

**Kings Bay/Crystal River Basin Management Action Plan (BMAP)
Meeting Summary**

*Thursday, June 23, 2016 at 2:00 PM
Crystal River City Hall
123 Northwest Highway 19, Crystal River, FL 34428*

Attendees

Paul Adams, Woodard & Curran
David Bruzek, Duke Energy
Will Bryant, FDOH-Citrus County
Debra Burden, Citrus County
Tiffany Busby, Wildwood Consulting
Ed Call, City of Crystal River
Kirstin Eller, DEP Ground Water
Cathy Foerster, Wildwood Consulting
Xueqing Gao, FDOH
Tom Giger, SWFWMD
Mark Green, SWFWMD
Terry Hansen, DEP BMAP
Janet Hearn, ATM on behalf of FDOT

Joyce Kleen, USFWS
Greg Lang, Mittauer & Associates
Celeste Lyon, DEP Ground Water
Sky Notestein, SWFWMD
Chris Rowe, FOWA
Jennifer Sagan, Amec Foster Wheeler
Mark Schroder, Citrus County
Bill Stevens, Citrus County
Charlene Stroehlen, Amec Foster Wheeler
Barry Vance, Water & Air Research
John Walkinshaw, GPI
Curt Williams, FFBF

Introduction

Tiffany Busby opened the meeting at 2:00 PM by welcoming everyone. She explained the DEP ground water staff were present to discuss the nitrogen source inventory. Terry Hansen, the DEP basin coordinator for Kings Bay/Crystal River (KB/CR), will be discussing new legislative requirements, overview of the BMAP process, and time tables. She thanked the City of Crystal River for arranging the meeting room. She reminded attendees to sign in and to provide their email information should they desire to be on the Florida Department of Environmental Protection (DEP) contact list to receive meeting notices. She then requested that each person in the room introduce themselves.

Review of BMAP Process for KB/CR

Terry Hansen introduced himself and directed the audience to the agenda projected on the screen. He briefly explained each topic that will be discussed and transitioned to his PowerPoint presentation. He stated that within the Springs Coast Basin, BMAPs are in development for KB/CR and Weeki Wachee Spring and River; total maximum daily loads (TMDLs) are being finalized for Homosassa Springs and the Chassahowitzka River; and TMDLs are in development for Aripeka Springs. The Springs Coast Basin is comprised of three counties (Pasco, Hernando, and Citrus) within five springsheds; therefore, solutions are needed basinwide, but with a county focus.

He presented a pie chart that depicts the DEP water quality framework that includes the following components: Set water quality standards; monitor water quality; determine pollution problems; if exceedances, establish restoration goals (TMDLs); work with community leaders; develop and implement restoration plans (BMAPs); and measure success and adapt (a continuous process).

Terry's next slide focused on the BMAP itself. He emphasized that the BMAP is a restoration plan, not a remediation plan. The overall restoration goal is to reduce the nutrient footprint – reduce the amount of nutrients in ground water going to KB/CR. He further stated that a BMAP is adopted by DEP through a Secretarial Order, enforceable by DEP, reviewed annually, and updated every five years.

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He discussed the regulatory framework for BMAPs. The process for preparing BMAPs and issues to be addressed are in Section 403.067, Florida Statutes, also known as the "Florida Watershed Restoration Act."

He presented a table on the KB/CR TMDLs by waterbody for the springs around the river. Key points were made including that this system is different from Weeki Wachee since there are multiple spring vents and multiple sources of nutrients. Also, this system has a total phosphorous (TP) impairment; therefore, solutions will be challenging.

He provided a graphic of the overall BMAP study area and stated that the BMAP uses a "geopolitical boundary," not a TMDL boundary. The study area boundary extends to the Gulf to include the bay and nearshore waters. The contributing area extends into Marion County; this area is not included in the BMAP.

Upon review of the land use slide, Terry stated that the primary stakeholders in the study area are homeowners and agriculture producers, since nonpoint sources contribute to most of the nutrient loading. The stakeholders need to reduce their nutrient footprint through reduced fertilizer applications, best management practices (BMPs), and healthy septic systems. He stated that DEP does not advocate total removal of septic systems; the key is to identify where removal makes the most sense.

Terry inquired if the audience had any questions thus far. There were no questions.

