FLORIDA KEYS NATIONAL MARINE SANCTUARY
Water Quality Protection Program Steering Committee
September 30, 2015
City Hall, Key Colony Beach, FL
DRAFT MINUTES

Steering Committee Members Present
Jennifer Derby, EPA Region IV (Co-Chair)
Jon Iglehart, FDEP (Co-Chair)
Sandy Walters, SWC, Inc. citizen representative maritime interests of the Florida Keys
Chris Bergh, The Nature Conservancy, Vice-Chair of Sanctuary Advisory Council
Gil McRae, FWC Fish and Wildlife Research Institute
George Neugent, Monroe County Board of County Commissioners
Julie Cheon, Florida Keys Aqueduct Authority
Sean Morton, NOAA Florida Keys National Marine Sanctuary
Bill Brookman, Florida Department of Health
Rod Braun, South Florida Water Management District
Shelly Krueger, Florida Sea Grant/Monroe County Extension
Chris Kavanagh, NPS, Everglades

Commented [ND1]: Everglades representative? Christopher Kavanagh was there, but not sitting at the table. I believe that he spoke to you about getting on the list…Don't know if we should include him or not in this list.

Management Committee Members Present
George Garrett, City of Marathon
Gus Rios, Florida Department of Environmental Protection
Steve Blackburn, EPA Region IV
John Hunt, FWC Fish and Wildlife Research Institute

I. Call Meeting to Order (Chair, Jennifer Derby)
Opening Remarks, Jennifer Derby, EPA
Co-Chair Jennifer Derby welcomed everyone to the meeting. She recognized and thanked the mayor of the City of Key Colony Beach for use of their facility. She also thanked Steve Blackburn for meeting and agenda preparation and Nancy Diersing for assisting with meeting logistics and preparing the minutes.

After reviewing the meeting agenda, Co-Chair Derby made the following announcements:

- The budget and Technical Advisory Committee (TAC) discussions would be moved up on the meeting agenda.
- Dr. Chris Kelble is not able to give his presentation on water quality monitoring this afternoon.
- EPA's Water Division (Atlanta) is very supportive of the WQPP and will be funding three new WQPP projects. FWC will be receiving funds to conduct a sponge restoration project; Monroe County received a grant to look at alternative technologies for canal remediation and identifying potential funding sources for canal restoration. Florida Keys Water Watch will also be receiving EPA funds.
- Co-Chair Derby and Steve Blackburn will be briefing the Water Division Director about the status of programs in October. Steve will be participating in the Coral Reef Task Force meeting and presenting about the work of this committee. Please get with Steve if

you have any particular issues of success or concern that you wish to part of the presentation, please send that information to Steve. Steve will send a follow-up reminder.
- A proposal has been made to add Shelly Krueger as a new member of the WQPP steering committee. The committee will take a vote on this later today.

Motion (passed)
Jon Iglehart made a motion to vote on membership regarding Shelly Krueger, Florida Sea Grant/Monroe County Extension, and to receive an update from Steve Blackburn on the EPA budget and to hold a discussion on the revitalization of the TAC, including how it would be formed and interact with the existing committees. The motion was seconded by Chris Bergh.

Discussion (steering committee members)
The by-laws of the WQPP specify certain seats and allow for the addition of new seats. Some seats are not being used and that can affect the voting. Motion passed with no objections.

Motion (passed)
A motion was made by Sandy Walters to approve the minutes from the March 2015 meeting. The motion was seconded by George Neugent and passed with no objections.

II. Update on Wastewater Projects in Monroe County
Ms. Tina LaSocco provided a presentation updating the wastewater connection report for Monroe County and the municipalities. To view this presentation, visit http://ocean.floridamarine.org/FKNMS_WQPP/pages/wqpp.html. Several new areas in Long Key (outside of Layton) and on Cudjoe have been added to the connection report. No Name, Big Torch and Middle Torch are considered together and are separated from the Cudjoe Regional, which is already underway. In terms of compliance, they have started in Key Largo and Big Coppitt. The number of residents coming into compliance has been good so far. Often, people are complying after they receive a friendly reminder from Codes Compliance to do so.

