

Upper Wakulla River and Wakulla Springs Basin Management Action Plan

Technical Meeting Summary

Thursday, March 28, 2013

9:30 AM – 12:00 PM

Woodville Community Center, Live Oak Room

8000 Old Woodville Road, Tallahassee, Florida 32305

Attendees

Joseph Addae-Mensa, DEO	Martha Lang, Leon Soil and Water Conservation District 1
Craig Barkve, Tallahassee	Roy Lima, FFS
Kris Barrios, NFWFMD	Debbie Lightsey, Citizen
Winston Borkowski, Hopping Green & Sams	Alex Mahan, Leon County Health Dept.
Catherine Bray, Tallahassee	Sean McGlynn, MLI
Kathy Burke, Leon County	Anita Nash, FDEP
Tiffany Busby, Wildwood Consulting	Bob Newburgh, Citizen
James Cichon, FGS	Steve Peene, ATM
Steve Cioccia, FDEP	Ron Piasecki, Friends of Wakulla Springs
Melissa Corbett, Wakulla County	Johnny Richardson, Leon County
John Cox, City of Tallahassee	Eberhard Roeder, FDOH
Jason Dickey, Cardno Entrix	Peter Scalco, FDEP
Charlie Donahue, DOH	Hannahs Scott, Citizen
Holly Edmond, FDACS	Will Sheftall, IFAS
Rance Ellis, FDACS	Harold Shenk, USFS
John Folks, FAMU	Charles Shinn, Florida Farm Bureau
Tom Frick, FDEP	Lee Smith, ECT
Charlie Gauthier, FDEP	Ed Steinmeyer, Leon County
Wendy Grey, Wendy Grey Land Use Planning	Jim Stevenson, Citizen
Pamela Hall, Citizen	Windle Tharp, FDOT
David Hammonds, FDOH	Herb Thiele, Leon County
Kenny Hayman, FDEP	Amy Tracy, ETM
Theresa Heiker, Leon County	Brian Wiebler, Tallahassee
Cal Jamison, Friends	Richard Wieckowicz, Consultant
Jill Jeslie, Gadsden County	Elke Ursin, FDOH
Duane Kent, ETM	Mark Yelland, DEO
Bryant King, DRMP	Laura Youmans, Leon County
John Kraynak, Leon County	
Ken Kuhl, FDEP	

Welcome and Introductions

Tiffany Busby welcomed everyone and everyone introduced themselves. Tiffany asked for comments on the February 21, 2013 meeting summary and there were no comments or corrections.

Discussion of the BMAP Boundary

Anita Nash reviewed the information used to create a proposed basin management action plan (BMAP) boundary and asked for feedback. Anita explained that the BMAP boundary would be effective for the first five-year iteration of the BMAP. If new information becomes available to refine the boundary, it is possible to change the boundary for the second iteration. Anita described the map in the handout. Anita reviewed the information that was used in the total maximum daily load (TMDL). She noted that the Cody Scarp is clearly identified in the map and is the best estimate of its location. The TMDL document identified water body identification (WBID) number 1006 for the surface watershed, as well as a springshed for Wakulla Springs. The springshed used in the TMDL was based on information from the Northwest Florida Water Management District (NFWFMD).

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The brown line is the Lost Creek surface watershed; Lost Creek is a contributor to the Spring Creek watershed and is within the proposed BMAP boundary.

For the northern portion of the proposed BMAP boundary, the Florida Geologic Survey (FGS) delineation of the Wakulla springshed was used, which was based on the potentiometric surface. This delineation is represented by the green line. The FGS delineation includes the most area of the available springshed delineations, including Lake Miccosukee in Jefferson County. Lake Miccosukee has a sink in its bottom, making it a direct contributor to groundwater. Anita stated that the purpose of the BMAP boundary is to establish what areas within Florida might be contributors of nitrates to the Upper Wakulla River surface watershed and Wakulla Springs, which is groundwater driven. It seems most appropriate to be as inclusive as possible, so all the potential sources are recognized and the management strategies to reduce nitrates can also be recognized.

