

Lake Okeechobee Basin Management Action Plan

Technical Meeting Summary

Wednesday, January 22, 2014

10:00 AM – 12:00 PM

Okeechobee County and County Health Department Auditorium

1728 NW 9th Avenue, Okeechobee, Florida 34972

Attendees

David Allen, Okeechobee	Kimberly Lawrence, Osceola County
Beth Alvi, FDEP	Steve Madden, Conestoga-Rovers & Associates
Rick Baird, Osceola County	Susan Martin, SFWMD
Bill Baker, MacVicar Consulting	Libby Maxwell, Florida Legislature
Lesley Bertolotti, SFWMD	Linda McCarthy, Lykes Brothers Inc.
Vanessa Bessey, FDACS	Tom Moran, Lake Wales
Karen Bickford, Lee County	Julie Neurohr, FDEP
Del Bottcher, SWET	Robert Norton, Citizen
Marisa Carrozzo, Conservancy of Southwest Florida	Steffany Olson, SFWMD
Kevin Carter, SFWMD	Nyla Pipes, One Florida Foundation
Sarah Catala, Hendry County	Fernando Pleitez, E Sciences
Jose del Rio, Kissimmee	Marcy Policastro, Wildwood Consulting
Kim Dinkins, FDEP	Luke Polk, Florida Farm Bureau
Steve Edmonds, One Florida Foundation	Irene Quincey, Pavese Law Firm
Katrina Elsken, Okeechobee News	Brian Roy, Royal Consulting Services
Tony Federico, MacVicar, Federico, & Lamb	Orlando Rubio, C.A.S. for Okeechobee County
Stan Ganthier, FDEP	Chad Rucks, SFWMD
Xueqing Gao, FDEP	J.P. Sasser, One Florida Foundation
Eric Gonzales, SFWMD	Clay Shrum, Spring Lake Improvement District
Paul Gray, Audubon Florida	Jeff Sumner, SFWMD
Jill Grimaldi, CDM Smith	Hilary Swain, Archbold Biological Station
Katie Hallas, FDEP	Jim Threewits, Okeechobee County
John Hayford, Okeechobee Utility Authority	Bridgett Tolley, Osceola County
Janet Hearn, ATM	Kenneth Todd, Palm Beach County
Clegg Hooks, FDACS	Eva Velez, AECOM
Frank Irby, Citizen	Pam Wade, SFWMD
Kerry Kates, Florida Fruit and Vegetable Association	Paul Whalen, TAC Environmental
Edgar Kerry, South Bay	Bonnie Wolff Pelaez, FDACS

Welcome and Opening Remarks

Beth Alvi welcomed everyone to the Lake Okeechobee Basin Management Action Plan (BMAP) meeting. She noted that this is the fifth technical meeting since the BMAP was kicked off last year, and the BMAP efforts will be ramping up now. Beth introduced Katie Hallas and Kim Dinkins as the Florida Department of Environmental Protection Basin Coordinators for the BMAP, and Dr. Xueqing Gao who has been working on the BMAP model. The participants introduced themselves and the entity they represent.

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Paul Gray noted that it would be helpful to have a call in number or videoconference for these meetings, for those people who are unable to travel. Beth responded that the Department would keep this in mind for future meetings.

Overview of the Watershed Loading Tool

Xueqing Gao stated that he will be discussing how the Department is using the Watershed Assessment Model (WAM), which was developed by Del Bottcher with Soil and Water Engineering Technology, Inc. (SWET), to create a tool for allocations at the sub-watershed level. Xueqing noted that Greg White (Department) did most of the work to create the allocation tool, but he could not attend the meeting due to other obligations. Throughout the process of creating the tool, the Department received input from Del and the South Florida Water Management District (SFWMD).

