

Onsite wastewater treatment systems

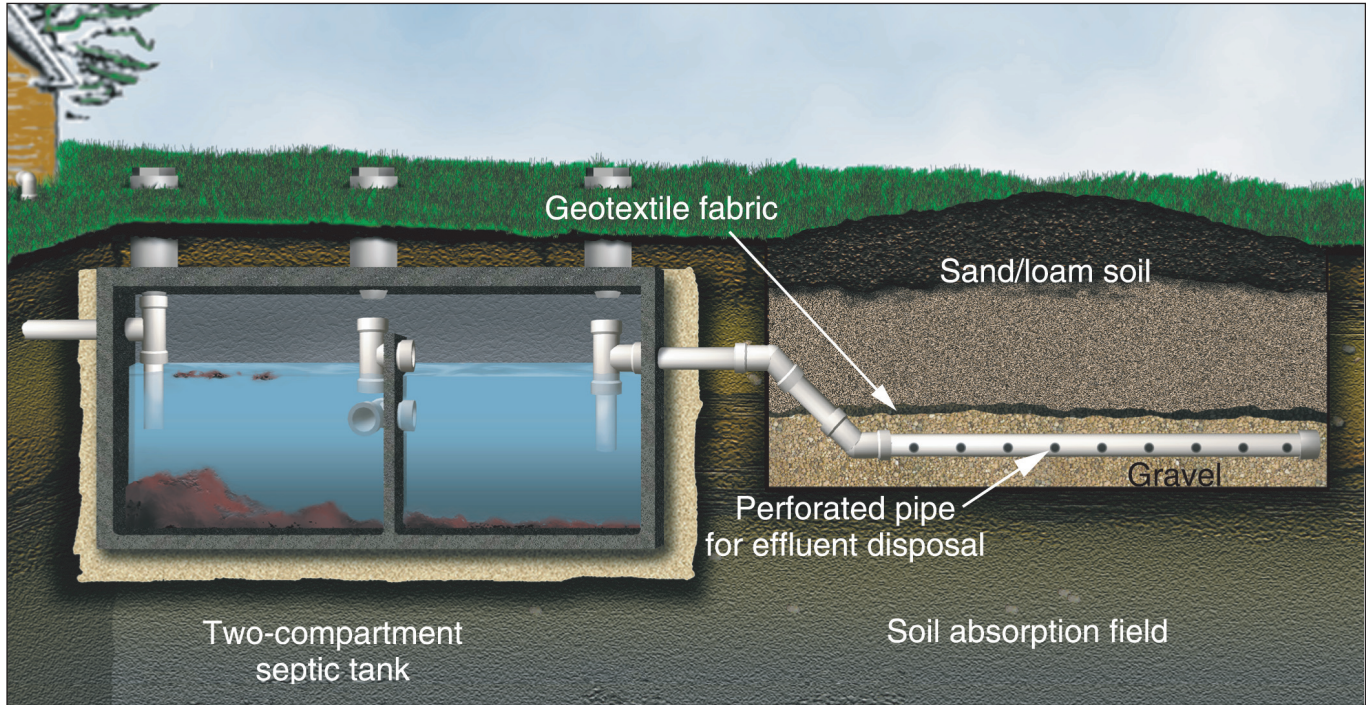


Figure 1: A septic tank and soil absorption field system.

Homeowner's guide to evaluating service contracts

Bruce J. Lesikar, Courtney O'Neill, Nancy Deal, George Loomis, David Gustafson and David Lindbo
Professor and Extension Agricultural Engineer, Extension Assistant, The Texas A&M System
Extension Associate, North Carolina State University
Extension Soil Scientist, University of Rhode Island
Assistant Extension Specialist, University of Minnesota
Associate Professor, North Carolina State University

Proper maintenance of your wastewater treatment system is critical for its performance and important for you, the owner. Your wastewater treatment system protects the health of the people living on and near your property; it helps safeguard your property values; and it helps preserve the environment.

All wastewater treatment systems require service. To maintain your system properly, you can periodically arrange for your wastewater system to be serviced yourself, or you can contract with a service provider to do it for you.

Homeowners seeking services from maintenance providers want proper service for a fair price, but

they often don't know what services are necessary for their system. As an onsite wastewater treatment system owner, you need to know:

- ✓ The definitions of terms used in discussing onsite wastewater treatment system service contracts.
- ✓ The components of your wastewater treatment system and how they work.

