

**List of Proposed Research Projects to Be Prioritized by the Research Review and Advisory
Committee (RRAC) for Florida Department of Health's Onsite Sewage Program**

December of 2017

PROJECT DESCRIPTION 1	
Project Title	Development of Funding Mechanisms for OSTDS Remediation and Upgrades
Proposed by	Bob Himschoot
Background	For too long, there has been no funds available to homeowners outside of a municipality or utility that have had the benefit of low cost infrastructure replacement funds and that has been through a central sewer. Most municipalities go the easy route and instead of helping a homeowner, they actually penalize a property owner by requiring both functioning systems as well as failing systems to pay an assessment to construct a massive collection system and enlarge treatment plants only to discharge almost a billion gallons of water a day into surface water, ocean outfalls or deep injection wells.
Objectives and Outcomes	Florida Department of Health Develop the structure and protocol for a homeowner who needs to remediate, replace or repair an onsite wastewater treatment facility on his residential or commercial property to have access to part of the State of Florida's portion of the federal State Revolving Fund, Spring Protection Fund, and the other available funding sources. This could also help fund a failed or contaminated fresh water well for a homeowner.
Research Approach	EPA is currently being asked by the National Onsite Wastewater Recycling Association to oversee a more equitable distribution of the SRF for the Onsite Industry. There will be a reporting requirement that Congress will be addressing. There are a number of states that are already using an approach to request and utilize these funds. Florida needs to inquire, develop protocol (simple system) and help make these funds available especially in the springs protection areas. In addition, there are other funding sources that support remediation and upgrade of decentralized systems, such as the Florida Spring Protection Fund, EPA Nonpoint Source Section 319 grant, EPA Water Infrastructure Finance and Innovation Act grant, U. S. Department of Agriculture, Rural Development Fund, U.S. Department of Housing and Urban Development Fund, etc. Mechanisms of obtaining and providing these fundings to needed decentralized owners will be investigated and compiled.
Potential Collaboration	Areas within Basin Management Action Plans for Remediation of Septic Systems. Rural Water services, Florida Onsite Wastewater Association, Florida Home Builders Association, Florida Association of Realtors
Duration	Twelve months or less
Estimated Budget (\$)	DOH manpower ?????
Ease of implementation	Relatively easy if a simple process is developed. Don't over complicate.
Comments	<p>Something that is a hot button with the U S EPA currently.</p> <p>EPA is desiring to see more money used in this area, but not seeing requests made from states at large. Reason is the big municipalities, hence engineering firms, are drafting all the requests and convincing local governments that central collection and treatment is the way to go. However, if you see the catastrophe that occurred during the recent hurricane, you will find that raw sewage was pumped into bays, rivers and ocean. Onsite contained their waste.</p>

