



Florida Department of Health  
Bureau of Environmental Health  
Onsite Sewage Programs  
Research Review and Advisory Committee Meeting

**DATE AND TIME:** December 11, 2012 at 1:00 p.m. ET

**PLACE:** Florida Department of Health Southwood Complex  
4042 Bald Cypress Way, Room #240P  
Tallahassee, FL 32399

**Or via conference call / web conference:**

Toll free call in number: 1-888-670-3525

Conference pass code: 8605907413

Website: [http://connectpro22543231.na5.acrobat.com/rrac\\_new/](http://connectpro22543231.na5.acrobat.com/rrac_new/)

This meeting is open to the public

**AGENDA:** FINAL

1:00 – 1:05	Introductions and Housekeeping
1:05 – 2:00	Discussion on Draft February 2012 Legislative Status Report for the Nitrogen Reduction Strategies Study
2:00 – 2:30	Updates on Other Projects
2:30 – 2:35	Other Business
2:35 – 2:55	Public Comment
2:55 – 3:00	Closing Comments, Next Meeting, and Adjournment

NOTE: Time slots are approximate and may be subject to change.

**Florida Department of Health Research Review and Advisory Committee  
Division of Disease Control and Health Protection  
Bureau of Environmental Health - Onsite Sewage Programs Section**

Approved Minutes of the Meeting held at the Southwood Office Complex, Tallahassee, FL  
December 11, 2012

**In attendance:**

- **Committee Members and Alternates:**

- In person:**

- Bill Melton (member, Consumer)

- Via teleconference:**

- Quentin (Bob) Beitel (alternate, Real Estate Profession)
    - Wayne (W.B.) Crotty (member, Septic Tank Industry)
    - Paul Davis (member, Division of Environmental Health)
    - Bob Himschoot (alternate, Septic Tank Industry)
    - Kriss Kaye (alternate, Home Building Industry)
    - Carl Ludecke (vice-chairman, member, Home Building Industry)
    - Eanix Poole (alternate, Consumer)
    - John Schert (member, State University System)
    - Clay Tappan (chairman, member, Professional Engineer)

- Absent members and alternates:**

- Taylor Brown (alternate, Division of Environmental Health)
    - Craig Diamond (member, Environmental Interest Group)
    - John Dryden (alternate, State University System)
    - Nancy Gallinaro (alternate, Local Government)
    - Tom Higginbotham (alternate, Division of Environmental Health)
    - Geoff Luebkekmann (member, Restaurant Industry)
    - Susan McKinley (alternate, Restaurant Industry)
    - Jim Peters (alternate, Professional Engineer)
    - David Richardson (member, Local Government)

- **Visitors:**

- Via teleconference:**

- Damann Anderson (Hazen and Sawyer)
    - Alice Berkley (Orange County Commissioner Brummer's office)
    - Patti Sanzone
    - Shanin Speas-Frost
    - Pam Tucker

- **Department of Health (DOH), Onsite Sewage Program Section:**

- In person:**

- Eberhard Roeder, Professional Engineer
    - Elke Ursin, Environmental Health Program Consultant

**Florida Department of Health Research Review and Advisory Committee  
Division of Disease Control and Health Protection  
Bureau of Environmental Health - Onsite Sewage Programs Section**

1. **Introductions** – Seven out of ten groups were present, representing a quorum. The groups that were not represented were Local Governments, Environmental Interest group, and the Restaurant Industry. Chairman Tappan called the meeting to order shortly after 1 p.m. The agenda was outlined, introductions were made, and some housekeeping issues were discussed. Since the last meeting David Richardson has moved from the alternate position to the member position and Nancy Gallinaro is the new alternate. Groups on the RRAC that have terms expiring in January of 2013 are the Real Estate Professionals, the Professional Engineers, and the Home Building Industry. Letters were sent to the appointing agencies requesting nominations in late November.
2. **Review of previous meeting minutes** – The minutes of the November 14, 2012 meeting were reviewed.

**Motion by Carl Ludecke, seconded by Quentin Beitel, to approve the minutes as submitted. All were in favor and none opposed and the motion passed unanimously.**

3. **Nitrogen Study Update** – Elke Ursin led the discussion on the draft February 2013 Legislative status report on Phase II and Phase III of the nitrogen reduction strategies study. The format for the report is similar to what has been submitted in the past and has been updated to reflect current information and added clarification regarding the funding status of the project. Bob Himschoot asked whether the balance to complete the project was sent by the department in a legislative budget request and Elke Ursin stated that in October of 2012 it was included in the draft, but she would need to find out whether it was included in the final version that went out. She stated that she would send an email with a response to this once she found out. Bob Himschoot stated that it was critical to know who was going to spearhead this request for funding with the legislature. Elke Ursin stated that in the past this has not been included in the Department's legislative budget request, and in the past the interest groups have spearheaded the funding. Elke Ursin will research DOH's role in requesting the funding and will let the group know. The draft report was edited during the meeting. The revised report will be sent to the RRAC with tracked changes showing the changes that were made.

**Motion by Bill Melton, seconded by Quentin Beitel, to move forward with the report making the changes discussed during the meeting, route the report internally within DOH, and send a copy of the report to the RRAC. All were in favor and none opposed and the motion passed unanimously.**

Elke Ursin stated that Hazen and Sawyer submitted an abstract to the 2013 Florida Water Resources Conference. If accepted, the paper and presentation will provide a project overview and some preliminary results.

4. **Updates on Other Projects**

- a) **EPA Non-Point Source Pollution Grant on the Performance and Management of Advanced OSTDS** – Elke Ursin gave an update on the status of the project. Staff submitted an abstract to present the results of the study at the 2013 Florida Water

**Florida Department of Health Research Review and Advisory Committee**  
**Division of Disease Control and Health Protection**  
**Bureau of Environmental Health - Onsite Sewage Programs Section**

Resources Conference, which will be held on April 28<sup>th</sup> through May 1<sup>st</sup> in Orlando Florida. A proposed timeline for the final report writing was presented.

**b) Florida Wastewater Inventory** – Elke Ursin presented on two potential avenues for continuation of the wastewater inventory. One is in coordination with Palm Beach County Water Resources to develop a statewide process for updating the inventory. The other is a disaster preparedness grant to work on a water and wastewater inventory, allowing for collaboration between several Bureau of Environmental Health program areas (onsite sewage, drinking water, geographic mapping and assessment, and disaster preparedness). Staff will meet in the next week to develop a project plan.

5. **Other Business** – Staff are working on updating the annual business plan for the research and engineering sections.
6. **Public Comment** – The public were allowed to comment throughout the meeting.
7. **Closing Comments, Next Meeting, and Adjournment** – The next RRAC meeting will be determined in the future to discuss the draft final report on the grant looking at the performance of advanced systems as well as to have a discussion on the process forward with research priorities. Bill Melton made a motion to adjourn. The meeting adjourned at 2:11 p.m.



**Department of Health  
Bureau of Environmental Health  
Onsite Sewage Programs  
Research Review and Advisory Committee**

**Wednesday December 11, 2012**

**1:00 pm - 3:00 pm**



# Agenda:

- |             |   |
|-------------|---|
| 1:00 - 1:05 | Introductions and Housekeeping  |
| 1:05 - 2:00 | Discussion on Draft February 2012<br>Legislative Status Report for the<br>Nitrogen Reduction Strategies Study |
| 2:00 - 2:30 | Updates on Other Projects   |
| 2:30 - 2:35 | Other Business  |
| 2:35 - 2:55 | Public Comment  |
| 2:55 - 3:00 | Closing Comments, Next Meeting,<br>and Adjournment  |



# Introductions & Housekeeping

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- Roll call
- Identification of audience
- How to view web conference
- **DO NOT PUT YOUR PHONE ON HOLD!!!!**
- Download meeting material:

<http://www.myfloridaeh.com/ostds/research/Index.html>



# Introductions & Housekeeping

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Local Government member is now David Richardson and the new alternate is Nancy Gallinaro

Groups that have terms expiring January 2013:

- Real Estate Professionals
- Professional Engineer
- Home Building Industry

Letters were sent in late November to each interest group requesting nominations.



# Florida Onsite Sewage Nitrogen Reduction Strategies Study

**Purpose:** Develop passive strategies for nitrogen reduction that complement use of conventional onsite sewage treatment and disposal systems, and further develop cost-effective nitrogen reduction strategies



# Florida Onsite Sewage Nitrogen Reduction Strategies Study

- Discussion on draft February 1, 2013 Legislative Status Report



# Florida Onsite Sewage Nitrogen Reduction Strategies Study

- Abstract submitted to the 2013 Florida Water Resources Conference, April 28<sup>th</sup>-May 1<sup>st</sup> in Orlando, Florida. The paper provides a project overview and some preliminary results.



# Update on Other Projects



# Performance and Management of Advanced Onsite Systems



## Assess:

**Water quality protection**

**Administration of program**

**Effective monitoring practices**

## Tasks:

Keys study



Database



Survey



Sampling



Best management practices



# Performance and Management of Advanced Onsite Systems

Submitted an abstract to present results of the study at the 2013 Florida Water Resources Conference

Timeline for final report writing:

- February 28, 2013: Draft Final Report submitted to DEP and RRAC members/alternates for review and comment.
- Week of March 11-15, 2013: RRAC Public Meeting to discuss report.
- March 19, 2013: All comments from DEP, RRAC, and public due for incorporation into final report.
- March 31, 2013: Final report to DEP for submission to EPA.



# Continuation of Inventory of OSTDS in Florida

- Update 2009 inventory and develop method to automate this process
- Prioritized in 2011: #1 Ranked project
- Two potential project ideas are in the works:
  - Coordination with Palm Beach County Water Resources
  - Development of a preparedness grant proposal



# Continuation of Inventory of OSTDS in Florida: Palm Beach County

- Possibility of coordinating with Palm Beach County Water Resources to develop a statewide process for updating the inventory
- 95% of the wastewater capacity responded to original inventory request
- Missing information from 30 smaller wastewater treatment plants
- Looking to work with Palm Beach County to develop a process to update and automate inventory information



# Continuation of Inventory of OSTDS in Florida: Preparedness Grant

- Knowledge of water and wastewater system boundaries is a challenge during disaster response
- Collaboration between people from DOH onsite sewage section, drinking water section, GIS section, and disaster preparedness section
- Staff are meeting next week to develop a project plan



# Other Business

- Staff are working on updating the annual business plan for the research and engineering sections. Once complete the document will be distributed.



# Public Comment



# Next Meeting

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## **Upcoming meeting topics:**

- Discussion on draft final report on the grant looking at the performance of advanced systems
- Discussion on process forward with research priorities

## **Proposed dates for next meeting:**

- Mid March 2013 (week of 11-15)



# Closing Comments and Adjournment

Florida Water Resources Conference

Abstract

Subject Area: Wastewater Treatment Process

2<sup>nd</sup> Subject Area: Regulatory Issues / Public Communications

Paper Title: Managing the 'other' advanced sewage treatment systems: An assessment of Florida's aerobic treatment units and similar onsite sewage treatment systems

Abstract:

Onsite Sewage Treatment and Disposal Systems (OSTDS) serve the wastewater needs of approximately one-third of Florida's residents. While most are conventional OSTDS or septic systems, there are some other systems that provide additional or advanced pretreatment before disposal. These systems are generally permitted as aerobic treatment units (ATU) or performance-based treatment systems (PBTS). They are managed differently from conventional systems, with Florida's regulations requiring that a system be inspected by the county health department inspector once a year and by the system's maintenance entity twice a year. We will present results from a study assessing the performance and management of such systems in Florida.

The Florida Department of Health received a grant from the Environmental Protection Agency's Nonpoint Source Pollution program (Section 319) to assess the performance and management of advanced systems throughout Florida. The study included several components, including: inventorying systems; surveying various user groups; assessing the operational status of systems; and sampling systems, including analyses for carbonaceous biochemical oxygen demand (cBOD5), total suspended solids (TSS), total nitrogen (TN), and total phosphorus (TP). Following an inventory effort, random samples of systems were selected for user surveys and for further field assessment. Six different user groups; including owners/users, regulators, maintenance entities, installers, manufacturers, and engineers; were surveyed to determine their perceptions of how advanced onsite systems are managed and performing. Project staff performed field visits on over 500 systems, and obtained at least one effluent sample from 340 systems, during the time from February through September of 2011. Field work has been completed, data analysis and reporting is nearing completion as of the time of abstract submission. In the presentation we will summarize the results of the inventory effort, highlight some results of the survey of owners and users of advanced systems, and discuss results from the assessment and sampling of a random sample of advanced systems.

Date when work/project/program was or will be completed: September 30, 2011 (field work) data analysis ongoing, anticipated completion of reporting to funding agency March 2013

Will this or a similar paper be presented or published elsewhere within the next 12 months? Yes. Florida Water Resources Journal has indicated interest in publishing an article based on the results of this work. Related materials, such as project reports will eventually be posted on the agency's web-site. Some initial results have been presented at the 2012 annual conferences of the Florida Onsite Wastewater Association and the Florida Environmental Health Association.

Has this paper been submitted to FWRC for consideration previously? Yes, we submitted an abstract for FWRC 2012 that was accepted. However, we had to withdraw the presentation and did not submit a paper.

If approved, can your abstract be included on the Technical CD? Yes

Do you feel this paper is worthy of a Workshop at FWRC? No.



# **MANAGING THE ‘OTHER’ ADVANCED SEWAGE TREATMENT SYSTEMS: AN ASSESSMENT OF FLORIDA’S AEROBIC TREATMENT UNITS AND SIMILAR ONSITE SEWAGE TREATMENT SYSTEMS**

**By: Eberhard Roeder, Ph.D., P.E. and Elke Ursin, Florida Department of Health**

## **Introduction**

Onsite Sewage Treatment and Disposal Systems (OSTDS) serve approximately one-third of all households in Florida. While most of them are conventional OSTDS or septic systems, there are some other systems that provide additional or advanced pretreatment before disposal. These systems are generally permitted as aerobic treatment units (ATU) or performance-based treatment systems (PBTS). A property owner may need or want an advanced system because the property is located in area where more stringent state or local regulations exist, because state regulations allow advanced systems with smaller drainfields or reduced setbacks in some instances, or for protection of the environment with cleaner wastewater.

Generally, advanced systems differ from conventional systems by allowing for variability in design, needing more frequent checkups and maintenance, and producing a cleaner effluent. They are managed differently from conventional systems, with Florida’s regulations (Section 381.0065 Florida Statutes and Chapter 64E-6 Florida Administrative Code) requiring that a system be inspected by the county health department inspector once a year and that a system owner contract with a maintenance entity, which in turn visits the system for maintenance twice a year. Since 2001, when a change in Florida Statutes decreased operating permit fees and resulted in the discontinuation of a sampling program implemented by the county health departments, there had been no systematic assessment of effluent quality of advanced systems in Florida. A review of aerobic treatment unit sampling results gathered previously in one county, showed high variability of effluent quality that was at least in part related to differences in sample locations (Roeder and Brookman, 2006).

The Florida Department of Health, Bureau of Onsite Sewage Programs received a grant from the Environmental Protection Agencies Nonpoint Source Pollution program (Section 319) to assess the performance and management of advanced systems throughout Florida. The study addressed several issues such as: a pilot project in Monroe County assessing variability of samples 2007-2009; development of an inventory of advanced systems in 2010 through 2011; a survey of various user groups in 2010; an assessment of the operational status and sampling of systems, mainly for cBOD5, TSS, total nitrogen, and total phosphorus during the time from February through September of 2011. In the following the results of the inventory effort are summarized, some results of the survey of owners and users of advanced systems are highlighted, and initial results of assessing and sampling a random sample of advanced systems are discussed.