The Lake Okeechobee Total Maximum Daily Load (TMDL) is based on a target concentration of 40 parts per billion (ppb) for total phosphorus (TP). When TP concentrations are greater than 30 ppb, more algal blooms are observed. In addition, based on historical measurements in the lake, the TP concentration was between 30 ppb and 50 ppb. Therefore, the Lake Okeechobee Technical Advisory Committee (TAC) determined that 40 ppb should be the target. To determine the total loading that can go the lake while still meeting the target concentration, a model is used that is based on the flow, lake surface area, TP target concentration, and net sedimentation rate. Using this equation, the total allowable loading to the lake is 140 metric tons (MT)/yr, of which 35 MT/yr are from direct atmospheric deposition on the lake. This source is considered out of the control of the Clean Water Act, so the remainder of the 105 MT/yr can be allocated to the entire Lake Okeechobee Watershed.

Allocating this load is complicated by the different land use uses, soil conditions, hydrological conditions, and land surface topography throughout the watershed. All of these factors impact how much load is generated from the watershed. In addition, there is transport attenuation of the loading through the watershed. This means that one pound of load from the Kissimmee area would have a different impact on Lake Okeechobee than one pound of loading from an area near the lake. For this reason, one set number cannot be used to determine allocations across the watershed. Therefore, the Department needed to create a tool that takes all these factors into account when determining allocations.

Xueqing noted that for the Lake Okeechobee Watershed, a tool already exists to estimate loading. Del's firm (SWET), on behalf of the SFWMD, created a set of watershed assessment models (WAM). The Department used the series of 11 WAM domains when creating its tool. These models make up the sub-watersheds north of the lake: Upper Kissimmee, Lower Kissimmee, Lake Istokpoga, Indian Prairie, Fisheating Creek, and Taylor Creek/ Nubbin Slough. WAM is a hydrology and water quality model. The model simulates rainfall falling onto the landscape, and depending on the land use and soil type, there will be a certain amount that runs off into the tributaries and downstream receiving water. As the water moves on the ground, there is also nutrient movement. Nutrients are carried in both the surface and ground waters. The water flow and water quality are simulated through a series of model inputs including rainfall, land use, soil, land surface topography, and point source discharges. Best management practices (BMPs) can also be added to the model. All of these factors need to be considered in an allocation tool.

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WAM is also a Geographic Information Systems (GIS) model, which takes most of the model input as GIS data. The GIS layers can be combined into a comprehensive dataset. The GIS aspect makes it easy to identify areas that meet certain criteria to determine where stormwater treatment should be added. The map in the presentation shows the unit area TP loading in the watershed, and this information can be used to identify TP hotspots where treatment is needed. In addition, WAM is a grid cell based model, which divides the watershed into lots of small grid cells that include information about that area. The grids provide a high resolution to check different features in the watershed, which would be helpful if more detailed allocations are needed in the future. The grid spatial resolution is one hectare (ha).

Xueqing noted that all of these features of WAM produce a load generated from the watershed, which can then be compared to the TMDL load. WAM creates several types of loads. The first is the maximum amount of load that can be generated from a certain area based on the conditions in that area. This load does not include attenuation. However, once the load is created, it does not stay in that area. As the load moves through the watershed, there is land surface attenuation, which is included in WAM. Once the load reaches a tributary, it will be transported downstream to the receiving water. Therefore, there is also in-stream transport attenuation, which is included in WAM. The final load reaching Lake Okeechobee includes both the land surface and in-stream attenuation factors. This is the load needed from the allocation tool to compare to the TMDL of 105 MT/yr of TP.

Xueqing noted that since the WAM can do a lot, there may be the question of why the Department is not directly using this model. Xueqing noted that the reason another tool was developed is that WAM is a complicated model that requires a lot of expertise to run. Since WAM is a grid based model with a lot of cells, it takes a while to run, and the Department wanted to be able to more quickly come up with results. WAM can create daily, monthly, or seasonal flows but, for allocations, the Department is more interested in a long-term average nutrient load. The tool also needs an index to represent the spatial trend using the factors mentioned earlier (land use, soil, rainfall, etc.). Xueqing noted that after discussions with the BMAP staff, Del, and SFWMD, the decision was made to use land use as the index to represent the spatial loading pattern since this is a major factor affecting nutrient loading. WAM also simulates loads associated with different land uses based on the associated conditions, so land use is a good index to simulate pollutant loading from the watershed. The land use information that was incorporated into the allocation tool included the land use type based on the SFWMD coverage, area (ha), and areal nutrient loading (kg/ha/yr). Multiplying the area times the areal loads results in the nutrient loads.

