Meeting Summary
Lakes Harney and Monroe Basin Management Action Plan (BMAP)
Technical Meeting
Thursday, November 18, 2010
10:00 AM – 12:00 PM
Deltona Library and Environmental Center, Deltona, Florida

Meeting Attendees

Brian Bates, Lake Mary	Jeff Holland, Parkstone HOA
Ann Benedetti, SJRWMD	Danielle Honour, CDM
Kassandra Blissett, Debary	Yanbing Jia, SJRWMD
Mary Brabham, SJRWMD	Carol Johnson, FDACS
Samantha Budd, FDEP	Robert King, Friends of Lake Jesup
Tiffany Busby, Wildwood Consulting	Rob Kirby, Volusia County
Gerald Chancellor, Deltona	Regina Lovings-Morse, SJRWMD
Marie Duffy, City of Sanford	Ryan Mitchell, E-Sciences
Gloria Eby, Seminole County	Dan O'Hanlon, Deltona
Mark Ellard, Geosyntec	Kim Ornberg, Seminole County
Chris Ferraro, FDEP	Marcy Policastro, Wildwood Consulting
Mark Flomerfelt, Seminole County	Joy Rector, Seminole Audubon Society
John Gamble, Volusia County	Keith Riger, DeLand
Xueqing Gao, FDEP	Lakshmi Sankaran, Seminole County
Andrew Gianni, Quentin L. Hampton Associates	Steve Szabo, Jones Edmunds and Associates
Kevin Hamilton, Lake County	Kalina Warren, FDEP
Mary Hamilton, Lake County	Glenn Whitcomb, Deltona
David Hamstra, Pegasus Engineering	Kelly Young, Volusia County
Janet Hearn, ATM	

Welcome and Opening Remarks

Tiffany Busby welcomed everyone to the meeting and thanked Volusia County for the use of their meeting room. This is the second meeting for basin management action plan (BMAP) for the Lakes Harney and Monroe section of the St. Johns River. There are several waterbody identification numbers (WBIDs) that are impaired for nutrients and the goal of these meetings is to implement the total maximum daily loads (TMDLs). The meeting last month was to provide an overview of the TMDLs and BMAP process. For this meeting, the Florida Department of Environmental Protection (FDEP) expert who developed the TMDL will explain how the TMDL was established and answer any questions from the stakeholders. The participants introduced themselves and the entity they represent.

TMDL Target Concentration Development

Xueqing Gao stated that the TMDL was developed using the Hydrologic Simulation Program – Fortran (HSPF) model, which was set up Yanbing Jia with the St. Johns River Water Management District (SJRWMD). The presentation will discuss how the model was set up and how the TMDL targets were established. In 2009, FDEP had placed the six WBIDs included in this TMDL on the verified impaired list. These WBIDs include Lakes Harney and Monroe and four river segments, which are impaired for dissolved oxygen (DO) and nutrients. These

impairments were determined using the state's narrative nutrient criteria; however, the U.S. Environmental Protection Agency (EPA) adopted numeric nutrient criteria (NNC) on November 15th and FDEP is going through that information now to determine how they will implement the criteria. The numeric threshold used by FDEP for this TMDL is a Trophic State Index (TSI) value of 60, since these lakes have a color higher than 40 platinum cobalt units (PCUs). For the river segments, FDEP used chlorophyll-*a* as the threshold, which requires an annual average of 20 µg/L. The Impaired Waters Rule (IWR) also allows FDEP to look at the trends during the verified period to determine if there is a significant change from historic conditions that indicate impairment. FDEP can also use other information that shows an imbalance of flora and fauna, such as bathymetry data or excessive benthic algae.

The DO assessment for Class III freshwater requires that the DO should not be less than 5 mg/L, and normal fluctuation above this level should be maintained. If the DO is below the threshold for more than 10% of the time, then the waterbody is considered impaired. Before FDEP can place a waterbody on the verified list for DO, the causative pollutant must be identified. The lakes were verified for nutrient impairments based on paleolimnological results. The river segments were impaired for DO because of nutrients. Once the impairment is verified, FDEP is obligated to develop a TMDL. The first step in the TMDL process is to establish the water quality target or concentration target. If there are multiple impaired WBIDs, FDEP must determine if different targets are needed. The second step is to set up a model to determine the relationship between watershed loading and water quality concentration.

