



# The Status and Future of Decentralized and Onsite Wastewater Treatment Technologies in Florida

**Leading the way with the most environmentally safe, cost-effective, and sustainable wastewater treatment and water recycling choices.**

This white paper was commissioned by the Florida Onsite Wastewater Association, Inc. (FOWA), a nonprofit corporation, and is intended to examine the status of Florida's water recycling efforts and offer sound choices for future water management efforts. A stated purpose of the organization's bylaws is "to protect and maintain the environment of the state of Florida . . ."[1]. Likewise, developing open communication channels about sustainable protection of Florida's environment is the underlying purpose of this white paper. However, the issues of managing water resources are extremely complex and dynamic, encompassing diverse commercial interests, economic impacts, and sociopolitical climates.

This paper addresses three main areas of concern:

- public and political perceptions and the influence they exert upon policies and practices relating to water conservation and recycling;
- the necessity for advancements in education and management efforts relating to water reclamation in order to implement standards for efficient and sustainable onsite wastewater treatment and water recycling; and
- the need for statewide communication, understanding, and relationship-building among all those concerned with Florida's environment and water management issues.

## Section 1: Perceptions

### **water, water, everywhere . . . (you know the rest)**

Our planet earth is a magnificent hydrology system. The vast majority of the Earth's surface is covered by water, yet only three percent of the planet's total is fresh water. Of that amount, two-thirds is frozen. The remainder makes up our earthly freshwater "budget," comprising one percent of the

planet's hydrologic total—two-thirds of which is categorized as groundwater (as opposed to surface water) [6].

Aside from irrigation and other industrial water usage, this freshwater we humans use ultimately goes down the toilet and drain, literally. These flows are known as domestic wastewater, requiring treatment processes before release back into the environment to recharge the aforementioned limited groundwater supply. No wonder the U.S. Environmental Protection Agency (EPA) and most other environmental organizations devote keen concern and attention to this delicate groundwater resource.

The treatment and recycling of this wastewater is accomplished via two basic methods:

- centralized collection and treatment systems, generally consolidating mass volumes of contributing users' wastewater for processing and discharge—these centralized systems are often publicly owned treatment works (POTW); and
- decentralized or onsite wastewater treatment systems (OWTS), used to treat and discharge relatively small volumes of wastewater—these systems also are commonly referred to as septic systems, private sewage systems, or individual sewage systems [10].

Do not allow the simple language above (i.e., mass volumes and small volumes) to create false perceptions as to the size and scope of these two water-recycling methods. According to EPA,

"Decentralized wastewater treatment is a very common treatment option in the United States. About one-fourth of the total population is served by OWTS, and about one-third of new construction employs this type of treatment . . . more than one-half of onsite systems are found in metropolitan areas" [10].

In Florida, 31 percent of the population is served by an estimated 2.3 million OWTS [2].



Visitors to the Florida Onsite Wastewater Association (FOWA) Training Center in Lake Alfred learn about alternative onsite system technologies.

During the latest one-year reporting period, 42,000 new OWTS were permitted across the state. Besides potential misconceptions as to the numbers of Americans served by OWTS, there may exist perceptions that centralized systems yield “better” treatment.

In its first report to Congress, which examined the feasibility of decentralized treatment as a lesser-cost option for many communities with wastewater treatment needs, EPA reported the following:

“Adequately managed decentralized wastewater treatment systems are a cost-effective and long-term option for meeting public health and water quality goals. New technologies are being applied to onsite systems, resulting in higher treatment levels, greater reliability, and more flexibility than ever before. In many communities onsite and decentralized systems are the most appropriate, least costly treatment option, and they allow maximum flexibility in planning for future growth” [10].

In its second report to Congress in 2003, EPA states these findings even more strongly:

“Properly managed onsite/decentralized systems offer several advantages over centralized wastewater treatment facilities. The construction and maintenance costs of onsite/decentralized systems can be lower, especially in low-density residential areas, mak-

ing them an attractive alternative . . . . (OWTS) also avoid potentially large transfers of water from one watershed to another via centralized collection and treatment. Both centralized and OWTS need to be considered when upgrading failing systems” [9].