Nitrogen Source Inventory and Water Quality Projects

Kirstin Eller of the DEP ground water management section provided a PowerPoint presentation on the results of the nitrogen source inventory and loading tool (NSILT) assessment for the springs of Kings Bay. There are multiple sources of nitrogen that contribute to the water quality impairment of the springs. The NSILT was developed to identify and quantify the major sources of nitrogen contributing to the ground water in the KB/CR study area. The NSILT is a geographic information system- (GIS-) based and spreadsheet-based tool that provides spatial estimates of the relative contribution of nitrogen from various sources while considering the transport pathways and processes affecting the various forms of nitrogen as they move through the land surface through soil and geologic strata into the Floridan aquifer.

In addition to the NSILT for KB/CR, DEP completed the Weeki Wachee NSILT and is developing an Aripeka/Magnolia NSILT, Homosassa NSILT, and Chassahowitzka NSILT, each expected to be complete by September 2016.

Kirstin provided visual depiction of the overall BMAP study area with further delineation of the numerous springs. She stated this study area is unique since there are a lot of spring vents with the same total nitrogen (TN) issues. The springs discharge from the same aquifer and have similar nutrient reduction needs.

She presented a pie chart of land uses within the KB/CR contributing area based on the Southwest Florida Water Management District (SWFWMD) 2011 land use layer. The majority of nitrogen inputs occur within agricultural and urban land areas.

Kirstin provided the steps to estimating the nitrogen load to ground water:

1. Estimate the nitrogen input to the land surface from various sources (best available data) within the BMAP boundary.
2. Estimate the environment's ability to uptake and utilize the nitrogen. This process is called "attenuation."

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3. Evaluate the degree of recharge within the BMAP boundary; this naturally varies based on geologic conditions and influences the quantity of water reaching the aquifer. DEP applies a weighted recharge factor to account for the variation.
4. Reach out to stakeholders regarding estimates and methodology; fine tune as needed.

She presented a hybrid flow chart to visually depict the nitrogen cycle and attenuation. The nitrogen sources are the following: atmospheric deposition, wastewater treatment facilities, septic systems, livestock operations, urban fertilizer, and crop fertilizer.

Kirstin showed the ground water recharge areas within the KB/CR study area. Most of the BMAP boundary is a high recharge area with over ten inches of water per year infiltrating the ground water. Recharge areas (high, medium, and low) are categorized based on a 2002 U.S. Geographic Survey (USGS) model. Recharge rates are weighted to estimate loading potential for each source category. The discharge area is not included in the NSILT as water in these areas will not reach the aquifer.

Nitrogen sources in KB/CR

Kirstin presented slides on nitrogen sources: atmospheric deposition, wastewater treatment facilities (WWTFs), septic systems, livestock operations, crop fertilizers, urban turf grass fertilizers, and sports and golf course turf grass fertilizers.

Biochemical attenuation factors

Attenuation factors for each nitrogen source were determined upon an extensive literature and peer review.

Recharge factors

Recharge factors are used to estimate the percentage of the non-attenuated nitrogen expected to reach the aquifer in a given year. In the high recharge area, DEP estimates that 90% of the non-attenuated nitrogen will reach the aquifer; 50% in the medium recharge area; and 10% in the low recharge area.

Results – estimated annual average nitrogen loading to ground water

Each year, an estimated 655,616 pounds of nitrogen enters the aquifer, mainly in the high recharge area. The estimated nitrogen load to the aquifer is higher than what is currently discharging from the springs, which may indicate an over-estimation or there could be considerable nitrogen storage in the subsurface which may enter the aquifer slowly over time. Another key takeaway is that nitrogen discharge from the springs are higher than the target--the TMDL. We need to close this gap between the discharge amount and the TMDL.

Kirstin concluded her presentation by stating that DEP is continually refining the NSILT methodology as new data become available. She encouraged attendees to contact her with any questions. Terry reminded the attendees that the NSILT is an estimate of major sources and percentage of contribution to the land surface.

Questions/comments by attendees

1. Xueqing Gao requested a list of TN components included in the model. Kirsten responded that she will provide him with an exact list of components.
2. Joyce Kleen: How are sprayfields factored in the NSILT? Kirstin: Information on WWTF sprayfields is obtained from permit files.