Xueqing stated that the GIS file for the tool needed to include information on the land use type and area, land use-specific areal loads, and in-stream attenuation. All of this information combined can be used to calculate a final load reaching Lake Okeechobee. The Department created the tool using SFWMD's land use shapefile for 2008-2009. SFWMD had made edits to this file in 2013 to refine the watershed boundary, including the watershed area in the St. Johns River Water Management District and Southwest Florida Water Management District. SFWMD also did some ground truthing to update the land uses and added the WAM land use classification to link to the Florida Land Use and Cover Classification System (FLUCCS). The shapefile from SFWMD includes the sub-watershed, basin, FLUCCS Level III land use, updated Level III land use, WAM land use, and land use area. To create the allocation tool, the Department added land use specific areal nutrient loads, receiving water attenuation, and the final loading to Lake Okeechobee.

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The land use specific areal loads came from the WAM output, which shows the land use type and unit load for each basin. Xueqing noted that in discussions with the BMAP team, they determined it was better not to include agricultural BMPs in the tool and instead to calculate the load reductions from these BMPs as part of the BMAP. Greg White went through the 11 model domains and found that only the domain for the S-191 basin explicitly included agricultural BMPs. In the S-191 basin, there were BMPs included in the model for dairies and citrus groves, which resulted in a lower loading from these land uses compared to the other ten model domains. The Department applied a correction factor to adjust the loading in the model to a condition without BMPs.

The receiving water attenuation factor for each of the 11 model domains was calculated by subtracting the total outlet load from the total inlet load and dividing this result by the total inlet load. This results in a percentage of the load attenuated in the model domain. The total inlet load includes the sub-watershed loads, upstream boundary load into the model domain (i.e., the load from the Upper Kissimmee sub-watershed into the Lower Kissimmee sub-watershed), atmospheric deposition directly onto the surface of major waterbodies, and possible sediment nutrient release. The total outlet load was calculated by multiplying the major outlet flow by the nutrient concentration of the flow. In some areas, there was also a ground water load that had to be subtracted out because it was not an input to Lake Okeechobee.

The final load to the lake is calculated by multiplying the areal load by the area times one minus the receiving waterbody attenuation rate for each model polygon. All of the loads added together in a sub-watershed results in the total sub-watershed loading. Overall, the watershed is a little more than one million hectares, and the total TP load to the lake is about 457 MT/yr. Xueqing noted that the Upper Kissimmee sub-watershed has the greatest acreage and the Taylor Creek/Nubbin Slough sub-watershed has the smallest acreage; however, the Upper Kissimmee sub-watershed has a lower load. This difference is due to the fact that about 44% of the Upper Kissimmee sub-watershed is natural lands with about 24% agricultural lands, whereas the Taylor Creek/Nubbin Slough sub-watershed is about 70% agricultural lands and less than 20% natural lands.

Xueqing noted that the Department is still refining the model and conducting quality assurance/quality control reviews to check the output. There were some issues when converting WAM into the tool in which some of the major waterbodies are shown as part of the watershed load, when they should be receiving waters without a load. To calculate the real load to Lake Okeechobee, a cumulative attenuation factor is needed, and this will be added to the model. The tool is currently producing nutrient loads for each model domain, but the Department can also produce areal nutrient loads for finer hydrologic units. Once the refined model is ready, the Department will compare the total load for each sub-watershed from the tool to the sub-watershed targets, which will also be developed by the Department, to determine the load reductions necessary to meet the TMDL goal. The load reduction targets will be discussed at future BMAP meetings. The Department is also determining the most appropriate starting loads for the natural lands.

