

Kings Bay and Crystal River Basin Management Action Plan

Meeting Summary

Thursday, July 10, 2014

11:00 AM – 1:00 PM

Crystal River City Hall – City of Crystal River Conference Room
123 North West Highway 19, Crystal River, FL 34428

Attendees

Jimmy Brooks, Citizen	Joyce Kleen, USFWS
Tiffany Busby, Wildwood Consulting	Eric Ladimer, Duke Energy
Tracy Colson, Kings Bay Springs Alliance	Jamie Letendre, St. Martins Marsh Aquatic Preserve
Mike Czerwinski, Citizen	Marcy Policastro, Wildwood Consulting
Jon Dowler, City of Brooksville	Jeff Priddle, ERC Florida
Walt Eastmond, Citrus County	Erin Rasnake, FDEP
Holly Edmond, FDACS	Bill Stevens, Citrus County
Pat Faherty, Citrus County Chronicle	Kimberly Sykes, USFWS
David Hamstra, Pegasus Engineering	Mary Szafraniec, AMEC
Terry Hansen, FDEP	William Tucker, AMEC
Janet Hearn, ATM	Barry Vance, Water & Air Research
Robin Holland, FFS	Ivan Vincente, USFWS
Suzanne Kaufman, Jones Edmunds	Curt Williams, Florida Farm Bureau
Sean King, SWFWMD	Quincy Wylupek, Citrus County
Steve Kingsey, Citizen	

Presentations

Meeting presentations are located at:

http://publicfiles.dep.state.fl.us/DEAR/BMAP/Springs%20Coast/BMAPs/CR_KB_BMAP/ in the appropriate month folder.

Introduction

Tiffany Busby welcomed everyone to the Kings Bay and Crystal River Basin Management Action Plan (BMAP) meeting, and thanked the City of Crystal River for the use of their meeting room. The participants introduced themselves and the entity they represent.

Project Collection Process

Terry Hansen stated that projects are the heart of the BMAP. The total maximum daily load (TMDL) sets the target for the waterbody to be unimpaired, and the BMAP is the restoration plan to reduce nutrients and to meet the TMDL target. This basin includes six waterbody identification (WBID) numbers that are impaired for total nitrogen (TN) and/or total phosphorus (TP) or orthophosphate. These WBIDs include several springs in the area and Kings Bay. The TN reductions for the springs on the north end of the bay are 50%-60%, and the springs in the southern part of the bay have TN reductions of about 20%.

The BMAP contributing area is mainly the springshed, which extends to the Withlacoochee River to the north. There are multiple springs that are impaired in the Springs Coast, which either currently have an adopted TMDL or will have a TMDL soon. It is important for the stakeholders, especially Citrus County, to think holistically about the impairments in the area to best address the needed nutrient

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reductions. The Southwest Florida Water Management District (SWFWMD) is also working on a Springs Coast Initiative to address water quality and water quantity issues.

During the last meeting, the draft nutrient source inventory (NSI) was reviewed. The inventory describes the sources that contribute to the impairment, and estimates the amount of nitrogen getting to the ground water. The main land uses in the basin are urban (45%), forest (23%), and agriculture (8%). Terry noted that the NSI is not being used to assign blame, but rather to determine how to best focus resources to address sources. There is approximately 778,218 pounds per year (lbs/yr) of TN to the ground water. The NSI looks at the amount of TN applied to the surface to determine how to reduce that amount to prevent the TN from getting into the ground water.

Terry noted that in this area, there is a springshed, as well as a watershed for the bay, so there is both a ground water contribution to the springs and a ground water and surface water contribution to the bay. In a springshed, the location of sources and projects matter. This area, geologically, is a joint and fracture system, so a stormwater pond that has great nutrient removal and is located over a conduit would have more benefit than a pond located further away from a conduit. There is a lot of legacy load in the springshed from past uses, such as agricultural practices that are no longer utilized. This load still needs to work its way through the system; however, it is important to reduce the current nutrient footprint so that when the legacy load is flushed out of the system, the reductions in nutrient loading will be seen at the springs and bay. The NSI will be used to determine the main sources.

