

Follow-up Report to the Wakulla Spring Restoration Workshop

Held at the Antique Car Museum, Tallahassee

February 25 and 26, 2009

Objectives

- **To develop solutions to restore the health of Wakulla Spring by reducing pollutants in the groundwater.**
- **To bring local governments together to discuss and commit to exploring solutions and finding opportunities to reduce wastewater impacts.**

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E. Workshop Agenda

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Wakulla Springshed Regional Partnership Memorandum of Understanding

WHEREAS, the Wakulla Springshed is a rich and bountiful ground water system that supplies drinking water to the region;

WHEREAS, the Wakulla Springshed contains unique ecosystems that are dependent upon sustaining a natural balance of dissolved chemicals in both the ground and surface water (nutrients in particular);

WHEREAS, the Wakulla Springshed provides sustained economic benefits to the region through human enjoyment of the natural springs and spring fed river that issue forth to the surface from this precious ground water system;

WHEREAS, the Wakulla Springshed includes natural wonders such as Wakulla Springs, the Leon Sinks Cave System and a vast network of navigable underwater caves unsurpassed in the United States;

WHEREAS, the Wakulla Springshed exhibits porous and rapid surface-to-ground water drainage south of the Cody Scarp and direct conduits to the ground water through surface drainage to lakes north of the Scarp;

WHEREAS, the Wakulla Springshed is easily polluted by land use changes and the associated human activities including wastewater disposal, stormwater management and fertilization practices that alter the natural balance of chemicals in the surface and ground waters;

WHEREAS, the degradation of water quality in the Wakulla Springshed has been documented to include increasing levels of nutrients and increasing algal and aquatic plant growth;

WHEREAS, this degradation of water quality in the Wakulla Springshed has been of concern for some time, and has been documented in numerous reports, including the May 2005 Peer Review Committee report on the workshop entitled, "Solving Water Pollution Problems in the Wakulla Springshed of North Florida";

WHEREAS, at the April 2008 meeting of affected local governments and interests the parties continued to express concern about pollution problems in the springshed and the stated need to consider joint efforts and solutions;

WHEREAS, it is in the best interest of Wakulla County, Leon County and the City of Tallahassee to protect our shared regional Wakulla Springshed water resources;

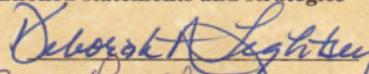
Therefore we agree to participate in the following inter-local efforts:

- To work cooperatively to investigate and consider methods to limit nutrient pollution inputs to surface and ground waters within the Wakulla Springshed;
- To work cooperatively to investigate and consider methods to lessen pollution inputs from both existing and new wastewater disposal systems;
- To work cooperatively to investigate and consider methods to explore the development of either a common regional entity or coordinated and consistently structured local entities to address management of the numerous septic systems in our area;
- To work cooperatively to identify and deploy the stormwater collections, management systems, and best management practices that reduce the generation of pollutants that enter stormwater.
- To allocate staff to jointly review and consider the recommendations derived from the February 25-26, 2009 Wakulla Springs Restoration Workshop and return with recommendations on appropriate follow-up actions by each respective government; and,
- To build upon the recommendations derived from the February 25-26, 2009 Wakulla Springs Restoration Workshop and jointly pursue regional, state and federal funding opportunities to further these recommendations.

I agree to the aforementioned statements and strategies

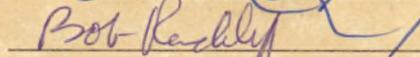
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City of Tallahassee



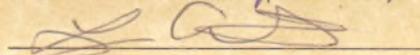
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Leon County



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Wakulla County



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Glossary

Black and Gold - a septic system drain field addition that removes substantial nitrate – under study not ready for market.

BMAP - Basin Management Action Plan – The implementation aspect of the Clean Water Act's total maximum daily load process.

GUA - Governmental Utility Authority which are authorized to be created under Section 163.01(7)(g)1, Florida Statutes

LDRs – Land Development Regulations

LID – Low impact development

O&M – Operation and maintenance

OSTDS – On site treatment and disposal system

PBS or PBTS – Performance-based system or Performance-based treatment system

RME - Responsible/Regional Management Entity – essentially a utility unit – in this report, one formed to manage the dispersed number of septic systems within the Wakulla Springshed or some portion thereof. Can be single or multijurisdictional in nature, addressing septic systems problems in a holistic fashion in the Springshed. Can do problems solving work itself and/or contract with private vendors to perform actions.

TMDL – Total Maximum Daily Load

WWTF – Wastewater Treatment facility

A. Background and Summary

On February 25th and 26th of 2009 a workshop was held in Tallahassee addressing measures to be explored and taken to help restore the Wakulla Spring watershed to a condition of ecological health and stability. This workshop was a follow-up to one held in May of 2005 which resulted in six important recommendations being offered:

Recommendation 1 - Goal of Wastewater Disposal Activities

A primary goal of all wastewater disposal activities in Leon and Wakulla Counties should be to reduce nutrient loading (nitrogen and phosphorus) to the aquifer.

Recommendation 2 - Wastewater Utility

A wastewater utility should be established and charged with improving the operation of all onsite sewage treatment and disposal systems (OSTDSs or septic systems), in accordance with the goal stated in Recommendation 1.

Recommendation 3 - Regulate Fertilizers

The amounts and types of fertilizer used in the catchment basin of Wakulla Springs should be limited and regulated through a combination of public education and targeted ordinances.

Recommendation 4 - Expedite the Total Maximum Daily Load Process

The Florida Department of Environmental Protection should expedite the establishment of total maximum daily loads and pollutant load reduction goals for Wakulla Springs and River.

Recommendation 5 - Hydrologic Observatory

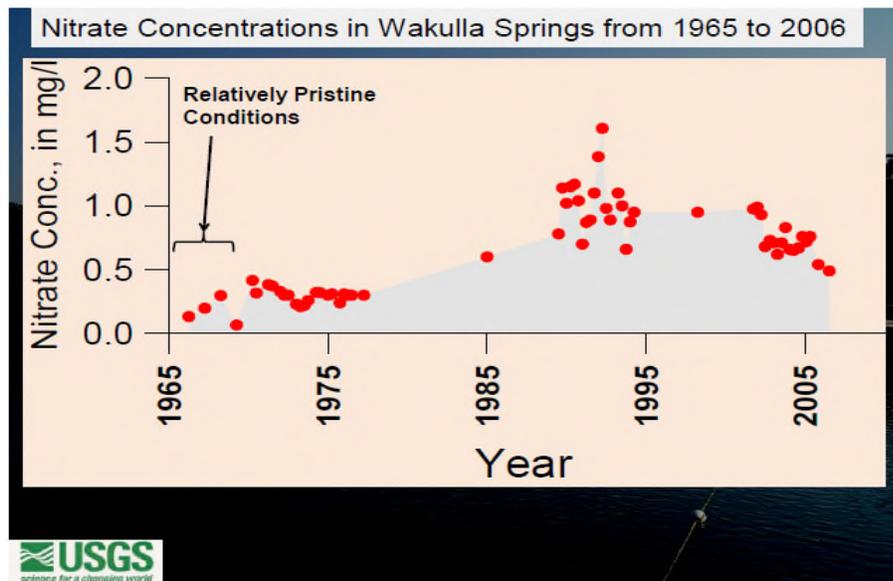
A Hydrologic Observatory should be established and charged with coordinating and facilitating research activities into a number of issues related to the health of Wakulla Springs and River.

Recommendation 6 - Public Education

A concerted, prolonged and properly funded effort should be made to educate the public on the importance of the previous recommendations to the long-term health of Wakulla Springs and its ecosystems.”

Over the intervening years since the 2005 workshop, significant progress has been made toward taking the steps that can reduce the nutrient ecological stressors (see the graph of Nitrate concentrations in Wakulla Spring from 1965 to the present below). This recent 2009 workshop provided an opportunity:

- To report on the studies and science that is now available to better understand the problems and guide future efforts;
- For major players within the springshed to update other involved stakeholders on actions they have been pursuing to restore Wakulla Spring; and,
- For recommended restoration actions steps to be revisited and updated where necessary.



Major Recommendations from the February 2009 Wakulla Workshop

A. Land Use Session & General Recommendations

1. Reduce nutrient loading throughout the springshed and continue to support more research, especially down-gradient, and work cooperatively with the developing FDEP Total Maximum Daily Load (TMDL) determination and the associated Basin Management Action Plan (BMAP) that is intended to work with pollution sources on agreed upon reduction actions.
2. Incorporate Low Impact Development (LID) development and stormwater management options into the local regulatory framework. The use of LID can help to reduce the volume and load of the stormwater entering the surface and groundwater system. Use of LID is especially important below the Cody Scarp where traditional stormwater design and management often leads to failure of the larger treatment systems and contamination of the aquifer.
3. Pursue management of fertilizers within the springshed such as management of fertilizer content (lower nitrogen) and application rates in the protection zone, if not countywide. The suggestion was that turf nutrient requirements should be regional.
4. Opinions varied as whether to sewer or not the Woodville Rural Community. The question of whether to establish central sewer as the preferred method of sewage treatment in the protection zone within the Woodville Rural Community and the USA, and alter policies to enhance requirements for connection to central sewer was highlighted, but not resolved. Additional future work is needed to further this issue. Management of land use density through regulation, density transfers and sewer infrastructure limitations must be considered and balanced within the designated springs protection zones (Leon and Wakulla). Cross-county cooperative arrangements may be possible (The Woodville area and northeast Wakulla area).
5. It was suggested that the City and County together seek and select a second major sprayfield site in preparation for regional growth and the next permitting cycle.

B. Septic Tank & Septic System Management Sessions

1. Septic system management - The next big step that is needed.

Pursue a feasibility study for a Responsible Management Entity (RME) and supporting fee structure to ensure all existing traditional OSTDS and new PBTS function effectively.

- Have the study investigate RME establishment from a regional or at least a County-wide perspective, and if possible work with the City and Wakulla County to create one RME - or at least well-coordinated separate jurisdictional entities. At an April 28th follow-up meeting to the February Wakulla Workshop, Leon and Wakulla County with City of Tallahassee representatives agreed on a proposal to pursue a first phase of a feasibility study for management options for septic tanks and funding. Through a feasibility study the details can be established and costed regarding proposed staffing needs for envisioned RME operations (Inclusive of operations, maintenance and monitoring needs).
- An inventory data base of septic system within the springshed is needed (Leon and Wakulla Counties). Data should also be developed on the condition and functioning of existing in-the-ground systems.

2. Within the spring protection zones, require nitrate removing performance based septic systems for new development or retrofitted existing failed systems when sewer is not available (or consider requiring an equivalent nitrate reducing approach – Cluster systems with package treatment of effluent, use of “Black & Gold” media as a nitrate reducing mechanism below retrofitted or new drainfields, etc.).

3. Public outreach and education is a critical component in achieving success. Pursue public education regarding septic systems and the nutrient impacts to the groundwater resulting from the common/existing septic system design as compared to available and developing options. This should include increased public review and reporting - by government(s), by the media, and by those doing formal research. Important is the fact that existing septic system do not treat for nitrates and this pollutant readily moves into the groundwater and to the springs and runs. It's a cumulative problem resulting from many individual septic systems not designed to handle the problem and often derelict or failing.

More Detailed Report

B. Summarized Closing Thoughts, Suggestions and Recommendations Resulting From the Specific Sessions

Land Use Session - Moderator, Wendy Grey-

Water quality protection

- Land use based on environmental features and community needs
- Education
- Incorporate LID into regulatory framework

Wastewater Session, Moderator, John Buss

Winston Churchill - *"Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning."*

- More down gradient monitoring is needed
- Reduce hydraulic loading. For example consider a possible Wakulla/Leon joint sprayfield
- Increase public reporting (status on sprayfield and septic systems)
- Formal integrative planning with land use
- Cost effective that is protective
- Consider staffing needs for Operation & Maintenance
- All WWTF should report Nitrogen and Phosphorus
- Turf nutrient requirements should be regional
- Reuse suppliers should educate users and provide a nutrient management plan

Septic Tanks Session - Moderator, Scott Henderson

- Consider Springshed cost-sharing (nitrogen discharge fee)
- Inventory data base is needed
- Maintenance of all septic systems is essential
- Recommend monitoring performance of septic systems (PBS)
- Leon County should adopt ordinance to require nutrient removal septic systems (PBS)
- Establish and Responsible/Regional Management Entity (RME) in the Springshed
- Recommend no central sewer to Woodville

Septic Tank Management Session - Moderator, Julie Harrington

Quote: *"Think outside the tank"*

- Inventory of septic systems (with actual numbers).
- Identify the unmaintained systems first.
- Determination of nitrogen removal for each lot to establish a target for the system and capital improvement goal.
- Coordination of water management strategies throughout the watershed.
- Septic systems should be centrally managed.
- Public outreach and education is a critical component in achieving success.
- Financing options for homeowners (grants, low interest loans, etc) need to be readily available.
- Some options:
 - Establish a sustainable user charge system for system repairs (O&M) and to extend life of system.
 - Health Department management

- Establish a GUA/RME
- Be creative and innovative in management solutions “think outside the tank”.
- Engage in spirit of cooperation to establish sustainable, cost effective and equitable solutions to septic systems management.

Final Discussion and Action Step Suggestions (All Participants)

- Septic System failure rates will decrease with management
- Monitor progress of current studies: Black and Gold (a septic system drain field addition that removes substantial nitrate), passive nutrient removal, PBS performance
- Clustering options for alternative systems approaches - need DEP input and guidance
- GUA - how to guarantee funding (need insurance)
- Solutions are incremental
- Officials need alternatives and costs (i.e. feasibility study)
- Consider how the ordinance (RME) could be written to encourage repair (other than enforcement)
- Need a facility plan for addressing sewage disposal within the springshed
- Accelerate Basin Management Action Planning (BMAP) within the Springshed as a part of the FDEP pollution control total maximum daily load (TMDL) calculations.
- Outline a work plan—Friends of Wakulla offer to facilitate a meeting

C. Individual Panelist Presentation Points & Thoughts (Where offered)

1. Dr. Kincaid

- Base delineation of aquifer vulnerability on the confining unit layer
- Minimize septic systems as an uncontrollable pollution
- Consider stormwater treatment at/near swallets
- Continue hydrologic data collection
- Consider buffer zones around conduits (where flow in the aquifer is dominant and rapid)—vulnerability increases with proximity to conduits

2. Hal Davis, USGS - Information gaps

- Delineate the full extent of the higher nitrate concentrations in the ground water above the Cody Scarp.
- Determine the sources and migration pathways to the Upper Floridan of nitrate above the Cody Scarp.
- Determine nitrate travel time and attenuation rates through the sand/silt/.

3. Dr. Brian Katz, USGS - Information gaps

- Evaluate conventional septic tank loading in higher density areas, and also characterize fertilizer use in these areas.
- Evaluate effectiveness of advanced treatment systems in reducing nitrate loading to ground water—Katz noted some studies have shown mixed results.
- Assess N, P, C cycling in Wakulla Springs and ground-water system especially during high-flow periods. Influx of organic carbon may stimulate denitrification.

4. Jan Mandrup-Poulsen, FDEP

- Develop nutrient criteria.
- Continue to move ahead with Total Maximum Daily Load (TMDL).
- Have an implementation plan with the Basin Management Action Plan (BMAP).

5. Wayne Tedder - Director, Tallahassee-Leon County Planning Department - Inside the Primary Springs Protection Zone

- Establish central sewer as the preferred method of sewage treatment in the protection zone, within the Woodville Rural Community and the USA, and alter policies to enhance requirements for connection to central sewer.
- Require performance based septic systems when sewer is not available.
- Designate or institute a Responsible Management Entity and supporting fee structure to ensure that all systems function effectively.
- Require the use of Low Impact Development land planning and engineering design.
- Develop a Transfer of Development Units system that caps the number of units allowed inside the protection zone based on the current densities allowed on the Future Land Use Map (excluding areas inside the USA) and allows those units to be transferred from sensitive areas to the Woodville Rural Community.
- In areas designated Urban Fringe inside the protection zone, permit only 1 dwelling unit per 3 acres or Conservation Subdivisions.
- Set fertilizer content and application rates in the protection zone.
- Make protection of environmentally sensitive features in the protection zone a priority for local government.