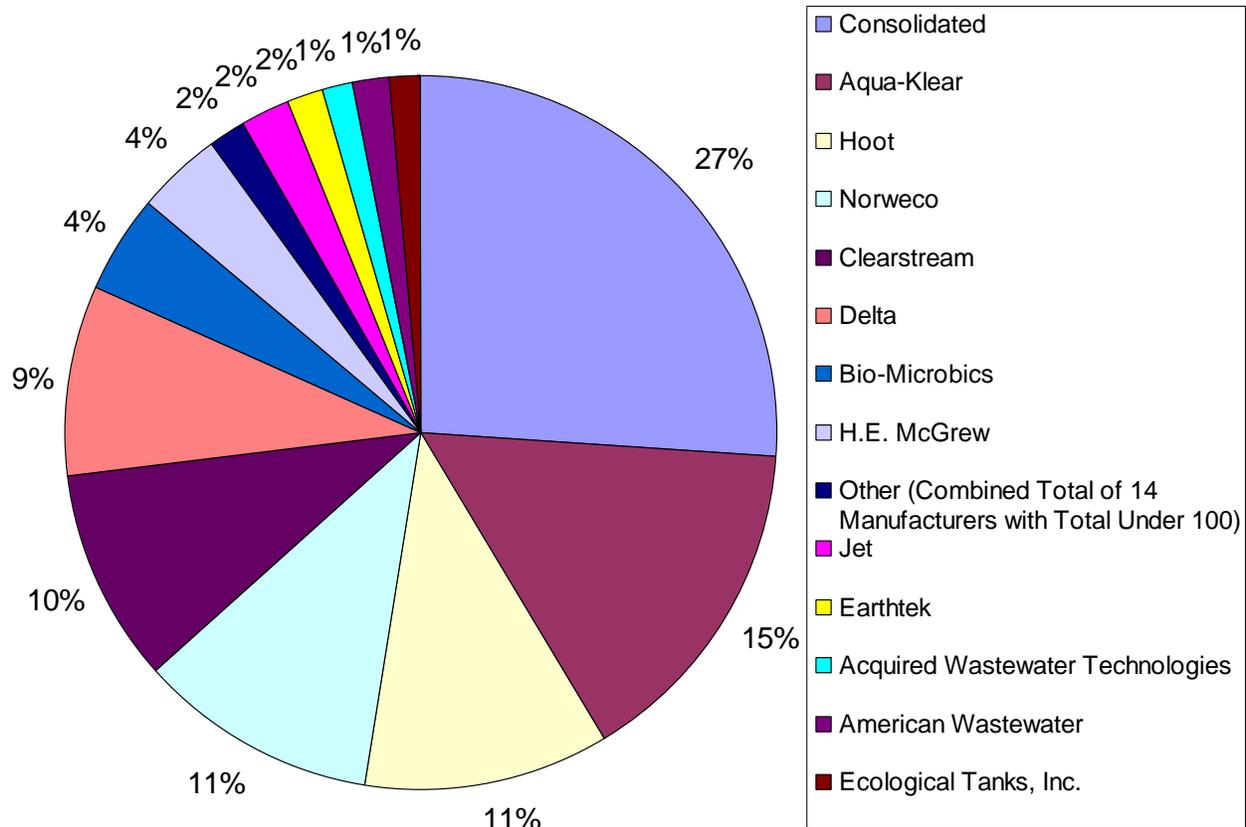
## **Inventory of Advanced Systems**

The objective of the inventory was to allow random and stratified random sampling for later surveys and site visits. The development of a project-specific inventory of advanced systems required the aggregation and consolidation of data from the Department of Health’s statewide permitting data system, a third-party web-based maintenance reporting system that is offered to

county health departments and maintenance entities through a contract with the Florida Department of Environmental Protection, and supplemental data obtained from county health departments and the Bureau of Onsite Sewage Programs. The resulting inventory, implemented in MS-Access, presented a snapshot of source databases in the second half of 2010. The consolidation steps utilized had the aim to match records from different sources to each other and generate a list of addresses for subsequent surveys and site visits. The project report contains additional details of the database development process (Ursin and Roeder, 2011).

The database identified nearly 16,600 addresses for advanced systems in Florida. Compared to the approximately 2.7 million onsite systems estimated to exist in Florida, this indicates that less than one percent fall into the “advanced” categories. Advanced systems in Florida are often concentrated in certain counties due to more stringent state regulatory or local ordinance requirements. Over 60% of the advanced systems in Florida can be found in the five counties with the most systems: Monroe, Charlotte, Brevard, Franklin, and Lee counties. Statutory requirements have triggered the high numbers in Monroe County, while local ordinances covering parts of Charlotte, Brevard and Franklin County are behind the high numbers there. In Lee County the flexibility of allowing larger houses, and/or smaller drainfields for advanced systems on a given lot appears to have been the reason behind the higher numbers there. Advanced systems are predominantly residential ATU systems. Just over half of the systems with installation dates were installed within 2 – 5 years of January 1, 2010, coinciding with the building boom in Florida.

Extended aeration is the predominant technology approach used in Florida, employed by over 90% of the inventoried systems that included treatment technology information. Fixed film and mixed approaches such as fixed activated sludge treatment share the remainder of the market. Figure 1 displays the distribution of systems by different manufacturers in Florida. Each of the manufacturers offers generally one to three different product lines of aerobic treatment units, usually based on the same technology. Consolidated, Aqua-Klear, Hoot, Norweco, and Clearstream are the top five manufacturers used in Florida. Those manufacturers that had less than 100 systems each identified were combined into the “Other” category.



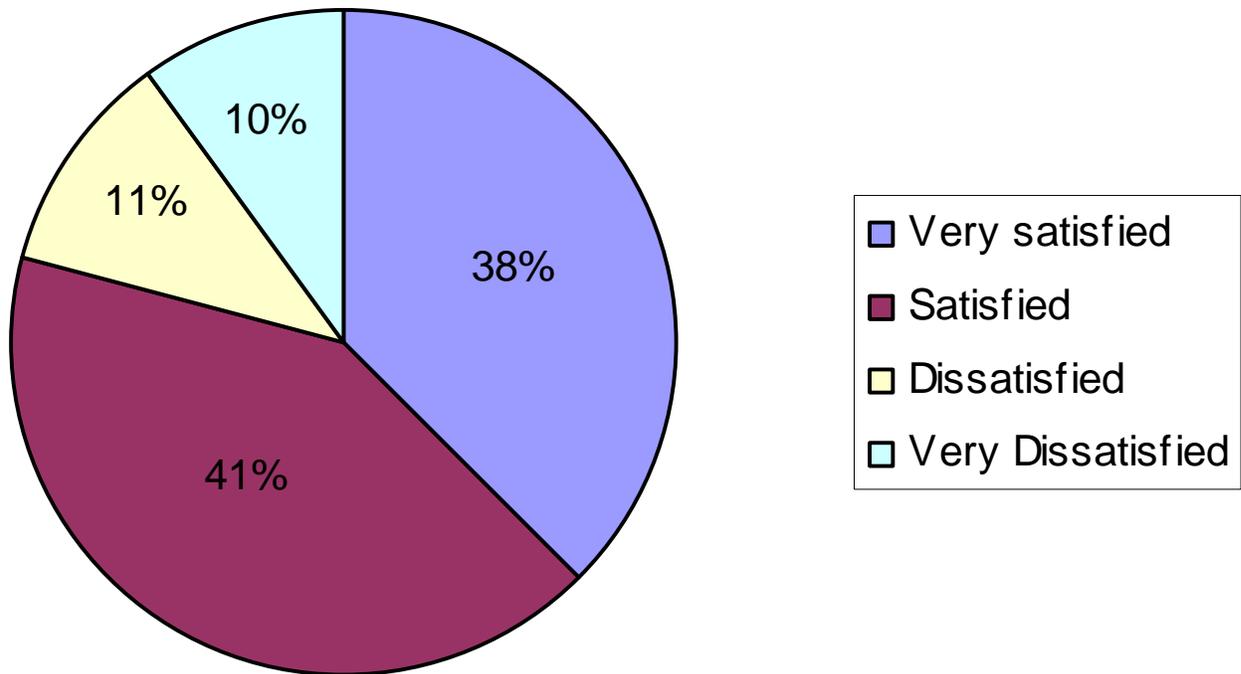
**Figure 1. Distribution of manufacturers of advanced treatment systems for which this information was available (n=9,161)**

### Survey of User Groups

The objective of the user group surveys was to allow a representative sample of several user groups to voice their views and opinions as well as to measure the practices and perceptions of these user groups about the management of advanced onsite systems. Florida State University's Survey Research Lab (FSU-SRL) performed the survey and provided methodological expertise. Survey questions included both some that were targeted to specific user groups as well as some overlapping questions, where appropriate, to gauge differences between the groups on specific issues. The project considered six user groups: system owners/users, regulators, installers, manufacturers, maintenance entities, and engineers.

FSU-SRL sent a total of 3,793 surveys to a stratified random sample of system owners/users and 660 completed surveys (17.4%) were returned. The addresses stemmed from an intermediate development stage of the inventory database that allowed stratification according to if the systems was an ATU or a PBTS and if the facility served was residential or commercial. Most of the surveys that were returned were by full-time residents that owned the home with the advanced system and for systems serving less than 4 people. Fifty-five percent reported never experiencing problems, thirty-three percent reported experiencing problems once or twice within last year, and eleven percent experienced problems several times. The major sources of problems were system malfunctions such as pump failures, electrical malfunctions, faulty alarms,

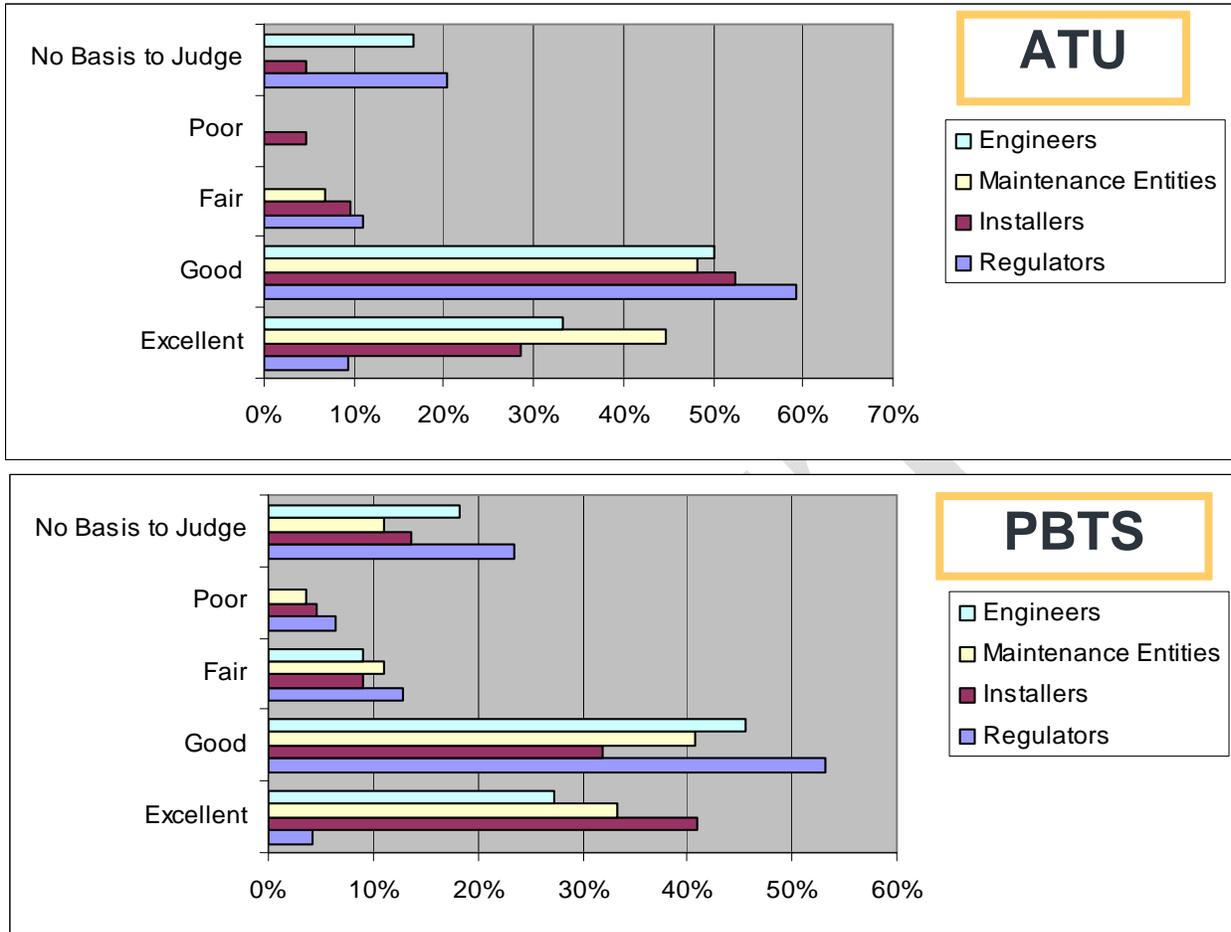
and bad motors. Figure 2 shows how satisfied system owner/users were with their systems, with 79% being either very satisfied or satisfied.



**Figure 2. System owner/user satisfaction (Question: How would you describe your overall satisfaction with your advanced onsite sewage system (septic system))**

FSU-SRL sent surveys to all county health departments, and all installers (septic tank contractors), maintenance entities, and engineers for which the department had contact information from licensing or permitting files. The response rates for installers (9%), maintenance entities (15%), and engineers (12%) were lower than for the owner/user group. More than half of the responding installers and about a third of the responding engineers indicated that they are not involved in the installation of advanced systems. This is likely a reflection of the small share that they constitute of the overall onsite sewage market as is the fact that eleven (of sixty-seven) county health departments reported not having a single advanced system installed in their county.

Figure 3 compares the responses from engineers, maintenance entities, installers, and regulators regarding their overall perception of treatment performance. All of these groups predominantly indicated that both ATU and PBTS performance is either good or excellent. When comparing this result with how satisfied homeowners are (Figure 2) this seems to indicate that advanced systems are fairly well accepted among the different user groups.



**Figure 3. Comparison of the perceptions of overall treatment performance of advanced systems between groups (Question: How would you rate the OVERALL TREATMENT PERFORMANCE of the advanced systems you are involved with?)**

### Assessment and Sampling of Advanced Treatment Systems

The inventory allowed system selection for further permit review, site assessment, and sampling. Most sites were selected as a random sample from the inventory, while others were chosen to ensure that a variety of technologies were part of the sample population. For purposes of this paper, only those that were selected as a purely random sample are included in the subsequent discussions and calculations (901 systems of 1014). The distribution of these sites generally aligned with the distribution of advanced systems in the state, with counties that have the most advanced systems having the highest representation in the random sample.

Project staff performed field assessments, usually combined with sampling, of over 550 systems throughout Florida. Logistical challenges and time constraints prevented sampling in about ten southern Florida counties (with a total of 87 selected sites) and kept the completion rate in Monroe at about 25% of the 260 selected systems. Of the systems that had a field assessment, 480 were from the purely random selection and only these will be discussed further. The detailed field assessments encompassed an initial assessment, similar to inspections that county

health departments perform and, where feasible, field measurements and sampling. Lab samples were packed in ice and sent overnight to a NELAP certified lab.

The field assessment included a check to see if the system was operational (power was on, no sanitary nuisance existed, aeration resulted in bubbles and mixing of sewage, and alarms were not on). Since the site visits were largely unannounced, these operational assessments can provide a general indication that could be applied to the larger population of advanced systems. Approximately five percent of the visited sites were vacant. Thirty percent of the sites visited were considered to be not operating properly (143 out of 480 systems). The main cause for a system to be non-operational was that the power indicator was off, followed by the aeration not working (Table 1). The most common combination of non-functional conditions was that the power was switched off, the power indicator was not on, and the aeration was not working. Since all three of these are a direct result of the power being off, this is not surprising, but it is interesting to note that the most common reason a system was not operational (20%) had to do with the power being off. If all power related operational status indicators are grouped together, we are left with three meta-groups: power related issues, sanitary nuisance related issues, and alarm issues. Power related issues consist of 70% of all operational problems followed by sanitary nuisance issues (9%), alarm issues (8%), power and alarm issues (8%), and finally power and sanitary nuisance issues (6%).

**Table 1. Distribution of issues leading to a non-operational status for non-vacant systems**  
**Reason For Non-Operational Status (non-vacant systems)**

	# Not OK	% Not OK
Power switched off	54	43%
Power indicator off	79	62%
Aeration not working	73	57%
Sanitary nuisance	20	16%
Alarm issue	19	15%

One means to provide an assessment of treatment performance was the comparison of effluent to “influent” data. Samplers obtained these samples by drawing from the clear zone of a pretreatment compartment or trash tank of systems. These samples represent then not raw sewage, but sewage that already has undergone some settling and anaerobic treatment. In this way these samples are more comparable to septic tank effluent, although septic tanks tend to be typically larger by a factor of about three.

