

Implementation of Model Programs 3 and 4 of the U.S.E.P.A. Voluntary Management Guidelines in the State of Florida

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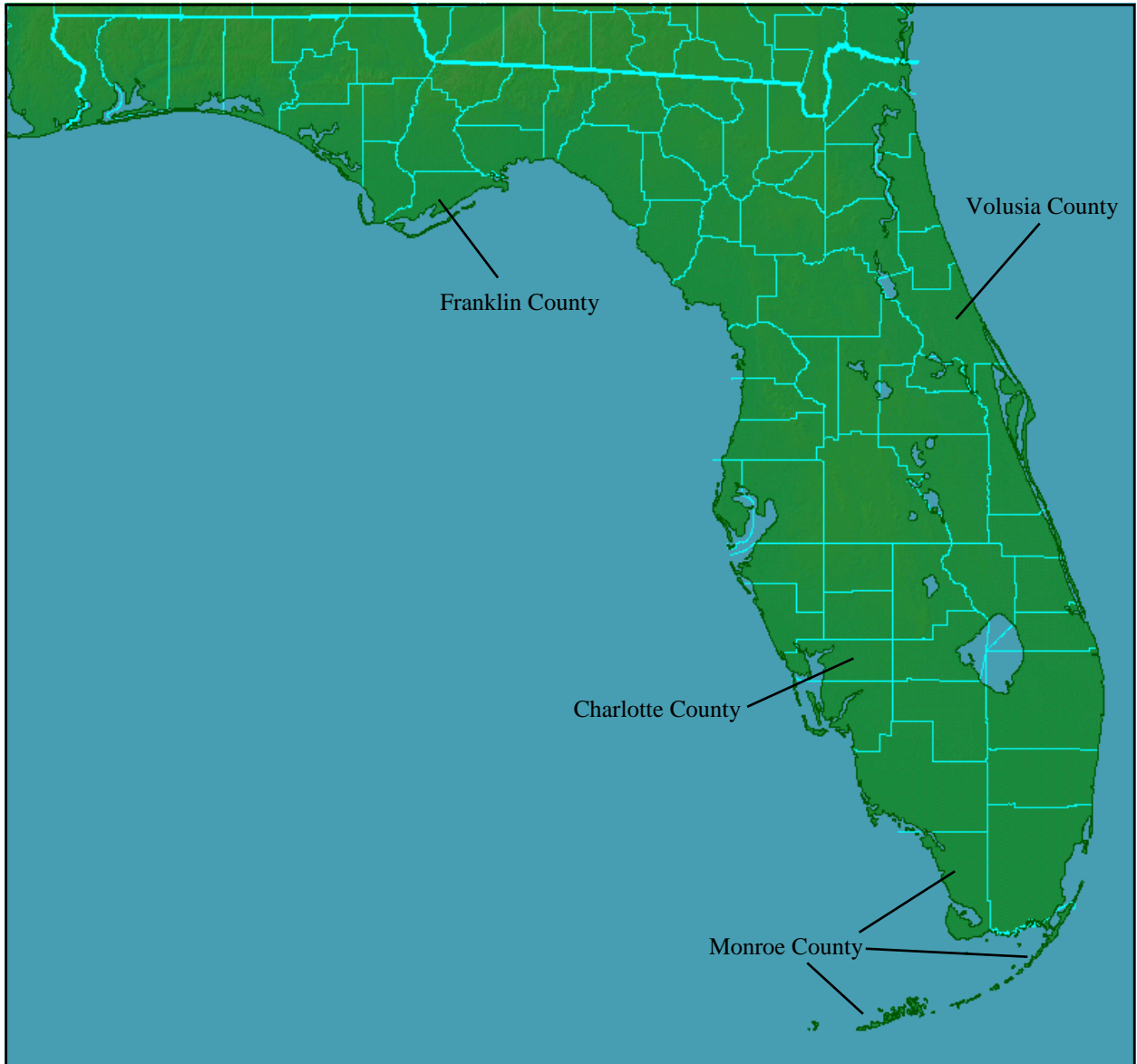


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I. Executive Summary

In November 2000 USEPA solicited pre-proposals for water quality agreements related to, among other topics, implementation of the newly drafted Voluntary Management Guidelines at the state level. The intent was to “test drive” these new guidelines to see if management as conceived of in the draft document could be made to work in the real world. There was also a desire on the part of USEPA to kick-start implementation of the guidelines in a few states in the hope that they would eventually become models for the country.

After the release of the RFP, the Florida Onsite Wastewater Association (FOWA), in partnership with the fledgling American Onsite Management Association (AOMA), drafted a pre-proposal that sought to implement Model Programs 3 and 4 of the guidelines in the state of Florida (see Appendix A). The plan within the pre-proposal involved a four-stage process by which the tasks would be accomplished. Phase I called for reviewing existing Florida laws and codes for possible impediments to implementation of Model Programs 3 and 4 and proposing changes to those laws and codes if such impediments were found. Phase II involved a planning process by which implementation of the model programs would be attempted in three pilot projects in Charlotte, Monroe and Volusia Counties. Phase III involved implementation of the plans developed in Phases I and II. Finally, Phase IV would be devoted to preparation of a case study documenting the entire project.

The pre-proposal was accepted in February of 2001 and a full proposal was delivered to USEPA shortly thereafter. On April 17, 2001, a kick-off meeting was held in Washington D.C. This meeting was attended by USEPA project officers and the principal investigators of five state level management implementation projects that had been selected for funding. Paul Chase attended this meeting on behalf of the Florida project, as did Robert Bastion, the Florida project officer. During this meeting, USEPA ground rules and procedures were explained and a brief presentation on each of the projects was given.

Following this meeting, and in anticipation of final grant approval, FOWA and AOMA hosted a meeting in Daytona Beach, Florida on July 27, 2001 for officials from the Florida Department of Health. Representatives from each of the Florida pilot project counties attended as well as officials from the main Department of Health office in Tallahassee. During that meeting, general support for the project was expressed, however, FOWA and AOMA were advised to seek permission from the Secretary of Florida Department of Health for the participation of any state employees.

Official approval for the project had not been received by September 11, 2001. The events of that day and the reaction of the Federal government delayed final approval of the grant until February 2002. It took until April 29, 2002 to receive an ACH Control Number from the USEPA Financial Management Center in Las Vegas. We finally worked out the details for billing that office for the grant and submitted the first invoice in early June 2002.

In the interim, FOWA sent a letter to the Acting Secretary of the Florida Department of Health seeking permission for the participation of state employees in the project. A reply was received on September 26, 2003 that intimated that if the grant sought the participation of the Department staff, we would need to provide that agency with some grant resources (see Appendix A).

Also, during the fall of 2001 and winter of 2002, AOMA was offered a service contract for their portion of the grant. Ultimately, the AOMA Board of Directors decided not to sign the contract. Therefore, FOWA offered an identical service contract to Chase Environmental Services, Inc. (CES) of Rochelle, Illinois. CES had a contract with AOMA to provide office services for that organization and CES president, Paul Chase, was serving as executive director of AOMA at that time. CES accepted the contract and became the sole subcontractor for FOWA instead of AOMA.

In June of 2002, work began in earnest on the grant deliverables. The principal investigators, Kevin Sherman and Paul Chase, met in early June to begin a review of Florida regulations and develop a plan for implementing the voluntary management guidelines in the three Florida counties.

Work Plan Adjustments

From the very beginning, a number of unforeseen factors forced changes in the original work plan. First, the events of September 11, 2001 forced a delay of about a year in the commencement of real work on the project. This also resulted in a compressed time frame for the project, which was scheduled to be completed by July 31, 2003. This factor had the greatest effect on the project. Second, the decision by the AOMA Board not to participate in the grant created a minor problem in that new arrangements for a grant partner had to be executed. Fortunately, these arrangements proceeded relatively quickly and smoothly and did not result in any additional delay in the project.

Third, the reluctance of the Florida Department of Health to participate without financial compensation was unforeseen and resulted in some work plan adjustments. Money for that purpose had not been budgeted and the work plan was adjusted so that the direct participation of the Department was not critical to the success of the project.

Aside from the diminished time frame, the most significant adjustments to the work plan were made as a result of the what was learned during the research and planning phases of the project. These adjustments were made “on the fly” and are discussed in detail in other sections of this document.

Research Phase

Phase I of the project, the research phase, consisted of two parts. The first was a review of Florida law and codes to determine their conformance with the Voluntary Management Guidelines’ Model programs 3 and 4. This review was completed in August of 2002. The review showed that Florida law and codes were fully in conformance with Model

Program 3. It also showed that Florida law and codes, while not providing any impediments to Model Program 4, remained mostly silent on issues pertaining to Model Program 4. As a result, no recommendations were made regarding changes to Florida law and codes, which eliminated the need to engage the Florida Department of Health on those issues.

The second part of the research phase involved investigating potential pilot projects with each of the three counties that were targeted in the grant proposal. A full discussion of each county is found in later sections.

Planning Phase

The Planning Phase was designed to build on what was uncovered during the Research Phase. Specifically, any impediments found in state-wide regulations to the implementation of Model Programs 3 and 4 of the Voluntary Management Guidelines would be examined and a plan developed to overcome them. Since no impediments were identified, no plan to change the regulations was developed.

In addition, plans would be developed to engage the communities in each of three pilot project counties that were identified during the Research Phase as candidates for higher level decentralized wastewater management. This turned out to be an extremely difficult process in that, despite numerous attempts, communities identified in each of the counties were either unsuitable for or uninterested in the project.

Needless to say, planning took other directions, most of which bore fruit.

Implementation Phase

The Implementation Phase of the project was designed to execute the plans developed during the Planning Phase. Despite some early setbacks during the Research and Planning Phases, the plans that were implemented worked in some cases. Higher level management was implemented where it had not been before. In some cases, the Implementation Phase is ongoing. What was set in motion during this Phase continues now at the end of the project.

Case Study Phase

The final phase of the project is devoted to developing a case study that describes what was uncovered during the project and the process by which that happened.

II. Voluntary Management Guidelines – Discussion

The document that formed the basis for this project was the *Draft EPA Guidelines for the Management of Onsite/Decentralized Wastewater Systems*, which appeared in the Federal Register in October 2000. The document is known colloquially as the *Voluntary Management Guidelines*. Since then, the document has been heavily revised, finalized and published by USEPA in March 1993 under the title, *Voluntary National Guidelines for Management of Onsite and Cluster (Decentralized) Wastewater Treatment Systems*. In February 2003, USEPA published a draft companion volume under the title, *Handbook for Management of Onsite and Clustered (Decentralized) Wastewater Systems*. All of these documents demonstrate USEPA's commitment to the idea that enhanced management of onsite/decentralized wastewater systems will result in better performance, thus making these types of systems truly a viable alternative to public sewer systems. A full discussion of the similarities and differences between these documents is beyond the scope of this case study. Suffice it to say that the basic concepts that were put forth in the *Voluntary Management Guidelines* are carried through into the later documents and the differences among them are more matters of emphasis and organization. By necessity, this case study and the research described within it use the original Draft Guidelines as their bases.

Onsite/decentralized wastewater management is first and foremost about assuring that onsite/decentralized wastewater treatment systems are designed, constructed, maintained and monitored in such a way that they are protective of the environment and public health. The Voluntary Management Guidelines provide tools for this assurance. Specifically, thirteen categories of activities are identified that as a whole, constitute what bases must be covered in any effective management program.