The red line on the map is the springshed boundary from J. Hal Davis' U.S. Geologic Survey (USGS) report. There are times when the water in the Spring Creek groundwater area flows in different directions; at times, Spring Creek groundwater flows toward Wakulla Springs. Areas where the NFWFMD had identified the Wakulla springshed area further to the west were included in the proposed BMAP boundary. There was a small portion of the NFWFMD springshed delineation that was within Liberty County, which was not included in the proposed boundary, as the area was both small and distant from the springs.

Johnny Richardson commented that there should be consideration for including the Lake Miccosukee watershed, not just the lake itself. It would be very important to include the watersheds where there are sinks. On the western side of the springshed, he suggested there are systems that head west toward Apalachicola. Overall, he recommended including the watersheds for the surface waters. Anita responded that there is an issue when the surface waters travel one direction and the groundwater travels another direction. There may be little benefit to including the surface waters that travel to another watershed.

Johnny requested to see a map that shows the springshed area in Georgia also. Anita agreed to provide a map of the entire springshed, including the area in Georgia.

Steve Peene asked if significant sources were identified from the Georgia side, what mechanisms are available to address those sources. Would there be some interaction with Georgia? Anita responded that in the broad sense, within the BMAP we could include a description of the Georgia groundwater contributions in the "considerations" section. We could also include additional text, based on stakeholder feedback, that through the U.S. Environmental Protection Agency (EPA), some additional discussions could occur about those sources. Overall, the Wakulla BMAP will focus on the area within Florida and where the biggest benefits would occur from projects and activities.

Joseph Addae-Mensa noted that the North Florida Water Partnership effort has involved the State of Georgia and perhaps that could be a model for engaging Georgia in regional efforts. Georgia is involved with that process even though the partnership's efforts are focused on Florida.

Pamela Hall asked if the boundary could be extended to include all of Hal Davis' springshed line to the south. Anita responded that Mr. Davis' original line extended quite a distance into the Gulf of Mexico. Anita stated that she spoke to Mr. Davis and asked him about the southern extent of the line. He responded that at the time the southern line was drawn, there was no scientific reason it was drawn so far south into the Gulf. Based on his opinion now, he would have tightened the line the way it is presented here on the map. Therefore, while the line follows the coastline more closely, it includes the most seaward Spring Creek vent and has Mr. Davis' concurrence.

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Ron Piasecki stated that Dr. Todd Kincaid is looking at water quantity in the four southern counties in Georgia and their water use. Anita responded that we could consider that as an area of important interaction with the Upper Wakulla River. However, the BMAP itself will not apply to areas outside of Florida because of legal constraints on the Florida BMAP process.

Richard Wieckowicz expressed concern that the lower portion of the Wakulla River being excluded from the BMAP because of the pollution sources there and the fact that it is a tidal river. There are a lot of water quality data and the St. Marks wastewater plant is a pollution contributor to the river. Anita responded that she inquired about these data and found that during the period of record that determined the Upper Wakulla River was impaired, there were no data from downstream of the boundary that showed that those downriver sources were contributors to impairing the upper river segment. Richard stated that there are historic data that shows the nitrogen impacts. Anita asked for his assistance with finding that information and expressed her willingness to discuss that information further with him.

Mark Yelland asked about the sufficiency of effort process and how it relates to possible changes to the BMAP boundary, particularly if it is discovered that Georgia is a significant source part way through the five-year period. Anita responded that Steve Cioccia's presentation would help answer that question and where our priorities should be in terms of nitrate reductions in relation to the Cody Scarp.

Theresa Heiker noted that Hubbard Branch in the Lake Miccosukee watershed has an EPA TMDL already in place.

Development Process of Priority Areas for Management Activities in the First BMAP Iteration

Steve noted that the agenda has been updated to reflect that a presentation on the aquifer vulnerable areas (AVAs) would take place today while the proposed priority areas for the BMAP will be discussed at the April meeting.