6. Ms. Lindsay Stevens, Wakulla County Administrator

Possible Changes to the Comprehensive Plan resulting from the 2009 Evaluation and Appraisal Report Amendments:

- Wakulla Springs Special Planning Area
- Evaluate creation of a TDR program
- Identify sending and receiving areas

Water Management Conservation Plan -Conservation Element

- Framework for Countywide Greenprint
- Possible acquisition list, or support state programs
- Recreation and Open Space Element
- Adopt recreational surface water use policies
- Coastal Management Element
- Incorporate Florida Yards and Neighborhoods, focus on fertilizer

Future Wakulla County Protection Measures & Possible changes to the Land Development Code Updates, anticipated 2010

- Refine Springs Special Planning Area Requirements
- Implement TDRS, if included in the Comprehensive Plan
- Identify sending and receiving areas
- Conform to NFWMD ERP requirements
- Incorporate BMPs for Landscaping
- Florida Yards and Neighborhoods, focus on fertilizer
- Incorporate Low Impact Development (LID)

- Stormwater Master Plan of County
- Identified nodes within the County
- FSU/DEP Study Implementation
- Partnerships

7. Eric Livingston - Department of Environmental Protection

- Restoring Wakulla Springs and river requires all Pointless Personal Pollution sources to be reduced.
- Prevention is always easier and cheaper than restoration. In particular, urban PPP problems start with land use decisions and designs and can be better managed by decisions to employ Low Impact Design practices.
- Local governments need to allow use of LID best management practices by putting them specifically into their Land Development Regulations (LDRs).

8. Jorge Gonzalez, St Joe Company (Speaking of the site of the proposed Southside DRI that is just off the Cody Scarp, within an area of varying degrees of Karst sensitivity)

- Develop a decentralized/distributive approach to stormwater management
- Try not to use large, central or deep ponds
- Use a higher number of smaller and shallower ponds
- Mimic the existing natural hydrology; treat and attenuate stormwater closer to the source; do not convey stormwater across long distances.
- Minimize development on the southern portion of project appropriate to the property and the Southside DRI
- Develop and use BMP's that focus on the operational/public awareness components such as University of Florida's Florida Yards and Neighborhoods Program; Fertilization Use; Public Awareness/Education; Other Low Impact Development (LID) Approaches (i.e. when appropriate, use of swales for stormwater treatment)
- Select BMPs appropriate to the site and land use – BMPs which work under the specific site and land use scenario.

8. Bob Routa suggested the need for government to partner with the development community.

9. Jack Leppert - Friends of Wakulla Spring

- More down-gradient research, scientifically designed, adequately funded, and useful to the city, the public, DEP and all others participating in and monitoring these landmark efforts. Periodic as well as event triggered measures from “downstream” chemical, biological and hydrological variables would be exceedingly helpful to researchers, the public, and communities worldwide.
- Reduced loading - That there be a long term commitment to reduce weekly discharge amounts at the current Southeast Sprayfield below the maximum 3.2 inch rule standard (and lesser during periods of heavy rainfall) and that the City and County together seek and select a second major sprayfield site in preparation for regional growth and the next permitting cycle.
- Increased public review and reporting - by the city, by the media, by those doing formal research, and by independent evaluators of this landmark series of events. These efforts could include a monitoring and review of project progress and difficulties, of the emerging worldwide and local research, and of the oversight of each of the provisions of the permit and of the settlement agreement.
- Septic system management - The next big step that is needed.

10. Sharon Sawicki – FDEP Conduct integrated planning up-front

- Think about what the community is going to look like 50 years from now and plan accordingly.
- Identify and implement management strategies that are the most cost effective and protective of the environment.
- When BAT and AWT package plants are the best management option, ensure they will be properly managed, operated, and maintained.

11. Erich Marzolf - St Johns River Water Management District

- Utilities, express the nutrient contribution their customers receive in terms of a fertilizer addition, and then implement an offset program.
- Irrigators, be careful with overspray (design & maintenance), especially in areas with large edge/area ratios or next to impervious surfaces (e.g. road medians).
- Support research to understand relationship between nutrient inputs, uptake and runoff for various plants, soils, seasons, etc.
- Continue to share your experiences, many areas of Florida are moving ahead with reuse focused only on water. Nutrients are important also.

12. Eberhard Roeder - Department of Health

- Springshed-wide management and cost sharing to identify and provide incentives for equitable and cost-effective nitrogen reduction.
- Nitrogen discharge fee (e.g., Chesapeake Bay Restoration Fund).
- Grant/loan program for wastewater treatment upgrades in priority areas.
- Inventory and track condition of existing onsite systems.

13. Jeff Chanton - Florida State University - Conclusions

- There is a direct connection between the surficial aquifer and Wakulla Springs.
- There is little evidence for nitrate attenuation in the limestone aquifer along that pathway. In the limestone aquifer—it is aerobic. No nitrate or phosphorus is attenuated in the aquifer.

14. Anthony Gaudio - Florida Onsite Wastewater Association

- That Leon County adopt a new Nitrogen reducing Onsite System Ordinance
- That a local county or regional RME be set up to manage all onsite systems in the Wakulla Springs basin, including all of Leon and Wakulla Counties.
- No sewer to Woodville. The net effect of running sewer to Woodville will be increased density which will increase the nutrient load to the spring and only replace a small number of existing septic systems, while increasing the number of new homes and commercial development.

15. Pad Juarez - Wakulla County Health Department

- Inventory is needed
- On going maintenance of PBTS is not a problem as it is a requirement of their permit.
- Currently there are no funds to help economically disadvantaged people.
- Give Wakulla County Health Department the authority to implement the last provision of the Wakulla County ordinance and we will set up a fund and evaluate all the systems in Wakulla County for a inexpensive amount of money to the home owners.

16. Pio Lombardo, P.E. - Lombardo Associates, Inc.

Closing Thoughts

“Conventional septic systems will not get you to where you want to be—they got you to where you are”

- Does not support NSF Standard 245 for certifying nitrogen removing technologies,
- A level 5 RME does not need a minimum of 50,000 existing septic systems to be viable – less is OK
- Look at costs per pound/day Nitrogen removal
- Look at Performance-Based Systems by sorting by capital cost, denitrification rate, electric and other operating/maintenance/repair/replacement costs (cost being first)
- Costs to consider for RME: Annual O&M: - administration, septage disposal, operation, maintenance, monitoring, annual debt servicing, * User charges when they include capital costs of repair and replacement (important)... can consider delaying replacement funding of depreciation account (i.e. sinking fund) in early years-then add on.

Recommendations

- Pursue Stimulus & SRF Funding
 - 20% Set-aside for Innovative Projects –must apply by June and be “shovel ready” within 12 months.
 - Address Affordability for Low Income Families
 - Grants exist for this purpose
 - “Lifeline ” Rates can be established –similar to electric rates
 - Allow User Fees to accumulate until property sold.
 - Property value increase should be greater than cost of improvements
 - Consider use of cluster systems (mini-sewers) for higher density areas
- Focus on:
- Innovation that provide or hold promise for cost savings
 - Risk Management not risk avoidance
 - Least Life Cycle Cost Options
 - Systems that are simple to operate and maintain with little homeowner participation
- Consider Private Public Partnerships
 - Hold system providers accountable for nitrogen removal claims and system performance
 - Buy performance not products
 - Review Performance in US EPA and State Field Evaluations such as:
 - LaPine, OR
 - Barnstable County, MA (Cape Cod)
 - New Jersey Pinelands
 - Montana

17. Kevin White Ph.D., Chairman of the Department of Civil Engineering at the University of South Alabama

- Best management is a Wastewater Utility (Level 5)
- Can be used to coordinate water mgmt strategies throughout springshed
- Smaller scale wastewater management

- Lesser infrastructure and cost
- Protects public health & the environment
- Can enhance property values and livability
- Follows “smart growth” ideals
- Integrate into your overall Water Management System
- Must do a life cycle analysis (20-30 yrs) with cost analysis
- Consider decentralized wastewater centrally managed

18. Ron Piasecki, President, Friends of Wakulla Spring

- Public should be educated and involved in wastewater management decision making processes and include homeowners, public officials, developers and real estate professionals, scientists, and the business community.
- Centralized management by the Wakulla County Health Department.
- Annual assessments for all septic systems in the county. (Lower fees for standard septic systems.)
- Wakulla County Health Department should be responsible for the following:
- Maintaining data base of all systems in the county.
- Annual inspections of all septic systems.
- Contracting with local contractors for pump outs and for maintenance contracts for Performance Based Septic Systems.
- Permitting of repair and new systems.
- Recommending policy changes to Board of County Commissioners (BOCC).
- Recommending annual fees- it might compel users to comply if there were billing options

Major Points

- Should be a centralized management system under County Health Department.
- Strong requirement for public involvement and education.
- Property rights of homeowners need to be discussed with homeowners.
- State funds acquired for grants or low interest loans for homeowners.

19. Bob Sheets, CEO of Government Services Group

- Determine role and members of entity
- Determine governance alternatives
- Develop funding alternatives based on different levels of service
- Draft Interlocal Agreement
- Begin with realistic goals
- Show benefits and cost of program vs. cost of doing nothing
- Unpermitted systems
- System failures that go unnoticed
- Form Working Group from affected Government, Industry and Citizens
- Give Group clear objectives and timeframe

D. More Detailed Workshop Sessions Summaries (Sections I-VI Below)

The workshop began with Charles Pattison, President of 1000 Friends of Florida welcoming participants and providing a brief synopsis on the program hoped to be accomplished. Mr. Pattison then introduced a commissioner from each of the sponsoring affected local governments: Commissioner Debbie Lightsey, City of Tallahassee; Commissioner Bryan Desloge, Leon County; and, Commissioner Howard Kessler, Wakulla County.

- City Commissioner Lightsey spoke of crafting a partnership, and the long-term agreement to move forward with an action plan for the future that would guide restoration of a healthy, beautiful Wakulla Springs.
- County Commissioner Desloge spoke of the fact that we want to keep Wakulla Springs to enjoy for generations to come and recognized the fact that this natural resource makes Tallahassee and Leon County unique from other areas.
- County Commissioner Kessler reminded us that this workshop will bring us closer to identifying solutions for improving and protecting Wakulla Spring and recognizes the spirit and importance of regionalism in our efforts to protect water resources. He highlighted that Wakulla Spring is a global treasure. Kessler noted he was proud that Wakulla County was one of the first local governments in Florida to pass an ordinance for performance based septic systems (PBS).

I. Science Overview

Workshop participants were updated on the past and more recent developments in information we have available to understand the Wakulla Springshed by three scientists researchers, that each have long been involved in studying this natural system.

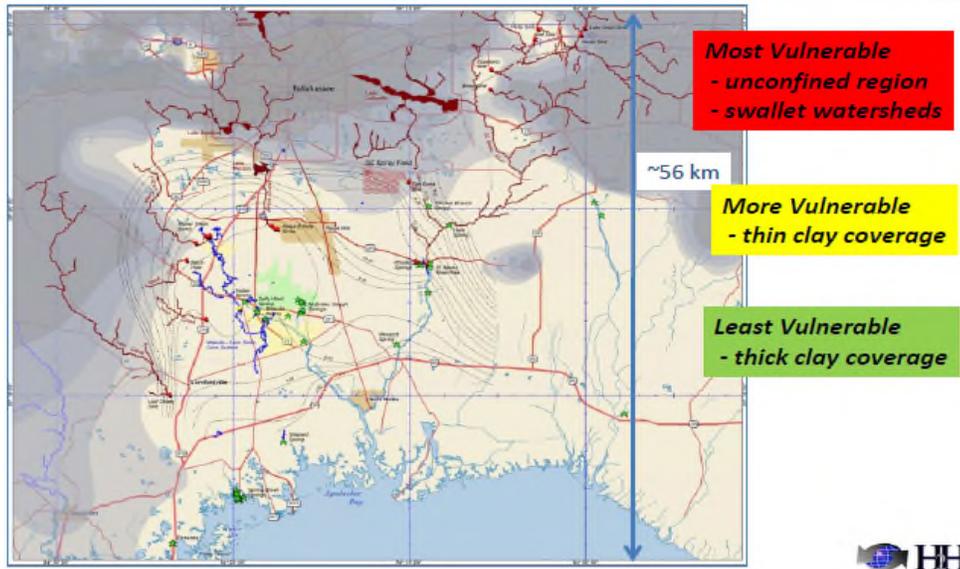
Dr. Todd Kincaid of H2H Associates - Presented on “*Controls on Aquifer Vulnerability in the Wakulla Springshed*”. Dr. Kincaid noted the most significant variable in aquifer vulnerability determination is recharge and that the travel time of pollutants through the system is short (see graphic below). Kincaid summarized:

- The Springshed aquifer is highly vulnerable to contamination from surface.
- Most critical aspect of aquifer vulnerability is distribution and thickness of clay confining layer.
- Most vulnerable region is unconfined section close to mapped or traced conduits.
- Swallet watersheds also vulnerable because surficial groundwater flow will be to streams that drain to swallets.
- Regions outside of swallet watersheds and underlain by thick clay are least vulnerable.
- Minimize potential contaminants in unconfined region.
- Consider stormwater treatment prior to swallet recharge.

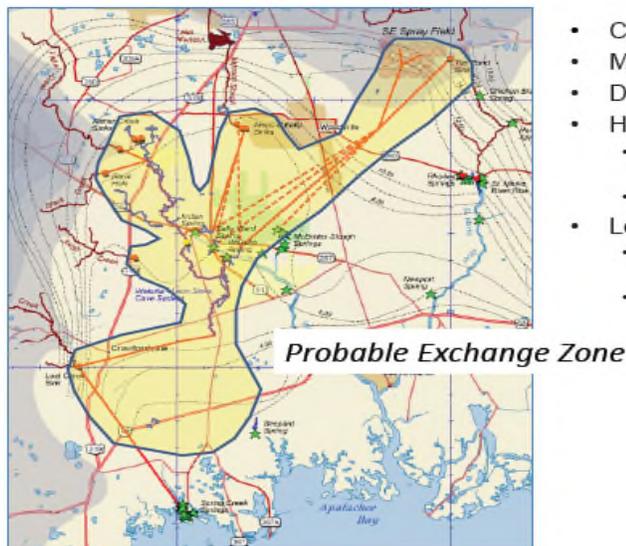
Recommendations

- Base delineation of aquifer vulnerability on the confining unit layer
- Minimize septic systems as an uncontrollable pollution
- Consider stormwater treatment at/near swallets
- Continue hydrologic data collection
- Consider buffer zones around conduits (where flow in the aquifer is dominant and rapid)—vulnerability increases with proximity to conduits

Vulnerability Areas



Probable Transport Times



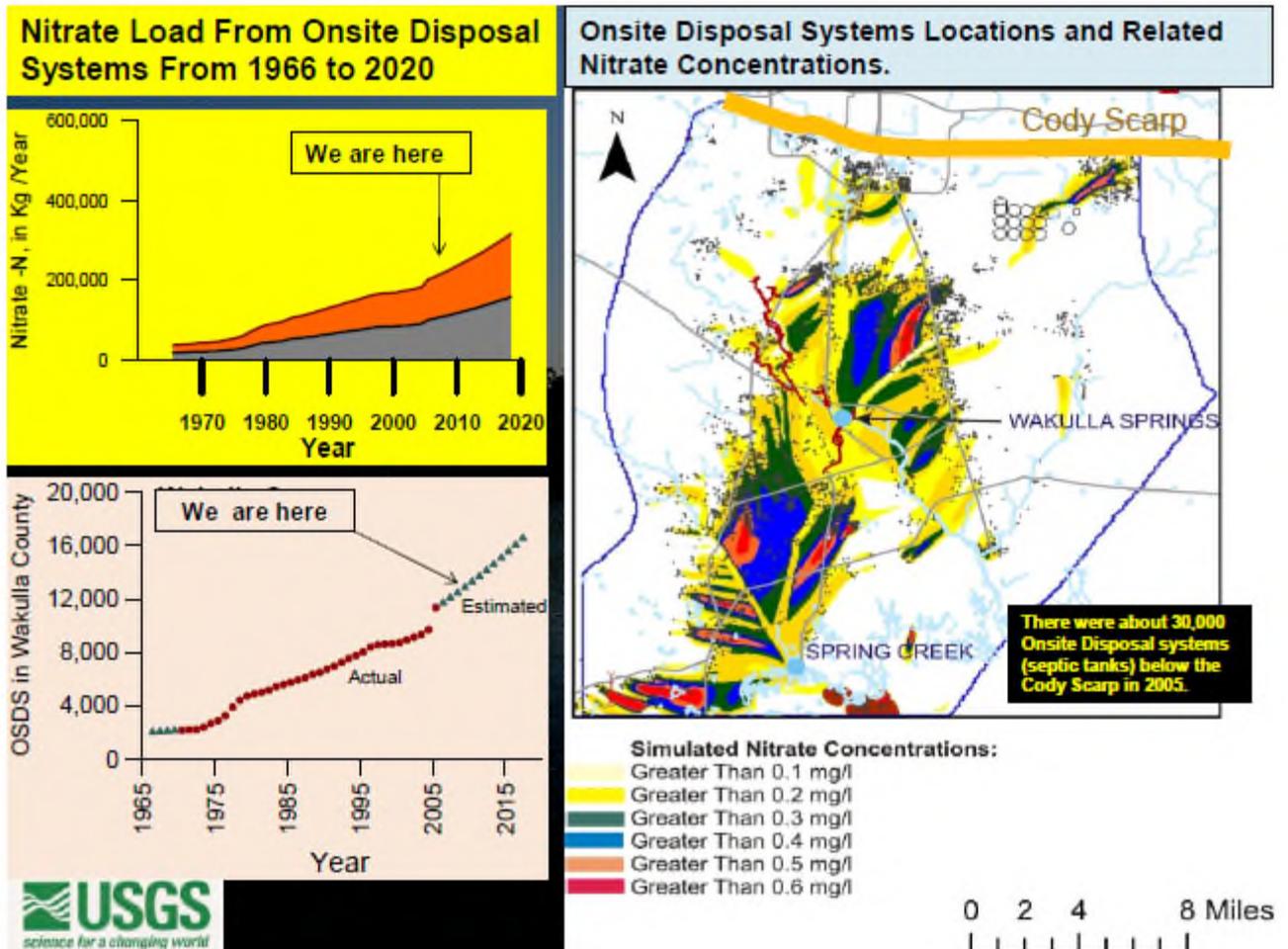
- Conduits: 800 – 7000 ft/day
- Matrix flow to nearest conduits
- Driven by rainfall
- High rainfall
 - Conduit flow dominated by swallet recharge
 - Matrix flow slows or stops
- Low rainfall
 - Conduit flow dominated by groundwater
 - Matrix flow increases

Hal Davis of the United States Geologic Survey - Reported on the, “Sources of Nitrate in the Wakulla Springshed.”