In reviewing the influent data, several samples showed high nitrate/nitrite nitrogen values. Samples with values above 5 mg/L nitrate/nitrite were excluded as inconsistent with an anaerobic pretreatment step (six of forty-seven samples). Possible causes are a misidentification of compartments in the field, or interaction between aeration treatment and pretreatment compartments. Table 2 summarizes the results of the pretreatment effluent sampling. The data show considerable and somewhat skewed variability with an interquartile range that is larger than the median value. The median value for cBOD5 (76mg/L) is much lower than the median for septic tank effluent reported by Lowe et al. (2009) (216 mg/L) while the median values for TSS (68 mg/L) were similar to the 61 mg/L reported by Lowe et al. (2009). The median values for TN (46 mg/L) and TP (8.3 mg/L) in this study were both somewhat lower than the 60 mg/L

and 9.8 mg/L, respectively reported by Lowe et al. The concentrations can also be compared to results from a pilot study for this project (Roeder, 2011). There, influent concentrations of advanced treatment systems that appeared to be most representative for pretreatment tank effluent showed median concentrations of 99 mg/L, 64 mg/L, 76mg/L and 10 mg/L for cBOD5, TSS, TN and TP, respectively. Again, the current study showed lower nutrient concentrations, which could be related to differences in water usage.

**Table 2. Pretreatment effluent or influent data summary.**

“Influent” Pretreatment Effluent (mg/L)		cBOD5	TSS	TKN	NO <sub>x</sub>	TN	TP
N	Valid	39	41	41	41	41	40
	Missing	2	0	0	0	0	1
Mean		115.2	92.0	51.9	0.3	52.3	9.0
Std. Deviation		100.0	111.4	37.6	0.7	37.3	5.6
Minimum		.0	7.0	.118	.019	2.970	.670
Maximum		393	630	181	3	181	34
Percentiles	10	14.0	20.0	11.8	0.0	12.0	3.3
	25	43.5	28.0	22.8	0.0	24.0	6.0
	50	76.4	68.0	45.8	0.1	45.9	8.3
	75	174.0	115.0	74.6	0.2	74.8	10.5
	90	259.0	147.2	103.5	1.3	103.5	14.3

The effluent concentrations are shown in Table 3. For the purposes of this analysis, the last sampling point of a treatment unit before dispersal in a drainfield, or borehole in Monroe County was used as representative of the overall treatment unit performance in cases when more than one sampling point had been sampled. The median concentrations for cBOD5 (5.4 mg/L) and TSS (19 mg/L) show substantial removal as compared to the influent concentrations. TN concentrations have been reduced. The TKN and nitrate-nitrite concentrations indicate that there is a wide variability occurring among systems in the extent of nitrification. TP concentrations are only about 1 mg/L lower than before the aeration step. Based on the median effluent concentrations relative to influent concentrations, the typical removal effectiveness of the advanced treatment units are 93% for cBOD5, 72% for TSS, 34% for TN, and 10% for TP. The removal effectiveness for cBOD5, TN, and TP is consistent with expectations for such treatment systems. The removal effectiveness of TSS is somewhat lower than expected, and suggests entrapment of inert solids during the sampling process.

**Table 3. Effluent concentration summary for the random sample of systems.**

Effluent (mg/L)		cBOD5	TSS	TKN	NO <sub>x</sub>	TN	TP
N	Valid	308	308	308	305	307	307
	Missing	1	1	1	4	2	2
Mean		25.5	36.7	21.5	16.2	37.6	8.0
Std. Deviation		53.5	56.5	32.2	21.1	32.6	4.4
Minimum		2.000	3.500	0.087	0.008	0.517	0.007
Maximum		450	484	252	108	290	29
Percentiles	10	2.0	3.5	0.1	0.0	7.4	2.9
	25	2.2	6.8	1.5	0.2	16.2	5.3
	50	5.4	19.0	7.7	6.0	30.3	7.5
	75	23.7	42.0	27.9	26.2	51.5	10.0
	90	63.9	92.0	69.1	47.3	77.0	13.0

Two comparisons of effluent concentrations were performed, using the Kruskal-Wallis test. First, effluent concentrations from systems with an unsatisfactory operational status (about 20%) were compared to effluent concentrations from systems with a satisfactory operational status. Secondly, effluent concentrations from sampled systems that had been found with power switched off, with power indicator off, or where aeration did not appear to occur (about 15%) were compared to all other effluent samples. In both cases, the systems that appeared operational performed significantly (level of significance <5%) better than the non-operational ones for cBOD5 and TN but not significantly different for TSS and TP. The operational systems under each definition did increase the removal effectiveness based on median concentrations for TN by about 4% to nearly 40% but did not do so for cBOD5. The apparent lack of aeration power for treatment systems resulted in samples with median concentrations that indicated lack of nitrification, no nitrogen removal, and reduced cBOD5 removal (from 93% to 57%). The substantial fraction of low cBOD5 effluent concentrations in samples from non-operational treatment systems and the measurement of high nitrite/nitrate concentrations in some of these samples indicate that the power operational status at the time of the visit is not completely predictive of effluent concentrations at the same time, for example, because of the hydraulic residence time in the treatment unit.

### Conclusions

Advanced OSTDS are utilized throughout Florida for various reasons and require more maintenance and management than a conventional OSTDS. By far the most common treatment approach in these systems is extended aeration.

During visits to almost five-hundred randomly selected systems, approximately one-third were found in a status that would require follow-up by the maintenance entity. The main reason for this was an apparent lack of power to the system.

Influent, or better pretreatment tank effluent, concentrations measured on the samples discussed, indicated wide variability in strength. Median cBOD5, TN, and TP concentrations were lower than reported in recent studies, which may be related to differences in water usage.

Median effluent concentrations indicated over ninety percent removal for cBOD5, about three-quarters removal for TSS, one-third for TN, and nearly none for TP. These are generally consistent with the treatment steps employed, while the lower than expected TSS removal may be in part related to the sampling process.

Advanced treatment systems assessed as operational, either as overall assessment or based on power supply and aeration effectiveness, perform significantly better than non-operational ones with respect to cBOD5 and TN-removal.

### **Acknowledgements**

This paper was funded in part by a Section 319 Nonpoint Source Management Program Implementation grant from the U.S. Environmental Protection Agency through an agreement/contract with the Nonpoint Source Management Section of the Florida Department of Environmental Protection. We would also like to thank the Wakulla, Monroe, Charlotte, Lee, and Volusia County Health Department's for their support and cooperation.

### **Notice**

The information contained within this paper does not necessarily reflect the official opinion of the Florida Department of Health and no official endorsement should be inferred.

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**STATUS REPORT ON PHASE II AND PHASE III OF THE  
FLORIDA ONSITE SEWAGE NITROGEN REDUCTION  
STRATEGIES STUDY**

Division of Disease Control and Health Protection  
Bureau of Environmental Health  
Onsite Sewage Programs

**February 1, 2013**

John H. Armstrong, MD, FACS  
Surgeon General & Secretary  
Department of Health

Rick Scott  
Governor

**Table of Contents**

EXECUTIVE SUMMARY..... 3  
1 INTRODUCTION..... 4  
2 PROJECT STATUS ..... 6  
3 ANTICIPATED PROGRESS IN 2013-2015 ..... 9  
4 FUNDING NEEDS ..... 10  
5 RECOMMENDATIONS..... 11  
APPENDIX A. 2010 Legislative Language ..... 13  
APPENDIX B. 2011 Legislative Language ..... 17  
APPENDIX C. 2012 Legislative Language ..... 20

**List of Figures**

Figure 1. Sign posted at the University of Florida’s Gulf Coast Research & Education Center’s test facility. .... 6  
Figure 2. Test facility constructed at the University of Florida’s Gulf Coast Research & Education Center. .... 7

**List of Tables**

Table 1. Summary of Legislative Funding ..... 5  
Table 2. Field Work Status by County for Task B and Task C ..... 8  
Table 3. Summary of Cash Appropriations and Spending as of November 27, 2012 .. 11  
Table 4. Summary of Contractual Funding Phase Tasks and Progress ..... 12

## **STATUS REPORT ON PHASE II AND PHASE III OF THE FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY – FEBRUARY 2013**

### **EXECUTIVE SUMMARY**

This report is submitted in compliance with Line Item 512 Section 3, Conference Report on House Bill 5001, General Appropriations Act for Fiscal Year 2012-2013. The purpose of this project is to develop cost-effective, passive strategies for nitrogen reduction for onsite sewage treatment and disposal systems (OSTDS). Regardless of the source, excessive nitrogen has negative effects on public health and the environment.

The Florida Legislature has provided a total of \$4.4 million for Phases I, II, and the first part of Phase III of a three phase project. The project remains within the original total estimated budget of \$5.1 million so there is no cost over-run. Funds appropriated and expended to date have established necessary viable protocols and have been appropriately used to test, and refine technologies and strategies to be tested in the field.

This project is in its fourth year of six, which means a time over-run. The contract, executed in January, 2009, was developed for a five-year term due to the complexity and magnitude of work necessary to get meaningful results. During each fiscal year, the Department authorized the provider to work on tasks for which there was sufficient budget and spending authority causing some delay in project completion which means there is a time over-run. A final appropriation of funds is required to keep the project on track to be completed by January 16, 2015. Florida TaxWatch endorsed this project as a good use of public funds (Wenner 2008).

During the 2012-2013 fiscal year efforts are focused on installing, monitoring, and modeling various full-scale OSTDS field sites at locations throughout the State of Florida to evaluate nitrogen reducing technologies and gathering information on how nitrogen moves through the soil and shallow groundwater. This field testing phase is crucial, so that the project will yield practical results that can be used to develop viable, cost-effective alternative passive technologies for use by homeowners for nitrogen issues associated with onsite systems. There are ten sites in progress as contractually required.

The tasks associated with the final phase include: continuation and completion of field monitoring of the performance and cost of technologies at home sites and of nitrogen fate and transport in the shallow groundwater; development of nitrogen fate and transport models that will be calibrated with the field sampling results; and final reporting on all tasks with recommendations on onsite sewage nitrogen reduction strategies.

The Department's Research Review and Advisory Committee (RRAC) supports concluding this study as originally scoped and recommends:

1. For fiscal year 2013-2014, that the Legislature provides the final installment of cash in the amount of \$700,000 and the budget authority in the amount of \$1,000,000 to continue the field testing.
2. For the fiscal year 2014-2015, that the Legislature provides budget authority in the amount of \$500,000 for continuation and completion of the tasks associated with this legislatively mandated study.

Continued support for this project will ultimately benefit Florida's approximately 2.7 million onsite system owners by finding cost-effective nitrogen reduction strategies that will improve environmental and public health protection.

## 1 INTRODUCTION

The Florida Legislature tasked the Department of Health to conduct a study to develop passive strategies for nitrogen reduction for onsite sewage treatment and disposal systems (OSTDS). Regardless of the source, excessive nitrogen has negative effects on public health and the environment. The primary motivations for this study are the environmental impacts that the increased levels of nitrogen in water bodies can cause. Programs within DEP identify water bodies impaired by excessive nitrogen, establish targets for maximum nutrient loads, and develop management action plans to restore the water bodies. The relative impact of OSTDS on total nitrogen levels varies from watershed to watershed with estimates ranging from below five to more than 20 percent. There is widespread interest in the management of OSTDS and their nitrogen impacts. The significance of this innovative project is that it evaluates and develops strategies to reduce nitrogen impacts from OSTDS regulated by the Florida Department of Health (DOH). The goal is to develop systems that complement the use of conventional OSTDS and are also affordable and ecologically protective with reduced engineering and installation costs that assist in sustainable development.

This study was based on budget language in 2008 (Line Item 1682, House Bill 5001, General Appropriations Act for Fiscal Year 2008-2009) that instructed:

...the Department of Health to further develop cost-effective nitrogen reduction strategies. The Department of Health shall contract, by request for proposal, for Phase I of an anticipated 3-year project to develop passive strategies for nitrogen reduction that complement use of conventional onsite wastewater treatment systems. The project shall be controlled by the Department of Health's Research Review and Advisory Committee and shall include the following components: 1) comprehensive review of existing or ongoing studies on passive technologies; 2) field testing of nitrogen reducing technologies at actual home sites for comparison of conventional, passive technologies and performance-based treatment systems to determine nitrogen reduction performance; 3) documentation of all capital, energy and life-cycle costs of various technologies for nitrogen reduction; 4) evaluation of nitrogen reduction provided by soils and the shallow groundwater below and down gradient of various systems; and 5) development of a simple model for predicting nitrogen fate and transport from onsite wastewater systems. A progress report shall be presented to the Executive Office of the Governor, the President of the Senate and the Speaker of the House of Representatives on February 1, 2009, including recommendations for funding additional phases of the study.

The 2010 legislature (included in Appendix A) specified that the existing contract for this project will remain in full force; that the Department, the Department's Research Review and Advisory Committee (RRAC), and the Florida Department of Environmental Protection (DEP) shall work together to provide technical oversight; that DEP will have maximum technical input; that the main focus and priority for work in Phase II shall be in developing, testing, and recommending cost-effective passive technologies for nitrogen reduction; that field installations for this project will be subject to significant testing and monitoring; and that no state agency shall implement any rule or policy that requires nitrogen reducing systems or increases their costs until the study is complete.

The 2011 and 2012 legislature (included in Appendix B and Appendix C respectively) specified that the existing contract for this project will remain in full force; that the Department, the Department's Research Review and Advisory Committee (RRAC), and the Florida Department of Environmental Protection (DEP) shall work together to provide technical oversight; that

completion of Phase II and Phase III must be consistent with the terms of the existing contract; that the main focus and priority for Phase III be developing, testing, and recommending cost-effective passive technology design criteria for nitrogen reduction; the installed systems are experimental in nature and shall be installed with significant field testing and monitoring; and that no state agency shall implement any rule or policy that requires nitrogen reducing systems or increases their costs until the study is complete.

The Florida Legislature has provided a total of \$4.4 million for Phases I, II, and the first part of Phase III of a three phase project with a total estimated cost of \$5.1 million (Table 1). This includes an initial appropriation of \$900,000 by the 2008 Legislature for the first phase of this study and an appropriation of \$2,000,000 by the 2010 Legislature for the second phase of this study, and an appropriation of \$1,500,000 by the 2012 Legislature for the first part of the third phase of this study. This project will require additional cash in the amount of \$700,000 to complete the study. Additionally, the Department will need budget authority in the amount of \$1,000,000 for work during fiscal year 2013-2014. This report is submitted in compliance with Line Item 512 Section 3, Conference Report on House Bill 5001, General Appropriations Act for Fiscal Year 2012-2013, which appropriated the funding for the study.

Florida TaxWatch has endorsed this project as a study that is a good use of public funds and that provides homeowners with cost-effective options for nitrogen reduction (email communication from Kurt Wenner to Jerry McDaniel June 2, 2008).

Table 1. Summary of Legislative Funding

Total Project Budget	\$5,100,000
Total Funding To Date	(\$4,400,000)
Balance to Complete (2013-2014 Fiscal Year Projected Funding Need)	\$700,000

The study contract was awarded in January 2009 to a Project Team led by Hazen and Sawyer, P.C., and was based upon an anticipated budget of \$5 million over a 3 – 5 year project timeframe, with an additional \$100,000 budget to DOH for project management. The contract identifies the following tasks:

**Task A – Technology Evaluation for Field Testing: Review, Prioritization, and Development:** This task includes literature review, technology evaluation, prioritization of technologies to be examined during field testing, and further experimentation with approaches tested in a previous DOH passive nitrogen removal study. Objectives of this task are to prioritize technologies for testing at actual home sites and to perform controlled tests at a test facility to develop design criteria for new passive nitrogen reduction systems.

**Task B – Field Testing of Technologies and Cost Documentation:** This task includes installation of top-ranked nitrogen reduction technologies at actual homes, with documentation of their performance and cost. Cost documentation for the systems will be broken down by permitting, design, materials and construction, and operation and maintenance.