There will continue to be growth in the basin so the BMAP will need to plan for future loading from land use changes. The stakeholders should consider the cost-benefit of the projects and associated reductions to determine what is feasible to spend to achieve reductions. The closer a source is to a spring vent, the shorter the travel time; therefore, location matters. The entire BMAP area is 178,758 acres. Approximately 31% of the acreage in the basin is within a five-mile buffer of the bay. This area will be the focus in the BMAP because it would have the fastest improvement for the bay and springs.

Terry stated that the purpose of the project collection process is to document what efforts the stakeholders have in the basin to reduce the nutrient footprint. The information needed on each project is the project title, lead entity and any partners, and start date. Projects since January 2000 are eligible to be included in the BMAP, and this date was selected based on the ground water travel time in the basin to the spring vent. Other information needed is the completion or projected completion date of the project, location, cost (to help estimate the cost of various actions to address the sources), and the nutrient reductions and how they were estimated. In looking at the annual average loading information from the NSI, the main sources are septic tanks, golf courses, urban fertilizer, farm fertilizer, and livestock. As part of the BMAP process, the Department and stakeholders will need to determine which sources could be addressed the fastest, and identify a plan for addressing those sources that will take longer to reduce. Terry noted that the numbers in the NSI are not exact, and are used as more of a guide to determine the relative contribution from different sources.

About 14% of the load in the basin is from golf courses. To address this source, the golf courses can implement best management practices (BMPs) that are recommended in the golf course BMP manual. Terry noted that he has a meeting with the golf course supervisors in two weeks to determine their current practices and what the opportunities might be to reduce the loading from these locations. Agriculture in the basin is about 12% of the load, and the agricultural producers are required to

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implement Florida Department of Agriculture and Consumer Services (FDACS) adopted BMPs for their commodity. Terry noted that he also has a meeting scheduled in two weeks with the Citrus County Agricultural Alliance to talk with the growers about their practices. Approximately 6% of the load is from urban fertilizer, and fertilizer ordinances can help to address this source. Bill Stevens stated that the Citrus County fertilizer ordinance is going to the Board of County Commissioners for review in August. The commissions fully support the ordinance so it should be adopted at this meeting. Terry noted that if these three sources were addressed, it would be a good start for the BMAP. Terry presented a map from FDACS that shows the current BMP enrollment for agricultural lands. FDACS is reviewing the land use coverage to determine if all the agriculture on the map is in production. There is not currently a lot of enrollment in the basin, so this is an opportunity for the Citrus County Agricultural Alliance to promote enrollment and reduce the nutrient footprint.

Terry stated that stormwater projects could also be submitted for the BMAP, although stormwater is not included as a source in the NSI. Stormwater sources are temporal, so it is difficult to document how much stormwater is collected at a given time. However, stormwater is an important consideration in the loading to the system, so it is helpful to document stormwater projects in the basin. If stormwater can be captured and treated to reduce the nutrients, then stormwater could be a good way to recharge the aquifer. Terry presented project ideas from other BMAPs that help to address stormwater. A big item is public education to help people understand how their actions are impacting the system. Another project option is creating living shorelines, and there is a project on Hunter Springs with Citrus County and SWFWMD to create a living shoreline where there is currently a seawall.

There are also wastewater treatment facility (WWTF) projects that can be implemented, and WWTFs are about 2% of load based on the NSI. The City of Crystal River facility is in the process of running lines to the power plant to use treated effluent at the plant instead of discharging it, which helps to remove a load from the system. The stakeholders should consider where the best locations are for biosolids and treated effluent application to take into account which parts of the basin are most vulnerable. The sewer collection system should be evaluated to determine if it is in good condition and where repairs might be needed. The utilities should also consider where they can extend the sewer collection system to accomplish the goal of addressing the septic tank loads, which are about 61% of the NSI load. Any actions taken to address septic tanks cannot conflict with Florida Statute provisions. Information is needed to gain a better understanding of septic tanks and sewer line locations to develop an initiative to connect septic tanks. There is also an ongoing study on other treatment technologies for septic tanks where connection to the sewer system is not feasible. One option for this type of treatment is biosorption activated media (BAM) to help with the denitrification process in the drainfield. Terry noted that it may take time to develop a plan to address septic tanks, and this plan can be developed while some of the other sources are addressed.

Terry stated that SWFWMD will provide example projects in the basin to give the stakeholders ideas. The Department cannot implement the BMAP without help from the SWFWMD and local governments. The SWFWMD website (www.watermatters.org/springs) has information on the five 1st magnitude springs within their district. This site includes information about projects, nutrient source inventories, a map showing how land use changed over time, and water quality data.