In Florida, as we shall closely examine in Section 3, the freedom to choose OWTS technologies has been leg-

islatively negated via statutory law, which dictates mandatory connections to centralized systems.

Listing barriers to implementation of more effective OWTS management programs, the first barrier mentioned by EPA is: “Lack of knowledge and public misperceptions that centralized sewage treatment plants perform better, protect property values, and are more acceptable than decentralized treatment systems” [7]. EPA is committed to elevating the standards of onsite wastewater management practices and removing barriers to preclude widespread acceptance of onsite treatment technologies [9].

### **a billion here, a billion there . . . pretty soon we’re talking real money**

After pointing out how very precious that usable water “budget” remains, you can correctly surmise that water does not come cheaply. The replacement value of the nation’s existing infrastructure for the potable water supply and wastewater collection, treatment, and discharge amounts to an astonishing estimate in the trillions of dollars. No exact figure can be determined. EPA, however, is very exact in identifying current capital needs. In the newest report to Congress, the agency identifies \$181.2 billion dollars in existing needs for POTW collection and treatment facilities. That represents an increase of \$26.6 billion from the 1997 report to Congress.

Future needs will be even more pressing. According to the Water Infrastructure Network, “New solutions are needed to what amounts to nearly a trillion dollars in critical water and waste-

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water investments over the next two decades. Not meeting the investment needs of the next 20 years risks reversing the public health, environmental, and economic gains of the last three decades" [7].

Ecological damage from system failures can be equally costly. Just as EPA supports advancements in OWTS, new rules are being proposed to expand and clarify permit requirements for 19,000 POTW collection systems in order to reduce sanitary sewer overflows (SSOs). EPA estimates there are at least 40,000 SSOs each year. Untreated sewage from these overflows contaminates our waters, causing serious water quality problems. It can also back up into basements, causing property damage and threatening public health [8].

The Citizens Environmental Research Council estimates that of the 42,600 POTW and privately owned centralized sewer systems, two-thirds may experience SSOs annually. The council's research indicates that the average number of overflows per system is 50 per year for medium-sized sewage operations serving 10,000 to 25,000 populations. Using these estimates, at least 140,000 SSOs occur nationally each year. "Even this number, most likely, seriously underestimates the total size of the SSO problem," states the council. Regulators currently estimate that SSOs are responsible for 1.26 trillion gallons of untreated sewage flowing into the nation's waters annually. In the most recent report to Congress, EPA estimates immediate needs of \$50.6 billion just for SSO control. In contrast, EPA estimates failures of OWTS to annually contribute some 250 billion gallons of improperly treated wastewater discharge [9].

Perceptions and impressions aside, this data speaks for itself. The environmental crisis of SSOs from our nation's centralized treatment systems is at least fivefold the impact of OWTS failures. Using the Citizens Environmental Research Council estimates, POTWs could discharge 1,600 percent greater amounts of untreated sewage into our environment than all the OWTS combined. Yet the public misconceptions persist, as EPA points out, ". . . that centralized sewage treatment plants perform better, protect property values, and are more acceptable . . ." than OWTS.

## Section 2: Advancements

Do not mistake the aforementioned facts to represent an argument portraying centralized water and wastewater utilities in America as "the enemy" of our environment, the national economy, or the onsite wastewater industry. Centralized collection and treatment certainly has its place

where development densities and geographic/geologic limitations preclude OWTS entirely. The purpose of this white paper is to factually inform the public and to publicize EPA's stance that "both centralized and onsite/decentralized systems need to be considered when upgrading systems" and that "adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals."

### Knowledge is good.

This brings us to the important topic of an "adequately managed" system. The Groundwater Foundation reiterates EPA's acceptance of OWTS as a viable treatment choice: "Homeowners who have a septic system that is properly designed and installed, and correctly operated and maintained, should receive years of reliable service with minimum risks to human and environmental health" [3].