PROJECT DESCRIPTION 2

	PROJECT DESCRIPTION 2
Project Title	Continuation of Florida Water Management Inventory
Proposed By	Elke Ursin
Background	Having an inventory of OSTDS is the first step to any management program. It is also very helpful in determining where remediation through an onsite nitrogen reduction system is the more appropriate option as opposed to connection to a centralized sewer system. Work on updating the Florida Water Management Inventory is ongoing dependent on funding. Having the Research Review and Advisory Committee’s support for the project enhances funding requests and also allows for more detailed analysis of the data to answer specific OSTDS-related questions.
Objectives and Outcomes	Maintain and update the Florida Water Management Inventory (http://floridahealth.gov/FLWMI).
Research Approach	<p align="center">Workflow Diagram</p> <pre> graph LR A[CONTACT MANAGEMENT] --> B[COUNTY DOH] B --> C[DATA GATHERING] C --> D[DATA PROCESSING] D --> E[GEOPROCESSING] E --> F[MAPPING & REPORTING] F --> G[TRACKING & STATUS] </pre> <p>CONTACT MANAGEMENT</p> <ul style="list-style-type: none"> • WW Contacts from DEP • DW Contacts from DEP • DOACS • DBPR • WMDs • County DOH • County GIS • Other Projects and/or Studies (such as BMAP, etc.) • Data from Delegated Counties (wells, sewer, drinking water, etc.) • Other Contacts <p>COUNTY DOH</p> <ul style="list-style-type: none"> • Participation • Contacts for Utilities • Contacts for GIS • Data Scrubbing • DB or Spreadsheet for Delegations <p>DATA GATHERING</p> <ul style="list-style-type: none"> • Website • GIS Requests • BMAP and similar requests for data • Data Request Emails • Reminder Emails • County follow-up • Data Sheet Template • GIS Response Tracking • Inventory Tracking Sheet • Inventory DB • County Indexes • External Sources and EID, DOACS, DBPR • Parcels (obtaining most recent DOR polygons and tables) <p>DATA PROCESSING</p> <ul style="list-style-type: none"> • Standardizing Data Sheets • Determining if Geocoding is required • Geocoding Data Sheets • Updating County Indexes • GIS review, standardization, and preparations for geoprocessing <p>GEOPROCESSING</p> <ul style="list-style-type: none"> • Determining Built / Not-Built • 2009 Crosswalk • Pre-Assignment Geoprocessing • Assign DW & WW Values <p>MAPPING & REPORTING</p> <ul style="list-style-type: none"> • GIS Maps • Data Products • Other non-GIS Reporting • Publishing • Online Hosting for Map Server <p>TRACKING & STATUS</p> <ul style="list-style-type: none"> • Team Weekly Status Reports • Weekly Project Reports (leadership) • Weekly Executive Summary • GIS Workflow Tracking Spreadsheet • County Indexing • Other status, tracking, Ad Hoc requests, etc. • Organization • Collaboration
Potential Collaboration	Multiple collaboration opportunities with DEP, Water Management Districts, emergency preparedness groups, EPA
Duration	Ongoing
Estimated Budget (\$)	Dependent on other funding sources. Annual funding for one full-time OPS staff to work on this project is approximately \$30,000.
Ease of Implementation	Minimum effort. The FLWMI data is currently in the Bureau of Environmental Health’s Toxicology Section, administered by Elke Ursin with a small team of OPS and contractual staff.
Comments	EPA has expressed an interest in using the FLWMI as a model other states could use.

PROJECT DESCRIPTION 3	
Project Title	Continued Monitoring on Passive Nitrogen-Reducing Onsite Systems
Proposed by	Xueqing Gao
Background	Convention onsite sewage treatment and disposal systems (OSTDS) have been shown not very effective in reducing nitrogen loads. Passive nitrogen-reducing OSTDSs identified and tested by the Florida Onsite Sewage Nitrogen Removal Strategy (FOSNRS) study have demonstrated their capability in nitrogen reduction. However, these systems were only monitored for about 18 months during the FOSNRS study. Long-term performance, design issues, maintenance needs, and maintenance and operation costs of these systems need to be tracked periodically.
Objectives and Outcomes	<ol style="list-style-type: none"> 1. Establish long-term performance of the two-stage passive nitrogen removal technology 2. Provide guidance for possible system refinement and future implementation
Research Approach	<ol style="list-style-type: none"> 1. Documenting system performance and issues 2. Document maintenance needs and operation costs 3. Collecting and analyzing water quality samples for nitrogen species concentrations at influent, effluent, and intermediate locations of these systems and evaluate nitrogen removal efficiency 4. Collecting and analyzing water quality samples for other pollutants including 5-day carbonaceous biochemical oxygen demand (cBOD5), total suspended solid (TSS), total phosphorus (TP), and bacteria at influent, effluent, and intermediate locations of these systems and evaluate removal efficiencies for these pollutants. 5. Taking field parameter measurements at above locations wherever possible, including temperature, dissolved oxygen, pH, conductivity, and oxygen reduction potential using YSI multi-parameter probe system.
Potential Collaboration	Consulting Company - Hazen and Sawyer Florida Department of Environmental Protection 319 grant group
Duration	Quarterly sampling for 2 years, totally eight sampling events
Estimated Budget (\$)	\$120,000
Ease of implementation	Intermediate. The major tasks include sampling preparation, sample collection and site monitoring, sample chemical analyses, database development and manipulation, data analyses, and report preparation. A monitoring protocol has been established and tested through two rounds of monitoring.

