants or soil absorption systems that have low-cost collection sewers are called cluster systems. Cluster systems treat wastewater from a group of dwellings and/or businesses and are most appropriate in moderately populated areas. These systems serve two or more dwellings (but not usually an entire community) and are located near the buildings they serve.

The wastewater from each dwelling or business flows into its own interceptor (septic) tank to settle out and allow solids to break down. From the tank, the effluent is able to travel through smaller diameter, therefore less expensive, collection pipes.

These pipes are buried at a shallower depth than full sewers and run relatively short distances to smaller, less maintenance-intensive treatment and disposal units. These units often use soil absorption fields or effluent recycling rather than discharging the treated wastewater into surface waters.

Funding Changes Affect Choices

Cost is always a primary consideration in deciding among wastewater treatment options. Costs include the money needed to install the system and the annual cost to operate and maintain it. Depending on whether a community is an isolated, rural town or is on the fringes of a larger municipality, different circumstances play a role in what system will best serve the community's needs.

System costs are related to population size and density, topography, distance to an existing treatment facility, and state and local performance standards. In sparsely populated areas, upgrading or replacing failing onsite systems and building smaller, cluster treatment systems to serve the community's core is usually most cost-effective.

During the 1970s and 1980s, the federal government provided direct funding to help build wastewater treatment facilities. Federal funds for wastewater systems increased significantly in 1972 as a result of the Federal Water Pollution Control Act (later called the Clean Water Act). Between 1972 and 1990, the federal government spent more than $62 billion to build or upgrade treatment facilities through the Construction Grants and the Innovative and Alternative (I&A) Technology programs.

This money more often made its way to larger municipalities, and many smaller towns across the U.S. never received any of these funds. Consequently, wastewater management problems were never resolved in many small communities.

Today, direct federal funding to communities is nearly nonexistent. The Construction Grants and I&A programs were eliminated in the early part of the 1990s. The Clean Water State Revolving Fund (CWSRF) Program replaced them. Communities now must depend on CWSRFs and other sources of money for infrastructure improvements. (*See the Fall 1999* Pipeline *for more funding sources*.)

Systems Must be Managed

Management is the key to keeping decentralized treatment systems functioning properly. Management can encompass planning, siting, design, installation, operation, maintenance, and monitoring onsite and cluster systems. Regular inspection and maintenance form the basis of any management program.

Using one management strategy over another may depend upon local environmental sensitivities, the complexity of treatment technology and equipment, and the local regulatory agency's authority and resources.

More than one management model might be effective under particular circumstances, but any model should give the regulatory agency enough authority to make sure failing systems are repaired or replaced.

The National Onsite Wastewater Recycling Association (NOWRA) suggests these seven elements be included in any management model:

- system performance requirements that protect human health and the environment;
- system management to fulfill specific and measurable performance requirements;
- compliance monitoring and enforcement to ensure adequate system performance;
- guidelines for all aspects of siting, design, construction, and operation;
- education for all service providers, regulators, planners, and owners;

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Pipeline issues with related topics