Ms. Julie Cheon gave a brief update on the FKAA wastewater projects. As part of a litigation agreement, FKAA agreed not to use more than 50% of the capacity of the current shallow well system until the deepwell is installed and operational. Cudjoe Key Regional Plant is ready as soon as they have permission to begin operations. Upper Sugarloaf is ready to begin operations followed by Summerland Key and Lower Sugarloaf.

Note: If someone chooses not to connect while under mandate to do so, FKAA would notify codes compliance that the residence is not hooked up. If a codes case has been opened because the property is not in compliance, research on the property related to sale of the property would reveal the codes case.

III. Real Potential Threats That a Wastewater System Failure Could Have Without Effective Monitoring and Maintenance
Ms. Sandy Walters gave a presentation, R*eal Potential Threats from Wastewater System Failure: Need for Proactive Monitoring and Maintenance Now!* To view this presentation, visit http://ocean.floridamarine.org/FKNMS_WQPP/pages/wqpp.html. Ms. Waters explained that FDEP has a hotline for wastewater incidents and receives on the average two notifications per

day. About two-thirds of the spills are under 10,000 gallons. Recent examples of spills of untreated wastewater across the state were given. Raw sewage can have up to 100,000,000 colonies of coliform bacteria per 100 milliliters. Even new systems can have breaks and leaks. Ms. Walters indicated that there are potential threats from the systems that have been put in place in the Keys and that steps can be taken to minimize the chance of having an accident that affects the environment.

IV. Asset Management Programs to Support Sustainable Infrastructure
Ms. Walters introduced her colleague, Mike Condran, who provided a program, *Asset Management Programs to Support Sustainable Infrastructure*. To view Mr. Condran's presentation, visit http://ocean.floridamarine.org/FKNMS_WQPP/pages/wqpp.html. Mr. Condran, GHD, explained that wastewater infrastructure is expensive to operate and maintain over time. Proper management of these assets minimizes costs and involves planning for the future, including estimating funding needs for aging infrastructure. GHD engineering helps companies and municipalities conduct asset management planning. Characteristics of good asset management are that the system is multi-disciplinary, systematic, sustainable, systems-oriented and integrated. The presentation reviewed the asset management life cycle, provided five core questions related to asset management and identified the 10 steps needed to build an asset management plan, which includes budget and financial planning.

Discussion (on Sandy Walters and Mike Condran's presentations)
Jon Iglehart noted that FDEP is the wastewater regulator for Florida. The database for FDEP includes both treated and untreated sewage. Over half of the spills reported through the FDEP hotline are of treated sewage. For every spill that occurs, FDEP has a meeting with the facility to ascertain what the asset management plan is and identify the steps being taken to minimize spills in the future.

Julie Cheon added that the FKAA has a 5 year capital improvement plan and 30 outlook year plans. She doesn't expect any issues with the wastewater system because it is so well-monitored. Walt Schwartz, a contract engineer on wastewater projects, added that every feature of the wastewater system has a GIS attribute so that they know where it is located and when it was installed. They have built-in monitoring to detect leaks, etc. and the system is fully tested. The highest pressure in the system is 70 psi, so they are operating under the maximum pressure. Right now, there are vacuum, low pressure and gravity systems in place. The transmission main is the largest pipe and has the most flow. Other pipes are relatively small and have smaller flows. A plan is in place in case there is a break in the system. Wastewater pipes in the lower Keys do cross bridges. The only bridge that was directionally drilled is Nile's Channel.

Ms. Walters would like to see this kind of discussion take place on a regular basis and to engage the other utilities in discussions as to how breaks, etc. will be handled should they occur.

George Garrett commented about the operations of these wastewater plants. The private property side of these issues can be a challenge to deal with. The Marathon wastewater system is closed and tight, but during high rains and tides the system takes on water. At the time the system in Marathon was being built, testing of the community's system that was to be connected was not required before hooking up to the main system. Some of these untested systems may

have allowed leaks to enter the larger system. Ordinances that mandate the testing of older systems can help address this issue. Key Largo Wastewater Treatment District has done a good job passing an ordinance to address this kind of thing.