Steve reviewed the three AVA assessments that were used as information sources: the Florida Aquifer Vulnerability Assessment II (FAVA II), the Wakulla County Aquifer Vulnerability Assessment (WCAVA), and the Leon County Aquifer Vulnerability Assessment (LAVA). Steve presented the definition of aquifer vulnerability and emphasized that the three assessments were conducted individually and should not be directly compared to each other. The three assessments used different data sets, different scales, and different periods of data records. Steve noted that the AVAs are predictive models but do not account for human activities at the land surface, take into consideration contamination types, nor estimate flow paths, fate, and transport of constituents.

Lakes and surface waters were excluded from the AVAs because they are treated separately from groundwater. Based on the AVA analyses, the locations of highest vulnerability include areas where the overburden of the aquifer is thin or absent, in areas of dense karst features, and areas of high soil pedality. The focus of the BMAP will likely be on areas that are identified in the AVAs as either "most vulnerable" or "more vulnerable."

Steve reviewed several maps that showed the more and most vulnerable areas within the proposed BMAP boundary area. Different color schemes were used to differentiate the vulnerability categories and to distinguish among the information sources, since the categories were not based on the same information or scale as previously noted.

Steve stated that he would like to focus the BMAP efforts on areas that have dense "most vulnerable" designations within the continually contributing springshed. These areas should be the focus so they receive the earliest management actions; receive the most proactive efforts, have faster effects on water quality, and are expected to have the most effectiveness for the effort expended.

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Steve suggested that the BMAP could use a two-tiered priority designation where priority zone 2 would be identified for areas that may be intermittently contributing to groundwater flows, and areas characterized as having lower surficial infiltration and less contribution to Wakulla Springs. Priority zone 1 would designate those areas that are a primary level of concern because they have high probability of surficial infiltration and contribution to groundwater flows, they have fast travel times to Wakulla Springs, and they are regularly contributing flows to Wakulla Springs. Steve offered to come back to the April meeting with some BMAP priority areas delineated for further discussion.

Amy Tracy asked if the Department is engaged with FGS in the evaluation of the AVAs and in the interpretation of the results. Steve responded that yes, the Department has been consulting with FGS staff on the use of the AVA information.

Amy asked if there is an intention to re-run an AVA model for the entire Wakulla basin or will the Department piece together three different models and how would that be done. Steve responded that he would like to have a springshed-wide model, but there is no funding available at this time to integrate the various models. However, the Department would be looking at the AVAs individually, so we won't be piecing them together, and then the Department will also look at other information that might affect the contribution or impairment.

Amy asked if the Department had done a cost estimate to run one springshed model for the Wakulla system. Amy asked if Steve had considered using a geographic information system (GIS) for the evaluation and to review the three levels of vulnerability. Anita asked James Cichon if he had any information on the FGS cost estimates to rerun the models. James responded that the cost estimate to update the model for Leon and Wakulla Counties only was between \$80,000 and \$100,000. Pamela responded that the costs included collecting new data, but it would be possible to run a revised model with existing data, which would decrease the cost significantly.

James commented that light detecting and ranging (LIDAR) data were used for Leon County but only limited LIDAR data were available for the Wakulla County area. LIDAR is an effective tool for detecting karst features, which are very beneficial for the model. Steve added that the Department is considering areas that need additional investigations.

Pamela noted that she reviewed the AVA reports in detail, and if you look at the individual layers in the different reports, they do have different scales. The probability maps summarize the conclusions from all the layers analyzed, but the data used to create the probability maps differ. It may be worthwhile to review the scales in all three AVA documents to see how the scales and, therefore the layers, compare.

James noted that some of the yellow areas in the WCAVA are comparable to the red areas in the LAVA. Steve added that the BMAP staff were considering the different probabilities and the layers of information that are most pertinent to the BMAP process and plan to review those with the FGS experts, if they are willing to provide that advice.

Pamela noted that it might be advisable to include the third category of vulnerability from the WCAVA as a priority area because that may be the category where there is the greatest error.

