

Indian River Lagoon Basin Management Action Plans

Meeting Summary

Friday, December 5, 2014

10:00 AM – 12:00 PM

Brevard County Agricultural Center, 3695 Lake Drive, Cocoa, FL 32926

Attendees

Beth Alvi, FDEP	VJ Karycki, Rockledge
Matthew Anderson, FDEP	Kerry Kates, Florida Fruit and Vegetable
Kenneth Andrews, 3E Consultants	Jenni Lamb, Melbourne
Courtney Barker, Satellite Beach	Claudia Listopad, Applied Ecology
Virginia Barker, Brevard County	John Matthews, Kennedy Space Center
Alix Bernard, Rockledge	Mike McCabe, Melbourne-Tillman WCD
Randy Burden, EcoSense International	Bach McClure, Brevard County
Tiffany Busby, Wildwood Consulting	Bill Messersmith, Vero Beach
Jessica Core, Patrick AFB	Keith Mills, West Melbourne
Kevin Coyne, FDEP	Ryan Mitchell, E Sciences
Graham Cox, Pelican Audubon Society	Matt Mitts, Vero Beach
Brett Cunningham, Jones Edmunds	Ryan Morrell, Air Force
Christine Daniel, FDEP	Terry Mott, Citizen
Robert Day, Citizen	Keegan O'Brien, 3E Consultants
Doug Durham, Kennedy Space Center	Judy Orcutt, Citizen
Rebecca Elliott, FDACS	Marcy Policastro, Wildwood Consulting
Gordon England, Applied Sciences	Ken Poole, Rockledge
Yesenia Escribano, FDEP	Robert Potts, E Sciences
Ellen Eveland, 3E Consultants	Tom Price, Kennedy Space Center
Joe Faella, Brevard County	HM Ridgely, Evans Properties
John Fergus, Satellite Beach	Gary Ritter, Florida Farm Bureau
Amelia Fontaine, Collective Water Resources	Mitchell Roffer, Citizen
John Gamble, Volusia County	John Royal, Brevard County
Xueqing Gao, FDEP	Todd Scaldo, Indian Harbour Beach
Rachel Gerena, Palm Bay	Linda Seals, UF-IFAS
Pattie Gertenbach, E Sciences	David Sinton, Melbourne Village
Clyde Giesenschlag, Citizens	Jeff Smith, ECT
Peggy Giesenschlag, Citizens	Steve Snoberger, Carter Associates
Lorraine Guise, Titusville	Robbyn Spratt, Brevard County
Hugh Harling, East Central Florida RPC	Dani Straub, Melbourne
Janet Hearn, ATM	Ed Wegerif, Cocoa
Tom Hill, Florida Farm Bureau	Kaylene Wheeler, Palm Bay
Chuck Jacoby, SJRWMD	John Windsor, FIT
George Jones, ORCA	Kelly Young, Volusia County

Welcome and Opening Remarks

Tiffany Busby welcomed everyone to the Indian River Lagoon (IRL) Basin Management Action Plans (BMAPs) meeting, and noted that the meeting covered all three BMAPs. The participants introduced themselves and the entity they represent.

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Tiffany introduced Beth Alvi who is the Administrator for the Florida Department of Environmental Protection Water Quality Restoration Program. Beth noted that there are several new Department staff working on the IRL BMAPs. The Department's Water Quality Restoration Program manages both BMAP development, as well as the nonpoint source funding program, which includes the Section 319 and total maximum daily load (TMDL) grant funding. Beth stated that she was previously a basin coordinator and she worked on the Caloosahatchee Estuary BMAP. While developing that BMAP, she watched and learned from the IRL BMAPs process. Beth introduced Kevin Coyne who is the Department's Environmental Administrator for the BMAP Program. Kevin has a background in TMDLs and standards development. Beth also introduced Yesenia Escibano who has been working on the IRL BMAPs for about a year assisting Mary Paulic (Department) and Katie Hallas. Beth noted that Katie recently accepted a position with the Florida Department of Agriculture and Consumer Services (FDACS). The Department is relying on Yesenia's support of the IRL BMAPs currently, and will be hiring a lead coordinator soon. The Department will continue to work on the IRL BMAPs as a team.