V. FY15 EPA funded projects/FY16 Funding Status/ TAC committee

Mr. Steve Blackburn gave an update on the EPA funding for FY16. To view this presentation, visit http://ocean.floridamarine.org/FKNMS_WQPP/pages/wqpp.html. In 2015, EPA received 293k used to fund three special studies: sponge community restoration, Florida Keys Water Watch, and Monroe County Canal Improvement. The sponge project received private funds totaling about 200k.

Co-Chair Derby recognized and thanked Steve for his hard work in setting priorities for special studies and following through with the funding process. Mr. Blackburn reviewed the public law, the Florida Keys National Marine Sanctuary and Protection Act, which calls for the Water Quality Protection Program and identifies its charges. The presentation included a summary of proposed funding for EPA geographic programs in FY16, which calls for an overall increase for EPA above FY15, but that increase will not go toward South Florida. South Florida is one of the only EPA geographic areas that is losing funding and may lose about 364k in FY16. This means that funds for special studies may not be available in the next fiscal year. In addition to the WQPP, the South Florida Geographic Initiative funding goes to support other things such as development of TMDLs, Everglades studies and the Southeast Florida Coral Reef Initiative.

Discussion

During the discussion the following points were made:

- Identifying funding needs is not the same as lobbying for funding, which many employees are not allowed to do.
- EPA has taken a number of steps to keep the budget needs in front of decision-makers in the agency, including bringing them to meetings to see the work being done under the WQPP.
- To be more effective in receiving funds, the program may need to be more specific about their exact needs and those needs and a budget can be articulated in a plan.
- The EPA and NOAA budget processes are different. NOAA submits budget requests well in advance and that request is processed at the next higher level. NOAA is now working on the FY18 budget.
- The comprehensive system-wide plan for the Great Lakes probably helped that program garner funding.
- The WQPP has the five areas that it is charged with addressing and these could be captured in a strategic plan that articulates funding.
- The last water quality plan was the 1998 action plan and the more recent update to Congress.
- There may be a need for a plan that can be used within EPA.
- Large amounts of federal funding are going toward Everglades restoration and that might play into how much money EPA invests in South Florida. This idea should be considered when approaching this topic of funding needs. In the early days of Everglades restoration,

the connection between the Keys and restoration was made, but has been lost somewhat since then.

- Since Bill Kruczynski retired from his position as the program liaison, a point of contact for the WQPP has not been living in the geographic area of the program. This decision was made at the EPA regional level.
- The intent of the act that called for the WQPP was to have a geographic presence.
- EPA does have some employees in South Florida working on other programs.
- The steering committee should consider developing a 5-year strategic plan that could be adopted by the committee and other people could support, too. It could be a South Florida plan that would address monitoring, restoration, canals, etc. and other activities called for in the legislation. It shouldn't require a great deal of time to develop and can be updated regularly.
- EPA has some strategic plans in place and has "measures" for South Florida that are reported to EPA. EPA also has a National Water Policy Guidance plan that captures some of this program in a broad way. It's conceivable that EPA could work on something like a strategic plan for the WQPP.

VI. Public Comment

Mr. Terry Peters, President, Treasure Harbor Homeowners Association

Mr. Peters explained that he lives on Treasure Harbor canal in Islamorada. His homeowners association is the first one in the area to get funding for a project to restore water quality. In 2005, he got three aerators installed in the harbor to help improve water quality using funds he raised from homeowners. The three aerators weren't enough to quite to the job. More recently, he worked with Susan Sprunt and Rhonda Haag in getting Vertex, also known as Aquatic Systems, to install 6 aerators installed and an air curtain. It has been about a year in November since the installation and the homeowners consider it to be very effective. They also put a weed curtain at the entrance. This is not a perfect system and water quality is being tested. Vertex found improvements in dissolved oxygen. Some seagrass still gets through under some conditions. Vertex is still working on tweaking the system to make improvements. He has seen major improvements in water clarity and fish life and he considers it to be a successful project.