Hilary Swain stated that in thinking about the attenuation factors in the model, the upstream sub-watersheds benefit from the attenuation in the waterbodies so it will be easier for them to comply with the TMDL. However, the inherent problem with this is that many of the lakes in the system are living on borrowed time. For instance, Lake Istokpoga will eventually reach its maximum capacity like Lake Okeechobee did. Hilary asked how the Department will address this situation. Xueqing responded that

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the attenuation factor in the tool is specific to Lake Okeechobee. The Department has an impaired waters process that it goes through every five years for each basin in the state. For the Kissimmee Basin, there are impaired waters, and the Department will develop TMDLs to address those impairments. The load reduction needs for those waters will be addressed through their TMDLs. The Department does not have to address all the waterbodies in a watershed at the same time, and the focus of this process is on the Lake Okeechobee TMDL.

Paul stated that Del has done work to evaluate legacy loads in the watershed. He asked if the model is attenuating the legacy load or the watershed runoff. Xueqing responded that WAM estimates the potential load that can be created from a specific land use. As that load moves through the watershed to a receiving water, there is surface attenuation. As that load then moves through the water to Lake Okeechobee, there is in-stream attenuation. The final attenuated load to Lake Okeechobee includes both of these attenuation factors. Del state that Lake Kissimmee currently has a very large assimilative capacity, which is why the loads from the Upper Kissimmee sub-watershed are so low. Lake Istokpoga also assimilates some of the load, but its capacity has been depleted. With the accelerated loads going into Lake Kissimmee, its capacity will soon be depleted, as well. Hilary noted that it would be helpful to also see the actual watershed loading before it is attenuated. Xueqing responded that this information could be added to the table.

Paul stated that there are parts of the watershed where there is so much TP in the soil, the water picks up this TP as it moves through the sub-watershed. In those areas, the assimilation is really negative. The lake is still well above the target of 40 ppb, and it may not reach its target with the watershed functioning this way. Del responded that the historical land practices have raised the unit load, and it will take a long time to change the TP dynamics in the watershed. Tony Federico asked if the 457 MT/yr is what reaches the lake. Xueqing responded that this is the long-term average load that reaches the lake based on an existing condition. Tony noted that the column header in the table is confusing. Xueqing responded that he would revise the title to make it clear this is the load reaching the lake.

Paul stated that the Lake Okeechobee Operating Permit will allow load to come to the lake from the C-44, which is outside the existing watershed. Therefore, the allowable load from the Lake Okeechobee Watershed to meet the TMDL is really 85 MT/yr. He asked how the Department would account for this additional load. Beth responded that this was discussed during the St. Lucie River and Estuary BMAP and Caloosahatchee BMAP development. Both the St. Lucie and Caloosahatchee TMDLs are based on Lake Okeechobee meeting its TMDL. Both of these areas also need total nitrogen (TN) reductions, so the Lake Okeechobee projects will also be assessed for TN reductions. Paul noted that there will be flows from these other areas into the lake. Beth responded that the Department has not accounted for this change yet. The Department wants to focus on projects and to identify a reduction amount for the first phase. The Department is also working with SFWMD and the Florida Department of Agriculture and Consumer Services (FDACS) to refine the model, which will be done as projects are implemented in the first phase. A stakeholder asked if the Department will be looking at TN targets for the Lake Okeechobee Watershed. Beth responded that Lake Okeechobee only has a TP TMDL; however, an evaluation will need to be made in the future as to whether additional TN reductions will be required in the watershed to achieve the Caloosahatchee and St. Lucie TMDLs. A handout was provided in a past meeting with both the TP and TN reduction efficiencies for the BMPs.

