



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

Tuesday April 10, 2007
9:30 am - 3 pm

Sylvan Lake Park
845 Lake Markham Road
Sanford, FL 32771



Agenda:

- Introductions
- Review Minutes of Meeting 02/06/07
- Wekiva Onsite Nitrogen Contribution Study status reports Tasks 1 - 4
- Updates on other projects
- Public Comment
- Closing Comments, Next Meeting, and Adjournment



Introductions & Housekeeping

-
- Travel reimbursement forms



Review Minutes of Meeting

02/06/07

- See draft minutes
- Two changes will be to add Scott Womble and Bill Melton to the attendance list



Wekiva Onsite Nitrogen Contribution Study

Overview of Tasks

- Task 1: Field Study to identify and quantify nitrogen loading at a few sample OWTS in the Wekiva Study Area (Ellis and Associates, Inc.)
- Task 2: Categorization and Quantification of Nitrogen Loading from Onsite Wastewater Treatment System Types (Otis Environmental Consultants, LLC)
- Task 3: Assessment if OWTS are a significant source of nitrogen to the underlying groundwater relative to other sources; in particular enumeration and aggregation of OWTS loading (University of Florida)
- Task 4: Recommend a range of possible cost-effective OWTS nitrogen reduction strategies if significant (Staff)



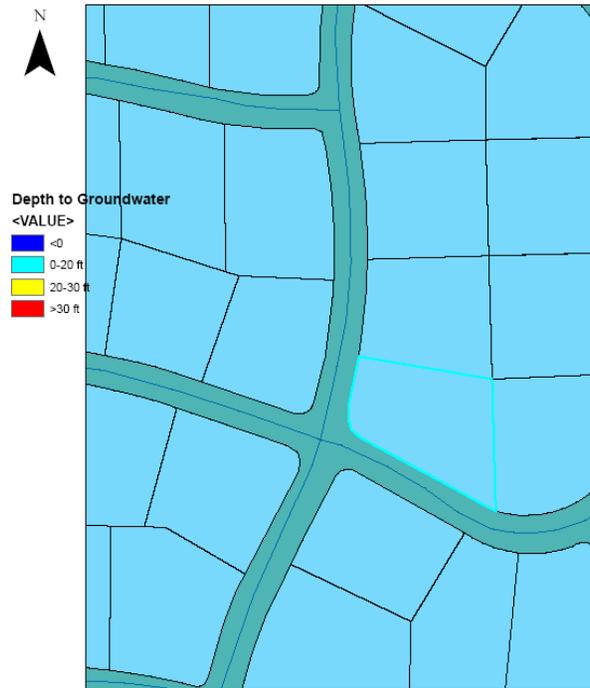
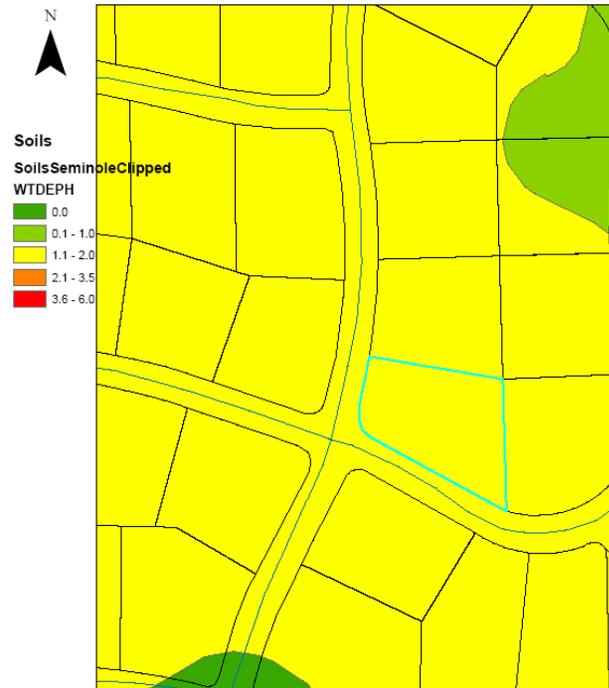
Wekiva Onsite Nitrogen Contribution Study

Task 1

- Sites selected for Seminole, Orange, and Lake County (details in upcoming slides)
- Sampling completed in Seminole and Orange. Lake County site is currently being sampled.
- Draft report for Seminole County site completed



Seminole County Site



Soils: Depth to Water
1.1 - 2.0 feet

Depth to Groundwater
0 - 20 feet

WAVA Protection Zone
Tertiary

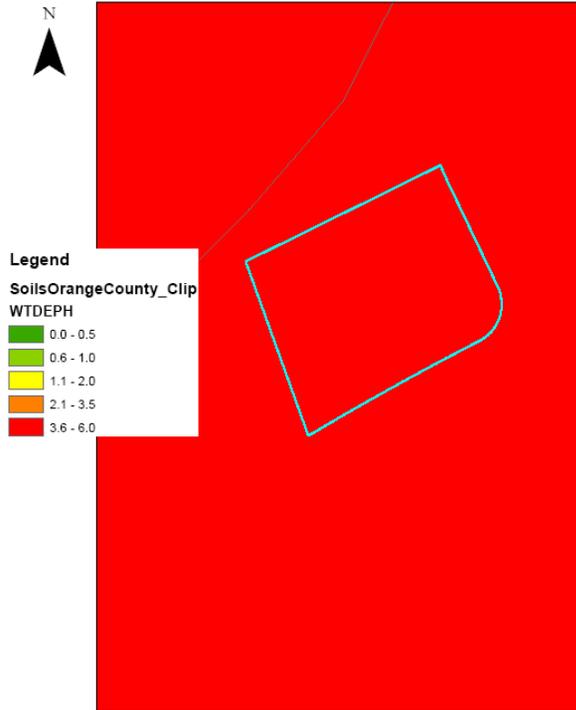


GIS Estimates vs. field verified findings for Seminole County site:

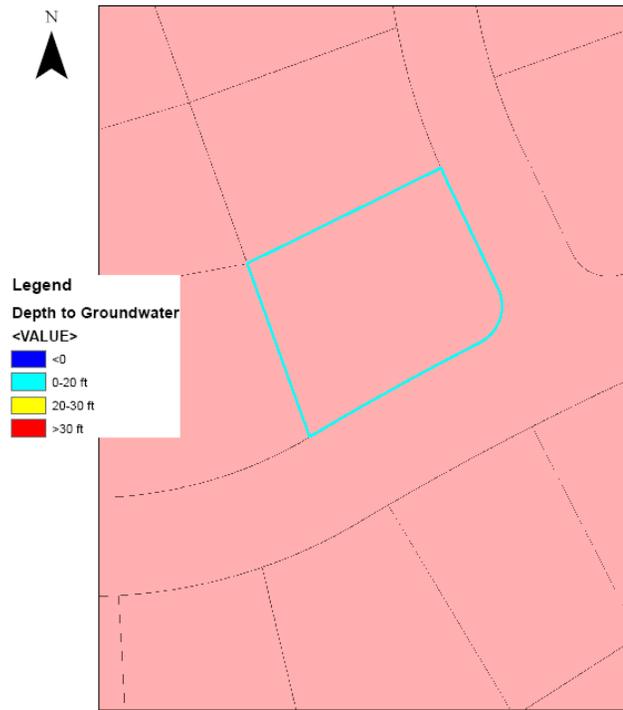
- Soil mapped as Myakka
 - Lowest estimated wet season water table elevation by soil type = 18 inches below grade
 - Depth to groundwater estimated at 0 to 20 feet
- Soil similar to Myakka
 - Observed water table from soil profile = 27 to 60 inches below grade



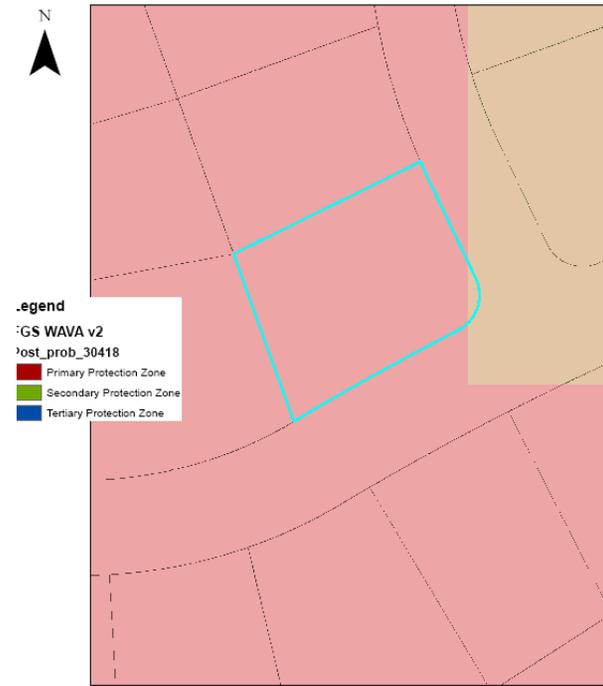
Orange County Site



Soils: Depth to Water
3.6 – 6.0 feet



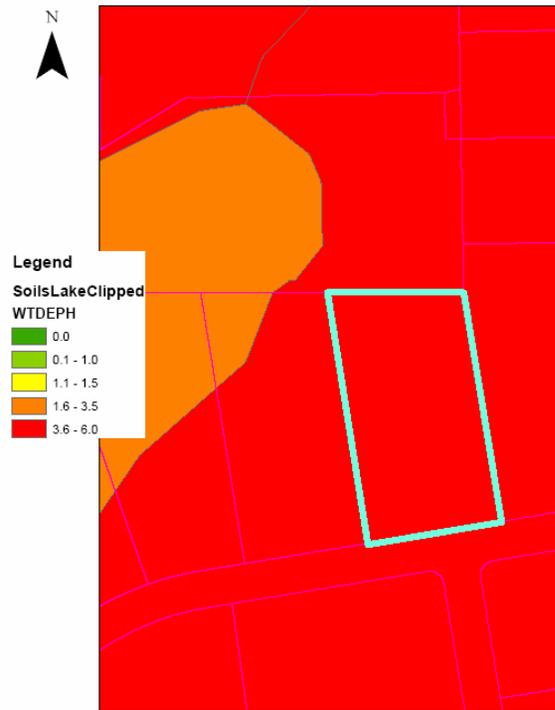
Depth to Groundwater
> 30 feet



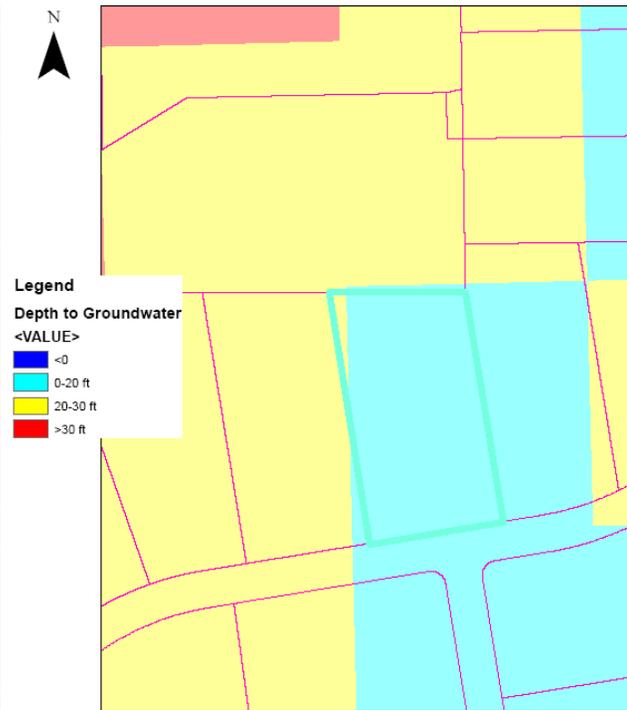
WAVA Protection Zone
Primary



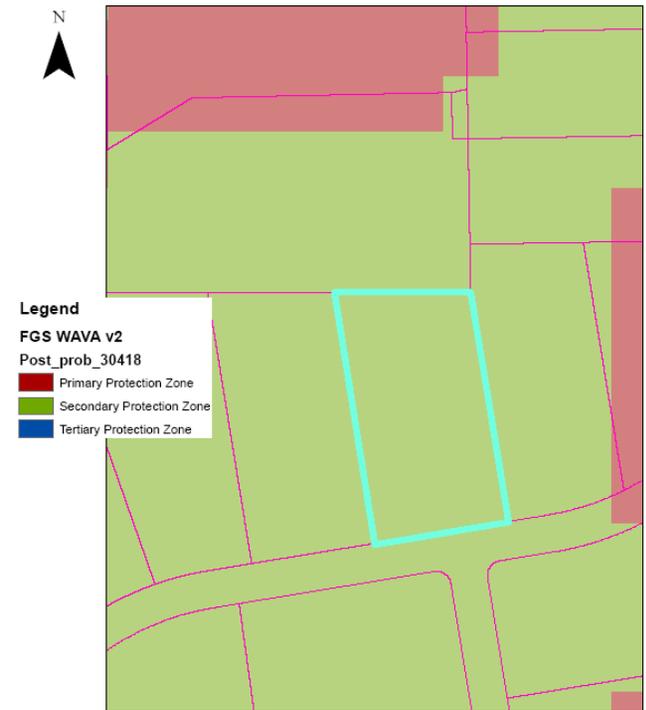
Lake County Site



Soils: Depth to Water
3.6 – 6.0 feet



Depth to Groundwater
0 - 20 feet



WAVA Protection Zone
Secondary



Wekiva Onsite Nitrogen Contribution Study Task 1

- Presentation by Mark Mechling with Ellis & Associates



Wekiva Onsite Nitrogen Contribution Study Task 2

- Presentation by Richard Otis with Otis Environmental Consultants, LLC



Wekiva Onsite Nitrogen Contribution Study

Task 3

- Presentation by Linda Young with the University of Florida



Wekiva Onsite Nitrogen Contribution Study Task 4

Range of Cost Effective Strategies

Status:

Reviewed information from permitting database

Continued cost gathering for typical systems for various treatment levels

Outline along management elements of EPA's guidelines



Discussion on Disassembling Lysimeter Stations

- On 2/16/07 spoke with Deryl Wagner Civil Engineering Department at USF
 - Originally there were some administrators at USF that wanted the site cleaned up after the study was completed, and that DOH was going to do this
 - The College of Public Health along with the engineering department were interested in keeping the facility and using it for teaching.
 - He thinks that the university still has this position on the issue but that he will check and make sure of it.
 - Requested follow-up but have not heard back.
- Suggest keep site in place until we hear otherwise and possibly utilize it with a future project. One suggested project is answering the question:
“What is the treatment effectiveness of OSTDS for pharmaceuticals and new viruses?”