Mr. Peters thinks it has been about an 80% improvement in water clarity and dissolved oxygen. He is happy to share his knowledge with anyone and invites people to come and see the results. He is happy to give a personal tour of their system. The system is being maintained by Vertex for two years, which is being paid for by Islamorada. The residents are paying the electric bill of $500 per month, spread across about 40 residents. The newer pumps are much quieter than the 2005 pumps and they generally last about 4-5 years. The homeowners will be doubling their homeowners fees to help pay for the system over time. There is clearly an improvement in property desirability with having more fish and nicer water quality. This neighborhood is already on sewer and most residences are hooked up.

VII. Canal Restoration Advisory Subcommittee

Rhonda Haag and Wendy Blondin provided a slide presentation, *Canal Restoration Demonstration Project Update*. To view this presentation, visit http://ocean.floridamarine.org/FKNMS_WQPP/pages/wqpp.html.

Monroe County demonstration projects involve testing weed barriers, organic removal, culvert installation, backfilling and pumping for effectiveness. The pumping project has not been approved yet.

The backfilling project in Key Largo was very successful. A 35-foot deep canal was backfilled using 900 truck loads of fill. A barge was used to spread the fill and turbidity barriers were placed to contain the turbidity, which took several weeks to dissipate. The dissolved oxygen impairment has been corrected. A layer of sand was added on top of the fill to encourage seagrass growth. Homeowners are very pleased with the results as evidence by the comments provided. To restore a canal on Big Pine Keys, organic material was removed using a hydraulic vacuum dredge. This project costs 1.2 million dollars and removed about five feet of muck from the canal bottom. They set up a dewatering system nearby used as the muck was removed. The final dewatered material was a beautiful organic material. Fourteen dumpsters of trash were removed from the canal bottom, which slowed down the removal process.

In August as part of the EPA public outreach for canal restoration, three tours were conducted at the Big Pine Key canal to educate people about the organic removal project. Organic removal will also be taking place in another canal on Big Pine Key and is expected to be completed by January 2016. Air curtains are planned for two canals in Big Pine Key. A culvert was installed in a canal on Geiger Key using FDEP and Monroe County funding to improve dissolved oxygen conditions. The culvert did improve dissolved oxygen but was closed because the neighbors claimed that it trapped additional seaweed. After the culvert was closed, seaweed accumulation was monitored and was found to be the same or worse as when the culvert was open. The pumping demonstration project, which is slated for Eden Pines, Big Pine Key, has several issues. The homeowners did not return a high enough percentage of approval letters and have no mechanism for funding the O & M costs after two years. Since many new owners have moved into the neighborhood in recent times, it was suggested that they resend the letters.

Permits are required for these projects from several agencies. At this time, they do not have the necessary regional general permit from US Fish and Wildlife Service for Threatened and Endangered Species within Key Deer Refuge for the air curtain in canal #266 and the Protected Resources Division (NOAA Fisheries) review for the weed barrier fence feature. Impacts to red mangrove trees have slowed the issuance of the permit for the culverts on two canals. Without an expedited review, this process could take 6 months to one year. When canal restoration began, WQPP steering committee drafted a letter to request designated staff in each agency. Over time, though, changeovers in staff have taken place. Developing a programmatic biological opinion for all canal water quality improvement projects is also recommended and would expedite restoration.

Ms. Haag explained that the county still hasn't figured out how they are going to fund the long term construction, operations and maintenance of the canal restoration project. She thanked FDEP and EPA for their letters to the county explaining what would happen if they did not continue with the canal restoration program—that the county faces the potential of being placed under the TMDL program if they didn't voluntarily agree to address the canal restoration issue. As they move forward, the selection process for prioritizing and funding of future restoration needs to be reevaluated. The Monroe County Board of County Commissioners is scheduled to

discuss programmatic plan for future canal restorations in January 13, 2016 (tentative). Three hundred canals out of the 500 do not meet state water quality standards.

