Handbook for Managing Onsite and Clustered (Decentralized) Wastewater Treatment Systems

An Introduction to Management Tools and Information for Implementing EPA's Management Guidelines

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Participating organizations include:*

National Environmental Health Association (NEHA)
National Onsite Wastewater Recycling Association (NOWRA)
National Environmental Services Center (NESC)
National Association of City and County Health Officials (NACCHO)
Rural Community Assistance Partnership (RCAP)
Water Environment Federation (WEF)
Consortium of Institutes for Decentralized Wastewater Treatment (CIDWT)
National Association of Wastewater Transporters (NAWT)
National Association of Towns and Townships (NATaT)
National Association of Counties (NACO)

For more information visit www.epa.gov/owm/onsite

Visit U.S. EPA's Onsite Wastewater Systems web site for more information on onsite and cluster systems or how to start a management program. The web site also provides design information for onsite and cluster system technologies, information on management programs, links to partner organizations useful in community education and outreach, publications for homeowners, and guidance manuals, including additional documents that supplement this Handbook.

*Electronic copies of this Handbook can be downloaded from the
U.S. EPA Onsite Wastewater Systems web site at: www.epa.gov/owm/onsite*

*Printed copies can be obtained from:
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An Introduction to Management Tools and Information for Implementing EPA's Management Guidelines

Office of Water

U.S. Environmental Protection Agency

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contents

Why do I need this handbook?

One in every four households in the United States relies on an individual onsite or small cluster system to treat wastewater. In far too many cases, these systems are installed and largely forgotten – until problems arise. On the other hand, EPA concluded in its 1997 Report to Congress that "adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas."

"This handbook is a great resource for communities looking for creative and affordable ways to address their wastewater management needs. It serves as a gateway to a wealth of practical tools and resources. Those who will benefit from this handbook include sanitarians, regulators, other wastewater professionals, community leaders, planners, and utility managers."

Benjamin H. Grumbles
U.S. EPA Assistant Administrator for Water

The difference between failure and success is the implementation of an effective wastewater management program. Such a program, if properly executed, can protect public health, preserve valuable water resources, and maintain economic vitality in a community. To facilitate proper management, EPA published *Voluntary National Guidelines for Managing Onsite and Clustered (Decentralized) Wastewater Treatment Systems*. This handbook assists with implementing the guidelines and is intended as a guide for communities that have evaluated a full range of wastewater options and determined that decentralized wastewater treatment is the most cost-effective and appropriate long-term option.

The handbook will help you to address some of the many challenges faced by communitites. Here are some common scenarios:

- Waterfront seasonal recreational communities have transformed into year-round bedroom communities whose residents find their onsite systems overwhelmed and their water quality threatened.
- Growing numbers of retirees are creating a demand for development in relatively remote rural areas, which lack significant wastewater infrastructure or management capacity.
- Scattered rural populations, often with limited incomes, suffer nuisances and public health hazards due to poorly-built, inadequately maintained, aging septic systems.
- Increasing growth pressure is occurring in the fringe areas just outside established metropolitan areas, where it is not feasible to extend sewer lines from existing treatment plants.

If you are facing similar wastewater challenges and are interested in finding solutions for your community, this handbook is for you. It provides:

- A basic overview of the elements essential for the sound management of decentralized wastewater systems.
- A step-by-step process for developing a management program specifically suited to your community.
- Links to extensive resources (articles, publications, web sites, databases, software, government programs) for more thorough investigation of particular topics or management program elements.

Coming soon— expanded online version

An expanded version of this handbook is being developed, and will include links to more specific information on topics of interest. A series of case studies is also being published to provide examples of successful management programs. Please visit the EPA Web site **www.epa.gov/owm/onsite** *for more information.*

What's inside

This handbook provides an overview of key considerations for developing or enhancing management programs for decentralized wastewater treatment systems. Here's an overview of what you'll find inside...

Look for this icon throughout the handbook to reference additional sources of useful information.

Introduction. What is management and why is it needed? Provides information on what a decentralized management program entails. A flow chart details the management development process.

Chapter 1. How do we get started? Outlines some of the driving forces behind a decentralized wastewater treatment management program. Information-gathering and public outreach are reviewed as critical factors in this phase to help communities identify management options that are technically feasible, cost-effective, and protective of public health and the environment.

Chapter 2. Where are we going? Discusses the important role of formal leadership in the program development process. During this phase, key stakeholders are identified, convened, and tasked with setting program goals. Various leadership options are reviewed.

Chapter 3. What is our current situation? Reviews necessary risk assessment and analytical work that must be undertaken to characterize the current situation and identify existing gaps in wastewater system management.

Chapter 4. What program is best for our community? Considers the authority needed to implement various program elements, such as operation and maintenance, enforcement, and permitting.

Chapter 5. How do we make our plan a reality? Offers options for implementing a management program, including the adoption of the model programs developed by EPA. Integrated wastewater planning, linkages between wastewater management activities, and compliance with state, tribal, and federal water resource protection programs are also reviewed.

Appendix A. EPA decentralized wastewater treatment fact sheets. Informative Fact Sheets summarizing each of the 13 program elements that make up an onsite management program. These one-page fact sheets describe various levels of management based on community needs along with real life examples to help guide decision-makers.

Appendix B. References and resources. Offers readers additional sources of information to further develop and enhance an onsite management program. These resources include links to information and offer many examples of onsite management programs across the country.

Appendix C. Glossary of terms. Provides common definitions used in the decentralized wastewater field.

What is management and why is it needed?

Decentralized systems can provide appropriate treatment if they are managed properly.

Onsite and clustered wastewater systems (commonly called "septic systems) serve nearly 25 percent of U.S. households and up to 33 percent of new development. More than half of these systems are over 30 years old and surveys indicate at least 10 percent might not be functioning properly.

Malfunctioning septic systems can cause bacterial contamination of groundwater and recreational waters as well as algae growth and other problems in lakes, rivers, streams, wetlands, and coastal waters. The high cost of sewers and centralized wastewater treatment plants have greatly limited communities in their efforts to address their wastewater treatment needs. State and local governments are now looking to innovative treatment systems and management options to help reduce or eliminate problem systems. Some communities have built advanced sewage treatment systems and created management entities as a long-term, reliable solution for unsewered areas. Others are focusing on enhancing existing programs to help homeowners better manage their septic systems.

What is a decentralized wastewater system?

Decentralized wastewater systems include a wide range of onsite and cluster treatment systems that process household and commercial sewage. Most discharge treated septic tank wastewater to the soil, but some discharge to ditches, streams, lakes ,and other waterbodies and need special federal or state permits. Some systems in arid regions promote evaporation or wastewater uptake by plants. Onsite and clustered wastewater treatment systems are known by many names, such as

- **Septic systems**
- **Onsite sewage systems**
- **On-lot sewage systems**
- **Private sewage systems**
- **Individual sewage systems**
- **Cluster, neighborhood or community systems**

This handbook refers to all of these as decentralized wastewater treatment systems.

The key to achieving effective performance of decentralized sewage treatment systems—from the simplest "box and rocks" septic tank and drainfield system to the most complex treatment and dispersal unit—is an effective management strategy. This strategy must consider a number of critical elements such as planning, site conditions, risk factors, system design, and operation and maintenance, all of which comprise a management program.

Benefits of managed decentralized systems

An estimated 60 million people in the United States rely on decentralized systems to treat their wastewater. These systems will play an even greater role in the future because they are often more affordable than conventional centralized sewage treatment plants and can be designed to perform under a variety of specific site conditions. A decentralized approach to wastewater treatment offers other benefits, including:

- **Protection of property values.** Well-managed, properly designed onsite or cluster systems can provide sewage treatment equivalent to a centralized plant, often at a lower cost.

- **Water conservation.** Decentralized systems can help recharge groundwater aquifers and maintain dry season flow in streams.
- **Preservation of the tax base.** Decentralized systems can be installed on an as-needed basis, thus avoiding the large up-front capital costs of centralized sewage treatment plants.
- **Life-cycle cost savings.** Proper management can result in lower replacement and repair costs, increased property values, enhanced economic development, and improved quality of life.
- **Effective planning.** Decentralized systems provide flexible wastewater options and help achieve land use objectives.

Although decentralized systems offer many benefits, they are not without problems and critics. Each communitiy must carefully evaluate its situation and management needs to develop a program that is supported by residents, protects public health and the environment, and allows the community to grow and prosper in a sustainable manner consistent with land use plans and needs.

Underground leaching chamber installation on an onsite wastewater system. *Photo: State Conservation Service Kansas*

Barnstable County, Massachusetts Department of Health and the Environment Alternative Septic System Information Center. *This Web site contains information on alternative onsite technologies.* *See page 52, reference 36.*

Building effective management programs

It's important to better understand why management programs have not been effective in the past. A review of current state and local onsite regulatory and management approaches reveals that many programs rely on homeowners to assume full responsibility for the operation and maintenance of individual treatment systems. Many of these programs, however, do not provide the information and trained service providers that homeowners need to accomplish this job. Local regulators often lack the legal authority to hold homeowners accountable for properly maintaining their systems. This is compounded by the fact that few homeowners are trained to check their systems. Without proper training, they can actually risk injury or death from exposure to hydrogen sulfide and other gases generated in the tank. As communities grow, many new rural and suburban residents move to unsewered areas unaware of their system location and the need for periodic maintenance. In this "unmanaged" condition, septic systems will not perform adequately and many will ultimately have problems.

Benefits of effective decentralized wastewater management include...

- **Reduced costs for repairs, operation, maintenance and replacement**
- **Longer system life**
- **Improved system performance**
- **Increased reliability and overall satisfaction**
- **Higher property values**

In order to enhance management of decentralized wastewater treatment systems, state and local governments should develop a well-thought-out strategy that considers a number of factors, including design options, site conditions, operation and maintenance requirements, periodic inspections, monitoring, and financial support. Central to this strategy is ensuring that the legal authority is in place to carry out program requirements. Legal authority can be granted at the state or local level. For example, some local health departments are authorized by state statute to adopt regulatory powers as necessary to carry out program functions such as issuing operating permits, requiring maintenance contracts, setting system pumping/repair/replace-

What is decentralized wastewater management?

Decentralized wastewater management is not just about septic systems. It is about how much your community will grow, what your community will look like, how clean your local stream or estuary will be, and even the layout of your streets and subdivision. Finding answers to these questions means understanding:

- **Community wastewater needs and their effects on public health and the environment**
- **Your local setting and technical options and solutions**
- **The relationship between the technical solution and the shape and form of your community**

ment schedules, and promoting compliance through inspections and fines. Other communities have adopted local ordinances to provide the necessary legal powers to support management efforts and to take appropriate action when public health or water resources are threatened.

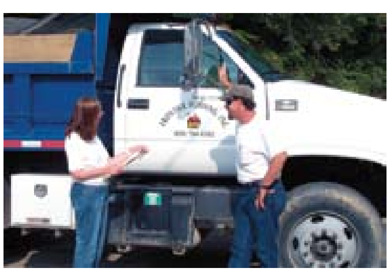
In some cases, communities have elected to give legal authority to a public and/or private responsible management entity (RME). Depending on state, tribal, and local codes, revised enabling legislation or special ordinances or agreements might be needed for a third-party entity to assume responsibility for certain services, such as system operation, inspection, monitoring, and ownership. Oversight of the management entity by the state or local regulatory authority is usally needed, regardless of the management approach selected.

Integrating decentralized wastewater treatment considerations into other programs also offers opportunities to manage systems more effectively. For example, planning agencies typically develop land use plans and zoning designations for various tracts of residential, commercial, and industrial land. However, they rarely consider clustering wastewater treatment facilities in unsewered areas or consult with water resource professionals on ways to accommodate soil-based or other treatment in rapidly developing locations. Integrating wastewater treatment into other programs can spur the development of creative and cost-saving approaches to wastewater management.

EPA's Voluntary National Guidelines for Managing Onsite and Clustered (Decentralized) Wastewater Treatment Systems *provides information on the impacts of decentralized wastewater systems, the need for management, and five management program models that can be used by states and communities.* *See page 49, reference #4.*

How to use this handbook

The process of finding solutions to wastewater problems must be driven by local needs consistent with community sentiment and state and federal requirements. This handbook offers guidance on ways to tailor a management approach to the specific needs of a community. It recommends the basic format for developing an effective onsite sewage management program based on the principles in EPA's *Voluntary National Guidelines for Managing Onsite and Clustered (Decentralized) Wastewater Treatment Systems*. This handbook is not a regulation, and readers remain free to use approaches other than those suggested here.



Management involves technology, engineering, and regulatory issues. Planners, health environmentalists, installers, elected officials, and citizens also play important roles.

Figure 1 summarizes the five major steps outlined in this handbook for developing or enhancing a decentralized wastewater management program. You can find additional resources in the appendices of this handbook. Fact sheets describing the 13 program elements of a decentralized wastewater management program appear in Appendix A. The management program elements provide a good basis for reviewing and evaluating existing programs and developing new ones. Resources and references are listed in Appendix B, and a glossary of terms used in this handbook appears in Appendix C.

Figure 1. *Process for developing a decentralized wastewater management program*

STEPS	KEY ACTIVITIES
1 Conduct initial scoping and outreach.	*Chapter 1* ■ Conduct informal surveys of existing system performance. ■ Review potential problems. ■ Identify organizations involved in system planning, permitting, operation, and maintenance. ■ Conduct initial outreach and education and convene interested parties to define problems and how to address them.
2 Convene interested stakeholders to investigate system performance and set goals.	*Chapter 2* ■ Identify key stakeholders (community leaders, regulators) and other potential partners (planning departments, developers, service providers, existing management entities, and watershed groups). ■ Develop a formal or informal group of key stakeholders to evaluate current activities, assess existing information, define problems, determine the feasibility of establishing or enhancing a management program, and develop goals.
3 Analyze existing information to assess the community and evaluate current and future risks.	*Chapter 3* ■ Develop a community profile to assess socioeconomic and other community factors. ■ Review existing statutory and regulatory authority. ■ Determine the current management approach of the existing regulatory authorities. ■ Inventory or otherwise collect information on existing systems and impacts, analyze risks posed by existing systems, and assign potential of risk to systems and groups of systems. ■ Assess growth and development trends and create risk scenarios under various management approaches to determine wastewater planning and management needs for newly served areas.
4 Enhance existing management program or develop new management entities.	*Chapter 4* ■ Synthesize information to identify and prioritize risks and management gaps. ■ Select program management approach. ■ Partner with stakeholder organizations (planning/zoning, water resource, service providers, and other entities) to determine implementation feasibility. ■ Conduct a reality check to determine the availability of management, technical, financial, and other resources.
5 Implement selected elements of the management program, monitor and adapt as necessary.	*Chapter 5* ■ Investigate resources needed to implement the program. ■ Establish management requirements for existing and new treatment systems based on health and water resource risks. ■ Evaluate approaches and powers needed for implementing management programs. ■ Coordinate with other wastewater and water programs. ■ Solicit support and resources from stakeholders. ■ Develop indicators to determine progress. ■ Implement and adapt management program as necessary.

How do we get started?

Initial scoping and outreach

Developing an effective decentralized wastewater management program is complex and often challenging, but it is essential to the future environmental and economic health of a community. The process can be broken down into several manageable tasks. This chapter offers some general guidelines for getting started.

Scoping is a relatively quick process of gathering information, discussing its importance, and deciding how to proceed. Detailed analysis is usually undertaken at a later stage (see Chapter 3).

Assessing the situation

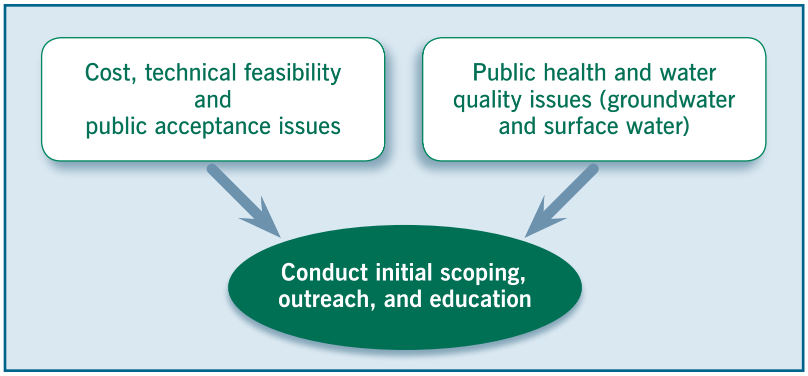
Communities across the nation—big and small, rural and urban—will all face wastewater management issues at some point. One of the greatest challenges facing many small or rural communities today is the set of problems associated with poorly operating small-scale wastewater treatment systems. These problems include:

- Threats to public health from malfunctioning septic systems, resulting in bacterial contamination of well water and swimming areas, or sewage surfacing on the ground
- Inadequate treatment that contributes to nutrient-induced algae growth or other problems in recreational and coastal waters
- Aesthetic concerns including odors, noises from aerators or other system components, or inadequately treated discharges of sewage to neighborhood ditches or streams
- High costs, lowered water tables, and construction-related disruptions associated with replacing onsite systems with sewer lines that transport wastewater to a distant centralized sewage treatment plant

These concerns often prompt residents and public officials to demand action from state and local officials. The question community officials most often face is "Do we stay with onsite systems and try to fix the problems, or do we move in another direction to a community-based or centralized system?"