Amy noted that Steve had stated that part of the considerations would be the density of the vulnerable areas and she asked what density would be used to differentiate what would be classified as "high density." Steve answered that it hadn't been decided how the density levels would be evaluated. There are large areas of dense vulnerability and those are fairly obvious, but there are other factors to be considered, such as the sources of nitrate and other density factors. Tom Frick added that the AVAs are one tool and multiple lines of evidence should be considered. Just because there is a vulnerable area to

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the aquifer doesn't mean the area contributes to Wakulla Springs. We want to make sure other lines of evidence are considered that are pertinent to Wakulla Springs.

Summary of Water Quality Data and the Existing Monitoring Network

Gary Maddox stated that his presentation has three objectives: 1) Address how recent nutrient concentrations in the Wakulla Springs and River compare with levels during the TMDL verified period; 2) Define which tunnels are contributing elevated nitrates to the Wakulla Springs and River; and 3) Identify what potential nitrate sources contribute to water quality in the major tunnels and springs.

Gary reviewed a map of the tunnel and cave systems. He noted that during storm events the national forest could contribute tannic acids and colored water to the system. The Department pursued permission from the park to install wells and measure the water quality in the tunnel system. Wiring was installed to flow meters within the tunnels, but the flow meters were only run for a short period of time. The wells allow water quality measurements without using cave divers.

There is a station within the Wakulla Main Spring about 180 feet down. The station was installed by cave divers and the samples are collected through the use of a pump. All the samples are analyzed by the Department laboratory. There are tubes that extend out into the tunnels and the tubes have to be purged before a sample can be taken, so it takes a while to collect a sample.

Gary showed an aerial photo with the surface and groundwater sampling stations labeled. Multiple agencies have been involved with sampling over the years. Many of the historic surface water sites are clustered together. The mapped sites are the locations from which Gary reviewed water quality data. He noted that the majority of the water in the Upper Wakulla River originates from the main spring vent.

Comparing sampling sites on the Upper Wakulla River, the main spring has the highest nitrate concentration. As the water proceeds down the river and plant uptake occurs, the nitrate levels decline overall. For the data that are presented, the collection dates range from 2000 through 2012. The verified period was from 2000-2007 (which is marked in yellow on the chart); these are the data that were used for the TMDL. The subsequent data period is from 2008 through 2012. In general, the nitrite levels are declining. The numeric nutrient criterion for springs is 0.35 mg/L nitrate and that concentration is marked on the graphs with a dashed line. Gary noted that there has been some confusion about the recent water quality data. While some of the river stations have had recent concentrations of less than 0.35 mg/L, the criteria is for the spring itself and, so far, the spring nitrate concentration are above 0.35 mg/L.

Gary reviewed the water quality from the various tunnels. The nitrate levels appear to be higher in the B and C Tunnels than in the main spring, which indicates that there are other sources of flow to the springs that are diluting the concentrations observed at the spring vent. Gary also showed the data from the D Tunnel, for which there are less data. Gary noted that B Tunnel, C Tunnel, and Wakulla Main Tunnel have been sampled on a quarterly basis since 2001 and, therefore, have the best dataset. NFWFMD has also been sampling Wakulla Main Tunnel regularly. Budgets have constrained additional monitoring efforts and, additionally, the tunnel collection sites have large populations of ticks. The ticks have infected some of the Department's field staff with Rocky Mountain Spotted Fever and Lyme disease. In an effort to protect the health of the field staff, the Department has avoided sending crews to certain sites.

Gary noted that all the tunnel data indicate fairly high concentrations of nitrate and higher levels than are observed at the spring boil. The data from K Tunnel indicate lower nitrate levels and may be the diluting source of flows from the other tunnels.

In terms of explaining the downward trend in nitrates, Gary explained that the rainfall data indicate that there has been a 0.5-inch decline in rainfall since the verified period based on data from the Tallahassee Regional Airport. However, the change in rainfall cannot explain the total decline in nitrate trends. The

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discharge data reflect the precipitation trends and, therefore, rainfall volume does not explain the decline in nitrates.

Gary showed a pie chart of sources from a 2002 NFWMD report showing nitrogen sources south of the Cody Scarp. Gary noted that atmospheric deposition is a large source on the chart, but has the opportunity to be taken up by plants and, therefore, does not reach the groundwater in its entirety. Also, atmospheric deposition is a fairly constant source and not one over which we have much control. So, the remaining sources are where the opportunities are for reductions.

