

**Silver Springs Basin Management Action Plan Meeting
April 11, 2013 – Technical Discussion on BMAP Boundary**

**Marion County Library Headquarters, Meeting Room C
2720 East Silver Springs Blvd, Ocala, Florida**

Meeting Notes

Opening Remarks, Introductions & Meeting Goals – Shane Williams and Mary Paulic

- Meeting goals are to discuss and select a BMAP boundary, increase understanding of the movement of nitrate in the environment and develop a BMAP objective statement.
- Audience members were requested to introduce themselves.

Timelines and Organization Discussion – Mary Paulic

- Technical discussions about the Silver Springs BMAP are noticed in Florida Administrative Review. There may come a time that smaller, technical groups are formed. There are major decisions to be made and discussions will include public education and outreach, as well as, future growth. There may also be specific policy level meetings.
- There will be at least 3 community meetings this year, which will be an opportunity to invite elected officials.
- A hand-out was provided that estimates a timeline of approximately 1 year for BMAP development.

Q and A

Is there a plan for reaching out to business or agricultural operations?	FDACS and Farm Bureau are typically present. DEP would like more contacts and is open to suggestions. DEP has reached out to the Chamber of Commerce and the Villages.
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BMAP Boundary Selection – Mary Paulic and Shane Williams

- Review of last month's meeting- Two options for delineating the springshed boundary were discussed, 1. Potentiometric surface, 2. Modeled Particle Tracking. Feedback favored using the potentiometric surface for delineation. Note that the springshed boundary based on the potentiometric surface follows the 1,000 year particle tracking.
- FDEP has proposed a focus area for the first 5 years of the BMAP, which would fall in approximately the 100 yr capture zone. The reason for this is that the entire springshed is a large, non-homogenous area. The proposed area is where the aquifer is most vulnerable due to the fact that there is not much overburden. Having a focus area would allow remediation activities to be conducted where it will be most effective in the short term. Future land use will be looked at as part of the total springshed to get ahead of the curve.

Q and A.

Was a boundary already set for Rainbow Springs?	No
What have you done in other springsheds?	The only completed spring BMAP is Wekiva. They used aquifer vulnerability, expert judgment and groundwater contributing area. Wakulla is going on now, and a similar "focus area" approach is being discussed there.
How will sources outside of the focus area that are known to have conduit flow going to be handled (i.e. Orange Sink and Keystone Heights areas)?	Orange lake is in focus area, but outside areas will need to be looked at. Most areas surrounding the springshed have TMDLs, so it's possible that the issues will be addressed in those BMAPs. For example, Orange Creek is N of this boundary. Any beneficial project occurring there will help Silver Springs. Rainbow and Silver will be adjacent an area will be in either the Rainbow or Silver. Essentially, the entire springshed is adjacent to or overlapped by other BMAPs.
Comment: One would think that the original springshed should be used for legal reasons. If you standardize the approach, it will hold up better in court. It's good data and defensible. Go with the big picture.	
Comment: Not all of the surrounding areas have TMDLs that are focused on nitrate.	
There is very little TMDL overlap in the southwest near the Villages. Villages is still fastest growing area and will be seeking additional CUP.	Portions of Villages are in the focus area. Additionally, they may get involved through MS4. FDEP will be contacting the Villages.
When will future growth be considered?	As part of the overall BMAP; not after 5 years. The focus area would be established for remediation projects.
To re-discuss the Focus Area- the reason it's being proposed is to concentrate efforts that will have the most impact over the next 5 years. 2009 land use shows urban landuse in center of the focus area. Agriculture and silviculture have BMPs where remediation can be conducted easily. The concern is that there will be a dilution of effort if we don't focus on a particular geographic area.	
Comment: Lake County Public Works involved with Wekiva, as we look for funding, multiple jurisdictions will be seeking same funds. Have focus are so that projects that can happen quickly that will have the most impact.	
Is the white area shown all public land?	No, it's just the most vulnerable area.
Focus area cuts out areas that are under pressure now. The NE boundary is of concern.	Don't think of 100 year capture area as the only area that will be addressed
How do you consider sandhill lakes within the boundary and their contribution of nitrate to the springs?	If impairments have been identified, they will be picked up in TMDLs for those waterbodies, that way they are directly addressed. If they

