Lake Jesup Crane Strand and Long Branch BMAP Working Group
Meeting Summary
Sylvan Lake Park
Sanford, FL
February 8, 2007

Attendees

Libertad Acosta-Anderson, CH2MHill	Robert King, Friends of Lake Jesup
Julie Bortles, Orange County	Steve Lienhart, URS
Mary Brabham, SJRWMD	Erich Marzdf, SJRWMD
Sherry Brandt-Williams, SJRWMD	Kevin McCann, City of Orlando
Tiffany Busby, Wildwood Consulting	Steve Miller, SSNOCWTA
Nancy Christman, SJRWMD	Durga Nagda, City of Lake Mary
Vanessa Cruz, City of Altamonte	Kim Ornberg, Seminole County
Lisa Curtin, City of Orlando	Mary Paulic, FDEP
Danny DeCiryan, SSWCD	Zynka Perez, City of Winter Springs
Jose R. del Ris, City of Casselberry	Marcy Policastro, PBS&J
Chris Ferraro, FDEP	Penny Post, Orange County
Mark Flomerfelt, Seminole County	Robert Potts, E-Sciences
Jennifer Gihring, FDEP	Roland Raymundo, Seminole County
Ed Hayes, FWC	Ed Torres, City of Casselberry
Migdalia Hernandez, City of Sanford	Bob Walter, Seminole County
Dan Homblette, Orange County EPD	Amy Tracy, FDEP
Danielle Honour, CDM	Joe Walter, PBSJ
Yanbing Jia, BCI	Shannon Wetzel, Seminole County
Carol Johnson, FDACS	Tom Ziegler, SJRWMD
Bob Kelly, SAIC	

Opening Remarks

Tiffany Busby welcomed the Working Group and members introduced themselves and the entity they represent. There were no questions on the adopted TMDLs.

Jennifer Gihring stated that the quarterly monitoring meeting for the basin will be held on February 22nd in Orlando. If any members are interested in participating, they should let Jennifer know and she will send their contact information to the appropriate person.

Mary Brabham noted that on Friday, February 16th, the Middle Basin Technical Advisory Committee (TAC) meeting will be held in Sylvan Lake Park.

Tiffany welcomed Amy Tracy to the group. Amy recently joined Fred Calder's group at the Florida Department of Environmental Protection (FDEP).

Technical Updates

Long Branch BMAP

Jennifer Gihring noted that the FDEP, Orange County and others have been writing the text for the Long Branch BMAP. A good draft should be ready in two to three weeks and

then there will be a meeting to discuss what information is still missing from the plan. There is also significant source identification work that will need to be completed. The draft BMAP may be ready to present to the Working Group at the next meeting.

Sediment Flux Study

Kim Ornberg stated that their Lake Jesup sediment flux study was finished. They are now working on incorporating the new information into the model. The average nutrient flux is 6,080 pounds/day of nitrogen and 563 pounds/day of phosphorus. In two to three months they should be able to give a full presentation to the Working Group on the results of the study and modeling efforts.

Tiffany asked if the results of the study matched what they were expecting. Kim responded that they did not know what to expect because the sediment flux had never been directly measured before. Joe Walter added that sediment flux was not included in the original TMDL model of Lake Jesup because it was thought that it may not be a significant factor. The results of this study show that sediment flux is significant and that fact may challenge some of the other assumptions in the original model. The TMDL was based on nitrogen fixation but this information shows that sediment flux is also important. Kim noted that the effects of nitrogen fixation and sediment flux both contribute to the nutrient levels in the Lake and all these factors need to be considered. The Lake can be divided into three sections based on differences in water quality and the middle section of the Lake has the most nitrogen fixation and the worst water quality. Sherry Brandt-Williams added that the long term water quality also supports these facts and she will present this information later in the meeting.

Robert King asked how confident they are that they have conclusive information for sediment flux in the lake. Kim responded that while the nitrogen fixation study was a snapshot in time because it was for a one day extreme event, the sediment flux study was over a longer period of time. They found that the sediment flux was not variable within the lake and they are fairly confident in the results. The study was performed by subcontractors who are retired U.S. Environmental Protection Agency (EPA) employees that worked on sediment studies at the EPA.