Gary noted that the practice of residual application has stopped since the time the report was done, so that is a significant source that has been controlled. At one time, the City of Tallahassee was land applying residuals from the wastewater treatment plant at the airport. Now, the practice is to remove those residuals from the Wakulla springshed. That leaves the other sources to reduce: on-site sewage treatment and disposal systems, large wastewater treatment, and fertilizer. Commercial fertilizer represents agricultural applications, turf applications on golf courses, and commercial application of fertilizer on residential lawns.

Gary summarized the results of the dye tracing studies performed by Todd Kincaid on the Southeast Sprayfield and where water moves underground. Dye tracing was also performed on Ames Sink. Gary showed a map of the tunnel systems and where they flow with respect to Wakulla Springs. Spring Creek and Lost Creek are also connected to the Wakulla system. These are not the only sources of nitrates to the system; these are the areas that have been studied.

Gary indicated that the long-term trends in nitrate have varied. Starting in the mid-1960s, the nitrate levels were very low, around 0.01 mg/L. The levels increased until the mid-1990s when they reached a peak of 1.6 mg/L. There has been a steady decline in nitrate since the 1990s. Gary presented a summary of the concentrations for various areas.

Gary summarized that nitrate concentrations show a declining trend in all Wakulla tunnels throughout the period of study and since the 1990s. In terms of the tunnel contributions, the Wakulla B, C, and K Tunnels all continue to show mean nitrate concentrations above 0.35 mg/L. B, C, and D Tunnels are the major contributors, with K Tunnel likely diluting the concentration. B Tunnel has the highest overall nitrate concentration. K Tunnel receives much of its flow from R tunnel and has the lowest overall nitrate concentration. B, C, and D Tunnels all are measured with declining concentrations in nitrates. The K Tunnel concentrations are unchanged, but are lower overall.

Gary outlined the likely sources of nitrates in each of the tunnels. The sources vary by the area, but include the Southeast Sprayfield, Ames Sink, Woodville, Fisher Creek, Black Creek, and the R Tunnel.

Gary indicated that there are some flow data for Fisher Creek as there was a flow gage installed, although there may not be water quality data for all the creeks. In the National Forest, you would expect fairly good water quality, although heavy in tannins. When the spring water turns dark, it is from tannic acids common in forested watersheds. Deep aquifer tends to be very clear and surface waters tend to be darker.

Richard asked if the tunnel water quality data are available on-line. Gary responded that all the tunnel data are in STORET; make sure you pick "spring data" and not "surface data" and you can find the tunnel water quality data. Richard asked about the flow data for each tunnel and where those data are located. Gary answered that the flow meters are not running right now, so all the flow data are historic data. To find those data, you should contact Rod Dehan at FGS.

Catherine Bray asked about the dissolved oxygen levels and the aquifer processes that occur. Gary responded that he is not an expert on oxygen dynamics but noted that nitrates tend to resist dissipation in the aquifer. Phosphorus interacts with the limestone and can form the mineral apatite. Therefore

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phosphorus levels tend to decline in groundwater over time, when in a limestone aquifer. Groundwater tends to be low in dissolved oxygen. They looked at isotope levels for some of these constituents to determine water sources and got mixed signals. They saw both organic and inorganic signals.

Joseph noted the recent hearing in Leon County regarding the planning process and land use decisions. He noted that it would be helpful for local government officials to have good scientific scenarios to tie the land use decision process together with water quality efforts to help local officials make good decisions. Gary responded that if we had enough data, we could do that. There is more information on the Wakulla system than for any other Florida spring, and perhaps in the world. Even with all that information, we could use more. It would be helpful to have more dye tracing and to understand how some of the large lakes with sinkholes within them influence the springs. However, dye tracing is an art. It needs to be performed under the right hydrologic conditions and is very expensive. We could do more science, but we are limited with the resources we have.

