

Discussion on Special Projects Credit Guidance
Thursday September 20, 2012
9:30 AM – 12:00 PM
Palm Bay Community Room, 120 Malabar Road SE
Palm Bay, Florida 32907

Attendees

Carolina Alvarez, Brevard County	Bach McClure, Brevard County
Virginia Barker, Brevard County	Ryan Mitchell, E Sciences
Tiffany Busby, Wildwood Consulting	Shailesh Patel, DMC
Matt Culver, Brevard County	Mary Paulic, FDEP
Bob Day, Citizen	Marcy Policastro, Wildwood Consulting
Mark Dixon, Patrick Air Force Base	Ken Poole, Rockledge
Roger Dykes, Cocoa	Allen Potter, Satellite Beach
Gordon England, Stormwater Solutions	Tom Price, Kennedy Space Center
Chris Ferraro, FDEP	Joanie Regan, Cocoa Beach
Mike Godfrey, RMG Associates	Troy Rice, SJRWMD
Lorraine Guise, Titusville	John Royal, Brevard County
David Gunter, IRFWCD	George Simons, Carter Associates
Dianne Hughes, FDEP Southeast District	Michelle Snyder, EcoSense International
Eryln Hupfer, ISC Environmental Assurance	Joel Steward, SJRWMD
Chuck Jacoby, SJRWMD	Dani Straub, Melbourne
Carol Johnson, FDACS	Bob Ulevich, SRID
VJ Karycki, Rockledge	Ed Washburn, Indian Harbour Beach
Art Lorenz, 3E Consultants	Kaylene Wheeler, Palm Bay
Mike McCabe, Palm Bay	Kelly Young, Volusia County

Welcome and Opening Remarks

Tiffany Busby welcomed everyone to the Indian River Lagoon (IRL) Basin Management Action Plans (BMAPs) special projects meeting. This meeting is a follow up to the June discussions. The participants introduced themselves and the entity they represent.

Muck Removal

Mary Paulic stated that the issue with muck in the lagoon is due to excessive nutrients in the muck that flux into the water column, which can lead to algal growth that affects light attenuation, which in turn affects seagrass growth. In addition, muck sediments are not good for seagrass growth. The source of the muck is largely upland soils, which makes land based controls important. This guidance document provides the information necessary for crediting in the basin management action plans (BMAPs); however, the projects will also have to meet permitting requirements. This guidance is specific to the IRL Basin.

The muck removal for BMAP credit is for restoration dredging, which is different from the typical navigation or maintenance dredging. The purpose of this dredging is to remove as much muck as possible in an area, given any structural constraints, to reduce nutrient loading in the lagoon. The guidance is more focused on the lower portions of the tributaries, which are estuarine or marine waters that are open to the IRL. For the purposes of the IRL guidance, muck

is black in color, dominated by clay/silt sized particles, and is at least 5% organic matter. For dredging, the average muck thickness is recommended to be 30 cm because of the limits in technology to remove muck. However, any muck deposit that is 5 cm or greater would be considered for credit, as long as muck is removed to the natural substrate. If a muck deposit is less than 5 cm thick, it will not flux for very long and may not be worth the cost to remove.

Gordon England asked if there is information available about how deep muck accumulates before it starts affecting seagrass growth. Joel Steward responded that seagrass could be found in a variety of sediment types; however, seagrass are not found in deeper muck deposits (six inches to one foot). This has more to do with the location of where muck deposits are found, which is typically in deeper waters or in tributaries/canals where seagrass would not grow. Tiffany added that the concept of the muck removal credit is to remove a nutrient source to the water column, as opposed to creating a habitat source for seagrass. Roger Dykes asked when the navigation channels are cleared, would the agency dredging be required to haul the muck offsite instead of putting it on spoil islands. Mary responded that this guidance is for BMAP credit and it will not become a regulatory requirement. Any requirements for management of the dredge spoil would most likely be handled as part of the permit conditions. Joel added that the U.S. Army Corps of Engineers (USACE) is no longer allowed to create spoil islands. They now use uplands sites as containment areas for disposal.