Discussion
The following points were made during the discussion:

- The letters that were originally sent requesting dedicated permit staff can be resent to Roy Crabtree at NOAA Fisheries.
- NOAA is in the process of adding staff to address the Protected Resource Division (PRD) backlog, so that will help expedite things in the future.
- The steering committee might benefit from having a NOAA Fisheries representative who is knowledgeable on canal restoration projects.
- Instead of having a fisheries representative, it would be more effective and timely to travel to St. Petersburg and give a presentation to the PRD staff. This idea received support.
- Grant money is in danger of being lost in some cases because of delays in permits.
- A huge amount of effort went into keeping Monroe County from mandated TMDLs.
- Commissioner Neugent thanked his colleagues in the county for putting forth funding for canal restoration, a program that has been very well received. He added that not all of his commissioners feel the same way because these are expensive proposal to deal with impairments in canals. It will take the residents speaking up to say how much they support these projects and that the county should continue as long as they can-- searching for outside funding and funding these with infrastructure sales tax dollars to correct these problems created in the 1950s and 1960s. Everyone here recognizes the good things this effort does and it has been a cooperative effort at all levels of government. NOAA, FDEP, EPA, the county and others have worked together to keep things going on this project. It was a challenge to obtain the last appropriation from the county, which was 2 million additional dollars. Success is imperative. For all the folks who feel that funding restoration is the right thing, if there is an opportunity to address this issue with other commissioners, please support continued funding. Commissioner Neugent stated that he takes a great deal of pride in these projects and thanked people for helping to keep things moving forward. He also made a request for input from people on the expenditure plan for the RESTORE funds, which is currently being developed in order to secure funds for Monroe County. Environmental and water quality projects will be addressed in the request.

George Garrett requested that the municipalities be involved in the BOCC workshop in January. They are also part of the restoration process.

VIII. Canal Monitoring Results (Henry Briceño)
Dr. Briceño provided a presentation, *Water Quality Monitoring Project for the Florida Keys National Marine Sanctuary*. To view this presentation, visit http://ocean.floridamarine.org/FKNMS_WQPP/pages/wqpp.html. Dr. Briceño presented the results for the EPA WQPP Water Quality Targets for 2014. The past three years, the Dissolved Inorganic Nitrogen (DIN) levels have been high, based on the indicator for all stations. Total phosphorus had been high in the past for all stations. An update on the canal monitoring related to the restoration techniques was also provided. As part of the canal assessment, they created

profiles of each canal's physical chemical properties, including taking diel measurements. Data collected on nearby canals shows that they are very similar to one another and that seasonal variability is important to consider. For the culvert on Geiger canal, they took measurements before and after the culvert installation and then again after the culvert was closed (due to the perception about seaweed retention). Compared to when the canal was closed, turbidity was lower and dissolved oxygen was higher when the culvert was open. Dr. Briceño will send out an annual report on the canal monitoring next week. Dissolved oxygen exceedances increased to nearly 100% after the culvert was closed. Nutrients are slow to change compared to dissolved oxygen and so far they haven't seen changes in nutrient conditions in the canals.

IX. Bioremediation as Effective Canal Restoration Technology

Mr. Brett Corwin, Biovation Environmental Services, LLC, gave a presentation on bioremediation methods that could be used in canals in the Florida Keys to improve water quality. The company has been in business since 1999 doing microbial remediation of soil and water. They offer an alternative to canal restoration program for water quality. Their system can be installed without any hard construction and is moveable in place. On a 1,000 foot canal, 6 pumps and a control system can implement quite a bit of oxygen (22 million feet of cubic air) in the column of water. In this technology, the water is inoculated with microbes that consume the decaying organic matter. Mr. Corwin introduced his colleague Dr. Randy Parkinson. Bioremediation is a proven technology used in surface waters in fresh and saline environments. They propose a two-phased approach that will turn over the water column three times per month and will inject 22 million cubic feet of air into the water column and will discharge microbes into the water column. Micro-bio mixtures will be tuned to the chemistry of the water column to enhance decay. Dr. Parkinson strongly encourages the committee to consider these as demonstration projects. The costs are competitive compared to ongoing approaches. The installation can be tuned to determine how many and when to run pumps since energy costs are a concern. To determine the success of the system, they recommend that a monitoring program with the same parameters being used in current monitoring efforts by FIU be implemented. They believe that this technology is a tried and true and has tremendous application in Monroe County. In a typical 1,000 foot canal, there would be 6 submersible pumps, not visible from the surface. The pumps can be directed to create a constant re-circulatory system throughout the canal to increase dissolved oxygen levels. Two pumps can be left in place permanently to keep circulation going. The microbes would be natural ones; the same ones used in shrimp farming ponds. Initially, inoculation with microbes will be needed two times to reduce the freeborn organics by 75% over a 6 month period. Microbes are approved by EPA and for food purposes. The technology may be adapted for use in harbors, too.