Pamela asked for estimates of the volume within the tunnels, because load is really the most important part of a TMDL. We can measure concentration, but if we don't understand the volume, it's hard to understand how important the various sources are. Gary answered that where we have flow data, we need to review those data alongside the water quality data to see how the loads are changing. We are fortunate to have some flow data. The equipment to measure flow is very difficult and expensive to install and difficult to maintain the equipment once installed.

Biological Monitoring Results

Joy Jackson outlined the sampling that has occurred in the Upper Wakulla River, primarily for macroinvertebrates. Joy showed a map of three stations that have been sampled for biological data; however, most of the data come from one site. There has been one rapid periphyton survey (RPS) also performed in the area.

Joy explained how the numeric nutrient interpretations are performed. In general, if there are indications of an imbalance of flora and fauna, and either a stream condition index (SCI) score of 40 or higher or the nutrient thresholds are exceeded, then the area is considered to be impaired.

There are different methods used to assess biological health including SCI, RPS, linear vegetation survey, biological reconnaissance, and artificial substrates. There has not been a linear vegetation survey done in the Upper Wakulla River so far, but that is a tool that would be recommended here. Algae and plants tend to respond more quickly to nutrient changes than in the macroinvertebrates. Joy noted that the SCI tool has evolved over time and, therefore, the different results can't be directly compared. The scales are sometimes different, so we can use them but we look at them individually.

Joy summarized the results of the SCI in the Upper Wakulla. Using the 1992 data, the average score was in the "poor" category, and Joy noted the majority of biological data are from that period. In 2004, the average score was 25 (categorized as "very poor"). In the most recent data from 2007, the score was still in the "poor" category. There seems to be a slight improving trend in biological conditions, but the overall quality is poor. Under the current scoring system, if the average score is less than 40 or an individual score is less than 35, the waterbody is considered to be impaired.

Johnny noted that the average 2004 score was 25 but is labeled as "good" on the slide. However, the legend indicates that a score of 25 would be "very poor." Joy thanked him for noticing that and offered to correct the labeling on the slide.

One RPS sample was performed in April 2012. In the assessment, 75 percent of the points assessed had a rank of greater than four of algal coverage. A rank of four or greater indicates visible filamentous algae.

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It is not uncommon for clear water systems like springs to have problems with filamentous algae. They need to perform additional samples to confirm this assessment. The rule requires at least two RPS samples separated by at least three months for them to be considered independent. There was also an RPS sample from below Highway 98 where 40 percent of the assessment points had a rank of four or higher. Joy also noted that hydrilla is clearly an issue in this system. Overall, the RPS is likely a better toolkit to evaluate the Upper Wakulla system versus using the SCI, even though we relied on the SCI in the past. Joy briefly described the decision key they use when they perform an RPS.

Jason Dickey asked about the SCI graphs and the slight increasing trend and whether the Department had looked into the numbers in a more detailed fashion to see what functional groups were recovering or improving. Joy replied that they haven't looked into the 10 different metrics, but it would be interesting to do.

A participant asked if the Department performs light meter measurements on the river. Joy responded that they don't use light meters; they use a densitometer to measure canopy cover. He asked why light meters aren't used. Joy responded that to keep the assessment rapid, the light meter isn't the best tool. They also perform other assessments on the same day so they have to manage the amount of equipment they bring into the field. It is possible that the types of measurements could evolve, but right now, they use a densitometer.

Jim Stevenson asked if the Department has the expertise to identify the kinds of algal species found. Joy responded that they do have the ability to identify species and have several excellent taxonomists on staff. However, they focus on the bloom species; they don't typically identify all the species in an entire sample.

Steve Peene asked since a spring runs differs from a regular stream system, are there different biological targets considered for stream systems compared to the general targets. Joy responded that the Department could consider different targets in the future through a principal components analysis or something similar. That could have some value, but they haven't yet developed those techniques.

Will Sheftall noted that there is a downward trend in water quality in most springs. He asked if there is a way to predict or correlate among the water chemistry and biological components when things are improving. Do we expect a gradual improvement in biological conditions or a big jump? Do we have a sense of how that might play out? Joy replied that through the statewide numeric nutrient criteria development process, the Department looked at the data for signals and correlations, but they did not find a stressor-response relationship. With floral tools, you are likely to see the relationships sooner. With invertebrates, it is possible to see some relationship, but in springs systems it might be better to use specific subsets that respond in spring systems, such as snails.