Wekiva Listing for Impairment

Chris Ferraro provided a copy of the final order and gave a presentation on the Wekiva impaired waters listing. The FDEP was required to adopt TMDLs by December 1, 2006 for the Wekiva area. While that deadline has passed, they are close to having a TMDL. The Wekiva River and Rock Springs Run were originally de-listed because the FDEP did not have the necessary information to support the listing of these areas. The Wekiva River and Rock Springs Run have now been added again based on "other information" that indicates an imbalance due to nutrients. The public notice period for the Secretarial Order for revisions to the verified impaired waters list ends on February 9th. Starke Lake, Prairie Lake, Lake Primavista and Lake Lotta will be removed because of concerns regarding the data that was the basis for the listing. The FDEP will use information from the St. Johns River Water Management District (SJRWMD) pollutant load reduction goal (PLRG) as the basis for the Wekiva TMDL and also several lake nutrient TMDLs in the

area (Spring Lake, Bay Lake, Silver Lake, Lake Lawne, Lake Florida, Lake Orienta, and Lake Adelaide). Public workshops will be held on all draft TMDLs and a notice will be sent after the review period on the Secretarial Order ends. The workshops should be held in late February or early March in the Wekiva area.

Kim Ornberg noted that Chris stated that the FDEP has almost completed TMDL development and she does not think Seminole County provided information to the FDEP on any of those lakes. Chris responded that this listing was based on the previous listing and the FDEP probably already had Seminole County's data from before. Mary Paulic added that the seven lakes were included in the original listing and as long as Seminole County submits their data through STORET, the FDEP will have their information. The TMDLs are still being reviewed and developed and there may be areas where more data is needed. This can be discussed in more detail at the TAC meeting.

Kim asked if the PLRG is complete and if it has been adopted. Sherry responded that the PLRG is complete and is located online. The PLRG does not need to be adopted by the SJRWMD board.

Site 10 Assessment

Danielle Honour stated that they have completed the document and the City of Sanford has reviewed it. They are now working on finalizing the report and it should be ready to be shared with FDEP soon. They will also give a presentation on the Site 10 assessment at either the March or April Working Group meeting. The work they have completed includes determining the amount of surface runoff due to rainfall, revising the land use in the model (previously all industrial), performing a groundwater analysis to determine the loading from groundwater, and estimating the loading from the reuse and biosolids application on the site. They are also trying to determine how the loads from Site 10 compare to the loading in the rest of the basin.

Robert King asked if the data they were using came from documents or sampling. Danielle responded that most of the information is from sampling because of the City of Sanford's monitoring requirements for the site. The City has also kept records of the number of loads brought to the site and the percent dry weight of the biosolids. The discharge is monitored, which provides information on the reuse, and there are also six surface water quality sampling sites in the swale systems and ponds. Joe Walter asked if the assessment was just for the western part of Site 10. Danielle responded that they have found that a significant portion of the site drains northeast to a St. Johns River tributary and only the western portion of the site is in the Lake Jesup watershed.

Watershed Loading Information

Yanbing Jia presented information on the development of the Hydrological Simulation Program-Fortran (HSPF) watershed loading model. The work on this model began more than two years ago to support the Lake Jesup Pollutant Load Reduction Goal (PLRG). The goals of the modeling are to estimate watershed loadings and evaluate management scenarios. The HSPF is a continuous simulation model that includes surface and subsurface hydrology and water quality, stream hydraulics and water quality processes.

The model is made up of 39 subwatersheds and five major subbasins. There are 13 different land uses, which include 47% urban and 33% water and wetland. This information was used to set up the basic structure of the model for the period of October 1997 to September 2003.

Best management practices (BMPs) were simulated in the model using literature values for removal efficiencies. In this watershed, the BMPs are onsite in small areas so the overall effect of the BMP on pollutant load removal was simulated instead of the actual BMP. There are no direct discharges from domestic wastewater facilities and the largest industrial facility is too small to have an impact. The nonpoint source loads were estimated from land uses, septic tanks, and atmospheric deposition.

The model was calibrated for the period of October 1999 to September 2003 and validated for the period of October 1997 to September 1999. Flow data from existing stations were used and the model was calibrated to closely match the simulated flow to the observed flow. The water quality calibration was based on literature-based land use loadings and in-stream observations. They found that the model can reasonably re-create water quality data across the watershed. The total watershed loading for the simulation period was 18.7 metric tons/year of total phosphorus and 140.7 metric tons/year of total nitrogen. These values are the total loading to the lake from both surface water and groundwater.