***Funding Sources for Wastewater Projects*—Fall 1999**

***Inspections Equal Preventative Care for Onsite Systems*—Spring 1998**

***Choose the Right Consultant for Your Wastewater Project*—Winter 1997**

***Alternative Sewers: A Good Option for Many Communities*—Fall 1996**

***Management Programs Can Help Small Communities*—Spring 1996**

***Septic Systems—A Practical Alternative for Small Communities*—Fall 1995**

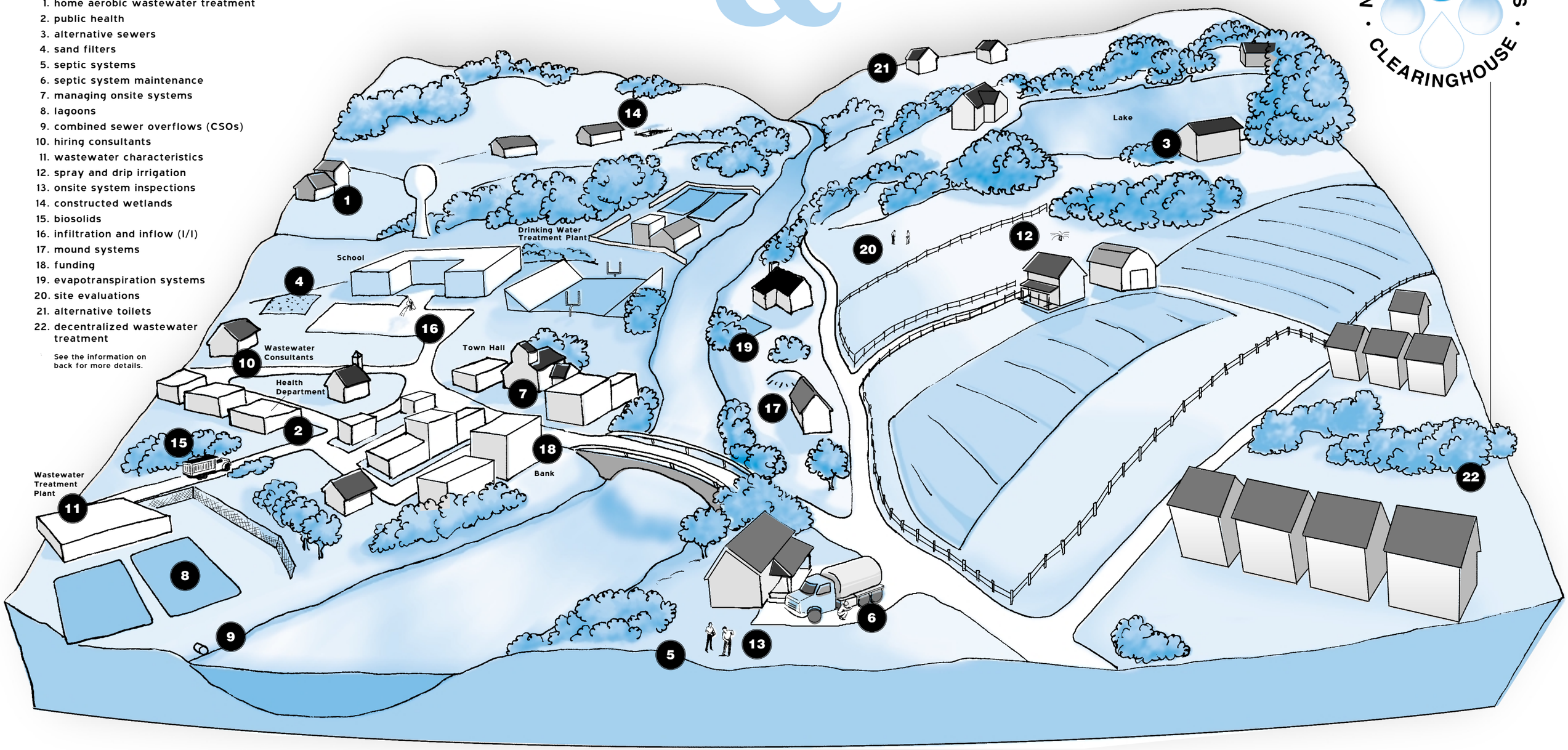
Small Community

Options & Resources

The National Small Flows Clearinghouse (NSFC) offers free and low-cost information and services to small communities and homeowners. A sampling of resources includes the following topics:

1. home aerobic wastewater treatment
2. public health
3. alternative sewers
4. sand filters
5. septic systems
6. septic system maintenance
7. managing onsite systems
8. lagoons
9. combined sewer overflows (CSOs)
10. hiring consultants
11. wastewater characteristics
12. spray and drip irrigation
13. onsite system inspections
14. constructed wetlands
15. biosolids
16. infiltration and inflow (I/I)
17. mound systems
18. funding
19. evapotranspiration systems
20. site evaluations
21. alternative toilets
22. decentralized wastewater treatment

See the information on back for more details.