The Foundation notes numerous ways for OWTS owners to minimize potential impacts that onsite wastewater systems may have on the environment, including the following:

- Regular inspection every two to three years is generally recommended.
- Conserve hydraulic overloads, a major cause of system failure.
- Care for the drainfield—plant/tree roots and vehicles/heavy equipment are common damage culprits.
- Limit the type and amount of household wastes poured down the drain [3].

Referring again to the most recent report to Congress, "EPA is committed to elevating the standards of onsite wastewater management practices and removing barriers to preclude widespread acceptance of onsite treatment technologies." The agency cites as one of the main barriers to more effective onsite wastewater management programs, "Ineffective or nonexistent public education and training programs." Actually, information abounds pertaining to proper maintenance and management of OWTS. Public attention (i.e. media awareness and exposure) and public access to this information is what's needed. State health agencies, local health departments, cooperative extension offices, and many of the agencies and organizations referred to at the end of this paper are excellent resources.

One of the most concise references for OWTS owners is published by FOWA, titled *The Magic Box: Your Septic Tank*. The short pamphlet is an excellent source of information about how an OWTS operates, promoting awareness about

maintaining your system and the need for regular inspection. The pamphlet is available from FOWA (see contact information on page 19), and in 2005 will be available on the association's Web site at [www.fowaonsite.com](http://www.fowaonsite.com).

FOWA is spearheading an industry-wide movement in Florida and across the nation to develop management standards for OWTS. Along with support from EPA's OWTS program, the Groundwater Foundations's septic system education project, and others, a relatively new *Model Framework For Unsewered Wastewater Infrastructure* guides FOWA's efforts [4]. Adopted in late 1999 by the board of the National Onsite Wastewater Recycling Association (NOWRA), the goal of the Model Framework is to achieve sustainable development while protecting human health and environmental quality. NOWRA, as in the case of previously cited parties of interest, recognizes that "The most critical element to ensure that consistency is maintained is Education." We will devote space and attention here to this Model Framework, as it is one of the most thoughtful and forward-looking observations of the current (and future) state of our natural water resources, and water recycling.



FOWA Director Kevin Sherman (foreground) and Jim Owen of the Polk County health department measure fluid flow from short and long pipes at the training center.

The Model Framework states that traditional "prescribed" models cannot achieve the goal of sustainability. A prescribed model is detrimental to achieving such goals because it largely ignores local environmental sensitivities and thwarts innovation. The prescribed model approach is unable to adequately balance human health and environmental protection with economic development pressures. The Model Framework contains critical components to achieve its goal—sustainable development. However, NOWRA emphasizes the necessity of each element, which collectively constitutes a total system capable of excellence in performance, and, therefore, promotes each of these seven elements equally:

1. performance requirements that protect human health and the environment;
2. system management to maintain performance within the established performance requirements;
3. compliance monitoring and enforcement to ensure system performance is achieved and maintained;
4. technical guidelines for site evaluation, design, construction, operation and acceptable prescriptive designs for specific site conditions and use;
5. education/training for all practitioners, planners, and owners;
6. certification/licensing for all practitioners to maintain standards of competence and conduct; and
7. program reviews to identify knowledge gaps, implementing shortcomings and necessary corrective actions [4].

NOWRA intends its Model Framework as the national ideal for building and maintaining OWTS infrastructure, and FOWA supports and advances its goals as the base for developing and sustaining similar standards in Florida.

### Creating the Standards

In the state of Florida, OWTS installation and use is regulated by the state Department of Health (DOH) Bureau of Onsite Sewage Programs, and individual county environmental health units (through Chapter 381, Florida Statutes and Chapter 64E-6, Florida Administrative Code). Onsite wastewater system contractors are licensed by DOH, which also issues individual permits for new OWTS construction and repair of existing systems. The actual number of repair per-

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mits issued by DOH during the latest reporting year was 18,708. As a percentage of the state's estimated 2.3 million OWTS, less than one percent required repair.