Updates on current projects



Florida Alternative Disposal Systems Assessment

- Contract executed February 16, 2007 with Dr. Kevin Sherman, On Site Management and Consultants, Inc.
- Tasks:
 - QAPP
 - Site selection and alternative drainfield material selection
 - Installation of systems for testing and associated sampling equipment
 - Assessment of treatment effectiveness and functioning of disposal systems
 - Report
 - Drainfield Removal / Training of DOH staff to continue project



Florida Alternative Disposal Systems Assessment

Alternative product selection (based on Centrax data):

- Alternative aggregate = EZ 1203 H
- Multi-pipe = PTI-11 pipe
- Chamber = Infiltrator EQ 36

Aggregate selection (based on survey of County Health Departments, septic contractors, and aggregate distributors in the Central Florida area as well as recommendation by provider):

- #5 limestone



Florida Alternative Disposal Systems Assessment

- Draft QAPP in packages
 - DOH to develop GANNT chart to insert as Figure 3
- Questions
 - Do we want to use 12.5 sq ft or 15 sq ft of absorptive surface?
 - If 15 sq ft, EQ 36 would be cut to where the endplate may not fit, PTI and EZ1203H bundles would be 5 ft and 3.75 ft respectively
 - If 12.5 sq ft, EQ36 endplate fits??? Would we need to go to the Quick4 @ 12 ft/chamber???, PTI 11 and EZ1203H will be in odd bundle lengths (4.167 ft and 3.125 ft respectively)
 - If we go to 12 ft then we need 1 EQ36Quick4 chamber, 4 feet of PTI 11, and 3 feet of EZ1203H
 - Do we want all products at the same absorptive surface elevation or according to the manufacturer's recommendations?
 - Should the manufacturer's recommended barrier material be used on the PTI 11 and EZ1203H?



Florida Passive Nitrogen Removal Study

- Contract executed on March 30, 2007 with Dr. Daniel Smith, Applied Environmental Technology
- Tasks:
 - Literature reference database & report
 - Lab experiments with QAPP & report
 - Cost assessment database & report
 - Recommendations regarding design, permitting, installation, maintenance, control, and replacement of passive treatment media report
 - Final project report



Taylor County Source Tracking Study

- Final project report submitted (in packets)
- Summary of conclusions (page 67-69 of report)
 - No significant differences in ammonia trends between sewer & OSTDS
 - Nitrate levels low for all sampling events
 - Caffeine and optical brighteners ineffective tracers due to dilution, low development density, etc.
 - Good correlation between Enterococcus and E. coli and the change from seasonal low water table (SLWT) and seasonal high water table (SHWT)
 - Some of the highest E. coli densities were among the sewered areas but sewer was only recently installed and may still reflect previous contamination
 - Background sites had a low Enterococcus/E. coli ratio, and beach sites had high ratios showing human-derived sources of pollution
 - Sewered areas do not show improved water quality in comparison to areas that remain on OSTDS
- Additional work (page 70-71 of report)
 - Discussion on whether this would be a possibility



Monroe County PBTS Performance Assessment

- Contract executed
- Sampling began February 18, 2007



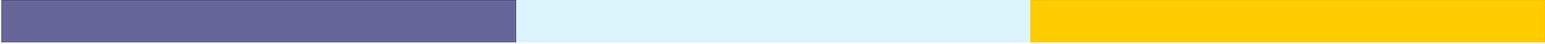
Manatee Springs, Phase II

- Contract amendment executed to extend the contract end date to September 30, 2007
- No cost extension requested from EPA
- Provider has expressed reluctance to continue contract with current prices as they are now outdated
- Suggested plan:
 - Cancel existing contract and write a new contract with new deliverable due dates and costs
 - RRAC discussion on plan (competitive / non-competitive procurement, etc.)



Remote Sensing of Optical Brighteners Study

- Decision to amend EPA and DOH scope of work to further refine the flow-through-fluorometer method
- Amendment process is ongoing
- DEP and Mote Marine are working on report on field sampling



Glass Cullet Assessment

- Report not received as of yet



Columbia County Well Testing Project

- CHD and Bureau of Water Programs fund testing of drinking water wells in similar situation as Magnolia II along the river. Sampling began 9/18 for pathogen indicators and nitrate.
- OSTDS plans to fund one additional event including analysis for TKN and TP (when available from DOH-labs), and TKN and TP part during high flow conditions. In addition proposing possible N-isotope sampling as well.



Projects coming up



319 Project on Performance and Management of Advanced Onsite Systems

- Revised scope in response to DEP comments



Sunshine Law Presentation

- Lucy Schneider, Esq.



Public Comment



Closing Comments, Next Meeting, and Adjournment

Important dates:

TRAP meeting: 5/17/07

Task 1 Field work final report due date: 5/30/07

Wekiva Commission meeting: 6/1/07

Final Wekiva report due: 6/30/07

Proposed dates for next meeting:

- Tuesday 6/12/07
- Tuesday 6/19/07
- Thursday 6/14/07
- Thursday 6/21/07

Do we want to meet to discuss Field work report, or the entire project report? If entire project report, suggest meeting closer to June 30, 2007 deadline.

Florida Department of Health

Research Review and Advisory Committee Meeting Summary

Meeting on April 10, 2007 at Sylvan Lake Park, Sanford

- **RRAC Members/Alternates Present:** Sam Averett, David Carter, Paul Davis, Marc Hawes, Bill Melton, Jim Rashley, John Schert, Clay Tappan, Pam Tucker, Ellen Vause, and Scott Womble. Seven out of nine groups were present, representing a quorum.
- **Review of Previous Meeting Minutes:** Minutes are to be amended to add Bill Melton and Scott Womble as having been in attendance. Minutes were approved as amended.
- **Wekiva Onsite Nitrogen Contribution Study:**

Summary of progress as of the last RRAC meeting and decisions made during the current meeting:

 - **Task 1** (Field Work, \$200,000):
 - Mark Mechling with Ellis & Associates, Inc. presented the draft report on the results of the first site which was located in Seminole County in the tertiary zone of the Wekiva Aquifer Vulnerability Assessment (WAVA). This draft report was posted by DOH at: <http://www.doh.state.fl.us/environment/ostds/wekiva/task1/DraftReport.zip>.
 - Mark Mechling outlines how the site meets the selection criteria developed by RRAC in previous meetings. Conductivity appeared to serve well as an indicator of the location of the effluent plume. The majority of the nitrogen found in the septic tank effluent and in the groundwater at this site is in the Total Kjeldahl Nitrogen (TKN) form. Nitrogen in this form must nitrify to the nitrate form prior to denitrifying. Average Total Nitrogen (TN) concentrations were 74 mg/L coming out of the septic tank, and 14 mg/L when averaging all groundwater samples underneath the drainfield. Average total nitrogen concentration in all samples from three locations on the property outside of the plume was approximately 2 mg/L, which is already at an elevated level compared to the background levels found at reference springs. The nitrate plume under the drainfield showed a reduction within 20 to 30 feet which could be due to denitrification, possibly promoted by organic matter in the

soil. The Total Nitrogen plume suggested reductions in concentration of 70% at approximately 80 feet from the septic tank and 98% at 130 feet. This reduction appeared to be mainly due to dilution.

- The Orange County site is in the primary WAVA zone and drilling has been completed. The Lake County site is in the secondary WAVA zone and drilling should conclude soon.
- Comments on the draft report should be submitted to Ellis & Associates from DOH by April 13'th. Any comments from the public should be directed to Elke Ursin for inclusion with comments by DOH, RRAC, and comments made during this RRAC meeting.
- **Task 2** (Categorization and quantification of nitrogen loading, \$25,000): Dr. Richard Otis with Otis Environmental Consultants presented on the progress. He has determined what categories he will use in his assessment of loading. He will use drainage class (excessively/somewhat excessively, moderately/well, and some what poorly/poorly/very poorly), water table depth (greater than or less than 3.5 feet), and organic matter content (greater than or less than 1%). He expects to have his table to DOH by the end of the week, and DOH is to post the table on the website once it is completed.
- **Task 3** (Assessment of the contribution of OWTS relative to other sources, \$25,000): Dr. Linda J. Young with the Department of Statistics at the University of Florida presented her progress to date. She made contact with the contractor performing the work for DEP (MACTEC) to see what methods they were using and ensure the Task 2 categories are relatable. The DEP method is mainly looking at land use classifications. Once she has received the information from Dr. Otis on Task 2 she will complete her portion for the overall nitrogen loading estimates in the Wekiva Study Area.
- **Task 4** (Cost-effective solutions): Eberhard Roeder presented the progress thus far. Cost information has been solicited from Lake, Orange, and Seminole counties for a typical system at various treatment levels. The outline will be similar to the management guidelines developed by EPA.
- **Updates on other projects:**

Several other projects that are proposed or ongoing were discussed. Some of the highlights:

 - **University of South Florida (USF) Lysimeter Station:** There was a discussion on the fate of the lysimeter station. USF has asked RRAC to propose projects on how to utilize the station. The

general consensus from RRAC is to keep the lysimeter station. There was a motion approved by all with no discussion for the department to move forward with a formal discussion with USF to develop a Memorandum of Understanding for the rehabilitation and continued use of the lysimeter station.

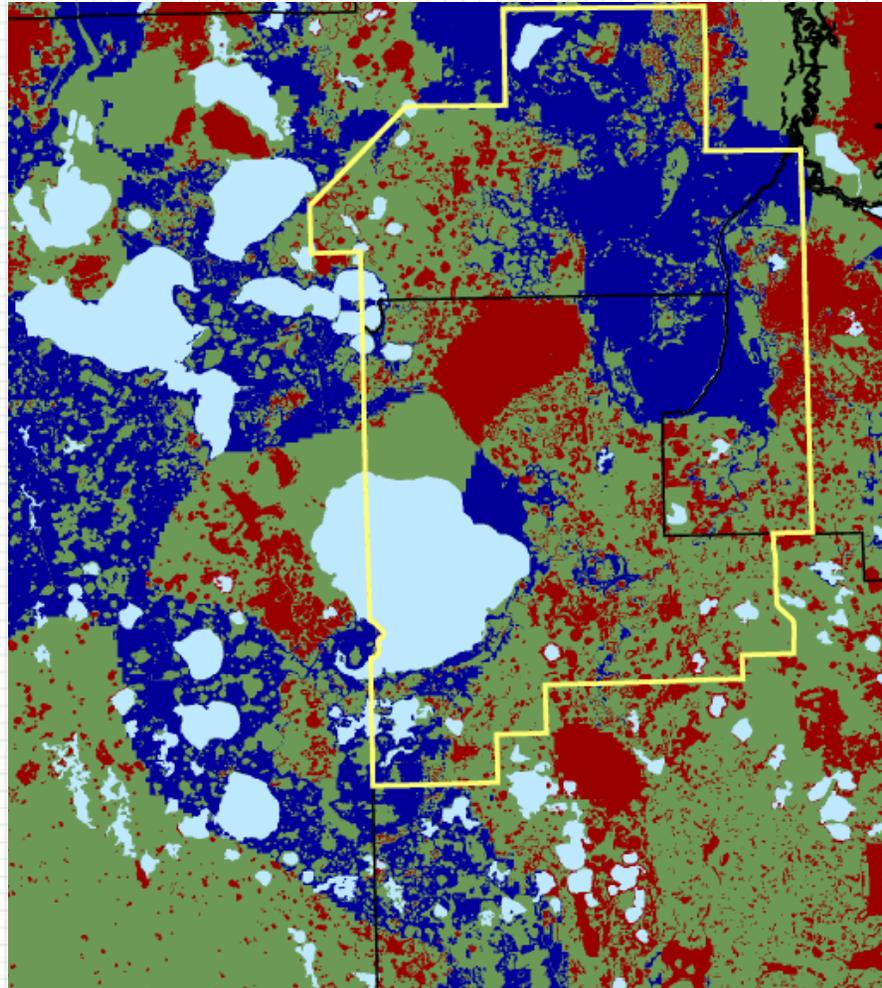
- **Florida Alternative Drainfield Product Assessment:** On Site Management Consultants, Inc. is the provider. Contract has been executed. The selected alternative drainfield products that will be used are Alternative aggregate = EZ 1203 H, Multi-pipe = PTI-11 pipe, Chamber = Infiltrator EQ 36 or Quick 4 EQ 36. These products were determined by looking at Centrax data over multiple timeframes. Aggregate selection = #5 limestone (based on survey of County Health Departments, septic contractors, and aggregate distributors in the Central Florida area as well as recommendation by provider). There was a discussion on how best to size the products so they are comparable to each other. RRAC directed staff to set up a meeting between the three selected alternative drainfield product manufacturers, DOH, and the contract provider to discuss any concerns or comments.
- **Florida Passive Nitrogen Removal Study:** Contract was executed on March 30, 2007 with Applied Environmental Technology.
- **Taylor County Source Tracking Study:** The final report has been submitted. There is a discussion on whether there is a possibility for additional work, and RRAC suggests staff present a list of priorities on what research needs to be done in Florida before making any commitments. Some of the conclusions:
 - No significant differences in ammonia trends between sewer & OSTDS
 - Nitrate levels low for all sampling events
 - Caffeine and optical brighteners ineffective tracers due to dilution, low development density, etc.
 - Good correlation between Enterococcus and E. coli and the change from seasonal low water table (SLWT) and seasonal high water table (SHWT)
 - Some of the highest E. coli densities were among the sewer areas but sewer was only recently installed and may still reflect previous contamination
 - Background sites had a low Enterococcus/E. coli ratio, and beach sites had high ratios showing human-derived sources of pollution

- Sewered areas do not show improved water quality in comparison to areas that remain on OSTDS
 - **Monroe County PBTS Performance Assessment:** sampling began February 18, 2007. Interim results of the sampling as they are available will be provided to RRAC for the next meeting.
 - **Manatee Springs, Phase II:** RRAC has directed staff to amend the contract to reflect current lab costs and updated deliverable due dates.
 - **Remote Sensing of Optical Brighteners Study:** Contract and EPA work plan shall be amended to reflect the scope of work change to further refine the flow-through-fluorometer method
 - **Glass Cullet Assessment:** Report has been received and will be posted on the website.
 - **Columbia County Well Testing Project:** Onsite sewage research program plans to fund one sampling event including analysis for TKN and TP (when available from DOH-labs), and TKN and TP part during high flow conditions. In addition RRAC has approved the addition of Nitrogen-isotope sampling as well.
 - **319 Project on Performance and Management of Advanced Onsite Systems:** Proposal has been submitted to DEP to collect data on Performance Based Treatment Systems, how they are managed, and where they are located.
- **Sunshine Law Presentation:** Lucy Schneider, Esq. with the general counsel office of DOH made a presentation on the Sunshine Law requirements.
- **Next Meeting:** A tentative date of May 10, 2007 was set, with the meeting beginning at 9:30 at Sylvan Lake Park in Sanford.