For more information please contact the NSFC at (800) 624-8301 or (304) 293-4191, fax (304) 293-3161, e-mail *nsfc_orders@mail.estd.wvu.edu*, or write NSFC, West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064

Pipeline
Small Community Wastewater Issues Explained to the Public

Small Community

Options & Resources

For more information or to order any of the following products, please contact the NSFC at (800) 624-8301 or (304) 293-4191, fax (304) 293-3161, e-mail *nsfc_orders@ mail.estd.wvu.edu*, or write NSFC, West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064. Please request each item by title and item number. A shipping and handling charge will apply to all orders.

1 home aerobic wastewater treatment

Aerobic treatment can be a good option for homes on sites unsuitable for septic systems or in environmentally sensitive areas. The Winter 1996 *Pipeline* (vol. 7, no. 1) explains the advantages and disadvantages of these systems, how they work, and their operation and maintenance. The price is 20 cents. Request item #SFPLNL04 *Home Aerobic Wastewater Treatment: An Alternative to Septic Systems.*

2 public health

Whether you are a homeowner with a septic system or a local official responsible for a community system, wastewater treatment is an important issue for you. The Summer 1996 *Pipeline* (vol. 7, no. 3) describes the dangers associated with inadequate wastewater treatment and how to avoid them. The price is 20 cents. Request item #SFPLNL06 *Wastewater Treatment Protects Small Community Life, Health.*

3 alternative sewers

Small diameter sewers can be used to collect and transport wastewater from small clusters of homes, developments, and communities. Because they don't require deep excavation, alternative sewers are often a more practical and economical choice than conventional gravity sewers. The Fall 1996 *Pipeline* (vol. 7, no. 4) provides an overview of alternative sewer technologies. The price is 20 cents. Request item #SFPLNL07 *Alternative Sewers: A Good Option for Many Communities.*

4 sand filters

Sand filters are used by many communities as an alternative to centralized wastewater treatment. Because they provide high quality treatment, sand filters are one of the best options for environmentally sensitive areas or for providing additional treatment where septic tank/soil absorption systems have failed. The Summer 1997 *Pipeline* (vol. 8, no. 3) describes open, buried, and recirculating sand filters, how they work, and their operation and maintenance. The price is 20 cents. Request item #SFPLNL10 *Sand Filters Provide Quality, Low-maintenance Treatment.*

5 septic systems

Septic tank/soil absorption systems are the most common type of onsite wastewater treatment. When properly designed, sited, constructed, and maintained, they are the best and most economical choice for many homes and businesses. The Summer 1995 *Pipeline* (vol. 6, no. 3) explains when septic systems are a good idea, how they work, and their advantages and disadvantages. The price is 20 cents. Request item #SFPLNL02 *Septic Systems—a Practical Alternative for Small Communities*.

6 septic system maintenance

Proper operation and maintenance are essential to prolonging the life of septic systems and preventing system failures. Homeowners and community leaders will find the Fall 1995 *Pipeline* (vol. 6, no. 4) full of helpful information. It explains how to care for septic systems, when to pump, what to and what not to flush, and what to expect at an inspection visit. The price is 20 cents. Request item #SFPLNL03 *Maintaining Your Septic System—a Guide for Homeowners.*

7 managing onsite systems

For many small communities, onsite and decentralized wastewater systems are more practical and economical than centralized systems. However, many communities view lack of individual control of these systems as a disadvantage. The Spring 1996 *Pipeline* (vol. 7, no. 2) explains why community management of wastewater systems is a good idea and gives several strategies for developing programs for the operation, maintenance, or monitoring of these systems. The price is 20 cents. Request item #SFPLNL05 *Management Programs Can Help Small Communities.*