**Task C – Evaluation of Nitrogen Reduction Provided by Soils and Shallow Groundwater:** This task includes several field evaluations of nitrogen reduction in Florida soils and shallow groundwater and also will provide data for the development of a simple planning model in Task D.

**Task D – Nitrogen Fate and Transport Modeling:** The objective of this task is to develop a simple fate and transport model of nitrogen from OSTDS that can be used for assessment, planning and siting of OSTDS.

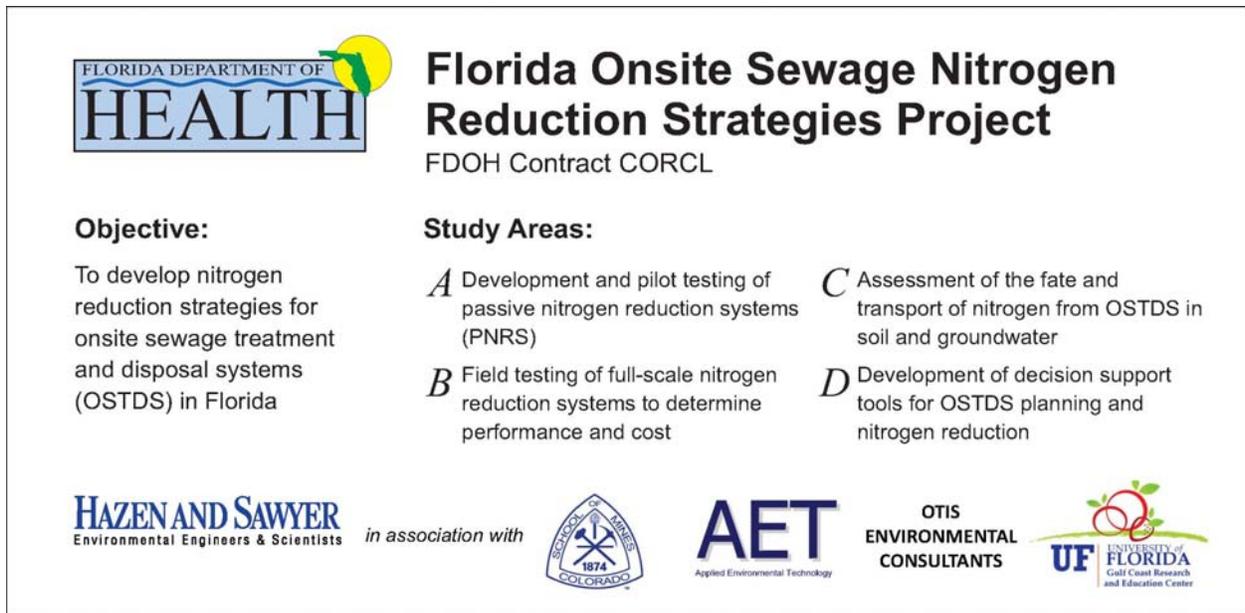


Figure 1. Sign posted at the University of Florida's Gulf Coast Research & Education Center's test facility.

## 2 PROJECT STATUS

Funding for the first and second phases of this project has been appropriated. The 2012 legislature approved funding for the first part of Phase III. A summary of the major project elements and their timing with funding phases is shown in Table 4. The contractor, in coordination with the RRAC and DOH, has successfully completed parts of Tasks A, B, C, and D, including literature reviews; ranking of nitrogen reduction technologies for field testing; design and construction of a test facility for further development of passive technologies; development of quality assurance documents for the test facility work, groundwater monitoring, field testing, and nitrogen fate and transport modeling; installation of nitrogen reducing systems at two home sites; completion of several sampling events of passive systems at the test facility and field sites; design and construction of a soil and groundwater test facility; and field sampling of the soil and groundwater under OSTDS at residential homes throughout Florida and at the test facility.



Figure 2. Test facility constructed at the University of Florida's Gulf Coast Research & Education Center.

Current efforts and work remaining for the 2012-2013 fiscal year includes: system installation and field sampling at additional home sites throughout Florida for the testing of passive systems and to test the soil and groundwater under OSTDS; sampling at the soil and groundwater test facility; and continuing with development of a nitrogen fate and transport model. RRAC supports concluding this study as originally scoped. The following work by task will proceed with the current funding level:

1. Task A. The technology evaluation included a total of 7 sample events at the passive nitrogen test facility, measuring 14 different analytes at over 40 sampling points in 11 systems, as well as a final report on the pilot passive nitrogen removal study at the Gulf Coast Research and Education Center (GCREC).  
**Current Status as of December 2012:** All sample events at the test facility have been completed. Test results are encouraging after 12 months of testing, showing a reduction in total nitrogen of over 95%, with a final effluent concentration of 2.6 mg/L or less for several of the systems. Analysis of the results from the 11 systems and report writing is underway. Two additional, drainfield-based systems have been installed and have had three monitoring events.
2. Task B. For field testing of technologies, the quality assurance project plan has been finalized. The research design proposes that seven onsite systems, utilizing various nitrogen removal technologies, will be installed at home locations throughout the State of Florida. It is anticipated that a total of seven field system performance monitoring events will be conducted on each these systems with the current funding level, measuring 16 different analytes at 2-8 different sampling points. A report providing a technical description of nitrogen reduction technologies will be written, as well as a report providing a template and user guidelines for system life cycle cost assessments.  
**Current Status as of December 2012:** Eleven homeowners residing at locations across Florida have agreed to participate in the study to date for Task B (Table 2).

Home sites have been identified in Wakulla County, the Wekiva area, and several other areas throughout the State. At least one of the home sites will have a gravity-fed system installed. Construction has been completed for two systems. Six out of seven sample events have been completed for the first system and one sample event has been completed on the second system. The design work has begun for the next three systems, which are located in Seminole County.

3. Task C. To evaluate nitrogen reduction provided by soils and shallow groundwater, a soil and groundwater test facility has been constructed to show how groundwater fate and transport of nitrogen occurs in multiple soil treatment unit regimes. Six of the thirteen total sampling events will be completed with the current funding level, sampling three of the four sites, and sampling six different locations at each site, and measuring multiple parameters in the effluent, soil, and groundwater. The existing OSTDS mound system at the University of Florida's Gulf Coast Research & Education Center (GCREC) in Wimauma, Florida was instrumented to study how nitrogen behaves in the soil and groundwater. Four sampling events that examine multiple parameters have been completed at the existing OSTDS mound system at GCREC. At least three soil and groundwater monitoring events will occur at up to three home sites to evaluate nitrogen movement in the soil and groundwater in the field, measuring multiple parameters in the effluent, soil, and groundwater.

**Current Status as of December 2012:** Tasks that have been completed thus far are the testing of media components per 381.0065(4)(m) F.S., two tracer tests to determine existing groundwater flow characteristics, and construction of the soil and groundwater test facility. Three of six monitoring events have been completed at four groundwater test areas at the soil and groundwater test facility to show how groundwater fate and transport of nitrogen occurs. Instrumentation of the existing OSTDS mound system at GCREC has been completed and four sample events have been conducted. Six homeowners have agreed to participate in the study to date for Task C (Table 2). Four home sites have been selected and instrumented. One sample event has occurred at the first of these sites, however, the groundwater flow direction could not be delineated, and no additional sampling events will occur at that site. Sampling is complete at the second instrumented site, and the third and fourth sites are currently being monitored having had one sample event completed.

Table 2. Field Work Status by County for Task B and Task C

County	# Sites Evaluated	# Agreements	Sites in Progress
Charlotte	12	0	0
Hernando	1	0	0
Hillsborough	4	3	3
Lake	1	0	0
Lee	4	1	0
Marion	8	3	0
Orange	2	0	0
Polk	3	1	1
Sarasota	13	0	0
Seminole	8	6	4
Wakulla	4	4	2
<b>TOTAL</b>	<b>60</b>	<b>18</b>	<b>10</b>

4. Task D. To address nitrogen fate and transport modeling from onsite systems in Florida a simple tool will be developed in Task D to assist in evaluating nitrogen loading from these systems. This will include development of a soil model to show how nitrogen is affected by treatment in Florida-specific soils, and a groundwater model to evaluate the movement of nitrogen down gradient from these systems. A final quality assurance project plan has been completed and the first steps will include the development of a soil model to show how nitrogen is affected by treatment in Florida-specific soils.

**Current Status as of December 2012:** Work has focused primarily on soil modeling under the current budget. Soil models are currently being developed and refined, and the project team has met several times to discuss and finalize model conditions. Groundwater modeling is underway with conceptual model development started. These models will be utilized to generate a simple tool for prediction of nitrogen fate, transport, and removal in Florida soils and groundwater.

### 3 ANTICIPATED PROGRESS IN 2013-2015

Additional funding and budget authority to carry over existing funding will be critical to complete the tasks associated with the final phase. These include: continuation and completion of field monitoring of performance and cost of technologies at home sites and of nitrogen fate and transport in the shallow groundwater; calibration and refinement of various nitrogen fate and transport models that will be calibrated with the field sampling results; and final reporting on all tasks with recommendations on onsite sewage nitrogen reduction strategies. In particular, the following work will occur with the final phase of funding being requested with this report:

1. For Task A, the final task report will be written. This report will include a summary of the accomplishments of the passive nitrogen removal test facility.
2. For Task B, it is anticipated that one final field system performance monitoring event will be conducted on each of the seven systems; and completion of final reporting on all of the field work associated with this task. Cost documentation for the systems will be broken down by permitting, design, materials and construction, and operation and maintenance.
3. For Task C, monitoring events at three home sites will be conducted to evaluate nitrogen movement in the soil and groundwater in the field. Final reporting for this task will be completed.
4. For Task D, the soil model will be completed and integrated with groundwater models which will be calibrated, and validated, utilizing the results of the field work collected in previous tasks, and a final task report will be written summarizing the results of this task.

## 4 FUNDING NEEDS

Activities in fiscal years 2008-2012 have prepared the framework for rapid implementation of all remaining project tasks in fiscal years 2013-2015. A final appropriation of cash in the amount of \$700,000 is required in 2013-2014. Budget authorization in the amount of \$1,000,000 in 2013-2014 and \$500,000 in 2014-2015 is required to reap the benefits of all previous work and to complete the goals of this project.

This project is in its fourth of six years and is within the original \$5.1 million budget. Funds appropriated and expended to date have established necessary viable protocols and have been appropriately used to test, calibrate, and refine technologies and strategies to be tested in the field. Continued funding for Phase III of the project is necessary for extensive field testing (the major portion of Task B) to be completed. Field testing is crucial, so that the project will yield results that can be used to develop viable, cost-effective alternative passive technologies for use by homeowners for nitrogen issues associated with onsite systems.

Project Tasks (described previously and shown in Table 3) are broken down further into funding phases as follows:

Initial Funding in 2008-2010 (Phase I): \$900,000 (cash and budget authority) appropriated (in 2008 and 2009 state budgets) – Status: Complete and funds fully spent. The initial funding was targeted to prioritize systems for testing, summarize existing knowledge, develop testing protocols, and establish a test facility for detailed soil and groundwater monitoring and for preliminary testing of pilot scale passive nitrogen reduction systems.

Funding in 2010-2011: \$2 million (cash and budget authority) appropriated (in 2010 state budget) – Status: Ongoing. This funding is for field monitoring over a 16 month monitoring period of performance and cost of technologies at each home site, and of nitrogen fate and transport. This funding will also continue the development and monitoring work at the test facility and continue the modeling work.

Funding in 2011-2012: Although \$2.75 million in budget authorization was appropriated in the 2011 state budget, no additional cash accompanied the budget authorization – Status: Ongoing. The remaining cash from the 2010-2011 appropriation was used to continue the monitoring of systems and the soil modeling work. The preliminary results of the project are encouraging.

Funding in 2012-2013: \$1.5 million (cash and budget authority) appropriated (in 2012 state budget) – Status: Ongoing. These funds are being used to continue to install and monitor nitrogen reducing systems, draft a life cycle cost assessment template report for systems evaluated in this study, monitor nitrogen in the groundwater under existing OSTDS, and to develop, validate, and refine the soil modeling work.

Funding in 2013-2015: To adequately fund the final phase of the project, \$700,000 cash is required to fund the completion of scheduled tasks. Further testing and analysis is required to confirm the results to date with field data and to provide data for development of the engineering specifications for full system designs. The funds will be used to complete monitoring and other field activities, perform additional testing as deemed appropriate by the Legislature, and for final reporting with recommendations on onsite sewage nitrogen reduction strategies for Florida's future. Budget authority is required in the amount of \$1,000,000 in the FY 2013-2014 budget and \$500,000 in the FY 2014-2015 budget to complete all remaining tasks. .

Further information on this project, including previous legislative reports and detailed project reports, can be found on the Department's website:

Table 3. Summary of Cash Appropriations and Spending as of November 27, 2012

	<b>Amount</b>	<b>Spent</b>	<b>Balance</b>
2008-2010 Appropriated Cash	\$900,000	\$900,000	\$0
2010-2011 Appropriated Cash	\$2,000,000	\$1,300,355	\$699,645
2012-2013 Appropriated Cash	\$1,500,000	\$272,707	\$1,227,293
2013-2014 Requested Cash	\$700,000	-	-
<b>TOTAL</b>	<b>\$5,100,000</b>	<b>\$2,473,062</b>	<b>\$1,926,938</b>

## 5 RECOMMENDATIONS

The Department's Research Review and Advisory Committee (RRAC) supports concluding this study as originally scoped and recommends:

1. For fiscal year 2013-2014, that the Legislature provides the final installment of cash in the amount of \$700,000 and budget authority in the amount of \$1,000,000 to continue the field testing.
2. For the fiscal year 2014-2015, that the Legislature provides budget authority in the amount of \$500,000 for continuation and completion of the tasks associated with this legislatively mandated study.

This final funding will be applied to the final phase of the project, for completion of field monitoring of performance and cost of technologies at home sites and of nitrogen fate and transport in the shallow groundwater, calibration and refinement of various nitrogen fate and transport models that will be calibrated with the field sampling results, and final reporting on all tasks with recommendations on onsite sewage nitrogen reduction strategies.

Continued support for this project will ultimately benefit Florida's approximately 2.7 million onsite system owners by finding cost-effective nitrogen reduction strategies that will improve environmental and public health protection. When fully funded, the results of this project will assist with producing nitrogen reducing systems that protect groundwater through reduced life-cycle costs and lower energy demands.