Review Brevard County Spatial Watershed Iterative Loading (SWIL) Model Status

Xueqing Gao stated that Brevard County and its consultants have undertaken a TMDL refinement effort, which has been an important activity in this basin for several years. Xueqing stated that he would provide an update on what is being done to refine the TMDL and the major issues that the Department has been discussing with the county. He will also discuss the next steps to refine the TMDL, and Xueqing noted that Claudia Listopad did a great job of putting together the SWIL model and working with the Department to make it useful for future TMDL development and identification of allocations.

The Department adopted nutrient TMDLs for the IRL and Banana River Lagoon (BRL) in March 2009, and then started BMAP development. During development of the BMAPs, the local stakeholders examined the details of the TMDLs, and raised questions about the approach and data used. Xueqing noted that as more data are collected, it is likely that some of the assumptions used to develop the original TMDLs could be improved. The Department started discussions with the stakeholders about refining the IRL TMDLs in mid-2011. These discussions included numerous meetings; teleconferences; documents, comments, and responses; and emails. The stakeholders' concerns focused on two main aspects: (1) how to refine the TMDL targets, and (2) how to improve the TMDL loading simulation.

In late 2012, the Department received a Technical Approach Document (TAD) from Brevard County and its consultants. The TAD described a conceptual model, which included providing the basis for chlorophyll-*a* as the benchmark to set nutrient targets, and using nutrients, chlorophyll-*a*, and seagrass temporal trends in the IRL to identify a reference time period. The TAD proposed using the period of 2001-2008 as the reference time period because there was a decrease in nutrients and an improvement in seagrass during this time. This period could be used to set the chlorophyll-*a* and possibly the total nitrogen (TN) and total phosphorus (TP) targets. The TAD also included an analysis of the functional relationship between chlorophyll-*a* and nutrients to set nutrient targets. In addition, the TAD proposed studying the inter-segment nutrient transfer to more accurately represent loads. The TAD was based on the assumption that the TN and TP load going into the lagoon will impact chlorophyll-*a* concentrations, which will impact the light attenuation process that will, in turn, impact the seagrass light requirement, as well as seagrass growth and reproduction. Xueqing noted that the existing TMDLs linked nutrients with seagrass depth limits; however, there is a background assumption that nutrients affect seagrass by impacting chlorophyll-*a*.

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The Department carefully reviewed the TAD, and they had several concerns. The first was that the conceptual model only had nutrient impacts to seagrass from water column processes through chlorophyll-*a*. However, there are also macroalgae and epiphytes in the system, which take up nutrients and can compete with seagrass. Therefore, using only chlorophyll-*a* as the benchmark to set TN and TP targets may not address the entire nutrient picture for seagrass. The Department felt that seagrass need to be included in the target setting. The Department was also concerned that although there was improvement in seagrass depths during the period of 2001-2008, there is no evidence that seagrass reached the depth limit targets. Therefore, using a target based on nutrient concentrations during that period could have uncertainties.

Brevard County responded to the Department's comments in June 2013 with a revised TAD. The revised TAD suggested changing the reference time period approach to both a reference time and segment approach. This approach would look at times and segments where seagrass are meeting depth limit targets to determine the TN and TP targets. Xueqing noted that this approach is consistent with the approach that the U.S. Environmental Protection Agency (EPA) suggested for estuary numeric nutrient criteria (NNC). The criteria that EPA suggested, which the county used in the revised TAD to set a reference condition, were: (1) no less than 20% of surface light at the seagrass deep edge; (2) chlorophyll-*a* concentration not to exceed 20 micrograms per liter ($\mu\text{g/L}$) more than 10% of the time; and (3) dissolved oxygen (DO) no less than 4.0 milligrams per liter (mg/L) or 42% saturation. If all three criteria are met, then that lagoon segment could be used to set TN and TP targets.