Principle sources were identified as:

- 1) City central sewer treatment and disposal system Southeast and Southwest Farm Sprayfields components. (Noted that improvements to the City’s treatment plants and sprayfields are underway)
- 2) Onsite Disposal Systems (Septic Tanks)
- 3) Fertilizer

- 4) Surface Water Runoff
- 5) Livestock
- 6) Atmospheric Deposition (essentially a natural source)



Information gaps that exist where additional future efforts can be directed

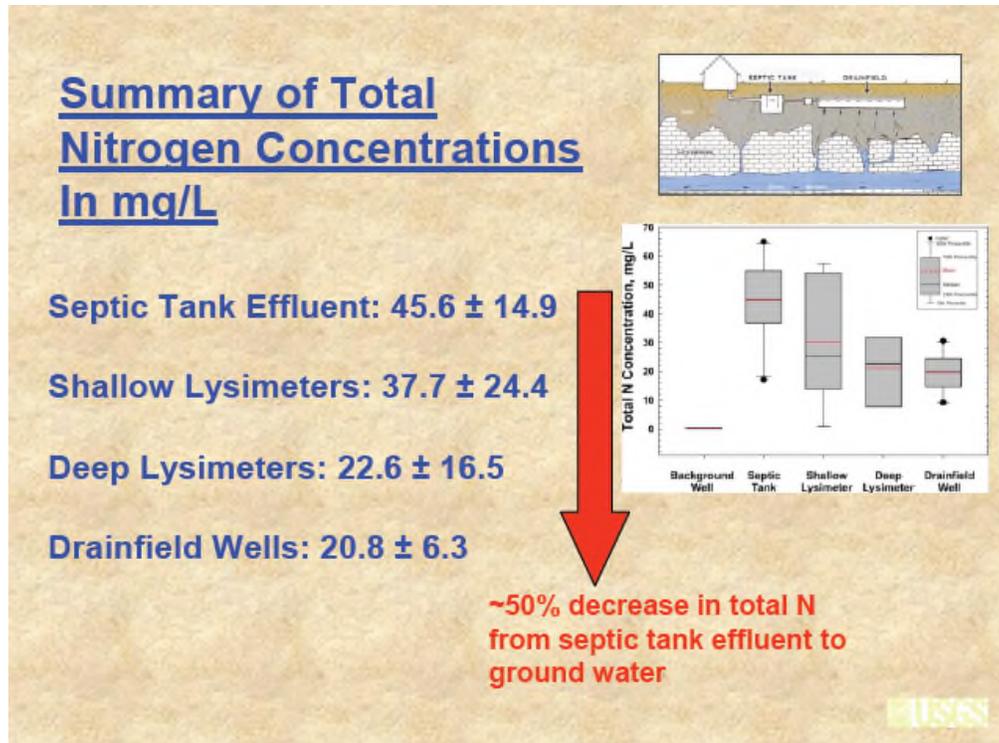
- 1) Delineate the full extent of the higher nitrate concentrations in the ground water above the Cody Scarp.
- 2) Determine the sources and migration pathways to the Upper Floridan of nitrate above the Cody Scarp.
- 3) Determine nitrate travel time and attenuation rates through the sand/silt/.

Dr. Brian Katz also from the USGS - Reported on a recent study, “Nutrients, Organic Wastewater Compounds, Pharmaceuticals, and Microorganisms Beneath Septic Tank Drainfields in the Woodville Karst Plain, Florida” authored by B.G. Katz, D.W. Griffin1, P.B. McMahon1, R.W. Hicks, E.Wade, H.S. Harden and J.P. Chanton.

The study summary and conclusions:

- Occasional detects of viruses and low concentrations of pharmaceutical compounds were found in soil pore water and ground water beneath the 3 septic tank drainfields.

- Annually about 4 to 20 kg of nitrate-N per household enters the ground-water system from septic tanks.
- High variability in nitrogen concentrations and nitrogen loading to ground water among the septic tank sites is related to differences in soil characteristics, water use, fertilizer use, and products consumed by each household.
- Potential loading throughout the karst plain is 82,000-400,000kg nitrate-N per year from conventional systems.
- Or 28,000-120,000kg nitrate-N per year from advanced treatment systems.



Information gaps that exist where additional future efforts need to be placed

- Evaluate conventional septic tank loading in higher density areas, and also characterize fertilizer use in these areas.
- Evaluate effectiveness of advanced treatment systems in reducing nitrate loading to ground water –Katz noted some studies have shown mixed results.
- Assess N, P, C cycling in Wakulla Springs and ground-water system especially during high-flow periods. Influx of organic carbon may stimulate denitrification.

Science Session Audience Comments/Questions

- Could the higher NO_3 concentration found north of the City be related to older sewers failing (exfiltration)? And the response was that, no—sewers monitored on regular basis and during public works projects--the problem is more infiltration where stormwater gets into sewers and overloads wastewater treatment facilities (WWTF).
- Can the fertilizer signature convert to look like septic nitrogen signature? And the response was that possibly this can happen.

II. DEP Regulatory Update

Jan Mandrup-Poulsen from Florida Department of Environmental Protection - FDEP Regulatory Update, entitled, “*Wakulla Spring TMDL & Proposed Nitrate Standard for Springs*”. The Department is moving forward to develop what is know as the Total Maximum Daily Load (or TMDL) for the Wakulla Spring and River. As indicated below, the run of the Wakulla River failed five biological impairment tests, as indicated by the Stream Condition Index (SCI) for ecological community impairment linked to excess nutrients (nitrate in particular).

**Wakulla River –
Impairment Listing Summary**

Basin	WBID	Parameter Identified as Causing Impairment	Concentration Causing Impairment	Year to Conduct TMDL	Comments
St Marks & Ochlockonee	1005	Biology	Median TN=0.56 mg/L; Median TP=0.025 mg/L	2009	Failed 5 SCI Studies, linked to nutrients

Group 1 Waterbody

Summary points for the basin are:

- Lab studies demonstrated nitrate-nitrite was primary factor causing elevated growth at levels above 0.230 to 0.263 mg/L – But don’t know growth level resulting in impairment.
- Independent field studies showed imbalances occur at 0.441 to 0.454 mg/L nitrate-nitrate – but, need to set criterion below these levels to prevent imbalance from occurring.
- Proposed criterion (0.35 mg/L) combines both lines of evidence and provides a margin of safety below levels demonstrating imbalance –Monthly average will be used for compliance purposes
- However, there is still some uncertainty about level of impact at concentrations up to upper 95th percent confidence interval, thus the Department is considering a two-tiered criterion approach. Specifically, when testing of the waterbody indicates nitrate levels greater than 0.35 mg/liter of nitrate and no other ecological lines of evidence are available, the waterbody will be placed on the Department’s Planning List for further study. However, if the data indicate concentrations greater than 0.6mg/liter of nitrate or there are existing lines of evidence showing of ecological impairment (e.g., based on nuisance conditions or periphyton growth studies), the waterbody will be placed on the Verified List and scheduled for TMDL development.

Potential Rule Language (paraphrased) to reflect these new criteria are:

62-302.XXX F.A.C

The nitrate criteria applicable to springs is a monthly average of 0.35 mg/L, unless modified by a TMDL adopted in 62-304 F.A.C., or a site specific alternative criterion has been adopted. Assessment of impairment for nitrate in springs is conducted in accordance with 62-303.XXX F.A.C.

62-303.XXX F.A.C.

Planning List: A spring will be placed on the planning list for nitrate if the criteria contained in 62-302.XXX is exceeded using the planning list binomial analysis to evaluate samples. Response variables (i.e., periphyton index, nuisance growths, etc.) will be monitored to determine if aquatic life use impairment exists.

Verified List: A spring will be placed on the verified list if a) the monthly average nitrate concentration of 0.6 mg/L is exceeded using the verified list binomial analysis to evaluate samples or b) if response variables (i.e., periphyton index, nuisance growths, etc.) are exceeded, or otherwise show aquatic life use impairment.

Recommendations for continued FDEP TMDL Development

- Develop nutrient criteria
- Continue to move ahead with Total Maximum Daily Load (TMDL)
- Have an implementation plan with the Basin Management Action Plan (BMAP)

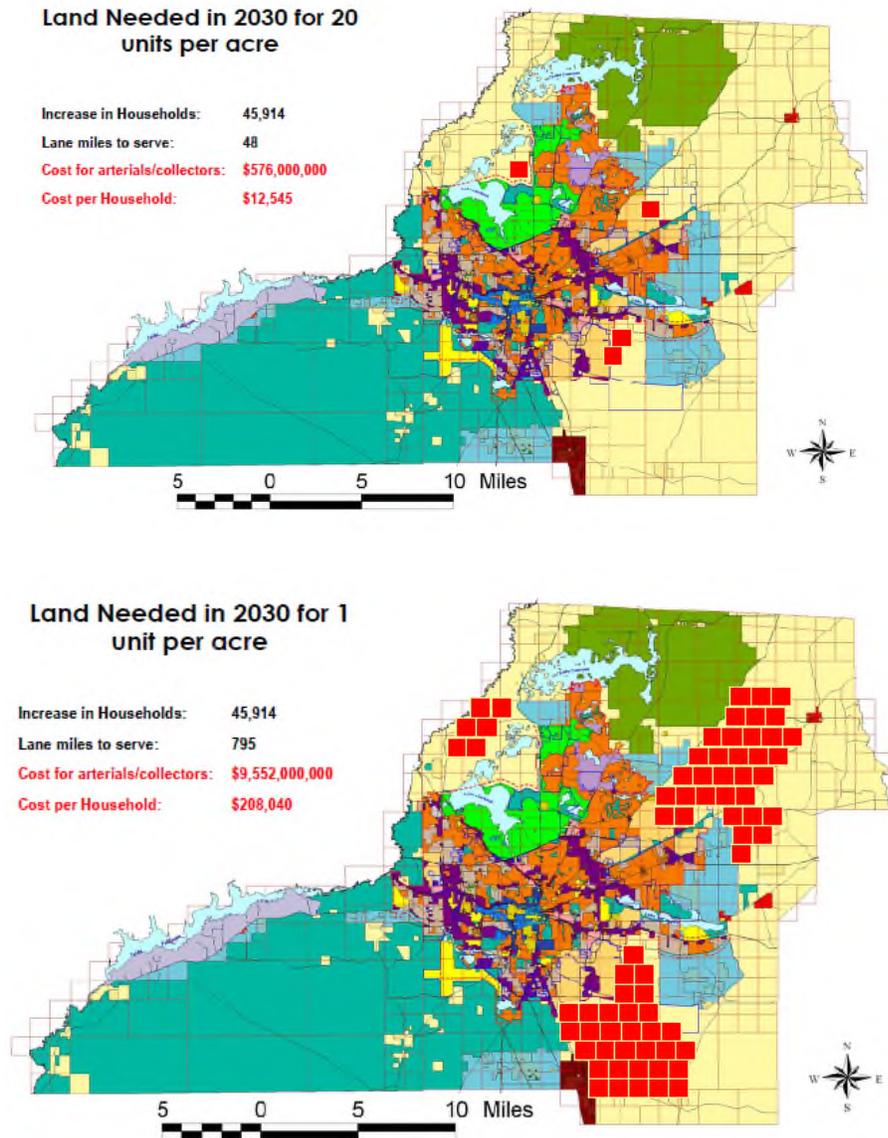
DEP Regulatory Session - Audience Comments/Questions

- How do we treat sources? Ans: Identify... also credit given to those who reduce source

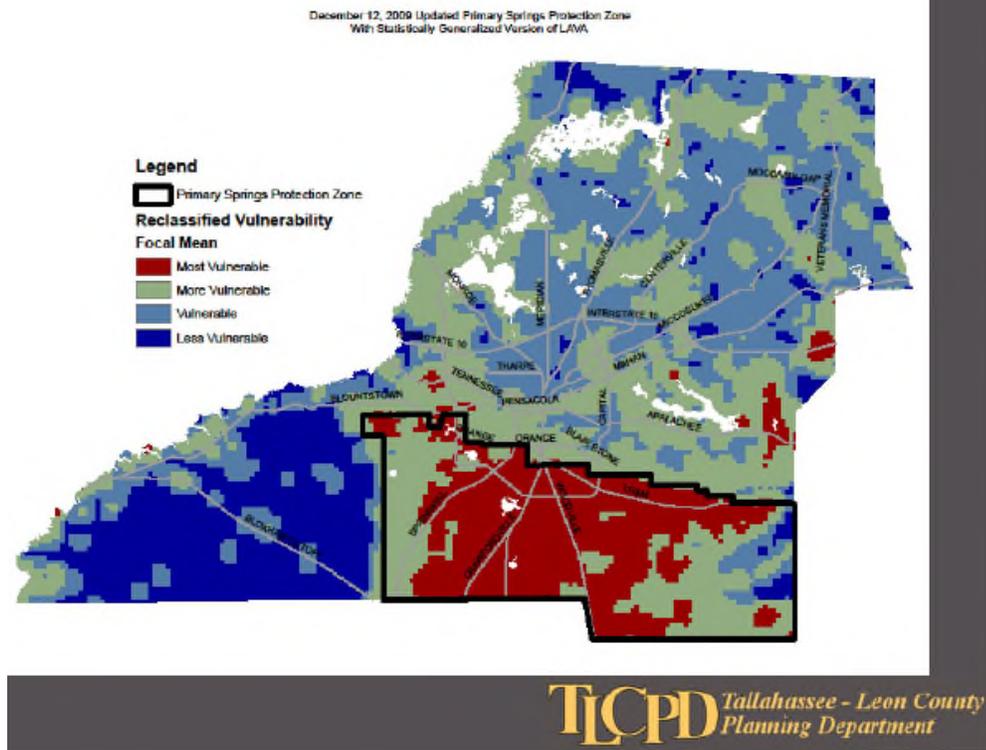
III. Session 1: Land Use Planning

Panelist 1: Wayne Tedder - Director, Tallahassee-Leon County Planning Department.

Mr. Tedder framed the land use issue by noting that by 2030 there may be an increase of 45,000 more residences. Mr. Tedder started by demonstrating that how we plan for future development within the springshed will have a lot to do with pollution impacts. He graphically presented the differences in land use when differing densities and development are applied across the remaining undeveloped landscape (e.g., land used by the year 2030 if densities were 20 units per acre versus land used at 1 unit per acre).