*******UPDATE ON NEXT MEETING DATE:** DUE TO A SCHEDULING CONFLICT AT THE PARK, THE NEXT MEETING HAS BEEN SET FOR MAY 8, 2007 AT SYLVAN LAKE PARK IN SANFORD STARTING AT 9:30 AM*****

Multiple Nitrogen Loading Assessments in the Wekiva Study Area

Part I: Investigation of an Onsite Wastewater Treatment System in the tertiary Wekiva Aquifer Vulnerability Assessment zone (Seminole County, Florida)



Wekiva Study Area Vulnerability Zones

March 2007

Figure 1. Regional view depicting Seminole County OWTS study site in relation to Wekiva River area

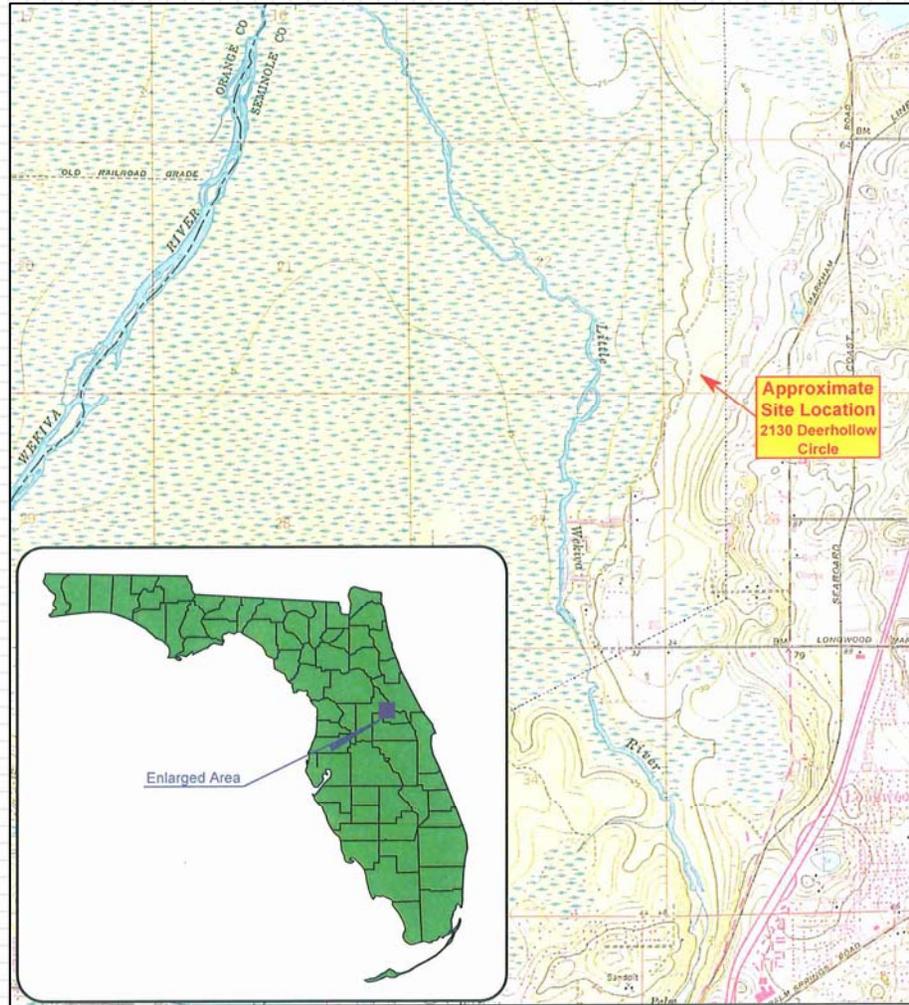


Figure 2. Groundwater flow direction at the Seminole County OWTS site

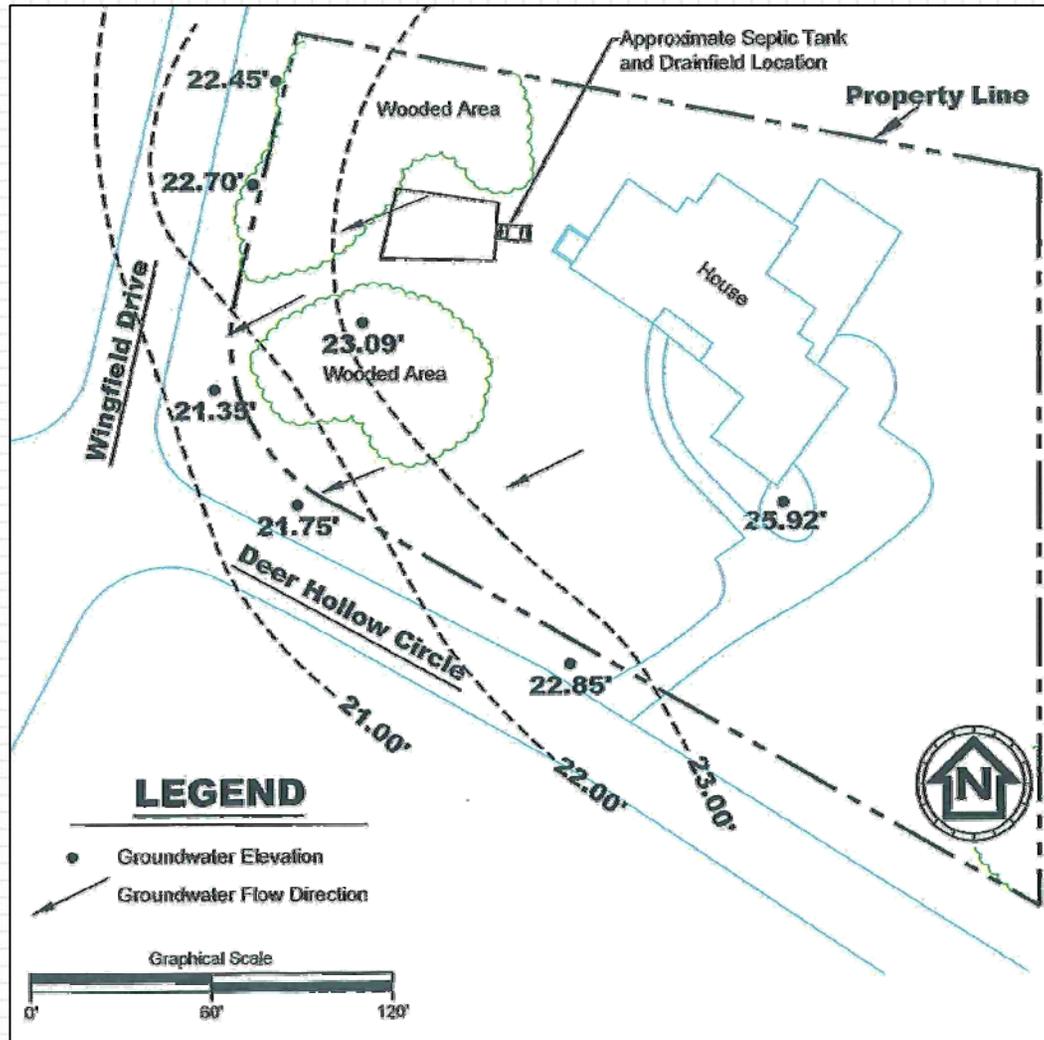


Table 2. Summary of USDA Soil Classification results from continuous soil sample SB-1.

Boring/ Sample No.	Sample Depth (ft.)	Mineral Content %	Organic Content %	Fines Content %	Natural Moisture Content %	USDA Soil Classification
SB-1	1-2	97	2.85	5	17	Dark Brown Sand
SB-1	6-7	99	0.79	2	21	Light Brown Sand
SB-1	7-8	99	0.18	5	17	Dark Brown Sand
SB-1	9-10	97	2.72	10	20	Dark Brown Sand
SB-1	11-12	99	1.37	7	18	Dark Brown Sand
SB-1	13-13.5	98	2.20	8	22	Dark Brown Sand
SB-1	15-16	99	0.97	9	17	Light Brown Sand
SB-1	16-18	99	1.07	5	17	Dark Brown Sand
SB-1	21-22	100	0.06	3	16	Brown Sand
SB-1	29-30	99	0.66	9	14	Grayish Brown Sand
SB-1	Mean	98.6	1.29	6	17.9	----



Table 3. Summary of average concentrations in STE samples from Deerhollow Circle site (DH) in Seminole County, Florida.

Sample Location	Concentration (mg/L)								Field Measurements		
	CBOD ¹	NO ₃	NO ₃ / NO ₂	NO ₂	TKN	N Total	P Total	TSS	pH	ORP	Conductivity
DH	180	0.19	0.55	0.35	73	74	8.9	49	6.69	-209	715

Table 4. Summary of Background Groundwater Quality, Seminole County OWTS Site

	Conductivity (µS/cm)	DO (mg/L)	NO ₃ -N (mg/L)	pH	TKN (mg/L)	Total N (mg/L)	Total P (mg/L)
Mean	228.2	1.2	0.159	6.19	2.057	2.285	2.95
Min	164.9	0.1	0.071	4.22	0.160	0.25	0.18
Max	308.0	4.0	0.400	7.46	11.00	12.00	8.37

Table 5. Summary of Average Groundwater Quality Beneath the Drainfield, Seminole County OWTS Site

	Conductivity (µS/cm)	DO (mg/L)	NO ₃ -N (mg/L)	pH	TKN (mg/L)	Total N (mg/L)	Total P (mg/L)
Mean	424.74	1.28	3.75	6.24	10.3	14.12	3.56
Min	183.0	0.1	0.075	5.52	0.47	0.68	0.18
Max	712.0	4.7	24.0	7.11	56.00	56.00	8.37



Figure 3. The nitrate plume encountered during the January/February 2007 Seminole County sampling event

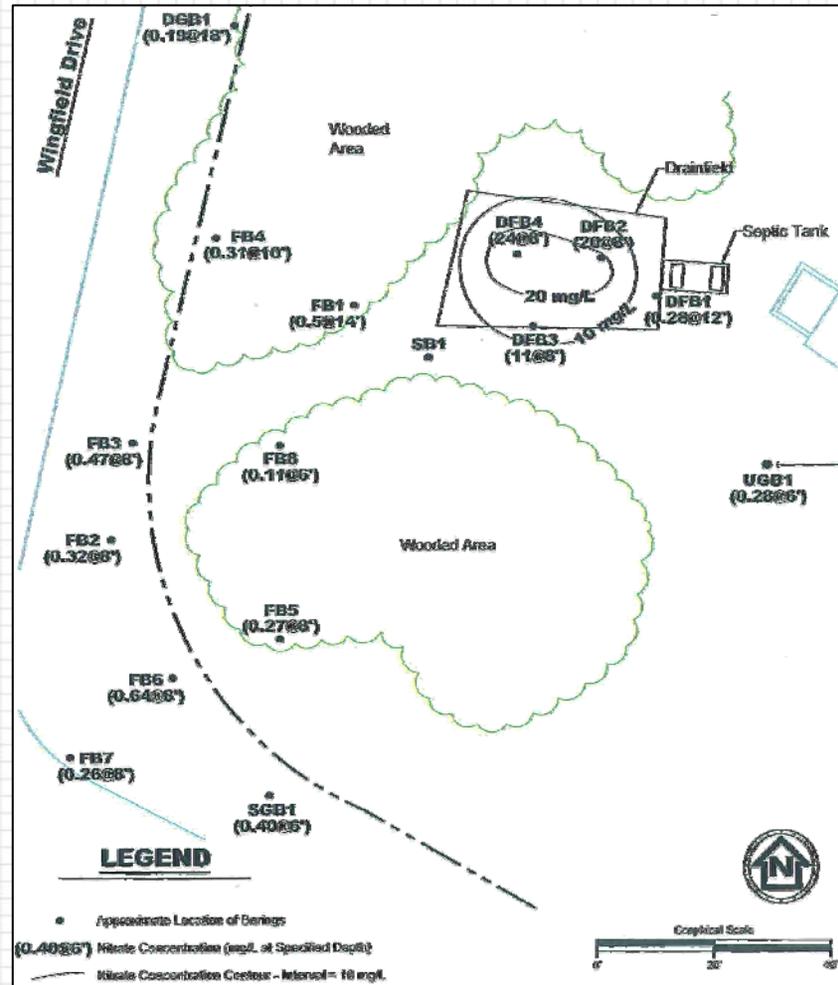


Figure 4. The total nitrogen plume encountered during the January/February 2007 Seminole County sampling event