8 lagoons

Lagoons are common around the world because they are a low-cost, low-maintenance, and energy-efficient wastewater treatment technology. The Spring 1997 *Pipeline* (vol. 8, no. 2) presents an overview of different types of lagoon systems, how they work, their operation and maintenance, and their advantages and disadvantages. The price is 20 cents. Request item #SFPLNL09 *Lagoons Systems can Provide Low-cost Wastewater Treatment.*

9 combined sewer overflows (CSOs)

Combined sewer overflows (CSOs) are remnants of the country's early infrastructure, when cities built combined sewer systems for collecting both wastewater and stormwater. Combined sewers can become overloaded during wet weather, causing untreated wastewater to overflow into the nearest body of water. The Spring 1995 *Pipeline* (vol.6, no. 2) explains the U.S. Environmental Protection Agency's CSO Control Policy and its requirements for small communities. The price is 20 cents. Request item #SFPLNL01 *Combined Sewer Overflows —A Priority for Small Communities.*

10 hiring consultants

Consultants are not all the same. Like doctors, lawyers, and other professionals they have different talents, interests, and levels of experience. The Winter 1997 *Pipeline* (vol. 8, no. 1) offers some strategies for hiring consultants that can be used by small communities and homeowners. Topics include developing requests for proposals (RFPs), conducting interviews, and negotiating contracts. The price is 20 cents. Request item #SFPLNL08 *Choose the Right Consultant for Your Wastewater Project.*

11 wastewater characteristics

The water we use may disappear from sight, but it never really goes away. Wastewater continues to affect our lives long after it swirls down the drain. How? Because certain wastewater components degrade water quality and can endanger public health. The Fall 1997 *Pipeline* (vol. 8, no. 4) answers some basic questions about wastewater and its potential to impact public health and the environment. The price is 20 cents. Request item #SFPLNL11 *Basic Wastewater Characteristics.*

12 spray and drip irrigation

Reusing water to irrigate land can help protect surface water resources by preventing pollution and by conserving potable water for other uses. The soil provides additional treatment through naturally occurring physical, biological, and chemical processes. The Winter 1999 *Pipeline* (vol. 10, no. 1) discusses two types of wastewater irrigation systems—spray systems and subsurface drip systems—plus operation and maintenance issues that go along with land-applied disposal methods. The price is 20 cents. Request item #SFPLNL16 *Spray and Drip Irrigation for Wastewater Reuse, Disposal.*

13 onsite systems inspections

Routine onsite system inspections help protect the health of families, their neighbors, and communities. They help homeowners determine when and how often maintenance is needed. The Spring 1998 *Pipeline* (vol. 9, no. 2) focuses on inspections of existing onsite systems to determine whether they are functioning properly and to diagnose problems before they lead to expensive repairs. The price is 20 cents. Request item #SFPLNL13 *Inspections Equal Preventative Care for Onsite Systems.*

14 constructed wetlands

Constructed wetlands can treat wastewater from a variety of sources—homes, businesses, and communities. The Summer 1998 *Pipeline* (vol. 9, no. 3) offers basic information for homeowners and community leaders about the types of constructed wetlands, how they work, and some of their advantages and disadvantages. The price is 20 cents. Request item #SFPLNL14 *Constructed Wetlands: A Natural Treatment Alternative.*

15 biosolids

Treating and disposing of sewage sludge and domestic septage can significantly add to wastewater treatment costs. These materials called "biosolids" have a variety of beneficial agricultural uses and help to rehabilitate land damaged by mining and other industries. The Fall 1998 *Pipeline* (vol. 9, no. 4) presents a brief overview of options for managing biosolids and discusses the regulations that are involved in biosolid recycling and disposal. The price is 20 cents. Request item #SFPLNL15 *Managing Biosolids in Small Communities.*

16 infiltration and inflow (I/I)