The Department reviewed the revised TAD, and noted that it still did not include any seagrass matrices in the analysis. The Department was also concerned about selecting a reference condition using 20 $\mu\text{g/L}$ for chlorophyll-*a* because this concentration may not be protective enough for the IRL. Xueqing noted that when the Department determined that the IRL and BRL were impaired for seagrass, only two segments were impaired for chlorophyll-*a*, and this was using a threshold of 11 $\mu\text{g/L}$. The Department also had concerns with only using the water column light attenuation because macroalgae and epiphytes affect seagrass distribution, and not necessarily by light attenuation. The Department met with Brevard County and its consultants in September 2013, and reiterated the need to include seagrass in the target setting. The county and its consultants agreed to go back and revise the conceptual model.

The county presented the revised conceptual model to the Department on August 20, 2014. In this model, watershed loading is a central component and is affected by watershed characteristics, atmospheric deposition, rainfall, and other sources. Internal loading is another important factor, as was seen during the bloom period. This model included macroalgae and epiphytes, as well as total suspended solids, turbidity, and color that also impact seagrass, although these factors are not related to nutrients. This model proposed looking at loading from all sources including watershed nonpoint sources, point sources, atmospheric deposition, ground water seepage, internal loads, and possible inter-segment nutrient transfer. The proposal was to use the Curvilinear Hydrodynamics in 3-Dimensions (CH3D) model set up by the St. Johns River Water Management District (SJRWMD) to simulate inter-segment transfer to help with mass balance. This would help to create a relatively complete picture of loading into each segment before evaluating the relationship between nutrient loads and seagrass depth.

Also during the August meeting, the county and its consultants suggested reanalyzing the regressions on the functional relationship instead of combining the segments into sub-lagoons. Previously, there were only three data points for each segment so the evaluation by segment could not be conducted. There are

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now more years of seagrass data and more recent land use data, so there is an opportunity to expand the regression analysis to determine if the functional relationship is still present. The county and its consultants also suggested normalizing the nutrient load data using the volume or area of the receiving lagoon segment in the updated regression analysis. The county also noted that the regression has a high sensitivity to some data points. The Department is working with the county and its consultants to address these items.

The Department provided comments on the revised conceptual model. One comment was to include the relationship of macroalgae and epiphyte impacts on seagrass. There is shading from the macroalgae and epiphytes can grow on the lagoon bottom and compete with seagrass. In addition, if macroalgae are healthy, they will absorb nutrients, which keeps phytoplankton under control. When macroalgae die, they will release nutrients and can cause phytoplankton to grow to excessive amounts. The Department and the county and its consultants are discussing how best to include impacts of macroalgae and epiphytes in the conceptual model. The Department continued to suggest that the approach not only look at light attenuation in the water column but also include seagrass matrices into the target setting analysis. The Department agreed with the questions raised about the regression relationships and that more data should be added to refine the relationships. The Department raised the question whether data from the algal bloom period should be included. If these data are included in the TMDL, they would help to address the algal bloom period. If these data are not included, the TMDL will only address the general long-term condition, and will not represent the bloom periods.

John Fergus suggested not including the data from the bloom period to build the model. The model can then be run for the bloom period, and if bloom conditions are not shown in the model, then there is something missing. Xueqing responded that the suggestion to calibrate the model with pre-bloom data and validate the model with bloom data is a good one. However, in order to use the data from the bloom period, there needs to be a better understanding of how macroalgae absorb nutrients when they are healthy and release nutrients when they are not healthy. John noted that salinity is included in the model but temperature is not in the model, and it was a major factor in the bloom. Xueqing noted that these are items the Department has been discussing with Brevard County and its consultants.