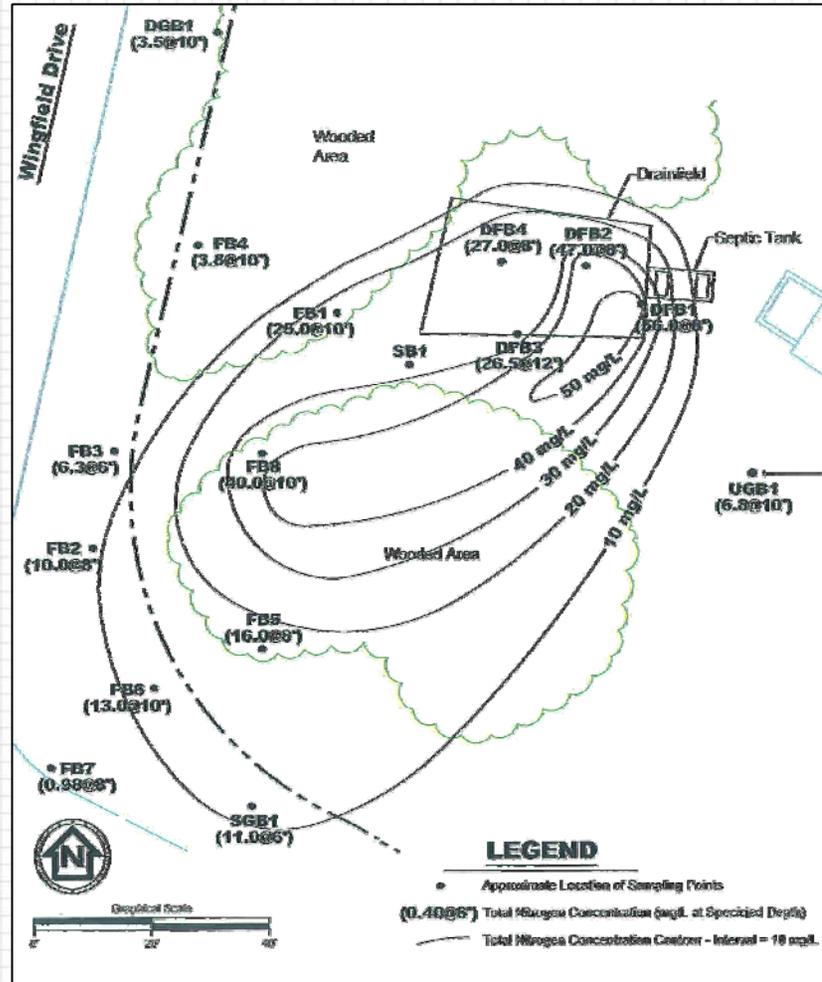


Figure 5. Locations of cross sections A-A' and B-B'

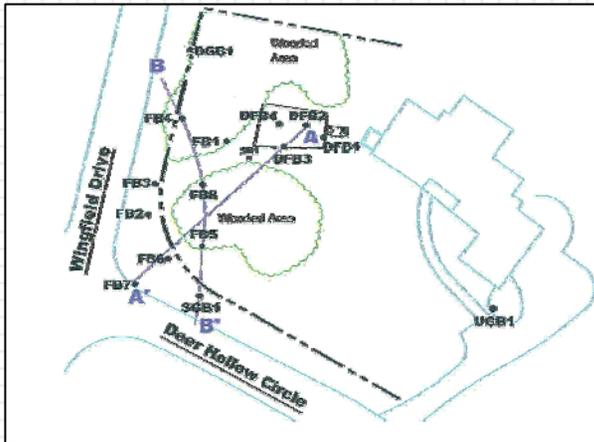
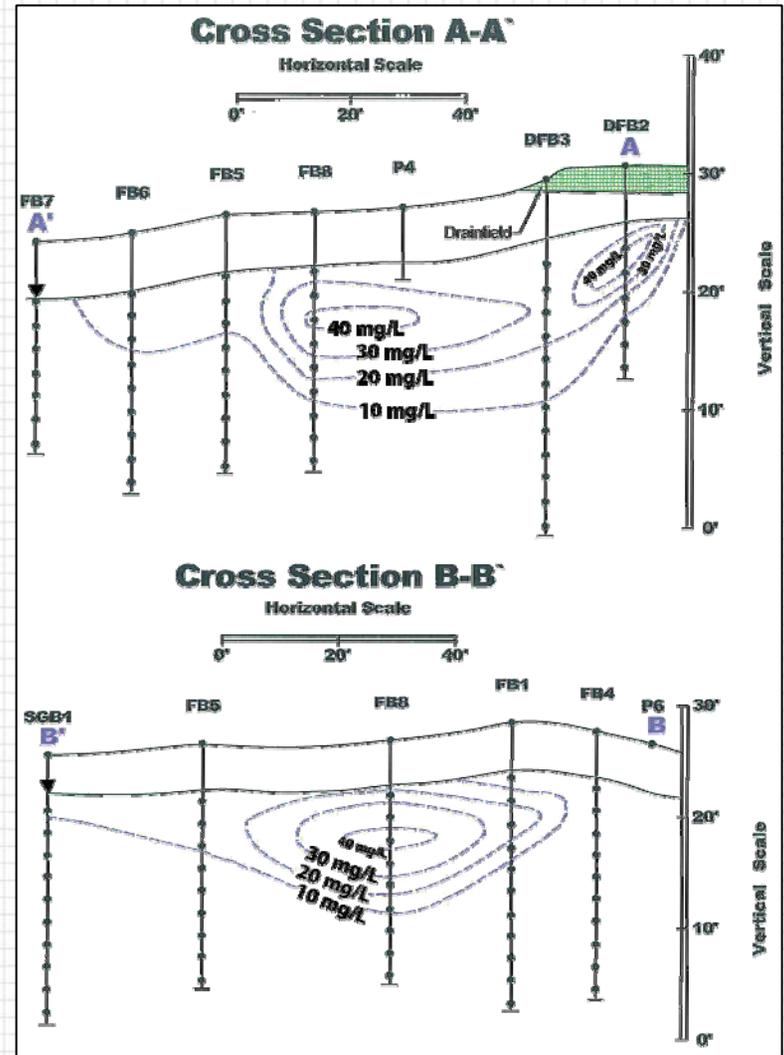


Figure 6. Cross sections A-A' and B-B' through the total nitrogen plume at the Seminole County OWTS site



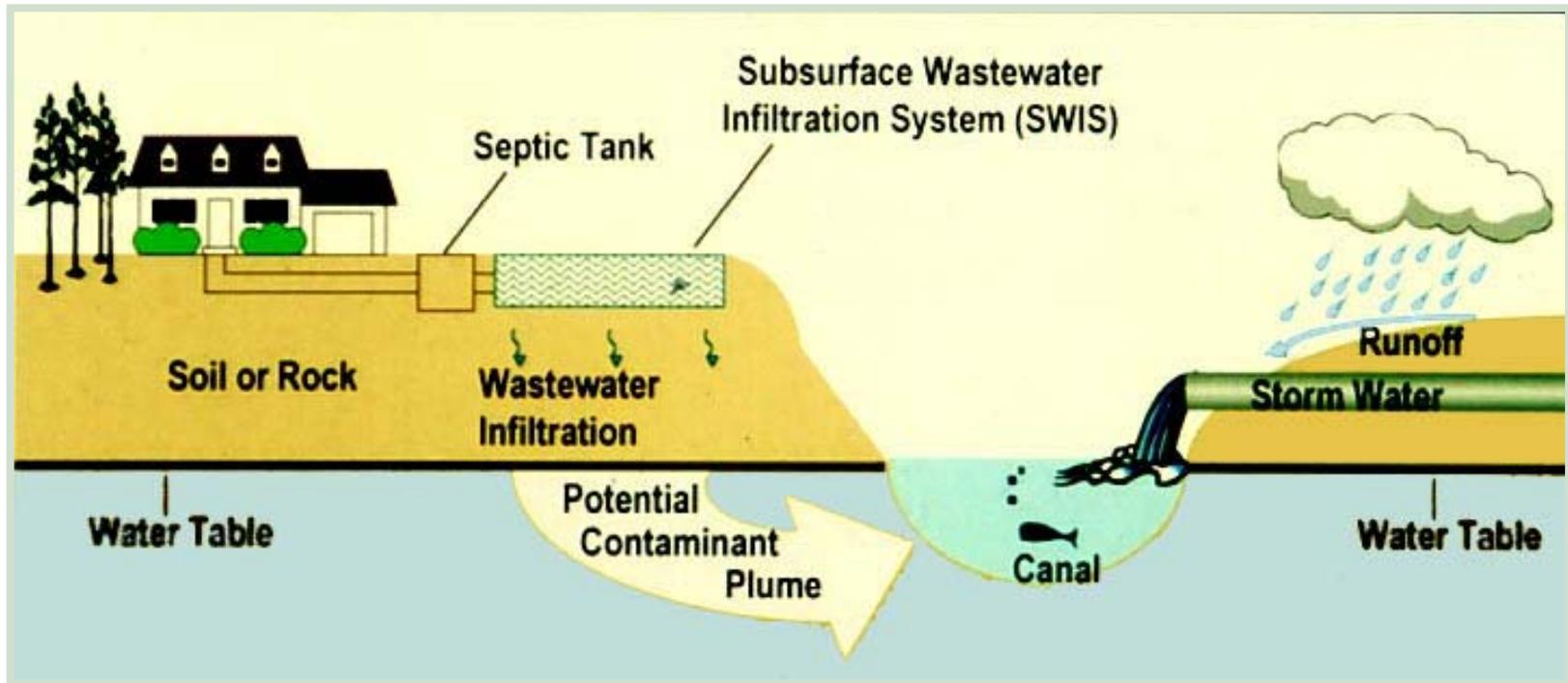
Wekiva Onsite Nitrogen Contribution Study

Task 2: Categorization and Quantification of Nitrogen Loading

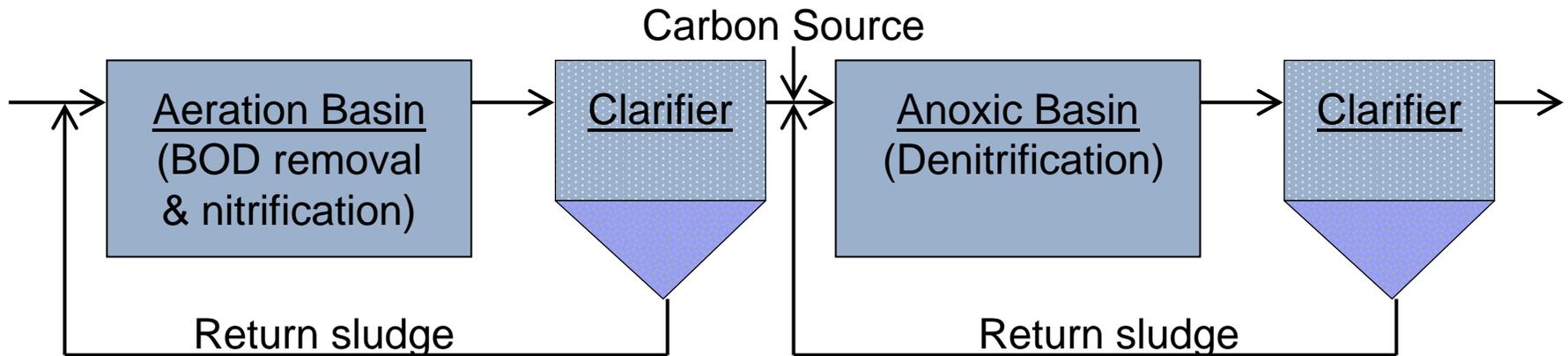
Research Review and Advisory Committee Meeting

April 10, 2007

Near-shore waters nutrient sources

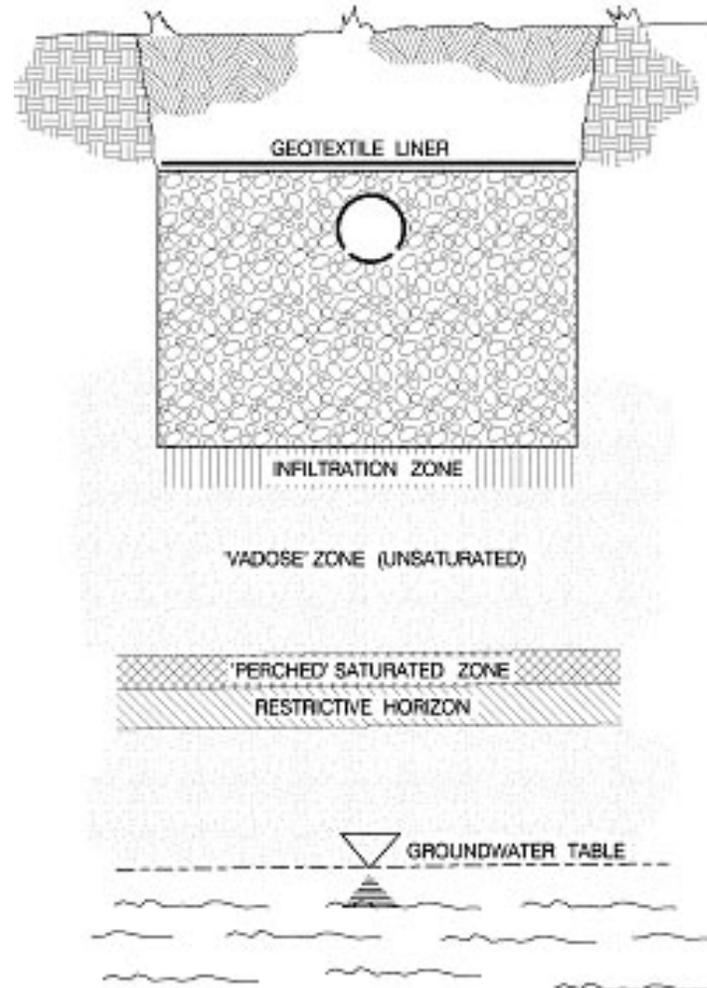


Two sludge system



- Two sludge systems can consistently produce effluents with $< 5\text{mg/L TN}$ as compared to 8 to 15 mg/L in single sludge systems
- Alkalinity is not recovered in two sludge systems
- Subsurface wastewater infiltration system acts as a two sludge system

N removal below an infiltration system



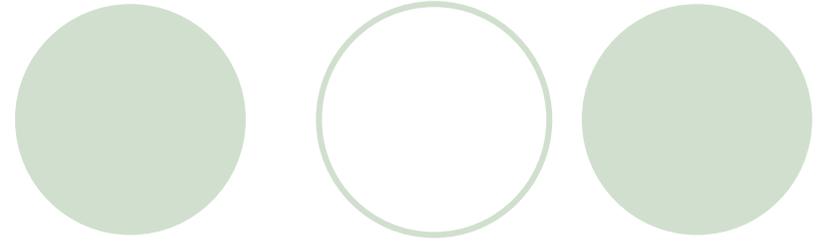
Performance of two sludge systems

Process	% TN Removal
Nitrification with C addition	50-98
Traditional subsurface infiltration	10-40
At-grade infiltration	40-80
Mound	40-80
Drip	30-50
Constructed wetlands (with pre-nitrification)	50-90