During this early stage of decision-making, it is important to fully investigate wastewater issues and needs and review potential solutions. Key to a successful scoping process is ensuring that it is done in an open manner—one that supports education and outreach to the community. Figure 2 shows the actions that occur during the scoping process. Adequate scoping and initial outreach is critical in setting the stage for an open, honest process that focuses on the needs of the community.

Figure 2. *Initial scoping and outreach*



Getting the ball rolling

Public awareness of wastewater issues brought about by news stories or complaints can provide a real opportunity to involve a number of stakeholders in the decision-making process and begin a community-wide dialogue regarding wastewater treatment needs. Local agencies can capitalize on the energy and resources of various interested parties, which can lead to innovative and effective management programs. It's not unusual for a developer, neighborhood association, citizen group, or sanitation district to kick off the effort to develop a decentralized wastewater management program. But local decision-makers and regulators must be actively involved and help to drive the process at the earliest opportunity.

Choices for Communities: Wastewater Management Options for Rural Areas. *This document helps communities explore their wastewater treatment options. See page 51, reference #17.*

The scoping process typically involves:

- Collecting data and information on water quality
- Identifying the number and types of onsite systems in an area
- Reviewing complaints and system malfunctions
- Assessing the types of system problems that have been reported to pumpers and other service providers
- Considering where new systems are likely to be needed

The use of a data management system and innovative mapping tools can greatly assist in reviewing this information.

Maryland partnership develops septic system impact study

The Department of Environmental Resources and Health Department in Maryland's Prince George's County worked together to develop geographic information system (GIS) tools to quantify and mitigate nonpoint source nutrient loadings to the lower Patuxent River, which empties into the Chesapeake Bay. The agencies developed a database of information on existing onsite systems, including system age, type, and location, with additional data layers for depth to ground water and soils. The resulting GIS framework allows users to quantify nitrogen loadings and visualize likely impacts under a range of management scenarios. Information from GIS outputs is provided to decision makers for use in planning development and devising management strategies. For more information see page 51, reference #25.

Scoping is an informal activity to...

- **Identify driving forces such as system malfunctions and health and water risks**
- **Gather information from regulatory authorities, water resource agencies, planning departments, and other interested parties**
- **Contact system installers and service providers to see what sorts of problems they have encountered in the field**
- **See if a discussion of identified issues can be "piggybacked" onto an existing activity or program (health board, planning commission, water quality meeting)**
- **Convene an informal discussion of interested parties at a time and place convenient for them**

Where are we going?

Setting goals and objectives

Stakeholders need to be involved at every stage of the program development process. If scoping indicates that problems exist and management solutions are needed, a formal (steering committee) or informal (advisory committee) stakeholder group can be formed to assess the situation and recommend options. The problems, goals, and strategies that the stakeholder group generates will help to define what is desirable and ultimately what is achievable. This effort will require a committed group of people who can work together to assess the problems uncovered during the scoping phase outlined in Chapter 1.

Identifying stakeholders and their roles

Selecting members of a stakeholder group requires carefully considering a wide range of participants. For example, people with technical understanding, community outreach skills, fiscal/financial training, legal backgrounds, and community organization experience should be strongly considered. Elected officials and senior staff from regulatory agencies such as local and state health and environmental agencies, are almost always key stakeholders and should be involved in the program development process. Figure 3 provides some examples of key stakeholders. An effective stakeholder group will:

Figure 3. *Establishing a stakeholder group*

- Understand the problems clearly before seeking solutions
- Take responsibility for and ownership of the problems
- Exercise strong leadership, coordination, and communication
- Help to develop a clearly defined vision, mission, and goals
- Gather information from as many sources as possible
- Take the time to identify and examine all options before making decisions
- Identify and use appropriate decision-making processes
- Keep all affected parties informed and involved
- Develop criteria for hiring and working with consultants

Establishing goals and objectives

As the process unfolds, it's likely that some organization—usually one of the stakeholder entities—will assume leadership for the process. This organization could be a local health department, sanitation district, private or public corporation, or homeowner association. The sponsoring organization and several of the stakeholder groups might have their own perceived outcomes and objectives. It is important, however, to go through a process to identify the group's common objectives and interests, such as:

- Characterizing and addressing existing problems such as health or water quality threats
- Identifying and minimizing impacts from future commercial or residential development
- Protecting public health, economic vitality, and important recreational or water resources
- Generating public awareness and interest in resolving problems
- Building trust between the sponsoring organization and partners
- Creating support for funding and implementing selected management actions

Remember that these objectives are only a subset of those which will be pursued during the program development process. Stakeholders will bring to the table their own goals and objectives, which need to be considered when developing the management program.

Convening a stakeholder group

The members of the stakeholder group must clearly understand their roles and responsibilities (see the *Public Education and Participation Fact Sheet* on page 36). Will the group develop an issues and needs assessment, or will it be charged with actually designing the program? Will it have decision-making authority or play an advisory role? It is important that the framework of the group be clearly defined to avoid any confusion. Establishing ground rules and time frames will also be necessary to keep the group on task. If you choose to hire a wastewater planning consultant, look for someone who is knowledgeable about both centralized and decentralized treatment options. Staged development of wastewater facilities through both centralized and decentralized systems, selected through an objective process, should be the focus of a wastewater planning consultant.

Involving key stakeholders in the management program helps to build trust, communication, and support for whatever options appear to best address community needs. Stakeholders often bring additional resources to the table for assessment and program development.

When developing a stakeholder group answer these questions:

- **How will the group be structured—will it be a fully empowered decision-making entity, steering committee, advisory body, or ad hoc group?**
- **How will decisions be made—by majority vote, consensus, input received but decisions made by a responsible party?**
- **What is the membership of the group—is there one representative from each locality or interest group, or a cross-section of stakeholder groups?**
- **What are the roles and responsibilities of the stakeholders—will they include outreach, analysis and assessment, selection of management options, preparation of reports?**

Key questions to consider

The following questions might help to guide the stakeholder group as they begin the program development process.

1. **Where are we now, and where do we want to go?** Asking this question will help the group to focus on problems and desired outcomes. It is also helpful for stakeholders to consider the consequences of not taking some kind of action.

2. **How do we get there?** Identifying common goals and preliminary objectives during initial meetings helps to keep the group focused. Goals are generally broad expressions of a future vision of the group. For example, a goal might be to "improve the operation and maintenance of existing onsite systems." Objectives are then linked to the goals and provide a yardstick against which progress can be measured. For example, the group might identify a specific objective such as: "within 2 years, all systems having electrical or mechanical parts will be inspected annually, and those that discharge to ditches or the ground surface will be replaced with soil infiltration systems."

Stakeholder involvement tasks

- **Summarize and review the driving forces for better system management**
- **Determine the level of stakeholder involvement expected**
- **Decide which stakeholders are needed and invite them to participate**
- **Provide background information and general goals to the stakeholder group**
- **Convene the stakeholders to discuss their interest and desire to participate**
- **Develop a framework for stakeholder meetings, decision-making, and actions**
- **Conduct outreach to build awareness and interest.**

Gaining public support for wastewater management in Idaho

Because of accelerated development in the Idaho panhandle and a rapid rise in nitrate concentrations in the Rathdrum Prairie Aquifer, the Panhandle Health District (PHD), which covers the state's five northernmost counties, developed a plan to implement an interim moratorium on new development served by conventional septic tank soil-absorption systems. The high nitrate problem had been traced through groundwater monitoring to wastewater systems in densely developed subdivisions. To gain support for the plan, the PHD made presentations that documented the problem and proposed solutions to school, civic, and professional groups. The agency also used radio and television ads. In all cases, the PHD attempted to craft the presentation contents and supporting materials specifically for the audience being addressed. All public presentations were conducted in a cooperative, rather than confrontational manner.

The PHD then formed an ad hoc citizens' committee to develop and present suggested changes to the preliminary policy developed by the PHD. This committee included representatives from the home builders, the U.S. Department of Agriculture's Natural Resources Conservation Service, and two other affected federal agencies, farmers, planning boards, the state legislature, the League of Women Voters, and conservation/environmental organizations. The committee members not only reached out to their respective constituencies but also solicited feedback from other interested parties. For more information see the *Public Education Fact Sheet* on page 36.

3. **Do we always need consensus? Who has decision-making authority?** Stakeholder consensus is not needed for every decision. In some cases, it might be more appropriate to simply gather information from the stakeholders. The factors to consider when selecting a decision-making protocol include the time frame, the importance of the decision, the information needed to make the decision, and the capability and authority of the group to make the decision. For a decision to be generally accepted by the public, people must be informed of an impending decision or action, be heard before the decision is made, and have the opportunity to influence the decision.

What is our current situation?

Assessing and analyzing existing conditions

During this step, stakeholders will continue to build on their knowledge of community and resource conditions. This chapter focuses on developing a community profile, reviewing legal authorities, assessing current management practices, preparing a risk assessment, and considering future community growth and development (Figure 4).

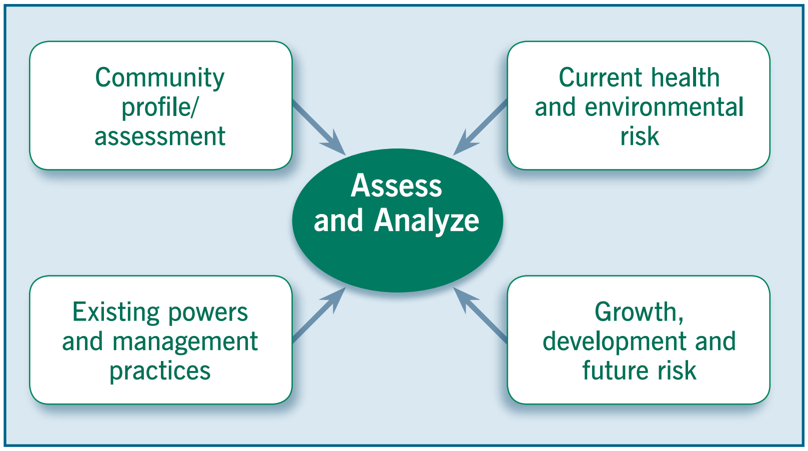


Figure 4. *Assessing and analyzing existing conditions*

Developing a community profile

A sense of community conditions is needed to provide context for stakeholder discussions. Therfore, it is beneficial for the stakeholder group to create a profile of their community which has three parts:

1. **Socioeconomic conditions**. A review of social and economic conditions provides perspective on the types of management actions that are likely to be acceptable and affordable for a community. For example, dealing with system malfunctions in densely populated low-income areas with small lots served by inadequate older treatment units might require cost-share assistance as opposed to stepped-up enforcement.

2. **Land and water resource conditions.** Information on a wide range of land and water resources that can assist in developing a community profile is readily available from a number of sources including:
   - Aerial photographs from property valuation and tax agencies, the Natural Resource Conservation Service, and local utilities
   - Population and housing census data (www.census.gov)
   - Wastewater, drinking water, and other data from local utilities
   - Soil data from the Natural Resource Conservation Service (www.soils.usda.gov/)
   - Topographic data from the U.S. Geological Survey (www.usgs.gov/)
   - Land-use and mapping data from planning agencies.
   - Water quality and watershed data from state water agencies and EPA websites (see page 45, reference #1 and #2)

Information and planning

Collecting information should not become burdensome. Focus on collecting information that is needed and available. For example, if the objective is to improve wastewater treatment systems in a specific area, target data collection efforts to assess the status of the existing systems, groundwater and surface water quality, and where infill development might occur. Denote potential areas where cluster systems might replace malfunctioning systems to capitalize on performance and cost efficiencies.

A geographic information system (GIS) can be used to store information and generate maps. These maps can familiarize stakeholders and the public with community conditions. Stakeholder groups are strongly encouraged to partner with planning agencies or data managers to develop or share GIS capabilities.

3. **Onsite and cluster system inventories.** An important step in developing a community profile is to estimate the number and types of onsite/cluster systems, along with their location and where they disperse treated wastewater. Information can be accessed by contacting a number of agencies including:

- County or city health departments
- Planning/zoning agencies
- Regional wastewater treatment plants
- Economic development offices, county/city housing, and property valuation agencies

Water quality information sources include:

- Source water assessment and protection plans from local drinking water utilities
- Watershed studies from local water/wastewater utilities and state water quality agencies
- Data from local or regional water quality monitoring organizations or volunteer groups

Service providers are also a good source of information, and include:

- Onsite service providers such as septic tank pumpers, designers, and installers
- Well drillers and other water-related professionals

Wastewater professionals can be a valuable source of information regarding the types of systems being installed, malfunctioning systems, and homeowner compliance with recommended service schedules.

Inventories and assessments of system performance provide vital information for risk analyses. These can begin as broad screening characterizations of service or geographical areas, with more refined analysis conducted in potential problem areas.

An assessment of resource conditions can be used to…

- **Identify and prioritize problem systems**
- **Identify the causes for inadequate performance of existing systems**
- **Collect soil data and other information needed for system design**
- **Evaluate the trends and likely impacts of future residential and commercial growth**
- **Examine technologies and system configurations that might accommodate growth**
- **Estimate costs and environmental and public health impacts of alternative solutions**
- **Define the desired character of the community**

Using GIS maps to assign risks

GIS maps can assist with developing a framework for assigning risk tiers to groups of systems. Several tools exist to aid in this process. One such tool is the "susceptibility determinations" that drinking water utilities make as part of their source water assessments. These assessments determine which potential sources of pollution, including onsite wastewater systems, pose the greatest threats to potable water systems.

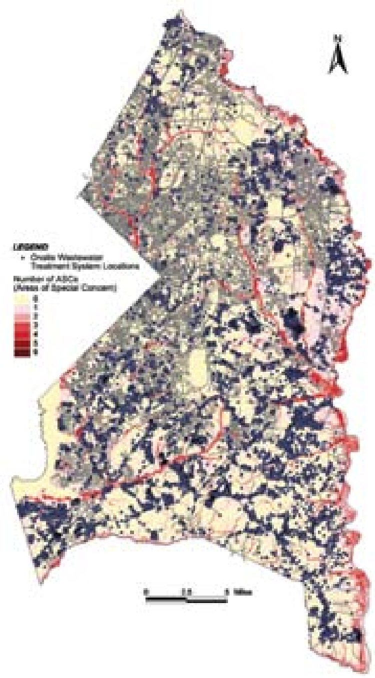
Using GIS tools to characterize water quality threats in Colorado

Summit County, Colorado, in partnership with the Colorado School of Mines and other organizations, developed a GIS to identify the adverse effects of nitrate from septic systems on water quality in the upper Blue River watershed. The GIS database included geologic maps, soil survey maps, topographic features, land parcel maps, domestic well sampling data, onsite system permitting data, well logs, and tax assessor data. The database can be updated with new water quality information, system maintenance records, property records, and onsite system construction permit and repair information. The database is linked to the DRASTIC groundwater vulnerability rating model and is being used to identify areas that have a potential for excessive contamination by nitrate-nitrogen, which helps in prioritizing water quality improvement projects. See page 54, reference #56 for more information.

Reviewing current regulatory powers and management

As part of the assessment and analysis phase, a review of the statutory and regulatory authority in place to carry out a decentralized wastewater treatment management program should be conducted, including:

- Authority to enter private property for inspection or health nuisance abatement
- Authority to require repair or replacement of malfunctioning systems
- Authority that allows private entities to manage systems, charge fees, or apply for funding



Onsite wastewater treatment systems in Prince George's County. *Source: Prince George's County OSDS Database*

Existing management practices should also be reviewed, including:

- Site evaluation procedures
- Educational, training, or other requirements for service providers
- The permitting process
- Design requirements
- Installation/construction requirements
- Operational and maintenance requirements
- Inspection, complaint, and compliance assurance procedures
- Program funding, including fees for permitting, inspection, or other management activities, and whether they cover costs

A review of existing statutory, regulatory, and management approaches will help to identify program gaps, barriers to new technology, and other shortcomings that might need to be addressed to enhance existing activities or develop a new management program.

Assessing public health and environmental risks

One of the most important goals of the management program should be to target actions in direct proportion to the risks posed by malfunctioning treatment systems. The importance of this concept cannot be overstated. In practice, this means that some systems need only minimal management, while others must be managed much more intensively.

Developing integrated risk assessments for wastewater systems is a demanding task, but the benefits can be significant. Examples of parameters to consider in assessing public health and environmental risks for existing systems are soil permeability, depth to groundwater, aquifer type, groundwater and surface water use, proximity to sensitive surface waters, topography, geology, density of development, and system types. In developing risk assessments, the objective is not to produce an expensive, time-consuming, lengthy and complicated study, but rather to quickly assimilate available data and identify classes or groups of systems posing similar risks so they can be managed in a similar manner. For example, widely scattered older systems sited in deep, well-drained soils far away from surface waters need not be managed as intensively as newer, electromechanical treatment units serving beach-front properties. Densely packed systems installed during the 1950s near a downtown area bisected by a trout stream might be targeted for replacement with a new clustered facility featuring neighborhood collection lines, a biofiltration unit, and pressure distribution to soils.

The development of a database and GIS mapping capabilities, or even hand-drawn maps, can help to inform risk assignment decisions. Inspections of individual systems in areas targeted for more intensive management can confirm risk decisions and bolster homeowners' confidence in the process and its outcomes. Table 1 summarizes some of the risk factors that indicate more intensive system management might be needed.