In addition, the *Voluntary Management Guidelines* recognize that the universe of onsite/decentralized wastewater systems encompasses an almost infinite variety of site conditions and technologies used to mitigate environmental risks on those sites. Thus, five model programs are described. These model programs are hierarchical, with Model Program 1 being the least intensive and providing the least level of assurance and Model Program 5 being the most intensive with the highest level of assurance. Each model program utilizes the thirteen activity categories with activities within those categories being, for the most part, specific to a particular model program. Table 1 on the following page summarizes the five model programs and the activities associated with each:

Table 1. USEPA Voluntary Management Guidelines Model Programs and associated Activities

	<i>Planning</i>	<i>Performance Requirements</i>	<i>Site Evaluation</i>	<i>Design</i>	<i>Construction</i>	<i>Operation & Maintenance</i>	<i>Residuals Management</i>	<i>Certification/Licensing</i>	<i>Education/Training</i>	<i>Inspections/Monitoring</i>	<i>Corrective Actions</i>	<i>Record Keeping & Reporting</i>	<i>Financial Assistance</i>
Model Program 1	Coordinate with State, tribal and local planning and zoning, water quality, and other water use-related agencies.	Prevent direct and indirect human contact with raw and treated wastewater.	Codify prescriptive requirements for evaluation procedures and acceptable site criteria to minimize impacts to groundwater and aquatic resources.	Codify designs suitable for sites meeting specific criteria.	Administer program for construction permits including agency review and acceptance of proposed system plans with a final construction inspection for compliance assurance.	(Responsibility of owner) Require controls to alert owner of need for maintenance. Establish program for owner reminders to perform scheduled preventive maintenance.	Assure residuals are used/ disposed of in accordance with 40 CFR Part 503 (Use and Disposal of Sewage Sludge) and applicable State/tribal/local requirements.	Administer certification/licensing programs based on requirements in CWA.	Educate owners on purpose, use, and care of system. Publish technical guidelines for service providers. Provide technical training for service providers.	Administer program for point-of-sale and change-in-use inspections.	Negotiate compliance schedules for correcting documented failures. Administer enforcement program with fines and/or penalties for failure to comply with requirements in timely manner.	Maintain construction permit file including site evaluation report and record drawings of system. Administer maintenance reminder system.	Provide inventory of available financial assistance programs to owners.
Model Program 2	Coordinate with State, tribal and local planning and zoning, water quality, and other water use-related agencies.	Indirect human contact with raw and treated wastewater. Establish measurable requirements for system maintenance.	Codify prescriptive requirements for evaluation procedures and acceptable site criteria to minimize impacts to groundwater and aquatic resources.	Establish alternative site acceptance criteria for systems with enhanced pretreatment.	Administer program for construction permits including agency review and acceptance of proposed system plans with a final construction inspection for compliance assurance.	(Responsibility of owner) Require engineering controls/alarms to alert owner of need for maintenance. Enact requirement for private maintenance contract between owner and trained service provider.	Assure residuals are used/ disposed of in accordance with 40 CFR Part 503 (Use and Disposal of Sewage Sludge) and applicable State/tribal/local requirements. Administer tracking system for residuals hauling and disposal.	Administer certification/licensing programs for site evaluators, installers, septage haulers, and inspectors.	Educate owners on purpose, use and care of system, selection of service providers, and procedures to follow when alarms are triggered. Publish technical guidelines for service providers. Provide technical training for service providers.	Administer program for point-of-sale and change-in-use inspections. Administer program for scheduled reporting of completed maintenance of mechanical treatment components.	Negotiate compliance schedules for correcting documented failures. Administer enforcement program with fines and/or penalties for failure to comply with requirements in timely manner.	Maintain construction permit file including site evaluation report and record drawings of system. Administer tracking system for private maintenance contract compliance.	Provide inventory of available financial assistance programs to owners.
Model Program 3	Coordinate with State, tribal and local planning and zoning, water quality, and other water use-related agencies.	Establish performance and maintenance requirements specific to individual systems.	Codify prescriptive requirements for evaluation procedures.	Establish procedures to approve engineered designs capable of meeting specific and measurable performance requirements.	Administer program for construction permits including agency review and approval of proposed system plans with a final construction inspection for compliance assurance (professional engineering certification).	(Owner responsibility) Administer program for limited term operating permits that are renewable upon documented compliance with permit conditions. Require approved contingency plans to prevent catastrophic failures.	Assure residuals are used/ disposed of in accordance with 40 CFR Part 503 (Use and Disposal of Sewage Sludge) and applicable State/tribal/local requirements. Administer tracking system for residuals hauling and disposal.	Administer certification/licensing program for site evaluators, designers, installers, septage haulers, and inspectors.	Educate owners on purpose, use and care of system, and selection of service providers. Publish technical guidelines for service providers. Provide technical training for service providers.	Administer program for time-of-sale and change-in-use inspections. Administer program for periodic compliance monitoring/reporting. Require system inspections at time of operating permit renewal.	Negotiate compliance schedules for correcting documented failures. Administer enforcement program with fines and/or penalties for failure to comply with requirements in timely manner.	Maintain construction permit file including site evaluation report and record drawings of system. Administer tracking system for operating permits.	Provide inventory of available financial assistance programs to owners.
Model Program 4	Coordinate with State, tribal and local planning and zoning, water quality, and other water use-related agencies.	Establish measurable performance and maintenance requirements specific to individual system applications.	Codify prescriptive requirements for evaluation procedures.	Establish procedures to approve engineered designs capable of meeting specific and measurable performance requirements.	Administer program for construction permits including agency review and acceptance of proposed system plans with a final construction inspection for compliance assurance (engineer certification rather than agency inspection for final construction approval for engineered designs).	(Management entity responsibility) Administer program for limited term operating permits that are renewable upon documented compliance with permit conditions. Require approved contingency plans to prevent catastrophic failures.	Assure residuals are used/ disposed of in accordance with 40 CFR Part 503 (Use and Disposal of Sewage Sludge) and applicable State/tribal/local requirements. Administer tracking system for residuals hauling and disposal.	Administer certification/licensing programs for site evaluators, designers, installers, operators, septage haulers, and inspectors.	Educate owners on purpose and use of system.	Administer program for time-of-sale and change-in-use inspections. Administer program for periodic compliance monitoring/reporting. Require system inspections at time of operating permit renewal.	Negotiate compliance schedules for correcting documented failures. Administer enforcement program with fines and/or penalties for failure to comply with requirements in timely manner.	Maintain construction permit file including site evaluation report and record drawings of system. Administer tracking system for operating permits. Administer financial, management, and technical audits of management entity.	Provide inventory of available financial assistance programs to owners.
Model Program 5	Coordinate with State, tribal and local planning and zoning, water quality, and other water use-related agencies. Provide area-wide comprehensive wastewater planning. Provide service area planning.	Establish measurable performance and maintenance requirements specific to individual system applications.	Codify prescriptive requirements for evaluation procedures.	Establish procedures to approve engineered designs capable of meeting specific and measurable performance requirements.	Administer general permit program for management entities to design and construct individual, cluster, and conventional sewerage systems that meet established performance requirements.	(Management entity responsibility) Establish program for limited term operating permits that are renewable upon documented compliance with permit conditions. Require approved contingency plans to prevent catastrophic failures.	Assure residuals are used/ disposed of in accordance with 40 CFR Part 503 (Use and Disposal of Sewage Sludge) and applicable State/tribal/local requirements. Administer tracking system for residuals hauling and disposal.	Administer certification/licensing programs for site evaluators, designers, installers, operators, septage haulers, and inspectors.	Educate owners on purpose and use of system.	Administer program for periodic compliance monitoring/reporting. Require system inspections at time of operating permit renewal.	Negotiate compliance schedules for correcting documented failures. Administer enforcement program with fines and/or penalties for failure to comply with requirements in timely manner.	Administer tracking system for area-wide operating permits. Administer financial viability audit of management entities.	Provide inventory of available financial assistance programs to permittees.

Model Program 3 is characterized by the use of limited term (renewable) operating permits as a management tool. Operating permits provide assurance by requiring maintenance contracts for onsite/decentralized wastewater systems as well as monitoring to assure compliance with performance standards (e.g., effluent quality). These factors are the conditions for renewing the permit. The *Voluntary Management Guidelines* recommend Model Program 3 in shellfish growing areas or where a source water assessment has identified onsite/decentralized systems as a threat to the drinking water supply. Thus, more environmentally sensitive areas can be developed with onsite/decentralized systems, but only if their performance can be continuously assured.

Model Program 4 is characterized by utility (or responsible management entity) management. In this situation, assurance of maintenance and system performance is taken out of the hands of the property owner altogether and becomes the responsibility of an outside agency, typically a private or public utility. USEPA recommends Model Program 4 in situations where environmental sensitivity is high and there is a need for continuous monitoring and reliable operation and maintenance. For Example, Model Program 4 would be appropriate for areas where monitoring of a drinking water supply has detected pathogens or elevated levels of nutrients and a source water assessment has identified onsite/decentralized systems as sources of concern. The main administrative difference between Model Programs 3 and 4 is that the operating permit is issued to the utility instead of the property owner. The main difference between Model Programs 4 and 5 is that Model program 4 leaves the ownership on the onsite/decentralized wastewater system in the hands of the property owner while in Model Program 5, the utility owns, as well as operates and maintains, the onsite system.

The Voluntary Management Guidelines are designed to be implemented primarily through the regulatory agencies that have jurisdiction over onsite/decentralized wastewater systems. Most of the activities found in the thirteen categories for all of the model programs are regulatory activities. This approach is also hierarchical in nature, with the intent that the *Voluntary Management Guidelines* be implemented at the state level and then presumably, at the local level. This hierarchical approach has both advantages and disadvantages for implementation. The main advantage is that once the guidelines are implemented at the state-level, i.e. become part of state regulation and programs, management programs become, de facto, universal within the state. This is because in most states local regulatory agencies, usually county health departments, operate decentralized wastewater programs under state guidance and with state regulations.

This main disadvantage is that the typical regulatory system at any level of government is not structured to facilitate management programs easily. Typically, onsite/decentralized wastewater programs are operated by a county health department using some permutation of state regulation. Both the regulations and the programs are set up to issue construction permits, conduct construction inspections, and respond to complaints about failing systems. Maintenance is seldom required. Operating permits are seldom issued. Monitoring is almost never part of the program. In addition, the regulations and programs are set up to deal with individual homeowners and individual contractors. Onsite/decentralized wastewater management, especially higher-level management,

requires that the program engage communities. Typical onsite/decentralized wastewater programs are not designed to engage communities.

This being said, the State of Florida is not a typical situation. The state onsite wastewater laws and regulations embrace the concepts of management and mandate management programs, at least with some system types. The following sections provides a review of Florida regulations with respect to their conformance to Model Programs 3 and 4 of the *Voluntary Management Guidelines*.

III. Florida – Laws and Regulations – Review Report

Analysis of Florida Onsite Wastewater Regulations and the US EPA Voluntary Management Guidelines

The purpose of this exercise is to examine Florida Onsite Wastewater Regulations and compare them to the USEPA's *Draft Guidelines for the Management of Onsite/Decentralized Wastewater Systems*, hereafter called the *Voluntary Management Guidelines*. Specifically, Chapter 64E-6 of the Florida Administrative Code and related provisions of the Florida Statutes (see Appendix B) are analyzed to determine their conformance with Model Programs 3, 4 and 5 as described in *Voluntary Management Guidelines*. Where conformance is lacking, specific recommendations for changes to Florida regulations are made to bring them into conformance.

Chapter 64E-6 of the Florida Administrative Code represents a very advanced form of state-level onsite wastewater regulation. Most of the concepts that are found in the *Voluntary Management Guidelines* are present in the Florida Onsite Wastewater Code. In this report, each program element of Model Program's 3,4 and 5 will be compared to provisions of Chapter 64E-6 and other related provisions of Florida law.

Chapter 64E-6 conforms most closely to Model Program 3 of the *Voluntary Management Guidelines*. The most defining characteristic of Model Program 3 is the assurance of system performance through the issuance of limited term operating permits. Each of the program elements for program Model 3 are described below along with their relationship to the Florida Onsite Wastewater Code:

Planning – Coordinate with State, tribal and local planning and zoning, water quality, and other water use related agencies.