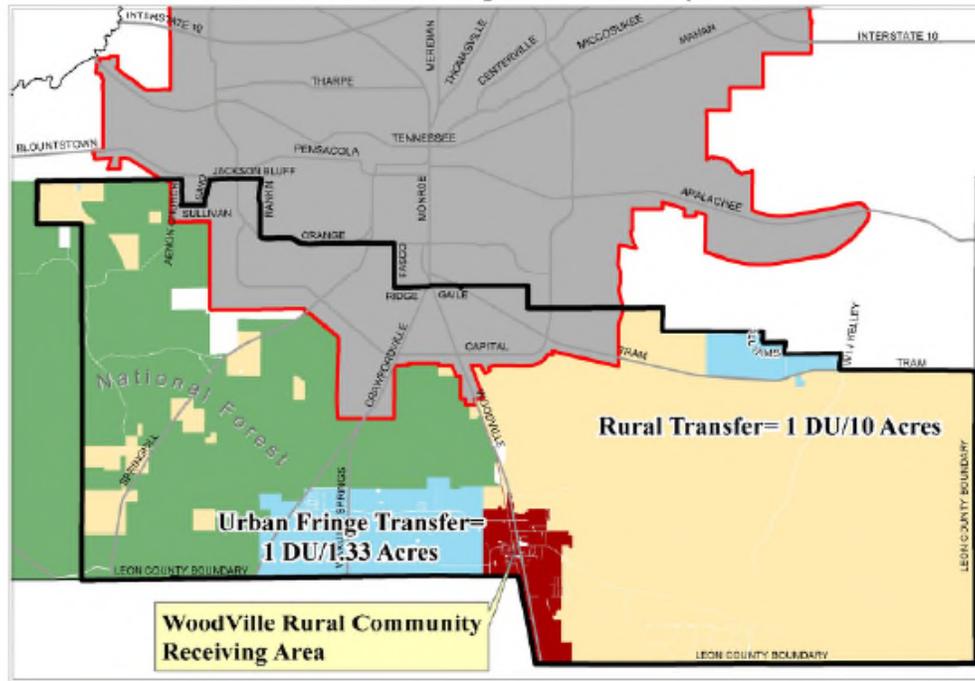
Mr. Tedder then went on to describe recently adopted Tallahassee–Leon County Spring Protection Policies. Comprehensive Plan Amendment PCT080117 was adopted on January 7, 2009. The amendment calls for the establishment of a Primary Springs Protection Zone based on the Leon Aquifer Vulnerability Assessment (LAVA) and the creation of policies that call for additional requirements and regulations within this zone



The requirements inside the Primary Springs Protection Zone are:

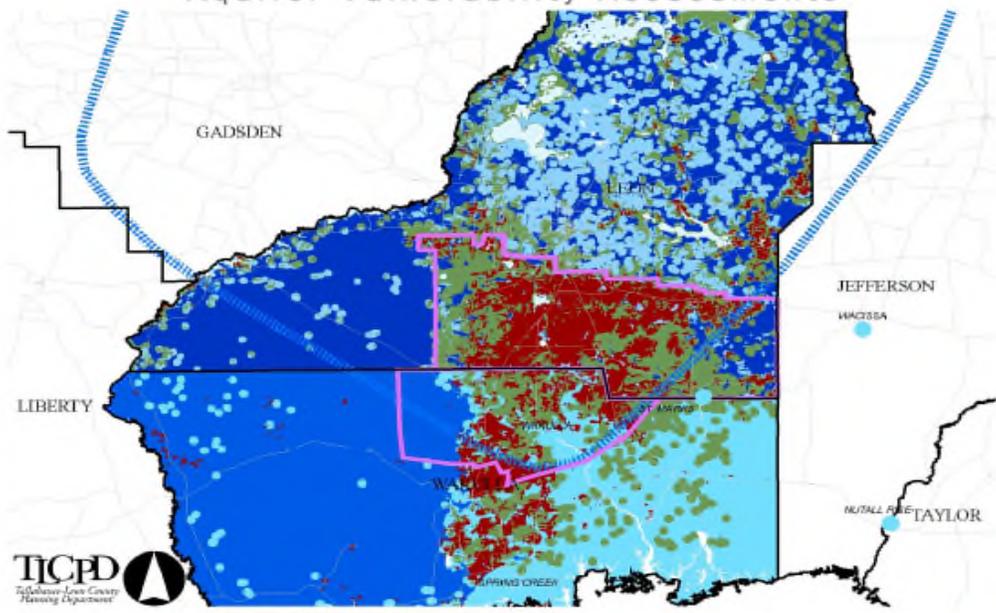
1. Establish central sewer as the preferred method of sewage treatment in the protection zone, within the Woodville Rural Community and the USA, and alter policies to enhance requirements for connection to central sewer.
2. Require performance based septic systems when sewer is not available. Designate or institute a Responsible Management Entity and supporting fee structure to ensure that all systems function effectively.
3. Require the use of Low Impact Development land planning and engineering design.
4. Develop a Transfer of Development Units system that caps the number of units allowed inside the protection zone based on the current densities allowed on the Future Land Use Map (excluding areas inside the USA) and allows those units to be transferred from sensitive areas to the Woodville Rural Community.
5. In areas designated Urban Fringe inside the protection zone, permit only 1 dwelling unit per 3 acres or Conservation Subdivisions.
6. Set fertilizer content and application rates in the protection zone.
7. Make protection of environmentally sensitive features in the protection zone a priority for local government.

Transfer of Development Units System



TICPD Tallahassee - Leon County
Planning Department

Leon and Wakulla County Aquifer Vulnerability Assessments

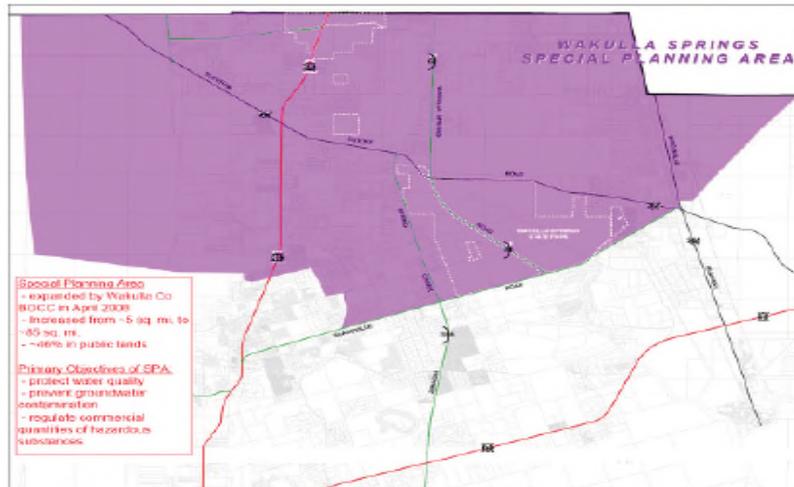


TICPD Tallahassee - Leon County
Planning Department

Panelist 2: Ms. Lindsay Stevens, Wakulla County Administrator, “Wakulla County - A History of Protection; A Future of Partnership.”

The current Wakulla Springs Special Planning area was described.

**Current Wakulla Springs
Special Planning Area**



Amended 2008



Wakulla Springs Special Planning Area

- Regulates 128 substances, from fertilizers to batteries.
 - Also includes water containing total dissolved solids in excess of 10,000 PPM or chlorides in excess of 500PPM
- Requires the use, storage and disposal of these substances to be reported when exceeding certain quantities.
 - 5 gallons of liquid or 50 pounds of solid of any of the regulated substances
- Limited exemptions for use of regulated substances, such as fuel for agricultural equipment.
- Includes requirements for reporting discharges.
- Special Planning Area considered as part of development permits, rezoning or future land use amendment requests though springs special planning area has not been used much in land use changes.
- Injection wells and drainage wells not permitted.

Current Wakulla County Water Quality Protection Measures

- Performance Based Septic Tanks (PBST) required County-wide
- Requires 100 to 300 foot buffer from the rim of Karst features with a direct connection to aquifer
- New and substantially redeveloped sites must conform with St. Johns River Water Management District Karst criteria, including:
 - Karst features cannot be used as storm water management facilities.
 - Pre-development flow rate and volumes must equal post development.

Current Wakulla County Wetland Protection Measures

- 75 foot buffer required for development.
- Newly-created lots smaller than 2 acres must not contain wetlands.
- Wetlands required to be placed in conservation easements.
- Best Management Practices required before, during and after construction to protect wetlands from intrusion and siltation.

Current Wakulla County Protection Efforts

- \$20M Expansion of Central Sewer and Water Reuse Facilities
- FSU/DEP Study on Wakulla County septic tanks
- Identify existing septic tanks
- Identify environmentally-sensitive priority areas
- Create management plan for PBST
- Study is a continuum
- Being coordinated with Wakulla County Health Department
- Stormwater Master Plan for Wakulla Gardens
- County –defined, financial based, exemptions for low income families for the installation of PBST

Future Wakulla County Protection Measures

Possible Changes to the Comprehensive Plan resulting from the 2009 Evaluation and Appraisal Report Amendments:

- Wakulla Springs Special Planning Area
- Evaluate creation of a TDR program and TDR components such as sending and receiving areas

Water Management Conservation Plan -Conservation Element

- Framework for Countywide Greenprint
- Possible acquisition list, or support state programs
- Recreation and Open Space Element
- Adopt recreational surface water use policies
- Coastal Management Element
- Incorporate Florida Yards and Neighborhoods, focus on fertilizer

Possible Future Protection Measures & Land Development Code Updates

- Refine Springs Special Planning Area Requirements
- Implement TDRS, if included in the Comprehensive Plan
- Identify sending and receiving areas
- Conform to NFWMD ERP requirements
- Incorporate BMPs for Landscaping
- Florida Yards and Neighborhoods, focus on fertilizer
- Incorporate Low Impact Development (LID)
- Stormwater Master Plan of County
- Identified nodes within the County
- FSU/DEP Study Implementation
- Partnerships
- Revisions to the land development code to address new plan requirements

Panelist 3 - Eric H. Livingston from the Bureau of Watershed Restoration, Florida Department of Environmental Protection presented regarding, “Low Impact Development: Focusing On Pollution Prevention” Mr. Livingston’s presentation provided keys to restoring Wakulla Spring directed around:

- Reducing nutrient loads from existing activities.
- Preventing new nutrient loads from future activities.

Significant pollution affecting the springshed is nonpoint source pollution. This is pollution from everyday human activities that is often referred to as Pointless Personal Pollution (PPP) that many times begins with the change in land use. To address such pointless personal pollution LOW IMPACT DEVELOPMENT (LID) approaches need to be incorporated. LID is a:

- Comprehensive approach
- Hydrology is integrating framework
- It prevents or minimizes pollutant or stormwater generation
- It creates multifunctional landscape and infrastructure
- More reliance on source controls or nonstructural BMPs

LID is part of the nonstructural, pollution prevention part of the stormwater tool box of best management practices which includes two main drawers:

- Nonstructural = prevention
- Structural = mitigation

An integrated LID approach promotes:

Land Use Management

- Protect natural SWM areas, wetlands, riparian buffers
- Minimize vegetation clearing and soil compaction
- Minimize impervious surfaces, especially DCIA
- Cluster development

Source Controls

- Street sweeping
- Florida Friendly landscaping (FYN Program)
- Florida Friendly fertilizers (slow release N, low/no P)
- Green Industry BMP program (landscape companies)
- Fertilizer bags stored under roof
- Fertilizer spills swept up and used on-site

Public Education

- Storm sewer stenciling
- Roof runoff to pervious areas
- Aquascaping littoral areas

Low Impact Design Principles:

- Protect/avoid sensitive areas
- Minimize disturbed/cleared areas /soil compaction
- Minimize loss of vegetation
- Minimize imperviousness, especially Directly Connected Impervious Areas
- Maximize infiltration
- Reduce setbacks

- Cluster development
- Use innovative planning tools (TDR)

Specifically, LID aims provides strategies to:

- Reduce Imperviousness
- Tailor and decrease road width
- Minimize road length
- Use pervious pavements for parking
- Reduce required parking spaces
- Reduce parking space size
- Use one way angled parking
- Minimize paved driveways/size
- Side walks on one side only

LID emphasizes following Florida friendly landscaping and fertilizers approaches. Because we want our landscapes to be green, not our water bodies, it is important to recognize that Florida landscapes are PPP sources that can be better managed by following Florida Friendly Landscaping and Fertilizers approaches.

- Florida Yards and Neighborhoods
- FYN Builder/Developer
- Green Industries BMP Program
- Landscape irrigation standards
- Golf Course BMP Manual
- Urban Turf Fertilizer Labeling rule
- Urban turf research program
- Model FFL ordinance

RECOMMENDATIONS

- Restoring Wakulla Springs and river requires all PPP sources to be reduced.
- Prevention is always easier and cheaper than restoration. In particular, urban PPP problems start with land use decisions and designs and can be better managed by decisions to employ Low Impact Design practices.
- Local governments need to allow use of LID best management practices by putting them specifically into their Land Development Regulations (LDRs).

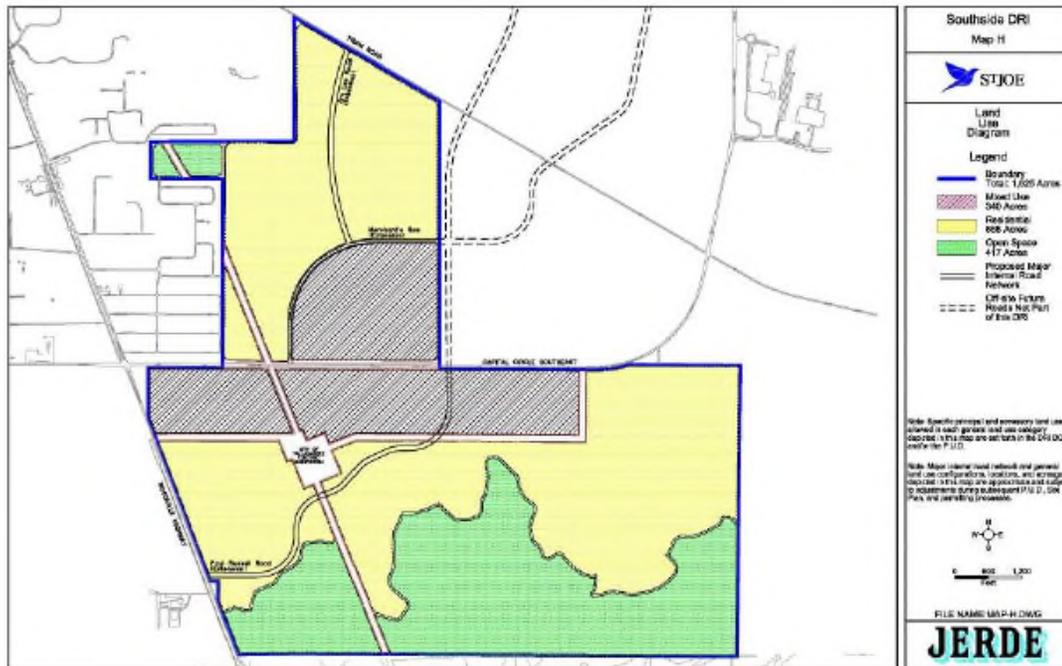
Jorge Gonzalez, St Joe Company - Case Study 1: “Southside DRI Planning for Springs Protection”.

Southside DRI is a proposed 1,625 acre Master Planned Mixed Use Project (Residential, commercial, office, hospital land uses) located in Southeastern Tallahassee/Leon County in the area of Tram Road, Woodville Highway and Capital Circle S.E.

The springs protection planning process began with early guidance from City and others. From this early upfront coordination the following recommendation came:

- Connect to central potable water and sanitary sewer (Already available to the site –no extensions required)
- Develop a decentralized/distributive approach to stormwater management
- Try not to use large, central or deep ponds
- Use a higher number of smaller and shallower ponds

- Mimic the existing natural hydrology; treat and attenuate stormwater closer to the source; do not convey stormwater across long distances.
- Minimize development on the southern portion of project appropriate to the property and the Southside DRI
- Develop and use BMP's that focus on the operational/public awareness components such as University of Florida's Florida Yards and Neighborhoods Program; Fertilization Use; Public Awareness/Education; Other Low Impact Development (LID) Approaches (i.e. when appropriate, use of swales for stormwater treatment)
- Select BMPs appropriate to the site and land use – BMPs which work under the specific site and land use scenario.



Bob Rوتا – N.G. Wade Investment Company - Case Study 2, “Longleaf Plantation in Wakulla County”.

Longleaf Plantation of Wakulla is in a Karst area south of the Cody Scarp. It has been planned to be an environmentally friendly, mixed-use development that will endure as Wakulla County’s premier sustainable planned community. The project will feature 45 percent conservation area, an extensive network of pedestrian trails, environmentally friendly design, and architectural controls for the community. The plan has been designed to incorporate elements of “Traditional Neighborhood Design,” which will promote an integrated mixture of land uses, walking and biking opportunities, and extensive areas of parks and other public spaces.

This Planned Unit Development (PUD)/Preliminary Plat is intended to be a self-contained, mixed use community that complies with the standards and intent for Sustainable Communities contained in Land Use Policy 1.2.9 of the Wakulla County Comprehensive Plan.

Features of the Longleaf Plantation of Wakulla PUD

- 45 Percent Natural Area
- Limited Clearing of Lots
- Advanced Wastewater Treatment Re-Use to Irrigate Common/Recreation Areas
- Pervious Pavement to be Used for Commercial and Office Parking Areas

- Centrally Located Park and Ride Area
- Nature Trails with Educational Kiosks at Environmentally Sensitive Features
- Development will Utilize Best Management Practices of the Florida Yards and Neighborhood Program
- Groundwater Monitoring Wells Strategically Located Throughout the Site for Groundwater and Aquifer Protection

Land Use Session Audience Questions and Discussion

- Who does maintenance of decentralized stormwater - Answer: not yet determined, but probably City once transfer is complete.
- Southside timeline – Answer: not sure.
- Southside obstacles - Answer: economic times, process time.
- Is Southside considering multi-modal transportation – Answer: working with the City of Tallahassee.
- Ways to limit loss of recharge – Answer: LID.
- Treatment vs. flood control in Karst, sandy areas – Answer: need soil amendment to get 24 hr treatment.
- Collaboration of public and private sectors is important.