Another meeting was held on November 18th where the county and its consultants presented the conceptual model to the Department and SJRWMD. During this meeting, they discussed how to include the seagrass matrices into the functional relationship analysis. This could be done by combining all the matrices into one seagrass index or keeping each matrix separate to determine which are most sensitive to nutrient loading. The most sensitive matrix or matrices could be used to set the target. SJRWMD noted at the meeting that they prefer to use the seagrass coverage matrix over the transect matrix because it is difficult to determine how much area is covered by seagrass from the transects. There was also discussion of a multiple lines of evidence approach, in which both the seagrass data and the results of the SJRWMD optical model would be used. In addition, they discussed how best to represent atmospheric deposition in the model. John Windsor asked what the proposals were for atmospheric deposition. Xueqing responded that the SJRWMD has Clean Air Status and Trends Network (CASTNET) stations that can be used to provide atmospheric deposition information. Bach McClure added that Noreen Poor (University of South Florida) worked on a model for Tampa Bay atmospheric deposition. She is currently revising this modeling and is working with EPA. The revised model for Brevard County integrates the deposition sites in the basin. Virginia Barker added that part of the challenge is that there are only two stations in the basin, one at Cape Canaveral and one at Sebastian

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Inlet, which do not collect the same types of data and do not collect the data in the same way. Therefore, using the data from these stations underestimates the overall atmospheric deposition in the basin. The model that Noreen developed seems to overestimate atmospheric deposition.

Xueqing noted that also during the November meeting, there was discussion about reevaluating the lagoon segments before starting the functional relationship analysis. SJRWMD is developing the Environmental Fluid Dynamics Code (EFDC) model, which could help with the inter-segment evaluation. At this meeting, there was agreement that Brevard County and its consultants would explore ways to include the seagrass matrices into the TMDL target setting. They will also explore how to evaluate macroalgae and epiphyte impacts, and SJRWMD will provide data to help with this evaluation. The next meeting will be held in January 2015 for Brevard County and its consultants to provide preliminary results of the seagrass matrix analysis. Xueqing noted that this is a complicated process that includes a lot of details that the Department wants to get right if they are going to readopt the TMDL. Brevard County raised some complications that would occur if the algal bloom period is included because the current SWIL model only simulates watershed loading through 2010. Therefore, the model period would have to be expanded, which requires including new land use information. During the November meeting, there was agreement to use data from 1995-2010 to develop the model to address the average long-term condition, and the bloom period will be evaluated in a separate study.

The Department also reviewed the SWIL model technical report from Environmental Research & Design (ERD) and the model structure from Applied Ecology Inc. (AEI). Xueqing noted that SWIL is a good model. The Pollutant Load Screening Model (PLSM) included five rainfall stations, whereas the SWIL model includes 68 stations, so the rainfall in the basin is more refined. The SWIL model takes into consideration the antecedent soil moisture condition, which is important because water runs off differently if the soil is dry versus saturated. The SWIL model also simulates runoff and baseflow separately, so the loading can be split to help determine how best to treat the loads. The SWIL model uses the updated soil coverage, which has a large impact on runoff. In addition, the model simulates monthly instead of annual loading, so it can include a high frequency data analysis. There were some issue with the model in which it was underestimating the observed flow. This seemed to be related to how the runoff coefficients (ROCs) were developed, and ERD adjusted the ROCs to address this issue. The water quality calibration has not yet been provided. There were some small issues, such as double counting some of the best management practice (BMP) treatment efficiencies, inconsistencies in equations between the model code and report, and the original model took a long time to run. AEI made some modifications to the model and it now takes a day, instead of a week, to run. AEI also added information to the SWIL model to help with future allocation calculations.