This particular program activity is found in all five of the Model Programs. It recognizes that:

- 1) Onsite/decentralized wastewater issues are a part of a broader agenda, which includes drinking water, storm water, surface water, groundwater, land use, and other environmental and public health issues. All of these are interconnected and impossible to separate.
- 2) Jurisdiction over these various concerns is usually split between a number of different state, local and federal agencies.

There are numerous references in Chapter 64E-6 to intergovernmental cooperation. Mostly these recognize the particular jurisdictions of various agencies that can be encountered with certain onsite/decentralized wastewater systems.

There are numerous references throughout Chapter 64E-6 to the roles of local (county) health departments vis-à-vis the Florida Department of Health. While the standards

governing onsite/decentralized wastewater systems and the interpretation of pertinent rules resides at the state level, the county health departments actually conduct the program day to day, issuing permits, investigating complaints, conducting inspections and other program related activities. The relationship between state and county authority in Florida is closer than in most states because the county health officials are hired as state employees.

There are also numerous references throughout Chapter 64E-6 to drinking water sources. For example, in 64E-6.004 (3) (a), there is a requirement that the location of all drinking water wells within specified distances be shown in relation to the property where a permit for an onsite wastewater system is being applied for.

In some instances, the volume of sewage being generated or the manner in which it is disposed of requires the involvement of the Florida Department of Environmental Protection. For example, in 64E-6.0181 (3) (a) 2. b., requires that large (2,000 - 10,000 gallon per day) onsite systems that discharge into a bore hole in the Florida Keys, obtain a permit for the treatment system from the Department of Health and a separate permit for a Class V injection well from the Department of Environmental Protection.

There are numerous other examples through Chapter 64E-6 about cooperation between the Florida Department of Health and a variety of different state and local agencies. All in all, the regulations in Florida clearly and completely reflect the planning program element in the *Voluntary Management Guidelines* for all Model Programs.

Performance Requirements – Establish performance and maintenance requirements specific to individual systems.

This particular activity is not found in Model Programs 1 and 2, but is introduced in Model Program 3. It is also found in Model Programs 4 and 5. It recognizes the need for system specific performance requirements that are dependent on environmental sensitivity, potential public health risk, and the complexity of the technology required to mitigate these circumstances.

Florida is unique among the states in that, while most states have regulations that are entirely prescriptive, Florida has specific provisions in its code regarding performance-based systems. Chapter 64E-6.001, specifically authorizes the use of performance-based systems and references other parts of the rules, which spell out the requirements in detail. Specific authorization is also found in the enabling legislation, Florida Statutes Chapter 381.0065 (4). Chapter 64E-6.027 (5) sets requirements for operating permits for performance-based systems. Chapter 64E-6.028 establishes location and installation requirements for performance-based systems. Finally, Chapter 64E-6.028 spells out monitoring requirements for performance-based systems.

All in all, the regulations in Florida clearly and completely reflect the performance requirement program element in the *Voluntary Management Guidelines* for all Model Programs.

Site Evaluation – Codify prescriptive requirements for evaluation procedures.

This particular program activity is found in all five of the Model Programs. It recognizes the importance of evaluating site conditions in detail prior to technology selection and system design. Most state regulations have some requirement for site evaluation which involves determining such conditions as soil permeability, depth to limiting layer, topography, location of potential sources of contamination (e.g., water wells, bodies of water, etc.).

Florida regulations provide detailed provisions for site evaluation, Chapter 64E-6.004 (3) and 64E-6.006 spell out requirements for determining the suitability of sites for onsite wastewater systems. All in all, the regulations in Florida clearly and completely reflect the site evaluation program element in the *Voluntary Management Guidelines* for all Model Programs.

Construction – Administer program for construction permits including agency review and approval of proposed system plans with a final construction inspection for compliance assurance (professional engineer certification).

This program activity is found in all five model programs, although in Model Program 3, an additional requirement for professional engineer certification is introduced. Construction permits and inspections are common to nearly all state and local onsite wastewater regulations and programs regardless of whether or not management occurs. In fact, the major weakness of most onsite wastewater programs is that issuing construction permits and conducting construction inspections is just about *all* that occurs.

Florida regulations provide for both construction permits and inspections. Chapter 64E-6.003 (2) requires a final inspection before an installed system is put into use. In addition, Chapter 64E-6.003 (2), (c), 1., states that if a professional engineer designed the system, it must be inspected and certified by the engineer. Chapter 64E-6.004 establishes the requirement for construction permits and designates the forms that must be used and the information that must be provided on the permit application. It also gives local health departments the ability to require that the plans be prepared by a professional engineer (Paragraph (4)). Chapter 64E-6.006 specifies requirements for location of systems. Chapters 64E-6.012 – 64E-6.015 specify standards for the construction of various types of systems.

Standards for the permitting, construction, and inspection of performance-based systems is spelled out in Part IV of Chapter 64E-6 (64E-6.025 – 64E-6.028). Chapter 64E-6.027, (4) requires an inspection by the county health department and certification by a professional engineer.

Florida regulations conform to Model Program 3 for the construction of systems to the extent that plans for all systems must be submitted and reviewed. In addition, the local health department must inspect all systems before they are put into use. Finally, for

performance-based systems, a certification by a professional engineer is required. This is also true of any other system designed by a professional engineer. All in all, the regulations in Florida clearly reflect the construction program element in the *Voluntary Management Guidelines* for Model Program 3. However, the professional engineer certification component is only found in references to performance-based systems.

Operation and Maintenance – (Owner’s Responsibility). Administer a program for limited term operating permits that are renewable upon documented compliance with permit conditions. Require approved contingency plan to prevent catastrophic failures.

This program activity is found in all five, model programs; however it is the most variable program component in that each model program has different requirements for operation and maintenance. In fact, the way operation and maintenance issues are dealt with most clearly distinguishes each model program from the others. In Model Program 3, responsibility for the operation and maintenance on onsite wastewater system remains in the hands of the system owner, as it does in Model Programs 1 and 2. However, in Model program 3, the concept of limited term operating permits is introduced as a mechanism to assure that proper maintenance is accomplished and proper system performance is assured.

Chapter 64E-6 is one of only a handful of state level regulations around the country that requires operating permits at all. In Florida regulations, operating permits are required for systems utilizing aerobic treatment units, systems used for non-residential establishments, and for all performance-based systems. Chapter 64E-6.003, (5), (a), (b) and (c) requires operating permits for each of these categories of systems and spells out their requirements. In addition, the enabling legislation which empowers the Department of Health to issue operating permits is specified in Chapter 381.0065, (3) (f).

Specific provisions for maintenance and monitoring are found in Chapter 64E-6.012 for aerobic treatment units and Chapter 64E-6.029 for performance-based systems.

Chapter 64E-6.026, (1), (d), requires an approved contingency plan in the event of (rather than to prevent) catastrophic failures of performance-based systems.

All in all, Florida regulations conform to Program Model 3 in that operating permits are required for systems that need that level of management.

Residuals Management – Assure residuals are used/disposed of in accordance with 40 CFR Part 503 (Use and Disposal of Sewage Sludge) and applicable state/tribal/local requirements. Administer tracking system for residuals hauling and disposal.

This program element is the same for all model programs and, as in all states, Florida regulations provide for the use and disposal of sewage sludge per the requirements of 40 CFR Part 503. Since tracking is also required under federal regulations, this is also covered in Florida regulations.

Specifically, provisions in Chapter 64E-6.010 mirror the federal requirements under 40 CFR Part 503. It should be noted that use/disposal on sludge that is not septage or food service establishment sludge is regulated by the Florida Department of Environmental Protection (DEP).

All in all, the regulations in Florida clearly and completely reflect the residuals management program element in the *Voluntary Management Guidelines* for all Model Programs.

Certification/Licensing – Administer certification/licensing program for site evaluators, designers, installers, septage haulers, and inspectors.

This program element appears in all model programs, although the requirements for each level are slightly different. For example, in Model Program 2, site evaluators, installers, septage haulers and inspectors are required to be certified or licensed. In Model Program 3, designers are added to the group. In Model Program 4, operators are added to the list found in Model Program 3.

Florida regulations provide for certifications and licenses that roughly correspond to those specified in the *Voluntary Management Guidelines*. Chapter 489, Part 3 of the Florida Administrative Code provides for licensing of Master Septic Tank Contractors and Septic Tank Contractors. Activities permitted under these licenses are specified in Chapter 489, part 3 and supported in Chapter 64E-6. Master Septic Tank Contractor can perform site evaluations, service systems, install systems, design systems where not prohibited by law, haul septage, and inspect systems. Septic Tank Contractors can install systems, design systems and haul septage. In addition, the design of performance-based systems and systems with drainfields larger than 1,000 square feet requires a Florida registered professional engineer. Finally, Chapter 64E-6 requires that those who service and maintain (“operate”) aerobic treatment units be licensed as Class D sewage treatment plant operators or else as a septic tank contractor with manufacturer’s training on the equipment to be serviced.

All in all, the regulations in Florida clearly and completely reflect the certification/licensing program element in the *Voluntary Management Guidelines* for all Model Programs.

Education/Training – Educate owners on purpose, use and care of system, and selection of service providers. Publish technical guidelines for service providers. Provide technical training for service providers.

This program element differs slightly in each of the Model programs, although all of them require educating owners on the purpose, use and care of the system. Educating owners on the selection of service providers is introduced in Model program 2 and also appears in Model Program 3. Publishing technical guidelines for service providers and providing technical training for service providers appear in Model Programs 1 – 3, but are not present in Model Programs 4 and 5.

Education of system owners is generally not a function of regulation and few state level codes have specific provisions mandating it. However, public education is always part of the mission of public health agencies at all levels and most agencies provide published information for homeowners about onsite wastewater systems. In addition, Environmental Health professionals working in onsite wastewater programs provide education to the public as a matter of course. In the Florida Statutes, Chapter 381.0065, (3), (i), empowers and requires the Florida Department of Health to “provide or conduct education and training of department personnel, service providers, and the public regarding onsite sewage treatment and disposal systems.” There are, however, no provisions in Chapter 64E-6 that support the intent of this law with respect to public education.

The publication of technical guidelines for service providers is normally left to manufacturers of the products to be serviced. For example, Chapter 64E-6.012 specifies certain maintenance requirements for aerobic treatment units (i.e., service interval). In addition, Chapter 64E-6.018 specifies maintenance requirements for systems and system components in the Florida Keys.

Most states which have licensing/certification programs for contractors, including Florida, also have initial or continuing education requirements. Such requirements do appear in Florida’s regulations in both Chapters 489 and 64E-6. In Florida, technical training for service providers is mostly conducted by the Florida Onsite Wastewater Association, either locally or at the State Onsite Wastewater Training Center in Lake Alfred.

To the extent that it is appropriate for codes to have them, the requirements in the education/training program element for all model programs are found in Florida regulations. Where they are not appropriate to be found in the code, the activities are being conducted as part of the normal course of the programs that deal with them.

Inspections/Monitoring – Administer program for time of sale and change in use inspections. Administer program for periodic compliance monitoring/reporting. Require system inspections at time of operating permit renewal.

This program element varies widely between the various model programs. All programs, except for Model program 5, require time of sale and change in use inspections. Model Programs 3 – 5 require periodic compliance monitoring/reporting and system inspections at time of operating permit renewal.

Florida regulations contain numerous provisions for inspections, monitoring and reporting. With respect to time of sale and change of use inspection, Chapter 64E-6.001, (5) defines and adopts Voluntary Inspection and Assessment of Existing Systems procedures which are apparently designed for time of sale inspections which correspond to the requirements of the Inspections/Monitoring Program element of all model programs. Provisions for change of use inspections and requirements for altering systems

where the usage has been altered (increased flow or sewage strength) are found in Chapter 64E-6.001, (4).

Chapter 64E-6.012, (2), (1),4., requires periodic inspections of aerobic treatment units by the maintenance entity and providing reports of these inspections to the Department of Health. Chapter 64E-6.012, (2) (m), requires annual inspections of aerobic treatment systems by the Florida Department of Health. Similar requirements are found for performance-based systems in Chapter 64E-6.029.