High groundwater or water remaining in the soil after rain or snow can infiltrate mainline pipes, joints, service laterals, connections, and other parts of older, damaged collection systems. Additional water can also enter collection systems from above-ground sources. Extra water entering collection systems is referred to as infiltration and inflow (I/I). The Spring 1999 *Pipeline* (vol. 10, no. 2) provides an overview of common methods for evaluating and correcting I/I problems, plus maintenance practices to prevent I/I from occurring. The price is 20 cents. Request item #SFPLNL17 *Infiltration and Inflow can be Costly for Communities.*

17 mound systems

Mound systems were developed to overcome three natural conditions: slow or rapidly permeable soils, shallow soils, and/or a high water table. A site with any of these conditions is not suited for a conventional septic system. The Summer 1999 *Pipeline* (vol. 10, no.3) discusses mounds and how they are designed, operated, and maintained. The price is 20 cents. Request item #SFPLNL18 *Mounds: A Septic System Alternative.*

18 funding

If your town is like other small communities, the most important—and perhaps the most difficult—part of a wastewater treatment project is securing the funding. Fewer residents help pay for a project, and fewer experts and resources are available to help find funding sources. The Fall 1999 *Pipeline* (vol. 10, no. 4) discusses funding sources for wastewater treatment projects. The price is 20 cents. Request item #SFPLNL19 *Funding Sources are Available for Wastewater Projects.*

19 evapotranspiration systems

Evapotranspiration (ET) systems use an alternative onsite treatment technology suitable for areas where risks of groundwater and surface water contamination might exist. The Winter 2000 *Pipeline* focuses on two versions of ET systems, how they are designed, how they treat wastewater effluent, and what climate and soil conditions warrant their use. The price is 20 cents. Request item #SFPLNL20 *Evapotranspiration Systems.*

20 site evaluations

More than one-fourth of Americans use some type of onsite wastewater treatment systems, and thousands of new onsite permits are issued each year. The Spring 2000 *Pipeline* explains the importance of a site evaluation, what steps are taken in the process, and how an evaluator uses test results to determine the best type of treatment system for a site. The price is 20 cents. Request item #SFPLNL21 *Site Evaluations.*

21 alternative toilets

Reduced amounts of water for toilet flushing is standard in the industry today. In addition to low-volume toilets, other alternatives have been developed. The Summer 2000 *Pipeline* (vol. 11, no. 3) discusses several designs of alternative toilets, and what circumstances may be suited to their use in the home or in public restrooms. The price is 20 cents. Request item #SFPLNL22 *Alternative Toilets: Options for Conservation and Specific Site Conditions.*

22 decentralized wastewater treatment

Small communities are frequently faced with needing to upgrade or replace their wastewater infrastructure, but centralized sewerage and treatment may not be the answer for everyone. The Fall 2000 *Pipeline* (vol. 11, no. 4) discusses ways to improve community wastewater treatment by using managed individual onsite and cluster systems. The price is 20 cents. Request item #SFPLNL23 *Decentralized Wastewater Treatment Systems.*

Environmental Services and Training Division

The Environmental Services and Training Division (ESTD) helps small communities protect their public and environmental health. Located at West Virginia University, ESTD houses four national programs:

- The National Drinking Water Clearinghouse (NDWC)
- The National Small Flows Clearinghouse (NSFC)
- The National Environmental Training Center for Small Communities (NETCSC)
- The National Onsite Demonstration Project (NODP)

Each organization has a separate mission and distinct goals, but they work collectively to provide a one-stop shop for small community drinking water, wastewater, and environmental training information and technical assistance.

To receive an information packet about the ESTD and its services, call (800) 624-8301 or (304) 293-4191, or visit ESTD's Web site at *http://www.estd.wvu.edu*.

NATIONAL SMALL FLOWS CLEARINGHOUSE

Public Acceptance of Decentralized Wastewater Treatment

When appropriately designed, sited, operated, and maintained, decentralized wastewater systems meet public health and water quality goals as well as centralized systems. Still, barriers exist, both real and imagined, that can hamper widespread acceptance of decentralized wastewater systems. These obstacles may be due to several factors:

- lack of knowledge and misperceptions about decentralized systems;
- state and local regulatory barriers;
- lack of adequate management programs;
- liability and engineering fee issues; and
- financial limitations of the community.