X. Engineered Filter Feeder Habitats and circulation systems

Mr. Barry Wray gave a presentation, *Indigenous Filter Feeder Habitat Systems Remediate & Maintain Canal Water Quality*. To view this presentation, visit http://ocean.floridamarine.org/FKNMS_WQPP/pages/wqpp.html. Mr. Wray is introduced his colleague on this project, Dr. Patrick Rice, Marine Science professor at Florida Keys Community College. He explained that this project is a joint effort with the Florida Keys Community College that involves using engineered filter-feeding habitats to improve water quality. They have worked with this technology here and elsewhere and found it to be very effective and inexpensive.

Canals do not have the natural conditions that promote a healthy ecosystem and are subject to pollution input from effluents, fertilizers, etc. Many of them are hyper-deep and the circulation and dissolved oxygen levels are greatly reduced in them. Stormwater remediation is expected to be very expensive in the Keys and requires land space. If the canals are considered a collection location, aeration pumps and these engineered habitats can be installed to clean that water much the same as a stormwater collection system would. The habitats can be engineered specifically to grow the filter-feeders needed for that site. When placed in the canal water, filter-feeders begin to filter the water, cleaning it up over time. When the the biomass accumulates on the habitat, i.e. the organisms begin to overgrow the habitat, the structure can be removed and replaced with a clean one. The habitat basically simulates the mangrove environment on a small scale and is relatively inexpensive to implement. Pumps work to increase the contact time with the microbes that decay the organic matter. Mr. Wray believes these habitats offer a great way to remediate canals in the Keys. When engineering a system for a specific canal, it is possible to calculate the turnover rates needed to be effective in that canal. An abundance of research information has been collected on this technology over the years.

Dr. Patrick Rice emphasized the effectiveness of the engineered habitat approach. He earned his Master's thesis studying how bivalves can be used to clean shrimp farm waste. In the Keys, some canals where nothing will grow will need to use a technique that sends a harmless minimal current to the structure, which keeps things alive and creates the alkaline conditions needed to promote growth on the habitat. This biorock technique has been used to create artificial reefs elsewhere. To jump start growth, habitats are placed where they begin to grow marine life before being placed in the canal with poor water quality. Mr. Wray explained that they would like to implement an 18 month pilot program with FKCC that would involve funding students in testing the habitats and periodic review (and eventually students from local high schools). Using research as an educational tool excites students. This proposal would require a total budget of 80k. The estimated cost is $50 per linear foot of canal and includes testing and maintenance. Water quality monitoring would be overseen by FIU and be carried out with FKCC and Monroe County school support. This is a highly competitive technology that can be used in restoration.

Lunch

Motion (passed)

A motion was made by Chris Bergh to develop an overarching strategic plan for the WQPP that includes the steering committee and TAC. The motion was seconded by George Garrett. The motion was amended to include that a draft of this plan be prepared by the next WQPP steering committee meeting.

Discussion

Consensus was reached that a strategic plan is needed to identify priorities and then work projects and a work plan can follow based on the strategic plan. This plan would help inform budget decisions, which are made well in advance by EPA. The suggestion was made to have WQPP members or their appointees go through an exercise (a workshop) to determine a small number of key priorities for the program. This kind of exercise could help identify priorities to guide special studies and be helpful in building collaboration amongst the different agencies.