In summary, the Department and Brevard County reached a mutual agreement to include the seagrass matrix into the target setting analysis. The Department is not limited to using depth limit to set the target; another matrix can be used if it is more sensitive to nutrients. The Department is open to a multiple lines of evidence approach, but will likely put more weight on the seagrass matrix. The model will quantify as many sources as possible to provide a complete picture of the functional relationship between seagrass and nutrients. The pre-bloom period will be included in the target evaluation, and the bloom period will be evaluated separately. The Department is very pleased with the SWIL model, and all comments raised on the model have been addressed. ERD recently refined the ROC calculation, and this has been included in the model. The water quality calibration is currently underway, and the next meeting will be held in January.

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John Fergus asked if the model and target would be ready before the end of this current five-year BMAP iteration so that the stakeholders can go smoothly into the next iteration with a new TMDL. Xueqing responded that after the January meeting, there will be better information to answer this question. The most important issue is how smoothly and quickly the seagrass matrices can be included into the target refinement.

Virginia noted that Xueqing's presentation was a great summary of the discussions, and this process has become complicated. The first TAD included all the items in the original 2011 scope of work. The information in the original TAD was sufficient for Tampa Bay and Charlotte Harbor, but was not enough for the IRL. Brevard County continued to fund the consultants for the second TAD, which was based on the NNC accepted by the Department and EPA for estuaries in Florida. However, this approach was also not sufficient for IRL. The county is now working on a new scope of work to address the items Xueqing noted in his presentation. When the process first started, the county had frequent meetings with the Department. The new scope of work will include budget for more meetings to coordinate. Virginia stated that the county would like to present the results of incorporating the seagrass matrix into the target setting process to the stakeholders first, so the meeting with the Department may not be held until February. The goal is to determine the simplest model to meet the needs. The consultants will keep adding components until the conceptual model tells the IRL story well. The county recognizes that macroalgae and epiphytes are significant sumps in the system; however, there are limited data on these biota, so it will be difficult to include information into a monthly model over a 15-year period. This is why the county is trying to develop an approach with both the regulatory agencies and scientists.

Mitch Roffer noted that in terms of annual numbers versus seasonal numbers, light attenuation has a different effect in different seasons. Xueqing responded that the SWIL model uses monthly data, and the seagrass data are collected annually. The Department is open to multiple lines of evidence to evaluate datasets with higher frequencies. John Windsor stated that a lot of the events in the IRL are driven by storms and, historically, there are not a lot of storm event water quality data. The water quality data are typically collected monthly or bimonthly and usually about the same time of the month, which does not represent reality. In addition, chlorophyll-*a* is patchy and sampling for chlorophyll at fixed locations often misses realistic measurements of the actual phytoplankton conditions. Xueqing responded that SJRWMD is working on developing the EFDC model, which currently does not include water quality constituents. SJRWMD may work with the Florida Institute of Technology to add water quality information. John asked if the presentation will be posted online. Yesenia responded that the presentation will be posted by next Wednesday.

Update on Credit for New Nutrient Reduction Projects

Yesenia stated that after the May BMAP meeting, the stakeholders gave the Department a list of BMPs for the Department to review. At the July meeting, the Department provided a list of BMPs with nutrient reduction efficiencies, and those that needed more information to determine the efficiency. For those BMPs with efficiencies, the efficiencies are the minimum reductions. If the stakeholders are monitoring a project, they can provide the data to the Department to review to increase the project reduction efficiency. Some of these BMPs already being implemented, such as the biosorption activated media (BAM) project in Ichetucknee; septic tank model in Jacksonville, St. Lucie, and in development for Indian River County; and low impact development (LID) projects in Cocoa Beach. For

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the BMPs without initial efficiencies, the Department is looking for more information from the stakeholders, either literature or monitoring. There is a living shorelines project in the Kings Bay Basin, which Southwest Florida Water Management District (SWFWMD) will monitor. The literature for living shorelines show a benefit for erosion control but nutrient data are needed for the BMAP. The Department determined that there was no BMAP credit for macroalgae harvesting projects because there is concern that without seagrass, macroalgae are the next best habitat. There is also no credit for using natural wetlands as filters; however, restoration and development of wetlands would receive credit. Yesenia noted that after the July meeting, the Department reached out to stakeholders for additional information on the BMPs that currently do not have efficiencies. Stakeholders provided information on plugging artesian wells. The Department also collected information on oyster reefs.