	haven't been put on the impaired list, we haven't addressed them. It is something we will look into, what connection may exist between those lakes and the Floridan aquifer and any potential impact to Silver Springs.
In the Harris Chain and Lake Apopka, there could be water transfers. Griffin is apparently "leaky" could be contributing to Silver. Need to investigate. Until that is known, should keep largest area possible.	Work is being done in that area and we could see improvements even though Griffin doesn't have a Nitrogen TMDL. Flow from Griffin goes more east than north. We will check on any connection of Lake Griffin with the aquifer.
Comment: if data shows that a line exists, follow that line. Follow the science. If data doesn't show that it's included, don't include it.	
One approach could be to consider the landuses, loads and recharge rates, and inventory N loading to direct activities within the springshed. However, you are going to have largest recharge in the unconfined areas, so when comparing similar uses within and without that area, you are going to get the highest loading there.	
Comment: The section in the focus area that is in Alachua County is all tree plantation, but that may change.	
Comment: A lot of the focus area is considered forest, but is in private ownership. If there are plans to fertilize now, they need to be considered current activities, not future activities.	

Stakeholders

- Stakeholders in the focus area include many municipalities. Audience indicated that others that may need to be included are Putnam County and FDOT District 2 in Alachua.

BMAP Objective Statement – Mary Paulic and Shane Williams

- Primary purpose is to focus on nitrate and getting to 0.35 mg/L NO3
- The BMAP will not address Rodman Dam or Silver Springs Attraction. Some of the Attraction projects may be incorporated into BMAP, but Parks has a separate plan for restoration. Ms. Sally Leib, the Silver River State Park Director said that stormwater will be addressed as part of the park restoration plan. The BMAP will also not address MFLs or CUPs, though FDEP realizes that those issues may influence decisions or impact BMAP.

Is there a budget for the BMAP?	FDEP doesn't have a specific budget for writing the BMAP. Feedback has indicated that people want to see things happening quickly.
Where does the plan go next?	It goes through review, comment and then to FDEP Secretary. After signature, it is an enforceable document.

- For May meeting- look at potentiometric surface area maps again to identify fluctuation areas and total area covered, paying attention to the Orange Creek BMAP area. Consideration will be given to compositing multiple year and seasonal potentiometric

surface maps to determine greatest area covered. Staff will develop a white paper to summarize boundary options.

Nitrate Sources Topic 1: Nitrogen Cycling and Nitrogen Sources in the Silver Springs Basin (Brian Katz)

- Nitrogen (N) cycling is the transfer of nonreactive atmospheric N to reactive N on earth. Because N gas makes up about 78% of atmosphere, N cycle is one of most important on earth. It takes intense heat (lightning) to form N Oxides, which is a form of nitrogen fixation. N can also be fixed by bacteria in root nodules of legumes.
- Human alterations of N cycle in the 20th century have more than doubled available nitrogen. This has been caused by 1. Extensive cultivation of legumes 2. Fertilizer production using the Haber-Bosch process 3. NOx from combustion. N₂ and N₂O more potent than CO₂. Results- eutrophication, acidification, fish kills due to ammonia, drinking water contamination.
- Nitrogen sources in Silver Springs Basin include atmospheric deposition, fertilizers, septic tanks, land application of treated wastewater and biosolids, animal waste and stormwater runoff. Impacts –In Silver Springs, there has been a 171% increase in algal biomass over 50 years; lower annual biomass of macrophytes; lower fish populations; lower gross primary productivity (GPP) and community respiration rate (CRR,) decrease in bird populations based on a study by Munch and others (2006).
- A summary of 4 recent studies that have investigated potential loading and sources to Silver Springs was presented.
 - Comprehensive study by Trudy Phelps evaluated nitrate concentrations based on land use. Highest mean nitrate concentrations were observed in agriculture and transportation/utilities land uses however, multiple up-gradient sources may contribute to these areas. An evaluation of loading quantification from different sources in the basin was based on fertilizer sales, livestock populations, atmospheric deposition and wastewater contributions. Fertilizer and livestock showed the greatest potential nitrate loading for Marion County. Limitations of this study include that it is based on 1995 land use; the wastewater component didn't differentiate between septic and WWTP effluent; there was no stormwater evaluation and no load separation between County and springsheds.
 - An isotope study of samples collected in 2011-12 from various spring vents showed a nitrate signature of primarily organic waste at Mammoth Spring and a mix of sources at Catfish and Reception Hall springs.
 - Dye trace studies were designed to identify sources, but were inconclusive.
 - During TMDL development, numerous potential sources were identified.
 - Atmospheric deposition, septic tanks, livestock, fertilizers, wastewater and stormwater
 - Future plans include preparing a detailed inventory of N inputs in the Silver Springs and their loadings of N to groundwater in the basin using 2009 land use.
 - Estimate groundwater N loads in most vulnerable areas. About 44% of springshed is unconfined, but has a majority of high intensity uses.