Tom Price stated that dredging in navigational channels should not be discounted entirely. Most of these channels are cut below grade so when the muck is removed, it is removed to the natural grade. Tiffany responded that this document is setting the guidance for BMAP credit, and if a project meets those guidelines, it can receive credit. Tom noted that the phrase “restoration dredging” seems not to allow navigational dredging so this should be clarified. Roger added that flux is being caused by boats moving up and down the channels, which have more of an effect than wave and wind suspension. Therefore, it is important to address maintenance of channels. Virginia Barker suggested changing the wording to say that the guidance allows for “dredging that provides restoration benefits” so it does not exclude navigational and maintenance dredging.

Shailesh Patel stated that the Florida Inland Navigation District (FIND) has a long-term plan for dredging the Intracoastal Waterway (ICWW), and they have built large-scale disposal facilities in different counties. The dredged material is removed hydraulically. Roger asked if the water is filtered before it is returned to the IRL after dredging. Shailesh responded that FDEP has turbidity standards that have to be met so FIND does clarify the water before returning it to the IRL. Mary stated that she worked with the FDEP Central District office on this guidance and also sent it to the USACE Palm Bay office. Ed Washburn asked who would receive credit for the FIND dredging. Virginia responded that it seems that the credit should reduce the overall reduction requirements. Marcy Policastro added that it would make sense to put the credit toward the overall reductions and then allocate the remaining reductions to the stakeholders.

Bob Ulevich noted that he is concerned about the requirement that muck removal credit is restricted to marine waters, because the Sebastian River Improvement District (SRID) system is located in the uplands and would not be eligible for muck removal credit based on the guidelines. The district conducts a lot of sediment removal activities that are a benefit to the St. Sebastian River downstream, so these activities should be eligible for credit. Mary responded that from her

understanding, the upper freshwater reaches have less probability of discharging to lagoon itself. At a salinity of about 1 part per thousand (ppt), the sediments start to floc, which is where the bigger muck deposits occur. The projects may need to be evaluated on a case-by-case basis to determine if they are eligible for credit. Bob stated that the SRID has major canals that discharge to the St. Sebastian River, which eventually discharges to the IRL. It is better to remove the sediments at their source instead of waiting for them to discharge into the lagoon. Virginia stated that municipal separate storm sewer systems (MS4s) are receiving credit for street sweeping and material removed from best management practices (BMPs) so the process recognizes the benefits of keeping this material out of system. Joel responded that while Bob makes a good point about removing the sediment, this would not be assigned credit under the muck removal guidance. Marcy added that credit for the sediment removal would be calculated using a process similar to the street sweeping and BMP clean out, which are based on weight or volume of material collected and the nutrient content.

Mary stated that in order to receive credit, muck must be removed to the natural substrate because even a small layer of muck can flux. Some areas may not be able to be fully dredged because of structures; however, enough muck must be removed so that the bottom would not be covered again. Credit will be discounted for excessive deposition of muck after dredging. The upstream limit for projects is based on salinity or a structure that prevents discharge to the lagoon. Once dredged, muck must be moved away from surface waters so that the material will not end up back in the waters. The distance for disposal and disposal requirements will be determined through permitting. Upland sites should include vegetative buffers and possibly treatment to prevent nutrient loading back to surface waters. The deposition rate should be measured every five years after a dredging project and reported to FDEP. If there is excessive deposition over 10 years, the project credit will be reduced.

Roger asked if there are good, current muck maps for the IRL. Bob noted that a map was included in the previous version of the guidance document. Joel responded that the map in the previous document just shows the general areas of muck. The St. Johns River Water Management District (SJRWMD) worked with Dr. John Trefry (Florida Institute of Technology) to create more detailed maps of muck deposits. The SJRWMD also used hydroacoustics to map the muck. Both studies seem to underestimate the muck coverage in the lagoon because of the limits on where they could survey. The Kennedy Space Center area was off limits and there may be muck deposits in that area. SJRWMD is in the process of finalizing the muck maps as part of the super bloom investigation. These maps will be posted to the SJRWMD website at some point. Virginia noted that as part of the super bloom investigation, one of the teams was going to evaluate how significant the internal nutrient cycling was to the bloom. Joel responded that this is part of the study, mainly for the North IRL. Information is still being pulled together by SJRWMD staff and then it will be sent for review before it is made available to the public.