Artesian wells are formed when a well is drilled into a confined aquifer, which contains ground water that is under pressure. The water from the wells sometimes reaches land surface but sometimes it does not. Plugging an artesian well helps to prevent loss of water and, if it has poor water quality, can help prevent contamination. The Department received a study from Satellite Beach that evaluated water quality in four wells in the surficial aquifer and four wells in the Upper Floridan. The study found no measured phosphorus in the Upper Floridan, and the pollutants came from surface runoff. This study is for a small area so the Department is open to more data, which need to include flow and concentration. John Fergus noted that at the last meeting, Mark Dixon (Patrick Air Force Base) mentioned that there is a 16-inch, four million gallons per day (mgd) well at Cape Canaveral. Using the nitrogen values from the Satellite Beach study, this well would release about 1,700 pounds per year of TN. Yesenia asked John to share this information with the Department.

Yesenia stated that the Department also received information from Brevard County on artesian wells, which led to discussions with SJRWMD. SJRWMD provided feedback that plugging artesian wells would help with water quantity and saltwater intrusion; however, there would be limited water quality benefits because of the low nutrient concentrations in the Upper Floridan. SJRWMD has funding this year for the artesian wells plugging program, and they would like to work with stakeholders to identify wells for this program.

Yesenia stated that information was also gathered on oyster reefs. Oysters are filter feeders, and they remove organic material from the water column. This material is absorbed for growth and maintenance, and nutrients are released as pseudo feces. Oysters help with nitrogen removal through sequestration in the shell and tissue. The Department contacted the FDACS Aquaculture Division to gather information about oysters because they are the state agency experts. The Department also reviewed literature on oyster studies from around the country. The benefits of oysters include reducing the potential for eutrophication, increasing water clarity which helps seagrass, providing abundant habitat for other organisms, and providing bottom stabilization and wave attenuation. Achieving significant nutrient reductions would require a high population of oysters, which cannot always be achieved on a large-scale. FDACS agreed with the information in the literature, and also suggested that the shell and tissue be harvested so that nutrients are not returned to the water. It is important to note that a linear relationship between oyster density and nutrient removal cannot be assumed. Oysters put ammonia into the water column, which could help accelerate phytoplankton growth. Therefore, there need to be enough oysters that nitrogen removal exceeds phytoplankton regeneration. In addition, the biogeochemical processes vary from area to area, so the nutrient removal rates will vary. For these reasons, the Department currently does not have enough information to determine a minimum nutrient

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removal benefit for oyster reefs but they would like to work with stakeholders to gather more information.

Tom Hill asked why there is a focus on oysters when clams are the biggest product in the IRL. Yesenia responded that the stakeholders asked about oyster reefs. Some of the studies reviewed included other filter feeders, and the Department use these to evaluate the benefits of clams. Brevard County is currently working with the Brevard Zoo on an oyster project. Bach stated that oysters and clams need different salinities and living conditions. Brevard County and the zoo are testing areas to determine where oysters do well. This is being done through volunteers who are hanging bags of oysters off their docks. Robbyn Spratt added that the county has started three oyster test locations (Port St. John, Scout Island, and the Marsh Harbor area on Merritt Island), which are pilot studies with the University of Florida. The schedule for the pilot studies was accelerated because some of the volunteer gardeners were having a hard time with their oyster bags. Yesenia noted that the Department would like to see the results of these studies, once available. Robbyn stated that the oysters are doing well in the lagoon but not in the canals. There was a rain event in September that killed some of the oysters, either from too much freshwater or something else.