IV. Session 2: Wastewater Management

Panelist 1: Jim Oskowis, P.E., City of Tallahassee. “City of Tallahassee Advanced Wastewater Treatment Program Update”. The City of Tallahassee wastewater treatment and disposal facilities went through permit renewal and challenges and then entered into a settlement agreement to protect water quality of Wakulla Springs. The agreement was signed in December 2006 and the necessary upgrades and modifications to the wastewater treatment train processes are underway including:

- \$220 Million City Commitment.
- Aggressive Compliance Schedules.
- 50% Sewer Rate Increase.
- 80% Nitrogen Reduction with AWT.
- Further Reduction of Nutrients with no Fertilizer, No Cows, and no biosolids land application.
- Completion of WP1 improvements at Thomas P. Smith can meet permit compliance schedule for nitrogen reduction of 9 mg/l in Jan. 2011 while for Lake Bradford Road Plant there has been some delay for due to impacts from tropical storm Fay.
- Discharge to meet permit limits has been confirmed by treatment process modeling.

Permit Compliance Schedules

Nitrogen Reductions		Construction Upgrades	
Years from Permit Issuance	Nitrogen Limit (mg/l @ AADF)	Years from Permit Issuance	Upgrade Completed
0.5	12.0	2.5	LBR
3	9.0	3.5	TPS First Train
5	6.5	4.5	TPS Second Train
6	3.0	5.5	TPS Third Train

Panelist 2 - Jack Leppert - Friends of Wakulla Spring, “Successes, Concerns and Opportunities as related to restoring water quality at Wakulla Springs”

Successes

- At long last the science, the politics, the will, and the support exists.
- An expensive and divisive trial was avoided - mediation was successful and a viable program of Spring’s biological restoration is progressing.
- Capable and committed City leadership and a project director are in place.
- Changed sprayfield farming impacts are producing “downstream” results.

Concerns

- Effects of the new sprayfield farming practices are not yet well known.
- Overuse or untimely scheduling of reuse could become damaging.
- Water quality measurements from down-gradient sample well sites, especially weather event correlated samples, are not taken or publicly reported often enough.
- Any reduction of general research support from the two Geological Survey units or DEP could undercut our knowledge flow.
- Reductions in environmental reporting from the media could lead to an under informed, and thus unappreciative public.
- City fiscal constraints relating to the 6-year plan are a possibility.

Opportunities (as distinct from specific recommendations)

- A collaborative plan of scheduled public reporting of progress would communicate and support deserved credit and explain any delays.
- Accelerated progress toward a multi-government, multi advocacy group collaborative for the explicit purpose of enacting septic and other waste management processes should be actively encouraged.
- Begin the process soon to prepare for the next permit renewal cycle which will occur in 3 years so that it can occur in a timely fashion and thus not once again become a contentious process.
- The city’s oversight committee could play a more active and public role.

Specific recommendations for follow-up actions as related to city waste water treatment in support of the restoration of Wakulla springs. **That There Be:**

- **More down-gradient research**, scientifically designed, adequately funded, and useful to the city, the public, DEP and all others participating in and monitoring these landmark efforts. Periodic as well as event triggered measures from “downstream” chemical, biological and hydrological variables would be exceedingly helpful to researchers, the public, and communities worldwide.
- **Reduced loading** - That there be a long term commitment to reduce weekly discharge amounts at the current Southeast Sprayfield below the maximum 3.2 inch rule standard (and lesser during periods of heavy rainfall) and that the City and County together seek and select a second major sprayfield site in preparation for regional growth and the next permitting cycle.
- **Increased public review and reporting** - by the city, by the media, by those doing formal research, and by independent evaluators of this landmark series of events. These efforts could include a monitoring and review of project progress and difficulties, of the

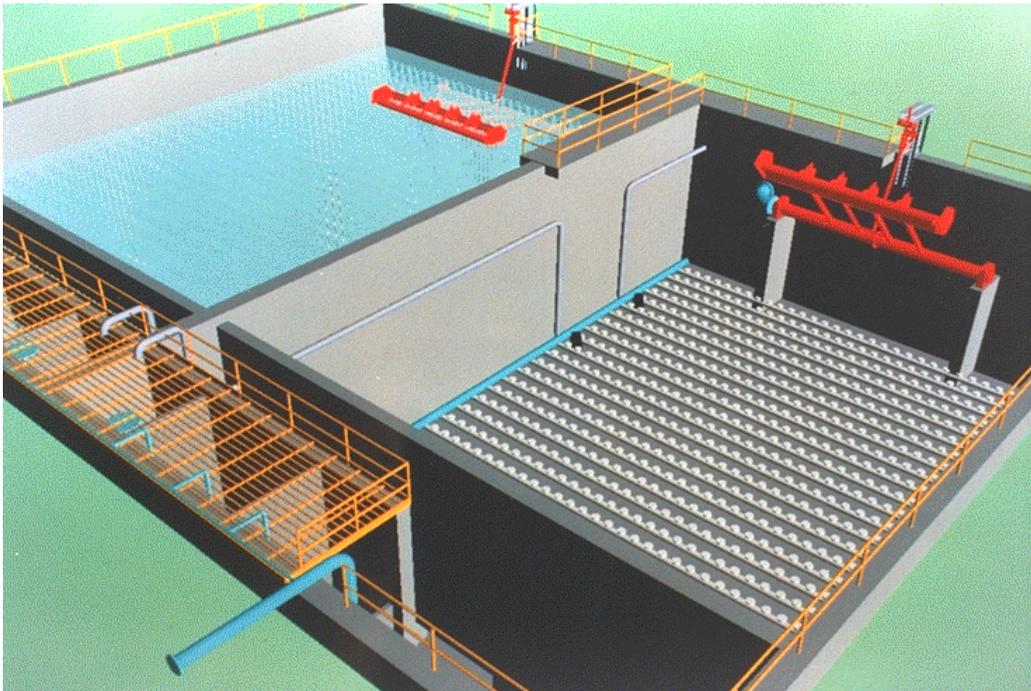
emerging worldwide and local research, and of the oversight of each of the provisions of the permit and of the settlement agreement.

- **Septic system management** - The next big step that is needed.

Panelist 3 - Sharon Sawicki, P.E., Domestic Wastewater Section – Florida Department of Environmental Protection, “The Role of Package Treatment Plants.”

What is a package plant?

- Pre-manufactured treatment facility used to treat wastewater in small communities or on individual properties.
- Typically 10,000 to 250,000 gpd but can be as small as 2000 and up to 500,000 gpd.



Who regulates package plants?

DEP

- >10,000 gpd (domestic) or 5,000 gpd (commercial).
- Regardless of size, plants with open tanks or above ground disposal.

DOH

- ≤10,000 gpd (domestic) or 5,000 gpd (commercial) with closed tanks and subsurface disposal.
- Can only serve a single establishment.
- Called ATUs or Performance Based Systems.

Nutrient removal technologies

- ≥100,000 gpd can meet 5-5-3-1 (AWT)
- <100,000 gpd can meet 10-10-10-1 (BAT)

What have we seen in the Florida Keys?

- Construction of small nutrient removal package treatment plants is costly

- There are significant economies of scale
- Construction and O&M Costs (\$/1000 gallons)

Treatment Level	Treatment Plant Design Capacity (gpd)				
	4,000	10,000	25,000	50,000	100,000
BAT	66	32	17	12	9
Secondary	43	21	12	9	6

Based on CH2MHill study using 1998 dollars.

What levels of treatment can package plants consistently meet?

Nitrogen removal mechanisms

- Slow-rate land application systems
- Nitrification-denitrification (15-25%)
- Ammonia volatilization (15–25%)
- Crop uptake (varies depending on crop)

Rapid-rate land application systems

- Nitrification-denitrification
- Ammonia volatilization
- Typical removal rate –50%

Source: EPA's Design Manual Land Treatment of Municipal Wastewater

Nitrogen removal mechanisms

- Actual groundwater loading is site specific depending on type of wastewater treatment, crops grown, soil type, temperature, application rate, etc.
- Consider an AWT plant using a sprayfield assuming 70% removal; the ground water loading would be about 0.9 mg/L/

When Are Package Plants Appropriate?

When up-front planning shows they are the most cost-effective and protective treatment option.

They are often used in areas where:

- Limited number of people
- Small wastewater flows
- Located outside regional service areas.

If plans are to provide sewer from a regional facility, a package plant may be a good option

- The area will already be sewerred
- The package plant could be converted to a lift Station

Recommendations

- Conduct integrated planning up-front
- Think about what the community is going to look like 50 years from now and plan accordingly.

- Identify and implement management strategies that are the most cost effective and protective of the environment.
- When BAT and AWT package plants are the best management option, ensure they will be properly managed, operated, and maintained.

Panelist 4 - Erich Marzolf, St Johns River Water Management District, “Designing Wastewater Reuse to Protect the Environment.”

Definition: “Water reuse involves taking domestic wastewater, giving it a high degree of treatment, and using the resulting high-quality reclaimed water for a new, beneficial purpose. Extensive treatment and disinfection ensure that public health and environmental quality are protected.”

The Case for Reclaimed Water

- There is an ongoing search for water sources other than aquifers (rivers, estuaries, oceans, reuse) to meet growing demand.
- Reducing effluent disposal into water bodies helps reduce nutrient pollution.
- Since ~50% of domestic water goes for landscape irrigation, reclaimed water appears to be a good alternative to irrigating with potable water.

Nutrient Distribution

- Our nutrient problems are in part, distribution problems.
- Reuse is one way that nutrient distribution can create a better balance between need and supply, thus reducing pollution.

Is there a potential for nutrients in reclaimed water to make it back to water bodies? YES!

- Just like we can’t ignore other activities which distribute nutrients on the ground (fertilizer, manure, septic systems, biosolids), reuse can’t be ignored. We shouldn’t assume that all nutrients distributed by reuse will be bound up by plants and soils.
- Reuse overspray accumulates on roadways and in gutters.
- Excess reuse flows to storm sewer system.

<i>Impacts of Reuse Overspray</i>							
Nutrient	Loading from Runoff		Loading from Reuse Overspray				
	Volume ¹ (gal/year)	Annual Load (kg)	Volume ² (gal/wk)	Volume ² (gal/year)	Reuse Conc. (mg/L)	Annual Load (kg)	Percent of Runoff Load (%)
Nitrogen (as N)	6,234	0.059	47	2,431	8	0.074	125
Phosphorus (as P)	6,234	0.007	47	2,431	4	0.037	520

¹Assumptions
Lawn Area = 1,000 ft²
Rainfall = 50 in/yr
Runoff = 20%
Runoff Conc: N = 2.5 & P = 0.3 mg/L

²Assumptions
Lawn Area = 1,000 ft²
Reuse Irrigation = 2/wk @ 0.75" @
Overspray = 5%

Nitrogen Loads (as Fertilizer Equivalents) to Southeast Farm (lb_n/1,000 ft²/yr)

Irrigation (inches/week) (mgd)	WWTP Nitrogen Concentration (mg/L)		
	9.3	3	1.1
3 (23.3)	7.57 (379%)	2.43 (122%)	0.86 (43%)
2 (15.5)	4.87 (244%)	1.62 (81%)	0.57 (29%)
1.6 (12.1)	3.95 (198%)	1.27 (64%)	0.45 (23%)
0.91 (7.0)	2.3 (115%)	0.74 (37%)	0.26 (13%)

Assumes a need for 2 lb N/1,000 ft²/year (St. Augustine in N FL) = 87 lb/acre

Closing Thoughts

- All WWTPs should be required to regularly monitor N & P - those discharging high concentrations should be encouraged to increase nutrient removal.
- Change conservation rules to apply to reuse (* in progress in SJRWMD).
- Is the FDACS fertilizer rule the appropriate threshold? Additional research on turf nutrient requirements relative to nutrient loss (clippings management) (* in progress by FDACS), seasonality of nutrient uptake, pulsed (fertilizer) vs. continuous (reuse).
- Require utilities supplying reuse to educate their customers as to the need for additional turf fertilizer based on the reuse nutrient load and implement a fertilizer offset program.
- Reuse was developed as an alternative to dumping effluent in water bodies (i.e. Lake Munson). Our waste has to go somewhere.
- We can use reclaimed water as a means to better balance areas of nutrient need and nutrient pollution.
- View reuse as a means to offset both potable water and fertilizer use. •Reuse is a relatively new approach and improvements are being made. We are learning from Tallahassee's experience.

Recommendations

- Utilities, express the nutrient contribution their customers receive in terms of a fertilizer addition, and then implement an offset program.
- Irrigators, be careful with overspray (design & maintenance), especially in areas with large edge/area ratios or next to impervious surfaces (e.g. road medians).
- Support research to understand relationship between nutrient inputs, uptake and runoff for various plants, soils, seasons, etc.
- Continue to share your experiences. Many areas of Florida are moving ahead with reuse focused only on water. Nutrients are important also.

Session 2: Audience/Participants Discussion

- Need to change the mindset regarding lawns....and fertilization.
- Consider some merit to dilution of nutrients as opposed to water conservation....

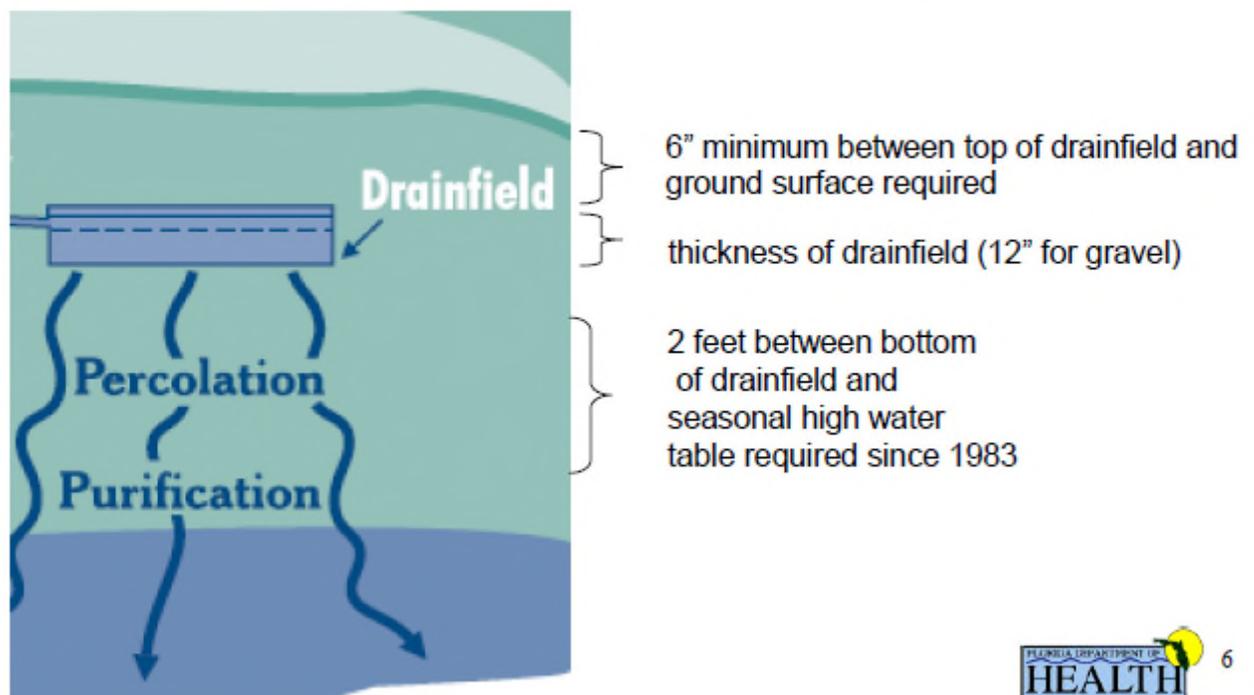
V. Session 3: Septic Tanks

Panelist 1 - Eberhard Roeder, Florida Department of Health, "Septic Systems: Form and Function".

