Decentralized Wastewater Treatment Systems

A Program Strategy

USEPA Office of Water

"Proper septic system maintenance is a commonly overlooked responsibility. Failing systems are a significant threat to our health and our water quality. Property owners can save themselves a lot of money and trouble by following a few simple guidelines."

A message from **Ben Grumbles**, Assistant Administrator of the Office of Water

Decentralized wastewater treatment systems (commonly called septic systems) are a significant component of this nation's wastewater infrastructure. They can be an effective option for protecting public health and the environment if properly designed, installed, and managed. They can be a significant threat to public health and the environment if they are not.

I am pleased to publish this Strategic Plan to improve the performance of decentralized wastewater treatment systems. This Strategic Plan presents our key goals and planned actions for our decentralized wastewater treatment system program. It builds on existing partnerships to provide a solid foundation of information, training, management, and oversight. It includes components for regulators, service providers, and property owners. I believe this Strategic Plan is a significant step forward for communities that choose a decentralized approach to help protect the health of their citizens and the environment.

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Decentralized Wastewater Treatment Systems: **A Program Strategy**

This strategy presents EPA's vision, mission and actions to improve the performance of decentralized wastewater treatment systems, thereby providing better protection of public health and water resources.

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EPA's Vision

Decentralized wastewater treatment systems are appropriately managed, perform effectively, protect human health and the environment, and are a key component of our nation's wastewater infrastructure.

EPA's Mission

EPA will provide national direction and support to improve the performance of decentralized systems by promoting the concept of continuous management and facilitating upgraded professional standards of practice.

Strategic Goals and Actions

This program strategy builds upon EPA's 2003–2008 Agency Strategic Plan, which identifies septic systems as a source of pollution. The program strategy includes the principles and strategic goals that will guide EPA's decentralized wastewater program over the next five years. To accomplish these goals, EPA will implement a series of actions internally and externally through partnerships with state and local governments and national organizations representing practitioners and the public (see Key Strategic Goals and Actions section).

Scope

Decentralized wastewater systems, often called "septic" or "onsite" systems, derive their name from their location—they treat wastewater close to the source, typically providing treatment on the property of individual homes or businesses. Decentralized systems also include systems serving clusters of individual homes, large capacity septic systems, and small collection and treatment systems (including "package plants"). These systems similarly treat wastewater close to the source, typically using small pipes for collecting small volumes of domestic wastewater, unlike centralized urban wastewater treatment systems that pipe large amounts of wastewater many miles through sewers prior to reaching the treatment facility.

Centralized wastewater treatment facilities typically discharge treated waste to surface streams, while decentralized systems (especially smaller ones) usually disperse treated waste under the ground surface, where the soil provides further treatment. Some decentralized systems are designed to discharge to surface waters following treatment, and these systems are also addressed in EPA's program strategy.

Problem Statement

Decentralized systems are an issue of national concern. Based on current information, decentralized systems:

- Serve 25% of the U.S. population[a]
- Are used in about one-third of all new housing and commercial development[a]
- Are typically utilized in rural areas, however, more than half of the 25 million systems are found in suburban areas[a]

Decentralized systems protect human health and water quality when they are properly sited, designed, installed, operated and maintained. However, it has been estimated that:

- Between 10 and 20% of all onsite systems are not adequately treating waste (actual failure rates are unknown); the failure rate for cluster systems which discharge is being researched[a,b]
- Half are more than 30 years old, and more likely to malfunction[a]
- Septic systems are the second greatest threat to groundwater quality[c] (as viewed by State water quality agencies)

There is currently limited information to document health and water quality problems resulting from poorly designed, operated and maintained systems, partly due to their widely distributed nature. The amount of impact to groundwater and surface water

[a] U.S. Department of Commerce, U.S. Census Bureau, *American Housing Survey for the United States-1995,* issued September 1997.
[b] V.I., Nelson, S.P. Dix, and F. Shephard, *Advanced Onsite Wastewater Treatment and Management Scoping Study,* May 1999.
[c] U.S. Environmental Protection Agency, *National Water Quality Inventory: 1996 Report to Congress,* EPA 841-R-97-008, 1998.

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from sub-surface dispersal or surface-discharging decentralized systems is generally unknown. These impacts are currently being investigated by EPA.

While complete quantitative information is lacking, there are many examples of improperly functioning onsite and other decentralized wastewater systems contributing to water quality impairments. These types of wastewater systems have been identified as contributors to numerous water quality problems, including swimming beach closures, drinking water source impairments, and shellfish bed closures.

This program strategy identifies how EPA will address water quality impacts by working with state and local regulators and other key stakeholders to upgrade the performance of decentralized systems through better management practices (siting, design, installation, permitting, inspections, operation and maintenance, etc.), as well as to upgrade professional standards in the decentralized wastewater industry. The strategy also specifies how the recommended management practices will be integrated in the activities and approaches being applied in the various EPA water programs, thereby helping to achieve mutual water quality objectives and public health protection goals.