Mitch stated that oyster shells are fairly inert, and oysters need something to grow on. He is unsure why it was recommended to remove the shells. Kevin responded that he raised the same question when he saw this because oyster shells were used in Chesapeake Bay. The Department will further investigate this recommendation. Randy Burden noted that over a long period of time, if the shells continue to be dumped in the lagoon, it will likely be too much. However, this is probably not an issue now. Yesenia stated that FDACS suggested placing any oyster test plots in shellfish-approved waters, and they will have an oyster BMP manual in the future that will provide additional guidelines. Matt Anderson stated that oyster habitat is ephemeral, so it can be there one year but not the next. Oysters are better filter feeders than clams, but location is an important factor for survival.

Update on 2013 Seagrass Mapping

Yesenia stated that the goal of the IRL TMDL is to restore deeper seagrass habitat. The seagrass depth limit target evaluation is done by project zone, using the last four mapping years of data. The evaluation is a two-step process, where Step 1 is the cumulative frequency distribution curve comparison, and Step 2 is the comparison of each assessment year's median to the TMDL median. Three out of the four years' medians must meet or exceed the TMDL median to be compliant. Yesenia noted that the Step 1 evaluation with the 2013 data is in progress.

For Step 2, neither BRL project zone is compliant, but the medians have increased from 2011 to 2013. In the North IRL, neither project zone was compliant but the median is increasing in North B. In the Central IRL, all three project zones are not compliant, although the medians increased from 2011 to 2013. The Department also evaluated the seagrass acreages in each project zone. In BRL, there was a large decrease in acreage after the blooms; however, the acreage increased in both project zones from 2011 to 2013. The acreage in North A slightly decreased in 2013, but there was an increase in acreage in North B. All three Central IRL project zones had a decrease in seagrass acreage after the blooms, but the acreage is increasing. The southern IRL seagrass was not impacted as much by the blooms. Yesenia noted that the Step 1 analysis is in progress to show the long-term trends. This step takes longer to evaluate but the Department should have the results in early January.

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Matt Mitts asked if the seagrass acreages come from the aerial photography. Yesenia responded that the acreages are from the aerial photography, which is usually collected between April and May. The years used in the evaluation are 2007, 2009, 2011, and 2013. Matt asked if this period is the peak growing season for seagrass. Yesenia responded that April and May is the peak growing season. John Windsor noted that the acreage in the Central IRL looks about the same for 2003-2009, so it may help to add bars or limitation on the data in future presentations. It is difficult to see the real changes in the acreage with all the numbers in the table. Bach suggested rounding to more even numbers to help. Tiffany added that graphs could be provided. Yesenia stated that she would add bar graphs to the presentation before posting it to the FTP site. Matt asked if any analysis has been done because it seems like the damage to the seagrass stops near Fort Pierce. Robbyn noted that she has friends who kayak and they are seeing seagrass recovery in areas that went away during algal bloom.

Bill Messersmith asked what these results mean for the stakeholders at the end of the first five-year BMAP period. Beth responded that there are three BMAPs for the IRL, and some included allocations and some did not. Based on the last two years of seagrass data, none of the project zones are compliant with the seagrass depth limit targets; therefore, the stakeholders need to continue to plan for load reductions. For those BMAPs with allocations, the load reductions should continue. For the Central IRL BMAP, which did not have allocations, the Department has started to evaluate the loading and can provide targets based on the PLSM to help with planning. If the stakeholders would prefer to use the new SWIL model, they can wait for that modeling to be completed for numbers. The Department is looking for feedback from the stakeholders on how to proceed.

Bach stated that he thinks Brevard County would prefer to wait until the January/February meeting with the Department to make a decision on how to move forward. Pattie Gertenbach noted that it would be helpful to see the Department's preliminary numbers since the timeline for the SWIL model numbers is unknown. Beth responded that the Department has not completed the target calculations yet but can provide the numbers, once available. The targets will not be ready before January, so it may be best to wait until the January/February modeling meeting and then share the information. Steve Snoberger asked if there is the option to wait for two more years to see if the next mapping year helps part of the Central IRL to meet the target. Beth responded that the stakeholders can wait for project planning; however, it would be better to start planning now in case additional reductions are needed.