Table 4. Summary of Contractual Funding Phase Tasks and Progress

Task	Status	Phase I	Phase II	Phase IIIa	Phase IIIb
<b>A Task A: Technology Selection &amp; Prioritization</b>		<b>\$352,144</b>	<b>\$336,514</b>	<b>\$0</b>	<b>\$35,480</b>
Literature review	Complete				
Ranking of nitrogen reduction technologies for field testing	Complete				
Design and construction of test facility	Complete				
Quality assurance project plan	Complete				
Monitoring and sample events (7 events)	Complete				
Final test facility report	Underway				
Final task report	Funding required <sup>1</sup>				
<b>B Task B: Field Testing of Technologies</b>		<b>\$50,202</b>	<b>\$599,610</b>	<b>\$265,408</b>	<b>\$263,834</b>
Quality assurance project plan	Complete				
Installation of ranked nitrogen reduction technologies at 7 field sites	Underway				
System performance monitoring events at 7 sites	Underway				
Life cycle cost assessment template development	Not started				
Final life cycle cost assessment report (per system)	Funding required <sup>1</sup>				
Final task report	Funding required <sup>1</sup>				
<b>C Task C: Evaluation of Nitrogen Reduction by Soils &amp; Shallow Groundwater</b>		<b>\$216,164</b>	<b>\$1,095,977</b>	<b>\$436,220</b>	<b>\$162,640</b>
Quality assurance project plan	Complete				
Design of test facility	Complete				
Construction of test facility	Complete				
Test facility monitoring and sample events (4 test areas sampled 6 times)	Underway, partially funded <sup>2</sup>				
Instrumentation of existing onsite sewage system mound at GCREC facility	Complete				
GCREC mound sample events	Complete				
Field sites sample events (4 sites, 3 sites will be sampled 3 times, 1 site discontinued)	Underway, partially funded <sup>2</sup>				
Final task report	Funding required <sup>1</sup>				
<b>D Task D: Nitrogen Fate and Transport Models</b>		<b>\$74,357</b>	<b>\$292,021</b>	<b>\$251,334</b>	<b>\$190,310</b>
Quality assurance project plan	Complete				
Soil model development (simple and complex)	Underway				
Performance evaluation and refinement of soil models	Not started				
Shallow groundwater/soil model development	Funding required <sup>1</sup>				
Performance evaluation and refinement of soil/groundwater model	Funding required <sup>1</sup>				
Decision making framework	Funding required <sup>1</sup>				
Final task report	Funding required <sup>1</sup>				
<b>Project Management (sum of contractor and Department of Health)</b>		<b>\$119,953</b>	<b>\$149,003</b>	<b>\$105,407</b>	<b>\$103,422</b>
Contractor project management	Underway	\$90,695	\$109,003	\$90,407	\$87,679
Department of Health project management	Underway	\$29,258	\$40,000	\$15,000	\$15,743
<b>Total Project Budget</b>	<b>\$5,100,000</b>	<b>\$812,820</b>	<b>\$2,473,125</b>	<b>\$1,058,369</b>	<b>\$755,686</b>
<b>Total Appropriated Cash</b>	<b>\$4,400,000</b>	<b>\$900,000</b>	<b>\$2,000,000</b>	<b>\$1,500,000</b>	<b>-<sup>3</sup></b>
<b>Total Spent as of November 27, 2012</b>	<b>\$2,473,062</b>	<b>\$812,820</b>	<b>\$1,660,242</b>	<b>\$0</b>	<b>-</b>
<b>Unspent Balance of Appropriated Cash</b>	<b>\$1,871,252</b>	<b>\$0</b>	<b>\$812,883</b>	<b>\$1,058,369</b>	<b>-</b>

1 A "funding required" subtask status indicates that the \$700,000 requested for fiscal year 2013-2014 is required to fund the subtask

2 A "partially funded" subtask status indicates that a subtask has received partial funding, but still requires a portion of the \$700,000 required to complete the funding for the project

3 A total of \$700,000 is required to completed the funding for the project  
GCREC – Gulf Coast Research & Education Center

**APPENDIX A. 2010 Legislative Language**

DRAFT

SECTION 3 – HUMAN SERVICES

486 SPECIAL CATEGORIES

CONTRACTED SERVICES

FROM GENERAL REVENUE FUND . . . . .	153,772
FROM ADMINISTRATIVE TRUST FUND . . . . .	337,765
FROM FEDERAL GRANTS TRUST FUND . . . . .	348,235
FROM GRANTS AND DONATIONS TRUST FUND . . . . .	2,648,438
FROM RADIATION PROTECTION TRUST FUND . . . . .	150,000

From the funds in Specific Appropriation 486, \$2,000,000 from the Grants and Donations Trust Fund is provided to the department to continue phase II and complete the study authorized in Specific Appropriation 1682 of chapter 2008-152, Laws of Florida. The report shall include recommendations on passive strategies for nitrogen reduction that complement use of conventional onsite wastewater treatment systems. The department shall submit an interim report of phase II on February 1, 2011, a subsequent status report on May 16, 2011, and a final report upon completion of phase II to the Governor, the President of the Senate, and the Speaker of the House of Representatives prior to proceeding with any nitrogen reduction activities.

Section 14. In order to implement Specific Appropriation 486 of the 2010-2011 General Appropriations Act, and for the 2010-2011 fiscal year only, the following requirements shall govern Phase 2 of the Department of Health's Florida Onsite Sewage Nitrogen Reduction Strategies Study:

(1) The underlying contract for which the study was let shall remain in full force and effect with the Department of Health and funding the contract for Phase 2 of the study shall be through the Department of Health.

(2) The Department of Health, the Department of Health's Research Review and Advisory Committee, and the Department of Environmental Protection shall work together to provide the necessary technical oversight of Phase 2 of the project, with the Department of Environmental Protection having maximum technical input.

(3) Management and oversight of Phase 2 shall be consistent with the terms of the existing contract; however, the main focus and priority for work to be completed for Phase 2 shall be in developing, testing, and recommending cost-effective passive technology design criteria for nitrogen reduction.

(4) The systems installed at actual home sites are experimental in nature and shall be installed with significant field testing and monitoring. The Department of Health is specifically authorized to allow installation of these experimental systems. In addition, before Phase 2 of the study is complete and notwithstanding any law to the contrary, a state agency may not adopt or implement a rule or policy that:

(a) Mandates, establishes, or implements any new nitrogen-reduction standards that apply to existing or new onsite sewage treatment systems or modification of such systems;

(b) Increases the cost of treatment for nitrogen reduction from onsite sewage treatment systems; or

(c) Directly requires or has the indirect effect of requiring, for nitrogen reduction, the use of performance-based treatment systems or any similar technology; provided the Department of Environmental Protection administrative orders recognizing onsite system modifications, developed

through a basin management action plan adopted pursuant to section 403.067, Florida Statutes, are not subject to the above restrictions where implementation of onsite system modifications are phased in after completion of Phase 2, except that no onsite system modification developed in a basin management action plan shall directly or indirectly require the installation of performance-based treatment systems.

DRAFT

**APPENDIX B. 2011 Legislative Language**

DRAFT

SECTION 3 – HUMAN SERVICES

465 SPECIAL CATEGORIES

CONTRACTED SERVICES

FROM GENERAL REVENUE FUND . . . . .	97,489
FROM ADMINISTRATIVE TRUST FUND . . .	335,165
FROM FEDERAL GRANTS TRUST FUND . . .	643,776
FROM GRANTS AND DONATIONS TRUST FUND . . . . .	3,401,038
FROM RADIATION PROTECTION TRUST FUND . . . . .	150,000

From the funds in Specific Appropriation 465, \$2,725,000 in nonrecurring funds from the Grants and Donations Trust Fund is provided to the department to complete phase II and phase III and complete the study authorized in Specific Appropriation 1682 of chapter 2008-152, Laws of Florida. The report shall include recommendations on passive strategies for nitrogen reduction that complement use of conventional onsite wastewater treatment systems. The department shall submit an interim report of the completion of phase II and progress on phase III on February 1, 2012, a subsequent status report on May 16, 2012, and a final report upon completion of phase III to the Governor, the President of the Senate, and the Speaker of the House of Representatives prior to proceeding with any nitrogen reduction activities.

Section 7. In order to implement Specific Appropriation 465 of the 2011-2012 General Appropriations Act, and for the 2011-2012 fiscal year only, the following requirements govern the completion of Phase 2 and Phase 3 of the Department of Health's Florida Onsite Sewage Nitrogen Reduction Strategies Study:

(1) The Department of Health's underlying contract for the study remains in full force and effect and funding for completion of Phase 2 and Phase 3 is through the Department of Health.

(2) The Department of Health, the Department of Health's Research Review and Advisory Committee, and the Department of Environmental Protection shall work together to provide the necessary technical oversight of the completion of Phase 2 and Phase 3 of the project.

(3) Management and oversight of the completion of Phase 2 and Phase 3 must be consistent with the terms of the existing contract. However, the main focus and priority to be completed during Phase 3 shall be developing, testing, and recommending cost-effective passive technology design criteria for nitrogen reduction.

(4) The systems installed at homesites are experimental in nature and shall be installed with significant field testing and monitoring. The Department of Health is specifically authorized to allow installation of these experimental systems. Notwithstanding any other law, before Phase 3 of the study is completed, a state agency may not adopt or implement a rule or policy that:

(a) Mandates, establishes, or implements more restrictive nitrogen-reduction standards to existing or new onsite sewage treatment systems or modification of such systems; or

(b) Directly or indirectly requires the use of performance-based treatment systems or similar technology, such as through an administrative order developed by the Department of Environmental Protection as part of a basin management action plan adopted pursuant to s. 403.067, Florida Statutes. However, the implementation of more restrictive nitrogen-reduction standards for onsite systems may be required through a basin management action plan if such plan is phased in after completion of Phase 3.

**APPENDIX C. 2012 Legislative Language**

DRAFT

SECTION 3 – HUMAN SERVICES

512 SPECIAL CATEGORIES

CONTRACTED SERVICES

FROM GENERAL REVENUE FUND . . . . .	2,047,489
FROM ADMINISTRATIVE TRUST FUND . . . . .	335,165
FROM FEDERAL GRANTS TRUST FUND . . . . .	643,776
FROM GRANTS AND DONATIONS TRUST FUND . . . . .	676,038
FROM RADIATION PROTECTION TRUST FUND . . . . .	150,000

From the funds in Specific Appropriation 512, \$1,500,000 in nonrecurring funds from the General Revenue Fund is provided to the department to complete phase II and phase III of the study authorized in Specific Appropriation 1682 of chapter 2008-152, Laws of Florida. The funds will be spent for installing field systems and sampling, installing and sampling the soil and groundwater at various sites throughout Florida to determine how nitrogen moves, and developing various models to show how nitrogen is affected by treatment in Florida-specific soils. The department shall submit a status report before October 1, 2012, a subsequent status report before February 1, 2013, and a final report upon completion of phase III to the Governor, the President of the Senate, and the Speaker of the House of Representatives prior to proceeding with any nitrogen reduction activities.

Section 5. (1) In order to implement Specific Appropriation 512 of the 2012-2013 General Appropriations Act, and for the 2012-2013 fiscal year only, the following requirements govern the completion of Phase 2 and Phase 3 of the Department of Health's Florida Onsite Sewage Nitrogen Reduction Strategies Study:

(a) The Department of Health's underlying contract for the study remains in full force and effect and funding for completion of Phase 2 and Phase 3 is through the Department of Health.

(b) The Department of Health, the Department of Health's Research Review and Advisory Committee, and the Department of Environmental Protection shall work together to provide the necessary technical oversight of the completion of Phase 2 and Phase 3 of the project.

(c) Management and oversight of the completion of Phase 2 and Phase 3 must be consistent with the terms of the existing contract. However, the main focus and priority to be completed during Phase 3 shall be developing, testing, and recommending cost-effective passive technology design criteria for nitrogen reduction.

(d) The systems installed at homesites are experimental in nature and shall be installed with significant field testing and monitoring. The Department of Health is specifically authorized to allow installation of these experimental systems. Notwithstanding any other law, before Phase 3 of the study is completed, a state agency may not adopt or implement a rule or policy that:

1. Mandates, establishes, or implements more restrictive nitrogen-reduction standards to existing or new onsite sewage treatment systems or modification of such systems; or

2. Directly or indirectly requires the use of performance-based treatment systems or similar technology, such as through an administrative order developed by the Department of Environmental Protection as part of a basin management action plan adopted pursuant to s. 403.067, Florida Statutes.

However, the implementation of more restrictive nitrogen-reduction standards for onsite systems may be required through a basin management action plan if such plan is phased in after completion of Phase 3.

(2) This section expires July 1, 2013.



**STATUS REPORT ON PHASE II AND PHASE III OF THE  
FLORIDA ONSITE SEWAGE NITROGEN REDUCTION  
STRATEGIES STUDY**

Division of Disease Control and Health Protection  
Bureau of Environmental Health  
Onsite Sewage Programs

February 1, 2013

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John H. Armstrong, MD, FACS  
Surgeon General & Secretary  
Department of Health

Rick Scott  
Governor

**Table of Contents**

EXECUTIVE SUMMARY ..... 3  
1 INTRODUCTION..... 4  
2 PROJECT STATUS ..... 6  
3 ANTICIPATED PROGRESS IN 2013-2015..... 9  
4 FUNDING NEEDS ..... 10  
5 RECOMMENDATIONS..... 11  
APPENDIX A. 2010 Legislative Language ..... 13  
APPENDIX B. 2011 Legislative Language ..... 17  
APPENDIX C. 2012 Legislative Language ..... 20

**List of Figures**

Figure 1. Sign posted at the University of Florida’s Gulf Coast Research & Education Center’s test facility. .... 6  
Figure 2. Test facility constructed at the University of Florida’s Gulf Coast Research & Education Center..... 7

**List of Tables**

Table 1. Summary of Legislative Funding..... 5  
Table 2. Field Work Status by County for Task B and Task C ..... 8  
Table 3. Summary of Cash Appropriations and Spending as of November 27, 2012... 11  
Table 4. Summary of Contractual Funding Phase Tasks and Progress..... 12

**STATUS REPORT ON PHASE II AND PHASE III OF THE FLORIDA  
ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY – FEBRUARY 2013**

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**EXECUTIVE SUMMARY**

This report is submitted in compliance with Line Item 512 Section 3, Conference Report on House Bill 5001, General Appropriations Act for Fiscal Year 2012-2013. The purpose of this project is to develop cost-effective, passive strategies for nitrogen reduction for onsite sewage treatment and disposal systems (OSTDS). Regardless of the source, excessive nitrogen has negative effects on public health and the environment.

The Florida Legislature has provided a total of \$4.4 million for Phases I, II, and the first part of Phase III of a three phase project. The project remains within the original total estimated budget of \$5.1 million so there is no cost over-run. Funds appropriated and expended to date have established necessary viable protocols and have been appropriately used to test, and refine technologies and strategies to be tested in the field.

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This project is in its fourth year of six, which means a time over-run. The contract, [executed in January, 2009](#), was developed for a five-year term due to the complexity and magnitude of work necessary to get meaningful results. During each fiscal year, the Department authorized the provider to work on tasks for which there was sufficient budget and spending authority causing some delay in project completion which means there is a time over-run. A final appropriation of funds [is required to keep](#) the project on track to be completed by January 16, 2015. Florida TaxWatch [endorsed this project](#) as a good use of public funds (Wenner 2008).

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During the 2012-2013 fiscal year efforts are focused on installing, monitoring, and modeling various full-scale OSTDS field sites at locations throughout the State of Florida to evaluate nitrogen reducing technologies and gathering information on how nitrogen moves through the soil and shallow groundwater. This field testing phase is crucial, so that the project will yield practical results that can be used to develop viable, cost-effective alternative passive technologies for use by homeowners for nitrogen issues associated with onsite systems. There are ten sites in progress as contractually required.

The tasks associated with the final phase include: continuation and completion of field monitoring of the performance and cost of technologies at home sites and of nitrogen fate and transport in the shallow groundwater; development of nitrogen fate and transport models that will be calibrated with the field sampling results; and final reporting on all tasks with recommendations on onsite sewage nitrogen reduction strategies.

The Department's Research Review and Advisory Committee (RRAC) supports concluding this study as originally scoped and recommends:

1. For fiscal year 2013-2014, [that](#) the Legislature [provides](#) the final installment of cash in the amount of \$700,000 and [the](#) budget authority in the amount of \$1,000,000 to continue the field testing.
2. For the fiscal year 2014-2015, [that](#) the Legislature [provides](#) budget authority in the amount of \$500,000 for continuation and completion of the tasks associated with this legislatively mandated study.

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Continued support for this project will ultimately benefit Florida's approximately 2.7 million onsite system owners by finding cost-effective nitrogen reduction strategies that will improve environmental and public health protection.

## 1 INTRODUCTION

The Florida Legislature tasked the Department of Health to conduct a study to develop passive strategies for nitrogen reduction for onsite sewage treatment and disposal systems (OSTDS). Regardless of the source, excessive nitrogen has negative effects on public health and the environment. The primary motivations for this study are the environmental impacts that the increased levels of nitrogen in water bodies can cause. Programs within DEP identify water bodies impaired by excessive nitrogen, establish targets for maximum nutrient loads, and develop management action plans to restore the water bodies. The relative impact of OSTDS on total nitrogen levels varies from watershed to watershed with estimates ranging from below five to more than 20 percent. There is widespread interest in the management of OSTDS and their nitrogen impacts. The significance of this innovative project is that it evaluates and develops strategies to reduce nitrogen impacts from OSTDS regulated by the Florida Department of Health (DOH). The goal is to develop systems that complement the use of conventional OSTDS and are also affordable and ecologically protective with reduced engineering and installation costs that assist in sustainable development.