- ✓ Your desired level of involvement in servicing the system. If you choose to perform some of the tasks yourself, make sure you understand clearly who is responsible for the different actions—you or your service provider.
- ✓ Exactly what services you are paying for. Homeowners need to know what is included in the base price of the contract. In many cases, the fees for these maintenance agreements are comparable to or less than those charged for centralized sewer service.

✓ The kinds of contracts that may be available. A basic monitoring contract just meets the state's minimum requirement but requires more activity by the homeowner. Other contracts offer more service and limit the homeowners' involvement in the operation, maintenance, and monitoring of their systems.

Homeowners who choose not to contract with service providers for regular maintenance should keep a record reminding them of when the service should be performed and what local service providers can assist in performing the different types of activities. Some tasks should be left to professionals to make sure the job is performed correctly and that the homeowners are not subjecting their families to undue health risks.

Advantages of service contracts

A good service contract guarantees that your system is getting the attention it needs. It can save you time, eliminate the inconvenience of maintaining the system yourself, and spare you the cost of replacing a system prematurely because it was not properly maintained.

Even though you may choose to maintain your own system, contracting with a maintenance provider also saves you the time and expense of completing the required training courses as well as the need to file periodic reports to various agencies yourself.

These service providers are professionals trained in the operation and maintenance of onsite wastewater treatment technologies.

Routine service and proper maintenance can help you identify problems early and prevent malfunctions. Early detection makes it possible to take remedial action before your system becomes a public health hazard, a detriment to the environment, a problem for you and your family, or a liability with respect to your property values.

Common terms

Knowing the following terms and definitions can help you select and work effectively with an operation and maintenance (O&M) service provider.

Service: The action of performing activities such as, but not limited to, inspection, assessment, and maintenance of system components.

Acceptable: The condition in which a component is performing its intended purpose and is considered to be operable. Another term used to describe a component that is operating as expected is *operational*.

Unacceptable: A condition in which a component is not operational or performing as expected. This condition indicates the need for maintenance, upgrades, repairs, or further investigation. Another term used to describe a component that is not operating as expected is *inoperable*.

Inspection: The process of identifying the current status of system performance, for reporting purposes to state authorities. Inspections may be performed for many reasons, including monitoring, operation, troubleshooting, or point-of-sale evaluation.

Operation: The action of assessing whether each component of the system is functioning properly. Each component must be operational if the system as a whole is to achieve the desired performance.

For example, a properly operating septic tank will have three distinct layers. The presence of these layers demonstrates that solids are settling to the bottom and scum is rising to the surface, allowing a clear zone in the middle to develop.

Another example is that in chlorinating systems, the availability of chlorine must be checked, because chlorine must be present in a chlorinator for it to be operating properly.

Maintenance: The action of conducting required or routine performance checks, examinations, upkeep, cleaning or mechanical adjustments to an onsite wastewater treatment

system, including replacement of pumps, filters, aerator lines, valves, or electrical components.

Monitoring: The action of verifying performance requirements for a regulatory authority. Monitoring may include collecting water samples and measuring flow rates.

A disinfection component should be evaluated to assess its performance. To assess this component's performance, the water leaving the system is tested for total chlorine residual or for the presence of fecal coliform bacteria. If an ultraviolet light disinfection component is used, a fecal coliform test should be performed to evaluate proper disinfection.

Reporting: The submission of a detailed account of service activities performed on a system. The report could be sent to the permitting authority, homeowner and/or the facility owner. It can serve as documentation of the activities being performed and as an assessment of the current status of the onsite wastewater treatment system.

Replacement: The process of exchanging a component with an equivalent component. The new component should be the proper equipment for the treatment system.

Examples include the aerator in an aerobic treatment unit being replaced with the same model aerator, an effluent pump being replaced with a pump having the same operating characteristics, or a riser cover being replaced with the same type of riser cover.

Repair: The action of fixing or replacing substandard or damaged components of an onsite wastewater treatment system. In Texas, the replacement of tanks or drain fields is considered a repair and requires a permit for the entire onsite wastewater treatment system. At the time of the repair, the new or repaired system must comply with current state regulations.

Upgrade: The action of creating a better system by adding a component or increasing the effectiveness of an

existing component. Upgrades do not necessarily change the performance of a system, but they can make it easier to maintain or increase the robustness of the process.

Examples of upgrades include adding effluent screens in the outlet baffle of a septic tank, adding risers to frequently accessed components, installing additional sensors to the system, adding remote monitoring, and changing the type of disinfection component.