Functions of the septic tank

- Collects solids (80% TSS reduction Lowe et al. 2007) and must be pumped regularly (e.g. 3-5 years).
- Removes a third to half of food (BOD5) without oxygen
- **There is little if any nitrogen removal** (i.e., 11+/- 5 lbs of total nitrogen per person and year leave tank).
- Watertight

Next stop: Drainfield



Functions of the drainfield

- Stores peak flows
- Disposes of water
- Consumes food using oxygen (air in soil)
- Removes/filters germs, food, suspended solids in the unsaturated zone
- Converts nitrogen to nitrate

Factors that influence nitrogen transport to and in ground water (Otis, 2007)

Good conditions for denitrification (=removal of nitrogen):

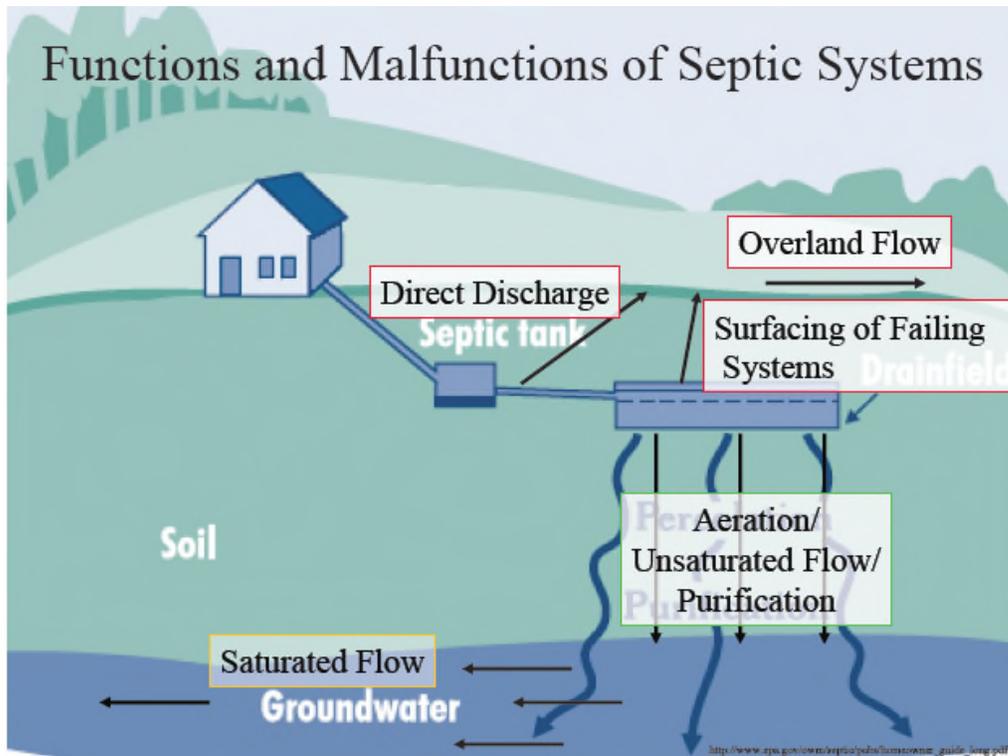
- Nitrogen present as nitrate after contact with air

Denitrification requires absence of air.

- Poorly drained

- water table no deeper than 3.5-feet below grade
- high organic carbon in the soil below drainfield (>1%)

TN: up to 50% reduction, largely due to dilution.



Nitrogen Load to Ground Water

- Nitrogen
 - 20-30 lbs per system released from typical septic tank
 - Some removal (10-50%) under drainfield
 - Further removal depends on ground water conditions.
- Relative importance depends on presence and magnitude of other sources

Total load depends on number of people served by onsite systems and treatment level.

How can we manage OSTDS Nitrogen?

- No sewage
- Limit flow and/or number of OSTDS per acre. This approach has been in Florida OSTDS rules for at least 30 years to protect drinking water against nitrate contamination.
- Increased Treatment:
 - Nitrogen reducing treatment at onsite scale (e.g., Keys, Wakulla County)
 - Connect to sewer if treatment is better and more cost-effective
- Management: either limit number of systems/acre or increase treatment level.

Recommendations for Wakulla Springs Restoration

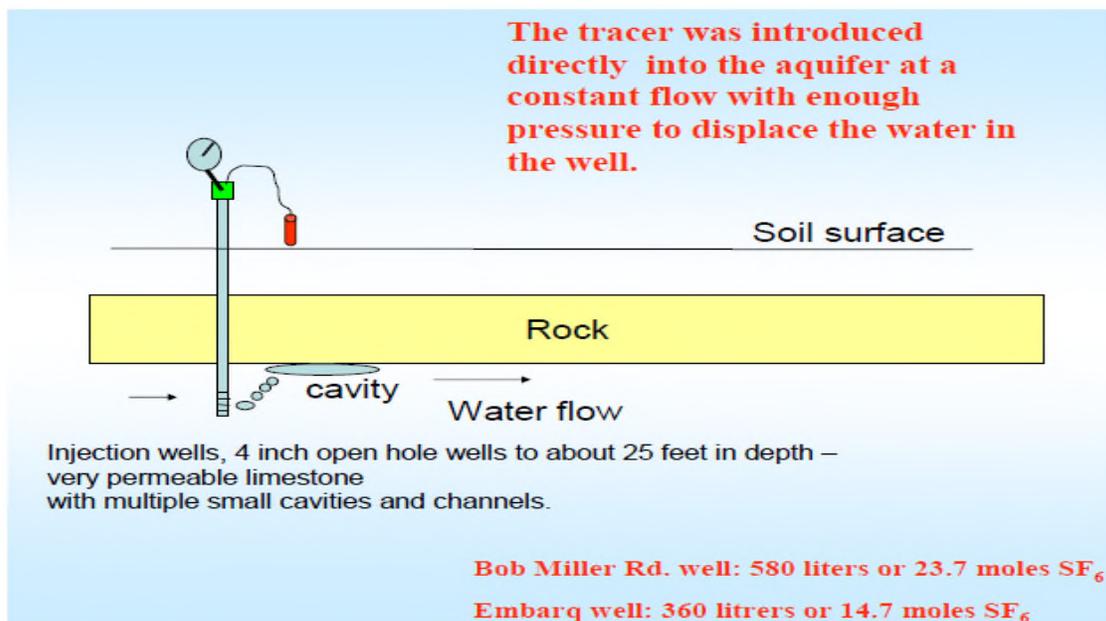
- Springshed-wide management and cost sharing to identify and provide incentives for equitable and cost-effective nitrogen reduction.
- Nitrogen discharge fee (e.g., Chesapeake Bay Restoration Fund).
- Grant/loan program for wastewater treatment upgrades in priority areas.
- Inventory and track condition of existing onsite systems.

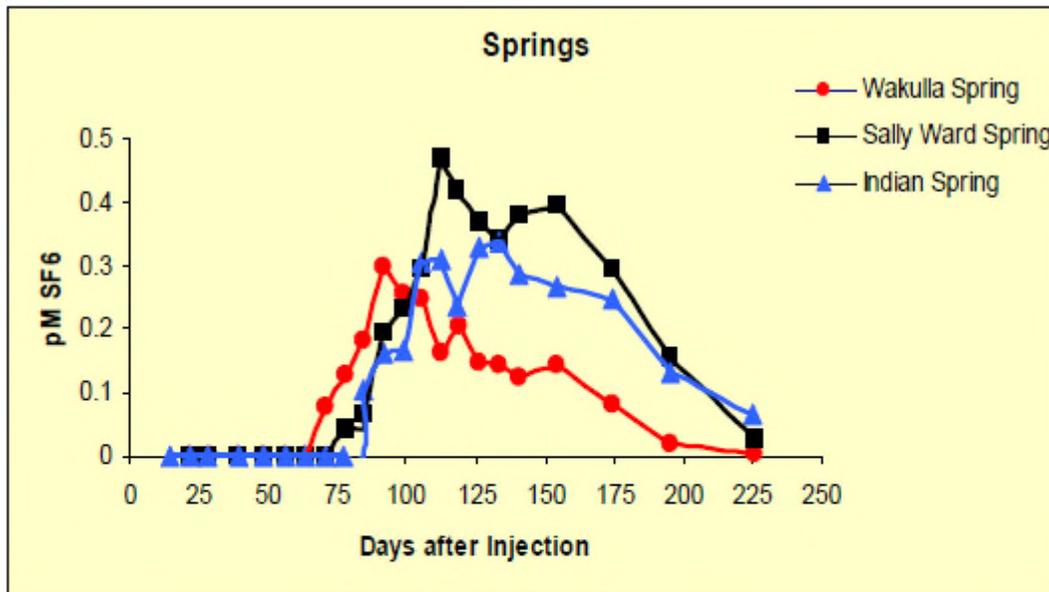
Panelist 2 - Jeff Chanton, Florida State University, “The Nitrogen Cycle, Septic Tanks and Karst Terrain”. Reporting on the results of “Woodville Karst SF₆ Tracer Test the modern N-Cycle & Subsurface Attenuation of Nutrients” Harmon Harden, Richard Hicks, Edgar Wade, Brian Katz, & Jeff Chanton.

Objective 1

Establish a connection between the surface-groundwater in the Woodville area and Wakulla Springs.
Tracer injected into shallow wells to mimic inputs from septic tanks

- Embarq Well on Woodville Hwy, 6.1 miles from Wakulla Springs, Water Depth 3.67m
- Bob Miller Rd. Well, 5.3 miles from Wakulla Springs, Water Depth 6.83m





	First Appearance	Peak
Wakulla Spring	71 Days	92 Days
Sally Ward Spring	78 Days	113 Days
Indian Spring	84 Days	126 Days

•Comparison with Spray field Dye Tracer Test

Spray Field Dye

Woodville SF₆

Deep Wells and a Sink Hole injected into three wells. 27m, 30m, 50m, 11.2 and 11.8 miles from Wakulla Springs

Shallow Wells, 8 meters deep
6.1 and 5.3 miles from Wakulla Springs

Peak at 92 for wells
Peak at 93 Days for sink hole

Peak at 92 Days

Recovery 10-41% Well Injection
4-15% Sink hole injection

Recovery 0.1-10%

Conclusion

- There is a direct connection between the surficial aquifer and Wakulla Springs.

Hypothesis: Nitrogen attenuation happens in air filled soil. Not in oxygenated limestone aquifers.

Nitrate attenuation

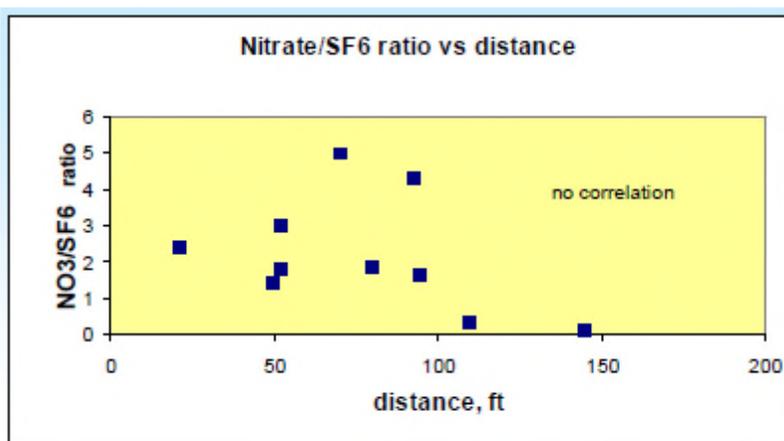
- Plant uptake
- Soil adsorption
- Denitrification

–Organic matter + NO₃ → N₂ + CO₂

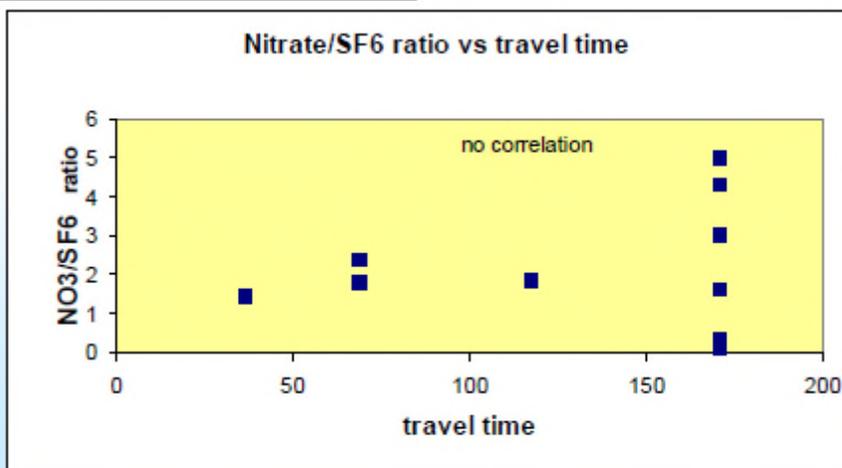
–Denitrification requires organic matter and low O₂ concentrations

–The limestone aquifer is aerobic.

Manatee Springs State Park Septic Study. DOH funded. Added tracer to drainfield, monitored wells downfield drilled in the limestone.



No relationship between nitrate tracer ratio and well distance or travel time



Also, from Sprayfield to Wakulla Springs, no change in relationship between nitrate and conservative tracer, Cl (Brian Katz, USGS data).

Tracer injected into shallow wells to mimic inputs from septic tanks

Embarq Well on Woodville Hwy

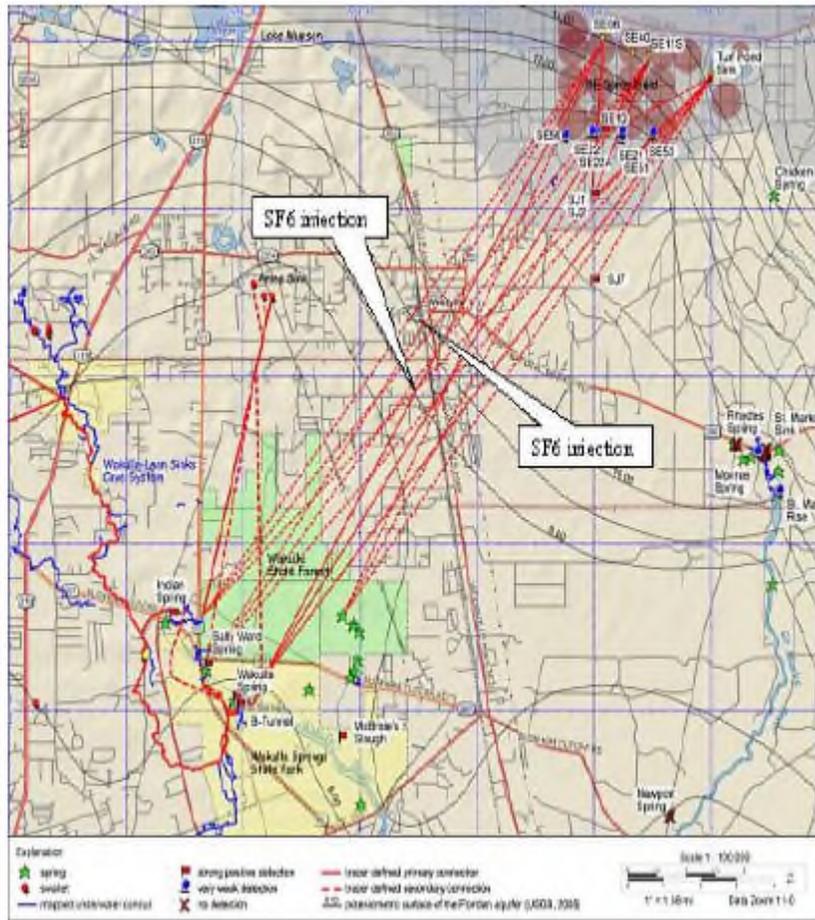
6.1 miles from Wakulla Springs

Water Depth 3.67m

Bob Miller Rd. Well

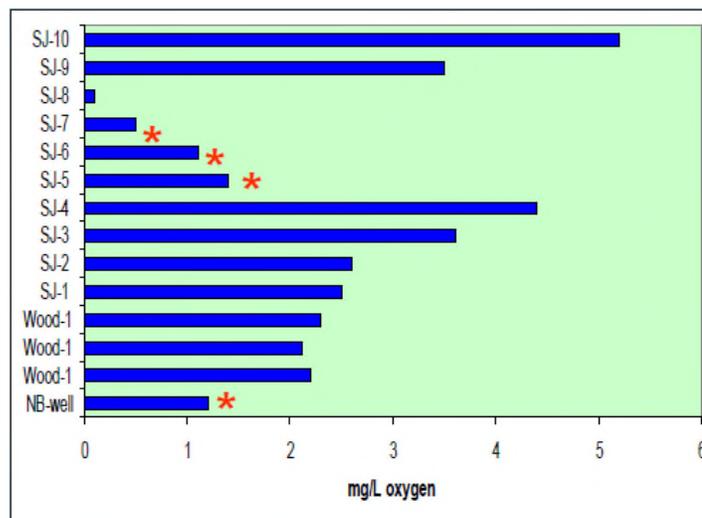
5.3 miles from Wakulla Springs

Water Depth 6.83m



Conclusions

- There is a direct connection between the surficial aquifer and Wakulla Springs.
- There is little evidence for nitrate attenuation in the limestone aquifer along that pathway. In the limestone aquifer—it is aerobic. No nitrate or phosphorus is attenuated in the aquifer.