This study was based on budget language in 2008 (Line Item 1682, House Bill 5001, General Appropriations Act for Fiscal Year 2008-2009) that instructed:

...the Department of Health to further develop cost-effective nitrogen reduction strategies. The Department of Health shall contract, by request for proposal, for Phase I of an anticipated 3-year project to develop passive strategies for nitrogen reduction that complement use of conventional onsite wastewater treatment systems. The project shall be controlled by the Department of Health's Research Review and Advisory Committee and shall include the following components: 1) comprehensive review of existing or ongoing studies on passive technologies; 2) field testing of nitrogen reducing technologies at actual home sites for comparison of conventional, passive technologies and performance-based treatment systems to determine nitrogen reduction performance; 3) documentation of all capital, energy and life-cycle costs of various technologies for nitrogen reduction; 4) evaluation of nitrogen reduction provided by soils and the shallow groundwater below and down gradient of various systems; and 5) development of a simple model for predicting nitrogen fate and transport from onsite wastewater systems. A progress report shall be presented to the Executive Office of the Governor, the President of the Senate and the Speaker of the House of Representatives on February 1, 2009, including recommendations for funding additional phases of the study.

The 2010 legislature (included in Appendix A) specified that the existing contract for this project will remain in full force; that the Department, the Department's Research Review and Advisory Committee (RRAC), and the Florida Department of Environmental Protection (DEP) shall work together to provide technical oversight; that DEP will have maximum technical input; that the main focus and priority for work in Phase II shall be in developing, testing, and recommending cost-effective passive technologies for nitrogen reduction; that field installations for this project will be subject to significant testing and monitoring; and that no state agency shall implement any rule or policy that requires nitrogen reducing systems or increases their costs until the study is complete.

The 2011 and 2012 legislature (included in Appendix B and Appendix C respectively) specified that the existing contract for this project will remain in full force; that the Department, the Department's Research Review and Advisory Committee (RRAC), and the Florida Department of Environmental Protection (DEP) shall work together to provide technical oversight; that

completion of Phase II and Phase III must be consistent with the terms of the existing contract; that the main focus and priority for Phase III be developing, testing, and recommending cost-effective passive technology design criteria for nitrogen reduction; the installed systems are experimental in nature and shall be installed with significant field testing and monitoring; and that no state agency shall implement any rule or policy that requires nitrogen reducing systems or increases their costs until the study is complete.

The Florida Legislature has provided a total of \$4.4 million for Phases I, II, and the first part of Phase III of a three phase project with a total estimated cost of \$5.1 million (Table 1). This includes an initial appropriation of \$900,000 by the 2008 Legislature for the first phase of this study and an appropriation of \$2,000,000 by the 2010 Legislature for the second phase of this study, and an appropriation of \$1,500,000 by the 2012 Legislature for the first part of the third phase of this study. This project will require additional cash in the amount of \$700,000 to complete the study. Additionally, the Department will need budget authority in the amount of \$1,000,000 for work during fiscal year 2013-2014. This report is submitted in compliance with Line Item 512 Section 3, Conference Report on House Bill 5001, General Appropriations Act for Fiscal Year 2012-2013, which appropriated the funding for the study.

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Florida TaxWatch has endorsed this project as a study that is a good use of public funds and that provides homeowners with cost-effective options for nitrogen reduction (email communication from Kurt Wenner to Jerry McDaniel June 2, 2008).

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Table 1. Summary of Legislative Funding

Total Project Budget	\$5,100,000
Total Funding To Date	(\$4,400,000)
Balance to Complete (2013-2014 Fiscal Year Projected Funding Need)	\$700,000

The study contract was awarded in January 2009 to a Project Team led by Hazen and Sawyer, P.C., and was based upon an anticipated budget of \$5 million over a 3 – 5 year project timeframe, with an additional \$100,000 budget to DOH for project management. The contract identifies the following tasks:

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**Task A – Technology Evaluation for Field Testing: Review, Prioritization, and Development:** This task includes literature review, technology evaluation, prioritization of technologies to be examined during field testing, and further experimentation with approaches tested in a previous DOH passive nitrogen removal study. Objectives of this task are to prioritize technologies for testing at actual home sites and to perform controlled tests at a test facility to develop design criteria for new passive nitrogen reduction systems.

**Task B – Field Testing of Technologies and Cost Documentation:** This task includes installation of top-ranked nitrogen reduction technologies at actual homes, with documentation of their performance and cost. Cost documentation for the systems will be broken down by permitting, design, materials and construction, and operation and maintenance.

**Task C – Evaluation of Nitrogen Reduction Provided by Soils and Shallow Groundwater:** This task includes several field evaluations of nitrogen reduction in Florida soils and shallow groundwater and also will provide data for the development of a simple planning model in Task D.

**Task D – Nitrogen Fate and Transport Modeling:** The objective of this task is to develop a simple fate and transport model of nitrogen from OSTDS that can be used for assessment, planning and siting of OSTDS.

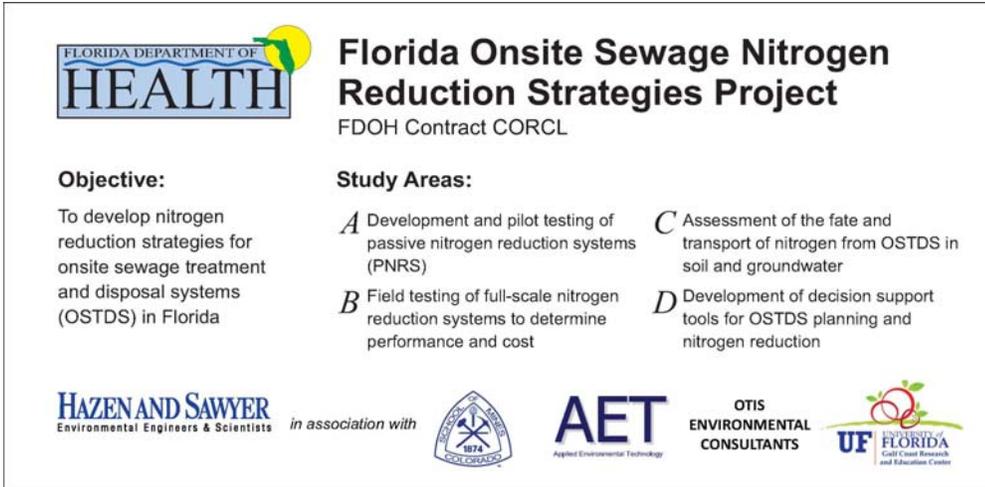


Figure 1. Sign posted at the University of Florida's Gulf Coast Research & Education Center's test facility.

## 2 PROJECT STATUS

Funding for the first and second phases of this project has been appropriated. The 2012 legislature approved funding for the first part of Phase III. A summary of the major project elements and their timing with funding phases is shown in [Table 4](#). The contractor, in coordination with the RRAC and DOH, has successfully completed parts of Tasks A, B, C, and D, including literature reviews; ranking of nitrogen reduction technologies for field testing; design and construction of a test facility for further development of passive technologies; development of quality assurance documents for the test facility work, groundwater monitoring, field testing, and nitrogen fate and transport modeling; installation of nitrogen reducing systems at two home sites; completion of several sampling events of passive systems at the test facility and field sites; design and construction of a soil and groundwater test facility; and field sampling of the soil and groundwater under OSTDS at residential homes throughout Florida and at the test facility.

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Figure 2. Test facility constructed at the University of Florida's Gulf Coast Research & Education Center.

Current efforts and work remaining for the 2012-2013 fiscal year includes: system installation and field sampling at additional home sites, throughout Florida for the testing of passive systems and to test the soil and groundwater under OSTDS; sampling at the soil and groundwater test facility; and continuing with development of a nitrogen fate and transport model. RRAC supports concluding this study as originally scoped. The following work by task will proceed with the current funding level:

1. Task A. The technology evaluation included a total of 7 sample events at the passive nitrogen test facility, measuring 14 different analytes at over 40 sampling points in 11 systems, as well as a final report on the pilot passive nitrogen removal study at the Gulf Coast Research and Education Center (GCREC).  
**Current Status as of December 2012:** All sample events at the test facility have been completed. Test results are encouraging after 12 months of testing, showing a reduction in total nitrogen of over 95%, with a final effluent concentration of 2.6 mg/L or less for several of the systems. Analysis of the results from the 11 systems and report writing is underway. Two additional, drainfield-based systems have been installed and have had three monitoring events.
2. Task B. For field testing of technologies, the quality assurance project plan has been finalized. The research design proposes that seven onsite systems, utilizing various nitrogen removal technologies, will be installed at home locations throughout the State of Florida. It is anticipated that a total of seven field system performance monitoring events will be conducted on each these systems with the current funding level, measuring 16 different analytes at 2-8 different sampling points. A report providing a technical description of nitrogen reduction technologies will be written, as well as a report providing a template and user guidelines for system life cycle cost assessments.  
**Current Status as of December 2012:** Eleven homeowners residing at locations across Florida have agreed to participate in the study to date for Task B. (Table 2).

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Home sites have been identified in Wakulla County, the Wekiva area, and several other areas throughout the State. At least one of the home sites will have a gravity-fed system installed. Construction has been completed for two systems. Six out of seven sample events have been completed for the first system and one sample event has been completed on the second system. The design work has begun for the next three systems, which are located in Seminole County.

- Task C. To evaluate nitrogen reduction provided by soils and shallow groundwater, a soil and groundwater test facility has been constructed to show how groundwater fate and transport of nitrogen occurs in multiple soil treatment unit regimes. Six of the thirteen total sampling events will be completed with the current funding level, sampling three of the four sites, and sampling six different locations at each site, and measuring multiple parameters in the effluent, soil, and groundwater. The existing OSTDS mound system at the University of Florida's Gulf Coast Research & Education Center (GCREC) in Wimauma, Florida was instrumented to study how nitrogen behaves in the soil and groundwater. Four sampling events that examine multiple parameters have been completed at the existing OSTDS mound system at GCREC. At least three soil and groundwater monitoring events will occur at up to three home sites to evaluate nitrogen movement in the soil and groundwater in the field, measuring multiple parameters in the effluent, soil, and groundwater.

**Current Status as of December 2012:** Tasks that have been completed thus far are the testing of media components per 381.0065(4)(m) F.S., two tracer tests to determine existing groundwater flow characteristics, and construction of the soil and groundwater test facility. Three of six monitoring events have been completed at four groundwater test areas at the soil and groundwater test facility to show how groundwater fate and transport of nitrogen occurs. Instrumentation of the existing OSTDS mound system at GCREC has been completed and four sample events have been conducted. Six homeowners have agreed to participate in the study to date for Task C (Table 2). Four home sites have been selected and instrumented. One sample event has occurred at the first of these sites, however, the groundwater flow direction could not be delineated, and no additional sampling events will occur at that site. Sampling is complete at the second instrumented site, and the third and fourth sites are currently being monitored having had one sample event completed.

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Table 2. Field Work Status by County for Task B and Task C

County	# Sites Evaluated	# Agreements	Sites in Progress
Charlotte	12	0	0
Hernando	1	0	0
Hillsborough	4	3	3
Lake	1	0	0
Lee	4	1	0
Marion	8	3	0
Orange	2	0	0
Polk	3	1	1
Sarasota	13	0	0
Seminole	8	6	4
Wakulla	4	4	2
<b>TOTAL</b>	<b>60</b>	<b>18</b>	<b>10</b>

4. Task D. To address nitrogen fate and transport modeling from onsite systems in Florida a simple tool will be developed in Task D to assist in evaluating nitrogen loading from these systems. This will include development of a soil model to show how nitrogen is affected by treatment in Florida-specific soils, and a groundwater model to evaluate the movement of nitrogen down gradient from these systems. A final quality assurance project plan has been completed and the first steps will include the development of a soil model to show how nitrogen is affected by treatment in Florida-specific soils.

**Current Status as of December 2012:** Work has focused primarily on soil modeling under the current budget. Soil models are currently being developed and refined, and the project team has met several times to discuss and finalize model conditions. Groundwater modeling is underway with conceptual model development started. These models will be utilized to generate a simple tool for prediction of nitrogen fate, transport, and removal in Florida soils and groundwater.

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### 3 ANTICIPATED PROGRESS IN 2013-2015

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Additional funding and budget authority to carry over existing funding will be critical to complete the tasks associated with the final phase. These include: continuation and completion of field monitoring of performance and cost of technologies at home sites and of nitrogen fate and transport in the shallow groundwater; calibration and refinement of various nitrogen fate and transport models that will be calibrated with the field sampling results; and final reporting on all tasks with recommendations on onsite sewage nitrogen reduction strategies. In particular, the following work will occur with the final phase of funding being requested with this report:

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1. For Task A, the final task report will be written. This report will include a summary of the accomplishments of the passive nitrogen removal test facility.
2. For Task B, it is anticipated that one final field system performance monitoring event will be conducted on each of the seven systems; and completion of final reporting on all of the field work associated with this task. Cost documentation for the systems will be broken down by permitting, design, materials and construction, and operation and maintenance.
3. For Task C, monitoring events at three home sites will be conducted to evaluate nitrogen movement in the soil and groundwater in the field. Final reporting for this task will be completed.
4. For Task D, the soil model will be completed and integrated with groundwater models which will be calibrated, and validated, utilizing the results of the field work collected in previous tasks, and a final task report will be written summarizing the results of this task.

#### 4 FUNDING NEEDS

Activities in fiscal years 2008-2012 have prepared the framework for rapid implementation of all remaining project tasks in fiscal years 2013-2015. A final appropriation of cash in the amount of \$700,000 is required in 2013-2014. Budget authorization in the amount of \$1,000,000 in 2013-2014 and \$500,000 in 2014-2015 is required to reap the benefits of all previous work and to complete the goals of this project.

This project is in its fourth of six years and is within the original \$5.1 million budget. Funds appropriated and expended to date have established necessary viable protocols and have been appropriately used to test, calibrate, and refine technologies and strategies to be tested in the field. Continued funding for Phase III of the project is necessary for extensive field testing (the major portion of Task B) to be completed. Field testing is crucial, so that the project will yield results that can be used to develop viable, cost-effective alternative passive technologies for use by homeowners for nitrogen issues associated with onsite systems.

Project Tasks (described previously, [and shown in Table 3](#)) are broken down further into funding phases as follows:

Initial Funding in 2008-2010 (Phase I): \$900,000 (cash and budget authority) appropriated (in 2008 and 2009 state budgets) – Status: Complete, [and funds fully spent](#). The initial funding was targeted to prioritize systems for testing, summarize existing knowledge, develop testing protocols, and establish a test facility for detailed soil and groundwater monitoring and for preliminary testing of pilot scale passive nitrogen reduction systems.

Funding in 2010-2011: \$2 million (cash and budget authority) appropriated (in 2010 state budget) – Status: Ongoing. This funding is for field monitoring over a [16 month](#) monitoring period of performance and cost of technologies at [each home site](#), and of nitrogen fate and transport. This funding will also continue the development and monitoring work at the test facility and continue the modeling work.

Funding in 2011-2012: Although \$2.75 million in budget authorization was appropriated in the 2011 state budget, no additional cash accompanied the budget authorization – Status: Ongoing. The remaining cash from the 2010-2011 appropriation [was](#) used to continue the monitoring of systems and the soil modeling work. The preliminary results of the project are encouraging.

Funding in 2012-2013: \$1.5 million (cash and budget authority) appropriated (in 2012 state budget) – Status: Ongoing. These funds are being used to continue to install and monitor nitrogen reducing systems, draft a life cycle cost assessment template report for systems evaluated in this study, monitor nitrogen in the groundwater under existing OSTDS, and to develop, validate, and refine the soil modeling work.

Funding in 2013-2015: To adequately fund the final phase of the project, \$700,000 cash is required to fund the completion of scheduled tasks. Further testing and analysis is required to confirm the results to date with field data and to provide data for development of the engineering specifications for full system designs. The funds will be used to complete monitoring and other field activities, perform additional testing as deemed appropriate by the Legislature, and for final reporting with recommendations on onsite sewage nitrogen reduction strategies for Florida's future. Budget authority is required in the amount of \$1,000,000 in the [FY 2013-2014](#) budget and \$500,000 in the [FY 2014-2015](#) budget [to complete all remaining tasks](#).