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SWFWMD Project Examples in Crystal River and Kings Bay Basin

Sean King stated that there are issues and drivers for springs in general, but all of these apply in the Kings Bay system. These items are spring flow because lower flow can lead to more algae growth and other changes in the system; nutrients, which can cause algal growth rates to increase and can cause toxic responses; invasive species and Kings Bay has a long history of water hyacinth and hydrilla, as well as some filamentous algal species; salinity, which is increasing in this basin due to sea level rise that has occurred over the last 100 years; manatee grazing because more than 600 manatees were seen in the bay recently; and recreation because boats and swimmers can have an impact on vegetation. Sean noted that these are all the issues that SWFWMD looks at when determining how to restore the system.

Sean showed an aerial image of Kings Bay in 1944, and the area to the east of the bay was a forested wetland. In an aerial image for 2010, this area is now developed with canals and residences. There is very little wetland left to filter the water and provide habitat. In addition, the eastern part of the springshed, which was historically forested, is now residential land use. While this is mostly low density development, it is still a big change from the natural condition, which affects water quality. Sean stated that springs are unique, and nitrogen is not always the problem. For instance, the upper part of Rainbow River has a high nitrate concentration but good visibility and not a lot of algae. In Kings Bay, the water is much cloudier and there is growth of filamentous algae; however, the bay-wide nitrate concentration is only 0.18 milligrams per liter (mg/L). The difference in the conditions is due to the differences in hydrology. Rainbow River is a high flow river whereas Kings Bay has a long residence time, which allows algae time to grow.

SWFWMD has developed a springs management plan, which is available on the website. The information in the plan is mainly focused on the 1st magnitude springs (Rainbow, Kings Bay, Homosassa, Chassahowitska, and Weeki Wachee). The plan includes a restoration project side, minimum flows and levels (MFL) program, monitoring and research, land acquisition, and an education and outreach program. The plan uses adaptive management because it is difficult to determine how some projects will work. The approach is to create an experimental design to determine what works and what does not. SWFWMD plans to monitor all their projects to help with this determination.

Sean stated that the restoration projects fall into two categories: (1) water quality and water quantity, and (2) aquatic habitat. Water quality and quantity projects include stormwater projects, treatment wetlands, reuse to reduce ground water pumping, agricultural BMPs through the Facilitating Agricultural Resource Management System (FARMS) Program, and water conservation programs (such as Water Star). The aquatic habitat projects are just now being explored by SWFWMD and include revegetation, living shorelines, and algae and muck removal.

Sean noted that some of the sources in the NSI, such as septic tanks, are not something that SWFWMD typically addresses. They are currently working with the Department on a force main project to remove septic tanks, and this project received springs funding from the legislature. SWFWMD also does not address urban fertilizer use. Therefore, SWFWMD alone will not resolve the problem in this area. Many of SWFWMD's projects are done cooperatively with local governments. They have also recently started the Springs Coast Steering Committee with different representatives from different agencies to try and address the larger problems facing the Springs Coast. The first meeting of the technical group was a few weeks ago, and the policy group, made up of elected officials, will meet later this month.

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SWFWMD hopes that this approach will help to create a plan that the stakeholders agree on to address the problems in this area.

Sean presented several example water quality and quantity projects. The first was the City of Crystal River to Duke Energy reclaimed water project. This project involves building a pipeline to take the city's effluent that is current discharged into the springshed offline, and sending the effluent to the new power plant to offset the plant's ground water pumping. This project has two benefits: (1) remove a nitrogen load from the springshed, and (2) reduce Duke Energy's pumping in the springshed by about 750 million gallons per day (MGD). The project is about 15% complete and will finish in spring 2015. Mike Czerwinski asked if SWFWMD has considered the implications of taking 750 MGD out of the springshed and what that might do to Kings Bay. Sean responded that Duke Energy would have pumped that water out of the ground water system, and it is instead being replaced by the treated effluent. Jamie Letendre asked if Duke Energy had been planning to pump freshwater for the plant instead of using Gulf of Mexico water. Sean responded that freshwater is needed because the water is being used for the air scrubber system. Steve Kingsey asked what happens with the nitrate in the effluent after precipitation in the air scrubber system. A participant noted that he is doing the permitting of this project for the City of Crystal River. The effluent will go through treatment before it is used in the scrubber. The material from the scrubber system will continued to be disposed of in the same location as it is currently disposed. After the scrubber process, the nitrogen in the water is not tied up in the same form, and is not discharged to the springshed.