Troubleshooting: The act of finding and eliminating sources of problems in the wastewater system. The service provider or other professional must evaluate the system to determine why it is not performing well.

Troubleshooting requires that the service provider have in-depth knowledge of treatment processes and the reactions of treatment components to various possible wastewater constituents. A service provider who can conduct troubleshooting is a specialist in this field.

Mitigation: The act of fixing a system that is malfunctioning. Before the system is repaired, all of its components (source, collection, pretreatment, and final treatment and dispersal) should be evaluated to determine all the reasons for nonperformance.

Compensation: The action of receiving a fair price for a proper service. Compensation is critical to making the whole management process function. Compensation is generally received in the form of a base contract fee. Fees may cover the costs of repairs, replacement parts, maintenance, and the labor required to provide the additional service.

The homeowner must clearly understand what is included in the base price and what is considered an extra charge. Also, you need to understand clearly how authorization is given to allow extra charges to be accrued.

Contract (service contract): A legal document that describes the relationship between the facility owner

and service provider. The service contract should list:

- ✓ Frequency of service visits
- ✓ Services included in the base price
- ✓ Services requiring an extra charge
- ✓ Maintenance parts included in the base price
- ✓ Maintenance activities outside the scope of the contract
- ✓ Facility owner responsibilities regarding use of the onsite wastewater treatment system.
- ✓ Timeframe for responding to complaints
- ✓ Responsibility for maintaining the disinfection device

Management: A collective term describing all the steps needed to conduct operational services, maintenance, monitoring, and compensation. All of these activities are essential for keeping an onsite wastewater treatment system performing properly.

Malfunctioning OSSF: An onsite sewage facility that is causing a nuisance or is not operating in compliance with the regulations.

Nuisance: (1) Sewage, human excreta, or other organic waste discharged or exposed in a manner that makes it a potential instrument or medium in the transmission of disease to or between people; (2) an overflow from a septic tank or similar device, including surface discharge from or groundwater contamination by a component of an onsite sewage facility; (3) a blatant discharge from an onsite sewage facility.

Maintenance provider: A person who maintains onsite sewage facilities for compensation. This person is licensed through the Texas Commission on Environmental Quality (TCEQ), the state regulatory authority.

Maintenance technician: A person who holds a valid registration issued by the executive director of the TCEQ to maintain onsite sewage facilities and work under a maintenance provider.

Frequency of service activities

All onsite wastewater treatment systems require regular maintenance. Four factors affect the frequency of activities:

- ✓ Regulations
- ✓ Site conditions and population density
- ✓ Technology
- ✓ Wastewater source or use

Regulations take into consideration environmental risk, public health risks, and population density when defining frequency of monitoring activities. Regulatory authorities are established primarily to protect public and environmental health. They determine:

- ✓ Which wastewater treatment systems require scheduled service visits and reporting of service activities
- ✓ How well those systems must perform
- ✓ How often the systems must be monitored for performance

The performance of an onsite wastewater treatment system is measured by field or laboratory tests of the water leaving the system.

In Texas, residential onsite wastewater treatment systems must be monitored every 4 months, or three times a year. This requirement directly relates to the technologies providing advance treatment and dispersal. The number of service visits can be increased by the local permitting authority or the designer of the system.

The permitting authority can increase the number of service visits based on the amount of waste treated or on public and environmental risks. The designer can specify more service visits if a specific configuration of treatment components and wastewater loading requires additional service visits to keep the system operating properly.

Site conditions also affect the frequency of service activities needed to prevent environmental and public

health problems. Environmental risk relates to the sensitivity of your site to acceptance of wastewater.

A site with deep, well-drained soil will have an excellent ability to accept and treat wastewater. This site will also have a low environmental risk. On the other hand, a site with a heavy clay soil, shallow soil overlying rock or hard caliche, a rocky soil, a seasonally saturated soil, or poor surface drainage has a limited ability to accept or treat wastewater.

Wastewater treatment systems located on these tougher sites pose greater risks to the environment. Treatment systems located near surface water such as lakes, rivers, or wetlands are also a greater risk to public health and the environment, because the constituents in the wastewater have a greater chance of human contact.

Population density affects the risk of harm that a system poses to public health. As population density increases, wastewater treatment systems are placed on smaller lots. This brings a greater risk of disease-causing organisms, or pathogens, leaving malfunctioning systems and reaching the neighbors.