Motion passed with no objections.

XI. Sponge Restoration Project Update

Mr. Bill Sharp, FWC Florida Fish and Wildlife Research Institute, gave an update on the sponge community restoration project being done in collaboration with Old Dominion University (ODU), University of Florida Sea Grant. FWC has been notified that EPA funding will be awarded for the project in the near future. Additional funding ($170k total) has been provided by three NGOs: Bonefish Tarpon Trust, The Nature Conservancy and Florida Keys Environmental Fund, Inc. To view this presentation, visit http://ocean.floridamarine.org/FKNMS_WQPP/pages/wqpp.html. By cultivating sponges in nurseries and incorporating a community participation/outreach & education component, this project will provide the foundation for implementing a large-scale sponge restoration in Florida Bay. At the end of the project 15,000 nursery-propagated sponges will be outplanted in the region of Florida Bay that was most highly impacted by the recent cyanobacterial blooms. Sponge restoration is needed because many sponges died during blooms of the past and they have not returned naturally. Sponges play and important role in Florida Bay water quality and ecology. They transform nitrogen into forms that are more usable to plants and support a variety of marine life. A variety of aspects of sponge ecology and cultivation are being tested as part of this multi-faceted project and costs for future restoration efforts will be estimated.

Discussion

Concerns were expressed about the cyanobacterial blooms and whether or not restored sponges will be killed by new blooms. Bill explained that they were planning to outplant in such a way as to optimize sponge recovery. The nurseries are located outside the areas that have traditionally experienced blooms. John Hunt explained that from earlier blooms they had learned that the pace of sponge recovery was very slow and not very likely to occur in nature. Sponge larvae don't live long, reducing the chances of successful reproduction in areas where there are few, if any, remaining sponges. Having a nursery with sponges available could be very helpful in jump starting the recovery process. If outplanted sponges are killed by new blooms, replenishment might be needed. John expects this project to provide some guidance on what it takes to achieve larger scale sponge restoration. Year 1 involves setting up the science studies with ODU. Once that is done, the nursery work will begin (year 2). Year 3 will focus on the outplanting of nursery grown sponges.

XII. Diadema sea urchins to test artificial sea water made with RO processed fresh water against natural sea water from Florida Bay

Mr. Martin Moe gave a presentation on *Diadema antillarum* and what he has learned about cultivating their larvae using two different sources of water-- reverse osmosis seawater and seawater from Florida Bay. To view this presentation, visit http://ocean.floridamarine.org/FKNMS_WQPP/pages/wqpp.html.

Mr. Moe explained that a disease destroyed this widespread reef herbivore throughout its range in the Caribbean region. After 32 years, *Diadema* haven't really recovered and yet they are needed to restore the function of herbivory to our reefs. Mr. Moe had been cultivating the larvae of this urchin successfully at two locations using seawater from 2010 to 2012. In the summer of 2012, larvae failed to develop properly. After three years of continuing to try to raise larvae under those conditions, he decided to raise larvae in both natural seawater and artificial water

that has been treated with reverse osmosis. Because hormones guide development, Mr. Moe suspected endocrine-disrupting chemicals in the water column could be interfering with embryonic development. In his experiment with the two sources of water, larvae raised in the artificial seawater did well, but the ones in natural seawater failed as they had in recent years. Although this experiment doesn't prove anything, he feels these results are indicative of endocrine disrupting chemicals and he would like to see more work conducted on these chemicals in the Florida Keys.