Charlie Donahue asked if there was any investigation of pesticides and endocrine disruptors on invertebrates. Joy responded that the assessment technique is designed to be a somewhat rapid method and, therefore, they don't examine individual fauna, which you would need to do to get a sense of those. They do some work with fish, but overall that kind of measurement is limited. We know that toxics affect the community, so certain organisms dropping off can be an indication of certain types of contaminants.

Florida Department of Health (DOH) Septic Tank Study

Elke Ursin noted that the DOH research program has been in place since 1983. Their basic charge is to look at public health and environmental impacts of septic systems on the environment. The research is funded by a \$5.00 surcharge on new septic system permits and, more recently, special legislative funding and outside grants. The research has helped shape the industry and the rules that apply. DOH has a

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Research Review and Advisory Committee that advises DOH on new research. The committee reviews and ranks proposals for research contracts as well as reviews the draft research reports.

In Florida, approximately 30 percent of the population uses septic systems for domestic waste treatment. The outflows from septic systems are one of the largest artificial groundwater recharge sources in Florida. Since 90 percent of our drinking water currently comes from groundwater, it is important to understand how these artificial recharge sources affect our drinking water resources. The amount of nitrogen that leaves an onsite treatment system depends on several factors including system usage, treatment level, proximity to groundwater, and the soil type.

In 2008, DOH received a special legislative appropriation that instructed them to further develop cost-effective nitrogen reduction strategies. The focus was on passive systems using reactive media for denitrification (and no more than one pump in the system) and similar to conventional systems in terms of operation and maintenance. Elke explained that DOH has a test site where they study cost-effective ways to reduce nitrogen from onsite wastewater treatment systems. They are also installing full-scale systems at actual home sites to test the techniques. They are monitoring seven sites in Florida and have conducted eight monitoring events. Using an additional stage of treatment between the existing tank and the drainfield, a biofilter can increase denitrification. The test center results show consistent treatment to very low nitrogen levels. The goal is to decrease nitrogen concentrations from the 61 mg/L leaving the tank to 10 mg/L or less. The two-stage system is achieving concentrations less than 3 mg/L.

There is a second type of system that also uses a two-stage process. There is a liner that filters the effluent into a second stage with a sulfur media. They haven't built this system in a home site yet, but they have the test results from their research facility and it is very effective at nitrogen removal. At least one system will be installed at a home site.

DOH is also contracting with the Colorado School of Mines to develop a model of nitrogen removal. They are developing a simple model to be used for assessment, planning, and siting of onsite treatment systems. The model will represent the treatment effectiveness in soil and groundwater. The model will be calibrated to site-specific data collected at four sites over 12 months.

The project timeline includes the original legislative appropriation in 2008. The contract for work began in 2009. DOH received additional appropriations in 2010 and 2012. Overall, \$4.4 million has been appropriated towards these research efforts. The contract is expected to be complete in January 2015 and the final report to the legislature is due in May 2015.

Successful outcomes of the study would provide several benefits: 1) Designs for passive systems that have been performance evaluated, are effective at removing nitrogen, and are user-friendly for property owners; 2) Cost estimates for these systems and a comparison of costs to existing systems; 3) Nitrogen fate and transport model that will help in estimating nitrogen contribution from existing and proposed systems; and 4) Opportunities for nitrogen reduction from onsite sewage systems in sensitive watersheds where municipal sewers are not feasible.

Elke reviewed some components of 2012 House Bill (HB) 1263 that amended 381.0065(4)(x), Florida Statutes. The bill prohibits governmental entities from requiring performance-based treatment systems (PBTS) before the study is completed. An exception is made for passive engineer-designed PBTS. The prohibition does not apply to a governmental entity that adopted a local law, ordinance or regulation on or before January 31, 2012, and it was noted that site-specific variances for violations of Chapter 64E-6, Florida Administrative Code, can require a PBTS.