Chapter 64E-6.003, (2), (e), requires systems with annual operating permits to be inspected by the Department of Health at least once during the term of the permit to determine compliance with the permit's provisions.

All in all, Florida regulations conform to the inspections/monitoring program element for all model programs.

Corrective Actions – Negotiate compliance schedules for correcting documented failures. Administer enforcement program with fines and/or penalties for failure to comply with requirements in a timely manner.

This program element is identical for all model programs. All state-level onsite wastewater regulations anywhere contain enforcement provisions to force correction or punish the violators. This is true whether or not the regulations contain any other provisions related to onsite wastewater management. In addition, all state level regulations regard the failure of an onsite wastewater system as a violation.

Florida regulations and statutes both contain provisions for administrative relief and even criminal prosecution related to the failure of onsite wastewater systems, which are described in the syntax of Florida law as “sanitary nuisances.” Chapters 381.0065 and Chapter 386 of the Florida Statutes give the Department broad authority to enforce its regulations and bring action against those who violate them.

The negotiation of compliance schedules for correcting documented failures is usually discretionary and depends on the seriousness of the problem.

Florida code gives inspectors the ability to issue citations for violations of 64E-6.

Florida regulations are in full conformance with the Corrective Actions program element of all model programs.

Record Keeping and Reporting – Maintain construction permit file including site evaluation report and record drawings of systems. Administer tracking program for operating permits.

The Record Keeping and Reporting program element varies slightly from model program to model program. Model Programs 1 – 4 require the maintenance of construction permit

files. Model Programs 3 – 5 require the administration of an operating permit tracking program.

Record keeping and reporting is nearly always done and hardly ever codified. Therefore, references to record keeping in onsite regulations are usually indirect. For example, Chapter 64E-6.015 (2) states, “Site specific information may be obtained by the applicant through examination of department records of permits previously issued for the site.” This provision assumes records are being kept, although nowhere in Florida onsite wastewater regulation is record keeping of construction permits or operating permits actually required.

As a practical matter, records are kept. It is impossible to operate any kind of onsite wastewater program without keeping construction permit records and it is pointless to require an operating permit for a system if one does not intend to track it even if only for renewal purposes. It is also quite likely that record keeping of this type is required by regulation, just not the onsite wastewater rules.

In any case, and without any direct evidence, it is assumed here that Florida regulations are in conformance with the recordkeeping/reporting program element for all model programs.

Financial Assistance – Provide inventory of available financial assistance to owners.

The financial assistance program element is identical in Model programs 1 – 4. In Model Program 5, the last word is changed from “owners” to “permittees.”

Providing financial assistance information is something that public agencies always do but is not usually mandated by law. The only reference to financial assistance at all in Florida onsite wastewater rules or law is the Florida Statutes, Chapter 381.0065, which deals with mandatory connection to public sewers. It provides two options. If there is an investor owned utility involved, a homeowner who can demonstrate financial hardship can get a payment plan. If a public utility is involved, the connection fee can be waived.

As a practical matter, it is in the interest of those enforcing onsite wastewater regulations to provide financial assistance information to financially strapped homeowners with failing onsite wastewater systems. On the other hand, public funding for individual onsite wastewater projects is very limited and most funding agencies only provide money to communities.

Again, without little direct evidence, it is assumed here that Florida regulations are in conformance with the financial assistance program element for all model programs.

This analysis shows that Florida onsite wastewater regulations conform to Model Program 3 of the Voluntary Management Guidelines, at least for systems that require that level of management (i.e., aerobic treatment systems, non-residential systems, and performance-based systems). For more conventional systems located in non-sensitive

areas, lower levels of management are probably sufficient. Where conformance is lacking, it is usually because the particular activity or program element is not a regulatory function, and therefore, would not (and perhaps should not) appear in the regulations anyway.

With respect to higher levels of management, evaluating the onsite wastewater regulations for conformance is problematic since Florida laws and rules, like those elsewhere in the country, are not really designed to facilitate utility responsibility for and/or ownership of onsite wastewater systems. It is likely that higher levels of management are possible utilizing local ordinances and perhaps other statewide regulations that deal with subdivisions and utilities. There are few if any provisions in Chapter 64E-6 and related onsite rules and laws that would prohibit or even pose significant barriers to higher-level management, although the rules and laws remain silent on many issues and some provisions might have to be reinterpreted. For example, the language in Chapter 64E-6.004, (7), concerning utility easements might need to be adjusted to account for utility ownership of an onsite wastewater system that serves multiple residences or businesses on multiple properties.

In conclusion, it appears that projects involving high-level onsite wastewater could proceed in Florida without serious regulatory difficulties related to implementing the *Voluntary Management Guidelines*. Therefore no specific recommendations are made for adjusting or changing the Florida code or law.

IV. Florida – Description of State Situation (Onsite Wastewater and Water Quality Issues)

Florida faces perhaps the greatest water quality issues of any state in the United States. The entire state, except for the northern border, is coastal, The Atlantic Ocean to the east and the Gulf of Mexico to the West. In addition, Florida contains a large and rapidly growing population, a high percentage of which is served by onsite wastewater systems. The economy in Florida is largely dependent on water, whether recreational or commercial fishing or swimming or bathing areas. Because of these factors, Florida faces a number of serious and ever growing water quality issues. Many of the waters in and around Florida have been heavily impacted and some of the impact has been linked to onsite wastewater systems.

Florida – General Description

Florida is located in the southeast-most portion of the United States. Geographically, most of Florida is a large, flat peninsula jutting southward into the waters of the Atlantic Ocean and the Gulf of Mexico. Only the northern boundary borders other states: Georgia and Alabama. Florida covers 65,758 square miles, 22nd among the 50 states. In land area, Florida is 53,997 square miles. 11,761 square miles of Florida are covered by water making it the 3rd wettest state behind Alaska and Michigan. Florida is 500 miles long and 160 miles wide at its furthest points. The highest point in Florida is Britton Point in Walton County (located in the Florida panhandle), at 345 feet above sea level. The lowest point is anywhere along the coast where the land meets the sea. The mean elevation of the state is 100 feet above sea level.^{1,2}

Florida can be divided into three distinct geographic regions, the Atlantic Coastal plain, the East Gulf Coastal Plain, and the Florida Uplands. The Atlantic coastal plain hugs the Atlantic and Gulf coasts from Cape Cod to the Mexican border. In Florida, this zone constitutes a strip that stretches between 30 and 90 miles from the coast. The land there is low and level and includes narrow strips of sand bars, coral reefs and barrier islands off shore. Much of the land is inundated with water (i.e. swamp or marsh), particularly during the rainy season.

The Eastern Gulf Coastal Plain is actually a sub-section of the Atlantic Coastal Plain and is identical in character except that it stretches along the Gulf Coast of Florida.

The Florida uplands forms a narrow strip about 275 miles long, east to west, and 30 to 50 miles wide along the northern part of the panhandle. It is characterized by low hills of red clay and many lakes. Unlike the coastal areas, the vegetation is mainly hard and softwood forests.

There are three major river systems in Florida, The St Johns, the St. Marys and the Suwannee. The St. Johns River runs from south to north roughly parallel to the

Atlantic coast between Big Cypress Lake in Indian River County and Jacksonville, where it flows into the sea. The headwaters of the St. Marys River (and the Suwannee River) is the Okefenokee Swamp in northeastern Florida. From there it forms the border between Florida and Georgia until it reaches the Atlantic Ocean north of Jacksonville. The famous Suwannee River flows northeast to southwest in a winding path from the Okefenokee Swamp to the Gulf of Mexico near Cedar Key, Florida. The Southern part of Florida has no major river system, rather fresh water there is contained in the numerous lakes and swamps.²

The soil types in Florida are numerous and the classification scheme complex. Suffice it to say that most soils in the state are primarily poorly drained sand or sandy clay. The soils in the northern part of the state more closely resemble those of other southern states, with the characteristic red clay and sand. Elsewhere, sand predominates. The state soil, Myakka is the most ubiquitous soil, occurring on more than a million acres of land in the state. It is a native soil and occurs in no other state. Myakka is a fine sand, grayish in color with a reddish brown, sandy subsoil. Like most soils in Florida, Myakka is characterized by shallow seasonal high water table.³

Florida's climate is hot and humid. For six months of the year temperatures are typically 90°F or higher and the relative humidity is at least 50%. The rest of the year, the climate is more moderate, but generally warm. The weather is characterized by sunshine interspersed with brief, daily thunderstorms. Precipitation averages about 50 inches per year in most areas, although there is great variability from season to season, from year to year and from location to location. It is generally cooler and rainier in the panhandle than elsewhere in Florida. Most rain comes in the form of thunderstorms, which occur more frequently in Florida than in any other state. Florida is also susceptible to hurricanes and tornadoes. Forty percent of all hurricanes that make landfall in the United States do so in Florida.⁴

Most of Florida is a hydrologic island, depending totally on local rainfall for its freshwater needs. About 150 billion gallons of rain falls on Florida each day. Another 26 billion gallons per day flows into Florida from elsewhere. About 70% (107 billion gallons) of the rain returns to the atmosphere through evapotranspiration. Human consumption accounts for about 2.7 billion gallons per day. The rest flows into rivers and streams or seeps into the ground to recharge aquifers.⁵

According to the U.S. Census Bureau, the population of Florida during the 2000 census is estimated to be about 15.5 million, making it the fourth most populous state in the union. It is also one of the fastest growing states. During the 1990s, Florida's population grew by about 23.5%, more than double the national average. Migration into the state accounts for better than 80% of this increase.

The percentage of population age 65 and older was 17.6% during the 2000 Census, compared to 12.6% nationally. The proportion of Black, Hispanic or Latino, and foreign-born residents in Florida also exceeded the national average. More than 80%

of Florida residents live in urban areas and about 50% live in one of the 400 municipalities there.¹

Florida's economy is centered mainly on tourism and agriculture. The massive cluster of theme parks in Central Florida and the numerous beaches on both coasts account for most tourism dollars. Agriculture is also very important. Florida leads the nation in the production of oranges, grapefruits, tangerines, and market-ready corn and tomatoes. Other important crops include sugarcane and a wide variety of winter vegetables. Cattle and dairy production round out the agricultural mix. Commercial fishing is also important to the Florida economy with the catch including crab, lobsters, oysters and shrimp as well as numerous varieties of ocean fish. Natural resources such as lumber, phosphate rock, sand and gravel are harvested in Florida as well.

Florida is also a major manufacturing center, producing items like food products, printed and published materials, electrical and electronic equipment, and transportation equipment.

There are major air and naval military facilities in Florida, as well as. The Cape Canaveral area supports the Kennedy Space Center as well as numerous associated scientific and defense-related industries.⁶

Water Quality Issues and Onsite Wastewater

Generally speaking, Florida's water-related issues are the result of population outgrowing the state's water management system's ability to deal with it. This is evident in nearly all aspects including drinking water, storm water and drainage, wastewater, recreational water, and water-related commerce and industry. These aspects are all closely inter-related and none can be effectively dealt with in isolation. Nonetheless, issues related to onsite wastewater systems can at least be isolated and discussed despite their relationship to aspects of water management.

There are a large number of onsite wastewater systems in Florida. Current estimates suggest there are at least 2.3 million systems installed and used state wide and that number grows by approximately 35,000 per year. Nearly 40% of the Florida population uses onsite wastewater systems.⁷

Onsite wastewater systems in Florida are frequently installed in challenging site conditions. The soils in Florida are mostly very permeable sand with an extremely shallow seasonal high water table. The topography is generally flat and lot sizes are often small. In addition, since most of the population lives along the coasts, proximity to the ocean or intercoastal waterways often becomes a matter of concern.