Jenni Lamb stated that basing the calculations on PLSM does not make sense because the SWIL model is better. She asked if there is a way to use this model to determine target reductions, once the water quality calibration is completed. Xueqing responded that the SWIL model is closer to reality but it is likely that the results may not be much different from the PLSM results. This will not be known until the final model calibration. Robert Potts noted that the way PLSM included ground water loading resulted in the stakeholders being allocated this portion of the load, which they do not have the ability to reduce. The SWIL model gives more detail on what the responsible loading is versus the loading that cannot be controlled. Xueqing responded that the TN and TP concentrations in the ground water are not significantly different from the runoff. The SWIL model will help to determine the most efficient way to treat the loading depending on whether it is in the ground water or runoff. Bach noted that Brevard County is already using the initial model results to determine projects. In areas where ground water is contributing more loading than surface runoff, they could build smaller facilities to constantly treat the ground water discharge from their stormwater facilities instead of larger projects to treat large storm events. Tiffany noted that this basin has mostly sandy soils, so a lot of the baseflow is runoff going into

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the ground and out to the lagoon. Whether to treat baseflow as part of the stakeholders' responsibility will be a policy decision. It could be that most of the loads in the ground water are controllable.

Mitch asked what mechanisms can be used to make the municipalities come into compliance, since they are not in compliance now. Tiffany responded that the information in the presentation showed that the lagoon is not compliant with the TMDL targets; however, the stakeholders are implementing the activities they committed to in the BMAPs. Beth added that the stakeholders are making reductions by implementing projects at the rate envisioned in the BMAPs. The Department and stakeholders need to start identifying the next phase of reductions. Beth noted that while the Department may estimate reduction targets based on the PLSM, work will not stop on the SWIL model development. As the next BMAP iteration gets closer, the Department and stakeholders will determine which model to use in the next iteration.

David Sinton noted that there were significant impacts from the bloom in the Central A project zone. The stakeholders in this zone need to accept that they will receive allocations in the next BMAP iteration and should start planning for actions and budget. Matt stated that the first five-year cycle ends in 2017. He asked if the new mandates start right after this first iteration ends. Beth responded that the Department and stakeholders will need to start planning for actions to achieve reductions to be prepared for the next BMAP phase. Tiffany added that the next BMAP iteration will outline a schedule for when the reductions need to be completed.

Graham Cox stated that to help with public perception, he recommends coming up with another name for the SWIL model.

Tiffany stated that the Department will notify the stakeholders when the next BMAP meeting is scheduled.

Adjourn

The meeting was adjourned at 12:11 PM.

Action Items

- The Department and Brevard County will continue to coordinate on including the seagrass matrix into the TMDL target setting process. The next meeting to discuss this will be in January or February.
- There will be continued discussions on what numbers to use in the SWIL model to estimate atmospheric deposition. John Windsor will follow up with Xueqing Gao if John has further questions about the atmospheric deposition data.
- There will be continued discussions over the longer term on how to model the algal bloom period, as well as when to incorporate new land use data from that timeframe.
- Yesenia Escribano will post the meeting presentations to the FTP site by Wednesday, December 10th. – *Completed*.
- John Fergus will share his calculations on the TN load from the Cape Canaveral artesian well. Yesenia will follow up with Mark Dixon the nitrogen content in this well.
- The Department will look into the nutrient reduction benefits of clams, in addition to oysters.
- Brevard County will share the results of their oyster pilot studies, once available.

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- The Department will further investigate the recommendation to remove the oyster shells from the lagoon.
- The Department will complete the Step 1 seagrass evaluation in early January.
- Yesenia will add bar graphs to the seagrass presentation before posting it to the FTP site. – *Completed.*
- The Department will finish developing Central IRL targets using the PLSM, and will share the results after the January/February modeling meeting.