Historical Background

The use of septic tanks for primary treatment of wastewater began in the late 1800s, and discharge of septic tank effluent into gravel-lined subsurface drains became a common practice during the middle of the 20th century. Public health departments were charged with enforcing the first onsite wastewater "disposal" laws, which were mostly based on soil percolation rates. During the 1950s, states began to adopt laws upgrading onsite system design and installation practices. Despite these improvements, many regulations are based on prescribed system designs that require site conditions to fit system capabilities rather than the reverse. The prevailing philosophy was based on the assumption that centralized wastewater collection and treatment services would be available in the future. The result was a wide variety of state and local regulations and codes controlling decentralized systems.

The 1970s saw an increase in research and technology development, creating a host of alternative decentralized systems capable of meeting secondary and advanced levels of treatment. However, the management of these systems (site evaluation, installation, operation and maintenance) remained at the pre-1970s level of sophistication, as did the levels of awareness and education of the property owner and regulator. As a result, many systems have been sited, designed, installed, operated and maintained based on outdated codes, regulations and information.

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Findings - Report to Congress

In 1996, Congress directed EPA to develop a report addressing: (a) the ability of decentralized systems to make more efficient use of the limited funding available for wastewater infrastructure, (b) whether these systems were appropriate alternatives to centralized treatment, and if so, (c) what actions EPA would take to implement the alternatives. In April 1997, EPA developed its *Response to Congress on Use of Decentralized Wastewater Treatment System*". In this document, EPA concluded that decentralized systems can protect public health and the environment, typically have lower capital and maintenance costs for rural communities, are appropriate for varying site conditions, and are suitable for ecologically sensitive areas when adequately managed. However, several major barriers to the improved performance of these systems were identified, including:

- Lack of awareness about system maintenance requirements, and public misperception regarding system performance and capability
- Regulatory and legal constraints
- Lack of management
- Fear of liability; financial disincentive for engineering consultants
- Financial constraints

Until significant progress toward eliminating these major barriers is made, it is likely that decentralized systems will continue to cause health and environmental problems, and will not be recognized as a key component of our nation's long-term wastewater infrastructure.

Stakeholder Involvement

A wide variety of stakeholders involved in regulating and servicing decentralized systems have expressed an interest in EPA involvement. This includes regulatory agencies at the Federal (USDA and HUD), state and tribal (health and environmental agencies), and local levels. Other stakeholders include service providers such as planners, developers, site evaluators, designers, operators, inspectors, manufacturers, pumpers and waste haulers. In addition, homeowners are increasingly interested in advice on proper maintenance and cost-effective solutions to wastewater issues.

EPA has initiated an extensive outreach program to obtain assistance in reaching the various stakeholders. Many stakeholders are represented by national organizations that have agreed to partner with EPA, including:

- State onsite regulators
- National Onsite Wastewater Recycling Association
- National Environmental Services Center
- National Environmental Health Association
- National Association of County Officials

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- National Association of City and County Health Officials
- National Association of Towns and Townships
- Rural Community Assistance Partnership
- National Association of Waste Transporters
- Consortium of Institutes for Decentralized Wastewater Systems
- Water Environment Federation

Guiding Principles

The following principles will guide the efforts of EPA to ensure implementation of systems that protect public health and the environment:

- **Protection of Public Health and the Environment.** EPA supports the most sustainable approach to implementing protective water pollution control solutions whether it be centralized or decentralized. Where used, decentralized systems must provide protection of public health and the environment for their served communities. This applies equally regardless of the economic status, race or size of the community.

- **Local Decision-making.** The decision to implement a centralized or decentralized (or combination) solution to wastewater treatment needs is made at the local level.

- **Watershed-wide Integration.** Integrated wastewater facility planning and management of water resources on a watershed level promotes sound and sustainable communities. The role of properly sited, designed, installed and managed decentralized systems that provide for recycling and reuse of treated wastewater for groundwater recharge, replenishment of aquifers and protection of ground and surface water, should be considered in planning.

- **State, Tribal and Local Government Authority.** States, Tribes and some local governments are responsible for regulating and managing decentralized systems. Flexibility is needed to craft and implement cost-effective management programs that are suitable for each individual community.

- **Agency-wide Coordination.** Most water programs have a role, either direct or indirect, in managing or working with decentralized systems. In dealing with decentralized systems, all water programs should facilitate improved siting, design, installation and management that protect human health and the environment. Agency programs (including point source, non-point source, groundwater, and funding programs) should regularly coordinate on issues that affect decentralized systems.

- **Cost Effectiveness.** Implementation of this strategy will provide for a broader range of cost effective options for communities to consider in meeting their needs, particularly in those communities that are less densely populated.