PROJECT DESCRIPTION 3

Comments

Two rounds of sampling have been conducted for these systems since early 2017. Preliminary results show that some systems keep functioning as they did during the FOSNRS study and provide satisfactory removal efficiency for nitrogen as well as for other pollutants. However, system failures due to change of owners, lack of maintenance, impact from hurricanes, as well as change of treatment media distribution, and decrease in treatment efficiency at some system components for unknown reasons have been observed, suggesting more periodic monitoring on these systems are needed.

The Department has filed an application for 319 grant support. The chance of getting the funding is high. Out of the total estimated cost of \$120,000, the 319 grant will provide \$72,000. Match from the Department fund will be \$48,000.

PROJECT DESCRIPTION 4	
Project Title	Correlations between water quality, OSTDS, and health effects
Proposed by	Eberhard Roeder and revised by D.E. Meeroff
Background	Field studies of OSTDS are site specific, focusing on single OSTDS units. Different approaches can be used to assess broader questions about environmental and public health impacts of OSTDS. A 1999 cohort study on an association of Giardiasis and Shigellosis 1994-1996 with the location of repair permits relative to a cohort of functional (systems without a repair permit) was inconclusive, in part due to small sample sizes. A study in 1999 in Brevard showed bacterial counts in private wells were higher in proximity to septic systems, and higher in wet season compared to dry season. In 2005 several FAMU interns gathered data on the public health effects of OSTDS with a focus on drinking water wells. A review of permitting data in 2004 indicated that, reported failures, as indicated by repair permit issuance, of onsite sewage systems statewide show a seasonal pattern, with a peak during the first quarter of a year. Variations in environmental conditions, system usage, funding or reporting are possible explanations. An MPH-intern project using the first iteration of the inventory and reported disease data remained in draft version and inconclusive. With the new FLWMI-inventory, data on water supply and wastewater disposal are available
Objectives and Outcomes	Perform an analysis using geographic information system (GIS) of any statistically significant correlations between key water quality parameters from private drinking water wells, OSTDS wastewater disposal method, and reported health conditions.
Research Approach	Obtain Institutional Review Board authorization to collect and aggregate health condition data. Gather data on drinking water well water quality parameters, OSTDS geolocations, and reported resident health conditions. Use FLWMI data for water supply/wastewater disposal. Water supply quality data are unlikely to be available statewide. It is recommended to perform a pilot test on one county in Florida. Put into a GIS database / map. Analyze the data to see if any statistically significant correlations exist, accounting for factors such as seasonality, lot size, age of infrastructure. Produce a final report with recommendations.
Potential Collaboration	Environmental Public Health Tracking programs at CDC and DOH may have related databases and project expertise. The Bureau of Water Programs has information on some private wells. Florida Atlantic University has GIS and public health expertise particularly in relation to OSTDS.
Duration	1 year
Estimated Budget (\$)	Depending on the final approach, the scope of the number of wells and OSTDS, access to health data or requires house-to-house surveys and water quality testing, the budget

PROJECT DESCRIPTION 4	
	could be approximately \$5,000 if conducted in house to \$20,000 if contracted out.
Ease of implementation	Medium to high effort depending on if the work will be conducted in house or contracted out. Staff involvement will be considerable in either case for project oversight and Florida OSTDS data gathering.
Comments	

PROJECT DESCRIPTION 5

Project Title	Estimation of failure or non-conformance rates of OSTDS
Proposed by	Eberhard Roeder
Background	<p>While “failing” septic systems are a common colloquial term, it is difficult to put precise meaning or numbers on this. Failing can reach from overflowing sewage continuously or intermittently to systems not meeting current code but past codes.</p> <p>Environmental impacts expected vary by the type of problem and by the number of systems with that problem.</p> <p>Currently the best information the Department has on failure rates is the number of annual repair permits, which are about one to two percent of existing systems. To estimate how many systems are failing at any given time, one approach is the multiplication of this ratio by the number of years of living with a failing system before a repair.</p>
Objectives and Outcomes	For defined types of failure or non-conformance, estimate frequency and duration
Research Approach	<p>Gather case study data that looked at this question in the past (Suwannee inventory, point of sale inspections, maintenance inspection programs, sanitary surveys).</p> <p>Cooperate with septic to sewer conversions to assess pre-existing onsite system conditions</p>
Potential Collaboration	Utilities
Duration	1-year
Estimated Budget (\$)	Depending on amount of field work, 30 k (0.5 years of environmental specialist to assess existing conditions)
Ease of implementation	