Necessary conditions for denitrification

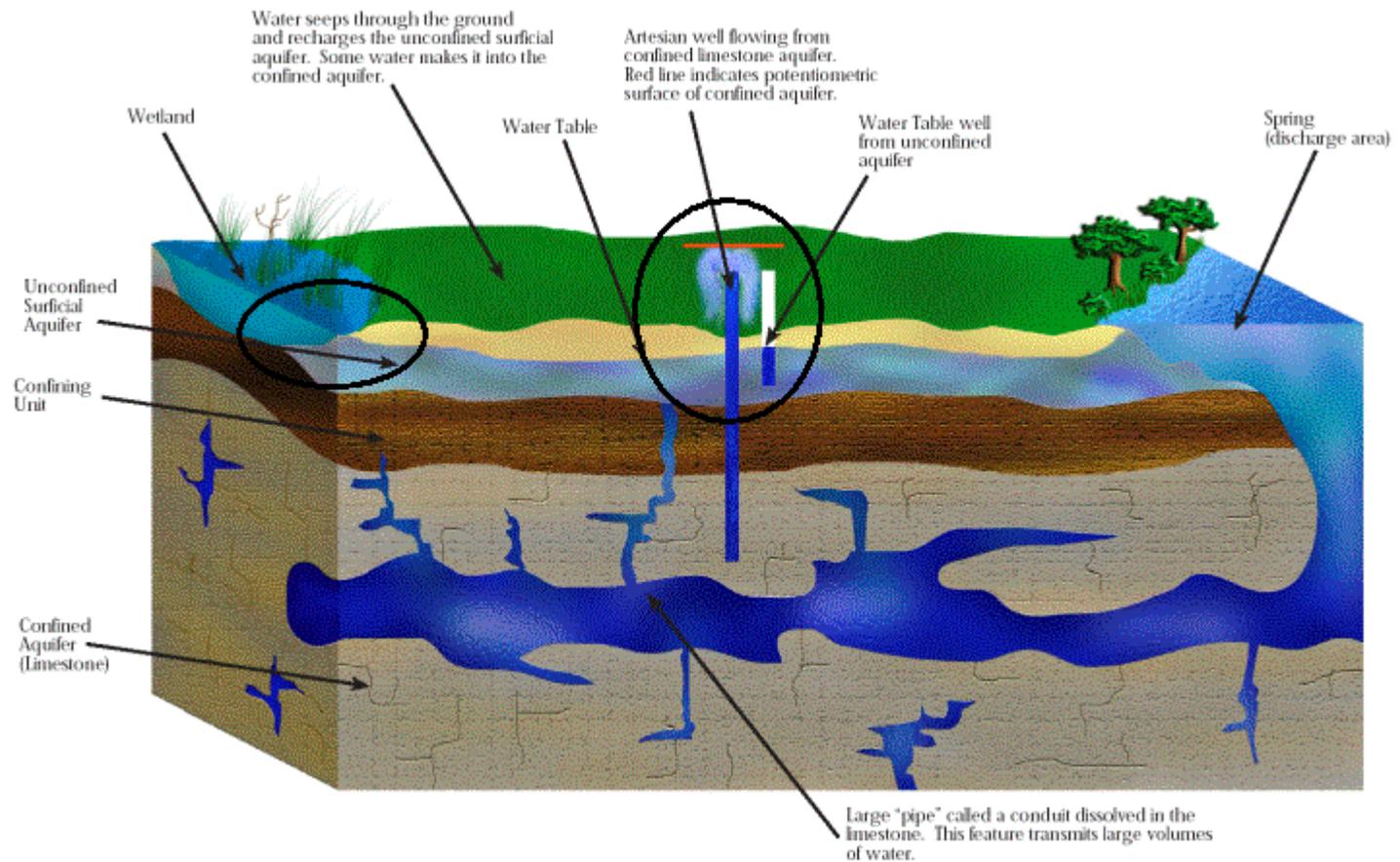
- Nitrified substrate
- Source of organic carbon
- Anoxic or anaerobic conditions
- Adequate residence time for biochemical reactions to occur

Soil Groupings

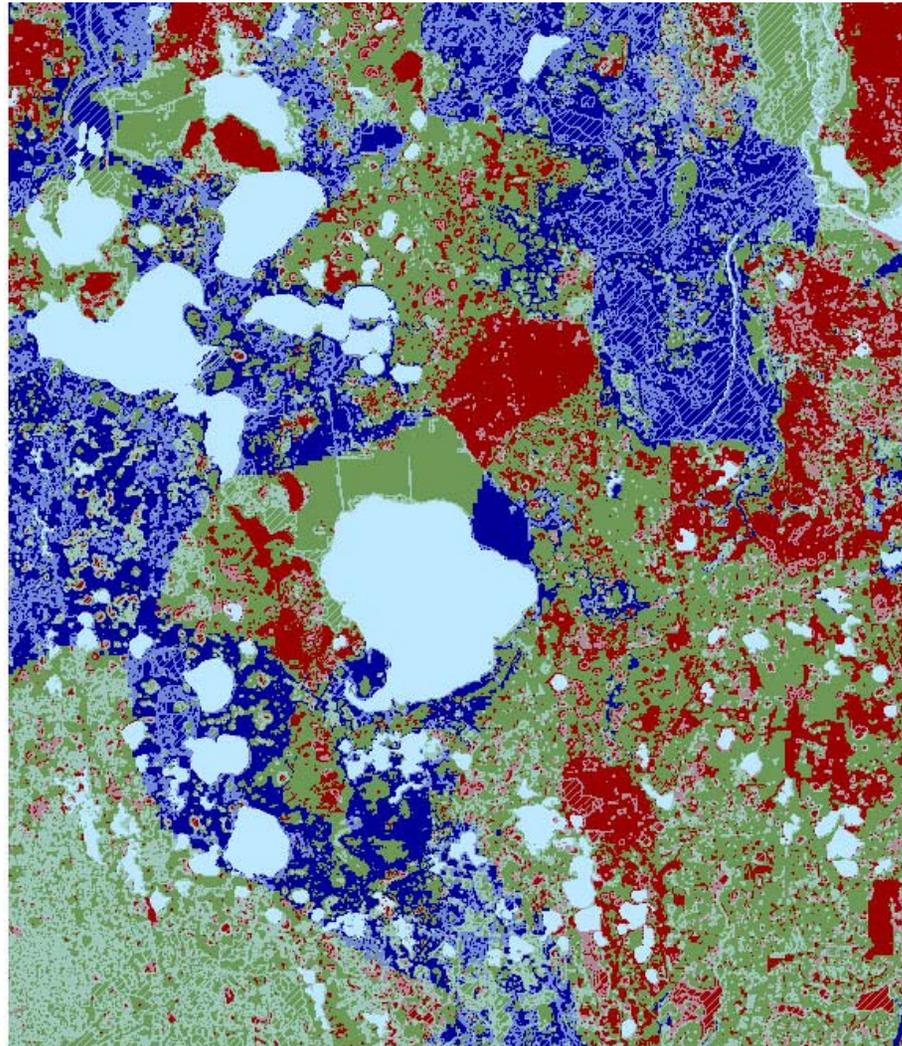


- Drainage class
 - Excessively & Somewhat excessively
 - Moderately well
 - Somewhat poorly, Poorly, & Very poorly
- Water table depth
 - < 3.5 ft
 - > 3.5 ft
- Organic matter content
 - < 1%
 - > 1%

Karst geology and hydrology



Relative vulnerability map of the Wekia Study Area



Research Review and Advisory Committee for the Bureau of Onsite Sewage Programs

Approved Minutes of the Meeting held at Sylvan Lake Park, Sanford, FL

April 10, 2007

Approved by RRAC on May 8, 2007

In attendance:

- **Committee Membership and Alternates:** Sam Averett (alternate, Septic Tank Industry); David C. Carter (member, Home Building Industry); Paul E. Davis (member, DOH-Environmental Health); Marc Hawes (alternate, Home Building Industry); Bill Melton (alternate, Consumer); Jim Rashley (alternate, DOH-Environmental Health); John Schert (member, State University System); Clay Tappan (member, Professional Engineer); Pam Tucker (member, Real Estate Profession); Ellen Vause (alternate, Septic Tank Industry); and Scott Womble (member, Septic Tank Industry)
 - **Not represented:** Environmental Interest Group; Restaurant Industry
 - **Visitors:** Patricia Allen (Office of Representative Bryan Nelson); Damann Anderson (Hazen & Sawyer); George Bartuska (Barnes Ferland and Associates, Inc.); Quentin Beitel (Markham Woods Association); Dominic Buhot (Greens Environmental Services); John Byrd (Aide to Orange County Commissioner Brummer); Ni-Bin Chang (University of Central Florida); Ron Davenport (Infiltrator Systems Inc.); Stewart Dawson (Mack Concrete); Sergio Duarte (Orange County Environmental Protection Department); Doug Everson (Plastic Tubing Inc.); Bill Hall (City of Ocala); Ray Hanson (Orange County Utilities); John Higgins (Markham Woods Association); Ken Jones (Markham Woods Association); Greg Kong (World Wide Water Recycling Inc. & Environmental Air Solutions LLC); Greg Liskey (Mack Concrete Ind.); Tony Matthews (Seminole County); Mark Mechling (Ellis & Associates); Steve Meints (Averett Septic); Dick Otis (Otis Environmental Consultants, LLC); Clayton Paslick (Septic System Industry); Harley Pattee (World Wide Water Recycling Inc.); Patti Sanzone (Florida Department of Environmental Protection); Gary Smith (Orange County Health Department); Marty Wanielista (University of Central Florida); Walter Wood (Lake County Environmental Services); Linda Young (University of Florida)
 - **Department of Health (DOH), Bureau of Onsite Sewage Programs:** Sonia Cruz; Bart Harriss; Mark Hooks; Eberhard Roeder; Elke Ursin
1. **Introductions:** Seven out of nine groups were present, representing a quorum. Chairman David Carter calls the meeting to order at 9:38 am. Marc Hawes is introduced as the new alternate for the Home Building Industry.
 2. **Review Minutes of Meeting February 6, 2007:**
 - a. **Motion was made by John Schert and seconded by Sam Averett for the RRAC to approve the 2/6/07 meeting minutes. Two changes to be made are to add Bill Melton and Scott Womble at having attended the meeting. All are in favor with none opposed to approve the minutes as amended, and the motion passed.**

3. Wekiva Onsite Nitrogen Contribution Study: Discussion on latest developments, summary of progress as of the last RRAC meeting, and decisions made during the current meeting:

- a. **Task 1** (Field Work, \$200,000): The draft report for the first site has been submitted and is posted on the Department of Health website. Elke Ursin gives a brief overview on the status of this task. Sites have been selected, there is one site located in each of the three counties involved in the study. The sampling for the Seminole and Orange County sites have been completed. The Lake County site is currently being sampled. The Seminole County site has a shallow groundwater table, with a soil type of Myakka, and is located in the tertiary Wekiva Aquifer Vulnerability Assessment (WAVA) protection zone. The Orange County site has a medium deep groundwater table, with a soil type of Tavares, and is located in the primary WAVA protection zone. The Lake County site has a medium deep groundwater table, with a soil type of Tavares, and is located in the secondary WAVA protection zone. The Lake County selected site is on a private well. It was difficult to find a one acre lot on public water where the groundwater is reachable with the probe. Mark Mechling with Ellis & Associates, Inc. presented on the status of the field work portion of the Wekiva project. The Seminole County site has been selected, the sampling was done between January 15th – February 6th. Mark Mechling went over the site selection review criteria. The draft report on the first site was submitted on March 23, 2007. DOH and other interested parties can review and make comments which will be incorporated into the final report. Sites 2 and 3 will have a draft report due in May with a final report due in May. The Seminole County site is just off Markham Woods Road near the Little Wekiva River. The house has 5 permanent residents. Ellis & Associates put in a series of piezometers to measure the depth to groundwater. The actual groundwater was about 4-5 feet below the ground surface, but the estimated wet season water table (EWSWT) could bring the groundwater level to be in the drainfield absorptive surface. Mark Mechling explains that the EWSWT may only be reached once every couple of years depending on the amount of rainfall and the groundwater conditions. For this site the groundwater is flowing in the direction of the Little Wekiva River in a southwesterly direction, which is what they would expect in observing the topography. They were fortunate to find properties large enough to avoid neighboring effluent plumes. John Schert asks whether the drainfield is in contact with the groundwater table, and Mark Mechling states that it is possible at times but that the soils are well drained and he expects that it has very limited contact with the bottom of the drainfield. The system looks like it is functioning very well and has been for a number of years. Marc Hawes asks whether Mark Mechling was surprised at the 4 foot drop of the water table across the site. Mark Mechling explains that there is a pretty big relief from the Markham Woods Rd. to the river and that it is not too surprising to see this. John Schert asks whether the surficial generally follows the topography and Mark Mechling answers that generally it does but that it

could depend on the soil type. After the piezometers were in and they determined the groundwater flow direction the site selection was finalized for the Seminole County site. They did look at other properties in Seminole County where the groundwater flow direction would not allow for sampling (i.e. the groundwater flowed under the house). These sites were rejected. They studied the soil lithology from the surface to below the contaminant plume and took soil samples and characterized 10 of the samples for organic content. They used a direct push rig with a slotted sampler and pushed to the capillary fringe. Once at the capillary fringe there was a two-foot sampling interval. They would wait until the field parameters stabilized before taking a sample, then they would take the sample and replace the sampler. They went 5-feet beyond the plume as measured by conductivity. They took background readings to see what the nitrogen was before influence from the drainfield. They did probes inside and outside the drainfield. John Schert asks whether they went down the same hole and whether it would stay open, and Mark Mechling indicated that they would go down the same hole and it would mostly stay open. Clay Tappan asks whether the surface elevations were measured and Mark Mechling indicated that they were. John Schert states that this is a great setup. The organic content ranged from 0.1% to 3% with an average of 0.29%. Past reports show a potential for denitrification at higher organic content levels. There was not much change in the soils in both the horizontal and vertical directions. Mark Hooks asks whether they had the Munsell information, Mark Mechling states that this is different from what engineers typically use so they do not have that information for everything, but that the information from both the Seminole County Health Department and Green's Environmental for the first 6-feet are included as an appendix to the report. He then goes through several slides summarizing some of the results. The average total nitrogen from the septic tank was 74 mg/L, background was averaged 2.2 mg/L, and beneath the drainfield it averaged 14 mg/L. Conductivity correlated very well with the location of the effluent plume. Mark Hooks mentioned that the 2.2 background water quality level mentioned in Table 4 is about 10 times the documented background levels in undeveloped areas. He wants to point out that the cumulative impacts in this area already have the levels elevated above unimpacted areas. He asks whether Mark Mechling has any idea what the other impact sources may be. Mark Mechling indicates that the 12 mg/L listed in SB1 may actually be in the plume. Damann Anderson states that he thinks this one is definitely in the plume. He then asks why there were no wells placed immediately upgradient from the drainfield. Mark Mechling stated that the greatest potential for an upgradient location was where the first piezometer UGB1 is located. In order to get good background information, years of sample data would be needed. They have one snapshot. Marc Hawes asks whether there was any correlation in turbidity values, and Mark Mechling states there were many fines and that it was an issue but that it was not a good indicator of where the plume was located. John Byrd asks