In many areas, a higher population also means an increase in the number of water wells, which also carries a greater risk of wastewater contamination.

Wastewater treatment technologies have specific service activities based on their treatment processes. All treatment processes require some level of service to keep them functioning.

In general, advanced treatment technologies are more complex than is standard technology and therefore require more frequent service visits. The manufacturer of each technology should have set service guidelines to ensure proper operation of the systems.

The **wastewater source or use** and its associated wastewater loading to the onsite wastewater treatment system also affect the frequency of

service visits. All wastewater treatment systems are designed to treat a specific capacity of wastewater based on both water quantity and the strength of the wastewater.

Water quantity is an estimate of the number of gallons of wastewater that a system can accept and treat every day. Wastewater strength is measured by its biochemical oxygen demand (BOD₅) and by its concentration of solids, fats, oils, and grease.

The strength of the wastewater is directly related to the number of people living in the residence and their tendency to put additional waste material into the system, such as through the use of a garbage disposal.

An onsite wastewater treatment system is designed to treat the wastewater from a specific number of people. In Texas, that is generally estimated by the number of bedrooms in the facility plus one. Therefore, a three-bedroom home is expected to have a maximum of four people living in the home.

If a system is loaded at a rate lower than the design rate, some of the service activities may need to be performed less often than expected. Likewise, if a system is loaded at or higher than the design rate, the service activities may need to be performed more frequently than normal.

Generally, an onsite wastewater treatment system is assumed not be loaded at a rate more than 70 percent of the design flow rate. If the load averages more than 70 percent, the treatment system can be augmented

with additional components, such as a flow equalization tank and a timer. This flow equalization tank and timer will help limit the risk of hydraulically overloading the following treatment components. Any treatment components before the flow equalization tank will need upsizing to accept and treat the peak hydraulic loading rate.

The organic loading is based on the number of people living in the house. If the organic loading rate exceeds the design value, the service activities will need to be performed more often.

Understanding your onsite wastewater treatment system

To select a service provider, homeowners need to know the components of their onsite wastewater treatment system and understand how they work. These systems can be divided into four components: wastewater source or use, wastewater collection, pretreatment, and final treatment and dispersal (Fig. 2).

The **wastewater source** or use is actually the type of facility that the wastewater treatment system is serving; it can be a residence or a commercial operation.

The **wastewater collection system** is generally the plumbing that conveys the wastewater to the pretreatment component.

The **pretreatment component** varies based on your site conditions

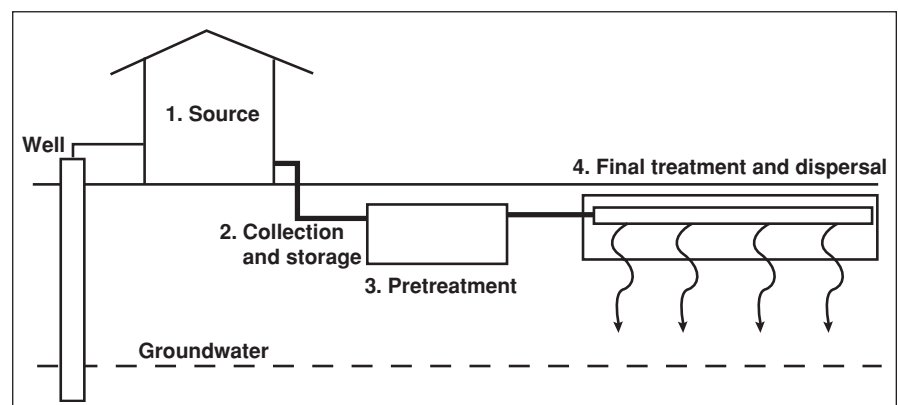


Figure 2. The components of an on-site wastewater treatment system.

and the type of final treatment and dispersal component being used. This component removes the necessary contaminants from the wastewater to obtain an effluent that can be accepted and treated by the final treatment and dispersal component.

A pretreatment component can consist of a septic tank(s), aerobic treatment unit, media filter, constructed wetland and/or disinfection unit.

The **final treatment and dispersal component** accepts the effluent from the pretreatment component, completes the treatment process, and disperses the effluent into the receiving environment.

Final treatment and dispersal components include media-filled trenches, gravel-less trench technology, low-pressure pipe drainfields, drip distribution fields, or spray distribution fields.

The designer of your system selects and sizes the components to build a system that can accept the wastewater from your facility and disperse clean water back into the environment.