If decentralized systems are to become accepted as a wastewater treatment solution, people need to be educated about the benefits of this choice. Some states (Arizona, Missouri, North Carolina, Rhode Island, Texas, Florida,Washington, and others) have training programs on the subject for sanitarians and installers. Because of training programs, some states'regulatory officials allow a broader use of alternative onsite technologies—with the condition that these systems be managed by professional, certified operators.

Educational materials directed to homeowners should explain proper wastewater disposal and maintenance practices, as well as provide information about the consequences of system failures. Increased awareness about decentralized systems ought to help reduce the number of failing systems and the eventual negative effects on groundwater and surface water.

Managing individual onsite systems within the community presents one of the biggest hurdles officials may face. Brochures, newspaper articles, helplines, and other forms of public information will help homeowners become aware of the importance of managing and maintaining onsite systems.

Decentralized Systems

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- certification/licensing for service providers and regulators; and
- program reviews to resolve shortcomings and to correct problems.

The U.S. Environmental Protection Agency (EPA) is in the process of developing a number of management models for decentralized wastewater systems. The EPA's models start from a hands-off level of involvement where a regulatory agency inventories systems, but property owners are responsible for their own systems' maintenance.

Four additional models have been proposed with increasing levels of oversight. The far end of the scale suggests a public or private utility own and manage all aspects of the decentralized system, including both onsite and cluster systems. This model is most appropriate where a complex network of advanced onsite systems and cluster systems is in place, and where the environment may be especially sensitive.

National Small Flows Clearinghouse (NSFC)

The NSFC offers a variety of technical assistance and free and low-cost information and materials about wastewater technologies for small communities. Just a few of the NSFC's many resources and services are mentioned in this newsletter. Call the NSFC at (800) 624-8301 or (304) 293-4191 or visit our Web site at www.nsfc.wvu.edu for more information.

National Onsite Demonstration Program (NODP) Phase IV

The NODP Phase IV was established to promote, develop, and demonstrate management strategies for onsite wastewater treatment in our nation's small communities. Program staff can assist local officials in setting up management districts around the country by identifying successful management models and providing educational information about these models. Call the NODP at (800) 624-8301, or (304) 293-4191, or visit their Web site at *www.estd.wvu.edu/nodp4.*

National Onsite Wastewater Recycling Association, Inc.

The National Onsite Wastewater Recycling Association, Inc. (NOWRA) is a national professional organization created to advance and promote the onsite wastewater industry. NOWRA serves all aspects of the industry including governmental regulatory personnel, installers, field practitioners, suppliers, distributors, engineers, research professionals, designers, consultants, educators, soil scientists and manufacturers. Call NOWRA at (301) 776-7468 or visit their Web site at *www.nowra.org.*

Cranberry Lake: A Management Case Study

Cranberry Lake and Byram Township officials started looking into septic system management in the 1980s because the water quality of the lake was being threatened by household wastewater. Aging and poorly-maintained septic systems, small lot sizes, and an increasing number of homes used year-round converged to create problems.

Byram Township is one of four municipalities in Sussex County, New Jersey, that shared a $500,000 state grant to help establish wastewater management programs. The township appointed a steering committee (to provide input and guidance) that included the town manager, a board of health representative, members of the Cranberry Lake Association, and members of the Byram Environmental Commission.

The steering committee initially met with the county's planning department to discuss their principal concerns including:

- financial assistance to residents to repair or replace their systems;
- technical assistance to identify appropriate, cost-effective technologies that would perform well given Cranberry Lake's soil limitations; and
- educational assistance for the committee and residents to learn about all aspects of onsite wastewater treatment.

As word spread about the potential for a wastewater management ordinance,which could mean septic system inspections and fees for residents, friction arose in the community. The steering committee realized that its most urgent task was to educate the community. They obtained materials from the county health department and from Rutgers University to begin a vigorous educational campaign.