Potential problem indicators

Untreated or partially treated sewage pooling on ground surfaces and in ditches, sewage backup in household plumbing fixtures, and sewage breakouts on slopes

High nitrate or bacteria levels in downgradient drinking water wells, presence of toxic substances in well water, and taste or odor problems in well water caused by untreated or poorly treated wastewater

Shellfish bed and recreational beach closures due to bacterial or viral contamination

Algae blooms and low dissolved oxygen concentrations in nearby surface waters

General approach for conducting risk assessments

Many researchers have used the following general approach to identify onsite and cluster systems that might be impairing or threatening water resources:

Identify pollutants such as pathogens, nitrogen, or phosphorus that are impairing or threatening waterways.

List likely sources of the pollutants of concern.

Estimate the total load of pollutants to the receiving water from each source. Estimating the total load of pollutants from onsite/cluster systems requires modeling system flows, pollutant output, transport and rate, and assimilation by the receiving waters. An alternative approach is to conduct lot-level analysis of system type, age, proximity to receiving water, repair and service records, and site conditions.

Create a matrix that ranks lot-level system risk by assigning ratings or risk level values and applying them to each lot or parcel. This approach is useful for areas where onsite/cluster systems are collectively judged to be a significant source of the pollutant or pollutants of concern.

Analyzing growth, development, and future risk

Analyzing growth, development, and future risk is similar to the process of assessing risks posed by existing systems. Projecting residential and commercial build-out and estimating likely system numbers and types can be challenging if there is no comprehensive land use plan or wastewater management plan. Consultation with the local planning agency and developers can yield significant information regarding planned build-out. The assessment can also be used to project risks posed by systems that might be installed in the future. Getting "ahead of the curve" by forecasting future risk is useful in developing design requirements (performance targets) and management needs for wastewater systems that will serve new subdivisions and commercial areas. **Combining or coordinating treatment service planning for both centralized and decentralized wastewater treatment facilities is highly recommended.** Developing a seamless approach to treatment planning by integrating individual, cluster, and sewage plant services builds efficiency, promotes effectiveness, and contributes to a sense that all wastewater treatment services are community assets that should be managed appropriately for public benefit.

Table 1. *Onsite system risk factors*

Risk category	Risk factors
Environmental sensitivity	◆ Impermeable soils such as heavy clay ◆ Shallow depths to groundwater ◆ Rock layers near the surface ◆ Hilly terrain with thin soils and steep slopes ◆ High densities of system installations ◆ Sensitive waterbodies nearby
Public health	◆ Drinking water wells nearby ◆ Recreational waters nearby ◆ Effluent surfacing or plumbing backups ◆ Potential for rapid groundwater movement ◆ Systems more than 25 years old not maintained ◆ Illegal system discharges
Treatment complexity	◆ Electrical and mechanical system components ◆ Heavy sewage loads (high-strength wastewaters) ◆ High fat, oil, and grease content in wastewater ◆ Industrial and certain commercial wastewaters

In practice, this means that local communities should examine future goals for growth, development, resource protection, and community character prior to evaluating wastewater treatment options, because the type of treatment selected – centralized, decentralized, or a combination of the two – can have a significant impact on these goals. For example, appropriately designed individual systems and cluster systems serving targeted areas can promote a "pay as you go" approach and ensure that extension of centralized sewer service does not promote unwanted growth or overload treatment plants already at capacity or experiencing overflow problems. Information from consultants or engineers familiar with the full range of treatment options, the planning guides cited in this chapter, and EPA's *Onsite Wastewater Treatment Systems Manual* (see page 52, reference #34) are all useful in analyzing the range of options available. This handbook is intended to aid in developing appropriate management programs for areas that select individual or clustered decentralized systems.

Watershed planning

Local government land use planning programs should be integrated with the selected wastewater management program. Planning can include performance targets for wastewater treatment and promote integration of wastewater/stormwater/watershed management programs and policies. For more information on integrated wastewater planning, see page 51, reference #25 and page 52, reference #35.

Assessing onsite system risks in Malibu

Malibu, California, relies on residential onsite wastewater treatment systems to protect valuable inland and coastal waters. A team of consultants and city staff conducted a three-year risk management study to develop recommendations to protect these resources and to meet state water quality standards. Many stakeholders, including regulators and environmental advocacy groups, were involved throughout and were essential to the study's success. The study area was defined by groundwater recharge zones in the alluvial aquifers around Malibu Creek and Lagoon, Winter Canyon and the surf zone of the Pacific Ocean near Surfrider Beach. The groundwater aquifer was the focus of the study because it receives the treated effluent from onsite systems and transmits groundwater to local surface waters.

The study integrated data from a network of new and existing monitoring wells into a centralized, web-based information management system. Using this information, a three-dimensional groundwater model was developed to evaluate impacts of onsite systems on groundwater quality and to determine the directions and rates of groundwater flow. The risk assessment approach used six steps:

1. Define receiving waters and objectives for key water quality constituents
2. Identify, locate, and quantify contamination contributed by onsite systems.
3. Evaluate hydrological conditions to determine groundwater flow directions and travel times
4. Estimate the assimilative capacity of unsaturated and saturated zones to account for the reduction or assimilation of pathogens and nitrogen during groundwater transport
5. Delineate specific areas that might pose pathogen and nitrogen risks to the receiving waters
6. Identify and evaluate alternative strategies to reduce risks to acceptable levels

The results indicated that portions of the study area might be contributing pathogens or nitrogen to either Malibu Creek and Lagoon or the surf zone. The recommendations focused on the desired water quality outcomes—specifically, meeting Total Maximum Daily Loads (TMDLs) for pathogens and nitrogen. Suggested actions included initiating a point-of-sale onsite system inspection program, requiring inspections for systems within the six-month pollutant travel time zones, evaluating a proposed clustered wastewater collection/treatment/dispersal system, and requiring disinfection or nitrogen removal for systems in the contributing areas. The City of Malibu is incorporating the action items into its Wastewater Management Plan. For more information see page 54, reference #49 and #50.

All management programs should...

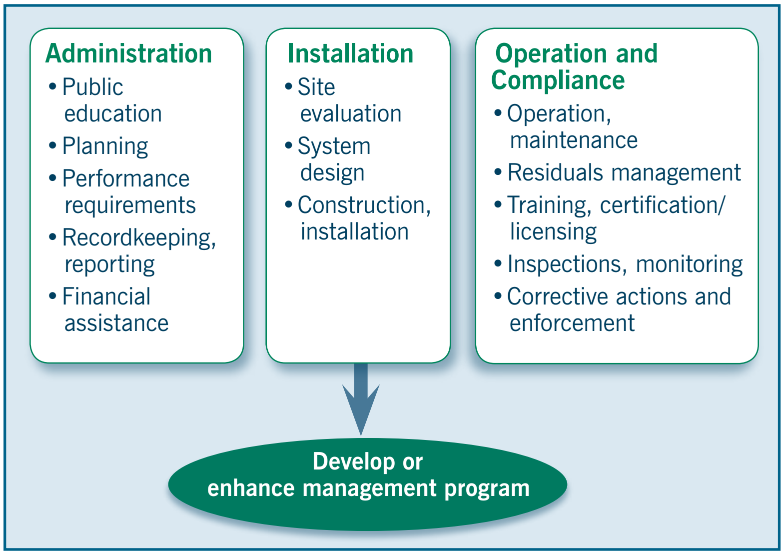
- **Have sufficient local support and legal authority**
- **Be flexible in adapting to changing demands**
- **Ensure reasonable homeowner costs**
- **Be able to achieve public health and environmental objectives**

What is best for our community?

Developing or enhancing your program

This chapter discusses the development or enhancement of your decentralized wastewater management program based on 13 principal program elements (Figure 5 and Table 3; also see Appendix A for fact sheets on each of these elements.)

Figure 5. *Decentralized wastewater management program elements*



Management programs typically support the twin goals of protecting human health and environmental resources. They might also influence future growth and community character, promote water recycling and reuse, protect and enhance private property values, and protect against water resource diversions. Developing management approaches for specific groups of onsite systems—which can be classified as having high, moderate, or low risk—will constitute much of the work in devising the overall management program.

Selecting a management approach

The EPA *Voluntary Management Guidelines* (see page 49, reference #4) detail five management approaches that respond to varying levels of risk posed by decentralized wastewater treatment systems (see Table 2 and www.epa.gov/owm/onsite). These conceptual models represent a range of possible programmatic responses to water quality and public health concerns or local wastewater infrastructure needs (Figure 6). Management models 2 through 5 are recommended for electromechanical systems and moderate- to high-risk site conditions. Each management approach consists of a "package" of management activities. The mix of institutions, procedures, and arrangements involved in a management program varies depending on enabling legislation, environmental conditions, resources, and other factors. Because of this diversity, the outcomes of management efforts will be different across the country depending on local conditions and needs.

Figure 6. *Using risk inputs to select a management model*

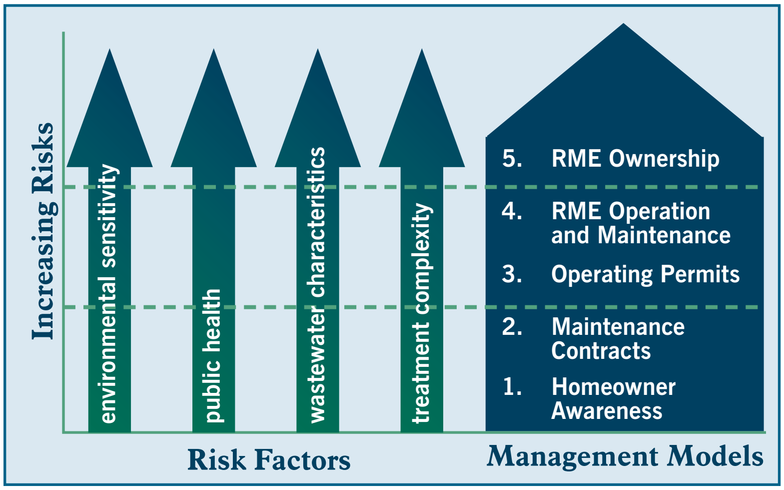


Table 2. *EPA management models for decentralized wastewater treatment systems*

Typical applications	Program description	Benefits	Limitations
1. Homeowner Awareness Model			
◆ Areas of low environmental sensitivity where sites are suitable for conventional onsite systems	◆ Systems sited and constructed based on prescribed criteria ◆ Maintenance reminders ◆ Inventory of all systems	◆ Code-compliant system ◆ Ease of implementation ◆ Inventory of systems that is useful for tracking and areawide planning	◆ No compliance ID mechanism ◆ Sites must meet siting requirements ◆ Cost to maintain database
2. Maintenance Contract Model			
◆ Areas of low to moderate environmental sensitivity where sites are marginally suitable for conventional onsite systems due to small lots, shallow soils or low-permeability soils ◆ Small cluster systems	◆ Systems properly sited and constructed ◆ More complex treatment options (mechanical, clusters of homes) ◆ Service contracts must be maintained ◆ Inventory of all systems ◆ Contract tracking system	◆ Lower risk of treatment system malfunctions ◆ Homeowner's investment protected	◆ Difficulty tracking and enforcing compliance due to reliance on the owner or contractor to report a lapse in services ◆ No mechanism provided to assess the effectiveness of the maintenance program
3. Operating Permit Model			
◆ Areas of moderate environmental sensitivity such as wellhead or source water protection zones, shellfish-growing waters, or bathing/water contact recreation areas ◆ Systems treating high-strength wastes, or large-capacity systems	◆ Performance and monitoring requirements ◆ Engineered designs allowed but may provide prescriptive designs for specific sites ◆ Regulatory oversight by issuing renewable operating permits that may be revoked for noncompliance ◆ Inventory of all systems ◆ Tracking of operating permit and compliance monitoring ◆ Minimum for large-capacity systems	◆ Systems can be located in more environmentally sensitive areas ◆ Regular compliance monitoring reports ◆ Noncompliant systems identified and corrective actions required ◆ Less need for regulation of large systems	◆ Higher level of expertise and resources for regulatory authority to implement ◆ Requires permit tracking system ◆ Regulatory authority needs enforcement powers
4. Responsible Management Entity (RME) Operation			
◆ Areas of moderate to high environmental sensitivity where reliable and sustainable system operation and maintenance is required (sole-source aquifers, wellhead or source water protection zones, critical aquatic habitats, and outstanding value resource waters) ◆ Cluster systems	◆ System performance and monitoring requirements ◆ Professional O&M services through RME (public or private) ◆ Regulatory oversight by issuing operating or NPDES permits directly to RME (system ownership remains with property owner) ◆ Inventory of all systems ◆ Tracking system for operating permit and compliance monitoring	◆ O&M responsibility transferred from the system owner to a professional RME that holds the operating permit ◆ Problems identified before malfunctions occur ◆ Onsite treatment in more environmentally sensitive areas or for treatment of high-strength wastes ◆ One permit for a group of systems	◆ Enabling legislation might be necessary to allow RME to hold the operating permit for an individual system owner ◆ RME must have owner's approval for repairs; might be conflict if performance problems are identified and not corrected ◆ Need for easement/right of entry ◆ Need for oversight of RME by the regulatory authority
5. Responsible Management Entity (RME) Ownership Model			
◆ Areas of greatest environmental sensitivity, where reliable management is required. Includes sole source aquifers, wellhead or source water protection zones, critical aquatic habitats, and outstanding value resource waters ◆ Preferred management program for cluster systems serving multiple properties under different ownership	◆ Establishes system performance and monitoring requirements ◆ Professional management of all aspects of decentralized systems ◆ RMEs own or manage individual systems ◆ Trained and licensed professional owners/operators ◆ Regulatory oversight through NPDES or other permit ◆ Inventory of all systems ◆ Tracking of operating permit and compliance monitoring	◆ High level of oversight if system problems occur ◆ Model of central sewerage that reduces the risk of noncompliance ◆ Onsite treatment in environmentally sensitive areas ◆ Effective planning and watershed management ◆ Potential conflicts between the user and RME removed ◆ Greatest protection of environmental resources and homeowner investment	◆ Enabling legislation or formation of special district might be required ◆ Might require significant financial investment by RME for installation or purchase of existing systems or components ◆ Need for oversight of RME by the regulatory authority; might limit competition ◆ Homeowner associations may not have adequate authority

Table 3. *Decentralized wastewater management program elements*

Elements	Purpose	Basic activities	Advanced activities
Administration			
Performance requirements	Link treatment standards and relative risk to health and water resource goals.	Prescribe acceptable site characteristics and system types allowed.	Stipulate that system performance must meet defined standards that consider water resource values, vulnerabilities and risks.
Planning	Consider site and regional conditions and effects on long-term watershed and public health.	Identify minimum lot sizes, surface water/groundwater separation distances, and critical areas requiring protection.	Monitor and model regional pollutant loads; tailor development patterns based on environmental and physical limitations; require clustering for large developments.
Record-keeping, inventory and reporting	Create inventory of systems and O&M logs, planning and reporting to oversight agencies.	Provide inventory information on all systems; submit performance reports to health agency.	Provide GIS-based comprehensive inventories, including web-based monitoring and O&M data input for administrative reporting and watershed assessment studies.
Financial assistance and funding	Provide financial and legal support for management program.	Implement basic powers, revenue-generation fees, and legal backup for a sustainable program.	Initiate monthly or quarterly service fees; cost-share or other repair/replacement program; full financial and legal support for management program; equitable revenue base and assistance programs; regular reviews and modifications.
Public education and participation	Maximize public involvement while developing a management program.	Sponsor public meetings, forums, updates and education programs.	Maintain public advisory groups, review groups, and other involvement opportunities in the program; distribute educational and other materials.
Installation			
Site evaluation	Assess system site and relationship to other features (groundwater and surface water).	Characterize landscape, soils, ground and surface water location, lot size, and other conditions.	Assess site and cumulative watershed impacts, groundwater mounding potential, long-term specific pollutant trends, and cluster system needs.
System design	Ensure that system is appropriate for site, watershed and wastewater characteristics.	Prescribe a limited number of acceptable designs for specific site conditions.	Implement codes for developing designs that meet performance requirements for each site; address wastewater, reuse and dispersal options.
Construction	Ensure installation as designed; record as-built drawings.	Inspect installation prior to covering with soil and enter as-built information into the file record.	Provide supplemental training, certification and licensing programs; provide more comprehensive inspection of installations; verify and enter as-built information into the record.

Table 3. (continued) *Decentralized wastewater management program elements*

Elements	Purpose	Basic activities	Advanced activities
Operation and Compliance			
Operation and maintenance	Ensure that systems perform as designed.	Initiate homeowner education and reminder programs that promote O&M.	Require service contracts or renewable, revocable operating permits with periodic reporting; log service reports in database; ensure responsibility for O&M activities.
Inspections and monitoring	Document provider performance, functioning of systems, and impacts.	Perform inspection prior to cover-up and property title transfer; provide complaint response.	Conduct regional surface water and groundwater monitoring; web-based inspection reporting and system operational monitoring; require installation and periodic operational inspections.
Residuals management	Remove and treat residuals; minimize health or environmental risks from residuals handling, use, and dispersal.	Ensure compliance with federal and state codes for residuals dispersal.	Conduct analysis and oversight of residuals program; web-based reporting and inspection of pumping and dispersal facility activities; assistance in locating or developing residuals handling facilities.
Training and certification/ licensing	Promote excellence in site evaluation, design, installation, O&M, and other service provider areas.	Recommend use of only state-licensed/certified service providers.	Provide supplemental training and certification/licensing programs; offer continuing education opportunities; monitor performance through inspections; sponsor mentoring programs.
Corrective actions and enforcement	Ensure timely compliance with applicable codes and performance requirements.	Provide for complaint reporting under nuisance laws; inspection and prompt response procedures and penalties.	Deny or revoke operating permit until compliance measures are satisfied; set violation response protocol and legal response actions, including correction and liens against property by RME.