whether the 12 mg/L background level will have a notation made that it may still be in the plume and Mark Mechling states that this is a draft report and they will most likely remove that from the calculations. David Carter points out that the 74 mg/L is out of the septic tank and the report indicates that that is the loading to the groundwater. He states that this is the amount to the drainfield but not necessarily what goes to the groundwater. Mark Mechling states that this will be variable depending on where the groundwater is located. John Schert asks if you subtract the nitrate from the 74 mg/L of Total Nitrogen, is the remaining nitrogen in the ammonia form? Mark Mechling states that the TKN will be mainly in the ammonia form. John Schert points out that the TKN mean under the drainfield is at 10.3 mg/L and the nitrate/nitrite at 3.75 mg/L. Mark Mechling states that the nitrate plume is fairly well confined. Outside of the plume the nitrate concentrations were less than 1 mg/L. There was a great deal of reduction under the drainfield. At this site Mark Mechling stated that he saw a great deal of nitrification/denitrification right underneath the drainfield. Damann Anderson asks how the borings were done at the drainfield. Mark Mechling indicates that it was done with direct push. They tried to go outside the gravel area when installing the borings at the drainfield. John Byrd asks whether he understood correctly that this system would be considered failing. Mark Hooks indicates that it does not meet current code standards and that DOH would require a new system to be two-feet above the estimated seasonal high water table, but it is not necessarily in failure. He states that this is representative of older development. If this system would need a repair it would only need to be 12-inches above the water table. Damann Anderson suggests adding a plume diagram of just the TKN. He also states that the results suggest that the drainfield sits in the groundwater quite a bit as it is mostly TKN and there is not much nitrification. Mark Mechling states that over time the system may have been in the water table. Eberhard Roeder suggests a map showing conductance. His calculations show that SGB1 is not in the plume and FB7 may be on the edge of the plume. Regarding the comment about the system being in the groundwater for a significant portion of time, Eberhard Roeder points out that even now when the system is not in the groundwater there is a great deal of TKN. Damann Anderson states that the nitrate under the drainfield is probably from this dry season and further out there are pulses of nitrate and TKN. Eberhard Roeder states that even under the drainfield there is a lot of TKN and Damann Anderson states that this is surprising. Ellen Vause states that when the RRAC committee set the criteria for systems installed after 1982 there was an assumption that the bottom of the drainfield would have a minimum 12-inch separation from the estimated seasonal high water table and this site does not meet this criteria 100% of the time. She asks whether this system meets the parameters that RRAC set and Damann Anderson states that the system does currently meet the criteria. Bill Melton states that he thought RRAC was more interested in finding what was representative of what is out there and they were willing to discard systems that were installed prior to

1982 because they were put in under different regulations. If there are many systems installed in this area under these standards, then it would be appropriate to study. Elke Ursin states that in her experience as an inspector in the Seminole County area, this situation is not uncommon and it may have something to do with increased development or something else altering the groundwater elevation after initial installation. Damann Anderson states the Myakka soil lithology show that the water table is high at this site. Mark Hooks mentions the Seasonally Inundated Area Study where one of the sites post-development showed an increase in the water table. He states that one would expect over 20 years that the indicators would change along with any corresponding changes in the groundwater table. Damann Anderson asks whether there is stormwater drainage in the subdivision and Mark Mechling states that there is. Damann Anderson states that he would expect the groundwater to lower because of this. Damann Anderson asks why there was a difference in where the water was observed in the soil profile near the drainfield (55-inches) and the soil profile for SB-1 was very near saturation at 1-2 feet. He asks whether there was an excavation done. Dominic Buhot, who performed the site evaluation, states that there was an excavation and white sand was put in underneath the drainfield. Damann Anderson states that it is possible that a spodic was removed and that this may explain some of the results. David Carter goes back to Ellen's comment about the water table elevation. He thinks that RRAC decided on systems installed after 1982 as they would be more indicative of systems being installed, but that now after hearing these comments he thinks that this site does give good data and is representative of older systems that do not have the groundwater separation. Damann Anderson asks whether there was any ponding in the drainfield and whether any inspection ports were put in. Mark Mechling states that they installed piezometers to look at this. There are two drainfields in close proximity to each other, one installed at a higher elevation than the other. They observed the piezometers to see a rise in groundwater levels under the drainfield to help determine which drainfield received the effluent. Damann Anderson points out that if the piezometers went through the drainfield this would create a conduit for effluent to travel to the groundwater. There appears to be a hot spot near where the piezometers are. Mark Hooks asks the timeframe between samples and Mark Mechling states they were there for 2.5 weeks. David Carter states that we can learn from these results but that the report needs to be clear that while RRAC's intention was to get a dry site meeting today's code this may not have totally qualified. Damann Anderson states that this site is representative and it is good data and that the point is to find the nitrogen loading to the groundwater. Bill Melton agrees with Damann Anderson and states that systems that were installed 20 or 30 years ago may not have the same controls as ones installed today. Eberhard Roeder states that the water table could have changed after it was put in and this could happen to any system because there is generally no follow-up after a system

has been approved. Eberhard Roeder suggests showing a contour map to show how the drainfield area is elevated. David Carter suggests blowing up the area where the drainfield is and showing a cross section. Sonia Cruz asks what the sample size was for these numbers, and Mark Mechling states that there were three effluent samples, approximately 40 samples for the background, and approximately 40 samples for beneath the drainfield. Pam Tucker asks whether RRAC should be concerned with Damann Anderson's comment about the piezometers installed in the drainfield area. Mark Mechling states that the piezometers were kept in place for the entire study period and in his opinion, this system has been in place for approximately 20 years, and he doesn't think this would make a difference in the results. It would take a long time for the effluent to make it to most of the downgradient locations. John Byrd states that it should be noted in the report that installing a piezometer in the drainfield would make the effluent go down to the groundwater and Damann Anderson states that that is not necessarily true. Mark Mechling states that they have established that the effluent could be going into the groundwater at times when the groundwater is elevated. Mark Hooks asks what the piezometer / well construction technique was, was there any grouting in the annular space? Mark Mechling answers that the piezometer was basically a 1 inch fully slotted pipe with a screen interval from just below the ground surface to into the groundwater. The piezometers were mainly put in by hand auger and some were put in by direct push. Doug Everson asks whether there was any attenuation of nitrogen at the soil interface at the drainfield. Mark Mechling states that there seems to be a great deal of attenuation in the drainfield. Eberhard Roeder points out that the top samples at DFB1 are more diluted than DFB4 and DFB2 supporting the argument that the piezometers in the drainfield did not effect the results. Paul Davis comments that washed builders sand was commonly used for excavation fill sand and this may have an effect on the shape of the plume. He asks how coarse the fill sand is underneath the drainfield. Dominic Buhot states that when he did his site evaluation along with the Seminole County Health Department, they found the water table at 27 inches below grade on the north side of the drainfield and found the water table at 42 inches below grade on the south side. He found white sand up to 3 feet below the drainfield. His opinion, as an installer, on why there are two drainfields is that the north system was installed first and was installed too low and was failed by the health department and instead of removing the aggregate they just installed another drainfield at a higher elevation and kept the aggregate from the north system in place. Mark Hooks suggests digging down beside the north system and seeing if there is any organic staining in the soil to see if it had ever been used. Elke Ursin confirmed that there is no record of a repair permit having been pulled on this property, but that the retention schedule does not require that this record be kept for an extended period of time. Dominic Buhot suggests looking that the grade of rock to see if it is similar. Mark Hooks states that either DOH or Dominic Buhot will do this. Mark

Mechling saw a lot of nitrate attenuation below the drainfield. The total nitrogen goes a lot further from the drainfield before it reaches the 10 mg/L level. They did some calculations using the same method as the Anderson 1998 report. They did not do a tracer study, but did make some assumptions about hydraulic conductivity and did some mass balance calculations. The calculations will be in the appendices. Most of the reduction seen is due to dilution rather than nitrification/denitrification. Damann Anderson asks what did he use for the dilution factor, was it conductivity? Mark Mechling states they used Darcy's Law. Damann Anderson points out that electrical conductivity is still high even at the lower contour line, and is not as degraded as the total nitrogen. Eberhard Roeder points out that this becomes even more complicated as background conductivity is also elevated. Eberhard Roeder suggests a few different cross section views, and whether this would influence some of the flux calculations. David Carter states that the calculations show 17.6 grams/day/person coming out of the septic tank, and the report needs to be clear about where this point is. David Carter points out that there are two things going on: denitrification and dilution, and the report is not clear about what makes it to the groundwater. Is there a way to quantify how much is denitrification and how much is dilution? Mark Mechling states that Table 8 shows that there is enough organic content in the soils to allow for denitrification. He points out that this only a snapshot and the question would be easier to answer if there were several samples taken with varying groundwater conditions. There are two other sites that he will be looking at to help reach some of these conclusions. Damann Anderson states that the only nitrogen that can be denitrified is nitrate and that most of the nitrogen at this site has not been nitrified. He states that this is something that may nitrify later, but it is difficult to quantify that. David Carter suggests that the discussion section be clearer that the 17.6 grams/day/person is what is leaving the septic tank, not necessarily what is loaded to the groundwater. Damann Anderson suggests adding a TKN plume diagram. Eberhard Roeder suggests several different calculations that could be done to show the denitrification and loading potential. John Schert would like to see a graph of conductivity and the dilution effect to help visualize the transformations. Damann Anderson suggests a plume diagram showing the ratio of conductivity to nitrogen and Eberhard Roeder states that he looked at that and it was not very helpful because there is low conductivity and low nitrogen. John Schert asks whether there are any impervious surfaces downstream and Mark Mechling did not see any clay downstream. Eberhard Roeder states that one reason for the high TKN at DFB1 may be due to the impervious surface of the septic tank and the shadow of the house so there may not be as much diffusion. Pam Tucker asks the status of the soil organic content task discussed at the last RRAC meeting. Mark Mechling states that they went back after the meeting and took additional soil samples from the surface to 30 feet and measured the organic concentration. Damann Anderson states that for this site the soil organic

content analysis was not as useful because most of the nitrogen was in the TKN form. Sam Averett is interested to see the results of this on the other sites. Damann Anderson asks what method was used to measure the soil organic content and Mark Mechling states it was the loss on ignition method. David Carter outlines the next steps. DOH will send comments on this draft report by Friday April 13, 2007. Then Mark Mechling will take the comments and revise the report in time for the next draft report on the other two sites. The conceptual idea is to include numerous tables and figures and summarize where they can. Comments should be sent to Elke Ursin and they will be forwarded to Mark Mechling on Friday.

- b. **Task 2** (Categorization and quantification of nitrogen loading, \$25,000): Dr. Richard Otis with Otis Environmental Consultants presented on the progress. His task is to determine the amount of nitrogen contribution from an onsite system before it reaches the groundwater. He goes over the different organisms that feed on wastewater and how some require oxygen while other do not. The organisms that are able to denitrify require organic carbon and an anaerobic / anoxic environment. There are aerobic conditions at the bottom of the drainfield to nitrify the effluent. There is very little carbon in wastewater. Wastewater needs an organic source and an anoxic condition to denitrify the effluent. Damann Anderson asks about how much nitrification/denitrification occurs in the biomat itself. Dick Otis doesn't doubt that that occurs, but the amount of nitrification/denitrification is difficult to tell. Paul Davis asks how the scenario would change with the addition of an ATU. Dick Otis states that the effluent will be nitrified as it comes to the drainfield, so it would decrease the biomat. He states that the plume would look very different if the Seminole County site had been nitrified first. Paul Davis states that what he sees in the field is very limited clogging in the drainfield and a healthy biomat with limited failures. John Schert states that alternating wet and dry conditions would be good. Mark Hook states that the basis of the 2-foot separation requirement is because of virus and fecal removal. Pathogens and nutrients are two competing contaminants of concern. Dick Otis states that historically the precedence has been on pathogen removal, and now excess nutrients are a concern. If we try to get rid of both pathogens and nutrients there are some competing methods on how to do this. If carbon is added, there can be almost complete denitrification (50-98%). Traditional subsurface infiltration provides 10-40% removal of nitrogen. At-grade systems and mounded systems provide 40-80% nitrogen removal. The reason the mounded systems have a higher removal rate than the subsurface systems is due to the organic topsoil layer. Sam Averett states that in Florida the topsoil is required to be removed under a mound or filled system, so this number may not be applicable there. Doug Everson states that it may be as simple as altering the construction technique to add more organic content in fill soil. Eberhard Roeder asks what amount of nitrogen recirculating media filters would take out, and Dick Otis states that he sees that as more a single sludge system, but the most basic type he would

expect approximately 50% removal. The necessary conditions for denitrification are: nitrified substrate, source of organic carbon, anoxic or anaerobic conditions, and adequate residence time for biochemical reactions to occur. He has determined what categories he will use in his assessment of loading. With Linda Young's help, he looked at the soils in the Wekiva Study Area and determined the different categories. He will use drainage class (excessively/somewhat excessively, moderately/well, and some what poorly/poorly/very poorly), water table depth (greater than or less than 3.5 feet), and organic matter content (greater than or less than 1%). Mark Hooks points out that a good part of the Wekiva Study Area is located in wetland areas, so even though it may be the dominant soil in the region it may not have much development on it. Dick Otis states that there are many questions that have come up regarding the results of the field work for one site. He states that it may be valuable to look at a high density subdivision and do some monitoring around it to see what the nitrogen load actually is from all the sources (fertilizer, wastewater, etc.) David Carter states that this is what Damann Anderson suggested at the beginning of this study. Eberhard Roeder states that this becomes difficult, as the plume can be very narrow, as was found in the first field work site, and you either hit it or miss it. This makes it difficult to determine the overall subdivision effect if you are not in the plume. Dick Otis expects to have his table to DOH by the end of the week, and DOH is to post the table on the website once it is completed. John Byrd asks whether Dick Otis will preface his report with a comment about the difficulty of the task that he has been given in terms of all the parameters involved, and Dick Otis states that he will try to do that.