Mary stated that the flux rates included in the guidance document are based on studies in the IRL Basin. The stakeholders can undertake their own studies to obtain site-specific flux rates for their project. Credit is based on the net flux rate, which is the difference between the muck flux rate and the natural substrate flux rate. The credit is time limited for up to 10 years. The time limit can be extended for up to five years, with one year for each additional 30 cm of muck removed. Effective upland controls are needed to limit the deposition rate. Credit can be

assigned for projects completed since January 1, 2000. Roger asked what the deposition rate is for the area of the St. Sebastian River that was dredged. Joel responded that this is unknown because SJRWMD does not have the funding for a post-dredge survey.

Joel stated that FDEP asked for his assistance in developing the guidance for the muck survey. The proposed method is a two-phase approach. The first phase would be a relatively inexpensive and quick process to make a determination, and the second phase would be implemented after a decision was made to move forward with muck removal. Phase 1 is a basic physical survey to roughly delineate the muck footprint for the proposed dredged area. This phase should not require a lot of time or money but will help to determine if the project will qualify for BMAP credit. A preliminary estimate of credit can be made to use in a cost/benefit analysis to determine if the project is financially feasible. The final BMAP credit determination will be made after the Phase 2 survey.

The muck removal credit guidance currently focuses on the estuarine reaches of streams and canals that are open to the lagoon; the lagoon proper is not yet included in the guidance. Therefore, most of the dredging will occur in linear or quasi-rectangular features. This phase of the survey will delineate and calculate the muck area, the average muck thickness, and the volume of muck. The volume of muck will be used to help the stakeholder determine the cost of the project. The measurement of muck thickness and verification of muck area can be conducted using a rod or probe. In addition, sediment cores and grab samples should be collected and archived. The probe measurements should be taken at three points along transects at equidistant points. Each transect should be placed at $1/5^{\text{th}}$ of the length of the linear feature for a total of six transects. One grab sample per transect and one intact core sample from the top of the muck to the natural substrate per linear feature should also be collected. This guidance is adaptable so there may be situations where six transects are too many.

The grab samples would be analyzed by a laboratory to test the sediment color and grain size to verify that the material is muck. Joel noted that he did not include an organic analysis of the material because this is more costly to analyze. If the material meets the color and grain size definition of muck then it should include organic material. When it is time to dredge, the contractor will need to know the amount of organic material for storage so the organic analysis will occur at that time. Before any fieldwork is conducted, the plan should be submitted to FDEP for approval. After the work is completed, a Phase 1 report should be submitted to FDEP including a map of the area, report on the findings, copy of the raw data, and copy of the laboratory data report and certifications.

Phase 2 of the survey will be conducted if the stakeholder decides to dredge. For this phase, the entity will want to hire a qualified contractor and the contractor will develop the surveys necessary to complete the permitting and project. Mary noted that the muck project credit guidance document includes examples of different types of technology that can be used for the Phase 1 survey. Joel responded that those are good examples and the process should be simple. Graduated metal rods could be used, or a PVC pipe can be used to determine the water depth and then a metal rod could measure the depth to the natural substrate. The depth of the muck would then be the difference between the two measurements. Tools that are more sophisticated will be needed for the Phase 2 survey.