A management framework to address gaps

The management program elements summarized in Table 3 and detailed in the *Decentralized Management Program Elements Fact Sheets* (see Appendix A) provide a useful framework for identifying and addressing potential gaps in the current management approach. It should be noted that Table 3 covers only broad programmatic management activities. The level or intensity of management activities applied to specific systems or groups of systems should be commensurate with the relative risks identified.

For example, implementing only the basic management activities for each program element might be appropriate for systems posing a low risk to public health or water resources, such as new gravity-flow soil infiltration systems installed at low densities on sites with suitable soils. However, advanced management activities would be more appropriate for higher-risk systems such as older systems or those installed at high densities on sites with poor soils, greater slopes and proximity to groundwater or surface waters. The intent is to manage groups of similar systems under a fairly uniform approach. For example, dozens of septic tank and leach field systems installed over two to three years

Training of service providers

Service providers should be professionally trained, licensed, or certified in system design, installation, inspection, operation, and maintenance. The use of certified professionals is endorsed by most wastewater industry organizations, such as the National Onsite Wastewater Recycling Association, the National Environmental Health Association and the National Association of Wastewater Transporters. For more information see the Training and Certification/Licensing Fact Sheet on page 46 and reference #53 on page 54.

Addressing water pollution

Managing water pollution risks posed by onsite systems is a process that includes:

- **Identifying pollutants of concern in the drainage area surface waters or aquifer**
- **Identifying pollutant sources and estimating relative contributions from each source**
- **Determining methods and costs of reducing pollutant contributions**
- **Sharing information and involving the public**
- **Defining what's economically feasible and technically achievable**
- **Determining the pollutant reductions necessary from each identified source or area**
- **Establishing authority to regulate the target sources**
- **Implementing a pollutant reduction strategy**

Use of NPDES permits for onsite systems

National Pollutant Discharge Elimination System (NPDES) permits have been used by some states to regulate onsite sewage discharges, and are required for all systems that discharge to ditches or surface waters. The Clean Water Act authorizes NPDES permits for individual or group dischargers. A state may implement a general NPDES permit program to cover the general class of individual or clustered wastewater systems that discharge to surface waters.

in a residential development would be managed in the same manner if site conditions warrant. This concept allows management programs to be tailored to the setting, whether it is a small rural town or a large jurisdiction such as a township or county. The key is to characterize systems according to their similarities, so that management approaches can be tailored to address the systems specific needs (see the *System Design Fact Sheet* on page 42). Grouping systems by the risks they pose based on location, technology type, and other attributes will help create a useful framework for screening out low-risk systems and focusing on those needing more intensive management.

Implementing the management program

The mix of institutions, procedures, and arrangements involved in a management program varies depending on a host of factors, including enabling legislation, environmental conditions and resources available. Because of this diversity, the outcomes of management efforts are likely to be different across the country. Table 4 provides a framework you can use to explore management issues.

Management programs can range from an informal network of private service providers, public agency staffs, and other partners operating under a coordinated framework, to a highly structured RME (responsible management entity) that owns or maintains a set of treatment systems. The key objective in developing the program is to ensure that it reflects the community's best effort to deal with public health and water resource threats. Developing a viable management program is a case-specific process, highly dependent on the commitment, creativity, and cooperation of the community and the stakeholders.

Many management programs are developed and overseen by local health departments. These programs may include performance-based requirements for design, construction, and operation and maintenance performed by outside contractors or other entities. State and local codes, memoranda of agreement, conditional permits, and maintenance contract requirements should clearly identify how the management program will be executed.

The most intensive management programs are those which rely on RMEs to manage designated systems. An RME is defined as a legal organization with the technical, managerial, and financial capacity to operate and maintain viable decentralized wastewater systems within the RME's jurisdiction. Sanitation and water districts, public/private corporations, public agencies or authorities, and special districts can all function as RMEs. Homeowner associations have proven to be less effective as RMEs because of their large scope of interests, lack of

Consideration of residuals management

Community decentralized wastewater management programs will need an ordinance to specify the frequency of residuals removal, approved service providers, and reporting requirements. The ordinance can require a specific frequency for pumping or inspection to determine if pumping is necessary. Existing management programs use both techniques. For more information see the Residuals Management Fact Sheet on page 45.

technical expertise, and lack of managerial/staffing support for providing wastewater services. Oversight by the local regulatory authority is needed to ensure that the RME complies with federal, state, and local rules regarding system permitting, operation, and maintenance requirements.

U.S. Environmental Protection Agency Onsite Wastewater Treatment Systems Manual. *This comprehensive reference manual is designed to provide engineers and regulators with guidance on the planning, design, and operation of onsite systems. See page 52, reference #34.*

In addition to the necessary legal authority, RMEs should have the technical, managerial and financial expertise needed to ensure system performance over the long term. RMEs can be formed in a variety of ways, which include modifying the missions of existing sanitation districts, public agencies, other public/private service providers, and profit or nonprofit corporations or by creating special districts. The early planning efforts should sort out what type of management entity can be created under specific state laws and determine whether additional enabling ordinances or legislation is necessary.

Table 4. *A framework for exploring management issues*

Issue	Questions to be addressed
Time frame	◆ At what point will the planned management program structure be sustainable? ◆ If the program is sequentially implemented, when will each sequence be completed? ◆ When will the management program be fully operational?
Service area	◆ What areas or which systems will the management program serve? ◆ Are these areas compatible with a local public jurisdiction that would have the necessary powers to make the program effective and sustainable? ◆ Do specific subareas need different management approaches (system designs, staffing, regulatory controls)?
Purpose	◆ What public health and water resource problems will be addressed? ◆ What measurements should be made (monitoring) to verify success?
Structure	◆ Can existing entities be modified or be included in a partnership to provide management services or will a new entity be needed? ◆ Should the management program be limited to decentralized wastewater treatment, or should other water, stormwater, or wastewater infrastructure be included? ◆ How will the program elements of the management program be staffed and administered? ◆ Will formal agreements, ordinances, or other legal mechanisms (articles of incorporation, public charter) be needed to create the structural elements of the program?
Authority and liability	◆ Which systems will be under the jurisdiction of the management program? ◆ Will the onsite treatment systems be privately or publicly owned? ◆ How will future wastewater systems be planned, designed, installed, operated, maintained, inspected, and repaired or replaced? ◆ What is the relationship between the management program and the regulatory authority? ◆ What formal agreements, ordinances or other legal mechanisms (e.g., with system or property owners) are necessary to implement each element of the program? ◆ How will the program be funded (planning, construction and operational phases)?

Integrating wastewater system management

Integrating wastewater planning and management for individual onsite, cluster, and centralized sewage treatment is highly recommended (see the *Planning Fact Sheet* on page 37). The federal Clean Water Act requires areawide wastewater management plans for many urban areas and other areas with water quality problems. It further requires that states conduct an ongoing planning process to ensure that wastewater treatment plans and other water quality control efforts are integrated and updated. Some states have adopted this approach to ensure that centralized and decentralized wastewater services are provided in the most effective manner possible.

Partnerships are helpful to promote wastewater management in your community. Have the stakeholder group explore opportunities to partner with other organizations and agencies. Cooperation and communication can often lead to wastewater improvements. For example, working cooperatively with neighboring communities to address residuals can help the community identify land application sites, wastewater treatment facilities, or other alternatives that can help manage wastewater treatment by-products. Because of environmental impacts linked to onsite and cluster system malfunctions, federal, state and local water resource protection agencies are often interested in partnering with decentralized wastewater programs to ensure that management efforts are locally and regionally coordinated. Consider partnering with:

- Planning/zoning and economic development agencies
- Local water, wastewater, and other public utilities
- State surface water and groundwater bureaus
- State wastewater discharge permitting agencies
- Volunteer water quality monitoring groups
- Onsite system service provider groups

Likewise, you can integrate other programs into your decentralized wastewater management program such as the following:

- Watershed Management
- The National Pollutant Discharge Elimination System
- Biosolids and Residuals Management
- Stormwater Management, Water Quality Management (including Total Maximum Daily Loads, or TMDLs)
- Water Quality Standards
- Source Water Assessment and Protection
- Underground Injection Control
- Coastal Zone Management
- Nonpoint Source Control
- Technology Transfer

Regulatory considerations for onsite programs

All treatment systems that discharge effluent to surface waters through a pipe, swale, drain, tile, or other man-made conveyance must comply with National Pollutant Discharge Elimination System permits and the antidegradation provisions of the federal Clean Water Act.

Treatment systems that discharge effluent below the ground surface and serve 20 or more persons per day – or those that receive commercial or industrial wastes – are regulated as Class V injection wells under the Underground Injection Control Program of the Safe Drinking Water Act. Class V injection wells are authorized by rule, i.e., a permit is not required as long as the system is constructed and operated in a manner that protects underground sources of drinking water and the owner or operator submits basic information about the system to EPA or the state groundwater agency. States can be more stringent and may require additional information or a permit in order to ensure that groundwater is adequately protected.

Treatment systems that cause or contribute to a violation of state or federal water quality standards may be subject to the Total Maximum Daily Load (TMDL) program under section 303 of the Clean Water Act. State or local implementation of TMDLs may require the use of better-performing treatment technologies or more stringent system management to ensure long-term protection of the designated uses of surface waters.

Conducting a reality check

Specifying wastewater system management requirements can be challenging, particularly for existing systems. In general, acceptance of new management activities like inspections, operating permits, and maintenance contracts is greater if:

- Negative health or environmental impacts have been demonstrated
- The impacts have been linked to onsite systems
- The management program will address the impacts

Before launching new program requirements, it helps to conduct a reality check by reviewing data collected during the assessment/analysis phase and sharing it with system owners. Involving the management program stakeholder group is also vital during this phase because the stakeholders' constituencies can help to provide information, explain technical and socioeconomic issues, and tap into community and other organizations that can build support for program implementation. If stakeholders have been directly involved in assessing current conditions, analyzing risk and developing the management program and if they have communicated with their constituents during this process, it is likely that program requirements will be known and generally understood.

Dealing with opposition to management

Some resistance to a new or enhanced management program might emerge because of citizens' reluctance to pay for a service that previously was "free." Past experience indicates that most residents will begin to comply once they recognize that the program is needed to address real community problems. In some cases, delaying (or phasing in) necessary technological upgrades and management services until after a substantial portion of the service population has accepted the program rules can help to create momentum and support.

Working through the underlying concerns such as maintenance costs or private property inspections can be addressed through a number of options, such as providing access to cost-share funds or notifying homeowners in advance of inspections. The best approach in most cases is to proceed with program implementation if there is general public support for the program. Remember to keep communication lines open and honest and express the desire to work with residents to address their concerns. Balancing mandatory compliance with persistent persuasion requires a person-to-person approach and patience, and provides the best guarantee of eventual success.

Prescriptive versus performance onsite system requirements

Most state and local health departments rely on prescriptive codes when issuing permits for onsite systems.

These prescriptive codes typically establish minimum setback distances between treatment system components and property lines, structures, and water resources; establish minimum square footage requirements for infiltration fields; and restrict the type of onsite systems that can be used.

Performance-based codes focus on treatment outcomes rather than system components or their location. The codes do not specify the type of system permitted but rather allow the design of a treatment system to meet the standards.

Performance-based codes are related to environmental sensitivity and are often created in concert with state environmental agencies. A performance-based code might specify pollutant concentration standards for the effluent at some specific point in the treatment process.

RME management is typically needed to ensure compliance with performance-based codes.

*For more information see the **System Design Fact Sheet** on page 42.*

How do we make our plan a reality?

Program implementation

Decentralized wastewater management programs will be as varied as the communities they serve. Each community has different issues and needs, but by targeting planning, design, performance, installation, operation, and maintenance requirements to those areas or system types that pose the most significant threats, the program should achieve its goals (see Figure 5).

Inspecting a septic system.
Photo: Kentucky Department of Health

Consideration of program authority

Legal authority is necessary to carry out an effective management program. In most cases broad legal mandates for onsite programs are vested under state law (see the *Corrective Actions and Enforcement Fact Sheet* on page 48). But when it comes to who can actually manage a wastewater program and under what circumstances special districts or private management entities may be formed, state laws are typically much more specific. For example, West Virginia law specifies three entities that can manage onsite systems, while California statutes authorize more than a dozen entities with the power to manage community wastewater systems.

The authority to carry out an onsite management program can be granted to local entity such as a township or county by local ordinance. Table 5 and Table 6 review the levels of authority required to carry out a management program based on the jurisdiction of the agency.

Figure 7. *Key outcomes of a management plan and implementation strategy*

Address current and future health and water resource risks

Plans for treatment options in new developments

Integrates and coordinates with other wastewater planning efforts

Is sustainable through adequate funding sources and local support

Coordinates with water resource programs, including source water protection, total maximum daily loads, stormwater management, areawide planning

Is continuously monitored and evaluated in order to adapt or improve as necessary

Onsite management authorities in Missouri

In Missouri the Department of Health regulates all single-family-residence wastewater systems and other sources of domestic sewage with flows less than 3,000 gallons per day that discharge to soil or holding tanks. The Department of Natural Resources (DNR) regulates systems with flows of 3,000 or more gallons per day, systems treating industrial facilities, and systems that discharge to surface waters except single-family systems discharging to lagoons. This “split” responsibility is typical for most states.

The DNR permits clustered systems. The agency requires the designation of a “continuing authority” defined by state rules before an operating permit is issued. The continuing authority is a permanent organization responsible for the operation, maintenance, and upgrading of the cluster system. The hierarchy of acceptable continuing authorities is listed in preferential order in the Missouri regulation. In recent years the legislature created an option of forming a nonprofit sewer company and establishing management guidelines on a watershed basis. For more information see page 49, reference #7 for a link to the Missouri law.

Table 5. *Public institutions as onsite management entities*

Program considerations	State agency	County	Municipality	Sanitation or special district	Improvement district	Public authority
Authority	Enforcement of state laws and regulations.	Enforcement of state codes, county ordinances.	Enforcement of municipal ordinances and state/ county codes.	Powers defined; may include code enforcement.	State statutes define extent of authority.	Duties specified in enabling instrument.
Financing capabilities	Usually funded through appropriations and grants.	Able to charge fees, assess property, levy taxes, issue bonds, appropriate general funds.	Able to charge fees, assess property taxes, issue bonds, appropriate general funds.	Able to charge fees, assess property taxes, issue bonds.	Can apply special property assessments, user charges, other fees; can sell bonds.	Can issue revenue bonds, charge user and other fees.
Advantages	Authority level and code enforceability high; programs can be standardized; scale efficiencies.	Authority level and code enforceability are high; programs can be tailored to local conditions.	Authority level and code enforceability are high; programs can be tailored to local conditions.	Flexible, renders equitable service (only those receiving services pay); simple and independent approach.	Can extend public services without major expenditures; service recipients usually supportive.	Can provide service when government is unable to do so; autonomous, flexible.
Disadvantages	Sometimes not sensitive to local needs and issues; often leaves enforcement up to local entities.	Sometimes unable to provide service, conduct enforcement; debt limits could be restrictive.	Might lack legal, financial, or other resources, thus needing special ordinances.	Could promote duplication/ fragmentation of public services.	Could contribute to fragmentation of government services; can result in initial administrative delays.	Financing ability limted to revenue bonds; local government must cover debt.

Funding management activities

Funding Decentralized Wastewater Systems Using the Clean Water State Revolving Fund. *A fact sheet that explains the Clean Water State Revolving Fund and activities that can be funded. See page 50, reference #8.*

Financial support for management programs is available through grant programs, low-interest loans, or service contracts (see the *Financial Assistance/Funding Fact Sheet* on page 38). A review of funding options reveals that user fees or service charges typically cover operational expenses for management programs (see Tables 7 and 8). If construction is required to install cluster systems or replace significant numbers of existing septic systems, loans, grants or both will likely be needed. Public-private partnerships are also a good source of funding support. Private partners include commercial wastewater sources, because these generators have the most to gain from a successful wastewater management program. The federal government is another source of funding. For example, a public or privately owned/operated RME is eligible under federal guidelines to receive EPA Clean Water State Revolving Fund (SRF) loans. However, many states have not yet implemented the rules needed to authorize these loans for decentralized wastewater programs.

Table 6. *Public/private corporations as management entities*

Management considerations	Public nonprofit corporation	Private nonprofit corporation	Private nonprofit corporation
Authority	Powers are specified in articles of incorporation.	Powers specified in articles of incorporation (homeowner association).	Powers specified in articles of incorporation.
Financing capabilities	Can charge fees; sell stock; issue bonds; accept grants and loans.	Can charge user fees; accept grants and loans.	Can charge fees; sell stock; accept some grants and loans.
Advantages	Can provide service when government is unable to do so; autonomous, flexible.	Can provide service when government is unable to do so; autonomous, flexible.	Can provide service when government is unable to do so; autonomous, flexible.
Disadvantages	Building support for this concept may be challenging.	Range of powers and services likely limited; must partner with empowered entity.	Company might not be fiscally viable; not eligible for some major grant or loan programs.