Why not use most current land use information (rather than 2009)?	Need to field verify, but 2009 is the most complete dataset. A participant comment that the property appraiser could help with some of the verification/updates.
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How do you determine what areas are contributing?	For the dye tracer study, sampled along the flow path.
Comment: Stormwater contribution of N is more likely from breakdown of plant material in ponds than home fertilizer. Suspect to find that there are hotspots rather than impacts from individual homes.	
Are the fertilizer data from commercial fertilizer sales to single home residences or to fertilizer companies/applicators?	The study used IFAS recommendations on fertilizer application to estimate for the land use estimates.
On Ag Operation, do you figure out what farms are actually applying or do you assume everyone is applying fertilizer?	For this study, assumed everyone followed IFAS recommendations for fertilizer application which depends on crop and soil type.
Why is Adena Springs Ranch highlighted?	Just to show where it is in the springshed.
Would a 1-2 person residence affect septic tank loads?	it is really a question of density. A high density area could be significant, but large acreages would not contribute as much. Focus will be on medium/high density areas.
Did estimates for agricultural land account for specific crop types?	Yes.
Is it true that nitrate is the best indicator for endpoint of N fate?	Yes
Can evaluating sucralose give a % of human waste contribution?	No. It can only show that there are contributions from human waste.
Can you clarify what TKN is?	TKN= NH_3 +Organic-N. TKN may be low in some places and high in others. In septic tanks, almost all discharge is TKN, but as it moves through the drainfield, it converts to NO_3
Comment: A participant called 5 Septic tank companies in Lake County and learned that they are bringing their effluent to Marion. Why? Can we look into this? DEP will check into the regulation of septage.	
Comment: Septic tank effluent can be more problematic than we think. May actually be higher number of septic tanks now. Private labs see effluent concentration almost 20x higher than municipal wastewater. Response: In Wakulla, nitrate concentration from septic tanks was found to be around 40 mg/L. We may need to re-evaluate nitrate loads from septic tanks.	

Overview of Nutrient Reduction Projects by Marion County (Gail Mowry, Marion County Stormwater)

- Stormwater Program History- Implemented due to Marion County's NPDES MS4 Permit, which is in its 3rd Permit Cycle. The program consists of six components, public outreach, public participation, illicit discharges/illicit connections, construction runoff, post construction runoff and municipal operations. It is funded by a \$15 property assessment. \$10 goes to program administration, while \$ goes to maintenance of stormwater facilities. A summary of those functions was provided.
- The stormwater group also implements the Watershed Management Program which provides a holistic view of water quality problems. This is used to provide Surface Water

Resource Assessments and develop capital projects. Three major capital projects were described.