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3. Several questions and comments were posed regarding calculation of TN in biosolids (byproduct of wastewater treatment) and land application of septage. Per Kirstin, biosolids and land application of septage are not included in the NSILT analysis.
4. Xueqing Gao: Are the septic tank calculations based on the modified Florida Department of Health (FDOH) model (2009)? Kirstin: Yes, and we will update the numbers during the next five years with FDOH-Citrus County counts and projects implemented in the BMAP.
5. Chris Rowe: How effective are septic systems now? Kirstin: Septic tank systems have an estimated 60% uptake; therefore, 40% of the 9 pounds of nitrogen (lb-N)/person per year (or 18 lb-N per year, per septic system) are making it to the ground water.
6. Debra Burden: Are behaviors of rural landowners considered? Kirstin: There are no data to distinguish fertilizing behaviors between urban and rural landowners.
7. Curt Williams: Fertilizer application by farmers fluctuates with how well the farmers are doing. If cattle prices are down, then fertilizing is less. Kirstin: We use an overall average in our calculations.
8. Joyce Kleen: Are deed-restricted communities applying more fertilizer than non-deed-restricted communities? Kirstin: We do not have specific data on this point. DEP contacted 25 homeowner associations (HOAs) in the Springs Coast Basin. They do not require fertilizer or prescribe application rates.
9. Mark Schroder: An additional question to ask of the HOAs is the type of grass required in the subdivision. Kirstin responded it is a good point.
10. Chris Rowe: Backyard gardens require different fertilizer application than lawns. Kirstin responded it is a good point.
11. Chris Rowe: Do you know the actual quantity of urban turfgrass fertilizer applied on properties? Kirstin: We are using fertilizer rates from a SWFWMD study; actual rates vary.
12. Xueqing Gao: Does your biochemical attenuation analysis take into consideration stormwater runoff? Kirstin: Stormwater runoff is the conveyance of TN, not the source. DEP is not currently assessing surface water runoff to ground water; therefore, stormwater runoff is not considered in the NSILT. However, DEP is working on methodology to include stormwater in the analysis since runoff makes its way to ground water, albeit at different locations and different concentrations.
13. Xueqing Gao: Atmospheric deposition represents 90% of the nonattenuated load? Kirstin: 90% attenuated; 10% leaching.
14. Debra Burden: How are golf course fertilizer rates analyzed? Kirstin: Golf courses are included in the sports turfgrass analysis.
15. Xueqing Gao: Does DEP intend to match nutrient loading to the model? Kirstin: Yes, DEP continues to improve the NSILT methodology. Terry: We do not yet understand system transport; we do not have travel time, relation time, or conduits.
16. Xueqing Gao: Which TN number will be used as the baseline? Kirstin: The TMDL is the baseline. Terry: We need to meet the TMDL within 20 years.
17. Chris Rowe: Do you have a legacy loading estimate? Terry: No, this is because of the complex ground water system.
18. Chris Rowe: What we are doing now could be reducing loads? Terry: It is unknown at this time the relationship of the loading we see at the springs and how much of past or current practices are being reflected in the current loads.

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Florida Springs and Aquifer Protection Act

Terry presented several slides on the recent legislation that goes into effect July 1, 2016. Since Crystal River is an Outstanding Florida Water and Kings Bay is an Outstanding Florida Spring, a BMAP must be adopted within two years of its initiation. Also, the TMDLs must be met within 20 years of the BMAP adoption and the BMAP must include five-year milestones. The BMAP must provide list of projects; include an on-site sewage treatment and disposal system (OSTDS) remediation plan; identify point sources and nonpoint source categories with estimated load allocations (NSILT); and identify a priority focus area (PFA). The PFA has not yet been determined for KB/CR, but will likely be the entire BMAP study area since there is so much high recharge and difficult to delineate areas. The DEP ground water section will work with SWFWMD to determine the PFA.

The legislation further specifies that a fertilizer ordinance shall be adopted by each local government and identifies agricultural BMPs. Prohibitions include WWTFs greater than 100,000 gallons per day (GPD), unless advanced wastewater treatment (AWT) is used; new OSTDS on less than one-acre lots; land application of biosolids; and hazardous waste facilities.

After the BMAP is adopted, stakeholders have access to funding sources that require an adopted BMAP to be considered for receiving funds; allows refinement of the NSILT to determine the required estimates of a project's nutrient load reductions; and allows development and implementation of innovative pilot BMP activities and effectiveness determination prior to required rulemaking.