Because of the permeable soils and high water table, effluent from onsite wastewater systems tends to migrate rapidly away from dispersal systems. This creates the potential for (and in some cases, demonstrated) impact on groundwater and surface

water. This, in turn, creates the need for advanced treatment systems, most of which require frequent maintenance and monitoring. This need was recognized only recently; therefore many onsite wastewater systems in Florida provide inadequate treatment and there are no requirements for maintenance and monitoring for most conventional systems used.

In 1999, the Florida Department of Health promulgated rules that constitute the most advanced regulatory system for onsite wastewater systems in the nation. These rules contain provisions for siting, design, construction, operation and maintenance of performance-based treatment systems that recognize and attempt to mitigate potential impacts to groundwater and surface water. They also correspond directly to Model Program 3 of the Voluntary Management Guidelines (see discussion in the previous section). Incorporation of these rules into local onsite wastewater programs is assured since the County Health Departments are functionally subordinate to the State Department of Health. Unfortunately, there has been resistance to incorporating far reaching management programs on sites with existing prescriptive designs.

V. Pilot Projects – Overview

A major part of the project was the attempt to implement the Model Programs 3 and 4 of the Voluntary Management Guidelines in communities in each of three counties in Florida. The three counties selected were Charlotte County, Monroe County and Volusia County.

Charlotte County was selected for a number of reasons. The first is that the population of the county and the accompanying development, are growing at a tremendous rate. Charlotte County is one of ten counties in Florida that has seen the population increase by more than 50% since 1990. This has put tremendous demands on the onsite wastewater regulatory system and has created a number of pressing water quality issues. Second, the use of onsite wastewater technology in a managed setting has been present in Charlotte County for many years. Charlotte County Utilities, the agency which provides public sewer services, has been using Septic Tank Effluent Pump (STEP) and Septic Tank Effluent Gravity (STEG) systems with small diameter sewer since the 1970's. Third, the Charlotte County Health Department has attempted and is now trying to implement onsite wastewater management concepts, including recent efforts to establish mandatory pumping of septic tanks.

Monroe County, which encompasses the Florida Keys, was selected mainly because of the water quality issues there. Because of special rules within the state onsite wastewater regulations, nearly all systems in Monroe County require operating permits. In addition, water quality impacts are very severe and very conspicuous there due to the poor construction of older onsite systems and sensitivity of the coral reefs and nearshore environments in the area.

Volusia County was selected because it is regarded as a leader in onsite wastewater matters, not only in Florida, but nationally as well. In addition, the county is inundated with a large number of aging systems installed on small lots with wet site conditions which, when replaced, are going to require maintenance intensive solutions. Finally, there have been a number of documented water quality impacts, particular along the Atlantic coast where there are a number of bathing beaches that have been closed because of pollution.

The original plan was to work with county health departments in each of the three counties to locate communities that might be “ripe” for the implementation of onsite wastewater management and the *Voluntary Management Guidelines*. These communities would be approached with offers of assistance from the project. If all went well, the principal investigators would guide each community through a process that would lead to the implementation of Model Program 3 or 4. As it turned, the plan had to be adjusted almost from the beginning. Activities in each of the target counties are described below.

VI. Charlotte County Pilot Project

Charlotte County is located on the Florida “Sun Coast,” i.e., that part of the gulf coast located between Tampa/St. Petersburg and Naples. The Sun Coast area has been booming in recent years and Charlotte County saw a population growth in the 1990s of 27.6%. Between April 2000 and July 2001, the population has increased by another 3.8%, with an estimate of 147,009 residents. Over a third of County residents are age 65 and older, double the Florida-wide average.⁸

Charlotte County encompasses the north end of Charlotte Harbor and extends inland through relatively sparsely populated swamp and woods. The county land area is 694 square miles. Immediately to the west of Charlotte Harbor, and just off shore, are a series of barrier islands. Punta Gorda and parts of Englewood are the only incorporated cities located within the county. There are, however, a number of other urbanized areas, most notably Port Charlotte, Harbor Heights, Grove City, and Rotunda.

The area started out in the 1960s as a huge 20,000 plus acre development owned by the General Development Corporation. The corporation provided public water throughout as the development was built out, but public sewers were provided for only a few areas. The lots that were platted were generally small (approximately 10,000 square feet) and the soils are sandy with shallow seasonal high water table in many areas. Many of the lots closest to Charlotte Harbor were located along canals that led to open water. To this day, the development has numerous vacant lots, but has been built up enough that water quality impacts have been detected. In fact, ambient water quality had deteriorated to the point where state agencies were threatening to limit development in the county.

Most of the original development was with septic tank/leachfield systems. Because of the adoption of a local ordinance in March 1999, newer development utilizes aerobic treatment units to provide pretreatment on smaller lots and near surface water.

In the late 1980s, General Development Corporation went bankrupt and sold off the public sewer infrastructure they had built to Charlotte County, which created Charlotte County Utilities to manage the system. In the early 1990s General Development Corporation sued Charlotte County over the price they received for the public sewer system. Ultimately, Charlotte County lost the lawsuit and ended paying General Development Corporation an additional \$50 million. When the residents’ property taxes increased to pay for it, there was a citizen’s revolt that resulted in most of the Charlotte County elected officials being voted out of office and the removal of upper management staff responsible for the debacle. Wastewater issues continue to be politically charged to this day.

In the late 1990s, the Florida Department of Community Affairs, the agency that controls development in Florida, informed Charlotte County that because of the deterioration of ambient water quality in Charlotte Harbor, the County had to expand

their public sewer capacity or face severe limits to future development. As a result, Charlotte County attempted to get citizens to approve a major sewer expansion. This effort ultimately failed. Charlotte County then offered to establish a countywide onsite wastewater management system. The Department of Community Affairs approved this plan as one of several measures the county needed to take.

To establish this onsite wastewater management program, the Charlotte County Health Department received a grant through the Florida Department of Environmental Protection in 1998 for “the demonstration of an on-site sewage treatment and disposal systems management program.” (see Appendix C) The idea was to inventory the 40,000 plus onsite wastewater systems in the county, and develop a pilot project that included evaluating existing septic tanks, upgrading those that needed it for serviceability, establishing mandatory pumping, and conducting an intensive public education campaign about the operation and maintenance and maintenance of septic systems. The final report for this project is due August 29, 2003.

Another measure taken by Charlotte County was the adoption of a local onsite wastewater ordinance (see Appendix D) by which development on small lots near the water had to employ pretreatment of the wastewater before it was applied to the dispersal system. This ordinance came to be known as the “ATU Ordinance” because the most common means of pretreatment permitted were single home scale aerobic treatment units. The local ordinance provided a number of other provisions designed to improve water quality, including reducing the number of Onsite Wastewater Systems in new developments. This corresponded to one of the overall goals of Charlotte County, which was to expand the existing public sewer system, albeit at a slower pace and as development demanded (see Appendix E). Another provision was to require drain field replacements be at an elevation at least 12 inches above the seasonal high water table. The ordinance also set standards for back fill material (sand). Finally, the ordinance required septage haulers and portable toilet pumpers to report the volume pumped to the Charlotte County Health Department.

In addition to all that had occurred, Charlotte County petitioned the Florida Department of Environmental Protection to remove a lock, known as Manchester Lock, that was designed to transport boats from a series of channels to Alligator Bay in the northwestern part of Charlotte Harbor (see Appendix F). The lock was old and inoperable and was costing the county in excess of \$300,000 per year in maintenance. The Department of Environmental Protection told the county that in order for approval to be granted for removing the lock, the county would, among other things, have to implement a mandatory septic tank pumping program for lots located on any tributary that led to Alligator Bay. The affected area was subject to interpretation and became a matter of negotiation between Charlotte County and the Department of Environmental Protection. The matter was settled in early 2003 and the Charlotte County Health Department was charged with drafting an Ordinance that would establish the mandatory pumping program. The initial deadline for the draft to be submitted was February, 2003. Because interpretation of the service area took so long to settle, the deadline was extended until April 2003. The mandatory pumping

program was a natural extension of what Charlotte County had agreed to do anyway to satisfy the Department of Community Affairs with the development issue. Charlotte County Utilities is the agency charged with providing public sewers to Charlotte County. Because of the politically charged nature of wastewater issues in the county, the utility has sought innovative ways to expand their services at reduced costs. One of the ways this has been accomplished has been through the use of decentralized wastewater technologies, which generally cost much less than conventional sewer technology. Specifically, Charlotte County Utilities has made extensive use of STEP (Septic Tank Effluent Pump) system discharging into a low pressure sewer for transporting waste from the home to the public wastewater treatment facility. This approach has been successful in that it has reduced the costs of sewer connection and has minimized disruption to landscaping, driveways and other existing structures.

With respect to the Pilot Project to implement Model Programs 3 and/or 4 of the Voluntary Management Guidelines in Charlotte County, all that has occurred there pointed to a community that was ripe for this type of management. In fact, many of the activities called for in the Voluntary Management Guidelines were already in place.

In late July, 2002, principal investigator Paul Chase met with Charlotte County Director of Environmental Health Bob Vincent to discuss a possible pilot project in Charlotte County. The discussion centered on two possibilities. The first was to approach Charlotte County Utilities to enlist their involvement in perhaps managing onsite wastewater systems in a new development. This seemed a natural course of action, since Charlotte County Utilities was already operating and maintaining decentralized wastewater technology in their public sewer system. Managing onsite systems was merely a natural extension. The other possibility was for one of the model programs, most likely Model Program 3, to be implemented as part of the Alligator Bay project. Bob Vincent agreed to assist us in exploring both possibilities.

In August of 2002, Kevin Sherman, Paul Chase, and Bob Vincent met with representatives of Charlotte County Utilities to discuss the possibility of a pilot project whereby the utility, with the help of the principal investigators and the Charlotte County Health Department, would agree to provide management of onsite wastewater systems conforming to Model Program 4 of the Voluntary Management Guidelines. The utility representatives politely, but flatly refused, citing the volatile politics of wastewater matters in Charlotte County.

What remained after this meeting was the Alligator Bay project. The ordinance, which was to be drafted by the Charlotte County Health Department, called for mandatory pumping of septic tanks in the area around Alligator Bay. Since the septic systems within the area would need to be tracked somehow, it was suggested that the ordinance be written to require limited-term, renewable operating permits for those systems. After some discussion about the logistics of such a provision, Bob Vincent tentatively agreed to do so.

As of late June, the draft ordinance had been submitted to the county attorneys for review. Bob Vincent indicated that the final draft of the ordinance would contain provisions for operating permits for the Alligator Bay project. He also mentioned that there was political support for a countywide mandatory pumping ordinance as a result of the findings of the Department of Environmental Protection grant.

VII. Monroe County Pilot Project

Monroe County is located at the extreme southern end of Florida. It encompasses the Florida Keys, portions of the Gulf Coast at the extreme south end of the main Florida Peninsula and the westernmost part of the Everglades. In land area, Monroe County is 997 square miles. With respect to development and onsite wastewater systems, Monroe County is synonymous with the Florida Keys. What occurs in Monroe County outside of the Florida Keys is not considered in this report.

The population of Monroe County in 2001 was 78,556 residents, a decline of 1.3% from the 2000 U.S. Census estimates.⁹ Nearly all of the population of Monroe County lives in the Florida Keys. There are no major metropolitan areas in Monroe County, although there are a number of smaller communities in the Florida Keys. These include Key West, Marathon, Islamorada, Tavernier, and Key Largo. There is a single mostly two-lane road, U.S. Highway 1, which connects all of the Keys to each other and to the mainland. The road runs along a series of bridges and causeways from the mainland to Key West. While the population has declined, tourism is on the increase. The Florida Keys welcomes millions of visitors each year and provides an infrastructure (hotels, restaurants, marinas, etc.) to sustain them.

The Florida Keys is a chain of ancient exposed coral reef that runs approximately 110 miles from the mainland near Key Largo to the largest and most populated key, Key West. Monroe County also encompasses a few landforms further west, called the Dry Tortugas. The soil throughout consists of coral overlain with crushed seashells and sand. Since the coral is porous, the shallow ground water is at the same elevation as the surrounding ocean.