Further information on this project, including previous legislative reports and detailed project reports, can be found on the Department's website:

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<http://www.doh.state.fl.us/environment/ostds/research/Nitrogen.html>

Table 3. Summary of [Cash Appropriations and Spending as of November 27, 2012](#)

	<a href="#">Amount</a>	<a href="#">Spent</a>	<a href="#">Balance</a>
<a href="#">2008-2010 Appropriated Cash</a>	<a href="#">\$900,000</a>	<a href="#">\$900,000</a>	<a href="#">\$0</a>
<a href="#">2010-2011 Appropriated Cash</a>	<a href="#">\$2,000,000</a>	<a href="#">\$1,300,355</a>	<a href="#">\$699,645</a>
<a href="#">2012-2013 Appropriated Cash</a>	<a href="#">\$1,500,000</a>	<a href="#">\$272,707</a>	<a href="#">\$1,227,293</a>
<a href="#">2013-2014 Requested Cash</a>	<a href="#">\$700,000</a>	<a href="#">-</a>	<a href="#">-</a>
<b><a href="#">TOTAL</a></b>	<b><a href="#">\$5,100,000</a></b>	<b><a href="#">\$2,473,062</a></b>	<b><a href="#">\$1,926,938</a></b>

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## 5 [RECOMMENDATIONS](#)

[The Department's Research Review and Advisory Committee \(RRAC\) supports concluding this study as originally scoped and recommends:](#)

- [1. For fiscal year 2013-2014, that the Legislature provides the final installment of cash in the amount of \\$700,000 and budget authority in the amount of \\$1,000,000 to continue the field testing.](#)
- [2. For the fiscal year 2014-2015, that the Legislature provides budget authority in the amount of \\$500,000 for continuation and completion of the tasks associated with this legislatively mandated study.](#)

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[This final funding will be applied to the final phase of the project, for completion of field monitoring of performance and cost of technologies at home sites and of nitrogen fate and transport in the shallow groundwater, calibration and refinement of various nitrogen fate and transport models that will be calibrated with the field sampling results, and final reporting on all tasks with recommendations on onsite sewage nitrogen reduction strategies.](#)

[Continued support for this project will ultimately benefit Florida's approximately 2.7 million onsite system owners by finding cost-effective nitrogen reduction strategies that will improve environmental and public health protection. When fully funded, the results of this project will assist with producing nitrogen reducing systems that protect groundwater through reduced life-cycle costs and lower energy demands.](#)

Table 4. Summary of Contractual Funding Phase Tasks and Progress

Task	Status	Phase I	Phase II	Phase IIIa	Phase IIIb	
<b>A Task A: Technology Selection &amp; Prioritization</b>		\$352,144	\$336,514	\$0	\$35,480	
Literature review	Complete					
Ranking of nitrogen reduction technologies for field testing	Complete					
Design and construction of test facility	Complete					
Quality assurance project plan	Complete					
Monitoring and sample events (7 events)	Complete					
Final test facility report	Underway					
Final task report	Funding required <sup>1</sup>					
<b>B Task B: Field Testing of Technologies</b>		\$50,202	\$599,610	\$265,408	\$263,834	
Quality assurance project plan	Complete					
Installation of ranked nitrogen reduction technologies at 7 field sites	Underway					
System performance monitoring events at 7 sites	Underway					
Life cycle cost assessment template development	Not started					
Final life cycle cost assessment report (per system)	Funding required <sup>1</sup>					
Final task report	Funding required <sup>1</sup>					
<b>C Task C: Evaluation of Nitrogen Reduction by Soils &amp; Shallow Groundwater</b>		\$216,164	\$1,095,977	\$436,220	\$162,640	
Quality assurance project plan	Complete					
Design of test facility	Complete					
Construction of test facility	Complete					
Test facility monitoring and sample events (4 test areas sampled 6 times)	Underway, partially funded <sup>2</sup>					
Instrumentation of existing onsite sewage system mound at GCREC facility	Complete					
GCREC mound sample events	Complete					
Field sites sample events (4 sites, 3 sites will be sampled 3 times, 1 site discontinued)	Underway, partially funded <sup>2</sup>					
Final task report	Funding required <sup>1</sup>					
<b>D Task D: Nitrogen Fate and Transport Models</b>		\$74,357	\$292,021	\$251,334	\$190,310	
Quality assurance project plan	Complete					
Soil model development (simple and complex)	Underway					
Performance evaluation and refinement of soil models	Not started					
Shallow groundwater/soil model development	Funding required <sup>1</sup>					
Performance evaluation and refinement of soil/groundwater model	Funding required <sup>1</sup>					
Decision making framework	Funding required <sup>1</sup>					
Final task report	Funding required <sup>1</sup>					
<b>Project Management (sum of contractor and Department of Health)</b>		\$119,953	\$149,003	\$105,407	\$103,422	
Contractor project management	Underway	\$90,695	\$109,003	\$90,407	\$87,679	
Department of Health project management	Underway	\$29,258	\$40,000	\$15,000	\$15,743	
<b>Total Project Budget</b>		\$5,100,000	\$812,820	\$2,473,125	\$1,058,369	\$755,686
<b>Total Appropriated Cash</b>		\$4,400,000	\$900,000	\$2,000,000	\$1,500,000	\$3
<b>Total Spent as of November 27, 2012</b>		\$2,473,062	\$812,820	\$1,660,242	\$0	
<b>Unspent Balance of Appropriated Cash</b>		\$1,871,252	\$0	\$812,883	\$1,058,369	

Deleted: OSTDS

- Deleted: September 26
- Deleted: 379,912
- Deleted: \$0
- Deleted: 1,093,213
- Deleted: 0
- Deleted: \$0

1 A "funding required" subtask status indicates that the \$700,000 requested for fiscal year 2013-2014 is required to fund the subtask  
 2 A "partially funded" subtask status indicates that a subtask has received partial funding, but still requires a portion of the \$700,000 required to complete the funding for the project  
 3 A total of \$700,000 is required to completed the funding for the project  
 GCREC – Gulf Coast Research & Education Center

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3.

**Deleted:** OSTDS – Onsite Sewage Treatment and Disposal Systems

**Moved up [1]:** ¶  
¶**RECOMMENDATIONS**¶

¶ The Department’s Research Review and Advisory Committee (RRAC) supports concluding this study as originally scoped and recommends:¶  
¶

**Moved up [2]:** budget authority in the amount of \$500,000 for continuation and completion of the tasks associated with this legislatively mandated study. ¶

¶ This final funding will be applied to the final phase of the project, for completion of field monitoring of performance and cost of technologies at home sites and of nitrogen fate and transport in the shallow groundwater, calibration and refinement of various nitrogen fate and transport models that will be calibrated with the field sampling results, and final reporting on all tasks with recommendations on onsite sewage nitrogen reduction strategies. ¶

¶ Continued support for this project will ultimately benefit Florida’s approximately 2.7 million onsite system owners by finding cost-effective nitrogen reduction strategies that will improve environmental and public health protection. When fully funded, the results of this project will assist with producing nitrogen reducing systems that protect groundwater through reduced life-cycle costs and lower energy demands.¶

**Deleted:** <#>For fiscal year 2013-2014, this project would require the Legislature to provide the final installment of cash in the amount of \$700,000 and budget authority in the amount of \$1,000,000 to continue the field testing.¶  
For the fiscal year 2014-2015, this project would require the Legislature to provide

**APPENDIX A. 2010 Legislative Language**

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SECTION 3 – HUMAN SERVICES

486 SPECIAL CATEGORIES

CONTRACTED SERVICES

FROM GENERAL REVENUE FUND . . . . .	153,772
FROM ADMINISTRATIVE TRUST FUND . . .	337,765
FROM FEDERAL GRANTS TRUST FUND . . .	348,235
FROM GRANTS AND DONATIONS TRUST FUND . . . . .	2,648,438
FROM RADIATION PROTECTION TRUST FUND . . . . .	150,000

From the funds in Specific Appropriation 486, \$2,000,000 from the Grants and Donations Trust Fund is provided to the department to continue phase II and complete the study authorized in Specific Appropriation 1682 of chapter 2008-152, Laws of Florida. The report shall include recommendations on passive strategies for nitrogen reduction that complement use of conventional onsite wastewater treatment systems. The department shall submit an interim report of phase II on February 1, 2011, a subsequent status report on May 16, 2011, and a final report upon completion of phase II to the Governor, the President of the Senate, and the Speaker of the House of Representatives prior to proceeding with any nitrogen reduction activities.

Section 14. In order to implement Specific Appropriation 486 of the 2010-2011 General Appropriations Act, and for the 2010-2011 fiscal year only, the following requirements shall govern Phase 2 of the Department of Health's Florida Onsite Sewage Nitrogen Reduction Strategies Study:

(1) The underlying contract for which the study was let shall remain in full force and effect with the Department of Health and funding the contract for Phase 2 of the study shall be through the Department of Health.

(2) The Department of Health, the Department of Health's Research Review and Advisory Committee, and the Department of Environmental Protection shall work together to provide the necessary technical oversight of Phase 2 of the project, with the Department of Environmental Protection having maximum technical input.

(3) Management and oversight of Phase 2 shall be consistent with the terms of the existing contract; however, the main focus and priority for work to be completed for Phase 2 shall be in developing, testing, and recommending cost-effective passive technology design criteria for nitrogen reduction.

(4) The systems installed at actual home sites are experimental in nature and shall be installed with significant field testing and monitoring. The Department of Health is specifically authorized to allow installation of these experimental systems. In addition, before Phase 2 of the study is complete and notwithstanding any law to the contrary, a state agency may not adopt or implement a rule or policy that:

(a) Mandates, establishes, or implements any new nitrogen-reduction standards that apply to existing or new onsite sewage treatment systems or modification of such systems;

(b) Increases the cost of treatment for nitrogen reduction from onsite sewage treatment systems; or

(c) Directly requires or has the indirect effect of requiring, for nitrogen reduction, the use of performance-based treatment systems or any similar technology; provided the Department of Environmental Protection administrative orders recognizing onsite system modifications, developed

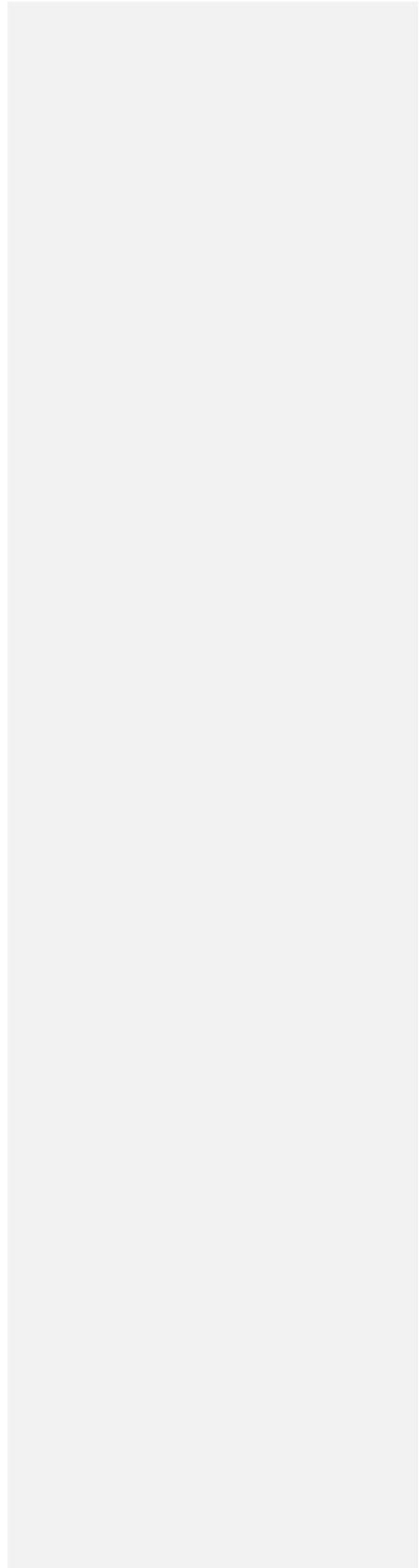
through a basin management action plan adopted pursuant to section 403.067, Florida Statutes, are not subject to the above restrictions where implementation of onsite system modifications are phased in after completion of Phase 2, except that no onsite system modification developed in a basin management action plan shall directly or indirectly require the installation of performance-based treatment systems.

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**APPENDIX B. 2011 Legislative Language**

DRAFT



SECTION 3 – HUMAN SERVICES

465 SPECIAL CATEGORIES

CONTRACTED SERVICES

FROM GENERAL REVENUE FUND . . . . .	97,489
FROM ADMINISTRATIVE TRUST FUND . . . . .	335,165
FROM FEDERAL GRANTS TRUST FUND . . . . .	643,776
FROM GRANTS AND DONATIONS TRUST FUND . . . . .	3,401,038
FROM RADIATION PROTECTION TRUST FUND . . . . .	150,000

From the funds in Specific Appropriation 465, \$2,725,000 in nonrecurring funds from the Grants and Donations Trust Fund is provided to the department to complete phase II and phase III and complete the study authorized in Specific Appropriation 1682 of chapter 2008-152, Laws of Florida. The report shall include recommendations on passive strategies for nitrogen reduction that complement use of conventional onsite wastewater treatment systems. The department shall submit an interim report of the completion of phase II and progress on phase III on February 1, 2012, a subsequent status report on May 16, 2012, and a final report upon completion of phase III to the Governor, the President of the Senate, and the Speaker of the House of Representatives prior to proceeding with any nitrogen reduction activities.

Section 7. In order to implement Specific Appropriation 465 of the 2011-2012 General Appropriations Act, and for the 2011-2012 fiscal year only, the following requirements govern the completion of Phase 2 and Phase 3 of the Department of Health's Florida Onsite Sewage Nitrogen Reduction Strategies Study:

(1) The Department of Health's underlying contract for the study remains in full force and effect and funding for completion of Phase 2 and Phase 3 is through the Department of Health.

(2) The Department of Health, the Department of Health's Research Review and Advisory Committee, and the Department of Environmental Protection shall work together to provide the necessary technical oversight of the completion of Phase 2 and Phase 3 of the project.

(3) Management and oversight of the completion of Phase 2 and Phase 3 must be consistent with the terms of the existing contract. However, the main focus and priority to be completed during Phase 3 shall be developing, testing, and recommending cost-effective passive technology design criteria for nitrogen reduction.

(4) The systems installed at homesites are experimental in nature and shall be installed with significant field testing and monitoring. The Department of Health is specifically authorized to allow installation of these experimental systems. Notwithstanding any other law, before Phase 3 of the study is completed, a state agency may not adopt or implement a rule or policy that:

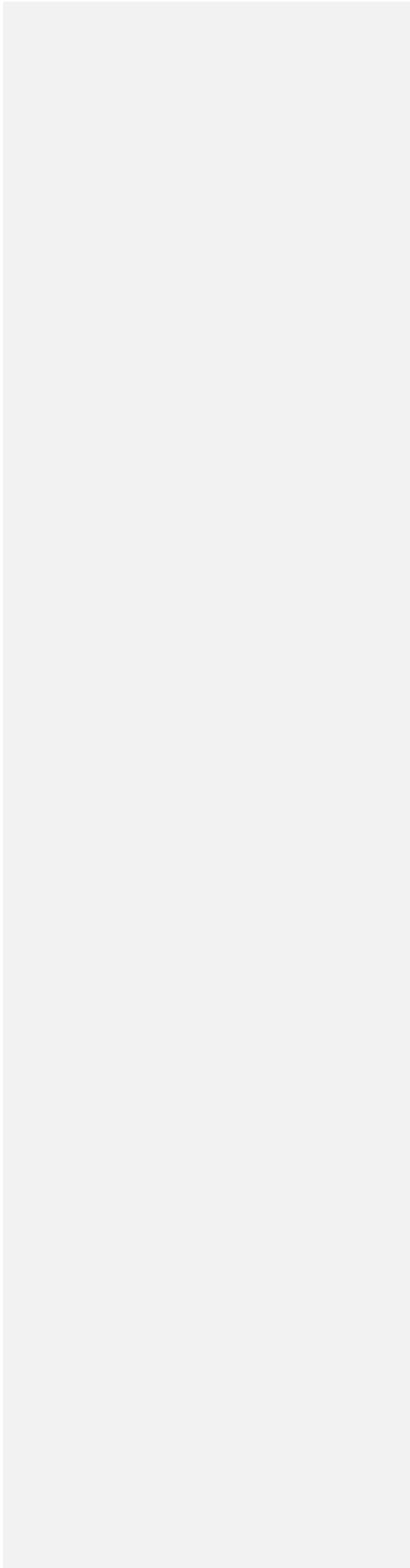
(a) Mandates, establishes, or implements more restrictive nitrogen-reduction standards to existing or new onsite sewage treatment systems or modification of such systems; or

(b) Directly or indirectly requires the use of performance-based treatment systems or similar technology, such as through an administrative order developed by the Department of Environmental Protection as part of a basin management action plan adopted pursuant to s. 403.067, Florida Statutes. However, the implementation of more restrictive nitrogen-reduction standards for onsite systems may be required through a basin management action plan if such plan is phased in after completion of Phase 3.