Panelist 3 - Anthony Gaudio, Florida Onsite Wastewater Association, “Advanced Treatment Onsite Wastewater Systems.”

Septic System Terms and Types

- Septic Tank, Drainfield, Leach Field
- ATU - Aerobic Treatment Unit
- PBTS - Performance Based Treatment System

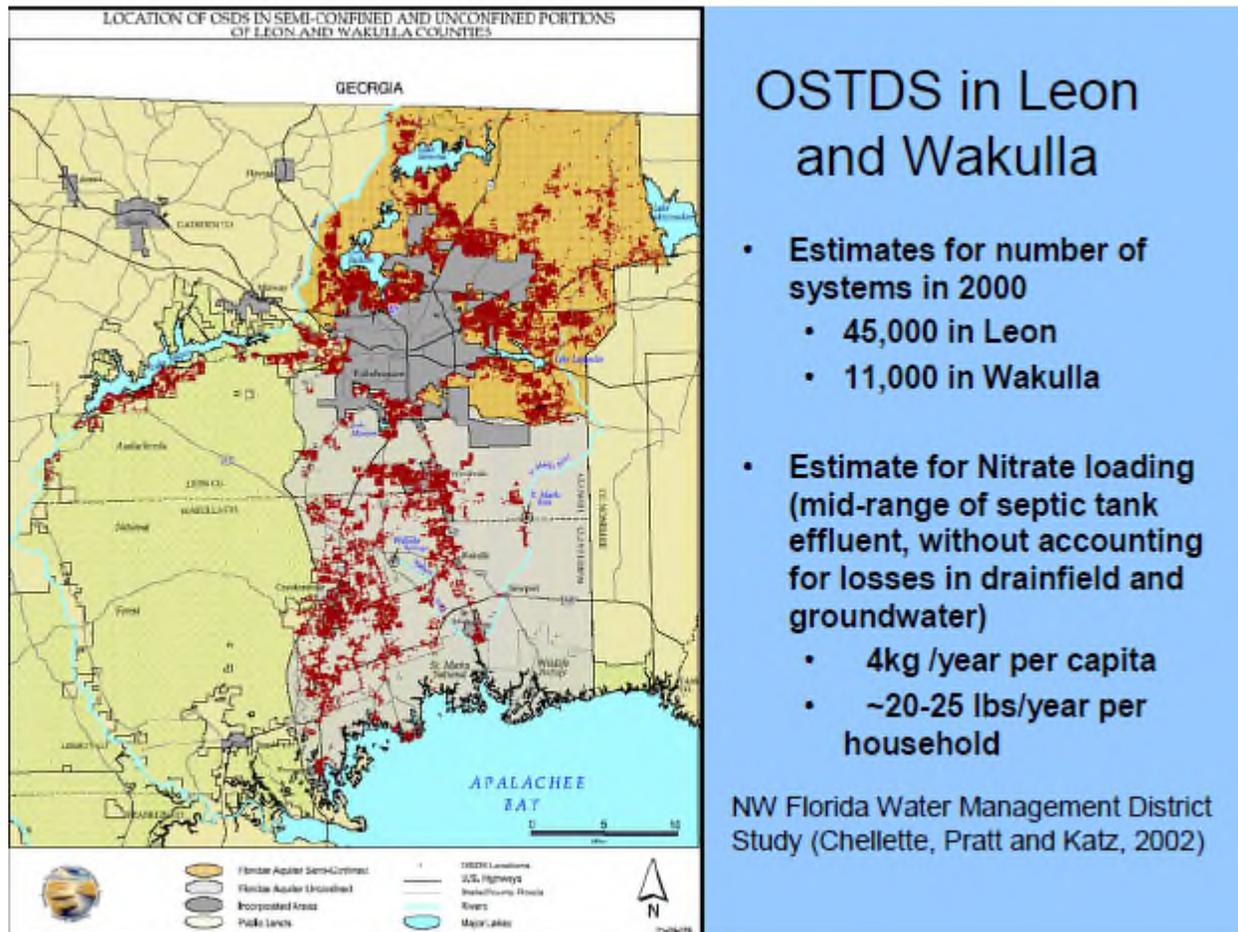
How long do they last?

- Average drainfield system in Florida lasts 17 years
- Studies have shown systems can last over 100 years with routine maintenance.
- Maintenance is missing!!!
- US-EPA 1997 report to Congress states that “Adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals...”

Current system, Except for ATUs and PBTS, only focuses on installation, not maintenance.

Nitrogen and Onsite Sewage Systems?

- About 20-25 pounds of Nitrogen per year per household comes out of the average septic tank-- equal to one large bag of fertilizer.
- Reduction in drainfield varies: about a quarter is removed



FOUR COMMON STEPS OF ONSITE WASTEWATER NITROGEN REMOVAL

- Septic Treatment
- Aeration Treatment, nitrification
- Recirculation to septic zone for denitrification
- Dispersal to drip irrigation for reuse and additional nitrogen uptake

Aerobic Treatment Unit (ATU)

- Brings sewage into contact with air (usually pretreated by septic tank)
- Allows smaller drainfield in some soils
- NSF-40 certification required for Florida
- Reduces CBOD5 and TSS (see next chart)
- Also reduces TN and TP but not required for NSF-40

Performance-based treatment systems (PBTS)

- Engineer-designed to achieve specified treatment levels
- Types include PBTS-ATU, filter systems (including peat, media or sand), drip irrigation, disinfection equipment (UV, chlorination)
- Sampling often required to verify treatment levels
- Includes nutrient-reducing systems where required
- Nitrogen and Phosphorus in Florida Keys for permanent systems
- Nitrogen reduction in Wakulla, proposed for Marion, Leon, and possibly Wekiva
- Big houses on small lots (reduced setbacks, increased flow)

Locally Available Approved ATUs and PBTS

- Southern Precast, Inc. –Moutrie GA
- Brooks Concrete, Inc. –Panacea FL
 - Both make precast concrete, “Norweco” and “FAST” systems
- Averett Septic Tank, Inc. –Lakeland FL Makes “HOOT” system

Advanced Systems Requirements (64E6-6.012) for Owners of ATUs or PBTS

- Permits & Contracts:
- DOH Annual Operating Permit (\$50 per year)
- Signed Maintenance Contract with approved Maintenance Entity (\$150-300 per year)

Inspections:

- Minimum twice annual system inspection & maintenance by approved Maintenance Entity (ME reports to county in writing or electronically---ex. Carmody System)
- One annual system inspection by DOH

What is an “Approved Maintenance Entity”?

- Licensed septic tank installer or
- Class D certified wastewater operator

Must meet the following requirements:

- Approved DOH maintenance service permit (\$25/yr)
- One annual DOH inspection of Maintenance Entity facilities and replacement parts supplies
- On manufacturer’s approved list indicating entity is trained for that system

- If approved by one Florida county, the entity can operate in all counties.

Performance Based Treatment - System Costs

- Current installation costs in Wakulla Co. \$5,500 to \$8,500 range (down from \$9,500-12,000)
- Maintenance contract \$150-300 per year
- Operating Permit \$50 per year
- Drip system materials cost less than standard drainfield materials
- Electrical operating costs: 2.1 kw per day @ \$0.12 per kw = \$7.65 per month
- Standard Systems cost \$2,200 to \$5,500 in Primary Springs Protection Zone (excluding fill)



Industry Trends

- Prices decreasing
- New manufacturers will be offering systems with 10-13 mg/L TN
- Current manufacturers now offering even lower TN (HOOT now has 5.8 mg/L system)
- NSF Standard 245 certifies a 50% reduction in TN from input to output

Recommendations to Help Restoration of Wakulla Springs

1. That Leon County adopt a new Nitrogen reducing Onsite System Ordinance
2. That a local county or regional RME be set up to manage all onsite systems in the Wakulla Springs basin, including all of Leon and Wakulla Counties.
3. No sewer to Woodville. The net effect of running sewer to Woodville will be increased density which will increase the nutrient load to the spring and only replace a small number of existing septic systems, while increasing the number of new homes and commercial development.

Panelist 4 - Patti Sanzone. Florida Department of Environmental Protection, “Evolving Changes – Involving and Educating Homeowners”.

Types of Outreach

- Information-Based Campaigns
- Attitude-Behavior Approaches
- Economic Self-Interest Approaches
- Community-Based Social Marketing

Steps to EFFECTIVE Outreach

- Identify barriers
- Using a combination of literature reviews, focus groups, and survey results
- Develop a social marketing strategy to remove barriers
- Use behavior change tools to find a good set of strategies for the community
- Pilot the social marketing strategy
- Try it out on a smaller audience than the intended large group.
- Evaluation
- Constantly assess the effectiveness of each part of the outreach strategy.
- Make modifications to the strategy as needed to improve the odds of the desired outcome happening.

Outreach for OSTDS Users

- Telephone/Mail/Internet Surveys, including interviews
- Outdoor Classrooms/Demonstrations
- Workshops
- Media Events and promotions/advertisements (often referred to as public service announcements (PSA), though advertisements are paid for ads and PSA are donated time by the media)
- Web site
- Information hotline
- Newspaper articles
- Presentations to community groups
- Exhibit booths at community events
- Homeowner association and business association newsletter articles
- Presentations for homeowner associations
- Brochures (such as already produced and others explaining management issues)
- Canvassing neighborhoods
- Monitoring water quality at Wakulla Springs by high school students/them mentoring middle school students in the issues and monitoring (possibly other aspects of the watershed, including the fish life, aquatic plant life, ecological habitats, etc.).

Outreach for Public Officials

- Educational workshops and training on specific topics as well as updates in process of educating OSTDS users and moving toward community solutions.
- Field days to see demonstrations of potential solutions for community (locally or away from the area).

GOAL: *REACH EVERYONE INVOLVED IN SOME WAY*

VI. Session 4: Septic Systems: Management

Panelist 1: Alex Mahon, Leon County Health Department, “Proposed Onsite Sewage Disposal Requirements within the Primary Springs Protection Zone (PSPZ), Leon County”

- Explained Leon proposed rule: e.g. Systems proposed to meet Method 245, which requires a 50% reduction (with drip irrigation can get 70%) or 10 mg/L
- Approx 38,000 – 45, 000 septic systems in Leon County and about 5,000 in the PSPZ. Process in development to do inventory.
- Not sure Level 5 RME would work—recommended minimum number of septic systems needs to be 50,000.

Panelist 2: Pad Juarez, Wakulla County Health Department, “Septic Management Options for Low Population Counties”

- Inventory is needed
- On going maintenance of PBTS is not a problem as it is a requirement of their permit.
- Currently there are no funds to help economically disadvantaged people.
- Give Wakulla County Health Department the authority to implement the last provision of the Wakulla County ordinance and we will set up a fund and evaluate all the systems in Wakulla County for a inexpensive amount of money to the home owners.

Panelist 3: Pio Lombardo, P.E. - Lombardo Associates, Inc., “Management of Decentralized Wastewater Systems”

Questions that Need to be Addressed

- What is Decentralized Wastewater Management?
- How do we implement a level 4 or 5 RME?
- What are the cost \$\$ benefits of Decentralized Wastewater Management?

Basic Attributes of Decentralized Management Entity

- Administration
- Operation and maintenance
- Repair
- System upgrade/replacement

Summary Limits of Wastewater Treatment Technology		
	Nitrogen (mg/l)	Phosphorous
Wastewater Concentration	60	
On-Site Systems		
Conventional System	40 - 50	4 - 7
Innovative On-Site Technologies - Type 1	20	4 - 7
Innovative On-Site Technologies - Type 2	12	1
Innovative On-Site Technologies - Type 3	3	0.1 - 0.5
Cluster Systems		
Centralized Systems	3	0.1 - 1
	3	0.05
Water Quality Limits		
Public Health	10	N/A
Environmental	0.3	0.05

	Capital Costs per lb N removed per day	% of Centralized Option
Groundwater Treatment - Pump & Treat	\$ 63,107	16%
Groundwater Treatment - Riparian wetland	\$ 37,864	10%
I/A On-site system - Type 2	\$ 319,744	82%
I/A On-site system - Type 3	\$ 216,043	56%
Cluster System	\$ 288,058	74%
Centralized System	\$ 388,878	100%

Administration of Decentralized Management Entity

- Ownership management
- Use regulation
- Regulatory compliance reporting, i.e. monitoring, permit requirements
- Customer service, billing, and collections
- User-charge system
- Financial
- Program management for capital improvements

Operation and Maintenance Issues of Concern to a RME

- Electricity use
- Labor
- Chemicals
- Equipment servicing
- Residuals removal and ultimate disposal
- Routine repair/parts replacement
- Equipment and major component replacement

Decentralized Management Focus

- On-site systems
 - Conventional
 - Innovative
- Cluster systems
 - Large septic systems
 - Large innovative systems
 - Mini-sewer systems



Management Responsibilities

	Level 4	Level 5
1. Administration	RME	RME
2. O&M		
3. System Repair	Owner	RME
4. Amortization of system upgrade/ replacement		
5. Future Capital Repair Fund (Depreciation Account, insurance)	Owner	RME



Management Model Overview

Level	4	5
Owner	Property Owner	RME
Operational Responsibility	RME	RME
Permittee	Owner	RME
Warranty	Owner (RME limited)	RME
RME Responsibility	Limited	Total

7

Environmental Engineers/Consultants
LOMBARDO ASSOCIATES, INC.

Decentralized Wastewater RME (4)

- Service organization
- Economies of scale
- Can be public or private
 - Public wastewater department
 - Private utility
 - Franchise
 - Open competition
- May be subject to FL PSC regulations when flows >10,000 gpd or 40 EDUs

Decentralized Wastewater RME (5)

- Provides “sewer equivalency”
 - Owner pays a bill
 - RME does any repairs
 - Contractual language prevents/minimizes abuses
- Can be public or private
 - Public wastewater department
 - Private utility (franchise)
- May be subject to Florida Public Service Commission regulations when flows >10,000 gpd or 40 EDUs

How do we implement a level 4 or 5 RME?

Implementation Steps

- Step 1 – Needs Analysis and Develop Repair, Replace, Upgrade Plan
- Step 2 – Optimize System Management
 - Pumping
 - Monitoring
 - Routine O&M
- Step 3 – Asset Management
- Step 4 – Repairs, Replacement, Upgrades

Benefits of Proper Management

- \$\$\$ - Significant savings are not unreasonable to achieve
- Allows for smart growth management
- Protective of public health and environmental resources
- Provide sewer equivalency at lower cost

Wakulla County Statistics

Housing Units, 2004	11,484
Number of Septic Systems	9,476 - 11,436
Older than 10 years	58%
20 years	37%
Number of Septic Systems in Springhead High Recharge Area	3,154
Number of New Installations	
1970-2005	9,698
Leon County	37,867
Annual Failure Rate of Well Managed Septic Systems	1.0 - 1.5%
Therefore Useful Life	~80 years
Annual Expected Number of Repairs- Wakulla	~100

Examples of Components of User Charge Structure – Level 5

	Existing Developed - Repairs	Existing Developed Non-Repair	Existing Undeveloped	Once Developed
Annual O&M Costs				
Admin	\$25	\$25	\$25	\$25
Septage	\$35	\$35	\$0	\$35
Operations	\$30	\$30	\$0	\$30
Maintenance	\$85	\$55	\$0	\$85
Monitoring	\$25	\$25	\$0	\$25
Connect Charge	\$ 0 – \$ 10,000	\$0	\$0	\$0
Annual Debt Service	\$0 - \$ 800	\$0	\$0	\$0
Capital Repair Fund	\$100+	\$180	\$0	\$100
<i>Total Annual Charge</i>	<i>\$300+</i>	<i>\$350+</i>	<i>\$25</i>	<i>\$300</i>

TMDL Expectations

- Significant Percentage of On-Site Systems will Require Denitrification
 - % will depend on % N Removed by PBS
 - Lower % Removed = more systems to achieve required mass removal

- Capital Improvement Program Requirements

Closing Thoughts

“Conventional septic systems will not get you to where you want to be—they got you to where you are”

- Does not support NSF Standard 245 for certifying nitrogen removing technologies,
- A level 5 RME does not need a minimum of 50,000 existing septic systems to be viable – less is OK
- Look at costs per pound/day Nitrogen removal
- Look at Performance-Based Systems by sorting by capital cost, denitrification rate, electric and other operating/maintenance/repair/replacement costs (cost being first)
- Costs to consider for RME: Annual O&M: - administration, septage disposal, operation, maintenance, monitoring, annual debt servicing, * User charges when they include Capital costs of repair /replacement (important)...can consider delaying replacement funding of depreciation account (i.e. sinking fund) in early years-then add on.