Sean stated that another project is the Hunter Springs water quality improvements. There is an existing stormwater pond in the area, and the pond discharges to the spring cove when the water levels in the pond are high. This project will expand the pond to capture more stormwater and to provide additional treatment to improve water quality in Hunters Cove. Sean noted that this is a more typical SWFWMD project. They are planning implement similar projects in the basin, and they are working with the City of Crystal River to select another project location in Hunters Cove. These types of projects also typically address flooding problems. The Hunter Springs project is in design now, and construction will start sometime in 2015.

For the Three Sisters Springs project, SWFWMD is designing a treatment wetland to treat stormwater runoff from the City of Crystal River before the runoff goes into Kings Bay. This type of project is very good for filtering nitrogen because wetlands convert nitrogen to a gaseous form that goes into the atmosphere. The wetlands will also capture sediments and other pollutants from the stormwater runoff. In addition, this project will restore a small part of a swamp wetland. The project is permitted and designed, and construction will start in fall 2014.

SWFWMD is starting a feasibility study for the Springs Coast wastewater treatment wetlands project to determine the best locations for the project. The goal is to add treatment wetlands to reduce nutrient inputs into the springshed from wastewater. A participant asked if SWFWMD wants to replace the existing sprayfields with wetlands or to add the wetlands in addition to the sprayfields. Sean responded that the exact project design has not been determined, but the goal is to include some sort of wetland treatment in the system. A participant asked about the use of BAM to help treat the wastewater that is land-applied. Sean responded that they have considered BAM but they are currently focusing on rerouting the water that would have gone to a sprayfield or rapid infiltration basin (RIB) through a wetland. Terry added that this type of treatment could be helpful for Pasco County to provide additional

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treatment for their effluent (currently 1 mg/L), and then the water could be used to recharge the aquifer. Mike asked if SWFWMD will look at the cost-benefit of standard treatment versus wetlands when evaluating this project. Sean responded that the project will include a cost analysis.

SWFWMD's FARMS Program provides agricultural BMP cost-share funding. This program is mainly in the southern part of the district now and is used primarily for water conservation BMPs to help reduce ground water pumping. In the Springs Coast, SWFWMD will be looking more at BMPs that improve water quality, and will focus on projects such as livestock waste management and better fertilizer use. There are no specific projects identified at this time.

Sean presented examples of the restoration projects, which could provide some water quality benefits. The Hunter Springs Park living shoreline is being done in conjunction with the City of Crystal River. The city is planning to redevelop the park, and the park currently has a seawall around it that is not in good shape. SWFWMD is considering adding wetland vegetation between the water and land to help treat stormwater runoff inputs to the spring. The vegetation would also interface with the water in the bay so there would be some removal of nutrients in the bay, as well. In addition, the vegetation would provide habitat for organisms in the bay. This project will include different types of living shorelines to determine which work best, so that this project can be expanded to other parts of the bay. The project is under design and is scheduled for construction in summer 2015. The project will include adding some backfill from the seawall into the bay to create a good elevation and appropriate soils for wetland plants. They will try out a variety of plants to determine which are best. In the Hunters Cove area, they will use freshwater plants.

SWFWMD is also evaluating floating wetlands, which are similar to a living shoreline but are used in the open water of ponds and lakes. Floating wetlands provide water quality benefits and some habitat. The wetlands usually consist of base material that floats, and the vegetation is planted in this material. The roots grow into the water and remove nutrients and particles. The roots of the plants provide a surface for microbes to grow on, and these microbes break down nutrients. The roots also develop biofilms that remove particles, which helps to improve water clarity. A participant asked if there are any recommended plants to prevent the need for ongoing maintenance of the floating wetland. Sean responded that he does not have information on specific plants. However, the plants will need to be periodically harvested and replanted to effectively reduce nutrients. SWFWMD will have a pilot project with floating wetlands in fall 2014 at Homosassa State Park. The design for the wetlands will need to be determined, because there are manatees in Homosassa that might be interested in eating the plants. Jamie asked if the floating wetlands are anchored. She also asked if SWFWMD considered the shading effects from these wetlands. Sean responded that the floating wetlands would be anchored to stay in one location. There will be some shading so the floating wetlands could not be used all over the bay because the shading would impact the submerged aquatic vegetation (SAV).