Terry showed two slides regarding nutrient input to land surface and loading to ground water. Fertilizer is the largest input to land surface while septic systems are a small factor (if a large factor, then a public health issue). Septic systems and fertilizer are the largest impacts to ground water.

Questions/comments by attendees

1. Paul Adams: Will the new OSTDS be standard or mechanical? Terry: Not sure at this time; however, it should be a performance-based drainfield enhancement. Tiffany: Within the BMAP we can define the types of septic systems that can be placed on less than one acre.
2. Chris Rowe: Who determines the PFA? Terry: DEP and SWFWMD.
3. Paul Adams: Does Citrus County have fertilizer inspectors? Debra Burden: Code enforcement has three staff who can identify fertilizer abusers.

BMAP Timeline

Terry provided the following timeline: BMAP adoption by June 2017. To achieve this deadline, there will be monthly meetings to develop strategies to meet legislative requirements. The next meeting is planned for July 19, 2016 and will focus on the OSTDS remediation plan. Future meetings will focus on the different source categories and how to address each one. Challenges include TP reduction in addition to TN reduction.

Maps

Terry briefly reviewed maps he had in PowerPoint format and proposed items for contemplation. While showing a map focused on the Kings Bay springs, he stated that DEP does not have details on loading and transit time. While showing a map of septic, sewer lines, and WWTF locations, Terry stated that DEP will speak with utilities regarding various options – run sewer lines, support enhanced septic systems, etc. DEP intends to look at a holistic system.

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Next Meeting

Terry stated that the next meeting will be July 19, 2016 at 9:00 AM in Crystal River and will focus on septic systems. He stated that Citrus County already provided several projects for inclusion in the BMAP; FDOH is currently writing a rule regarding septic systems (emphasis on human health). We need to determine a likely solution path.

In the meantime, presentations from today's meeting will be placed on the DEP website at the following location:

http://publicfiles.dep.state.fl.us/DEAR/BMAP/Springs Coast/BMAPs/CR_KB_BMAP/.

Additional Questions/Comments by Attendees

1. Janet Hearn: Will DEP be setting allocations, and if so, the allocation should be on sources, not stakeholders.
Terry: DEP is looking at allocations; we need to identify source contribution. We are approaching this as a big balance sheet. How do we achieve the goals on 5-, 10-, 15- and 20-year schedules? How do we prioritize?
Tiffany: We've not done this before. The most similar BMAP is Wekiva Spring, but it did not include entity-specific allocations.
Janet: Make sure you really understand the system before assigning allocations. What are you going to tell the stakeholders if they do not meet the goals? Stakeholders need to be aware there is potential enforcement by DEP.
Terry: We agree there are a lot of unknowns; allocations will be developed as we progress. There are steps along the way (every five years) that will allow us to make corrections.
2. Chris Rowe: Is a double-tank septic system the preferred system? Terry: FDOH-Citrus County and FDOH-Tallahassee are looking at passive nitrogen systems; however, multiple systems are under evaluation by the water management districts and FDOH. FDOH will need to undertake rulemaking to have the systems permittable.
3. Will Bryant: FDOH-Citrus County is also exploring scalable improvements to WWTFs. Terry: DEP is not pushing "all sewer all of the time." We need the most cost-effective solution.
4. Xueqing Gao: What about TP?
Terry: Not sure at this time; yet another mystery.
Will Bryant: The TP source could be old phosphate mines.

Adjournment

The meeting adjourned at 3:57 PM.

Action Items

Below are action items from the meeting.

1. Kirstin – Provide Xueqing Gao with a list of TN components used in the model.
2. Kirstin – Consider how to include TN calculations for biosolids and land application of septage in the NSILT analysis. It was noted that septage land disposal is no longer allowed as of July 1, 2016.
3. Terry – Consider how septage land disposal will be discussed in the BMAP.
4. Kirstin – Consider how to determine, and apply if possible, the difference in fertilizing behaviors between rural and urban landowners.
5. Kirstin – Consider different fertilizer application rates for lawns and backyard gardens.

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6. Kirstin – Continue working on methodology to include stormwater runoff as a loading category in the biochemical attenuation analysis.
7. Kirstin – Consider the recently completed data on Citrus County OSTDS in future updates of the NSILT.
8. All – Save the date for the next meeting on July 19, 2016 at 9:00 AM at the Crystal River City Hall.