- SW 31st St Stormwater Retrofit – on SW corner of SR 441 and 31st St. Untreated stormwater runoff from this 32 acre area was previously being discharged into a sinkhole. The area now contains a constructed wetland with bio-retention area, which is obtaining a 76% treatment efficiency for nitrate.
- Silver Springs/River Pollution Reduction Project- multiagency project to treat stormwater that was previously discharging directly into half-mile creek (a tributary to Silver Springs). Consists of a pump station that diverts runoff to a treatment pond.
- UCF DRA Nutrient Study- Bold and Gold soil amendment was added to a retention pond. The next phase is to use the product in the Village of Rainbow Springs with enhanced anaerobic conversion to nitrate to see if further reduction of nitrogen can be obtained.
- The county has also developed regulations for springs protection through Ordinances, Fertilizer Rules and Comprehensive Plan updates.

Can you research the use of Bold and Gold product for new development?	Marion County is working on the Land Development Code, but Bold and Gold is not going to be required.
What is the red light on the pump station at SR 40?	Could mean that the pump isn't working and the water flows to half mile creek. During high intensity events, water misses the second chamber, so the County is working with FDOT to move the tail water switch to outside. The State Park calls MC Stormwater if they observe issues at the pump.
What is the concentration associated with the projects?	We don't know concentrations at the moment but we are seeing 76% removal of nitrate at 31 st St and 1,700 lbs of N reduction at the Silver Springs project.
What are the costs?	Maintenance for the constructed wetland and bio-retention area- \$350/visit twice per year after established, 7 times per year at startup.
Are the County's stormwater priorities going to be tied to the BMAP?	we have always been gearing up for the TMDL and focused on water quality. We have been working since 2004.
Have you done any sampling at mouth of Half Mile Creek?	yes, before the project was complete. But not since.
What was going on when the system was pumping into the creek?	Our pump doesn't pump into the creek. We don't think that it was coming from the pump station, but from stirred up sediment within the creek. That event occurred when we were coming out of a dry season so a lot of organic matter had accumulated.
Is there a greater prevalence of sinkholes in stormwater ponds?	With our karst topology, any time you dig down into the ground, you increase your chance of sinkholes.

Typical fixes seem to consist of just a dump truck of dirt.	Our approach is to over-excavate by 3 ft, then compact to 90% using suitable material.
Ocala has a pond that occasionally opens with sink holes. Despite being lined with clay, it has a high percolation rate. It is essentially a settling pond in a line of ponds. They get a lot of questions about this pond.	
Will there be stormwater retrofits at Silver Springs?	Yes. No more stormwater discharge to the spring. (applause)
Note that the previous nitrate sources presentation used the same potentiometric surface map as was presented in the March meeting (2004 map).	

Looking Ahead – (Shane Williams)

- The May meeting will be on the 16th or 23rd. The boundary discussion will be continued. Topics for May will also include be a continuation of discussion of nitrate sources with a focus on wastewater; project data collection and projects underway and completed.
- In June, continued nitrate source discussion will focus on agriculture and additional discussion about completed and ongoing projects. The community meeting is also planned for June, or early July.
- **Action Items:**
 - **We will evaluate additional seasonal and annual potentiometric surface maps to help define the ground water contributing area for Silver Springs. A technical white paper will be prepared that summarizes what we have learned.**
 - **DEP is preparing an inventory of nitrogen sources and their loadings in the basin using 2009 land use. Completion date has not been determined.**
 - **DEP is checking into the regulation of septage.**
 - **We will follow-up on questions about connection of Lake Griffin to the Floridan aquifer and lakes in eastern portion of Orange Creek Basin.**

Comments

- Other agency efforts- SJRWMD has launched a Springs Initiative that will provide \$3 million toward additional research on groundwater modeling, conduit flow studies, etc. The effort will be designed similar to the Water Supply Impact Study.
- SWFWMD is wrapping up the Central Florida Initiative.

NOTE: If you cannot make the meeting and would like to have input on the items on the agenda, please email your comments to Mary Paulic at mary.paulic@dep.state.fl.us. Presentations will be available on the DEP FTP site at: http://publicfiles.dep.state.fl.us/DEAR/BMAP/Silver_springs/