- c. **Task 3** (Assessment of the contribution of OWTS relative to other sources, \$25,000): Dr. Linda J. Young with the Department of Statistics at the University of Florida presented her progress to date. Her task is to determine the amount of nitrate/nitrite at the surface as well as at the groundwater interface. She made contact with the contractor performing the work for DEP (MACTEC) to see what methods they were using and to ensure the Task 2 categories are relatable. The DEP method is mainly looking at land use classifications. She will be looking at both the land use classification and the recharge rates to determine the loading. Once she has received the information from Dr. Otis on Task 2 she will complete her portion for the overall nitrogen loading estimates in the Wekiva Study Area.
- d. **Task 4** (Cost-effective solutions): Eberhard Roeder presents the progress thus far. Cost information has been solicited from Lake, Orange, and Seminole Counties for a typical system at various treatment levels. The outline will be similar to the management guidelines developed by EPA and presented at the last RRAC meeting.

4. Discussion on Disassembling Lysimeter Stations

- a. There was a discussion on the fate of the lysimeter station. USF has asked RRAC to propose projects on how to utilize the station. Some suggested

projects are to look at the treatment effectiveness of OSTDS for pharmaceuticals and new viruses, the benefits of drip irrigation looking at various parameters and various vegetation types, and dosing versus gravity distribution. John Schert asks whether there is a general budget for these research projects, and Elke Ursin answers yes there is: \$5 out of every new septic system permit goes in to fund research. Mark Hooks states that the income is approximately \$200,000 per year depending on the number of systems installed, and the outgoing funds depend on the number of projects that are going as well as what the legislature authorizes can be spent. John Schert recommends having a research agenda, and Eberhard Roeder states that RRAC establishes priorities for projects. David Carter states that it may be a good time for an update on this. John Schert states that on the University of Florida website the question is asked: "What do you want research done on?" Clay Tappan states that one of the original issues with the lysimeter station is that whatever research the department takes has to go through competitive procurement, and he does not think the competitive procurement document can specify that the lysimeter station must be used. Can DOH/RRAC tell USF that the selected provider will work on their campus? Mark Hooks states that DOH would need to renew the agreement between DOH and USF for use of the site. It will take some retrofit to get the system back up and operating. The computer system is old and may need to be replaced, the vacuum pump is broken and would need to be replaced, the sewage source is now on sewer and a valve would need to be installed to allow sewage to go to the station, the force main that brought the sewage to the station would need to be replaced, and the well pump for the artificial water table would also need to be replaced. Mark Hooks states that in order to get the station back up and running there would need to be a maintenance and repair contract done first, then there can be competitive bidding on new projects. Damann Anderson states that there should be an evaluation on the structural soundness of the facility as well. Pam Tucker asks how many of these type research stations are there, and the answer is that this is the only one like it in the United States and possibly the world. The general consensus from RRAC is to keep the lysimeter station. There was a motion made by Clay Tappan and seconded by Paul Davis for the department to move forward with a formal discussion with USF to develop a Memorandum of Understanding for the rehabilitation and continued use of the lysimeter station. There was no discussion and all were in favor, the motion passed.

5. Updates on other projects

- a. Ongoing projects
 - i. **Florida Alternative Disposal Systems Assessment:** On Site Management Consultants, Inc. is the provider. Contract has been executed. The selected alternative drainfield products that will be used are Alternative aggregate = EZ 1203 H, Multi-pipe = PTI-11 pipe,

Chamber = Infiltrator EQ 36 or Quick 4 EQ 36. These products were determined by looking at Centrax data over multiple timeframes. At a previous RRAC meeting it was discussed that the selected aggregate be compatible with what is most commonly used in the area where the study is done. The type of aggregate that will be used is #5 limestone based on a survey of County Health Departments, septic contractors, and aggregate distributors in the Central Florida area as well as from a recommendation by Kevin Sherman. David Carter asks what the timeframe is for comments from RRAC, and Elke Ursin states that there is a limited timeframe for DOH / RRAC to review this and to send comments to her within the next two weeks. Elke Ursin will work on the GANTT chart to outline the timeline for the project. There are some questions that Kevin Sherman has asked that RRAC may have some input on. One question is on how best to size the products so they are comparable to each other. Originally the idea was to use the equivalency rating for 15 square feet of aggregate. So, for example, the PTI 11-pipe has an equivalency of 3 square feet for every 1 linear foot. To make 15 square feet of PTI 11-pipe you would need 5 linear feet of the product. The problem comes when the products need to be cut to meet the equivalency rating, and whether this is acceptable. There is a question on whether the Infiltrator EQ 36 Quick 4 is the more appropriate product to use. Sam Averett states that Infiltrator is phasing out the full EQ 36 and using the Quick 4 instead, and if the project is to look to the future to go ahead and use that chamber. If going with the Quick 4, the equivalency rating comes to 12 square feet, which would be equivalent to 4 linear feet of the PTI 11 pipe, and 3 linear feet of the EZ1203H. Doug Everson with PTI has a concern about going from 5 linear feet to 4 linear feet and suggests adding more linear footage rather than cutting it back. Elke Ursin brings up the costs and the restrictions on the amount of flow from a single family home. Doug Everson has a concern about how a comparative sample can be obtained with only 4 linear feet of product and that if this is done the results will be challenged by the manufacturer. Eberhard Roeder asks how many feet do the manufacturers think they need before the results will not be challenged any more, and Doug Everson states that all of the products are based on an equivalency of 3 feet of aggregate. He suggests using 30 – 90 square feet of aggregate and to use the equivalent alternative drainfield product. Paul Davis states that that would require starting over with something the size of an apartment complex and that cannot be changed at this point. Damann Anderson states that the amount of effluent entering each drainfield will need to be closely monitored to ensure they are equal. Ron Davenport with Infiltrator mentions a Clemson study that used EZ Flow and that the product was cut and it was disputed. Paul Davis mentions that the EZ Flow Florida Installation

Guide does outline how to cut the product, and if that is how it is installed here he does not see any problem with installing it this way for research. Doug Everson suggests having a meeting to discuss this. Paul Davis states that it may not be possible to scale up this project at this point. Ron Davenport states that the full size EQ 36 chambers are being slowly phased out. David Carter suggests letting Kevin Sherman know about this discussion as one of the responses to the QAPP. Another question that Kevin Sherman asked staff prior to this meeting is whether the different drainfield products, which have different heights, should be installed with the same bottom elevation or with the same amount of fill on top. Bill Melton states that the bottom elevations should match. Paul Davis states that that may be difficult to do if the products have differing heights and they need to be gravity fed. Jim Rashley states that if he is doing a gravity system he is just going to have to meet the state regulation as long as the water table is not an issue. Ellen Vause states that the systems are installed at the permit elevation, not the manufacturer recommended elevation. Ron Davenport and Doug Everson both agree with Ellen Vause's statement. Sam Averett summarizes the RRAC recommendation that the bottom elevation needs to match the permit and be the same for each system, and the cover over the drainfields need to be the minimum as per code. There is also a question about whether the manufacturer recommended barrier material should be used. The general consensus is to use the manufacturer recommended barrier material, as this was part of the agreement with the state for getting approved. Doug Everson states that if the total drainfield area meets the minimum size the current code allows there would be less of a chance that the results would be challenged. Sam Averett states that with the aggregate the endwalls will act as sidewalls and there will be an additional amount of sidewall protection. Ron Davenport would like to see the endcaps on the Infiltrator chambers because he knows that that adds additional storage capacity. Doug Everson states that there is no argument that it is good to have an equivalency evaluation of all of these products. There is a discussion on the difficulties of finding two houses that generate large amounts of sewage flows. Doug Everson recommends having a meeting with the three manufacturers and Kevin Sherman. Paul Davis states that the RRAC meeting is the forum for this. He also states that this is a test to failure study, by putting in a minimum code size system you are not going to get results until years down the line. With no results you will not gain anything out of all the research. Bill Melton clarifies the intent of this project as being not so much one product against another, but instead how well do alternative products work against aggregate. Paul Davis mentions that the state of Florida is experiencing a higher rate of failures than in the past, which has a direct impact on public

health. The cause of these failures may not be accurately documented in the field, as the reporting happens prior to a repair permit being issued and the system being opened up for inspection. For example, it is difficult to see that a drainfield failed due to excessive roots growing in the drainlines without digging up the system, which cannot happen until the repair permit is issued. Sam Averett asks whether it is better to spend three hours evaluating why a system failed, or to spend that time fixing the system. Alternative drainfield products have a smaller footprint than aggregate, and have equivalency ratings. This study will test them against rock to see how well they are working. RRAC directed staff to set up a meeting between the three selected alternative drainfield product manufacturers, DOH, and the contract provider to discuss any concerns or comments. Kevin Sherman should be at the next RRAC meeting to answer some of the questions brought up at this meeting.

- ii. **Florida Passive Nitrogen Removal Study:** Contract was executed on March 30, 2007 with Applied Environmental Technology. First there will be a literature review on what technologies are available, then a QAPP will be prepared outlining different lab experiments that can be done to test some of the results found in the literature review, there will be a cost assessment done to look at how much the technologies cost, they will provide various recommendations, and finally prepare a final project report. This is a one year contract.
- iii. **Taylor County Source Tracking Study:** The final report has been submitted. Some of the conclusions:
 - No significant differences in ammonia trends between sewer & OSTDS
 - Nitrate levels low for all sampling events
 - Caffeine and optical brighteners ineffective tracers due to dilution, low development density, etc.
 - Good correlation between Enterococcus and E. coli and the change from seasonal low water table (SLWT) and seasonal high water table (SHWT)
 - Some of the highest E. coli densities were among the sewered areas but sewer was only recently installed and may still reflect previous contamination
 - Background sites had a low Enterococcus/E. coli ratio, and beach sites had high ratios showing human-derived sources of pollution
 - Sewered areas do not show improved water quality in comparison to areas that remain on OSTDS

There is a discussion on whether there is a possibility for additional work, and RRAC suggests staff present a list of priorities on what research needs to be done in Florida before making any commitments. Clay Tappan states that possibly by collecting more data over time may yield more conclusive results. Damann Anderson states that because

this is a tidal system it is flushed constantly. Ellen Vause mentions the similarity between this study and the Suwannee River study and how there was no significant difference until you went up the river to see that the source was the dairy and poultry farms. She asks how important it is to prove whether it is one or the other, when it could be a different source altogether. Sam Averett states that the bottom line is that sewer areas do not show improved water quality than areas served by septic systems.

- iv. **Monroe County PBTS Performance Assessment:** Sampling began February 18, 2007. Sam Averett is looking for information on what types of systems are being installed in the Keys and whether they are in the hot zone or the cold zone. There is a comment from the audience that grab samples are worthless and costly. Sam Averett states that one grab sample is useless, but 1000 grab samples is worth a lot, and the samples are taken out of the dosing tank so it is more like a composite sample for the last 24-48 hours. Interim results of the sampling as they are available will be provided to RRAC for the next meeting.
 - v. **Manatee Springs, Phase II:** There was a contract amendment done to extend the contract end date to September 30, 2007. A grant extension from EPA has been requested to match the new contract end date. The provider has requested the contract be updated to reflect current lab costs, and new contract due dates. There is a question about whether the contract would need to be canceled or amended. If it is canceled there is the issue of whether this would need to be competitively procured. Patti Sanzone with FDEP recommends amending the contract rather than cancel. RRAC has directed staff to amend the contract to reflect current lab costs and updated deliverable due dates.
 - vi. **Remote Sensing of Optical Brighteners Study:** Contract and EPA work plan shall be amended to reflect the scope of work change to further refine the flow-through-fluorometer method.
 - vii. **Glass Cullet Assessment:** Report has been received and will be posted on the website.
 - viii. **Columbia County Well Testing Project:** Onsite sewage research program plans to fund one sampling event including analysis for TKN and TP (when available from DOH-labs). The initial sampling showed that two wells had increased levels of nitrate. There was a motion made by Paul Davis and seconded by Bill Melton to add Nitrogen-isotope sampling to this study. There was no discussion and all were in favor, the motion passed.
- b. Projects coming up
- i. **319 Project on Performance and Management of Advanced Onsite Systems:** Proposal has been submitted to DEP to collect data on Performance Based Treatment Systems, how they are managed, and where they are located. Doug Everson suggests initiating a

homeowner's survey on how the maintenance entities have responded to complaints and how the systems have been functioning.