The following entities have provided support for decentralized programs and facilities in the past. Use the information links below to contact these agencies regarding your program needs:

U.S. Environmental Protection Agency

- The Clean Water State Revolving Fund (CWSRF) is a low- or no-interest loan program that has financed sewage treatment plants across the nation.
  Web site: ***www.epa.gov/owm/cwfinance/cwsrf*** *Phone:* ***202-564-0752***
- The Catalog of Federal Funding Sources for Watershed Protection is a searchable database of financial assistance sources (grants, loans, cost-sharing) available to fund watershed protection projects.
  Web site: ***http://cfpub.epa.gov/fedfund/***
- The Environmental Finance Program provides financial technical assistance to the regulated community and advice and recommendations on issues, trends and options.
  Web site: ***www.epa.gov/efinpage/*** *Phone:* ***(202) 564-4994***
- The Nonpoint Source Pollution Program can support a wide range of nonpoint pollution abatement projects including onsite wastewater system projects.
  Web site: ***www.epa.gov/owow/nps/319hfunds.html*** *Phone:* ***(202) 566-1163***

Financing onsite systems in Pennsylvania

State financing programs for onsite systems often merge various funding streams to provide an accessible, easy-to-use support mechanism for individual system owners. The Pennsylvania Infrastructure Investment Authority (PENNVEST) provides low-cost financing for systems on individual lots or within entire communities. Teaming with the Housing Finance Agency and the Department of Environmental Protection, PENNVEST created a low-interest loan program for low- to moderate-income homeowners. The $65 application fee is refundable if the project is approved. The program can save system owners $3,000 to $6,000 in interest payments on a 15-year loan of $10,000. Since 1999 PENNVEST has approved 230 loans totaling $3.5 million. The program is financed by revenue bonds, special statewide referenda, the state general fund, and the State Revolving Fund. For more information see page 50, reference #12.

U.S. Department of Agriculture

> **Funding onsite systems and management in Massachusetts**
>
> Massachusetts has developed three onsite management funding programs. The first program provides low-interest loans to homeowners to address onsite system problems. Another program provides tax credits of up to $6,000 ($1,500 per year) to defray the cost of system repairs for a primary residence. Finally, the Comprehensive Community Septic Management Program, sponsored by environmental, finance and housing agencies, provides low-interest loans for long-term community, regional, or watershed-based solutions to system malfunctions in sensitive environmental areas. Loans of up to $200,000 (and more, in some cases) are available and are repaid by the communities and homeowners that participate in the program. Funds for these programs include the State Revolving Fund loan program, state general funds, and loans from area banks. For more information see page 50, reference #13 and #14.

- The Rural Housing Service makes funding available to low- and moderate-income rural Americans to acquire homes through several loan and grant guarantee programs.
  Web site: ***http://www.rurdev.usda.gov/in/loansandgrants.htm***
- The Home Repair Loan and Grant Program is for low-income families that own homes in need of repair and offers loans and grants for renovation. Loans are for up to 20 years at one percent interest.
  Web site: ***http://www.rurdev.usda.gov/rhs/sfh/brief_repairloan.htm***
- The Rural Utilities Service loans assist public or nonprofit entities developing water and waste dispersal systems in rural areas and towns with populations of no more than 10,000.
  Web site: ***www.usda.gov/rus/water/programs.htm***
- The Rural Business-Cooperative Service provides guaranteed loans to help create jobs and stimulate rural economies. This program provides guarantees for up to 90 percent of a loan made by a commercial lender.
  Web site: ***www.rurdev.usda.gov/rbs/busp/b&i_gar.htm***

U.S. Department of Housing and Urban Development

- Community Development Block Grants provide annual grants for community development to smaller cities and counties for rehabilitating residential and nonresidential structures, constructing public facilities, and improving water and sewer facilities, including onsite systems.
  Web site: ***www.hud.gov/cpd/cdbg.html*** *Phone:* ***(202) 708-1112***
- The Appalachian Regional Commission helps communities to fund the development of onsite programs.
  Web site: ***www.arc.gov*** *Phone:* ***(202) 884-7799***

Tribal Sources

- The EPA Clean Water Indian Set-Aside Program administers grants in cooperation with the Indian Health Service to address tribal sanitation needs.
  Website: http://www.epa.gov/owm/mab/indian/cwisa.htm Phone: (202) 564-0621
- The Indian Health Service–Sanitation Facilities Construction Program administers the Sanitation Facilities Construction Program to deliver environmental engineering and sanitation facilities to Native Americans.
  Web site: ***www.dsfc.ihs.gov*** *Phone:* ***(301) 443-1046***
- RCAP Native American Program services include onsite technical assistance to address drinking water supply and wastewater treatment needs, including decentralized wastewater training, construction and repair, operator certification, income, and rate surveys.
  Web site: ***www.rcap.org*** *Phone:* ***(202) 408-1273***

Table 7. *Advantages and disadvantages of various funding sources*

Source	Description	Advantages	Disadvantages
Loans	Money lent with interest; can be obtained from federal, state and commercial lending institutions.	State and federal agencies can often issue low-interest loans with a long repayment period. Loans can be used for short-term financing while waiting for grants or bonds.	Loans must be repaid with interest. Lending agency might require certain provisions to ensure repayment of the debt. Commercial loans typically are available at high interest rates and might be difficult to obtain without adequate collateral.
Grants	Funds awarded to pay for some or all of a community project.	Funds do not need to be repaid. Small communities might be eligible for many different grants to build or upgrade their wastewater facilities.	Requires time and money to manage. Wage standards may apply increasing project expense. Might require use of material/design requirements that exceed local standards resulting in higher costs.
General obligation bonds	Bonds backed by the full faith and credit of the issuing entity. Secured by the taxing powers of the issuing entity. Used by local governments.	Interest rates are usually lower than those of other bonds. Offers considerable flexibility to local governments.	Community debt limitations might restrict use. Voters often must approve of using these bonds. Usually used for facilities that do not generate revenues.
Revenue bonds	Bonds repaid by the revenue of the facility.	Can be used to circumvent local debt limitation.	Do not have full faith and credit of the local government. Interest rates may be higher than those of general obligation bonds.
Special assessment bonds	Bonds payable only from collection of special assessments.	Removes financial burden from local government. Useful when direct benefits can be identified.	Might be costly to some landowners and inappropriate in areas with nonuniform lot sizes. Interest rate may be high.
Bondbank monies	States use taxing power to secure a large-issue bond that can be divided among communities.	States can secure bond at a lower interest rate. The state may issue the bond in anticipation of community need.	Many communities compete for limited amount of bond bank funds.
Certificates of partici-pation (COPs)	Certificate that may be issued by a community to several lenders that participate in the same loan.	Costs and risks spread out over several lenders. In some cases COPs may beissued when bonds would exceed debt limitations.	Involve complicated agreements among participating lenders.
Note	A written promise to pay a debt.	Method of short-term financing while a community is waiting for a grant or bond.	Community must be certain of receipt of the grant money. Notes are risky because voters must approve general obligation bonds before they are issued.
Property Assessment	Direct fees or taxes on property. May include grant and bond anticipation notes. Sometimes referred to as an improvement fee.	Useful when benefits from capital improvements are identifiable. May be used to reduce local-share debt requirements for financing. May be used to establish a fund for future capital investments.	Initial lump sum payment of assessment might be a significant burden on individual property owners. Some states and localities restrict the allowable burden on individuals.
Connection fees	Charges assessed for connection to existing system.	Connection funded by beneficiary. All connection costs might be paid.	Might discourage development. Can be restricted by state and local laws.
Impact fees	Fees charged to developers.	Paid for by only those who profit. Funds may be used to offset costs.	Might reduce potential for development. Can be restricted by state and local laws.

Table 8. *Fee-for-service management agency examples*

Services provided	Service providers	Typical costs to owner
Maintenance reminders. Complaint response.	County health department staff. Owner pays for maintenance services needed.	Negligible
Inspection upon title transfer.	County health department staff. Contracted licensed inspector.	~ $75 to $150 at the time of sale
Inspection every 2 to 5 years. Tank pumped out at time of inspection. Effluent screen cleaned or replaced annually.	County health department staff. Contracted operation and maintenance service providers.	~ $25 quarterly
Inspection of system every year. Effluent screen cleaned or replaced annually. Tank pumped out every 5 years.	County health department staff. Contracted operation and maintenance service providers.	~ $30 to $40 quarterly
Inspection of system every six months. Effluent screen cleaned & replaced annually. Tank pumped out every 5 years.	County health department staff. Contracted operation and maintenance service providers.	~ $15 per month
System inspections as needed. On-call service for problems. Repair of faulty system components. Replacement of system if needed.	Responsible management entity. Contracted service providers.	~ $30 to $35 per month; other charges for repairs or replacement

A Responsible Management Entity (RME) may...

- **Purchase, lease and rent real and personal property**
- **Access and inspect the systems it manages by covenant ordinance or other instrument**
- **Apply for and receive loans and grants for construction of facilities**
- **Enter into contracts, undertake debt obligations, borrow funds, and issue stock or bonds**
- **Establish and collect charges for system usage or oversight**
- **Make rules and regulations regarding the use of systems**
- **Ensure the repair or replacement of malfunctioning systems**

Selecting a management entity

In some cases a community might choose to adopt a basic management approach by selecting management actions to target problem systems, track compliance, and respond to noncompliant owners through a stepwise approach such as (1) notification and persuasion, (2) technical/financial assistance, and (3) enforcement action. In other cases, a community might opt for a more advanced management approach through a Responsible Management Entity (RME). RME management has been the preferred option for areas with very intensive management needs, and it is best suited to areas that include cluster systems (see the *Operation and Maintenance Fact Sheet* on page 44). The common ownership of collection lines and larger treatment and dispersal systems typical of cluster facilities make a "single manager" RME approach preferable. These management entities can also handle individual onsite systems within their jurisdiction and seek to maximize the number of dwellings served in order to be financially sustainable.

Creating a centralized management entity will be a new undertaking for many localities. States and communities can consider several options. In some cases, a management partnership—coordinated by the regulatory authority and supported by local planning agen-

A Guide to the Public Management of Private Septic Systems. *Communities can use this handbook to examine their wastewater treatment options and design a unique program that meets their needs. See page 51, reference #20.*

cies, service providers, and public agencies—might provide the best option to oversee and implement a program. Another option is to enlist an existing sanitation or other special district to provide a solid base of support for management functions like planning, installation, operation and maintenance, inspection, enforcement, and financing. For example, a sanitation district could be responsible for regional planning, inspecting systems, and ensuring system maintenance such as tank pumping and residuals reuse/dispersal, while the health department would retain authority over approving system designs, issuing permits, and overseeing construction.

Enforcement Authority and Tools

Enforcement authority can be granted through

- **State enabling legislation**
- **Municipal ordinances/ codes**
- **Local health board powers to abate nuisances and provide public health services.**

Onsite management programs use a variety of enforcement tools to compel compliance, from citations and property liens to turning off water service.

Public service providers such as utility districts can also serve as a management entity. Private or public RMEs have been created to manage the full range of decentralized system management activities—from regional planning and system permitting to inspection and enforcement. RMEs can relieve the strain on the regulatory authority by engaging in fee-for-service activities with only occasional compliance support from or intervention by the regulatory authority. The approach selected will be unique and based on each community's situation.

System inspections are a key component of management programs, Clogged septic tank effluent filters (above) can trigger calls for needed service, but regular inspections tailored to system type, setting, and use profile provide a better approach for ensuring long-term system performance.

Septic System Checkup: The Rhode Island Handbook for Inspection. *A Handbook with instructions for gathering septic system records, locating components, diagnosing minor in-home plumbing problems, conducting flow trials, dye tracing, and maintenance scheduling.* *See page 54, reference #56.*

Creation of an onsite management district in Colorado

In 1969 the Crystal Lakes Development Company began building a residential community 40 miles northwest of Fort Collins, Colorado. Three years later the company sponsored the creation of the Crystal Lakes Water and Sewer Association to provide drinking water and sewage treatment services to the growing community. Membership in the Association is required of all lot owners, who must also obtain an onsite system permit from the Larimer County Health Department. The Association enforces county health covenants, assists in system design and installation, monitors surface water and groundwater, and has developed guidelines for inspections, which are conducted at the time of property transfer. The Association conducts preliminary site evaluations for proposed treatment systems.

The county health department has also authorized the Association to design systems. The Association manages wastewater treatment for more than 100 permanent dwellings and 600 seasonal residences. Management services are provided for all systems in the development, including 300 holding tanks, seven community vault toilets, recreational vehicle dump stations, a lodge, offices, a restaurant, and a cluster system that serves 25 homes on small lots. The Association is financed by annual property owner dues of $90 to $180, and a $25 property transfer fee, which covers inspections. For more information see page 53, reference #38.

A formal program evaluation includes:

- An evaluation team composed of stakeholders
- A review of goals, objectives, and operational components of the various management program elements using a checklist to identify which program elements already exist and evaluate whether they are meeting their objectives
- A review of the program elements and feedback collected from staff and stakeholders to determine the level of progress toward goals and objectives and to assess current status, trends, administrative processes, and cooperative arrangements with other entities.
- Identifying program elements in need of improvement, as well as actions or amounts and types of resources needed to address deficient program areas
- Identifying sources of additional support or assistance to improve program performance
- Communicating suggested improvements to program managers for consideration in program structure and function

Evaluating the program

Septic System Checkup: The Rhode Island Handbook for Inspection. *A Handbook with instructions for gathering septic system records, locating components, diagnosing minor in-home plumbing problems, conducting flow trials, dye tracing, and maintenance scheduling. See page 54, reference #56.*

Monitoring of program performance is key to effective decentralized wastewater management. The management authority should regularly review inspection reports, water quality monitoring data, customer complaints, and fee structures to track the progress of the management program in achieving goals and objectives. Although an annual management program review is recommended, the management program should be able to make interim adjustments in response to unanticipated problems that arise during the course of normal operations.

The 13 program elements listed in Appendix A provide a framework for reviewing and adapting management approaches. The evaluation method you choose for each program, like the program itself, will depend on local circumstances, the types and number of stakeholders involved, and the level of support by management agencies.

Additional information and resources

This handbook should be used in tandem with the EPA *National Voluntary Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems* (see reference #4) as a starting point for developing and implementing an effective decentralized wastewater treatment management program. EPA has also developed information on decentralized wastewater treatment management to supplement this handbook. The information is available on the EPA web site at www.epa.gov/owm/onsite. Information is also available from the EPA cooperating partners listed on page 55.

There is no “cookie-cutter” approach for improving decentralized wastewater system management. By following the steps outlined in this handbook and using the resources listed in appendices A and B along with supplemental materials on EPA’s web site, you can develop the program that best fits the needs and resources of your community.

EPA FACT SHEETS

Decentralized Wastewater Management Program Elements

Program Management Elements

Administration

1. Public education
2. Planning
3. Performance requirements
4. Recordkeeping and reporting
5. Financial assistance

Installation

6. Site Evaluation
7. System design
8. Construction and installation

Operation and Compliance

9. Operation and maintenance
10. Residuals management
11. Training and certification/ licensing
12. Inspections and monitoring
13. Corrective actions and enforcement

Develop or enhance decentralized wastewater treatment management program

FACT SHEET 1

Public Education and Participation

Decentralized wastewater management programs require public support. The success of these programs will depend on how well homeowners, system service providers, and other stakeholders are involved in the development process. Unless people understand the need for a management program, there is little chance it will be adopted. Once in operation, the program must keep the community involved and informed to perform at its best.

Relationship to Other Program Elements

Involving and educating homeowners, service providers, and the public will set the groundwork for how well a management program is received and ultimately how well it performs. Public awareness is particularly crucial when it comes to initiating several management program elements including planning, inspections/monitoring, operation/maintenance, corrective actions, and financial assistance.

Options

Public education and participation can be implemented by regulatory agencies or through cooperative actions supported by program partners. The figure below shows the varying approaches to public education and participation.

Public Education and Participation Approaches

Basic	➤ Promote public awareness of management program development and rule revisions. ➤ Distribute multimedia materials on basic system operation and maintenance needs. ➤ Reminders sent to owners when operation and maintenance should be scheduled.
Intermediate	➤ Public involvement in program development and annual program reviews. ➤ Develop locally specific educational materials including information on watershed impacts. ➤ Provide users with lists of approved service providers. ➤ Provide information through workshops, fairs, schools, and other events to educate system owners on them on operation and maintenance, health and environmental impacts, causes of malfunction, and program procedures.
Advanced	➤ Involve public in program development, annual program reviews, and public education and outreach efforts. ➤ Educate homeowners about management program advisory boards, variance and complaint review panels. ➤ Work with homeowners in system design phase and during inspections to optimize management program performance and acceptability. ➤ Conduct outreach programs at civic, school, and other events to answer questions and obtain feedback from citizens.

Examples

In south Deschutes County, Oregon, a decentralized wastewater project determined that education was the key to public support of the maintenance program. The project team involved and educated homeowners, real estate professionals, and building contractors through a one-hour training session that provided continuing education unit credits for real estate professionals.

Key Evaluation Questions

- What are your outreach objectives, messages, target audiences, and communication venues?
- Which activities would benefit from public or partner involvement, and how can we implement them?

FACT SHEET 2

Planning

Planning can be used to integrate management strategies for areas served by both centralized and decentralized wastewater treatment facilities. Integrating wastewater planning functions provides better long-term management of facilities and can help local officials deal with a number of needs such as sewer overflows, NPDES effluent limitations, Total Maximum Daily Loads, and antidegradation requirements. Variables to consider during the planning process include wastewater flows, proximity and uses of nearby water resources, landscape topography, hydrology, hydrogeology, soils, environmentally sensitive areas, system options and locations, population densities, and need/potential for clustering treatment/reuse facilities.