The scenario analysis included the following: 1) Current condition (1997-2003); 2) Future condition with 25% BMPs; 3) Future condition with 50% BMP; 4) Future condition with 75% BMPs; and 5) Pristine condition. The pristine condition represents all land uses converted to forest, except water and wetland, to represent the background condition. The simulations showed that even in the future condition with 75% BMP, the concentrations are still higher than the background and it will be unlikely that the TMDL and PLRG could be met. The treatment efficiencies of the BMPs used in the watershed would have to be improved or alternative technology used. Also, non-structural BMPs, such as better regulations and low phosphorus fertilizer, should be used.

Steve Miller asked if the pristine condition assumes current atmospheric deposition. Yanbing responded that it does include current levels of atmospheric deposition and even if this value were reduced, it would not greatly affect levels in the lake because atmospheric deposition is a very small component of the loading.

Bob Kelly noted that there are a lot of BMPs currently in place that may not have good treatment efficiency. If in the future BMPs with better treatment efficiencies are used and the old ones are retrofitted, that could make a big difference in the loading. Yanbing responded that it depends on the efficiency assumed for better BMPs. Even if the BMPs could reduce the loads by an additional 30%, the nutrient levels would still be above the background levels. Tiffany Busby asked if the literature values used for atmospheric deposition were based on Florida or national levels. Tiffany also asked what value was used for the BMP efficiencies since the ranges can be fairly large. Yanbing responded that the atmospheric deposition value is Florida-based using information from Sherry

Brandt-Williams and Xueqing Gao (FDEP). For the BMP removal efficiencies, the average value was used, which should be appropriate for the watershed overall. Dan Homblette stated that Orange County sees four to five violations of National Pollutant Discharge Elimination System (NPDES) permits each week from facilities that are not maintained. If this continues, the future conditions could be worse then the model predicted. Bob Kelly added that using the average removal efficiency values for the BMPs seems to assume that the infrastructure is maintained. Since this might not be the case, it could be useful to make other assumptions in the model and see how that affects the results. Yanbing stated that using the average efficiency is a conservative estimate and he provided a table that showed the efficiencies used in the model.

Mark Flomerfelt asked if the report with the model results is out for review. Yanbing responded that the report should be posted on the SJRWMD website soon but he provided an electronic copy to Jennifer Gihring. Jennifer will post the report and Yanbing's presentation on the FTP site.

Ed Torres noted that in the graphs showing the model calibration for total nitrogen and total phosphorus loading it does not look like the simulated values are close to the observed. Yanbing stated that the average values for wet weather and dry weather are close to the observed values.

Amy Tracy stated that the data used in the model was through 2003 and she asked if there have been any major stormwater projects or retrofits that have occurred since then that would change the land use or loading. Yanbing responded that there have been some changes but nothing large enough that would be seen on a watershed level. These changes can be incorporated in future model runs. Sherry added that there have not been many changes in land use but there are new stormwater projects in place.

Kim Ornberg asked if the event mean concentrations (EMCs) used in the model are the same as the ones Joe Walter is using. Bob Kelly noted that this brings up an important point. There are several factors that need to be compared among the models to determine where they differ and how this affects the results.

Mary Paulic asked what is considered pristine. Yanbing responded that the pristine condition is if all land use is changed to forest except for water and wetland. Kim asked if the pristine condition model run would be the basis for the PLRG. Mary Brabham responded that the pristine condition would not be used for the PLRG.

Nutrient Dynamics in Lake Jesup

Sherry Brandt-Williams stated that intent of the presentation is to show the data that the SJRWMD has been collecting on Lake Jesup since 1995. The SJRWMD's goals for Lake Jesup are to be able to see the bottom, healthy grass beds to help solidify the bottom and habitat for fish and wildlife. These goals are from the Surface Water Improvement and Management (SWIM) Plan.

The SJRWMD has been monitoring the lake and tributaries since 1995 for phosphorus, nitrogen, chlorophyll, zooplankton, metals and micronutrients. The focus has been on bathymetry, dating and characterization of sediments, and lake stage. There are several ongoing modeling efforts including hydrodynamic, HSPF watershed loading, and groundwater flow solute transport.

From the monitoring, it has been found that the trophic state index (TSI) is variable from year to year with a general downward trend. The TSI has decreased since the discharge of sewage was cut off from the lake. About five percent of the time, the total phosphorus (TP) level achieves the target. The monthly average TP shows a lot of variability from year to year and it is not seasonal. This is most likely caused by the large quantity of phosphorus in the lake. The yearly average TP is increasing. The monthly average total nitrogen (TN) is also variable. The levels steadily increased from 2000-2002 and then decreased, which is a spike found when looking at some of the other parameters. The TN level achieves the target about 10-15% of the time. The yearly average TN level is fairly flat. It was also found that there is no real correlation between TN and TP, most likely because neither nutrient is limiting. The monthly average chlorophyll is also variable with the same peak as TN. There is seasonal variability in phytoplankton; however, cyanophyta are always abundant and nitrogen-fixers are part of this group.