The climate, flora and fauna in the Florida Keys are tropical. There is a rich aquatic environment associated with the shoreline in the Keys and also the submerged coral reef that runs parallel to the Keys offshore. The ecosystem in the Keys is unique to Florida and the nation.

The groundwater is saline (which distinguishes a “key” from an “island”). There are no freshwater wells in the Keys except for a few dug wells on Key West. Drinking water for all of the Keys is provided by a pipeline from the mainland that carries it from drinking water treatment facilities in Dade County on the mainland, along U.S. Highway 1, all the way to Key West. A keys-wide unit of government known as the Florida Keys Aqueduct Authority manages the drinking water system.

According to Monroe County Health Department officials, there are about 26,324 parcels utilizing onsite wastewater systems in Monroe County including illegal cesspools (2,285) and Class V Injection wells (1,000).¹⁰ Until recently, most systems were conventional septic field leachfield systems or else septic tank/cesspit systems. A cesspit is basically a hole blown or dug into the coral rock base or an intentionally leaking septic tank.

For many years, water pollution has negatively impacted the nearshore waters, reefs and ocean environments in and around the Florida Keys. Fecal bacteria and nutrients (primarily nitrogen and phosphorous) have been the major culprits. Nutrients in particular have had an immense impact on the sea grasses along the shoreline and the submerged coral near the Keys. Also, boat canals that lead from subdivision developments to the ocean have also been impacted. It has long been suspected that onsite wastewater systems have been at least part the source of this pollution. The delivery mechanism is a process called tidal pumping. In brief, tidal pumping occurs when effluent from an onsite system flows into to saturated groundwater too rapidly for the renovation of the pollutant in the effluent. Since the tidal amplitude on the Gulf of Mexico side of the Keys will not be identical to the Atlantic Ocean side, a gradient allowing rapid movement of subsurface flow is created. Tidal pumping allows pollutants to be carried with the tide to the canals, shoreline and/or nearby coral reef in a very short time. Most of the movement is toward the Atlantic Ocean, which is the same side the reef is located. The tidal pumping mechanism also operates with conventional septic systems. The bottom-line is that most onsite wastewater systems in the keys send nitrogen, phosphorous and pathogens through the groundwater with very little removal.

As mentioned above, the population of the Florida Keys is declining. One of the reasons is that the Florida Department of Community Affairs has made it difficult to get building permits. There are two concerns. The first is that Highway 1 is an inadequate hurricane evacuation route for the current population, much less a growing one. If a major hurricane were to hit the Keys, it would be impossible to fully evacuate everyone to the mainland in time along the mostly two-lane U.S. Highway 1. The highest elevation in the Florida Keys is about 16 feet above sea level. The storm surge from a major hurricane will be 7 to 14 feet. This means major flooding and no place to go for many residents, particularly in the Lower Keys. The second concern is that increased development is likely to make an already bad water pollution problem worse. Public sewer facilities in the Keys are available to only a small percentage of the population. The majority of homes and business, even in the towns, utilize onsite wastewater systems.

In order to get a building permit in the Keys, the applicant must accumulate “cesspit credits.” In other words, the building permits are tied to the upgrading of cesspits to current codes, which for the Keys means special “nutrient reducing systems.” These systems provide pretreatment of effluent and are intended to reduce nitrogen, phosphorous and pathogens to very low levels.

The Florida Keys has been in the national spotlight since at least 1990, when it was declared a National Marine Sanctuary (over the objections of many of it’s citizens). Since then, there have been nearly countless grants and studies designed to improve the water quality situation there. In 1995, the Monroe County Board of Commissioners adopted the Monroe County Comprehensive Plan 2010. The plan was designed to improve water quality in the Florida Keys through a variety of measures, including expanding the public sewer infrastructure and eliminating cesspools. In

1996, Florida Governor Lawton Chiles issued Executive Order 96-108, which, among other things, required Monroe County to identify and eliminate cesspools. In 1997, the Monroe County Comprehensive Plan was amended to comply with Florida Statutes. That same year, the county adopted amendments to its 2010 Comprehensive Plan and established a five-year work program to study and plan for wastewater improvements in the Keys. Consequently, work began on the Monroe County Sanitary Wastewater Master Plan.

The Cesspool elimination program called for by Governor Childs in 1996 seemed to be going nowhere, so in 1998, Governor Jeb Bush issued Executive Order 98-309, which was designed to reinvigorate that program. In 1999, the Florida Department of Health promulgated new rules that required special effluent quality standards for Monroe County onsite systems that made them Onsite Wastewater Nutrient Ready Systems (OWNRS). Specifically, the rules set the following limits on effluent discharges to groundwater: BOD₅ = not more than 10 mg/l, TSS = not more than 10 mg/l, Total N = not more than 10 mg/l, Total P = not more than 1 mg/l. These standards had already been adopted by the Monroe County 2010 plan. The same rules promulgated by the state Health Department required that operating permits be issued for any system, statewide, that employed an aerobic treatment unit or that was designed to treat and dispose of sewage from non-residential facilities. By reducing the discharge of nutrients to the environment, it was hoped that water quality in the Keys would improve. At about the same time, the Governor and Cabinet amended the five-year work plan that established a compliance schedule for wastewater treatment systems in the Florida Keys. The changes called for identification and remediation of all unpermitted onsite systems in “cold spots (those areas that will never be served by public sewers)” by July 12, 2003. All other onsite systems would have to meet the new standards by 2010. Monroe County adopted Ordinance 31-1999 to bring county regulations into conformance with the new five-year work plan. The same ordinance reinstated the Cesspool Identification and Elimination Program.

One of the problems associated with the measures described above is that while OWNRS systems were going to be required, it was unclear which technologies or combinations of technologies were capable of meeting the new effluent standards. In addition, the cost of providing OWNRS systems was not known. Therefore, in 1998, Ayres Associates was contracted to conduct a demonstration project that would answer many of these questions. A prison on Big Pine Key was chosen as a test site and sewage from this facility was fed into several different systems to see which one(s) could meet the standard. In the end, an aerobic treatment unit manufactured by Biomicrobics, Inc. combined with an SDI bed constructed of brick chips (for phosphorous removal) was demonstrated to nearly meet the new standard. None of the other systems complied. In addition, anticipated installation and maintenance costs for the OWNRS system were determined to be much higher than for conventional systems.

As a result of this study, The Monroe County Health Department began to issue permits for OWNRS systems throughout the Keys. Federal grant money accelerated

the process. Through a number of rounds of fund distribution, homeowners in specific areas could receive up to 85% of the cost to replace their cesspools or other sub-standard system. This resulted in tremendous increase in the number of aerobic treatment units installed. By the beginning of 2003, nearly 2,000 aerobic treatment units, many of them Biomicrobic FAST units, had been installed. Before the Big Pine Key study, there were fewer than 300.

In 2001, the Florida legislature passed two bills that threatened to slow the progress of water quality improvements in the Florida Keys. The first was a change in the operating permit fee from \$150.00 per year to \$100.00 every other year. By cutting the fee by more than half, it reduced the ability of local health departments to fund monitoring programs for systems with operating permits. The other change extended the compliance deadline for all systems in the Florida Keys until 2010. It also permitted the use of “interim” systems for Hot Spots, those that would eventually be served by public sewers. Interim systems did not have to meet the 10-10-10-1 standard. Rather, standard NSF Class I Aerobic Units, which are not certified for nutrient reduction, could be used instead. This added to the proliferation of aerobic treatment units in the Keys.

In August 2002, principal investigator Paul Chase met with Monroe County Health Department Director of Environmental Health Bobbi Sleighter and Environmental Health Supervisor Bill Brookman to discuss a possible pilot project in the Florida Keys. What emerged from the discussion was that the Monroe County Health Department’s greatest problem was their inability to track operating permits and maintenance of the growing number of OWNRS and aerobic systems in the county. They were also having difficulty communicating with service providers on maintenance and monitoring issues. These activities are already required by Florida onsite wastewater regulations, but the Monroe County Health Department was unable to accomplish them either strategically or logistically with the lowered fee income. These fundamental difficulties precluded any project as sophisticated as a community pilot.

After further discussions, it was determined that the best way the project could assist Monroe County in implementing the Voluntary Management Guidelines was to arrange a system whereby the county could track OWNRS system and interim system operating permits and maintenance events. The goal of the effort was to bring Monroe County into conformance with Florida Onsite Wastewater regulations and, thus, with Model Program 3 of the Voluntary Management Guidelines.

A review of onsite wastewater system tracking products showed that Carmody Data Systems, Inc. of Deforest, Wisconsin, was best equipped to solve Monroe County’s problem. The Carmody Data Systems tracking system provided all of the features necessary to bring Monroe County’s program into conformance with Florida onsite regulations and once conformance was achieved, make the program sustainable for the future. The Carmody system is Internet-based and relies on service providers to enter data about service and monitoring events on onsite systems they have under

contract. In addition, reporting of service events requires that questions of importance to Monroe County Health Department be answered about each system.

Other features of the Carmody system include service event scheduling for each component of each system tracked. The system provided the Monroe County Health Department with a number of compliance tools, such as flagging non-complying systems uncovered during monitoring event reporting, flagging for overdue maintenance events. Finally, the system provided the ability of the Monroe County Health Department to bill for operating permit fees, which was impossible before and absolutely essential for generating revenue to make the system sustainable.

After a series of meetings with Carmody Data Systems and the Monroe County Health Department during September and early October, 2002, a contract was signed whereby the Project would pay Carmody Data Systems for set up and one year monthly maintenance fees on the system for Monroe County. The intent is that after the first year, revenue generated from operating permits would allow for the future use of the data system. As this will require about one to two dollars per system per year, county officials were certain they would continue to use the system.

In November 2002, a training meeting for service providers in Monroe County was held at Hawk's Cay Resort in Duck Key Florida, just north of Marathon. The Project hosted and funded the event and attracted about 40 service providers and health department officials. The meeting opened with a presentation by Bobbi Sleighter, during which she stated that the Monroe County Health Department fully intended to use the Carmody system. Afterward Carmody Data Systems president, Scott Carmody provided an introduction to the system and training on how to use it. Following the training presentation, a question and answer period was held. During which service providers gave mostly positive feedback. Overall, the meeting went well and set the stage for the success that followed.

The core data (the operating permit database) generated by the State of Florida CENTRAX system was uploaded into the Carmody System and the service providers, who updated the onsite system information as they reported service and monitoring events, eventually corrected inaccuracies.

After the initial training meeting, monthly follow-up meetings were held and, overall, the service providers were found to be cooperative and even enthusiastic about the project.

As of this writing, the Monroe County initiative has been an unequivocal success. Both the Monroe County health Department and the service providers there have embraced the Carmody Data System and made great strides in the reporting of service and monitoring events for OWNRS systems. In addition, communication between the health department and the service providers has been greatly improved.

To date, 1,303 service events have been posted on the system, where there was no reporting before. Operating permits being tracked has gone from 0 to 2,196. The number of systems serviced was previously unknown. Today it is 937. Revenue generated from operating permits was \$0. Today it is \$600.00.

The system has worked so well that word has gotten around to other health department. In fact, some of the Project's unexpended funds have been used to set up Franklin County, Florida with the Carmody Data System to track operating permits there. Thus, it is estimated that 80% of onsite wastewater systems utilizing aerobic treatment units in the state of Florida will eventually be tracked by the Carmody Data System in these two counties.

Franklin County, in the northern Florida panhandle, is home to the world famous Apalachicola oyster. The barrier island that delineates the shellfish (oyster) harvesting area is known as St. George Island.

One-third of the level area of St. George Island is a state park and is preserved from development. The remaining area is platted for development.

The Department of Community Affairs also considered Franklin County an Area of Critical State Concern. Through their leadership, county ordinances were developed which required all new development on the island to be aerobic treatment units and all failing septic systems on the island to be replaced with ATU's. Currently, Franklin county contains the second largest number of ATU's after Monroe County. David Brumbach of the Franklin County Health Department was delighted to receive the projects assistance in setting up the 250 ATU's on the county system.