There are many kinds of onsite wastewater treatment systems available. Knowing the type of system on your property will help you determine your service needs. You'll need to know:

- ✓ Where is the onsite wastewater treatment system located on the property?
- ✓ What pretreatment and final treatment and dispersal technologies are assembled to treat the wastewater generated there?
- ✓ What are the basic activities associated with the service of your technology?
- ✓ Are there any special laws or regulations regarding the service of your onsite wastewater treatment system?

This publication describes the general service activities associated with onsite wastewater treatment systems. More information on the

service of your particular technology is available from the Texas AgriLife Extension Service's onsite wastewater treatment fact sheet series. It can be accessed from the Web at <http://ossf.tamu.edu>.

How do you know what service is needed for your system?

Most technologies come with suggested maintenance activities from the manufacturer. They may include a specific frequency of service activities or an estimate of the hours required for maintaining the system. The manufacturer should also provide an estimate of the types of parts that need to be replaced and the frequency of their replacement.

If no information on your system is available, check similar technologies or seek advice from a professional or your local regulator. Also check with the regulatory agencies for any guidelines or regulations that may be in place in your area for certain technologies.

Who is required to have a service contract and report service activities?

Texas has established its contract and reporting requirement based on technology. Technologically, pretreatment components that are designed to meet secondary treatment standards (advanced organic matter and solids removal) require monitoring.

Texas regulations allow homeowners to service their own systems without meeting reporting requirements. Some individual jurisdictions require a service contract and reports on the system status. These jurisdictions may require homeowners to be trained if they wish to maintain their systems.

These pretreatment systems include aerobic treatment units, sand filters, media filters, trickling filters, and disinfection technologies. Pretreatment and final treatment and dispersal components can be mixed

and matched to develop a complete onsite wastewater treatment system.

The use of other technologies, such as a septic tank, may not require a contract or reporting of service activities, but long-term performance can be improved by having a long-term relationship with a service provider.

Generally, a service contract is obtained by the homeowner to have the required service performed and the required reporting submitted. However, homeowners who wish to maintain their systems must accept responsibility for conducting the service.

Once homeowners learn what is required to service their onsite wastewater treatment systems, many choose to contract for the service with service providers. Ultimately, homeowners are responsible for the operation of their onsite wastewater treatment system.

What types of service contracts are available?

Several types of service contracts are available. A common mistake by many homeowners is to compare initial prices for service contracts but not compare the services offered. Homeowners need to know the actual service they will receive for the given contract they are signing. As the amount of service increases, the costs will also rise to cover the additional activities.

A **monitoring contract** is a contract for monitoring (testing) the onsite wastewater treatment system performance. The service provider will *only* collect samples and deliver the required information for reporting to you and to the permitting authority. Other actions typically add costs.

An **operating contract** is a contract for assessing whether the components are operable. The service provider will evaluate each component of the system and document its current operating condition. Under

this contract, the service provider will identify the components needing maintenance or repair but will not perform these services.

A **maintenance contract** is a contract for conducting the routine activities associated with keeping the components operating properly. The service provider will perform the manufacturer-recommended actions to keep the onsite wastewater treatment system functioning. This contract may not include less frequent activities, such as the removal of residuals from the treatment components.

Most service contracts are actually a combination of the various contracts outlined above. A service contract may cover both monitoring and operation, or it may include monitoring, operation, and maintenance (MOM).

A MOM contract is the minimum level of service recommended, because the service provider would conduct the performance monitoring required by the permitting authority, evaluate the operational status of the components, and provide routine maintenance activities. MOM contracts may or may not include less frequent activities such as removing residuals.

A **repair contract** is a contract for replacement of components as they break or fail to operate as appropriate. Be sure to evaluate the contract to determine what is covered regarding labor associated with replacement of components and the replacement parts themselves.

A **management contract** is an all-inclusive plan. This contract could be equivalent to being served by a centralized sewer system. The service provider performs all the required activities for monitoring, operation, maintenance, and repair.

Management contracts are fairly new, and a few providers are even including mitigation of a malfunctioning system as a part of the contract. This does not relieve the homeowners of their responsibilities regarding

wastewater constituents that they are adding to their systems.

Currently, only a few service providers offer management contracts. Most service contracts are a combination of the previously described service contracts.

For example, the minimum level of service contract should be a combination of operating and monitoring contracts. Therefore, the service provider should conduct required performance testing of the effluent to meet requirements and assess the operational status of the system components. The service provider may offer other services such as maintenance and repairs on a fee basis.