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Kimberly Lawrence asked if the urban BMPs were left in the tool even though the agricultural BMPs were removed. Del responded that the WAM domains were run for the period of 2004-2006, and the model included BMPs that were expected to be implemented at that time. The University of Florida – Institute of Food and Agricultural Sciences (UF-IFAS) phosphorus BMP had been implemented widely by agricultural producers, and this was assumed to be in place in the model. For the urban areas, there was a certain amount of retention assumed to be in place. Kimberly asked if there would be an option to update the urban BMP coverage to add that would have been in place for the 2008-2009 land use coverage. Del responded that these additional BMPs could be added to the model. Linda McCarthy asked if the dairy rule was included in the S-191 basin. Del responded that this rule was accounted for in the S-191 basin because this area had a higher implementation of the rule. Beth added that this is true for the WAM domain, but the Department removed the dairy rule BMPs from its tool.

Hilary noted that all of this modeling is done for an average year, but the effect could be very different in a high rainfall year. Xueqing responded that compliance with the TMDL will be determined based on achieving a certain percent reduction. The Department will not compare the load to the TMDL every year. Tony stated that the Lake Okeechobee TAC set the TMDL as a long-term average based on a five-year rolling average. This average would be what the Department uses to compare to the TMDL. Xueqing noted that reducing watershed loading will result in a long-term reduction in loads to the lake. The focus is not on a year-to-year comparison with the TMDL but seeing a water quality improvement in the lake. Del stated that there is information in WAM that can help identify what practices are effective for cutting off peaks in loads to the lake. This is part of the larger BMAP effort. Beth added that the model results provide a rough idea of the loads to determine what should be done in the first BMAP phase. The Department will continue to work on how to assess water quality trends and will work with SFWMD and FDACS on creating a more refined tool for the second BMAP phase.

Status Updates on BMAP Components

Katie Hallas stated that the Department has also been working on some of the other BMAP components. One of these components is project collection. The Department has asked the stakeholders several times for project information, and she noted that many of the stakeholders have been great about providing project information. Projects have already been received from the cities of Kissimmee and Orlando; Florida Department of Transportation (FDOT) Districts 1, 4, and 5; Highlands, Martin, Orange, Polk, Okeechobee, and Osceola counties; Istokpoga Marsh Watershed Improvement District; Spring Lake Improvement District; and SFWMD. Over the next month, the Department will be calculating the load reduction benefits from these projects for both TP and TN. Katie noted that the Department will use the standard BMP efficiencies to determine the load reduction benefits; however, if stakeholders have monitoring for a specific project, they should provide this information to the Department to ensure the full benefit is being accounted for in the BMAP. The Department is working with FDACS to determine where cost-share and owner-implemented agricultural BMPs are located, so that the associated load reductions from these BMPs can be calculated. This evaluation will also help to identify hotspots where additional cost-share BMPs should be added to achieve greater reductions.

Katie stated that if the stakeholders have any new project information or outstanding information to support their submittal, they should provide this information to the Department by February 14th. The Department is looking for completed projects since 2009, and projects that will be completed during the first BMAP phase. The BMAP should be adopted by the end of this year, so the first phase would end in 2019. The presentation includes a link to the project collection information.

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Katie noted that another important aspect of the projects is funding. The Department has the Section 319 grant, which provides money for agricultural and urban stormwater projects. The application deadline for this funding is typically around Memorial Day. The Department will post information to its website closer to the application deadline, and Katie noted that this information will also go out to the BMAP distribution list. Another option for funding is through the TMDL grants, which have quarterly deadlines. The next application deadline will be in March, and information about this funding opportunity will also be sent to the BMAP distribution list. The specifications for this funding source are outlined in Section 62-305, Florida Administrative Code. These requirements include a 50% match of which 25% must come from local money, the project must be permitted or ready to be permitted shortly after grant approval, and the project must be monitored. This monitoring information could be submitted to refine the load reduction benefits in the BMAP. There is also the State Revolving Loan Fund for both wastewater and stormwater projects. The presentation includes a link to a handout with more details on these and other funding sources. Katie noted that when a stakeholder includes a project in a BMAP, the project receives more points in the ranking for approval and awarding of funding. The Department understands that funding is tight, but reductions are needed and there are opportunities for grants.