VIII. Volusia County Pilot Project

Volusia County is located in the northeastern part of Florida on the Atlantic Coast between St Augustine and Cape Canaveral. The St. Johns River flows south to north near the western border of Volusia County and Lake George, the second largest lake in Florida, is located in the county's northwest corner. The U.S. Census Bureau estimated the population of Volusia County in 2001 to be 454,581.¹¹ Most of this population lives in urban areas, such as Daytona Beach, Deltona, Deland and Ormond Beach. Daytona Beach is one of the better known tourist areas in the state outside of the Orlando area. The beach itself attracts tourists throughout the year, particularly during spring break. The Daytona International Speedway is also a world class attraction.

The population of Volusia County is expanding rapidly. According to Volusia County Health Department officials, they expect to issue more onsite wastewater system construction permits (over 4,000) this year than any other county in the state.

Volusia County is 1,103 square miles in area. The ecology of Volusia County is typical of Central Florida. Woodlands in the west give way to swamps and beaches as you approach the Atlantic Coast. The soils in Volusia County are also typical – sand and sandy clay with shallow seasonal high water table. In fact the water table in much of Volusia County is shallower than elsewhere, thus many of the onsite wastewater systems there are raised (mound type) systems.

Development in some parts of Volusia County proceeded in much the same way as it did in Charlotte County. The General Development Corporation platted a huge residential development in Deltona in the 1960s. As with Charlotte County, the Deltona development was primarily residential with small lots. Public water was provided, but most of the development was with onsite wastewater systems. The Volusia County Health Department has expressed concern that the onsite systems there are all about 30 - 40 years old and it is anticipated that large numbers are due to fails in the near future. In addition, recent years have seen some high profile beach closings due to fecal coliform contamination. These factors, plus the rapid development, prompted the Volusia County Board to ask the health department to develop recommendations concerning wastewater infrastructure in areas served by onsite wastewater systems. Therefore, in 1999, the Volusia County Health Department developed a report called *Recommendation on the Status of Sewage Disposal and Collection in Volusia County, Florida*. This document is called “the Red Book Report” colloquially.

In late July 2002, principal investigator Paul Chase met with Onsite Wastewater Program Coordinator Chuck Luther to discuss the pilot project in Volusia County. He asked that a letter be sent to Volusia County Director of Environmental Health Peter Thornton requesting their participation. This was done.

In late August 2002, the principal investigators met with Volusia County Health Department officials in Deland to discuss the specifics of the pilot project. It was agreed that the health department would try to locate a community that might agree to participate in a pilot project designed to implement Model Program 4 of the *Voluntary Management Guidelines*.

In late October 2002, the principal investigators met again in Deland with Volusia County Health Department officials and some representatives from a community near Ormond Beach that had expressed interest in the pilot project. Officials from the City of Deltona had also been invited, but did not attend the meeting. Discussions with the Ormond Beach area representatives revealed that, despite their interest, their community was not a good candidate for the pilot project. This was because they were adjacent to the City of Ormond Beach, which not only was served by public sewers, but also had offered to connect the adjacent community if they would only agree to annex. There were a myriad of technical and political difficulties within the community that precluded a high-level onsite wastewater management program. In the end, it was recommended that they annex and get public sewers – it was clearly their best option.

The representatives from the community left the meeting at this point and the principal investigators discussed the pilot project further with the Volusia County Health Department officials. We were told that the health department had exhausted their list of candidates for pilot projects, but that they would still like to see the grant succeed in Volusia County. After further discussion, it was agreed to set up a meeting with the director of Volusia County Utilities, which provided public sewer service to unincorporated areas of the county, to see if we could spark interest with them in managing onsite wastewater systems.

We met with Volusia County Health Department officials and the director of Volusia County utilities in late November 2002. We gave a presentation about onsite wastewater management and how Volusia County Utilities might participate. During the discussion that, it became apparent that Volusia County Utilities had no interest in such a venture. In fact, the utility director told us she was philosophically opposed to the whole idea.

After this meeting, it was clear that there was not going to be a pilot project in Volusia County. We the discussed the idea of writing an addendum to the Red Book Report that would allow the health department to recommend and perhaps leverage onsite wastewater management where they could. The health department officials agreed.

A review of the Red Book Report was conducted and the addendum was completed in April 2003. Paul Chase met one last time with Chuck Luther and we went over the addendum in detail. Chuck Luther said he thought the addendum could be a useful tool and would consider the recommendations made within it. Paul Chase offered the Project's assistance with implementing the recommendations if they acted quickly,

since the Project was due to be completed in a few months. Further contact with Volusia County was still pending at this writing. The original Red Book Report can be found in Appendix G. The Addendum is printed on the following pages.

Addendum to the Volusia County Health Department “Red Book” Report, 1999

April 9, 2003

Introduction

The purpose of this addendum is to provide some alternative sewage disposal system infrastructure options based on the USEPA Voluntary Management Guidelines. While the system found in the “Red Book” report provides three options: suitable for onsite systems, recommend central sewer, and strongly recommend public sewer, it is proposed that one or more additional options be considered that involve onsite wastewater systems in various levels of managed settings.

The “Red Book” Report

The “Red Book” report produced by the Volusia County Health Department characterizes developed areas of Volusia County according to the risk factors related to site conditions as they apply to sewage disposal system infrastructure. The report is ambitious in its scope in that it attempts to provide guidance for sewage disposal infrastructure planning within all developed areas of the county using an objective, i.e., quantitative, method for generally characterizing sites according to public health and the environmental risk. The report explicitly states, however, that it “should not be viewed as any kind of plan for sewers in the county.” This apparent contradiction illustrates an important distinction. It recognizes that, while the report provides a technical evaluation of developed areas concerning their suitability for sewage disposal system infrastructure, it does not purport to apply this evaluation to any particular plan. Infrastructure planning involves a number of non-technical factors, most of which are not within the ability of the health department to decide.

The evaluation method utilizes an index scheme by which six classes of site conditions are applied to an algebraic formula. The number generated from this formula is used to further classify developed areas into one of three infrastructure-planning types: suitable for onsite systems, recommend central sewer, and strongly recommend public sewer. The algebraic formula and the variables it uses are discussed in detail below.

Index Scheme

The index scheme is applied to each of 90 developed areas within the county and that these developed areas are primarily subdivision developments. In some cases, areas are divided into two or more sub-areas, due to varying site conditions within them. The 90 developed areas comprise about 90% of all developed areas within Volusia County.

The algebraic formula used to generate the index number is found in Figure 1, below. It has been restated for the sake of simplicity:

Figure 1. Algebraic formula used to calculate sewage disposal system infrastructure index

$$\frac{P+B+A+W+R}{D}$$

P = Permeability Index W = Water Table Index
 B = Water Body Index R = Regulated Water Index
 A = Age of System Index D = Density Index

The Permeability Index

The Permeability Index is generated from a table, which assigns an index number based on soil permeability. The table accounts for the entire range of soil permeability found in Volusia County and the divisions between the permeability classes, while somewhat arbitrary, are generally useful in assigning risk. The Permeability Index table is reproduced below:

Table 1. Permeability Index Table

<i>Average Permeability (from Table 16 of soils book)</i>	<i>Index</i>	<i>Examples</i>
> 20" per hour	5	Astatula, Canaveral
6.0 – 20	4	Apopka, Myakka
2.0 – 6.0	3	Chobee, Daytona
0.6 – 2.0	4	Myakka Variant, Gator
0.2 – 0.6	5	Bluff

The index table general assigns higher risk to permeability extremes. Highly permeable soils are regarded as high risk presumably because of the likelihood that sewage will pass through it too rapidly to provide complete treatment. Low permeable soils are also assigned higher risk numbers, perhaps because such soils increase the likelihood of onsite system failure due to hydraulic overload.

Overall, the scheme is reasonable. However, there is one potential problem. Onsite systems installed in soils with low permeability should theoretically pose no greater risk of failure than those installed in medium permeability soils. The absorption area

of a system utilizing low permeability soils would simply need to be greater, based on criteria already published in the Florida Onsite Code. A case could be made that soils with slow permeability pose less risk than highly permeable soils because the time it takes sewage to pass through them should provide more thorough treatment. On the other hand, practical experience could dictate otherwise. The “Red Book” report notes that drainage characteristics of the soil are factored into the risk, however not all slow permeable soils are poorly drained and not all high permeable soils are well drained. While the drainage characteristics of a site are a factor, they do not necessarily affect permeability. In addition, drainage characteristics of a site may be more pertinent to the Water Body Index or the Water Table Index.

Water Body Index

The Water Body Index is generated from a table that assigns risk based on the proximity of the onsite systems to various types of water bodies. The types of water bodies that provide the index numbers are based primarily on water body usage. The Water Body Index table is reproduced below:

Table 2. Water Body Index

Adjacent to food production (shellfish harvesting)	5
Adjacent to protected waterways or public beaches	4
Adjacent areas drain to surface water body	3
Not adjacent to (nor flows to) waters of concern	1

The Water Body Index number is higher for those bodies of water where contamination would have the greatest potential public health impact and lower where the potential impact is less. This scheme is both reasonable and intuitive. However, it would perhaps be more useful if it took into account whether or not an adjacent body of water was already impacted. If it has been demonstrated that contamination is already present in a body of water, the potential public health risk is much higher, regardless of the water body’s use.

Average Age of System Index

The Average Age of System Index is derived from a table that assigns risk based on the average of the number of years a systems in a developed area have been in use. The table used for assigning this index is reproduced below:

Table. 3 Average Age of System Index

<i>Average Age of System</i>	<i>Index</i>
1 to 10 years	1
11 to 16 years	2
17 to 26 years	3
> 26 years	5

The Average Age of System Index number is lower for newer systems and higher for older systems. The scheme recognizes the fact that onsite systems have finite life-spans and that older systems tend to fail more often than newer ones. The table also makes the unstated but reasonable assumption that failed systems pose higher risk than those that are operating properly. It is hard to quibble with this scheme because so much of what is known about system life-span and failure falls in the realm of anecdote and conventional wisdom. A case could be made that using the mode or mean rather than the average system age would be statistically more significant; however, in this context, using the average is probably as good as any other statistical measure.

Water Table Index

The Water Table Index is generated from a table that divides the depth to seasonal high water table into five slices and assigns a index number to each. The Water Table Index is reproduced below:

Table 4. Water Table Index

<i>Depth to Water Table</i>	<i>Index</i>
> 48"	1
36 to 48"	2
24 – 35"	3
0 – 23"	4
Above Ground Surface	5

The Water Table Index attempts to capture the significant impact the depth to seasonal high water table has on the operation of onsite systems and the associated risks. The depth to seasonal high water table interacts with a number of other factors that determine how well an onsite system treats and disposes of sewage. This complexity of this interaction makes it difficult to isolate seasonal high water table as a lone factor and then quantify it with an index number. For example, the length of time that the seasonal high water table occurs during the course of a year has an affect on risk. The level of sewage pre-treatment and the depth an absorption system is installed both enter in the risk equation as well. Nonetheless, any scheme that purports to assess the risk of onsite systems *must* take seasonal high water table into account, and this scheme works as well as any.

Public Water Index

The Public Water Index, also described as the “Regulated Water Status,” is generated from a table that assigns a risk number based on the source of drinking water the developed area uses. The Public Water Index table is reproduced below.