From the data, it was found that TN is correlated with chlorophyll, two nitrogen-fixing phytoplankton (this led to the nitrogen fixation study), total dissolved solids (TDS) and total suspended solids (TSS). The SJRWMD is not sure yet if nitrogen is driving the increases in chlorophyll or if it is the other way around. TN is also highly correlated with the N/P ratio and tends to drive the ratio.

The water quality monitoring shows how much of the TP is readily available phosphate, which is quickly converted to phosphorus in the lake. There are really high levels of orthophosphate coming from the tributaries and if this flow can be cut off before it reaches the lake, this would be the most cost-effective way to reduce the TP levels. The open water data shows that the lake can be divided into three separate areas based on water quality. The TP concentration is lowest at the neck where water from the St. Johns River is entering. The central portion of the lake has the highest TP concentration which is surprising because most of the loads are coming in at the lower portion of the lake. The water stages are highly variable from year and it does not take much to increase the size of the lake to incorporate the surrounding wetlands.

The results show that total Kjeldahl nitrogen (TKN), total dissolved solids (TDS) and TSS are all significantly and negatively correlated with lake stage, which means that as the lake volume decreases, organic material is left behind. This may also indicate that there is little exchange with the wetlands during inundation. TP shows no correlation with lake stage, which follows the trend that TP has very little correlation with any of the lake factors. This may indicate that the TP is so excessive that any relationship is being obscured.

The sediment record, based on a 1996 core study, shows the highest sediment accumulation between 1940 and 1980. Overall, the level of sedimentation has leveled off as the development in the area levels off. The net TP accumulation has been increasing every year since 1980 with some pulses in earlier years. The diatom record shows a significantly increasing trend in hypereutrophic species and there is evidence that the lake has not been phosphorus limited since the turn of the century.

The SJRWMD has several efforts ongoing in the Lake Jesup area. A nitrogen fixation study is underway that will look at the annual and diurnal rates to create a more accurate nitrogen budget and to determine what factors are driving the increase in nitrogen. They are also looking at other methods to date and source nutrients in the water column (microbal assays, isotopic analysis and carbon dating). The SJRWMD is also reevaluating the targets and developing load-response relationships. There are several stormwater projects that are about to come online and new treatment options that will be implemented in the next year. The draft PLRG should be released about six months after the final issue of HSPF although coordination with FDEP will begin before then. The SJRWMD is also compiling a restoration/management plan to determine the amount of nutrients that need to be removed and the estimated costs.

Tiffany noted that she spoke to Regina Lovings-Morse (SJRWMD) and she is planning to make a presentation on the paid-for-performance projects at the next meeting.

Technical Reports

Lake Jesup Source Tables

Bob Kelly noted that the information in his presentation is based on the TMDL model and as the new information discussed during the meeting continues to come in, the model will need to be updated. The TMDL modeling shows that the phosphorus loads entering the lake are related to the size of the subbasin they are coming from. The concentrations, on the other hand, are similar across the subbasins. Overall, the water entering the lake is contributing phosphorus to the system. For nitrogen, the concentrations coming into the lake are lower the concentration in the lake. The major source of phosphorus is runoff and the major source of nitrogen is nitrogen fixation.

Several revisions were made to the TMDL data. Uncontrollable land uses (water, wetlands, open space, and conservation areas) were identified, Site 10 and golf courses were separated out, and residential land uses and transportation classifications were made consistent for all the counties. It was found that most of the nitrogen and phosphorus loads from MS4s are coming from Seminole County. Medium density residential development is the major contributor of nutrients and phosphorus. Overall, Lake Jesup has higher phosphorus concentrations from uncontrolled sources than gross controllable sources.

Yanbing Jia noted that the phosphorus concentrations shown are higher than what has been observed. Joe Walter responded that these concentrations are just for surface water inflows. If groundwater (base flow) were included, the concentration would be lower.

Sherry Brandt-Williams stated that it will be important to conduct a nitrogen fixation study in a lake that is not so enriched to see how that affects the results. Sherry has a report on a study at Lake George on nutrient manipulations that she will send to Jennifer Gihring to distribute to the group.