Ken Poole noted that this guidance seems to pertain only to jurisdictions that have creeks, and entities like Rockledge with drainage canals could not receive credit for dredging. Joel responded that the guidance is currently focused on tributaries and canals that are open to the IRL. Ken stated that they remove the vegetation and muck from their canals every two years so it is not allowed to build up to the one foot required for receiving credit. Joel responded that the one foot depth is meant to be an operational guidance; however, there can be as little as 5 cm of muck in an area that can be dredged for credit. The dredging would have to occur in canals that are open to the lagoon system, such as the Satellite Beach canal system. Bob stated that he does not believe there is a control structure on the St. Sebastian River so this system should be open all the way to the lagoon. Mary responded that if this area is tidal, it could be that it meets the salinity requirements for dredging credit.

Tom suggested that if the Phase 1 survey is supposed to be simple, the coring should be removed as a requirement. In some places, muck is really deep so it will be very difficult to obtain a top to bottom core. Joel responded that the core is used to demonstrate that the material is muck, and he can show how to collect a core if assistance is needed. Bob Day asked what group in FDEP (regulatory, laboratory, or BMAP) would review the project. Mary responded that in order to receive BMAP credit, someone within FDEP's Bureau of Watershed Restoration would have to review the project, primarily Basin Coordinator staff. In order to receive a permit, someone from the regulatory group would need to review the project. Chris Ferraro added that the Phase 1 survey is more of a BMAP issue to determine if muck is present and eligible for credit. The Phase 2 survey would involve the permitting group to determine the requirements for removing the muck.

Ed asked how credit would be determined for past projects because it will be difficult to recreate the information that Joel outlined from the surveys. Mary responded that she is unsure if some of this information would have been collected as part of the project permitting. Marcy added that information on the content of the material to show it was muck, area dredged, and current deposition rate would be needed for credit. Mary stated that she will check with Environmental Resource Permit (ERP) staff about the information that goes in a permit and also try to review an example permit to determine what information may be available for past projects. Ed noted that credit is only assigned for up to 10 years and most canals fill up with muck again in 13-14 years, so it may not be worth dredging for credit. Joel responded that if the canal is dredged again, the entity would keep the credit. The purpose of this project is to manage the loading. Mary asked if most of the muck is from uplands or from the canal banks degrading. Ed responded that most of the loading is from upland sources that include a lot of fertilizer. Bob Ulevich added that a lot of the older areas have dirt banks so the slope breaks down and also becomes an issue.

Roger noted that some of the ditches have sediment build up that can wash out in a big storm, causing deposits at the outfalls. While these areas are fresh water, it is better to remove the deposits at the outfalls than it is to allow the deposits to flow into the lagoon. He asked if FDEP staff could look at the Cocoa outfalls to determine if muck removal in these areas would be eligible for credit. Mary responded that she could look at these ditches because some are probably more the size of a canal. Mary will set up field visits with SRID, Rockledge, Cocoa, Titusville, and Brevard County to evaluate project options.

Matt Culver asked if anyone has talked with the agencies about permitting these projects. Some of the canals in Brevard County are very deep and they are only allowed to dredge five feet, which would not receive credit since this would not be to the natural substrate. In addition, a lot of funding is available for up to five feet of dredging, and not more than that. Mary responded that FDEP would work with the permitting agencies to let them know that it is beneficial to dredge deeper for environmental reasons, and this has been done for past projects.

Mary stated that FDEP is planning on holding a sediment and erosion control workshop. The stakeholders provided feedback topics they were interested in, Mary stated that FDEP might also want places in the basin with sediment and erosion control issues to be mapped with Google Earth or Google Maps. The proposed format for the workshop would be a 1.5-day standard training course with 45-50 people in attendance. This would be followed by a one-day field workshop focused on erosion control measures. Potentially two workshops would be held in: (1) Titusville, and (2) Palm Bay or Vero Beach. The workshops would be held in mid-November or early December. Ken asked if this workshop would be eligible for education credits for certifications. Mary responded that the participants in the 1.5-day standard workshop would receive education credits. Roger asked if people could attend the one-day field visit without attending the 1.5-day class. Mary responded that as long as the person has completed the basic course in the past, they could attend the field day.