Katie presented a map of the projects submitted to date that have been completed since 2009. More projects have been implemented in the watershed before the BMAP timeline. Katie noted that the Department is still missing some project shapefiles, so some of the dots on the map may not be in the exact location of the project. It is very encouraging that so much has been done, and there will be discussion at future meetings about what else should be done to meet the allocations at the sub-watershed level. A stakeholder asked if the BMAP projects are limited to water quality, or if water quantity projects could be provided. Katie responded that water quantity projects could be provided if they have a water quality aspect, since the BMAP is focused on improving water quality. The stakeholder should provide the project to the Department, so further discussions can occur.

Katie stated that the Department has also been working with SFWMD on the BMAP monitoring plan. Since this is such a large watershed, the Department will prepare a draft monitoring plan that will be presented at the next meeting for discussion and stakeholder input. Also during the next meeting, the monitoring objectives will be reviewed. If the stakeholders have monitoring they would like included in the BMAP, this information should be provided by January 31st. The Department will be working with in-house statistical experts to determine a trend analysis network that can best evaluate the inter-annual variations in loads and to determine if the BMAP efforts are helping to meet the TMDL. Katie noted that this will be an ongoing process, and these discussions will start at the next meeting. The Department is also working with FDACS to design an agricultural BMP verification program. The Department has been evaluating its state lands, and there are some good locations in the Lake Okeechobee Watershed for potential BMP verification projects. Additional details about this process will be provided at future meetings.

Katie noted that the Department will determine the target loading by sub-watershed, calculate the nutrient load reduction benefits from the projects submitted, work with stakeholders to identify additional projects needed at the sub-watershed level, and continue outreach to develop specific projects with the stakeholders. Katie stated that if the stakeholders know of people in the watershed the Department should be talking with, to please let them know. This outreach will help ensure the

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Department is using the most up-to-date knowledge. The Department would like to start holding monthly BMAP meetings, and based on coordination with SFWMD and FDACS, it looks like the third week of the month is best. Katie asked for stakeholder feedback on the best time for a monthly meeting to avoid conflicts with local meetings. One stakeholder noted that Thursdays were better for him, and it would be helpful to have a set day and time for these meetings.

Pam Wade asked what the BMP verification on state lands would entail. Katie responded that some of the state lands are leased to agricultural producers, or are empty lands where BMPs can be added to test the effectiveness. Beth added that this program is still in the preliminary stages, and the Department is coordinating with FDACS on the best approach. Karen Bickford asked if there may be an opportunity for a mitigation bank type of situation from this assessment. Beth responded that the Department can consider this option. They have been assessing the state lands to determine which should be sold to purchase lands that are more appropriate lands for conservation. A stakeholder asked what would be the ultimate use of the data collected. Beth responded that the data would be used to verify if the agricultural BMPs efficiency estimates are correct or if there is a better way to use the BMPs. The goal of this assessment is still being determined. Del noted that the Department should be aware that this assessment will be difficult.

Rick Baird noted that there was an algal scrubber system on Taylor Creek, and he asked if there are other demonstration projects in this watershed that the Department or SFWMD are evaluating. Lesley Bertolotti noted that SFWMD has five hybrid wetland treatment technology (HWTT) projects in the watershed, which are a mixture of wetland and chemical treatment. HWTT has been shown to be very effective in removing TP from the system. These projects are separate from the stormwater treatment areas, and are more of parcel-scale project.

Katie stated that the stakeholders can contact her or Kim Dinkins if they have any questions about the BMAP.

Adjourn

The meeting was adjourned at 11:39 AM.

Action Items

- The Department will try to have a call in number or videoconference available for future BMAP meetings.
- The Department will update the loading summary table to include the watershed loads before they are attenuated, and to clarify the title for the final loads reaching the lake.
- The Department will determine how to assess water quality trends to determine progress towards the TMDL.
- The stakeholders should submit any additional project information by February 14th.
- The stakeholders should submit any additional monitoring information by January 31st.
- The stakeholders should provide feedback on the best day for a monthly BMAP meeting.