How do I compare service contracts?

The homeowner or facility owner must compare not only the price, but also what is included in the base price of the contract. You need to evaluate the contract thoroughly to determine:

- ✓ What services are included in the base price?
- ✓ What services are available for an additional fee?
- ✓ What is the hourly rate for performing additional services?
- ✓ When do additional charges begin to accrue?
- ✓ How are the additional service and associated fee approved?
- ✓ What are the homeowner's required activities associated with the operation of the system?
- ✓ When is payment due for the services being performed?
- ✓ What information will you, the homeowner, receive to let you know what base service was performed and when?
- ✓ How will you know when someone will arrive to conduct the service?
- ✓ How should you contact the service provider when an alarm has sounded indicating that the system needs service? How is the charge calculated for that extra service call?

- ✓ How will troubleshooting and subsequent repairs be handled when a system needs extra service?
- ✓ What are the homeowner's or facility owner's responsibilities regarding the operation of the system?
- ✓ What activities will you perform yourself?
- ✓ Are you required to use this service provider to replace parts or conduct maintenance?
- ✓ How long will it take for the provider to respond to an alarm condition?

In addition to evaluating the contract, you should also evaluate the service provider:

- ✓ What is the firm's record with the Better Business Bureau?
- ✓ What do references say regarding the firm's work?
- ✓ How many onsite wastewater treatment systems does the firm service in a day? It takes time to provide service on a system.

You need to know the answers to all of these questions to help you make an informed decision regarding the selection of a service contract and provider. The least expensive base service contract may not be the best deal. It is important to know what is included in the base price, which services will require an additional fee, and how those additional fees will be approved and calculated.

How do I find a local service provider?

There are three approaches to locating a service provider. The first approach is to contact the TCEQ and ask for a list of people who are licensed and are potential service providers.

The TCEQ has a Web site that can help you find professionals in your area: http://www.tceq.state.tx.us/compliance_support/data/ossf_search.html. You will need to search the site for individuals with a maintenance provider license and then contact them.

The second approach is to contact the local permitting authority to obtain a list of the professionals in your area.

The third approach is to ask the manufacturer of your onsite wastewater treatment system components for a listing of service providers in your area.

Summary

Wastewater will continue to be generated as a part of our daily activities. Effective management of wastewater is critical to protecting public health, environmental health and property values.

All wastewater treatment technologies require service. However, the type and frequency depends on the specific technologies used to assemble the wastewater treatment system on your site and how you use water.

Several different types of service contracts are available to the homeowner. The basic monitoring contract meets only the minimum requirement. But this contract requires more activity by the homeowner. Additional components of contracts can offer more service and limit the homeowner's involvement in the operation, maintenance, and monitoring of the wastewater treatment systems.

When evaluating all contract options, make sure you clearly understand who is responsible for the different actions—you or your service provider—and what is included in the base price of the contract.

Homeowners who choose not to contract for these services should keep maintenance records that remind them of when service should be performed. They should also keep a list of local service providers who

can perform the different types of activities. Some tasks should be left to professionals to make sure that the job is performed correctly and that you are not subjecting yourself and your family to undue health risks.

A good service contract guarantees that your system is getting the proper attention it needs, and it can save you time, the hassle of maintaining the system yourself, and the cost of replacing a system prematurely because of simply not taking care of the system.

Acknowledgment

This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture under Agreement No. 2005-45049-03209.

The Onsite Wastewater Treatment Systems series of publications is a result of collaborative efforts of various agencies, organizations and funding sources. We would like to acknowledge the following collaborators:

Texas State Soil and Water Conservation Board	USEPA 319(h) Program
Texas On-Site Wastewater Treatment Research Council	Texas AgriLife Extension Service
Texas Commission on Environmental Quality	Texas AgriLife Research
Consortium of Institutes for Decentralized Wastewater Treatment	USDA Natural Resources Conservation Service

All publications in the On-Site Wastewater Treatment Systems series can be downloaded from the World Wide Web at:
<http://AgriLifeExtension.tamu.edu>.

Produced by AgriLife Communications and Marketing, The Texas A&M System
Extension publications can be found on the Web at: <http://AgriLifeBookstore.org>.
Visit Texas AgriLife Extension Service at <http://AgriLifeExtension.tamu.edu>.

Educational programs of the Texas AgriLife Extension Service are open to all people without regard to race, color, sex, disability, religion, age, or national origin.

10M, Revision