Table 5. Public Water Index

<i>Regulated Water Status</i>	<i>Index</i>
Privates wells used	5
Mixture of wells and municipal water	3
Regulated water provided	0

The Public Water Index assesses risk according to how drinking water is provided to the developed area. The use of private wells is assessed a high risk index number, presumably because drinking water is drawn from the same water formations that are exposed to contamination from onsite systems. Public water use is assigned a low (no) risk number presumably because the source of water is (1) “regulated,” i.e. treated and monitored and (2) is drawn from a source that is not exposed to contamination from onsite systems. This illustrates an interesting disconnect between public health and environmental protection agendas with respect to water quality issues. Within the context of this index, where a community derives its drinking water from is purely a public health issue. If no one is drinking the water that underlies a developed area, then there are no public health impacts. However, drinking water source has little impact on whether or not there are any environmental impacts from onsite systems. Given that the “Red Book” report was produced by the Volusia County Health Department, the inclusion of the Public Water Index is appropriate and the scheme itself is reasonable in gauging public health risk.

Density Index

The Density Index assigns a risk rating based on the population density expressed as number of dwelling units per acre. The Density index is used as the denominator in the algebraic formula used in calculating the risk number, therefore, the index number assigned is lower for high density (higher risk) developed areas and lower for low density (lower risk) developed areas. The Density Index table is reproduced below:

Table 6. Density Index

<i>Density (useable area)</i>	<i>Index</i>
0.00 to 1.00 units per acre	5
1.01 – 2.00	4
2.01 – 3.00	3
3.01 – 4.00	2
4.01 – 5.00	1
> 5.00	0.5

Population density is certainly a major factor in evaluating public health and environmental risk from onsite systems. The number of systems per unit of land has a direct bearing on the volume of pollution entering the environment in a developed area. In addition, the concentration of pollution in a particular area has a direct bearing on public health and environmental risk. The fact that the Volusia County Health Department uses it as the denominator in the index formula suggests that they consider it an over riding factor in determining public health risk. Statistically, this index has a profound effect on the index number generated and, consequently, on the classification assigned.

The Sewage Disposal Infrastructure Index

When each of the individual indices for a particular developed area is applied to the algebraic formula, an index number is calculated. This index number is then used to classify developed areas into three broad sewage disposal system infrastructure categories. In the Southeast Volusia Geographic Area, additional categories seem to have been created. For example, #48, the Park Avenue vicinity and a few others were classified “recommend public sewer due to commercial and light industrial area.” In another case, #34 Hewitt Overlook vicinity was classified “ recommend for central sewer but density advantages allow for no consideration at this time.” This tendency to qualify the three established categories was ubiquitous in the southeast Volusia region.

In all, the data suggests that mitigating circumstances frequently overrode the index number in the classification scheme. For example, the lowest score calculated for any developed area was 2.40. There were three areas with this score and two of them were recommended for public sewer. The second highest score calculated was 34. Two developed areas scored 34 and one was classified “recommended for central sewer” while the other was classified “strongly recommended for central sewer.” The sheer number of anomalies noted in the data shows that subjective criteria often dictated the recommendation and that this happened often enough to reduce the usefulness of the numeric scheme. On a positive note, there was more consistency of recommendations within individual areas of the county than in the county as a whole. This points to varying interpretations of the index numbers and the thresholds for making recommendations depending on who was interpreting the data. This in turn suggests

varying opinions among county personnel about the efficacy of onsite systems generally.

Finally, and despite the anomalies, the data did show a general trend with developed areas scoring low index numbers being more likely to be classified “suitable for onsite systems.” Those scoring the highest numbers generally received “strongly recommend connection to central sewers.” The middle ground, however, was up for grabs.

Onsite Wastewater Management

The USEPA Voluntary Management Guidelines are grounded in the premise that if onsite systems are maintained and monitored with greater care and frequency, they should work better and be a viable alternative to public sewer systems. The Voluntary Management Guidelines describe five model programs that outline 13 classes of activities for each model program. Generally speaking, lower level model programs are intended for areas where environmental sensitivity is low and site conditions allow passive, low maintenance onsite systems. They are less intrusive and have fewer mandatory program elements. Higher level model programs are intended for areas where environmental sensitivity is high and where site condition challenges require more complex technological solutions. Consequently, they tend to be more intrusive and have numerous specific, mandatory program elements.

Whatever the situation, *all* onsite systems could benefit from management. It has been demonstrated that failure rates with onsite systems are dramatically reduced when they are in managed settings. Generally speaking, the higher level of management a system receives, the less likely it is to fail. This is particularly true of systems that contain mechanical components, i.e., systems other than conventional septic tank-leachfield systems. Florida onsite wastewater regulations recognize the value of management in that they require continuing maintenance and monitoring of more complex systems. For commercial and performance-based systems, limited term operating permits are required. The management measures established in Florida regulations mirror the Voluntary Management Guidelines’ Model Programs 2 and 3.

In many cases, onsite wastewater systems are a more attractive option for communities than connection to public sewers. Onsite wastewater systems are typically less expensive to install and manage than public sewers. In addition, onsite wastewater systems do not usually require annexation into political entities for their installation and management. Public sewer extensions are often resisted by communities and become the focus of political turmoil. Under these circumstances, being able to provide a managed onsite wastewater option has definite advantages.

Incorporating Management into the “Red Book”

Currently, the “Red Book” report provides three classes of recommendations. Either a developed area is suitable as it is for onsite wastewater systems or else connection to public sewer is either recommended or strongly recommended. Table 7, below, summarizes the recommendations made for all classified developed areas:

Table 7. Recommendations for all developed areas

<i>Recommendation</i>	<i>Number of Developed Areas</i>
Suitable for Onsite Systems	42
Recommend connection to central sewer	27
Strongly recommend connection to central sewer	25
No recommendation	2
Total	96

While onsite wastewater management is suitable for all developed areas, within the context of the “Red Book” report management is most needed in environmental sensitive areas that pose the most risk to public health. In some instances, it is already required under Florida law. Nearly all such areas received a “recommended” or “strongly recommended” classification.

Incorporating a classification called “suitable for managed onsite wastewater systems” would provide a number of benefits and require only minor adjustments to the current “Red Book” scheme. The benefits have already been described in the previous section. The recommendations for adjustments are described below.

1. Utilize the existing numeric scoring system; however, revisit the interpretations to reduce anomalies in the recommendations.
2. Examine those developed areas that remain in the “recommend” category and select those which scored below the median of all developed areas receiving that recommendation.
3. Reclassify those areas as being “suitable for onsite wastewater systems in a managed setting.”
4. When the issue of sewer connection arises in the community, offer an appropriate onsite wastewater management scheme as an alternative.

5. If this proves to be successful, revisit the classification scheme to include more developed areas in the “managed onsite” category.

The scheme described above is mainly designed to prevent restructuring the existing numeric index system while still incorporating onsite wastewater management into the recommendations. In other words, management can be implemented with minimal resources. However, if resources are available and there is the will to provide a better scheme, the following recommendations should result in a more effective scheme and more seamless integration of onsite wastewater management in Volusia County:

1. Provide a multiplier for the Body of Water Index so that it takes into account existing impacted water bodies. The multiplier could be as simple as doubling the point value. More intensive examination could result in a scheme that is based on the degree of impact with a number of multipliers.
2. Reexamine the permeability index and consider revisions based on the notion that less permeable soils provide better treatment.
3. Provide a Topography Index. The slope of a site has implications for both surface water drainage and technology selection and should be accounted for.
4. Provide a Waste Strength Index. High strength waste in particular has a profound impact on the operation of an onsite wastewater system and, consequently poses a greater risk to public health and the environment due to technological measures needed to treat the waste as well as the potential added pollution load. Using mass loading calculations could provide some benefit in constructing an index table.
5. Provide a Technology Selection Index. While this has no direct effect on public health or environmental risk, it is a major factor in determining the need and extent of management measures.
6. Reexamine the Density Index and its use as a denominator in the index formula. “Red Book” data shows that this particular index skews the final index number, particular where density is high.
7. Reexamine and prioritize the various indices and recalibrate the index tables accordingly. A five point scale may not be appropriate for all indices.
8. Provide thresholds for the recommendation categories. A particular point value should mean the same thing across the board and result in the same recommendation. Without this, the quantitative scheme is rendered less useful.

Conclusions

The approach taken in the “Red Book” report is innovative and ambitious. However, it could be more useful with some controls to enhance consistency in interpretation. Two action plans are provided for incorporating onsite wastewater management into the recommendations that ultimately result from the scheme. It is recommended that one or the other be undertaken by the Volusia County Health Department.

IX. Florida Project Findings - Discussion

Implementing Model Programs 3 and 4 of the Voluntary Management Guidelines in Florida turned out to be more difficult than first anticipated. While the onsite wastewater regulations in Florida already mandate Model Program 3 for most systems that need it, implementation at the local level turned out to be somewhat problematic. This is mainly true in Monroe County, where onsite wastewater management activities are most needed. Before the Project came to their assistance, it is difficult to say that any management activities were occurring there at all. Monroe County is where the Project met with its greatest success. As testament to this success, Franklin County was added to the list of counties assisted. Word of mouth, positive reaction in Monroe County led to Franklin County seeking out the project.

In Charlotte County, circumstances there were already moving the county toward Model Program 3 across the board. The Project can claim some success in accelerating the process by convincing the Charlotte County Health Department to draft language into the local ordinance for the Alligator Bay project mandating operating permits for septic tank/leachfield systems in the project area. This move, when it occurs, will be unprecedented in Florida.

The Volusia County pilot project met with little success. Model Program 3 had already been fully implemented there, but was of little importance due to the small number of systems that required operating permits in the first place. This is ironic because the Volusia County Health department was the most willing of the three pilot project counties. Should the health department adopt recommendation made in the addendum to the Red Book report, the Project can claim some small success there.

Implementing Model Program 4 met with no success anywhere. In Monroe County, the most likely agency for such activities, the Florida Keys Aqueduct Authority, opted out long ago. In addition, Monroe County had the least developed management programs of any kind and implementation of a high level management program there was untenable from the start.

In Charlotte and Volusia Counties, attempts to engage county utilities with high-level onsite wastewater management were met with no interest whatsoever. Not only were the utilities not interested, but in the case of Volusia County, they were vehemently uninterested. After an exhaustive search, the Volusia County Health Department found only one community with any interest at all in high-level management. As it turned out, that community was not suited for it.

The Project raises some questions, perhaps more than it answers. Why should implementing high-level onsite wastewater management be so difficult in the only state in the union where the regulations fully mandate it? Why are utilities so resistant to the idea of managing onsite wastewater systems? The answers to these questions probably lie in the age-old issues of political will, resources, public awareness and institutional tradition.

On a very basic level, those most affected by decisions related to onsite wastewater management, politicians and the public, do not understand it. Therefore they are unwilling to pay for initiatives related to it. While there is great concern for water quality issues in Florida, most of the resources available for water quality improvement initiatives are allocated elsewhere. The move by the Florida legislature to reduce the operating permit fee for onsite systems is a case in point.

The lack of interest on the part of public wastewater utilities to embrace high-level onsite wastewater management is mostly baffling. Common sense would dictate that moving in this direction would permit utilities to expand their customer base without investing in expensive public sewer infrastructure. However, institutional tradition may lie at the core of their resistance. Public sewer utilities are designed to provide public sewers. This culture has regarded septic tanks as the “enemy” or at best, second-class, band-aid solution to wastewater treatment. Embracing onsite wastewater management could be regarded as thinking way outside of the box.

What does the Florida experience say about Model Programs 3 and 4 of the *Voluntary Management Guidelines*? One conclusion that can be drawn is that Model Program 3 is viable, as long as there are resources available to implement it. Evidence of this can be seen in all of the pilot project counties. In Monroe County, both the industry and regulatory community have embraced it, even though the jury is still out on the general public. In Charlotte County, there is political support for a mandatory pumping program for all septic tanks. In Volusia County, there was perhaps the most enthusiasm, at least on the part of health department officials.

On the other hand, Model Program 4 seems to be less viable, at least in the initial attempts made by this Project. Perhaps the time is not ripe for such advanced concepts to be adopted here. The other possibility is that the Model program itself is flawed in some way. In any case, the resistance we encountered here suggests that implementation of a Model 4 Program in Florida is a long way off.

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