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**APPENDIX C. 2012 Legislative Language**

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## SECTION 3 – HUMAN SERVICES

## 512 SPECIAL CATEGORIES

## CONTRACTED SERVICES

FROM GENERAL REVENUE FUND . . . . .	2,047,489
FROM ADMINISTRATIVE TRUST FUND . . . . .	335,165
FROM FEDERAL GRANTS TRUST FUND . . . . .	643,776
FROM GRANTS AND DONATIONS TRUST FUND . . . . .	676,038
FROM RADIATION PROTECTION TRUST FUND . . . . .	150,000

From the funds in Specific Appropriation 512, \$1,500,000 in nonrecurring funds from the General Revenue Fund is provided to the department to complete phase II and phase III of the study authorized in Specific Appropriation 1682 of chapter 2008-152, Laws of Florida. The funds will be spent for installing field systems and sampling, installing and sampling the soil and groundwater at various sites throughout Florida to determine how nitrogen moves, and developing various models to show how nitrogen is affected by treatment in Florida-specific soils. The department shall submit a status report before October 1, 2012, a subsequent status report before February 1, 2013, and a final report upon completion of phase III to the Governor, the President of the Senate, and the Speaker of the House of Representatives prior to proceeding with any nitrogen reduction activities.

Section 5. (1) In order to implement Specific Appropriation 512 of the 2012-2013 General Appropriations Act, and for the 2012-2013 fiscal year only, the following requirements govern the completion of Phase 2 and Phase 3 of the Department of Health's Florida Onsite Sewage Nitrogen Reduction Strategies Study:

- (a) The Department of Health's underlying contract for the study remains in full force and effect and funding for completion of Phase 2 and Phase 3 is through the Department of Health.
  - (b) The Department of Health, the Department of Health's Research Review and Advisory Committee, and the Department of Environmental Protection shall work together to provide the necessary technical oversight of the completion of Phase 2 and Phase 3 of the project.
  - (c) Management and oversight of the completion of Phase 2 and Phase 3 must be consistent with the terms of the existing contract. However, the main focus and priority to be completed during Phase 3 shall be developing, testing, and recommending cost-effective passive technology design criteria for nitrogen reduction.
  - (d) The systems installed at homesites are experimental in nature and shall be installed with significant field testing and monitoring. The Department of Health is specifically authorized to allow installation of these experimental systems. Notwithstanding any other law, before Phase 3 of the study is completed, a state agency may not adopt or implement a rule or policy that:
    1. Mandates, establishes, or implements more restrictive nitrogen-reduction standards to existing or new onsite sewage treatment systems or modification of such systems; or
    2. Directly or indirectly requires the use of performance-based treatment systems or similar technology, such as through an administrative order developed by the Department of Environmental Protection as part of a basin management action plan adopted pursuant to s. 403.067, Florida Statutes. However, the implementation of more restrictive nitrogen-reduction standards for onsite systems may be required through a basin management action plan if such plan is phased in after completion of Phase 3.
- (2) This section expires July 1, 2013.

**FLORIDA DEPARTMENT OF HEALTH  
ONSITE NITROGEN REDUCTION STRATEGIES STUDY**

**PROGRESS REPORT NO. 17  
(October, 2012)**

<b>Task</b>	<b>Task Status</b>	<b>Activity this Period</b>	<b>Technical, Schedule, or Budget Problems Encountered</b>	<b>Recommended Methods to Resolve Problems</b>
<b>Task A – Technology Evaluation for Field Testing: Review, Prioritization, and Development</b>				
Task A.1, Draft Literature Review Report	Task Complete	Task Complete	None	N/A
Task A.2, Final Literature Review Report	Task Complete	Task Complete	None	N/A
Task A.3, Draft Classification of Technologies Report	Task Complete	Task Complete	None	N/A
Task A.4, Draft Technology Ranking Criteria Report	Task Complete	Task Complete	None	N/A
Task A.5, Draft Priority List for Testing Report	Task Complete	Task Complete	None	N/A
Task A.6, Technology Classification, Ranking and Prioritization Workshop	Task Complete	Task Complete	None	N/A
Task A.7, Final Classification of Technologies Report	Task Complete	Task Complete	None	N/A
Task A.8, Final Technology Ranking Criteria Report	Task Complete	Task Complete	None	N/A
Task A.9, Final Priority List for Testing Report	Task Complete	Task Complete	None	N/A
Task A.10, Draft Innovative Systems Applications Reports	Not started	No activity	N/A	N/A
Task A.11, Final Innovative Systems Applications Reports	Not started	No activity	N/A	N/A
Task A.12, Identification of Test Facility Sites	Task Complete	Task Complete	None	N/A
Task A.13, Draft QAPP PNRS II	Task Complete	Task Complete	None	N/A
Task A.14, Recommendation for Process Forward Meeting	Task Complete	Task Complete	None	N/A

<b>Task</b>	<b>Task Status</b>	<b>Activity this Period</b>	<b>Technical, Schedule, or Budget Problems Encountered</b>	<b>Recommended Methods to Resolve Problems</b>
Task A.15, Final QAPP PNRS II	Task Complete	Task Complete	None	N/A
Task A.16 Materials Testing for FDOH Additives Rule	Task Complete	Task Complete	None	N/A
Task A.17, PNRS Specification Reports	Task Complete	Task Complete	None	N/A
Task A.18, Test Facility Design 50%	Task Complete	Task Complete	None	N/A
Task A.19, Test Facility Design 100%	Task Complete	Task Complete	None	N/A
Task A.20 PNRS II Test Facility Construction Support & Administration	Task Complete	Task Complete	None	N/A
Task A.21 PNRS II Test Facility Construction 50%	Task Complete	Task Complete	None	N/A
Task A.22 PNRS II Test Facility Construction 100%	Task Complete	Task Complete	None	N/A
Task A.23 PNRS II Test Facility Construction Substantial Completion	Task Complete	Task Complete	None	N/A
Task A.24 PNRS II Test Facility Accept Construction	Task Complete	Task Complete	None	N/A
Task A.25 Monitoring & Sample Event Reports	Task Complete	Task Complete	None	N/A
Task A.26 Data Summary Reports	Task Complete	Task Complete	None	N/A
Task A.27 Draft PNRS II Report	Underway	Started work on draft PNRS II report.	None	N/A
Task A.28 Final PNRS II Report	Not started	No activity	N/A	N/A
Task A.31 Change-order Allowance	Underway	FDOH authorized \$19,000 to perform a simulation of bioreactor filtration treatment of onsite wastewater April 4, 2011. The Biotool Task 1a and 1b reports completed on December 8, 2011. Remaining change-order budget = \$ 1000.	None	N/A

<b>Task</b>	<b>Task Status</b>	<b>Activity this Period</b>	<b>Technical, Schedule, or Budget Problems Encountered</b>	<b>Recommended Methods to Resolve Problems</b>
<b>Task B – Field Testing of Technologies and Cost Documentation</b>				
Task B.1, Identification of Home Sites	Task Complete	Task Complete	None	N/A
Task B.2, Vendor Agreement Reports	Underway	One vendor agreement remains in Ph3A budget to be completed.	None	N/A
Task B.3, Draft QAPP for Field Testing	Task Complete	Task Complete	None	N/A
Task B.4, Recommendation for Process Forward Meeting	Task Complete	Task Complete	None	N/A
Task B.5, Final QAPP Field Testing	Task Complete	Task Complete	None	N/A
Task B.6 Field Systems Installation Report (per system)	Underway	Installation of B-HS2, located in Hillsborough County, completed September 25, 2012. Started design of B-HS3, B-HS4 and B-HS5 located in Seminole County.	None	N/A
Task B.7 Field Systems Monitoring Report (per event)	Underway	Fifth and sixth B-HS1 monitoring events completed on September 28, 2012 and November 20, 2012, respectively.	None	N/A
Task B.9, Technical Description of Nitrogen Reduction Technology Report	Not started	No activity	N/A	N/A
Task B.11, LCCA Template Report (draft)	Not started	No activity	N/A	N/A
Task B.12 LCCA Template Report (final)	Not started	No activity	N/A	N/A
Task B.16 Change-order Allowance	Underway	Remaining change-order budget = \$39,448.95.	None	N/A

<b>Task</b>	<b>Task Status</b>	<b>Activity this Period</b>	<b>Technical, Schedule, or Budget Problems Encountered</b>	<b>Recommended Methods to Resolve Problems</b>
<b>Task C – Evaluation of Nitrogen Reduction Provided by Soils and Shallow Groundwater</b>				
Task C.1, Draft Literature Review on Nitrogen Reduction in Soils & Shallow GW Report	Task Complete	Task Complete	None	N/A
Task C.2, Final Literature Review on Nitrogen Reduction in Soils & Shallow GW Report	Task Complete	Task Complete	None	N/A
Task C.3, Draft QAPP Evaluation of Nitrogen Reduction Provided by Soils & Shallow GW	Task Complete	Task Complete	None	N/A
Task C.4, Recommendation for Process Forward Meeting	Task Complete	Task Complete	None	N/A
Task C.5, Final QAPP Evaluation of Nitrogen Reduction Provided by Soils & Shallow GW	Task Complete	Task Complete	None	N/A
Task C.6, S&GW Test Facility Design 50%	Task Complete	Task Complete	None	N/A
Task C.7, S&GW Test Facility Design 100%	Task Complete	Task Complete	None	N/A
Task C.8, S&GW Test Facility Design Final	Task Complete	Task Complete	None	N/A
Task C.9, S&GW Test Facility Construction Support & Administration	Task Complete	Task Complete	None	N/A
Task C.10, S&GW Test Facility Construction 50%	Task Complete	Task Complete	None	N/A
Task C.11, S&GW Test Facility Construction 100%	Task Complete	Task Complete	None	N/A
Task C.12, S&GW Test Facility Construction Substantial Completion	Task Complete	Task Complete	None	N/A
Task C.13, S&GW Test Facility Accept Construction	Task Complete	Task Complete	None	N/A

<b>Task</b>	<b>Task Status</b>	<b>Activity this Period</b>	<b>Technical, Schedule, or Budget Problems Encountered</b>	<b>Recommended Methods to Resolve Problems</b>
Task C.14, Soils & Hydrogeologic & Monitoring Plan for S&GW Test Facility	Underway	Started work on soils, hydrogeologic and monitoring plan for S&GW test facility.	None	N/A
Task C.15, Tracer Testing at GCREC	Underway	No activity	None	N/A
Task C.16 S&GW Sample Event Report	Underway	S&GW Test Facility Sample Event Report (SER) No. 2 completed on October 22, 2012. Sample Event No. 3 conducted October 15 through 26, 2012. SER No. 3 completed on November 20, 2012.	None	N/A
Task C.17 S&GW Data Summary Report	Underway	S&GW Test Facility Data Summary Report (DSR) No. 1 and 2 completed on October 22, 2012 and November 20, 2012, respectively.	None	N/A
Task C.18 Test Facility Closeout Report	Not started	No activity	N/A	N/A
Task C.19 Field Site Selection	Task Complete	Task Complete	None	N/A
Task C.20 Instrumentation of GCREC Mound System	Task Complete	Task Complete	None	N/A
Task C.21 GCREC Mound Sample Event Report	Task Complete	Task Complete	None	N/A
Task C.22 GCREC Mound Data Summary Report	Task Complete	Task Complete	None	N/A

<b>Task</b>	<b>Task Status</b>	<b>Activity this Period</b>	<b>Technical, Schedule, or Budget Problems Encountered</b>	<b>Recommended Methods to Resolve Problems</b>
Task C.23 Instrumentation of Remaining Field Sites	Underway	Continued instrumentation at C-HS4 located in Hillsborough County which started in August 2012. Completion of instrumentation scheduled for the week of December 3 <sup>rd</sup> .	None	N/A
Task C.24 Field Sites Sample Event Reports (SER)	Underway	<u>C-HS3</u> : Sample Event No. 1 conducted on August 28, 2012. Sample event report completed October 22, 2012.	None	N/A
Task C.25 Field Sites Data Summary Report (DSR)	Underway	<u>C-HS2</u> : DSR No. 4 completed on September 28, 2012.  <u>C-HS3</u> : Started work on DSR No.1	None	N/A
Task C.26 Draft Site Summary and Close-out Report (per site)	Not started	No activity	N/A	N/A
Task C.27 Final Site Close-Out Report (per site)	Not started	No activity	N/A	N/A
Task C.30 Change-order Allowance	Not started	No activity	N/A	N/A
<b>Task D – Nitrogen Fate and Transport Modeling</b>				
Task D.1, Draft Literature Review on Nitrogen Fate & Transport Model Report	Task Complete	Task Complete	None	N/A

<b>Task</b>	<b>Task Status</b>	<b>Activity this Period</b>	<b>Technical, Schedule, or Budget Problems Encountered</b>	<b>Recommended Methods to Resolve Problems</b>
Task D.2, Final Literature Review on Nitrogen Fate & Transport Model Report	Task Complete	Task Complete	None	N/A
Task D.3, Selection of Existing Data Set for Calibration Report	Task Complete	Task Complete	None	N/A
Task D.4, Draft QAPP N Fate and Transport Modeling	Task Complete	Task Complete	None	N/A
Task D.5, Recommendation for Process Forward	Task Complete	Task Complete	None	N/A
Task D.6, Final QAPP N Fate and Transport Modeling	Task Complete	Task Complete	None	N/A
Task D.7 Simple Soil Tools	Underway	FDOH and project team conference call (October 3, 2012) to discuss model conditions. Soil parameters have continued to be statistically evaluated incorporating the soil series with the highest number of permits.	Further progress and final deliverable depends on agreement between FDOH, H&S, and CSM on the conditions to be represented. Departure of Mia Tuchloke at CSM has delayed finalization of soil parameters.	N/A
Task D.8 Complex Soil Model	Underway	Task is 80% complete with continued model development coding and preliminary testing of incorporating a shallow groundwater table.	Finalization of soil parameters is required for completion.	N/A

<b>Task</b>	<b>Task Status</b>	<b>Activity this Period</b>	<b>Technical, Schedule, or Budget Problems Encountered</b>	<b>Recommended Methods to Resolve Problems</b>
Task D.9 Complex Soil Model Performance Evaluation	Not Started	No activity	N/A	N/A
Task D.10 Validate/Refine Complex Soil Model	Not Started	No activity	N/A	N/A
Task D.11 Aquifer Model Combined with Complex Soil Model Development	Not Started	No activity	N/A	N/A
Task D.12 Aquifer-Complex Soil Model Performance Evaluation	Not Started	No activity	N/A	N/A
Task D.13 Validate/Refine Aquifer-Complex Soil Model with Data Collection from Task C	Not Started	No activity	N/A	N/A
Task D.14 Development of Aquifer-Complex Soil Model for Multiple Spatial Inputs	Not Started	No activity	N/A	N/A
Task D.16 Task D Guidance Manual (Draft)	Not Started	No activity	N/A	N/A
Task D.17 Task D Guidance Manual (Final)	Not Started	No activity	N/A	N/A
Task D.18 Change-order Allowance	Not Started	No activity	N/A	N/A
<b>Task E – Project Management, Coordination and Meetings</b>				
Task E.1, Project Kick-off Meeting	Task Complete	Task Complete	None	N/A
Task E.2, PM-Project Progress Report	Underway	The October 2012 bimonthly progress report (this report) was completed November 20, 2012.	None	N/A
Task E.3, RRAC or TRAP Presentation	Underway	No activity	None	N/A
Task E.4, RRAC or TRAP Meeting Attendance	Underway	No activity	None	N/A
Task E.5, PAC Meeting	Not started	No activity	N/A	N/A