Relationship to Other Program Elements

Planning is the foundation for many program elements including the establishment of local performance requirements and criteria used for site evaluation, system design, construction, inspections, operation and maintenance, and residuals management .

Options

Planning can be implemented by enhancing existing planning and zoning programs or through integrated wastewater facility planning. The figure below shows the varying approaches to planning.

Planning Approaches	
Basic	➤ Work with local and regional planning agencies to access and utilize information such as soils data and planning requirements.
Intermediate	➤ Assess vulnerabilities of receiving waters. ➤ Identify treatment standards based on health and water resource risks.
Advanced	➤ Establish overlay treatment zones based on environmental sensitivity and potential health impacts. ➤ Identify cluster system opportunities for existing and new developments.

Example

In Prince George's County, Maryland, the Department of Environmental Resources and the Health Department worked together to develop geographic information system (GIS) tools to quantify and mitigate nonpoint source nutrient loadings to the lower Patuxent River, which empties into the Chesapeake Bay. The agencies developed a database of information on existing onsite systems, including system age, type, and location, with additional data layers for depth to ground water and soils. The resulting GIS framework allows users to quantify nitrogen loadings and visualize likely impacts under a range of management scenarios to be used to manage wastewater in new developments.

Key Evaluation Questions

- Do current land use planning and zoning approaches consider the full range of wastewater treatment options?
- Are centralized and decentralized wastewater planning and management approaches integrated?

FACT SHEET 3

Performance Requirements

Performance requirements for systems are derived by characterizing the risks they pose to health and water resources and by setting pollutant loading limits based on limiting those risks to specific levels. Performance requirements specify objectives for each wastewater management system, which may include physical, chemical, and biological process components. Performance compliance is based on cumulative, extrapolated pollutant removals for the various system components (e.g., septic tank, suspended growth or fixed film reactors, lagoons, wetlands, soil, disinfection). Performance can be measured via numeric or narrative criteria. Numeric criteria reflect time-based mass loadings or pollutant concentration limits designed to protect sensitive water resources. Pollutants commonly targeted in performance requirements include nutrients, bacteria, oxygen demand, and solids.

Relationship to Other Program Elements

Performance requirements are derived from planning goals and projected system impacts, site evaluations, system design, inspections/monitoring, and operation/maintenance.

Options

Performance requirements can be implemented through regional analysis, planning, statutes, ordinances, and actions by the regulatory authority. The figure below shows the varying approaches to performance requirements.

Performance Requirements Approaches	
Basic	➤ Prevent direct and indirect contact with wastewater through prescribed site requirements, hydraulic loading restrictions, and separation distances. ➤ Designate specific and acceptable system designs.
Intermediate	➤ Specify alternative technologies for certain sites or conditions that do not meet prescribed requirements. ➤ Establish inspection and maintenance reporting requirements based on system type and performance desired.
Advanced	➤ Identify water resource uses and characterize surface and groundwater quality. ➤ Evaluate cumulative impacts/allotments for all sources of critical pollutants. ➤ Establish numeric and narrative performance requirements for onsite/decentralized systems based on water quality criteria and assimilative capacity of land and water resource(s). ➤ Develop protocols and frequencies for measuring (monitoring/ inspections) compliance.

Examples

Massachusetts' onsite regulations designate several specific areas as "nitrogen-sensitive." Onsite systems in those areas must remove at least 40 percent of the influent nitrogen loading. Restrictive maximum discharge flows are specified per acre/day unless the treatment systems can meet certain specific requirements for nitrogen reduction.

Key Evaluation Questions

- Which water resources receive treated effluent and what are their uses and protection criteria?
- What loading limits should apply to which systems, given the cumulative and mass pollutant loads expected?
- How can we implement or apply these loading or concentration limits to treatment systems (e.g., through permits)?

FACT SHEET 4

Recordkeeping, Inventories, and Reporting

System inventories provide the nuts and bolts for onsite management. Basic system information—GIS location, type, design capacity, owner, installation, and servicing dates—is essential to an effective program. The best recordkeeping programs feature integrated electronic databases with field unit data entry (i.e. using a hand-held PDA), save-to-file CAD drawings, and user-specified reporting formats.

Relationship to Other Program Elements

Data collection and inventories provide information for planning and support establishment of performance requirements for critical areas. All program elements rely on system inventories, reports, and similar data—particularly planning, inspections/monitoring, operation/maintenance, and compliance/enforcement.

Options

Recordkeeping, inventories, and reporting are implemented by management agencies and RMEs. The figure below shows the varying approaches to recordkeeping, inventory and reporting.

Recordkeeping, Inventories, and Reporting Approaches	
Basic	➤ Maintain system inventory, site evaluation, construction permit, and inspection files. ➤ Conduct maintenance reminder and public education programs.
Intermediate	➤ Develop reporting approaches to collect operation and maintenance information from service providers and from inspections, in addition to system inventory. ➤ Institute electronic reporting and database system for operating permit program actions.
Advanced	➤ Provide system inventory and tracking system as an intermediate approach with watershed characterization information and data to assist staff and state agency. ➤ Develop interactive, real-time information tracking programs to maximize productivity. ➤ Track watershed and groundwater trends. ➤ Facilitate reporting to oversight agencies and maximize public education/involvement.

Examples

Cuyahoga County, Ohio developed a Microsoft Access Database to enter, access, and track permits, system drawings, evaluation results, and other information on each onsite system. The database allows the county to respond to homeowner and service provider questions and send out tank pumping reminders as needed.

Key Evaluation Questions

- Does our tracking system for new permits contain GIS location, system size and type, installation date, design capacity, and other key data (system components, site evaluation report, facility type)?
- How do we report, track, and manage data on inspections, repairs, pumpouts, and other services?
- Can our data be used for new development planning and generating service reminders?
- Are we coordinating our inventory and reporting systems with those of our partners (e.g., planning office)?
- Can we use our data to track service provider performance, training needs, and identify other management needs?

FACT SHEET 5

Financial Assistance and Funding

Financial assistance is needed to:

1) Develop or enhance a management program.
2) Provide support for the construction and modification of wastewater facilities.
3) Support operation of the program.

Funding for program development and operation is often available from public and private loan or grant sources, supplemented by local matching funds. It can also be derived from some form of resource sharing among management program partner organizations such as planning departments or health and water resource agencies. Developing a responsible management entity (RME) and financing for the construction and operation of facilities require larger investments which might come from grants and loans. Long-term operating costs are usually borne by system users through payment of fees and tax assessments.

Relationship to Other Program Elements

Program funding and other financial support is essential to develop, implement, and maintain a management program. All program elements depend on cash or in-kind support.

Options

Funding support can be acquired through grants, loans, user fees, and other assessments. The figure below shows the varying levels of financial assistance approaches.

Financial Assistance and Funding Approaches	
Basic	➤ State/local governments provide necessary legal and administrative support to conduct all aspects of the management program.
Intermediate	➤ State/local funds support basic administrative and other costs. ➤ Work with state, tribal, or local governments and local lending institutions to develop low interest loan programs. ➤ Provide guidance to help owners seek funding for system upgrades or replacement.
Advanced	➤ State/local funds support basic administrative and other costs. ➤ Grants, cost-share funds, low-interest loans, or other programs help low income owners pay for system repairs or replacement. ➤ User fees cover inspections, repair, replacement, operation and maintenance costs, and a sinking fund to cover future infrastructure needs.

Examples

The Commonwealth of Massachusetts has developed three programs that help finance onsite systems and management programs. The loan program provides loans at below-market rates. Another program provides a tax credit of up to $4,500 over three years to defray the cost of system repairs for a primary residence. Finally, the Comprehensive Community Septic Management Program provides funding for long term community, regional, or watershed-based solutions to system malfunctions in sensitive environmental areas. Low interest management program loans of up to $100,000 are available.

Key Evaluation Questions

- ➤ What management activities and infrastructure needs require funding, financing, or other support?
- ➤ Are some essential management activities or infrastructure needs underfunded? By how much?
- ➤ Where can funding for these activities or facility components come from?

FACT SHEET 6

Site Evaluation

Evaluating a proposed site in terms of its environmental conditions, physical features, and characteristics provides the information needed to size, select, and locate the appropriate wastewater treatment system. Regulatory authorities issue installation permits based on the information collected and analyses performed during the site evaluation. Prescriptive site evaluation, design, and construction requirements are based on experience with conventional septic tank/soil absorption systems and empirical relationships that have evolved over the years. A soil analysis using core sampling to a depth of 4-6 feet or a backhoe pit, rather than a simple percolation test, provides the best approach for assessing soils, seasonal water table fluctuations, and other subsurface site features. Performance-based approaches require a more comprehensive site evaluation. Site evaluation protocols may include presently employed empirical tests, specific soil properties tests and soil pits to characterize soil horizons, mottling, and a variety of other properties.

Relationship to Other Program Elements

Site evaluations that consider soils, slopes, water tables, surface hydrology, overall system densities, and other features provide the basis for system design and help to focus on planning and the establishment of performance requirements.

Options

Site evaluation protocols are adopted by the regulatory authority and implemented through training, outreach, and certification/licensing programs. The figure below shows the varying approaches to site evaluation.

Site Evaluation Approaches	
Basic	➤ Require assessment of site hydraulic acceptance and other physical features, including slope and vertical and horizontal setbacks for soil-based systems to determine compliance with prescriptive rules. ➤ Require licensed/certified site evaluators.
Intermediate	➤ Prescribe a broader set of site conditions to permit prescribed alternative technologies. ➤ Require third-party licensed/ certified site evaluators. ➤ Designate alternative systems for sites not meeting conditions prescribed for conventional systems.
Advanced	➤ Provide supplemental protocols for assessing site assimilative and treatment capacity keyed to local hydrogeology and critical pollutants. ➤ Characterize critical design and performance requirements and system boundaries. ➤ Provide supplemental certification/licensing training for site evaluators to meet local needs.

Examples

In 1997, Texas eliminated percolation test requirements for onsite systems and instituted new performance requirements for alternative systems such as drip systems, intermittent sand filters, and leaching chambers. Site evaluations in Texas are now based on soil and site analyses. Service providers must also be certified. State officials took these actions after onsite system installations nearly tripled between 1990 and 1997.

Key Evaluation Questions

- What are the current site evaluation procedures and how are they linked to various system design options?
- Who is authorized to conduct site evaluations and what are the education, training, or certification requirements?

FACT SHEET 7

System Design

Decentralized wastewater treatment system design requirements focus on protection of public health and water resources. However, systems should also be affordable and aesthetically acceptable. Prescriptive codes that specify standard designs for sites meeting minimum criteria simplify design reviews but limit development options and the potential for meeting performance requirements. Where management programs rely on the state code for design, there may not be any need for special design protocols. However, in sensitive environments where performance codes are employed, there is a need to include a design protocol even if it only expands the number of prescriptive system choices and site parameters for sites that do not meet the conditions for conventional systems. Design protocols should address the potential implications of water conservation fixtures, impacts of different pretreatment levels on hydraulic and treatment performance of soil-based systems, and the operation and maintenance requirements of different pretreatment and soil dispersal technologies.

Relationship to Other Program Elements

System designs are based on the program elements of performance requirements, site evaluations, and planning-level considerations. System design will also affect the inspection/monitoring elements of a management program as well as operation/maintenance requirements.

Options

System designs are developed by certified professionals or the regulatory authority. The figure below shows the varying approaches to system design.

System Design Approaches	
Basic	➤ Design only conventional septic tank/gravity-flow soil treatment systems on sites meeting code-described prescriptive criteria. ➤ Require state certified/ licensed designers.
Intermediate	➤ Allow limited number of alternative designs on certain code-specified non-compliant sites. ➤ Require state certified designers; provide potential for engineered alternative designs for larger and cluster systems.
Advanced	➤ Institute protocols for use of risk-based designs based on site evaluation results, specific wastewater sources, planning considerations, and receiving water uses ➤ Provide supplemental training and licensing/certification for designers based on specific needs of local water resources.

Examples

The New England Interstate Water Pollution Control Commission adopted a regional, interstate process for reviewing proposed wastewater treatment technologies. A technical review committee evaluates innovative and alternative technologies as well as system components that replace part of a conventional system, modify conventional operation or performance, or provide a higher level of treatment than conventional onsite systems.

Key Evaluation Questions

- What sort of system designs are allowed on which type of sites and who develops the system design?
- Is there a need to adopt a performance design approach or to expand the type of systems and sites allowed?
- If more complex designs are permitted, how can we assure that they are competently reviewed?

FACT SHEET 8

Construction/Installation

Poor installation can adversely affect performance of both conventional and advanced systems that rely on soil dispersion and treatment. Most jurisdictions allow installation or construction to begin after issuance of a construction permit, which occurs after the design and site evaluation reports have been reviewed and approved. Performance problems linked to installation/construction are typically related to soil moisture conditions during construction, operation of heavy equipment on soil infiltration areas, use of unapproved construction materials (e.g. unwashed aggregate containing clay or other fines), and overall construction practices (e.g. altering trench depth, slope, length, location). The impacts of improper installation of soil-based systems generally occur within the first year of operation in the form of wastewater backups. Some improper construction practices may not be as evident, and may take years to manifest themselves in the form of degraded groundwater or surface water. Inspections by the regulatory authority or other approved professional should be conducted at several stages during the system installation process to ensure compliance with design and regulatory requirements.

Relationship to Other Program Elements

The primary program element linked to installation of the system is training, certification and licensing of installers.

Options

Construction and installation of systems is typically coordinated by the regulatory authority through the permitting, inspection, and oversight process. The figure below shows the varying approaches to construction/installation.

Construction/Installation Approaches	
Basic	➤ Construction permit based on code-compliant site evaluation and system design. ➤ Installation by trained professionals. ➤ Inspection of system prior to backfilling to confirm installation complies with design.
Intermediate	➤ Use of more proactive measures such as pre-construction meeting at site with owner, installer during all phases of construction. ➤ Maintain certification/licensing and training requirements for installers.
Advanced	➤ Provide extensive construction oversight for all critical steps such as field verification and staking of system components; inspections after backfilling and installation are complete. ➤ Supplemental training for installers on difficult sites and new technologies. ➤ Verification and database entry of as-built drawings and other installation information.

Examples

The Responsible Management Entity (RME) for Shannon City, Iowa uses its trained and certified staff or USDA Rural Development staff to provide construction oversight. Final pre-cover inspection and permitting are also performed by the Union County Sanitarian.

Key Evaluation Questions

- Are installers trained and certified/licensed to build or install the type of systems they are working with?
- Do inspectors visit the site before, during, and after installation to verify that design directives were followed?
- Are records of system design, location, installer, owner, and as-built drawings kept in permanent files?
- Is advanced training available for installers who work with new technologies, difficult sites, and other challenges?

FACT SHEET 9

Operation and Maintenance

O&M for most systems includes some user awareness of inputs that might impact treatment processes, such as strong cleaners, lye, acids, biocides, paint wastes, oil and grease, etc. Gravity flow soil-infiltration systems require little O&M beyond limiting inputs to normal residential wastes, cleaning effluent screens/filters, and periodic (e.g. every 3–7 years) tank pumping. Systems employing advanced treatment technologies and electromechanical components require more intensive O&M attention, e.g., checking switches and pumps, measuring and managing sludge levels, monitoring and adjusting treatment process and system timers, checking effluent filters, monitoring effluent quality, and maintaining disinfection equipment. Operators and service technicians should be trained and certified for the types of systems they will be servicing; services should be logged and reported to the management program so that long-term performance can be tracked. The use of a dial-up modem or Internet-based monitoring equipment can improve operator efficiency and performance tracking when large numbers of systems are involved.

Relationship to Other Program Elements

O&M is linked most closely to system design, inspection and monitoring, residuals management, performance requirements, and recordkeeping and reporting. O&M also relates to training and certification for service providers.

Options

O&M can be implemented through homeowner education (for simple gravity-driven, soil-based systems), trained service providers (for more complex systems), or RMEs (for systems owned/operated by a responsible management entity). The table below summarizes basic, intermediate, and advanced approaches.

Operation and Maintenance Approaches	
Basic	➤ O&M educational materials and service reminders circulated to system owners ➤ Complaint response protocols published ➤ Only certified/licensed O&M providers can be used
Intermediate	➤ Maintenance contracts and reporting required for electro-mechanical systems ➤ Operating permits renewable upon reported completion of required O&M tasks and inspections ➤ Prescriptive requirements for surface risers and inspection ports
Advanced	➤ Trained, certified service providers handle O&M tasks for all systems in accordance with established protocols ➤ Supplemental training and certification programs provided or supported by RME through training centers or other means ➤ Electronic access to O&M records by field personnel ➤ O&M provider performance reviews frequently updated and local approval list disseminated

Examples

Fairfax County, Virginia requires septic tank pumping every five years. System owners must provide the county health department with a written notification within 10 days of the pump-out. A receipt from the pump-out contractor, who must be licensed to handle septic tank residuals, must supplement the notification.

Key Evaluation Questions

- Do we have clearly defined O&M requirements based on system type and performance requirements or risk factors?
- Are operators and service personnel trained and certified before servicing systems?
- How are O&M services reported to the management program? Is the data easily entered and retrieved?
- Are system owners aware of waste restrictions, their system type, and how to access O&M services?