Aquatic Vegetation Harvesting

Mary stated that the aquatic vegetation harvesting credit guidance is preliminary, like the muck guidance, and new information was added on sampling. The focus of this guidance is mostly on invasive exotics. Aquatic plants take up nutrients but if they are left in place, they will die and decompose, releasing the nutrients back into the waterbody. Harvesting the plants removes the nutrients from the waterbody. Credit will be assigned for harvesting freshwater plants that live within the water column or on the water surface. The guidance currently does not include algae. The focus for harvesting is on green, flowering plants such as water lettuce, water hyacinth, and hydrilla. Aquatic plants are largely water (about 90-95%) so credit for removal will be based on the dry weight of the plant material and the associated nutrient content. The nutrient content has a lot of variability because of the factors that affect plant growth including light and water clarity, season, nutrient availability in the water column, sediment content, organic matter, and location in the waterbody. In addition, luxury uptake of nutrients for storage, age of the plant, and concentrations in various plant parts play a role.

The credit for aquatic vegetation harvesting will be based on the types of plants present, abundance of each plant, mass of the wet plant material that is removed, percent dry matter calculated in a laboratory, and the total nitrogen (TN) and total phosphorus (TP) content determined by a laboratory on a dry weight basis. Mary stated that the traditional methods for surveying plants include transects to measure along a line and quadrats to measure a set area. For streams and canals, the first step would be to walk the stream or canal to determine what plants are present and if there is any plant zonation by location. If there is plant zonation, the percent cover can be estimated by using the distance of the canal or stream that is covered by that plant. For mixed plants, a 100 meter length transect should be measured with surveys conducted every 10 meters. This could be done using a one-square meter quadrat to estimate the percent

coverage of each plant. Marks could be added on the quadrat to create a grid to help with measurements. A sample of the plant material should be collected at each 10-meter mark for laboratory analysis. The survey method could also be used after the plants are removed and have been spread out on the ground.

David Gunter stated that the way he measures the plant material was to put a boom across the canal to collect the plants in an area. The plant mass was then measured and the acreage calculated. The weight of the material was determined after the water ran off the plants. Samples of the plant material were taken to a laboratory for weighing and drying. The plants do not have very high nutrient contents, but when this concentration is multiplied by the volume of plant material removed, the credit does add up. Mary noted that she has information on laboratories for plant analysis to share with David. Carol Johnson noted that the Institute of Food and Agricultural Sciences (IFAS) should have tissue sampling laboratories. Mary responded that they do but they do not take typically take samples outside of research projects. Gordon England stated that Columbia Laboratories (Jacksonville) charges \$85 for three plant samples. There is also the HBEL, Inc. laboratory in Palm City (near Stuart) that does analytical testing of tissue samples.

Mark Dixon stated that he is working with Steve Beeman (Beemats) on a plant harvesting study at Patrick Air Force Base, and sorting the plant material takes a lot of time. It would be better to come up with an average credit for plant harvesting, by averaging the nutrient content of all the plant types. This would help to save time and money. Mary responded that once initial measurements for nutrient concentrations in different plants have been determined, FDEP could look at the option of using an average TN and TP concentration. Separate nutrient concentrations may need to be determined by subbasin (Banana River Lagoon, North IRL, and Central IRL) depending on the variability in nutrient content across the IRL Basin. Virginia suggested that the concentrations could also be divided into categories such as plants that are floating, plants that grow in sediments, and plants in a managed system.

Ken asked if a formula could also be provided to assign credits based on the cubic yards of material collected, for those entities that do not have a scale. Mark stated that in his project with Steve Beeman, they are finding that about 30,000 cubic yards of material equals about 26,000 pounds. Mary stated that there are several considerations for weighing the material including waiting for the water to run off the plants, crushing the plant will result in a loss of water weight, and removing sediment and debris from roots. Mark stated that the sediment should be kept in the equation for credit because it is a nutrient source that is removed. Mary responded that she will consider assigning credit for the sediment on the roots but the material needs to be clean before going to a laboratory.