Committee members and county officials made presentations and gave seminars at local meetings. The committee developed newspaper articles to explain the issues. They also manned a booth at the Cranberry Lake Community Club's annual meeting, and they inserted wastewater management flyers in various township mailings.

Because some residents declared that they'd never had their septic systems pumped in 25 years, and others were not even sure they had septic systems, the committee distributed all kinds of information, from broad environmental concepts to basic information about how a septic system works. The steering committee dedicated itself to dispelling rumors and to making sure Cranberry Lake residents were fully aware of the seriousness of their dilemma.

After several more public meetings, the board of health finally passed the ordinance, and its regulations impose very straightforward basic maintenance requirements. Key provisions of the ordinance require that all homeowners obtain a $15 septic system operator's permit, valid for three years. Property owners must submit a plot plan showing the location of the property's well and septic tank and drainfield. They must also attach a brief description of the septic system. Homeowners receive an educational packet with each permit renewal.

To renew the three-year permit, homeowners must pay the fee and submit proof that the septic system had either been pumped out or that they had received a board of health waiver. Waivers might be issued under certain circumstances, such as infrequent use of a vacation home, so that a six-year pumping period is granted instead of the usual three years.

"I see getting a septic license as similar to getting a dog license. It costs twice as much, but it's no big deal. People know it's for everybody's protection." *Ronald Gatti*

Failure to comply can result in a fine of up to $1,000 per day and/or up to 90 days of community service. Even though compliance has not been perfect, the township doesn't want to fine anybody.

Margaret McGarrity, a member of the Byram Township Environmental Commission, said they send out a notice when it's time for license renewal and pumping. If there's no response, another notice follows in

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Photo courtesy of Cathie Falvey

Former *Pipeline* Editor Cathie Falvey and her brother, Jim, enjoyed spending time at Cranberry Lake when they were children.

How Homeowners Can Help Themselves

The Clean Water State Revolving Fund (CWSRF) is a low- or no-interest source of funding for installing, repairing, and upgrading decentralized wastewater systems in small towns and rural and suburban areas. Federal and state contributions are used to capitalize or set up the programs. These assets, in turn, are used to make low or no-interest loans for important water quality projects. Funds are then repaid to the CWSRF over terms as long as 20 years.

Repaid loans are recycled to fund other water quality projects. These CWSRF resources can help supplement the limited financial resources currently available for decentralized treatment systems. Projects that may be eligible for CWSRF monies include:

- new system installation (single and cluster systems) to correct an existing nonpoint source problem;
- replacing, upgrading, or modifying inadequate or failing systems;
- costs associated with establishing a centralized management entity* (e.g., permitting fees and legal fees); and
- capital costs associated with centralized management programs (e.g., trucks, storage buildings, and spare parts).

Ohio is an example of a state that is helping residents improve their onsite wastewater systems. In August 1997, the Ohio EPA and Mahoning County General Health District agreed to create a linked deposit program to make low-interest loans available to individual homeowners who needed to upgrade or replace their home sewage disposal systems. Ohio's process for obtaining a CWSRF loan is outlined below.

The homeowner obtains a permit from the county that outlines specifications about proper installation, operation, and maintenance of the onsite system. The homeowner is then issued a certificate, which he or she can take to any bank that participates in the linked deposit program.

The lending institution, using its own criteria, decides whether or not to offer the applicant a loan and at what interest rate and term. The lending institution notifies the Ohio EPA, who then deposits the loan amount in the bank at a reduced interest rate.Savings from the reduced interest rate are then passed on to the loan applicant.

Ten individuals have received loans totaling $53,335. Over the next three years, Ohio's EPA Water Pollution Control Loan Fund will make $1,425,000 available for use in this program. A similar program is being launched in Cuyahoga County, Ohio, with $1,950,000 earmarked for the first three years of the program.