Jennifer noted the results of the TMDL modeling will change as the model is refined with information from the Site 10 study, SJRWMD studies, and Yanbing's modeling efforts. The model will continued to be refined until the group feels comfortable with the data and then they can look at revising the TMDL and finishing the BMAP.

Crane Strand Wastewater

Jennifer Gihring stated that the FDEP is working on source identification in the Crane Strand area to verify the sources identified in the TMDL and to determine the changes since the TMDL was developed. The first step is to compile information on the wastewater infrastructure in the Crane Strand Basin. They are looking at areas that have already been repaired and where improvements can be made based on their impacts to the basin. Jennifer requested information from the members on areas that are on sewer versus septic, areas that have had improvements, and priority areas for retrofits or investigations to help with the mapping effort.

Amy Tracy explained the sources of data for the current version of the map. The goal was to match parcel data to the address information that was provided on the septic tank permits. There were some discrepancies found along Colonial Drive and Goldenrod where Amy was unable to match the given address to the parcel. The yellow parcels on the map have septic systems. The green parcels are areas on sewer. The sewered area was determined by creating a 250 foot buffer around the sewer lines (shown in red). If a parcel does not have a building on it, then it does not have a septic tank.

Also included on the map is City Industries, which is a known National Priority List (NPL) site for hazardous waste. The facility discharges into Crane Strand Canal and it is required to monitor effluent (dissolved oxygen, nitrogen and phosphorus weekly and toxicity annually). This site was once a hazardous waste treatment and collection center and the FDEP is not sure if it is still an active facility. Dan Homblette stated that Orange County may have additional information on this site and he will conduct some research into this facility.

Danielle Honour asked if the areas on the map without polygons are unknowns. Amy responded that they are in the process of collecting information on lift stations in the area. Also, some of the information they have is in AutoCAD and needs to be converted to GIS. Jennifer added that they are going to continue to find information to fill in the gaps on the map. Once they have a better idea of the infrastructure in the area, they will start integrating the information from the Rocket Report on areas that need to update their infrastructure. They will also continue to identify potential sources in Crane Strand.

Robert King asked how they were going to include private lift stations. Migdalia Hernandez stated that the utilities should have information on the private lift stations because they would need to contact the owners in case of an emergency.

Danielle asked if the information from the Department of Health (DOH) is from the state or local agencies. Jennifer responded that the state database was used to identify septic tank repairs and information was also collected from the Orange County DOH. The FDEP will also contact the Seminole County DOH.

Next Steps

Jennifer Gihring noted that the comparison of the Lake Jesup input data from the different models will be one of the main topics for the next meeting. Other potential agenda topics include: Adding the new Site 10 information into the models, working on the wastewater infrastructure map for Crane Strand (Orange County will determine if they have any information on the City Industries site), finding information on private lift stations in the Crane Strand area and an update on the paid-for-performance projects.

Tiffany Busby also reminded the members to submit their project collection spreadsheets with information on what projects they have completed and the projects they have planned. The only submittal received since the last meeting is from Orange County. If there are any issues with the spreadsheet, the members should let Tiffany know what they are. Jennifer added that there is no set deadline for submitting this information but the project collection process is on a parallel track with the nutrient refinements and the two efforts will need to be complete at the same time.

Upcoming meetings are scheduled for:

- Thursday March 8th from 1:00 PM to 4:00 at **City of Sanford** (300 North Park Avenue, Utility Training Room)
- Thursday, April 12th from 1:00-4:00 PM at Sylvan Lake Park
- Thursday, May 10th from 1:00-4:00 PM at Sylvan Lake Park

Adjourn

The meeting adjourned at 3:50 PM.

Action Items

1. Jennifer will post the watershed loading assessment report and Yanbing's presentation on the FTP site.
2. There are several factors (EMCs and other input data) that need to be compared among the models to determine where they differ and how this affects the results.
3. Regina will give a presentation on the paid-for-performance projects at the next meeting.
4. The models will need to be updated to include information from the new studies (Site 10, nitrogen fixation and sediment flux).
5. Sherry will send the Lake George study on nutrient manipulations to Jennifer.

6. Working Group members should submit information they have for Crane Strand (areas on sewer versus septic, areas that have had improvements, and priority areas for retrofits or investigations) to Jennifer for use in the mapping effort.
7. Orange County will determine if they have any information on the City Industries site that they can provide to FDEP.
8. Working Group members are asked to complete their project collection spreadsheets and submit them as soon as possible.