DOH contracts with FOWA to provide continuing education courses required for its personnel and licensed OWTS contractors' continuing education units. An actual hands-on training center is owned and operated by FOWA near Lake Alfred, Florida. Another of the vital elements of its Model Framework, NOWRA contends that "Licensing/certification of all practitioners is the fundamental link to maintain high standards of competence and conduct. Continuing education is a central tenet . . . for licensing and certification programs."

One of FOWA's goals, in line with the NOWRA Model Framework, is to develop standards of OWTS management. NOWRA's model calls for a governmental regulatory agency to have continuous oversight of the performance of all OWTS. Management of an OWTS must be provided by the system's owner. Upon surveillance and documentation of performance by said regulatory agency, a renewable operating permit would be issued to the responsible party (i.e., owner) [4].

A more manageable plan might be for specifically trained and sanctioned private contractors to conduct the direct inspection, permitting and reporting duties called for—ultimately overseen by DOH. Onsite systems across the state could be required to obtain a new "DOH certified system" designation, a statewide renewable operating permit granted by licensed private inspection professionals, following acceptable performance evaluations at set intervals (i.e., every two to three years). DOH could ensure compliance and administer enforcement by conducting spot checks randomly. The renewable operating permit, documented and filed with DOH, could be required to be current before granting transfers of title/property, rezoning, estate settlements, or other legal proceedings under the jurisdiction of and requiring state and/or county documentation and recording.

Whatever form these standards take for management of Florida's OWTS infrastructure, they must be economically and logistically feasible, accountable, and sustainable.

### Section 3: Relationship Building

As noted earlier, there are disparate interests across Florida concerning environmental issues and, in particular, water recycling. It is clear that all concerned could benefit from a level playing field,

where one framework is established that applies fairly and equitably. Sustainability of the state's existing and future economic and environmental assets should drive this framework of fairness.

### **doublespeak, double standards, double jeopardy.**

Florida Statutes Title XXIX, Chapter 381.0065, begins as follows:

"It is the intent of the Legislature that where a publicly owned or investor-owned sewerage system is not available, the department (DOH) shall issue permits for the construction, installation, modification, abandonment, or repair of onsite sewage treatment and disposal systems."

Chapter 381.00655 follows:

"Connection of existing onsite sewage treatment and disposal systems to central sewerage system; requirements. (1)(a) The owner of a properly functioning onsite sewage treatment and disposal system . . . . . must connect the system or the building's plumbing to an available publicly owned or investor-owned sewerage system within 365 days after written notification by the owner of the publicly owned or investor-owned sewerage system that the system is available for connection."

Therefore, while Florida encourages a properly installed and maintained OWTS, a property owner with a brand new state-of-the-art OWTS could very soon be legally forced to abandon that system in favor of (mandatory) hookup to an expanding POTW and pay dearly for the "privilege." The statute (381) reads that the POTW notify owners one year in advance of expected completion of centralized collection lines abutting said property. Once available for hookup, states 381, that owner then has exactly 365 days to connect into the POTW collection lines, complete with accompanying connection fees imposed as the local jurisdictional governmental body sees fit. These "impact fees" vary in amounts across Florida, ranging as high as \$30,000 for water and sewer connections. That same owner then becomes the POTW's customer, paying for his monthly sewer service. The only costs associated with the new OWTS, after installation expense, would have been routine maintenance.

That's where the double standard—and much more than double expense—comes in. This same owner has already complied with statutory mandates for the installation of his OWTS. (No more

than four OWTS, adhering to strict setback limitations, are permissible per acre in Florida, where public water is available. Where private wells are concerned, no more than two OWTS are allowable per acre. Localized zoning regulations can be more restrictive. The state statutes set “no-greater-than” density requirements).

Our owner in this example has obtained all proper OWTS permits from DOH, and paid for the system’s installation. With proper management and maintenance, that system could be expected to function properly for 30 years or more. But, alas, the owner has elected to build his future in the path of “progress.” Sewer expansions are announced. Construction begins the next year. Completion the year following. Then comes hookup year for our owner—some “progress.” It’s more like our owner built in the path of poverty.