To develop the water quality target for this area, FDEP looked at the data to determine if different targets were needed for different segments. When looking at the water quality data, FDEP found that the water quality was different upstream and downstream of the confluence of Lake Jesup and the St. Johns River. For the period of 1996 through 2007, the median value for the chlorophyll-*a* data upstream of the confluence ranged from 2.5-4 µg/L, whereas the data downstream ranged from 8-12 µg/L. The TN and TP data were similar upstream and downstream of the confluence. The relationship between TN and chlorophyll-*a* and TP and chlorophyll-*a* showed that the same amount of TN or TP supports more chlorophyll-*a* in the downstream segments. This observance led to the question of what caused this difference. There are several factors that could result in this observation including different morphology, water residence time, color and turbidity, nutrient compositions, and influence from other waterbodies.

The morphology of Lakes Harney and Monroe were similar with similar drainage areas, flow, and water residence times. The lakes also had similar turbidity, color, and nutrient compositions. Therefore, the difference appears to be because of contributions from Lake Jesup. The chlorophyll-*a* concentration in Lake Jesup is 66.5 µg/L and upstream of Lake Jesup the concentration is 9.9 µg/L. The Lake Jesup outflow accounted for about 10% of the flow through this portion of the river, based on data from flow stations in the area. FDEP determined that the same nutrient targets could be used for all segments because Lake Jesup will always contribute chlorophyll-*a* to the downstream segments making the chlorophyll-*a* concentration in that area higher than upstream.

The technology is not available to directly establish nutrient targets for the river segments. However, the river concentrations are similar to the lakes so the lakes were used to set the targets. The river has a shorter residence time than the lakes; therefore, targets that are protective for the lakes will also be protective of the river. Three methods were used to determine targets: (1) a nutrient TSI equal to 60, in which the TN and TP values were back calculated using the TSI equation; (2) paleolimnological studies and the TN-TP correlation, which was determined by dating the age of different layers and the concentration of TP to determine the accumulation rate; and (3) the 75th percentile reference lake method for alkaline, colored lakes. The median values from these methods were selected as the targets, which are 1.18 mg/L TN and 0.07 mg/L TP. The upstream river segments will achieve a target 5.8 µg/L for chlorophyll-*a*, the downstream segments will achieve a target of 9.1 µg/L for chlorophyll-*a*, Lake Harney will have a TSI target of 51, and Lake Monroe will have a TSI target of 54.

John Gamble asked if 10% of the chlorophyll-*a* target is coming from Lake Jesup. Xueqing responded that 10% of the flow is from Lake Jesup but the chlorophyll contribution is less than 10%. John noted that the activities in the Lake Jesup watershed will also influence the Lakes Harney and Monroe watershed. Xueqing responded that it will have some influence but the residence time of Lake Jesup will always be longer than Lakes Harney and Monroe, which affects the water quality of Lake Jesup.

Xueqing noted that for the DO target, there was a question about how much influence nutrients have on the DO data. By reducing nutrients to the target concentrations, the majority of the DO data should be above 5 mg/L. There are other factors that affect DO, including color. The TMDL states that when the nutrient targets are met, the resulting DO concentration will be the natural condition. The TMDL does not say that 5 mg/L will be met at all times.

Questions

Tiffany stated that at the last meeting, there was a question about the proposed NNC in comparison to the targets in the TMDL. The TMDL targets do meet the NNC requirements for colored lakes. Kim Ornberg added that the municipal separate storm sewer systems (MS4s) had a teleconference with EPA and EPA stated that all adopted TMDLs and BMAPs would stand until they came up for reevaluation. John asked what the target is for Lake Jesup. Xueqing responded that the target in Lake Jesup is 0.09 mg/L for TP, which is also within the range for the NNC. The question was asked once the targets are met for nutrients if the resulting chlorophyll-*a* concentration would also be considered natural background, similar to DO. Xueqing responded that FDEP will use the nutrient targets since the chlorophyll-*a* target was based on achieving the nutrient concentrations. The chlorophyll-*a* concentration achieved once nutrients have reached the targets will be considered background.

Kim asked if FDEP also looked at vegetation indices. Xueqing responded that there is some submerged aquatic vegetation (SAV) in Lake Jesup, but he is not sure if the Florida Fish and Wildlife Conservation Commission (FWC) have SAV targets for Lakes Harney and Monroe. Gloria Eby stated that Seminole County recently completed a SAV study in Lake Jesup. This study will be used to establish a benchmark for SAV coverage at the confluence. The U.S. Army Corps of Engineers is talking about making modifications to the channel at the confluence.

David Hamstra asked if EPA's NNC are more conservative than the TMDL targets, if FDEP would use those values instead. Xueqing responded that the TMDL is more site-specific and would supersede the NNC. EPA also stated that the TMDLs would stand. Tiffany asked how the TMDL considers that reductions that will be made as part of the Lake Jesup TMDL. Xueqing responded that the Lake Jesup loads are considered in the chlorophyll-*a* target. While the drainage basin does not include Lake Jesup, the reductions in Lake Jesup will help reduce chlorophyll-*a* levels, which will help achieve the downstream targets. Carol Johnson asked if the channel widening at Lake Jesup will significantly affect the loads in the Lakes Harney and Monroe basin. Xueqing responded that he did not have details about the channel widening but noted that a study was conducted in the 1990s on lake mixing. Tiffany added that USACE also recently did some modeling of the impacts of the channel widening.