PROJECT DESCRIPTION 5

Comments

PROJECT DESCRIPTION 6	
Project Title	Statewide: Community Outreach and Education for OSTDS
Proposed by	Elke Ursin
Background	Community outreach on the non-sewer connection options for nitrogen reduction will be needed as this option becomes necessary under DEP's BMAP's.
Objectives and Outcomes	Targeted messaging for OSTDS nitrogen-reduction options tailored to homeowners, builders, and OSTDS installers.
Research Approach	Develop educational tools and provide education on the use of the tools developed, OSTDS impacts, analysis and modeling of groundwater impacts, proposed and any resulting rule changes, training on how to install and maintain resulting nitrogen reduction system designs, as well as an overall understanding of OSTDS.
Potential Collaboration	Florida Onsite Wastewater Association, DEP, DOH Office of Communications
Duration	Multi-year, with a phased implementation
Estimated Budget (\$)	Depends on scale, could range from \$50,000 to \$200,000
Ease of implementation	Difficult – requires significant staff time
Comments	

PROJECT DESCRIPTION 7	
Project Title	Update DEP Nitrogen Source Inventory Loading Tool (NSILT) for OSTDS
Proposed by	Elke Ursin
Background	DEP's Nitrogen Source Inventory Loading Tool (NSILT) has been used historically to determine the nitrogen contribution from OSTDS in BMAP areas impacted by nutrients from groundwater. Historically they have used a population estimate for the area and a loading number to calculate the load. Tools developed during the Florida Onsite Sewage Nitrogen Reduction Study (FOSNRS) by the Colorado School of Mines as well as others developed by FSU and DEP, could be combined and overlay with the Florida Water Management Inventory (FLWMI) data to create a new parcel-specific method of determining OSTDS nitrogen input to enhance the accuracy of planning efforts.
Objectives and Outcomes	Combine modeling efforts with the FLWMI to update the NSILT OSTDS calculations.
Research Approach	Tools available to help determine nitrogen loading from OSTDS include the Department's Florida Water Management Inventory, a parcel-based map showing the drinking water source and wastewater treatment method for every built property in the state; and the nitrogen fate and transport model developed as a part of the FOSNRS project. These tools can be used in the BMAP process to further refine nitrogen loading estimates to impaired waters. Specifically, to update the input numbers used in the DEP Nitrogen Source Inventory Loading Tool (NSILT)
Potential Collaboration	DEP, Water Management Districts
Duration	Multi-year?
Estimated Budget (\$)	Depends on scale, could be done in-house with staff time for relatively low cost or contract out (?\$100,000?)
Ease of implementation	Depends on strategy chosen

PROJECT DESCRIPTION 7

Comments

PROJECT DESCRIPTION 8	
Project Title	Validation and Calibration of Transport Models of Nitrogen from OSTDS
Proposed by	Eberhard Roeder
Background	Several vadose zone and groundwater models have been developed over the last several years (STUMOD-FL; ArcNLET). Results from STUMOD-FL have been corroborated with datasets from the USF-lysimeter station and a large drainfield as part of FOSNRS. ArcNLET has been mainly applied at the subdivision scale. Limited experience is available to judge how representative model results are when used for prediction. More information is also needed to guide the modeler in parameter selection.
Objectives and Outcomes	Apply the model to several onsite sewage plume case studies in which the modeling assumptions should be applicable. Calibration efforts will show: <ul style="list-style-type: none"> -a quantitative representation of the fate of nitrogen -parameter values that allow matching of plume concentrations -shortcomings in the conceptual model
Research Approach	Gather plume data Process into datasets that can be used for calibration Apply models, first with default assumptions, then calibrate Evaluate model fit, sensitivity
Potential Collaboration	Model developers, University students, FDEP, water management districts
Duration	1 year
Estimated Budget (\$)	Depends on the number of case studies, and to which extent effort can be done in-house; 30k
Ease of implementation	Finding complete plume data sets suitable for modeling is rare. This will take some work. Cooperation from the model developers will be useful, in particular if the work discovers bugs or needed changes to the conceptual model.

PROJECT DESCRIPTION 8

Comments

Depending on the success of the calibration with “good” data sets, the models could in a later phase be used to understand studies with less complete data sets.