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- **Partnerships.** Implementation of this strategy will depend on voluntary partnerships with States/Tribes, local governments, service providers and other stakeholders.
- **Targeted Efforts.** Given the wide variety of barriers to address, implementation of this strategy will focus on those activities that produce the greatest environmental and public health benefit.

Key Strategic Goals and Actions

Strategic Goal #1: Strengthened internal and external partnerships

Action 1: Develop action plans in each Regional office to address Regional and watershed-specific activities to support the Program Strategy. Hold annual meetings of EPA coordinators.

Action 2: Conduct forums in each Regional office to promote collaboration between regional, state and local regulators.

Action 3: Develop a Memorandum of Understanding with external partners to solidify their support for the program.

Action 4: Identify and pursue opportunities for improved coordination among water programs (point source, non-point source, estuaries, watersheds, water quality cooperative agreements, source water assessment and protection, UIC, TMDL).

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Strategic Goal #2: Improved system performance through improved practitioner competency, management practices, and technology transfer.

Action 1: EPA, working with the stakeholders, will publish a Management Handbook and other tools that serve as implementation guidance for the Management Guidelines.

Action 2: Provide assistance in upgrading training, registration, certification and licensing programs for practitioners (i.e., site evaluators, designers, installers, inspectors and maintenance providers).

Action 3: Provide assistance with implementation of a model regulatory code using performance-based standards developed using sound science.

Action 4: Identify efforts needed to improve acceptance of appropriately managed systems.

Strategic Goal #3: Improved accountability, control and oversight through enhanced state and local program implementation and regulatory reform.

Action 1: Continue to manage projects demonstrating approaches for improved state and local management programs. Share the results with interested parties.

Action 2: Conduct study to characterize the impact of malfunctioning decentralized systems, discharging and non-discharging, on surface and groundwater quality. Encourage states and local communities to inventory and assess systems. Develop easy to use software for inventorying and tracking systems.

Action 3: Provide assistance to states in adopting the Management Guidelines and meeting commitments under the Government Performance Results Act measure.

Action 4: Reaffirm policies that integrate EPA programs that share regulatory authority over various decentralized activities to assure compliance with regulatory requirements. These programs include permits for wastewater and stormwater discharges, underground injection control, source water assessment and protection, non-point source control, watersheds management, total maximum daily loads, enforcement and compliance, and coastal zones .

Action 5: Initiate efforts to improve management practices for key problem areas, including cesspools, communities lacking basic sanitation and significantly impacted source waters.

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Strategic Goal #4: Improved local decision-making through improved public awareness.

Action 1: Continue to develop outreach and education materials, disseminate materials, and reach out to organizations representing state and local officials, practitioners, financing authorities, and environmental advocacy groups.

Action 2: Explore options to promote development of appropriate management programs when funding decentralized systems using SRF.

Major Accomplishments/Actions to Date

- EPA's 1997 *Response to Congress on Use of Decentralized Wastewater Treatment Systems* is considered a landmark document that, for the first time, articulated EPA's position on decentralized systems. The report is at least partly responsible for increased activity and progress in the decentralized field.
- Since 1998, **Congressional interest** has increased, resulting in $46 million in funding specifically directed towards addressing the barriers outlined in the 1997 report to Congress.
- In 1999, the first annual **meeting of state onsite regulators** was held. The sixth annual meeting is planned for March, 2005.
- In May 2001, EPA issued a determination that Class V well regulations under the **Underground Injection Control program** are adequate to protect drinking water from existing large capacity septic system(s). As an additional layer of protection, EPA efforts to develop guidance for improving management practices were cited.
- In February 2002, EPA published its *Onsite Wastewater Treatment Systems Manual*, an extremely popular document used for designing onsite systems using a performance-based approach.
- In February 2003, EPA's highly successful **"Wastewater Month"** featured the distribution of thousands of brochures to inform homeowners of their responsibility to properly maintain septic systems.
- In March 2003, EPA released *Voluntary National Guidelines for Management of Onsite and Clustered (Decentralized) Wastewater Treatment Systems*.
- **EPA's Strategic Plan**, completed in September 2003, recognizes decentralized systems as an important part of the nation's wastewater infrastructure. The Strategic Plan incorporates a Government Performance Results Act measure to assist states in their adoption of EPA's Management Guidelines.
- In September 2003, the first national meeting of the **EPA Regional Coordinators** for the Decentralized Wastewater Program was held. Another is planned for March, 2005, and annually thereafter.

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- In June 2004, EPA's **Septic System Website** became one of the first designed under the Agency's topics-based requirement ("web-lite").
- As of September 2004, **five states have adopted the Management Guidelines**: Arizona, Florida, New Jersey, North Carolina and Rhode Island.

Next Steps

- EPA will share this program strategy with its partners and work toward the vision of appropriately performing and managed decentralized wastewater systems.
- The strategy will be evaluated and updated, as appropriate, every five years.
- EPA headquarters will work cooperatively with the EPA regional offices to implement the actions under each of the identified strategic goals.

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