Recommendations

- Pursue Stimulus & SRF Funding
 - 20% Set-aside for Innovative Projects –must apply by June and be “shovel ready” within 12 months.
- Address Affordability for Low Income Families
 - Grants exist for this purpose
 - “Lifeline ”Rates can be established –similar to electric rates
 - Allow User Fees to accumulate until property sold.
 - Property value increase should be greater than cost of improvements
- Consider use of cluster systems (minisewers) for higher density areas

Focus on:

- Innovation that provide or hold promise for cost savings
- Risk Management not risk avoidance
- Least Life Cycle Cost Options
- Systems that are simple to operate and maintain with little homeowner participation
- Consider Private Public Partnerships
- Hold system providers accountable for nitrogen removal claims and system performance
 - Buy performance not products
 - Review Performance in US EPA and State Field Evaluations such as:
 - LaPine, OR
 - Barnstable County, MA (Cape Cod)
 - New Jersey Pinelands
 - Montana

Panelist 4: Kevin White Ph.D., Chairman of the Department of Civil Engineering at the University of South Alabama, “Centralized Management of Decentralized Wastewater Infrastructure: Experiences in Mobile Alabama”

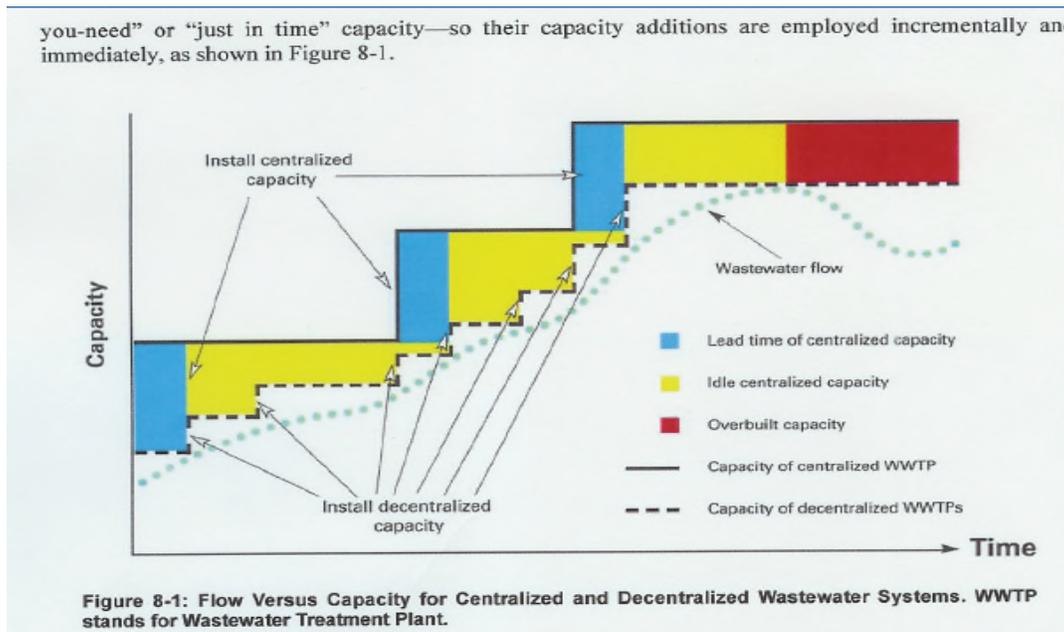
Examine Community Needs

- Whole system, life-cycle analysis of wastewater choices

- Integrated Water Management where possible, drinking, wastewater, stormwater—better financially—keeps systems working in perpetuity
 - Drinking Water
 - Wastewater
 - Storm water
 - Watershed-Based....thus, regionally cooperative
- All costs and benefits (life cycle assessment)
 - Capital investment
 - Operation and maintenance costs
 - Rehabilitation or replacement

Financial Planning and Financial Risk

- Decentralized is “Build and fund as you go”—can design for a shorter time span, can target pollutant removal more effectively.
 - Better matches capacity to growth in demand
 - Moves capital costs to the future
 - Reduces “net present value”
 - Less debt incurred
 - If growth is LESS than expected, you don’t get stuck with excess capacity, and an inability to pay for it
 - Small decentralized investments over time allows you to adjust technology choices as improved or cheaper alternatives become available



Decentralized Wastewater Management

- Collection, Treatment, and in-ground reuse NEAR the point of generation.
- Minimizes wastewater:
 - Volumes
 - Infrastructure
 - Costs
- Facilitates “smart growth” concepts

- Enhances property value and “livability”
- Integrated into an overall plan of wastewater management (Utility Managed!)

Decentralized Sewer Model...

- Minimize Infrastructure and costs
 - Pretreatment – solids digestion
 - Collection – short length, small diameter
- Simple Treatment – low biosolids production
- In-ground dispersal and/or reuse
- **Regulated Utility Managed**
 - Construction specs
 - Treatment system operation
 - Long-Term collection and treatment system maintenance, including septage management
 - Billing

Traditional “Centralized” Sewer is characterized by....

- Long lengths of pipe
- Large diameter pipes
 - To handle large flows and solids
- Subject to infiltration and inflow (rain water)
- Large, complex treatment plants
- Discharge of effluents to surface waters
- Costly \$\$\$\$

Effluent Sewer (alternative collection – Solids kept on-site –just liquids go to treatment plant)

- Interceptor tank at each home removes solids (and liquefies)
- Only Liquids only are transported in the sewer
- Small-diameter (2-inch to 4-inch PE) sewers are the norm



Decentralized Sewer Costs

- Up Front Capital Costs ~ \$6800/home
 - collection system (sewer lines)
 - treatment plant
 - in-ground dispersal or irrigation reuse
- Tap Fee (when home is connected) ~ \$4200/home

- for tank, effluent filter, & pump
- Total \$11,000/home (25% to 50% less than traditional “centralized” sewer)
- O&M Costs ~ \$22/month/home

Utility Management Model

- Developer
 - Pays utility \$750 to \$3000 per lot—for WWTP
 - Deeds land to utility (WWTP)
 - Installs sewer main in development (2”-4”line)
 - (builder/home buyer) pays “tap fee”(\$1800-\$3600) as each house is sold
 - Onsite components (tank, pump, connection, etc.)
- Utility
 - Builds and operates WWTF
 - Installs and maintains STEP or STEG systems onsite
- Homeowner
 - Pays a monthly sewer fee (\$35-\$40/month)

Recommendations & Summary - Decentralized Wastewater Management

- Best management is a Wastewater Utility (Level 5)
- Can be used to coordinate water mgmt strategies throughout springshed
- Smaller scale wastewater management
- Lesser infrastructure and cost
- Protects public health & the environment
- Can enhance property values and livability
- Follows “smart growth” ideals
- Integrate into your overall Water Management System
- Must do a life cycle analysis (20-30 yrs) with cost analysis
- Consider decentralized wastewater centrally managed

“Technology is not a limitation—our limit is creative ability to manage”

Panelist 5: Ron Piasecki, President, Friends of Wakulla Spring, “Systems Management and Property Rights”

What is the Most Suitable OSTDS Management Entity for Wakulla County?

- Wakulla County, through ordinance and policies, has determined that water quality is of primary importance.
- The selection of a suitable management entity depends on the maintenance needs of the septic systems.
- Research and public discussion are integral to the management selection process.
- Technical, legal, and financial advice should be tapped early to assess the options.

Factors to consider when establishing a Management System

- Ability to provide policy and management continuity;
- Ability to charge fees for service;
- Ability to compel users of the services to comply with the requirements of the management system (e.g., service and inspections);
- Capacity to maintain adequate financial responsibility;

- Ability to hire and retain qualified employees;
- Ability to provide adequate enforcement of septic systems requirements;
- Billing options such as monthly or annual fees added to property tax bill needs to be addressed.

Property rights and the education of homeowners

- Concern for homeowners property rights.
- Requirement for education of homeowners:
 - Reasons for maintenance;
 - Types of systems available;
 - Permitting process;
 - Financial resources available for homeowners to make repairs or upgrade systems.

Recommendations for Wakulla County

- Public should be educated and involved in wastewater management decision making processes and include homeowners, public officials, developers and real estate professionals, scientists, and the business community.
- Centralized management by the Wakulla County Health Department.
- Annual assessments for all septic systems in the county. (Lower fees for standard septic systems.)
- Wakulla County Health Department should be responsible for the following:
- Maintaining data base of all systems in the county.
- Annual inspections of all septic systems.
- Contracting with local contractors for pump outs and for maintenance contracts for Performance Based Septic Systems.
- Permitting of repair and new systems.
- Recommending policy changes to Board of County Commissioners (BOCC).
- Recommending annual fees- it might compel users to comply if there were billing options

Major Points

- Should be a centralized management system under County Health Department.
- Strong requirement for public involvement and education.
- Property rights of homeowners need to be discussed with homeowners.
- State funds acquired for grants or low interest loans for homeowners.

Panelist 6: Bob Sheets, CEO of Government Services Group, “Creating an Effective Septic Tank Management Authority”

The Governmental Utility Authority (GUA) Concept

- Separate utility authorities are authorized under Section 163.01(7)(g)1, Florida Statutes
- A GUA is an innovative home rule mechanism
- GUAs are governed by a locally-appointed Board
- Participating local governments have control over the GUA but do not incur any liability for debt or operations
- The GUA can be a multi-jurisdictional entity for septic tank regulation and management

Economic Advantages

- Bargaining power and clout

- Public ownership alternative
- Future system improvements financed on a tax-exempt basis
- Economies of scale
- Pool of professional resources
- Extensive management expertise
- Professional construction managers and inspectors
- Certified local government finance professionals
- Experienced local government managers

Management Advantages of Septic Tank Regulatory Authority

- Difference between failure and success is the implementation of effective management system
 - Currently property owners are responsible without accountability
 - Accountability will reduce system failures
 - Provide consistent management approaches
 - Flexibility in funding
 - Customer service
 - Educate public
 - Improve public awareness
- Reliability, efficiency and responsiveness through centralized management
- Provide critical services without burdening local government resources
- Assist with
 - Recordkeeping/inventory/reporting
 - Planning
 - Training
 - Certification/licensing
 - Inspection/monitoring
 - Customer service (ombudsman)
- Public education
- Promotes and protects
 - Environmental quality
 - Public health
 - Homeowners investment
 - Community investment
 - Local tax base

Examples of Program Elements

- Administration
 - Public education
 - Planning
 - Performance requirements
 - Recordkeeping, reporting
 - Financial assistance
- Operation and Compliance
 - Training, certification/licensing
 - Inspections, monitoring
 - Corrective actions and enforcement

Getting Started

- What Do You Want to Accomplish?
 - Records Management

- Public Education
- Fee Collections
- Oversight without burden on local government
- Consumer Protection
- Environmental Protection
- Water Resource Protection
- Citizen Financing Options
- Local Business Preference – keep revenue in community
- Next Step
 - Determine role and members of entity
 - Determine governance alternatives
 - Develop funding alternatives based on different levels of service
 - Draft Interlocal Agreement

Strategies for Success

- Identify Stakeholders
 - Government
 - Citizens
 - Builders
 - Service Providers
- Foster Community Involvement
 - Education
- Develop Management Plan
 - Outline clear and specific goals
 - Develop public outreach program
 - Outline role of entity and structure
 - Specific and measurable performance requirements and compliance reporting
 - Outline performance requirements, corrective actions and inspection/monitoring
 - Training and certification/licensing
 - One size does NOT fit all
 - Implementation can be phased
 - Prioritize “hot spots”
 - Develop indicators to determine progress and success
 - Implement and adapt management plan as necessary
 - Start small
 - Develop Budget and Funding Plan
 - Drivers that Impact Dollars
 - Type of septic system
 - Frequency of inspections
 - Other services that may be provided by entity
 - Remember There is no such Thing as “Preliminary Numbers”
 - Manage expectations

Benefits

Addresses Public Policy Issues:

- Protection of property value
- Water conservation
- Preservation of tax base
- Life-cycle cost savings
- Effective planning – flexible options

Flexible Funding Options:

- Special assessment collected on tax bill
 - annual inspections and oversight
- Unencumbered local government financial resources
 - Independent bonding capacity
 - Bank loan
- Ability to lend money to replace/repair failed systems
 - Low interest loan collected on tax bill
 - Hardship policy
 - Mitigation policy

Closing

- Begin with realistic goals
- Show benefits and cost of program vs. cost of doing nothing
 - Unpermitted systems
 - System failures that go unnoticed
- Form Working Group from affected Government, Industry and Citizens
 - Give Group clear objectives and timeframe

G. AGENDA



Agenda Wakulla Spring Restoration Workshop Antique Car Museum, Tallahassee February 25 and 26, 2009

Objectives:

- To develop solutions to restore the health of Wakulla Spring by reducing pollutants in the groundwater; and
- To bring local governments together to discuss and commit to exploring solutions and finding opportunities to reduce wastewater impacts.

Wednesday, February 25th

7:30 a.m. **Registration** (coffee and snacks)

8:00 a.m. **Welcome & Opening Remarks**

1000 Friends of Florida - Charles Pattison

City of Tallahassee – Commissioner Debbie Lightsey

Leon County – Commissioner Bryan Desloge, Chairman

Wakulla County – Commissioner Howard Kessler, Chairman

8:30 a.m. **Science Overview**

Moderator: Jim Stevenson – Wakulla Spring Basin Working Group

Hydrology of the Wakulla Springshed

Dr. Todd Kincaid - H2H Associates

Nitrate Sources of the Wakulla Springshed

Hal Davis - U.S. Geological Survey

Septic Tanks and Groundwater Quality in the Wakulla Spring Basin

Dr. Brian Katz - U.S. Geological Survey

9:40 a.m. **DEP Regulatory Update**

Wakulla Spring TMDL & Proposed Nitrate Standard for Springs

Jan Mandrup-Poulsen - Department of Environmental Protection

10:00 a.m. **Break**

10:30 a.m. **Session 1: Land Use Planning**

Moderator: Wendy Grey - Wendy Grey Land Use Planning

Comprehensive Plan Policies for Springs Protection

Wayne Tedder - Tallahassee-Leon County Planning Department

Wakulla County-A History of Protection; A Future of Partnership

Lindsay Stevens, Wakulla County

Low Impact Development

Eric Livingston - Department of Environmental Protection

Case Studies:

Southside Development of Regional Impact

Jorge Gonzalez - St Joe Company

Longleaf Plantation: A Sustainable Community

Bob Routa – N.G. Wade Investment Company

Florida Springs Task Force Award Presentation

12:00 p.m. **Lunch - Water Sustainability and the Future of Florida**

Cynthia Barnett – Senior writer, Florida Trend magazine

1:30 p.m. **Session 2: Wastewater Management**

Moderator: John Buss - City of Tallahassee

Progress Report: City of Tallahassee Advanced Wastewater Treatment Program

Jim Oskowis - City of Tallahassee

Successes, Concerns and Opportunities

Jack Leppert - Friends of Wakulla Spring

The Role of Package Treatment Plants

Sharon Sawicki - Department of Environmental Protection

Designing Wastewater Reuse to Protect the Environment

Erich Marzolf - St Johns River Water Management District

3:00 p.m. **Break**

3:30 p.m. **Session 3: Septic Tanks**

Moderator: Scott Henderson – Green Utility Districts, LLC

Septic Systems: Form and Function

Eberhard Roeder - Department of Health

The Nitrogen Cycle, Septic Tanks and Karst Terrain

Jeff Chanton - Florida State University

Meeting the Requirements of Performance Based System Ordinances

Anthony Gaudio - Florida Onsite Wastewater Association

Evolving Changes – Involving and Educating Homeowners

Patti Sanzone - Department of Environmental Protection

5:00 p.m. **Adjourn**

Thursday, February 26

8:00 a.m. Session 4: Septic Systems: Management

Moderator: Julie Harrington - Florida State University

Proposed Onsite Sewage Disposal Requirements within the Primary Springs Protection Zone, Leon County

Alex Mahon – Leon County Health Department

Septic Management Options for Low Population Counties

Pad Juarez - Wakulla County Health Department

Management of Decentralized Wastewater Systems

Pio Lombardo, P.E. - Lombardo Associates, Inc.

Centralized Management of Decentralized Wastewater Infrastructure: Experiences in Mobile Alabama

Kevin White - Ph.D., Chairman of the Department of Civil Engineering at the University of South Alabama

Systems Management and Property Rights

Ron Piasecki- President, Friends of Wakulla Spring

Creating an Effective Septic Tank Management Authority

Bob Sheets- CEO of Government Services Group

10:15 a.m. **Break**

10:30 a.m. Recommended Actions and Discussion

Moderator: Jim Stevenson – Wakulla Spring Basin Working Group

Land Use Planning: Wendy Grey

Wastewater Management: John Buss

Septic Tanks: Scott Henderson

Septic Systems Management: Julie Harrington

11:45 a.m. Wrap Up and Inter-local Commitment

Charles Pattison - Wakulla Spring Basin Working Group

12:30 p.m. **Adjourn**