- 6. Sunshine Law Presentation:** Lucy Schneider, Esq. with the general counsel office of DOH makes a presentation on the Sunshine Law requirements. The Sunshine Law covers two sections of the Florida Statute: 286.011 and 286.012. The Sunshine Law establishes that all meetings of a board where decisions are made are public meetings, and for any action to be legally binding it has to be made at a public meeting. It extends to discussions, deliberations, and any actions taken by the committee. There is no requirement for a quorum to be present in order for the Sunshine Law to be in effect. It applies to any gathering where two or more members meet and discuss any matter that may come to the board. All written communications, telephone conversations, computers, use of non-members as liaisons, email communications between members, etc. are subject to this law. All public business must be discussed in the sunshine. It does not apply to discussions with DOH staff. RRAC members can discuss things individually with staff, but cannot use staff as a go-between to effect communication with someone else. Any meeting shall provide reasonable notice to the public as to the time and location of the meeting along with a description of items that may be discussed or voted on. These meetings should easily allow public access. Attendance at a meeting that is in violation of the Sunshine Law is considered a non-criminal infraction which is punishable by a fine not to exceed \$500, and a knowing violation of the law is considered a misdemeanor of the second degree. Section 286.012 F.S. states no board member present at a board meeting in which an official decision, ruling, or act is to be taken can abstain from voting. The only exception is when there is, or appears to be, a conflict of interest. A conflict of interest is defined as a situation in which regard for a private interest tends to lead to disregard of a public duty. If there is a conflict, prior to discussion or deliberation, you would have to come forward and state what the conflict of interest is. Then the discussion can continue and a memorandum must be filed and submitted within 15-days to the person taking the meeting minutes to be added to the public record of the meeting. Paul Davis asks whether discussions can occur between the member and the alternate and Lucy Schneider states that the law considers them one so a discussion is permitted. Lucy Schneider then presents on public records retention. All such records are open for inspection by any person. The DOH staff will maintain many of the original documents, but if a RRAC member creates a document (writes a letter, makes notes on a report, etc.) that is also a public record. Lucy Schneider suggests giving DOH staff these documents once their term is up with RRAC. Pam Tucker asks whether she can give a member of the public a copy of the document she has, or whether she needs to refer them to DOH. Lucy Schneider states that the document can be passed on by Pam Tucker. Bill Melton asks whether drafts need to be retained and Lucy Schneider states that if anyone wants it they can have it but they need to understand that it may not truly reflect the final document. Drafts are not required to be retained once the final comes out. Clay Tappan asks whether handwritten documents are public record, and Lucy Schneider states that that is now a unique document and it must be retained. David Carter asks whether properly

advertised teleconferences are acceptable, and Lucy Schneider states yes. David Carter would like clarification that speculative conflicts don't apply. For example it would not be a conflict for an engineer to vote on something that requires more permits which may lead to more work for him or her as that is speculative gain, and Lucy Schneider agrees with this. Ellen Vause suggests that DOH staff have this form on hand at the meetings and Elke Ursin states that she will have it available. There is a question on what recourse is available if the public does not agree with the vote. Lucy Schneider states that the voting member has been selected to act as a public servant and the vote could go either way. They are doing what they are required to do pursuant to the law. The member should not vote for something only because it will bring the member private gain, the member should vote for something because it is the right thing to do. Lucy Schneider states that the statute is balancing the fact that they want public officials to be independent and impartial, but they also want to attract those citizens best qualified to serve. Lucy Schneider will research further into whether TRAP issues that are discussed at RRAC meeting are a violation of the Sunshine Law. David Carter asks about when he makes a report to TRAP and whether that is a violation and Lucy Schneider will look into that further. Clay Tappan clarifies that it is OK for RRAC members/alternates to report back to the association that they represent on the outcome of the meeting, and Lucy Schneider states that is correct. The basic idea is to make discussions of the board available to the public. Ellen Vause suggests advertising FOWA meetings as public meetings and Lucy Schneider will look into this further.

7. Public Comment

- a. None.

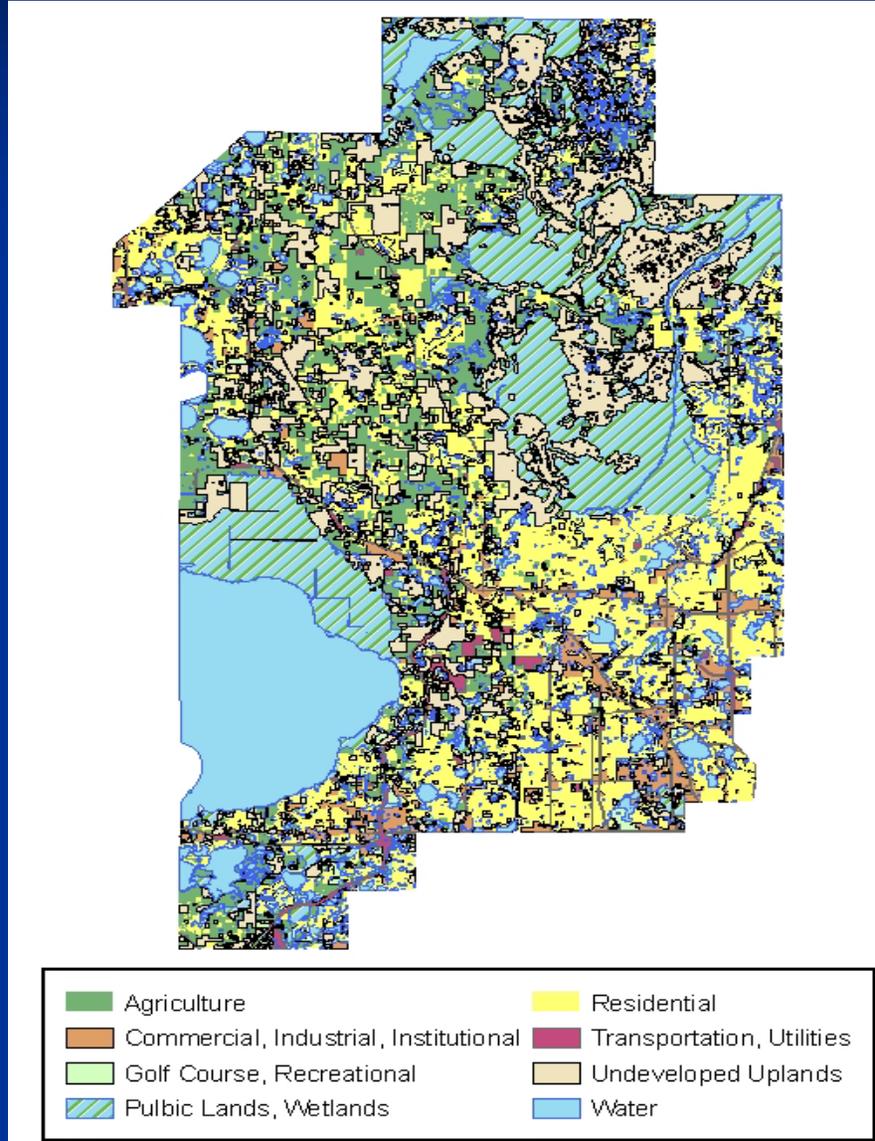
8. Closing Comments, Next Meeting, and Adjournment

- a. A tentative date of May 10, 2007 was set, with the meeting beginning at 9:30 at Sylvan Lake Park in Sanford if it is available. Bill Melton moved to adjourn and Paul Davis seconded, all were in favor and the meeting adjourned at 3:07 pm.

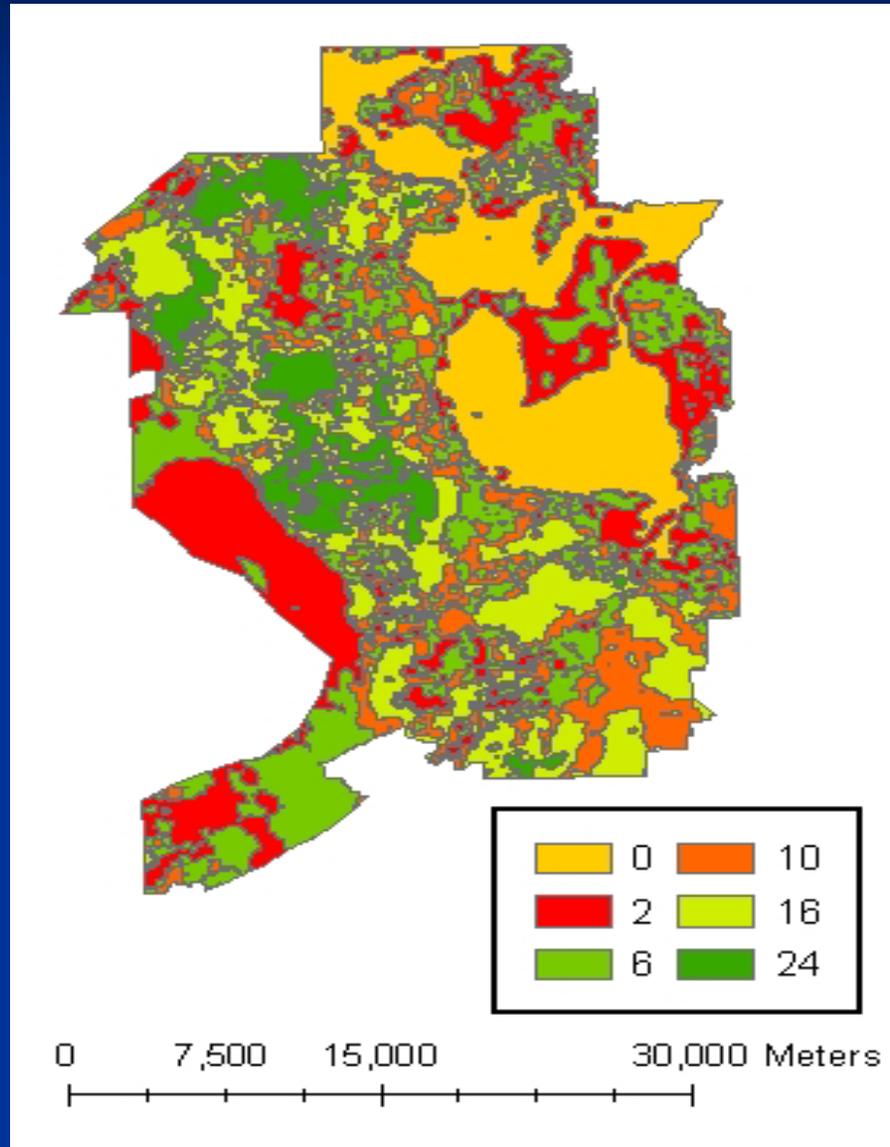
Interim Report on Task 3

Linda J. Young, Ph.D.
Department of Statistics
University of Florida

Wekiva Land Use

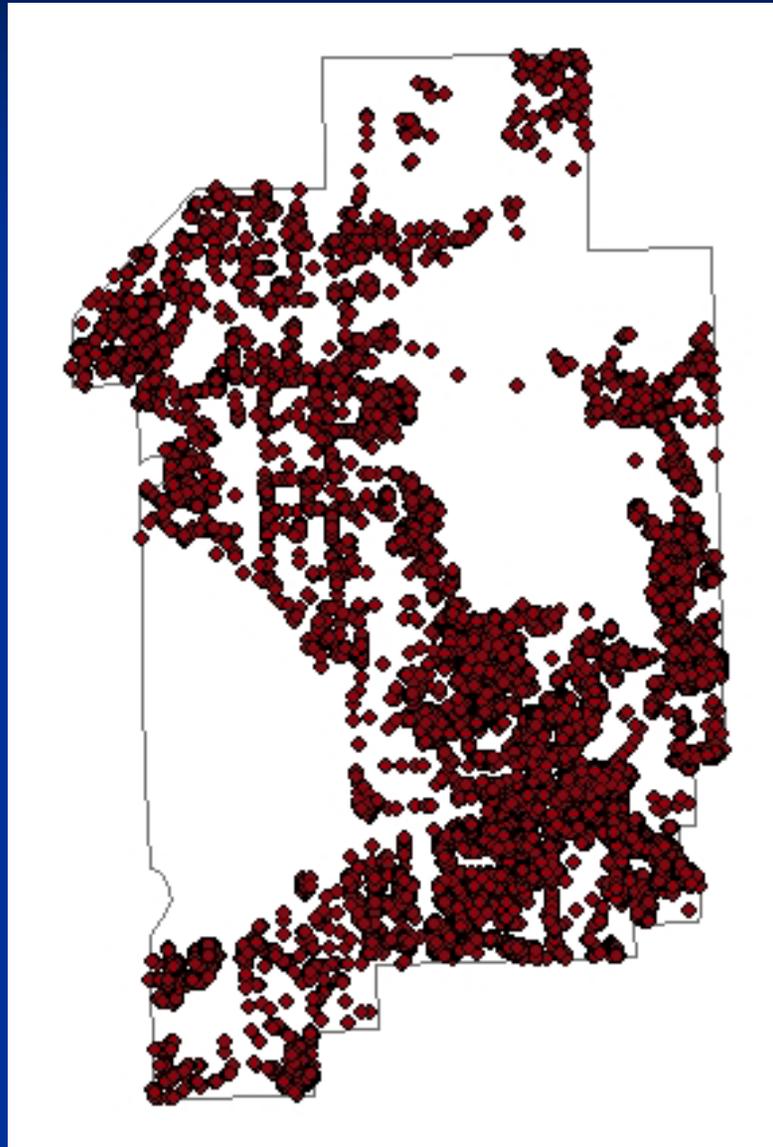


Wekiva Recharge Rates



Obs	LUCODE	TOTAL_ACRES
1	1100	14277.7905
2	1180	10127.6555
3	1190	552.0337
4	1200	52334.4100
5	1290	3430.0135
6	1300	9082.3153
7	1390	293.4791
8	1400	8536.9301
9	1480	180.9203
10	1490	104.4016
11	1510	347.1430
12	1520	12.9116
13	1530	28.2894
14	1550	2180.6147
15	1560	277.6273
16	1562	24.1019
17	1611	157.0275

Septic Systems



Organic Matter ≤ 1%

Drainage	Average Seasonal High and Low Depth to Water		Total
	≤ 3.5 feet	> 3.5 feet	
Frequency Percent Row Pct Col Pct			
Excessively	0	21065	21065
	0.00	52.96	52.96
	0.00	100.00	
	0.00	67.99	
Well	0	52	52
	0.00	0.13	0.13
	0.00	100.00	
	0.00	0.17	
Moderately Well	934	9838	10772
	2.35	24.74	27.08
	8.67	91.33	
	10.63	31.75	
Poorly	7855	29	7884
	19.75	0.07	19.82
	99.63	0.37	
	89.37	0.09	
Total	8789	30984	39773
	22.10	77.90	100.00

Frequency Missing = 8526

Controlling for Organic Matter > 1%

Drainage	Average Seasonal High and Low Depth to Water		Total
	≤3.5 feet	> 3.5 feet	
Frequency			
Percent			
Row Pct			
Col Pct			
Excessively Well	0	5746	5746
	0.00	80.67	80.67
	0.00	100.00	
	0.00	86.89	
Well	0	194	194
	0.00	2.72	2.72
	0.00	100.00	
	0.00	2.93	
Moderately Well	0	673	673
	0.00	9.45	9.45
	0.00	100.00	
	0.00	10.18	
Poorly	510	0	510
	7.16	0.00	7.16
	100.00	0.00	
	100.00	0.00	
Total	510	6613	7123
	7.16	92.84	100.00

Frequency Missing = 19