Use of the HSPF Model to Estimate the TMDL Target

Xueqing stated that the next step is to identify sources to estimate existing loading to determine the correlation between watershed loading and water quality concentration. The watershed loading can then be adjusted in the model until waterbody targets are achieved. There are seven permitted facilities in the basin with surface discharges. Five of the facilities are concrete batch plants with generic permits that do not require nutrient monitoring and are not major contributors of nutrients. The Sanford Power Plant discharges to the river downstream of Lake Monroe. This discharge is mainly once through cooling water, which was pulled from river and does not include additional nutrient loadings. Other water sources at the power plant are routed to the cooling pond, which only discharges one time per year to test the gate. Therefore, the only allocation assigned in the TMDL is for the Sanford North Wastewater Treatment Facility (WWTF), which is downstream of Lake Monroe and does not influence the majority of the basin. There are also 11 MS4 permits; three are Phase I and eight are Phase II.

Nonpoint source loads were simulated using the HSPF model. This model has been promoted by EPA and is widely used. The domain includes two drainage basins, Lake Harney and Lake Monroe, and 19 subbasins (11 in Lake Harney and eight in Lake Monroe). The loading is summarized by subbasin and also by land uses. The land use per acre loading can be used to determine the jurisdiction loading. The model only covers the immediate drainage basin, but there are known contributions from the Upper St. Johns River, Lake Jesup, and Econlockhatchee River, which were considered boundary conditions. The loads were calculated based on measured flow and concentrations from U.S. Geological Survey (USGS) flow gages. The model includes 13 land use categories.

Chris Ferraro asked what year is the land use in the model. Xueqing responded that the land use is 2000 but the model simulates a period of 1996-2003. John asked if the basin boundaries are from SJRWMD because Volusia County has new Light Detection and Ranging (LIDAR) data that are more accurate. Yanbing Jia responded that SJRWMD is in the process of updating the boundaries and they can have the stakeholders look at the drainage basin. LIDAR data does not have all the information needed to establish boundaries. SJRWMD has used USGS information and then field verified the boundaries. John noted that Volusia County has found problems with the boundary when compared to their LIDAR data. Xueqing requested that Volusia County provide him with more details on their LIDAR data.

Xueqing stated that the model simulated loading from land uses, groundwater, septic tanks, wastewater sprayfields, point source discharges, and atmospheric deposition. In the model simulation, when rainfall hits the ground, it will go into the soils in pervious areas. When the soil is saturated, water will also fill depressions on the land. The remainder of the rainfall becomes runoff that moves towards the waterbody based on the slope in the area. The water in the soil will move towards the waterbody through interflow and baseflow. Pollutants also build up on land surface and can be carried in runoff to the receiving waterbody. Pollutants are also transported in the soils through interflow and baseflow. The model includes direct discharges and direct atmospheric deposition on the waterbody. John asked if reclaimed water loads on the lands were also simulated. Yanbing responded that part of the reclaimed water is land sprayed and is included in the model. The amount of reclaimed water applied was obtained from FDEP and a map of where the reuse is applied was also used in the model.

Xueqing noted that the model can simulate hydrologic and water quality processes in the waterbody. For the watershed nonpoint source loading simulation, water quantity, sediment erosion, runoff quality, and inputs were included. For the instream simulation, hydraulics, sediment transport, sediment contaminant interactions, direct atmospheric deposition, water quality constituents and processes, point sources, lake/reservoir simulation, and benthic processes and impacts were included in the model. The model includes multiple modules including PERLND (pervious land), IMPLND (impervious land), RCHRES (receiving waterbody), and BMP (accounts for treatment).

David asked if the model factors in the load reductions from the lakes in the watershed before stormwater reaches the receiving waters. Xueqing responded that the model is based on subbasins, and any lakes would be considered a land use of water. Ryan Mitchell asked if there is an associated loading with each land use. Xueqing responded that different parameters can be assigned to the same land use in different subbasins. Yanbing added that the accumulation rate for a land use would be the same in a subbasin but can vary across subbasins. Xueqing stated that under each operation group, there are different parameters for each land use. This generates a lot of information for the area, and those loads are then put into the receiving water. A best management practice (BMP) can be placed between a source and the receiving water to reduce the loading.