FACT SHEET 10

Residuals Management

The primary objective for septage management is to establish procedures for handling and dispersing the material in a manner that protects public health and water resources and complies with applicable laws. Approximately 67 percent of the estimated 12.4 billion gallons of septage produced annually in the U.S. is hauled to POTWs or other facilities for treatment, while the remaining 33 percent is land applied. Federal regulations (under 40 CFR Part 503) and state/local codes strive to minimize exposure of humans, animals, and the environment to chemical contaminants and pathogens that may be present in septage. Residuals management programs include tracking or manifest systems that identify sources, pumpers, transport equipment, final destination, and treatment or management techniques.

Relationship to Other Program Elements

Residuals management is closely linked to planning, operation/maintenance, inspection/monitoring, and training/certification of service providers. Public education is also a key factor when new residual facilities are proposed.

Options

Residuals can be land-applied after proper treatment, discharged to a septage or wastewater treatment plant, or delivered to an approved dispersal site. The figure below shows the varying approaches to residual management.

Residuals Management Approaches	
Basic	➤ Assure that residuals are being reused or managed in compliance with applicable federal, state, and local requirements ➤ Educate and remind owners of the need to inspect and/or pump tanks. ➤ Require only state-certified/ licensed O/M residuals handlers using approved sites and management practices.
Intermediate	➤ Require homeowners and licensed/certified service providers to report when tanks are inspected, residuals are removed, and how the residuals are managed in order to renew operating permit. ➤ Maintain and disseminate list of acceptable O&M service providers.
Advanced	➤ Create and administer tracking, inspection, and monitoring plan for all aspects of tank inspections, residuals removal, hauling, treatment, and reuse/disposal. ➤ Provide any necessary supplemental training and registration/licensing programs for local O&M providers or arrange it with training centers and universities. ➤ Develop contingency plans for alternative management practices or disposal sites. ➤ Employ only approved service providers.

Examples

Hollis Warren Incorporated has operated a dedicated land application site for septage in Kent County, Delaware for more than 10 years. The operation processes 4 million gallons of septage annually by screening, grit removal, and lime stabilization. The decanted liquid is then land applied to irrigate reed canary grass, corn, and soybeans. Solids removed during decanting are applied at agronomic rates to farmland for beneficial reuse as a soil amendment.

Key Evaluation Questions

- Where are pumpers currently hauling septage removed from tanks, and how is it treated, used, or dispersed?
- Do we have adequate capacity to handle current and future septage loads?
- What are the barriers to expanding existing land application and septage facilities or establishing new ones?
- Can the management program provide support (e.g., public education, financing) to overcome these barriers?

FACT SHEET 11

Training and Certification/Licensing

A variety of professionals and technicians including planners, regulators, designers, installers, operators, pumpers, and inspectors, are all involved in some aspect of a decentralized wastewater management program. Training, along with certification or registration, provides system owners and users with competent service providers and "raises the bar" in promoting professionalism among the industry. Service providers need to have a solid working knowledge of treatment processes, system components, performance options, operation/maintenance requirements, and laws/regulations. This training can be provided by universities, colleges, technical schools, agency-sponsored training programs, regional/local workshops, or formal/informal apprenticeship programs. Service providers should have extensive and detailed knowledge of their particular service area and a general grasp of other related activities (e.g. planning or site evaluation). Opportunities for cross-training, joint accreditation/certification, and sharing of training resources should be pursued wherever possible.

Relationship to Other Program Elements

Training and certification are linked primarily to site evaluation, design, construction, residuals management, inspections/monitoring, and operation/maintenance.

Options

Training and certification programs can be implemented by the regulatory authority, RME, or other regional/national trade organizations. The figure below shows the varying approaches to training, certification and licensing.

Training and Certification/Licensing Approaches	
Basic	➤ Require homeowners to use only state or tribal certified/licensed service providers. ➤ Track and investigate system owner complaints.
Intermediate	➤ Support more comprehensive state/tribal training requirements for certificate or license. ➤ Create and disseminate lists of acceptable service providers contingent on their accuracy of reporting and service complaint investigations.
Advanced	➤ Develop an inspection program and performance reviews for approval of service providers in district. ➤ Implement supplemental training programs for service providers seeking to perform services based on local protocols, system variations, and other specifications.

Examples

A number of states and national trade groups such as NSF International, the National Association of Wastewater Transporters, National Environmental Health Association, and the National Environmental Service Center have developed training and accreditation programs to verify the proficiency of persons performing system inspections and other services. Training and certification programs include written and field tests and have continuing education requirements. Providers that past tests are often included on vendor lists which help to support quality services.

Key Evaluation Questions

- What state or regional training and certification programs are available, and for which service areas?
- Can we approve joint accreditation or common recognition for regional, state, or multi-state training/certification?
- Are apprenticeships available for providers-in-training opting for experienced-based competency approaches?

FACT SHEET 12

Inspection and Monitoring

Perhaps the most significant shortcoming in existing management programs is the lack of regular inspections and performance monitoring. Area-wide monitoring regimes include testing groundwater and surface waters for indicators of poor treatment, such as the presence of human fecal bacteria and excess nutrients. All systems need to be inspected, at an interval defined by the technological complexity of system components, the receiving environment, and the relative risk posed to public health and valued water resources. The best approach is to establish an inspection regime and schedule based on the consideration of the system's relative reliance on electromechanical components combined with health and environmental risk. Less effective surrogate approaches include, in order of descending effectiveness:

1) Requiring comprehensive inspections at regular intervals.
2) Third party inspections at the time of property transfer.
3) Inspections only as part of complaint investigations.

Relationship to Other Program Elements

Inspection and monitoring are defined by source characterization, site evaluation, and system design, and are influenced by planning objectives and residuals management and performance requirements.

Options

Inspections and monitoring can be implemented by regulatory authority personnel, RME staff, or third-party inspectors. The figure below shows the varying approaches to inspections and monitoring.

Inspection and Monitoring Approaches	
Basic	➤ Educate homeowners on how and when to conduct basic walkover inspections. ➤ Require comprehensive inspections by licensed/certified persons at time of property transfer, change in system use, and complaint investigation. ➤ Require only trained inspectors.
Intermediate	➤ Specify regular operating inspections of all systems as part of operating permits ➤ Develop inspection reporting program with O&M provider/homeowner inputs ➤ Permit only licensed/certified inspectors to perform comprehensive inspections.
Advanced	➤ Conduct aquifer or watershed and pretreatment system effluent monitoring. ➤ Regularly evaluate monitoring data and permit requirements to determine if any program adjustments are needed. ➤ Develop supplemental training programs specific to local needs for approved inspectors. ➤ Formalize comprehensive system construction inspections.

Examples

Wisconsin requires management plans with maintenance or service contracts stipulating inspection/monitoring schedules for certain systems with electromechanical components. Property deeds must note that management plans are in effect. Inspection/monitoring services must be provided by a licensed, certified, or registered provider.

Key Evaluation Questions

- Are system inspections required?
- Is the inspection schedule based on system type and relative risk factors?
- Who is authorized to conduct inspections or monitoring, and how are they trained and certified?
- How are inspection/monitoring results reported and it is required to be provided to regulators?

FACT SHEET 13

Corrective Actions and Enforcement

A decentralized wastewater management program should be enforceable in order to assure compliance with laws and to protect public health and the environment. Management agencies should have the legal authority to adopt rules and assure compliance by levying fines, fees, assessments, or by requiring service providers to respond to system malfunctions. Emphasis should be placed on those tools that encourage compliance, rather than punishment. It also helps to have the support of the courts to implement an effective enforcement program. In order to assure compliance, management agencies typically need authority to:

- Respond promptly to complaints.
- Provide meaningful performance inspections.
- Issue notices of violation (NOVs).
- Implement consent orders and court orders.
- Hold formal and informal hearings.
- Issue civil and criminal actions or injunctions.
- Condemn systems and/or property.
- Correct system malfunctions.
- Restrict real estate transactions.
- Issue fines and penalties.

Relationship to Other Program Elements

The enforcement program provides backup and support for planning, site evaluation, construction, certification/ licensing, residuals management, inspections/monitoring, and operation/maintenance.

Options

The enforcement component of the management program is typically a function of the powers granted to it. The figure below shows the varying approaches to corrective actions and enforcement.

Corrective Actions and Enforcement Approaches	
Basic	➤ Issue Notice of Violation (NOV) and negotiate compliance schedules for problems. ➤ Administer enforcement program with fines or penalties for malfunctions ➤ Comply with requirements in a timely manner.
Intermediate	➤ Develop revocable operating permit program to assure corrective actions through required inspections and enforcement. ➤ Create electronic reporting system to track corrective measures with real-time input from staff and service providers.
Advanced	➤ Implement public education and involvement programs that promote the economic and health/environmental protection benefits of code compliance. ➤ RME implements corrective actions with power to compel compliance by imposing property liens or other enforcement instruments.

Examples

Cranberry Lake, New Jersey passed an ordinance which requires owners/operators of onsite systems to operate and maintain their systems, pump out tanks as needed, perform repairs, maintain service records and issue reports. Those failing to comply can face fines up to $1,000 per day, up to 90 days of community service, and court proceedings.

Key Evaluation Questions

- Does a complaint response system exist, and do residents know how to use it?
- Are there local ordinances and legal procedures in place to enforce codes and health/environmental rules?
- Do inspectors have the right to enter private property to inspect systems and assess needed repairs?
- Is there a public outreach and involvement program to engage and educate people on the benefits of compliance?

References and resources

These resources are offered to provide additional information on decentralized wastewater treatment management. Many of these sources are referred to in the Handbook and correspond to the reference number below.

Management Resources

Informational Databases and Websites

1. U. S. Environmental Protection Agency Surf Your Watershed

Gathers environmental information available by geographic units by state, watershed (Surf's primary focus), county, metro area, and tribe. Visit Website http://cfpub.epa.gov/surf/locate/index.cfm

2. U.S. Environmental Protection Agency 2002 National Assessment Database.

Summarizes electronic information submitted by the states to EPA in the 2002 water quality reporting cycle. This information should not be used to compare water quality conditions between states or to identify statewide or national trends because of differences in state assessment methods and changes to EPA guidance. This represents the most recent electronically available state water quality information. We are currently assembling information for the 2004 reporting cycle. To access this information visit http://www.epa.gov/waters/305b/index.html

3. U.S. Environmental Protection Agency Site for Onsite and Clustered (Decentralized) Wastewater Treatment Systems.

Website provides tools for communities investigating and implementing decentralized management programs and contains fact sheets, program summaries, case studies, links to design manuals and other materials, and a list of state health department contacts. Visit http://cfpub.epa.gov/owm/septic/index.cfm for more information.

Guidance and Policy Documents

4. U.S. Environmental Protection Agency Voluntary Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems.

This guide provides information on the impacts of decentralized wastewater systems, the need for management, and five management program models that can be used by states and communities. Visit the EPA Website to view this document at http://cfpub.epa.gov/owm/septic/septic.cfm?page_id=268

5. Response to Congress on Use of Decentralized Wastewater Treatment Systems.

This EPA document describes the benefits and barriers to implementing an onsite wastewater management program. It can be downloaded from http://cfpub.epa.gov/owm/septic/index.cfm

6. Model Ordinances to Protect Local Resources.

This web site includes model ordinances to serve as a template for those charged with making decisions concerning growth and environmental protection. For each model ordinance listed, there are several real -life examples of ordinances used by local and state governments around the nation (onsite sewage is included under the illicit discharges category). Visit http://www.epa.gov/owow/nps/ordinance/index.htm

7. Missouri Onsite Regulatory Authority

is specified in: 10 CSR 20-6.010, Construction and Operating Permits, Continuing Authority http://www.sos.mo.gov/adrules/csr/current/10csr/10c20-6a.pdf and Missouri Revised Statutes, Chapter 398.825, http://www.moga.mo.gov/statutesearch/

Financial Assistance/Funding Documents

8. Funding Decentralized Wastewater Systems Using the Clean Water State Revolving Fund.
This fact sheet explains the Clean Water State Revolving Fund and the types of activities that can be funded. It can be downloaded from http://www.epa.gov/owm/cwfinance/cwsrf/factsheets.htm#Decentralized

9. Valuing Decentralized Wastewater Technologies A Catalog of Benefits, Costs, and Economic Analysis Techniques.
Presents a "catalog" of the economic advantages and disadvantages of decentralized wastewater systems relative to larger scale, centralized solutions. It also discusses techniques that can be used to place economic values on positive and negative impacts brought about by a community's choice of a wastewater system. Visit http://www.rmi.org/images/other/Water/W04-21_ValuWstWtr.pdf to download the report.

10. National Decentralized Water Resources Capacity Development Project Case Studies of Economic Analysis and Community Decision Making for Decentralized Wastewater Systems.
This report examines how communities consider and value the benefits and costs of different scale wastewater facility options (onsite, cluster, and centralized options) in monetary or other terms, and examines the driving issues, motivations, thought processes, and decision-making methods of stakeholders relative to choices of wastewater system scale. Case study communities are included. Visit http://www.rmi.org/images/other/Water/W04-20_DecentWasteSys.pdf to download the report.

11. Rural Empowerment Zone and Economic Community Program.
The road to economic opportunity and community development starts with broad participation by all segments of the community. This Website provides information on how to involve the community and develop a strategic plan. Visit http://www.ezec.gov/index.html

12. PENNVEST Onlot Sewage Disposal Funds
PENNVEST was established in 1988 to help provide more than $2.5 billion for improvements in Pennsylvania's drinking water, sewer and stormwater systems. PENNVEST provides Low-cost financing for wastewater systems across the Commonwealth. See the PENNVEST Website http://www.pennvest.state.pa.us/pennvest/ or go directly to http://www.pennvest.state.pa.us/pennvest/cwp/view.asp?A=4&Q=75918

13. Community Onsite System Management Program.
Provides tools to help communities regulate and manage on-site systems. See Website http://www.mass.gov/dep/water/wastewater/onsite.htm

14. Potential Roles for Clean Water State Revolving Fund Programs in Smart Growth Initiatives.
The CWSRF is a widely available financing source used to fund municipal wastewater treatment projects as well as nonpoint source pollution control and estuary protection projects. See Website http://www.epa.gov/owmitnet/cwfinance/cwsrf/smartgro.pdf

15. Onsite Wastewater Management: Cost and Financing
Several approaches are being used to collect the funds necessary to maintain an onsite wastewater management system. Visit http://ohioline.osu.edu/aex-fact/0751.html to view this fact sheet.

Planning/Decision-Making Resources

16. Building Our Future: A Handbook to Community Visioning.
This manual provides community residents with a process for planning for their mutual future. It can be downloaded from http://www.drs.wisc.edu/green/_documents/_community/Building%20Our%20Future%20-%20A%20Guide%20to%20Community%20Visioning.pdf

17. Choices for Communities: Wastewater Management Options for Rural Areas.
This 17-page document helps communities explore their wastewater treatment options. It can be downloaded from http://www.ces.ncsu.edu/plymouth/septic/98hoover.html

18. City of Vancouver Citizen Handbook on Building Community.
The handbook is meant to encourage more active citizens—people motivated by an interest in public issues and a desire to make a difference. See http://vcn.bc.ca/citizens-handbook/

19. Community Visioning: Planning for the Future in Oregon's Local Communities.
This report describes how new approaches to anticipate and plan for change are needed—approaches that actively engage citizens in thinking about the future at the local level. The report can be downloaded from http://www.design.asu.edu/apa/proceedings97/ames.html

20. A Guide to the Public Management of Private Septic Systems.
Communities can use this handbook to examine their wastewater treatment options and design a unique program that meets their needs. This document can be downloaded from http://devsoc.cals.cornell.edu/cals/devsoc/outreach/cardi/publications/resources/index.cfm

21. The Neighborhood Charrette Handbook: Visioning and Visualizing Your Neighborhood's Future.
The Charrette workshop is designed to stimulate ideas and involve the public in the community planning and design process. This handbook can be downloaded from www.michigantownships.org/downloads/charrette_handbook.pdf

22. National Environmental Services Center (NESC).
NESC's NODP (National Onsite Demonstration Program) has produced two videos and a series of CD ROMs that can be used to communicate wastewater options to citizens. Order from http://www.nesc.wvu.edu/

23. A Quick Handbook to Small Community Wastewater Treatment Decisions.
This document guides communities through choosing an effective and reasonably priced wastewater treatment system. See http://www.extension.umn.edu/distribution/naturalresources/DD7735.html

24. U.S. Environmental Protection Agency Community-Based Environmental Protection.
Community-Based Environmental Protection (CBEP) integrates environmental management with human needs, considers long-term ecosystem health, and highlights the positive correlations between economic prosperity and environmental well-being. For more information, visit http://www.epa.gov/care/library/howto.pdf

25. Wastewater Planning Handbook Mapping Onsite Treatment Needs, Pollution Risks, and Management Options Using GIS.
This handbook is a guide to wastewater management planning for small communities using geographic information systems. See Website http://www.ndwrcdp.org/userfiles/WUHT0117_post.pdf

Homeowner Guides

26. Environmental Protection Agency Homeowner Septic System Checklist.
Worksheet that allows homeowners to keep track of septic system inspections and maintenance. See http://www.epa.gov/owm/septic/pubs/septic_sticker.pdf

27. The Easy Septic Guide.
This handbook describes everything homeowners need to know about their onsite systems. It has chapters on checking, understanding, and maintaining a system. The handbook can be downloaded from http://www.dlg.nsw.gov.au/Files/Information/ssguide.pdf

28. Homeowner's Handbook to On-Site Wastewater Disposal Zone.
The Sea Ranch Association, an onsite management entity, developed this handbook for new homeowners. The handbook explains a septic system and explains a typical inspection. To learn more, call 707-785-2444.