Certainly, anyone faced with the preceding scenario would feel himself or herself somewhat poorer for the experience—a legislatively mandated experience at that. (Chapter 381 does provide provision for financial “hardship”: owners who can prove said hardship get to extend their hookup fees over five years worth of interest-free monthly payments).

### **Fair play for Floridians? Or fair game for fee collectors?**

Most citizens remain of the belief that their government exists to protect property values and standards of living. This is certainly not the case when it comes to Chapter 381. Though contention can be made against mandatory POTW hookups in general, even where existing centralized systems exist, the most troublesome aspect of 381 is the hookup requirement to a future centralized collection expansion. Local governments and investor-owned utilities have come to relish and rely on these “legislated” income sources. Annexation attempts—and POTW utility expansions—are in the news daily across Florida. What fiscally aware and budget-conscious official wouldn’t grasp at such a generous source of income potential? The thinking goes as follows: One hundred new homes in that sewered subdivision, times \$10,000 hookup fees per home, plus ongoing (i.e., never-ending) monthly service rates of \$100 a month. That’s \$2.2 million over ten years, and none of it includes ad-valorem taxes (i.e., \$2.2 million into the county/city coffers, with no tax increase).

The above example is not some fictitious fable. A proposed 2003 town ordinance in Florida calls for creation of a wastewater utility district extending up to five miles beyond the corporate limits of

the municipality, requiring customers in that area to connect within 180 days of when it becomes available [5]. The problem here is not development, POTW systems, impact fees, or local governments and the utility systems they own/operate. A sustainable Florida for the future must include functional and increasingly efficient POTW and OWTS. We have already examined the expense of maintaining existing POTW infrastructure, let alone constructing and maintaining new systems brought online. The problem with Florida’s legislation as it exists now in regards to mandatory POTW connections is the double standard language we have examined. The statute creates the potential for Florida’s citizens to suffer the double whammy of paying twice for the same intent: recycling our precious water resources in an ecologically sound and sustainable manner.

### **The Message**

Perhaps our language is skewed, because our perceptions are skewed, as we discussed in Section 1 of this paper. Somewhere along the line the message became garbled. Or perhaps, given the advantages to development interests and municipal budget coffers, we deceived ourselves that somehow centralized systems are superior and more acceptable compared to onsite systems. EPA has certainly recognized this, as we again refer to its latest Report to Congress, citing as the main barriers towards implementing more effective onsite programs:

- lack of knowledge and public misperceptions that centralized sewage treatment plants perform better, protect property values, and are more acceptable than decentralized systems;
- legislative and regulatory constraints and prescriptive requirements that discourage local jurisdictions from developing or implementing effective management and oversight functions;
- splitting of regulatory authority, which limits the evaluation of alternatives;
- liability laws that discourage innovation... in designing innovative, effective, low-cost systems; and
- other financial or institutional barriers that prevent communities from accessing funds, considering alternative wastewater treatment approaches, or creating management entities that span jurisdictions of multiple agencies [9].

The message needs to be turned around. Instead of clamoring to expand centralized utility

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systems, local jurisdictional leaders should be champions of “Florida’s economically sustainable and ecologically sound future, utilizing the nation’s leading onsite treatment technologies and management, in concert with progressive centralized treatment systems.” We cannot emphasize EPA’s current stance strongly and loudly enough:

“Adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals. Properly managed onsite systems offer several advantages over centralized wastewater treatment facilities. Onsite systems can protect public health and the environment and can lower capital and maintenance costs.”

A balance must be maintained in the ratio between waters recycled through onsite and centralized systems. Any further “lean” of that ratio towards the centralized system will simply not be sustainable for our future. Floridians of every social, economic, and political persuasion need to get this message through their heads: we’re going to have to scramble to scrape together every available penny to maintain and retrofit the state’s existing centralized water/wastewater infrastructure. If we continue to demand expansion of those systems, there simply will not be enough money to go around. Seeking to subsidize such a losing proposition with the hard-earned dollars of the 31 percent of Florida’s population already served by modern and efficient onsite water recycling? That’s simply not sustainable. In fact, it’s outright unacceptable.