Mary stated that in order to obtain the weight of the plants, a sample of the material should be placed into a watertight container with a known weight and volume, and the weight measured. The material should then be placed into a container that allows water to drain out, and this should be weighed until the weight stabilizes. Once stabilized, this is the weight of the wet plant material and a sample should be sent to a laboratory for analysis. The nutrient content of the material will need to be determined through local sampling to create an IRL database because the literature values are very variable. The amount of credit is determined by multiplying the mass

of the wet material by the percent of dry matter by the TN or TP concentration or by the percent of TN or TP on a dry weight basis.

Mary stated that credit will be assigned for aquatic plant harvesting where plant removal is not part of a permit or contained within another BMP as part of regular maintenance. Mark ask why it matters if plant removal is part of maintenance because the uptake of nutrients by the plants would increase the efficiency of the BMP. Gordon added that in wet ponds, vegetation removal is an enhancement of the pond efficiency beyond what was calculated by Harvey Harper. Mark noted that they are currently spraying the vegetation in the pond so removing the material would be better. Mike McCabe asked if removal of vegetation from roadside swales and ditches could be included for credit since they are proactively removing these plants before they reach larger canals. Mary responded that she believes vegetation removal is part of the maintenance needed to keep the swales functional; however, she will find out what maintenance activities are included in the BMP efficiencies to determine if additional credit can be assigned for vegetation harvesting. Virginia noted that it would be better to have separate credits for the BMP and maintenance, instead of a combined credit, to help incentivize maintenance.

Mary stated that the distance of plant disposal from the waterbody will affect credit. Credit will not be assigned for disposal on the canal bank because the nutrients will go back into the waterbody. The plant material should be disposed of away from a waterbody and buffers could be added to help remove nutrients. If disposal occurs on site, the material should be stored about 100 feet away from the waterbody. Spreading the plant material will help with decomposition. Mark noted that Steve Beeman has found that duckweed is high in phosphorus so it can be used as a fertilizer. Mary responded that she asked IFAS if the plant material could be used as compost and they cautioned her against using plant material from agricultural areas because the plants can take up metals, especially copper. Also, plants from animal operations and septic tank areas are not recommended for compost because of pathogens that could attach to the plant roots.

Public Comments and Wrap Up

Virginia stated that she spoke with Joel and Shailesh about the potential for capping very deep muck deposits to stop nutrient flux. This would allow dredging a canal or stream to the navigable depth and then capping the remaining muck to receive BMAP credit. Virginia stated that she spent the last two days with the USACE Coastal Engineering Board and she requested that when they dredge the ICWW that they try to separate the material and use some of it for muck capping. Capping could also be a good option for bringing the lagoon bottom grade up to a level that would be suitable for seagrass or oysters.

Mark stated that he has done vegetation sampling recently as part of the project with Steve Beeman and Harvey Harper. He requested that FDEP provide the necessary protocols for sampling so that this information can be used by others in the basin. Mary provided the draft protocols and they are using these to sample the plants harvested from the Air Force Base's golf course and canals.

Adjourn

The meeting was adjourned at 12:01 PM.

Action Items

- Mary Paulic will notify the FIND about the muck removal guidance being issued.
- FDEP will revise the muck guidance to clarify that navigational and maintenance dredging can count for credit if the projects meet the guidelines for credit.
- Mary will review an example permit (the application and the permit itself) to determine what information may be available for past dredging projects.
- Mary will set up field visits with SRID, Rockledge, Cocoa, Titusville, and Brevard County to evaluate muck removal project options and what types of areas are eligible (canals, large ditches, etc.).
- Mary will follow up with David Gunter with laboratory information for plant material analysis.
- FDEP will consider using an average TN and TP concentration for plant harvesting credit, regardless of plant type.
- FDEP will consider assigning credit for the sediment on plant roots that is removed as part of the aquatic vegetation harvesting.
- Mary will find out what maintenance activities are included in the BMP efficiencies to determine if additional credit can be assigned for vegetation harvesting.