Sean stated that the Three Sisters Springs bank stabilization project is being implemented because there is a lot of erosion occurring in this area for a variety of reasons. The goal of the project is to stabilize the shoreline in a natural manner using different sized pieces of limestone, adding wetlands plants, and filling in areas that have been significantly undercut. This project is partially designed, and construction should start in summer 2015.

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The goal of the Kings Bay revegetation project is to get eelgrass to grow in areas that it used to grow historically. SWFWMD is starting the project in Hunters Cove because it is a freshwater system and there are some existing patches of eelgrass. In addition, this area will have the living shoreline and stormwater projects that will help with the success of replanting. There may be a need for some large-scale algae and sediment removal in the future to help the revegetation. SWFWMD will be trying new techniques since past plantings in the bay have not been successful. In the past, manatees were able to easily pull out the plants for grazing, so this project will use coconut fiber mats that are made for planting. Each mat is 3 feet by 15 feet, and the eelgrass seedlings are planted in the mat. The plants are allowed to grow offsite for a few months. Once the plants are developed, the mats can be rolled up and moved to be placed down like sod. If there is already a good bed developing on the mats before they are placed in the bay, there is a better chance the plants will stay in place, even with grazing. SWFWMD is also trying to obtain a permit for small exclusion cages that would be weighted down on top of the mats to prevent grazing. Several options will be tested including the mats with and without cages, cages around plants not on mats, using existing seed sources, and planting in areas that have already been cleared of muck and algae and areas that have not had this removal.

Jamie asked if this project is being done in partnership with Duke Energy. Sean responded that it is, and Duke Energy is letting SWFWMD use their ponds to grow the eelgrass mats. The first mats were placed in the ponds in April, and the plants are growing well. There are about 200 mats, which is more than what is needed for this experiment. SWFWMD is hoping to have success at Hunters Cove, and then they can apply for a permit to revegetate other parts of the bay. A participant asked how the mats are held down. Sean responded that rebar staples or cinder blocks are being used to hold the mats down in the ponds. The mats will get heavy over time and will not need to be secured. Jamie asked if there is a maintenance schedule to remove algae that grows on the plants. Sean responded that SWFWMD is aware that algae will grow, but there is no set schedule for maintenance. Once the mats are in Hunters Cove, they will be monitoring them regularly.

Jamie asked what the depth of the ponds is compared to Hunters Cove. Sean responded that the average depth in the ponds is three feet, and Hunters Cove is a little deeper. The water in the ponds is similar to Hunters Cove. The water in the pond is a little murky but the eelgrass is growing well. The eelgrass being used is more tolerant of different conditions. This type of eelgrass has also been used in Lake Apopka and Lake Jesup, and it has been successful. The eelgrass should grow well in spring system, but they will have to figure out algae maintenance and how much protection is needed from manatees. Jamie asked what the boat traffic is like in the area of the planting because a prop scar could affect the eelgrass. Sean responded that he was not sure of the amount of boat traffic but the vegetation areas will be well marked. There are three test plots planned, with one in the middle of an existing native vegetation, and the other two in little coves that are mainly algae now. They will also have a revegetation project in the Homosassa upper spring area. SWFWMD did a similar restoration project in Weeki Wachee where they removed the muck and algae and then planted SAV. This project worked well, which gives hope that this is a possible measure that works.

Steve stated that during the MFLs process, SWFWMD worked with a contractor to create a water flow model for Kings Bay. He would like to see two sets of variables added to the model: (1) sea level to see how rise affects the hydrology of the bay, and (2) plant densities. This information would be useful to improve understanding of the system.

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Adjourn

Terry stated that the next BMAP meeting would be held on Thursday, August 14th from 10:00 AM – 12:00 PM at the City of Crystal River City Hall. He will send a notice about the meeting and the meeting topics, including refining the NSI. The meeting presentations will be posted to the BMAP website.

The meeting was adjourned at 12:49 PM.

Action Items

- Terry Hansen will send a notice to the distribution list about the next meeting date and agenda topics.
- Terry will post the meeting presentations to the BMAP website.