### Conclusions (with a call to action)

FOWA will do its part to help lead this effort towards creating the most efficient, cost-effective, environmentally-safe and sustainable wastewater treatment and water recycling choices. The prioritized three-year action plan of FOWA includes the following goals:

- continuing to advance the professionalism of the onsite wastewater industry statewide,
- continuing to communicate the economic and sustainability benefits of OWTS in Florida,
- developing the OWTS standards for compliance certifications and renewable operating permits, and
- providing education, developing communication channels, and lobbying political support to eliminate the bias against free choice and potential economic hardships currently dictated by Florida Statute 381.

Where allowable, building densities exist—or can be planned—within master communities and/or subdivisions, developers utilizing OWTS can gain the position of being the cost-cutting, nature-loving, environmentally friendly builders, improving Florida’s water recycling efforts and ecology, while saving their customers money. Instead of a legacy of annexation and utility expansions, Florida’s politicians who embrace the pro-choice stance for OWTS can point to a record of cost savings for citizens (i.e., voters), while diminishing future large-scale ecological dangers and liability from potential SSOs. Knowing there is a sustainable economic future in store, educators, students, scientists and engineers can exert influence and brainpower towards developing yet more efficient generations of onsite treatment technologies. They can expand the existing universe of site evaluations, with the correct environmental conditions where OWTS may be the innovative alternative.

Florida residents and homeowners can know that their choice of an OWTS is a sound option, environmentally and economically. The option carries responsibilities to understand and ensure proper operation, management, and maintenance of that system. OWTS owners can be assured of keeping their system operating at optimal performance for decades of service, via regular inspection and certification from a trained, licensed environmental professional the public can hold in trust. That same owner also needs to live with the peace of knowing that he/she will not be forced to pay premiums to connect to a future centralized collection expansion.

Finally, the centralized utilities themselves can adapt their collective mindset from the expansionist mode. The final paragraph of 381 reads: “A publicly owned or investor-owned sewerage system may, with the approval of DOH, waive the requirement of mandatory onsite sewage disposal connection if it determines that such connection is not required in the public interest due to public health considerations.” More and more Floridians—influential economic leaders and average homeowners alike— will be calling that phrase to the attention of policymakers. After all, the “owners” of these POTWs are you and I, the taxpaying public.

## References

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## For More Information About Water Recycling and Reuse

**National Environmental Services Center**  
 (National Small Flows Clearinghouse,  
 National Onsite Demonstration Project,  
 National Environmental Training Center for  
 Small Communities)  
 West Virginia University  
 PO Box 6064  
 Morgantown, WV 26506  
 (800) 624-8301  
 (304) 293-4191  
[www.nesc.wvu.edu](http://www.nesc.wvu.edu)

**NOWRA**  
 P.O. Box 1270  
 Edgewater MD 21037  
 (800) 966-2942  
[www.nowra.org](http://www.nowra.org)

**Groundwater Foundation**  
 P.O. Box 22558  
 Lincoln NE 68542-2558  
 (800) 858-4844  
[www.groundwater.org](http://www.groundwater.org)

**U.S. Environmental Protection Agency (EPA)**  
 Office of Wastewater Management (4204)  
 Ariel Rios Building  
 1200 Pennsylvania Ave., NW  
 Washington, D.C. 20460  
 (202) 564-0653  
[www.epa.gov/owm/decent](http://www.epa.gov/owm/decent)

**USDA—Rural Utilities Service**  
 Glen Deal, P.E. (1571)  
 1400 Independence Avenue, SW  
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 (202) 720-1582  
[www.usda.gov/rus/](http://www.usda.gov/rus/)

**National Decentralized Water Resources Capacity Development Project (NDWRCDP)**  
 3901 Grand Avenue, Suite 304  
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