The model also includes input from two springs in the Lake Monroe area. In addition, loads from failing septic tanks within 50 feet of a receiving water were included. These tanks were determined using Florida Department of Health (FDOH) information on repair permits in the basin. There is one failing tank within 50 feet of Lake Harney and three tanks near Lake Monroe. The BMP information included in the model was collected by SJRWMD and divided into dry pond, wet pond, and swale categories. Atmospheric deposition was simulated for both wet and dry deposition.

Information from the USGS gaging stations in the basin were used to calibrate the model. A good correlation between the simulated and actual flow was found. There was also a good correlation for the water quality conditions in the model versus the data from the water quality stations in the watershed. The TMDL includes a summary of inputs from different sources and organizes the load by the types of input including upstream, watershed, direct rainfall, and point

source. The majority of the loading for all receiving waters is from upstream inputs, which means that the boundary loadings dominate. The loads from Lake Jesup were assumed to meet the reduction from its TMDL. The Upper St. Johns River and Econlockhatchee River contributions were adjusted to meet the target. Atmospheric deposition was not changed. The TMDL TN reductions range from 37% - 39% and the TP reductions range from 31% - 33%. The Sanford WWTF is required to reduce by a percentage similar to the nonpoint sources.

Questions

Tiffany stated that as the last meeting there was a question about contributions from landfills, and Chris had noted that she did not think there were any landfills with surface discharges. Xueqing responded that at the time of the model, FDEP did not have details about the landfills. Seminole County recently provided information on the nutrient concentrations for their landfill, which is similar to the land use concentration in the model.

John asked what SJRWMD is going to do in terms of development review because BMPs will only achieve part of the pollutant loads. He asked if SJRWMD is going to start restricting development through their permits or if the local governments have to do this. Mark Flomerfelt noted that no net load increase is required for Lake Jesup. Mary Brabham added that this is the requirement for any impaired waters. Tiffany added that the state has also been working on the fertilizer ordinance and statewide stormwater rule to help local governments with future loading from urban land uses. John asked if the no net increase in loads will still be in effect if the impairment goes away. Kim responded that it would because the technology does not yet exist for no net increase, so FDEP changed the rule to a 85% reduction unless the entity discharges to an impaired waterbody, in which case they have to meet the more stringent requirement of no net increase or 85% reduction.

David noted that nonpoint sources are only 22% of the load contribution and he asked how those sources were supposed to achieve a 37% reduction. Xueqing responded that a sensitivity analysis could be run to determine how much of the loading is from upstream. This information can be used to help with detailed allocations. The purpose of the TMDL is to determine a total allowable load to the waterbody. Samantha Budd added that the BMAP will initially focus on the immediate watershed loadings and then the stakeholders and FDEP can determine what should be done about upstream sources. Tiffany noted that FDEP is not trying to hold the stakeholders in this basin responsible for loads coming from other areas. Xueqing stated that the goal is to figure out the most cost effective way to achieve the load reductions, and FDEP does not yet know how the Upper St. Johns River loadings will be met. Chris stated that a lot of work has been done in the Upper St. Johns River Basin by the SJRWMD and it would be good to look at the associated reductions from those projects.

The question was asked if all six WBIDs need to meet the percent reductions in the TMDL. Tiffany responded that all six WBIDs do need to meet the reductions. The BMAP process will assign specific allocations to the entities in the basin and the percent reductions for each entity could vary. John asked since the reductions are enforced through the MS4 permits, how the Deltona discharges in the Volusia County MS4 system would be separated. Xueqing responded that the TMDL includes language that each entity is only responsible for the loads from their jurisdiction.

Danielle Honour asked if the model took into account noncontributing basins because there are a lot of closed systems in Deltona. Yanbing responded that this was accounted for and that subbasin 14 does not contribute loading. Tiffany added that stakeholders can provide information on other noncontributing areas for FDEP to consider in the BMAP. John noted that most of the areas in Volusia County do not discharge except in high water conditions. Tiffany noted that the model already accounted for differences in soils. The HSPF model is more detailed than the Lake Jesup model, so the runoff estimates are thought to be more accurate.

Mark asked if there is a simple way to see how much load is contributed by each subbasin. Xueqing responded that this information can be pulled out from the different modules. The per acre loading can be determined and then the attenuation and BMP factors need to be applied.

Public Comments and Wrap Up

The next meeting will be held on Thursday, January 20, 2011. The location has yet to be determined.

Adjourn

The meeting was adjourned at 12:25 PM.

Action Items

- Seminole County will provide the SAV study report to Xueqing Gao once it is complete.
- Volusia County will provide information on their LIDAR data to Xueqing and Yanbing.
- Stakeholders should provide information about know noncontributing areas so an assessment can be made how to handle those aspects in the BMAP.
- Staff should have further discussion on upstream loads and their implications to the BMAP.