**The EPAencourages establishing or designating a management entity for all decentralized projects. Acceptable management entities include cities and counties, special governmental units (e.g., sanitary districts and county service districts) public or private utilities, private corporations, and nonprofit organizations.*

Cranberry Lake Case Study

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one month. If after another month has lapsed and the property owner still has not responded, a notice of violation can lead to a summons.

Community support for the wastewater management program has grown stronger each year as residents come to understand its importance. Ronald Gatti, township manager, said, "Having to stand before a judge and defend against willful violation of the law isn't an attractive prospect. Besides, I see getting a septic license as similar to getting a dog license. It costs twice as much, but it's no big deal. People know it's for everybody's protection."

Web Sites: Funding for Onsite Wastewater Treatment

EPA State Revolving Fund (SRF) Program General Information
www.epa.gov/owm/finan.htm

EPA SRF Program State Revolving Fund State Contacts
www.epa.gov/owm/srfcon.htm

Funding Decentralized Wastewater Systems Using EPA's Clean Water SRF
www.epa.gov/owm/septic3.htm

HUD State Community Development Block Grant (CDBG) Program
www.hud.gov/progdesc/cdbg-st.html

HUD Community Connections Information Center
www.comcon.org/

National Small Flows Clearinghouse National Onsite Demonstration Program
www.estd.wvu.edu/NODP

USDA Rural Development Field Offices
www.usda.gov/rus/water/states/usamap.htm

USDA Rural Utilities Service Water Programs
http://www.usda.gov/rus/water/index.htm

RESOURCES AVAILABLE FROM NSFC

To order any of the following products, call the National Small Flows Clearinghouse (NSFC) at (800) 624-8301 or (304) 293-4191, fax (304) 293-3161, e-mail nsfc_orders@mail.estd.wvu.edu, *or write NSFC, West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064. Be sure to request each item by number and title. A shipping and handling charge will apply.*

Choices for Communities: Wastewater Management Options for Rural Areas

This booklet examines alternatives to the conventional septic system, alternative wastewater collection technologies, and land-based treatment and disposal technologies. It begins with a history of onsite systems and discusses alternatives to centralized sewering, stressing that management, maintenance, and inspection are key. The cost for the booklet is 50 cents. Item #WWBLMG09.

Rural Community Assistance Program (RCAP) Help for Small Community Wastewater Projects

Developed by the EPA Office of Water, this free, two-page fact sheet describes RCAP, a national network of nonprofit organizations, and how they provide onsite technical assistance to communities to help them attain or maintain adequate wastewater treatment services. Item #WWFSFM32.

Wastewater Treatment and Disposal for Small Communities

This manual is designed to guide planners and designers through the required steps for developing small community wastewater management systems. The book provides general descriptions of alternative treatment technologies available for small communities. The cost is $16.55. Item #WWBKDM70.

Funding Decentralized Wastewater Systems Using the Clean Water State Revolving Fund

The Clean Water State Revolving Fund (CWSRF) is a low- or no-interest funding source for installing, repairing, and upgrading decentralized wastewater systems in small-town, rural, and suburban areas. This free, four-page fact sheet describes how the CWSRF operates and lists eligible projects, as well as who may qualify and how to get a project funded. Item #WWFSFN07.

Wastewater Products Catalog 2000

This newly updated catalog lists and describes the many products and services that the NSFC offers. The catalog may also be downloaded from the NSFC Web site at *http://www.nsfc.wvu.edu* or is available free upon request. Item #WWCAT.

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Steve Hogye—*Project Officer*
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National Small Flows Clearinghouse
West Virginia University
Morgantown,WV
Peter Casey—*Program Coordinator*
Michelle Moore—*Editor*
David Pask—*Technical Advisor*

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For wastewater information, call the NSFC at (800) 624-8301 or (304) 293-4191

National Small Flows Clearinghouse
West Virginia University Research Corporation
West Virginia University
P.O. Box 6064
Morgantown, WV 26505-6064

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