29. The Septic Education Kit.
The Department of Commerce's National Technical Information Service distributes this toolbox that contains everything needed to organize an education program on the care and maintenance of onsite systems. The kit can be ordered from http://www.ntis.gov. Enter AVA20666KK00 into the technical reports search.

30. Septic Yellow Pages.
This Website provides useful information concerning onsite systems for homeowners. To view see http://www.septicyellowpages.com/homeowner.html

Technical Resources

Technical Assistance Resources

31. National Environmental Services Center.
National Environmental Services Center provides technical assistance and information about drinking water, wastewater, environmental training, and solid waste management to communities serving fewer than 10,000 people. Visit http://www.nesc.wvu.edu/

32. National Small Flows Clearinghouse.
The National Environmental Service Center at NSFC has produced a technology overview CD ROM. Visit http://www.nesc.wvu.edu/wastewater.cfm or call 800-624-8301.

33. U.S. Environmental Protection Agency Municipal Technologies Branch Fact Sheets.
These fact sheets cover difference treatment technologies. See http://www.epa.gov/owm/mtb/mtbfact.htm

System Design

34. U.S. Environmental Protection Agency Onsite Wastewater Treatment Systems Manual.
This comprehensive reference manual is designed to provide state and local governments with guidance on the planning, design, and oversight of onsite systems. It can be downloaded from http://www.epa.gov/nrmrl/Pubs/625R00008/html/62500008.htm

35. Creative Community Design and Wastewater Management.
A guidance manual for local officials to demonstrate the use of alternative on-site wastewater treatment technologies to support zoning for compact and sustainable land use patterns. See http://www.ndwrcdp.org/userfiles/WUHT0030_post.pdf

Alternative Systems

36. Barnstable County, Massachusetts Department of Health and the Environment Alternative Septic System Information Center.
This Web site contains information on alternative onsite technologies. View the site at http://www.barnstablecountyhealth.org/AlternativeWebpage/index1.htm

37. City of Austin, Texas Onsite Wastewater Treatment and Disposal Fact Sheets.
The set of fact sheets covers many onsite topics from conventional systems to alternative systems. The fact sheets can be downloaded from http://www.ci.austin.tx.us/wri/fact.htm

38. Are Cluster Treatment Systems the Key to Implementing Effective Decentralized Wastewater Management?
Given a choice of managing hundreds of onsite systems versus systems that serve several hundred homes, management professionals will favor the cluster scale. To access this article see Website http://www.infiltratorsystems.com/word/NOWRA_Cluster_S%C9n8-24-01_1.doc

39. A Simpler, Cheaper Alternative to Sewer Systems.
This handbook describes a wastewater project in Willard, a village in New Mexico, where the sole supply of drinking water is threatened by wastewater. Visit http://72.14.203.104/search?q=cache:4_NHGbJP-SoJ:www.nmenv.state.nm.us/cpb/Jan%252003%2520Willard%2520Case%2520Study.pdf+Willard,+a+village+in+New+Mexico+septic+system&hl=en&gl=us&ct=clnk&cd=1 and http://www.forester.net/ow_0507_large.html

40. Constructed Wetlands for Wastewater Treatment.
This document describes constructed wetlands for wastewater treatment and has numerous case studies. It can be downloaded from http://www.epa.gov/owow/wetlands/pdf/ConstructedWetlands-Complete.pdf

41. Subsurface Flow Constructed Wetlands for Wastewater Treatment: A Technology Assessment.
This report verifies that a subsurface-flow constructed wetland can be a viable and cost-effective wastewater treatment option. This document can be downloaded from http://www.epa.gov/owow/wetlands/pdf/sub.pdf

42. Washington Sea Grant Septic Manuals.
Five homeowner manuals Pressure Distribution, Gravity, Mound, Sand Filter, and Proprietary Device can be viewed at http://www.wsg.washington.edu/mas/ecohealth/waterquality.html

State Onsite Fact Sheets

43. Delaware Department of Natural Resources and Environmental Control.
These fact sheets describe different wastewater disposal systems. Visit http://www.dnrec.state.de.us/dnrec2000/P2/Septic.htm

44. Massachusetts Department of Environmental Protection Publications.
This Web page contains links to many publications concerning septic systems and alternative technologies. For more information, visit http://www.mass.gov/dep/water/wastewater/septicsy.htm

45. Ohio State University Extension Fact Sheets.
This series of fact sheets cover topics from septic system maintenance to costs and financing. They can be downloaded from http://ohioline.osu.edu/aex-fact/

46. Oregon Department of Environmental Quality On-Site Fact Sheets.
These fact sheets provide information on septic system installation and maintenance. They can be downloaded from http://www.deq.state.or.us/wq/onsite/onsite.htm

47. University of Minnesota Fact Sheets.
This set of fact sheets covers topics from homeowner education to alternative technologies and can be downloaded from http://www.extension.umn.edu/topics.html?topic=2&subtopic=110

48. Pennsylvania Department of Environmental Protection Wastewater Management Fact Sheets.
These fact sheets cover topics from sewage planning to sewage disposal systems. The fact sheets can be downloaded from http://www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqp_wm/Pubs-c.htm

Risk Assessment

49. Risk Assessment of Decentralized Wastewater Management in High Priority Areas of the City of Malibu, California.
Powerpoint presentation can be viewed at http://www.coastalconference.org/h20_2005/pdf/wednesday_2004/1C/Georgeetal-Risk_Assessment_of_Decentralized_Wastewater_Trea.pdf

50. Integrated Risk Assessment for Individual Onsite Wastewater Systems
The primary objective of this project was to develop an approach to risk-based decision making for individual onsite wastewater treatment (OWT) systems. To view this report see http://www.ndwrcdp.org/userfiles/WUHT0118_ORNL_Electronic.pdf

Operation and Maintenance

51. Septic Tank Maintenance
These three publications explain the relationship between septic systems and water quality, and provide recommendations for septic system maintenance (e.g. tank pumping schedules). They can be downloaded from http://www.aces.edu/pubs/speng/sepmaint.pdf, http://www.aces.edu/pubs/docs/C/CRD-0081/, and http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf.

52. U.S. Environmental Protection Agency's Decentralized Onsite Management for Treatment of Domestic Wastes.
This program provides operation and maintenance information for on-site wastewater treatment systems and can be downloaded from http://www.epa.gov/seahome/decent.html

Training

53. Model Decentralized Wastewater Practitioner Curriculum
A model decentralized wastewater field practitioners training curriculum for use throughout North America. Visit http://www.ndwrcdp.org/userfiles/WUHT0105.pdf

Inspection, Monitoring, Compliance

54. University of Rhode Island Fact Sheets.
This set of fact sheets covers topics such as what you should know about inspectors, how to hire a contractor, and how to order and buy a distribution box. The fact sheets can be downloaded from http://www.uri.edu/ce/wq/RESOURCES/wastewater/Onsite_Systems/index.htm

55. Septic System Checkup: The Rhode Island Handbook for Inspection
This handbook includes instructions for gathering septic system records, locating components, diagnosing minor in-home plumbing problems, conducting flow trials, dye tracing, and maintenance scheduling. Website: http://www.dem.ri.gov/pubs/regs/regs/water/isdsbook.pdf

56. Summit County Water Quality: Septic Systems and Potential Nitrate Pollution Analysis
This study demonstrates the use of a geographic information system (GIS) for modeling septic system nitrate impacts to water quality in the upper Blue River watershed, Summit County, Colorado. See Website: http://ehasl.cvmbs.colostate.edu/projects/water.summit.county.html

EPA Cooperating Partners

EPA and eight partner organizations signed a Memorandum of Understanding in 2005 to address environmental problems resulting from failures of decentralized wastewater treatment systems (often called septic systems) when they occur. The agreement formalizes the collaboration between EPA and its partners to help community governments improve their wastewater programs. The agreement focuses on better planning, septic system design, and long-term operation and maintenance of septic systems. To view the Memorandum of Understanding visit the EPA Website: http://cfpub.epa.gov/owm/septic/index.cfm

The partners joining EPA in this effort are:

National Association of Towns and Townships (NATaT). The purpose of NATaT is to strengthen the effectiveness of town and township government. NATaT does this by educating lawmakers and public policy officials about how small town governments operate and by advocating policies on their behalf in Washington, D.C. Website: http://www.natat.org/

National Association of Wastewater Transporters, Inc. (NAWT). NAWT is dedicated to serving the interests of the liquid waste pumping and drain cleaning industries. The association works with EPA to promote training and certification of the pumping industry. Website: http://www.nawt.org/

National Environmental Health Association (NEHA). NEHA fosters more cooperation and understanding between and among environmental health professionals, contributing to the resolution of environmental health issues, and by working with other national professional societies to advance the cause, the image, and the professional standing of the environmental health profession. Website: http://www.neha.org/

National Environmental Services Center (NESC). NESC provides information about drinking water, wastewater, environmental training, and solid waste management in communities serving fewer than 10,000 individuals. Website: http://www.nesc.org/

National Onsite Wastewater Recycling Association, Inc. (NOWRA). NOWRA is the largest organization within the U.S. dedicated solely to educating and representing members within the onsite and decentralized industry. Website: http://www.nowra.org/

Rural Community Assistance Partnership, Inc. (RCAP). RCAP operates as a national service delivery network of six regional partners and a national office in Washington, D.C. Every year, more than 200 RCAP specialists provide technical assistance, training, and financial resources to more than 2,000 small rural communities in all 50 states, Puerto Rico, and the U.S. Virgin Islands. Website: http://www.rcap.org/

Water Environment Federation (WEF). WEF is a not-for-profit technical and educational organization with members from varied disciplines who work toward the preservation and enhancement of the global water environment. Website: http://www.wef.org/Home.htm

Consortium of Institutes for Decentralized Wastewater Treatment (CIDWT). CIDWT often referred to as "The Onsite Consortium", is a group of Educational Institutions cooperating on decentralized wastewater training and research efforts. The Consortium also includes people from educational institutions, citizens groups, regulatory agencies and private industry. Website: http://www.onsiteconsortium.org/

Glossary of terms

Aerobic Treatment Unit (ATU): A mechanical wastewater treatment unit that provides secondary wastewater treatment for single home, cluster of homes, or commercial establishments by mixing air (oxygen) and aerobic and facultative microbes with the wastewater. ATUs typically use either a suspended growth process (such as activated sludge, extended aeration and batch reactors), fixed film process (similar to a trickling filter), or a combination of the two treatment processes.

Alternative Onsite Treatment System: A wastewater treatment system that includes different components than typically used in a conventional septic tank and subsurface wastewater infiltration system (SWIS). An alternative system is used to achieve acceptable treatment and dispersal of wastewater where conventional systems either may not be capable of protecting public health and water quality, or are inappropriate for properties with shallow soils over groundwater or bedrock or soils with low permeability. Examples of components that may be used in alternative systems include sand filters, aerobic treatment units, disinfection devices, and alternative subsurface infiltration designs such as mounds, gravelless trenches, and pressure and drip distribution.

Centralized Wastewater System: A managed system consisting of collection sewers and a single treatment plant used to collect and treat wastewater from an entire service area. Traditionally, such a system has been called a Publicly Owned Treatment Works (POTW) as defined in 40 CFR 122.2.

Cesspool: A drywell that receives untreated sanitary waste containing human excreta, which sometimes has an open bottom and/or perforated sides (40 CFR 144.3). Cesspools with the capacity to serve 20 or more persons per day were banned in federal regulations promulgated on December 7, 1999. The construction of new cesspools was immediately banned and existing large-capacity cesspools must be replaced with sewer connections or onsite wastewater treatment systems by 2005.

Cluster System: A wastewater collection and treatment system under some form of common ownership which collects wastewater from two or more dwellings or buildings and conveys it to a treatment and dispersal system located on a suitable site near the dwellings or buildings.

Construction Permit: A permit issued by the designated local regulatory authority that allows the installation of a wastewater treatment system in accordance with approved plans and applicable codes.

Conventional Onsite Treatment System: A wastewater treatment system consisting of a septic tank and a typical trench or bed subsurface wastewater infiltration system.

Decentralized System: Managed onsite and/or cluster system(s) used to collect, treat, and disperse or reclaim wastewater from a small community or service area.

Dispersal System: A system which receives pretreated wastewater and releases it into the air, surface or ground water, or onto or under the land surface. A subsurface wastewater infiltration system is an example of a dispersal system.

Engineered Design: An onsite or cluster wastewater system that is designed and certified by a licensed/certified designer to meet specific performance requirements for a particular wastewater on a particular site.

Environmental Sensitivity: The relative susceptibility to adverse impacts of a water resource or other receiving environment from dispersal of wastewater and/or its constituents. The impacts may be low, acute (i.e. immediate and significantly disruptive), or chronic (i.e. long-term, with gradual but serious disruptions).

Large Capacity Septic System: A soil dispersal treatment system having the capacity to serve 20 or more persons-per-day subject to EPA's Underground Injection Control regulations.

Management Model: A program consisting of thirteen elements that is designed to protect and sustain public health and water quality through the use of appropriate policies and administrative procedures that define and integrate the roles and responsibilities of the regulatory authority, system owner, service providers and management entity, to ensure that onsite and cluster wastewater treatment systems are appropriately managed throughout their life cycle. The program elements include public education and participation, planning, performance requirements, training and certification/licensing, site evaluation, design, construction, operation and maintenance, residuals management, compliance inspections/monitoring, corrective actions and enforcement, record keeping, inventory, and reporting, and financial assistance and funding. Management services should be provided by properly trained and certified personnel and tracked via a comprehensive management information system.

National Pollutant Discharge Elimination System (NPDES) Permit: A national program under Section 402 of the Clean Water Act for regulation of discharges of pollutants from point sources to waters of the United States. Discharges are illegal, unless authorized by an NPDES permit.

Onsite Service Provider: A person who provides onsite system services. They include but are not limited to designers, engineers, soil scientists, site evaluators, installers, contractors, operators, managers, maintenance service providers, pumpers, and others who provide services to system owners or other service providers.

Onsite Wastewater Treatment System (OWTS): A system relying on natural processes and/or mechanical components to collect, treat, and disperse or reclaim wastewater from a single dwelling or building.

Operating Permit: A renewable and revocable permit to operate and maintain an onsite or cluster treatment system in compliance with specific operational or performance requirements stipulated by the regulatory authority.

Performance-Based Management Program: A program designed to protect public health and water quality by seeking to ensure sustained achievement of specific, measurable performance requirements based on site and risk assessments.

Performance Requirement: Any requirement established by the regulatory authority to assure future compliance with the public health and water quality goals of the community, the state or tribe, and the federal government. Performance requirements can be expressed as numeric limits (e.g., pollutant concentrations, mass loads, wet weather flow, structural strength) or narrative descriptions of desired conditions or requirements (e.g., no visible scum, sludge, sheen, odors, cracks, or leaks).

Permitting Authority: The state, tribal, or local unit of government with the statutory or delegated authority to issue permits to build and operate onsite wastewater systems.

Prescription-Based Management Program: A program designed to preserve and protect public health and water quality through specification of pre-engineered system designs for specific sets of site conditions, which if sited, designed, and constructed properly, are deemed to meet public health and water quality standards.

Prescriptive Requirements: Specifications for design, installation and other procedures and practices for onsite or cluster wastewater systems on sites that meet stipulated criteria. Proposed deviations from the stipulated criteria, specifications, procedures, and/or practices require formal approval from the regulatory authority.

Regulatory Authority (RA): The unit of government that establishes and enforces codes related to the permitting, design, placement, installation, operation, maintenance, monitoring, and performance of onsite and cluster wastewater systems.

Residuals: The solids generated and/or retained during the treatment of wastewater. They include trash, rags, grit, sediment, sludge, biosolids, septage, scum, grease, as well as those portions of treatment systems that have served their useful life and require disposal such as the sand or peat from a filter. Because of their different characteristics, management requirements can differ as stipulated by the appropriate Federal Regulations.

Responsible Management Entity (RME): A legal entity responsible for providing various management services with the requisite managerial, financial, and technical capacity to ensure the long-term, cost-effective management of decentralized onsite and/or cluster wastewater treatment facilities in accordance with applicable regulations and performance requirements.

Septage: The liquid and solid materials pumped from a septic tank during cleaning operations.

Septic Tank: A buried, watertight tank designed and constructed to receive and partially treat raw wastewater. The tank separates and retains settleable and floatable solids suspended in the wastewater and discharges the settled wastewater for further treatment and dispersal to the environment.

Source Water Assessment: A study and report required by the Source Water Assessment Program (SWAP) of the Safe Drinking Water Act addressing the capability of a given public water system to protect water quality that includes delineation of the source water area, identification of potential sources of contamination in the delineated area, determination of susceptibility to those sources, and public notice of the completed assessment.

Underground Injection Well: A constructed system designed to place waste fluids above, into, or below aquifers classified as underground sources of drinking water. As regulated under the Underground Injection Control (UIC) Program of the Safe Drinking Water Act (40 CFR Parts 144 & 146), injection wells are grouped into five classes. Class 5 includes shallow systems such as cesspools and subsurface wastewater infiltration systems. Subsurface wastewater infiltration systems with the capacity to serve 20 or more people per day, or similar systems receiving non-sanitary wastes, are subject to federal regulation. Class V motor vehicle waste injection wells and large-capacity cesspools are specifically prohibited under the UIC regulations.

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