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The budget implementing language in the 2012 legislation put restrictions on state agencies until Phase 3 of the study is complete (scheduled for 2015). A state agency may not adopt or implement a rule or policy that does the following: 1) Mandates, establishes, or implements more restrictive nitrogen-reduction standards to existing or new onsite sewage treatment systems or modification of such systems; or 2) Directly or indirectly requires the use of performance-based treatment systems or similar technology, such as through an administrative order developed by the Department of Environmental Protection as part of a basin management action plan adopted pursuant to s. 403.067, Florida Statutes. However, the implementation of more restrictive nitrogen-reduction standards for onsite systems may be required through a basin management action plan if such plan is phased in after completion of Phase 3.

Debbie Lightsey asked if the systems being tested use more land than a conventional septic tank. Elke responded that the short answer to that is “a little bit” because you need two tanks. It is possible that the additional stage could be installed between the existing tank and drainfield. However, it depends on the site characteristics and the existing layout. There is more square footage where there would be something in the ground, but you only need space for two tanks. Debbie asked if the 2.6 mg/L achieved was from the drainfield, or from the pipe from the tank. Elke answered that the 2.6 mg/L is the concentration leaving the pipe and before it entered the drainfield, based on the test center results.

Pamela stated that she is familiar with this kind of work. She wondered why DOH had not pursued some of the existing technologies that use passive systems that have been used and approved in other states. Why are we reinventing the wheel? The Lombardo report mentioned the Nitrex system, for example. Elke responded that the Nitrex system is considered as “innovative status” in Florida and has been tested, so DOH is looking at that. The research plan went through a strict review process on what information was already out there and what gaps needed to be filled. Elke added that they aren’t repeating any research that has been done elsewhere. Pamela commented that her opinion is that the legislation’s real purpose was to postpone anyone addressing the impacts of septic tanks. The technologies exist to address this problem such as the Black and Gold product. Elke added one of the goals to establish non-proprietary treatment techniques. Some of the other passive treatment systems are proprietary, such as the Black and Gold material, and therefore, not available for anyone to use. The treatment techniques being developed in this project will be open to everyone.

Will asked if they had considered looking at systems that use plants to convert ammonia to nitrate or are all the systems focused on denitrification. Elke responded that the model would consider evapotranspiration and plant root uptake of nitrogen, so it will be considered in that context. When you look at drip dispersal, which is an approved technique in Florida, the process tends to require pumps. One of the main goals was to avoid the need for pumps. There is a University of Florida Institute of Food and Agriculture Sciences (UF-IFAS) study looking at the existing drip dispersal system to evaluate agricultural options.

Mark asked about the affordability of the new system and if there were there a ball park figure for what it would cost. Elke responded that they do not yet have an estimated cost. The field testing of these systems will provide the information on which they can estimate the costs, because these systems are media dependent.

Public Comments and Wrap Up

There were no public comments. The next meeting was scheduled for Thursday, April 18th at 9:30 AM, at Woodville Community Center. Tiffany reviewed the action items.

Debbie asked if the Department’s isotope study would be presented. Anita answered that it is on the schedule for the April meeting.

Upper Wakulla River and Wakulla Springs Basin Management Action Plan

Tom thanked the speakers for their presentations.

Debbie asked if the Steve could send the link to the map in an email to make it easy to find. Steve responded that he could provide the link to the location, as well as to presentations from today. Anita noted that the water quality data would be revised and re-posted.

Adjourn

The meeting ended at 12:03 PM.

Action Items

1. Anita Nash will provide a map of the entire area, including Georgia. – *Completed.*
2. Richard Wieckowicz will assist Anita in finding the historic data that shows the nitrogen impacts. Anita will discuss this information further with him.
3. Steve Cioccia will come back to the April meeting with BMAP priority areas delineated for further discussion.
4. Joy Jackson will correct the labeling on the slide related to the 2004 SCI score. – *Completed.*
5. Steve will provide a link to the presentations and map via email. – *Completed.*
6. Steve and Anita will re-post the water quality data with corrected information. – *Completed.*