Discussion

During the discussion, the following points were made:

- Dr. Briceño explained that Dr. Piero Gardinali, FIU, has done some work on pharmaceuticals in seawater and added that he and his colleagues will be examining some water samples from the outfalls from Miami Beach.
- Examining nearshore waters for chemicals from humans is important work that should be done. If there are impacts, they can't be addressed until they are understood.
- The steering committee could give the task of compiling the research on what is known on endocrine disruptors to the TAC.
- Special study funding was available for this task but no one applied for it and therefore it is not getting done.
- EPA's scientists could summarize the information.
- Any conclusions that endocrine-disrupting chemicals are responsible for impacts to the *Diadema* larvae are highly speculative at this point. People were cautioned about reaching conclusions without enough scientific information and that includes any speculation that chemicals used in the Horizon oil spill were responsible for the lack of complete development in *Diadema* larvae.
- The FWC Fish and Wildlife Research Institute lab in Marathon has looked for links to disruptors in the past and not found them to be substantiated.
- There are other water bodies that have had endocrine disruptor research conducted, but not the Keys.
- Even though the connection between Diadema larvae failure and endocrine disruptors is speculative, it is important to conduct this kind of work to find out more information.

XIII. Florida Keys Water Watch

Ms. Shelly Krueger gave a presentation on Florida Keys Water Watch, a citizen water quality monitoring program. To view this presentation, visit http://ocean.floridamarine.org/FKNMS_WQPP/pages/wqpp.html. Florida Keys Water Watch is modeled after Georgia Adopt-A-Stream program. Shelly has been trained in this program so that she can train people in the Florida Keys to collect and process water samples using their EPA approved protocol. She is also working on a quality assurance plan for Florida so that Florida Key Water Watch can be a stand-alone program for this area. So far, Water Watch has held 14 workshops, has 30 sample sites spanning from Key West to Biscayne Bay and over 90 data uploads onto the Georgia Adopt-A-Stream water quality database. Program participants enter their data on the Georgia database where they area available to everyone through Georgiaadoptastream.org. Some organizations are also participating in the program. Ms. Krueger recently was awarded more money that will be applied to initiating the program in three

schools in the Florida Keys. She will be providing reports that summarize the results. A link to this site can be provided on the WQPP.

XIV. Public Comment
No public comments were offered at this time.

XV. Technical Advisory Committee (TAC)
Discussion
The following points were made during this discussion:

- The TAC was already addressed as part of the greater discussion on the strategic plan. The earlier motion incorporated creating a strategic initiative that would guide the work plan and the development of the TAC. The role of the TAC would be determined through the process to develop the plan.
- A plan is needed that will guide the development of the TAC.
- A list of TAC members recently invited exists and probably should not be discarded.
- This new list of TAC members was based on input from steering committee members and it represents a wide range of expertise.
- The group that puts together the strategic plan should provide guidance on the nature of the TAC. They should address whether the TAC is supposed to provide advice or if they are a technical group that provides information because this could have a bearing on whether or not the meetings need to be publically announced.
- In the past, the TAC provided technical advice to the steering committee based on their expertise and that having the right disciplines represented is important.
- People with specific expertise were invited to address specific issues as members of the TAC.
- So much more is known today about the attributes of the Florida Keys ecosystem than when the TAC was first convened fifteen years ago. The WQPP has evolved drastically over the years as studies greatly improved the understanding of the ecology and hydrology of the Keys. In the future, additional people may be needed on the TAC with different expertise.
- When the TAC first formed they also served to vet FKNMS science projects that they funded.
- It was agreed that the roles of the three entities of the WQPP (steering committee, management committee, TAC) should be evaluated and described.
- Support was expressed for a facilitated discussion that covers all of the options and then prioritization can take place. The WQPP should relook at the charges in the legislation. This discussion started because of the budget issues. Congress originally authorized a 4 million dollar project. What does a 4 million dollar program look like? The goal of the facilitated workshop is a five year plan.
- The most important thing to do first is for the steering committee to identify the few priorities key priorities areas for the program. This should be done before a work plan is developed.
- Concerns were expressed for the time involved in developing these plans and opportunities to make the budget case could be lost before the plan is developed.

- One suggestion was to set up subcommittee in a month or so to come up the plans for a workshop, which could be held as part of the normal steering committee meeting in six months.
- The planning subcommittee will give thought as to how to proceed. This workshop to set priorities might help reinvigorate the committee, too.
- The workshop really should be two-days and should be separate and in advance of the next steering committee meeting.
- The idea of having a smaller subcommittee getting a plan on paper for the larger group to review was suggested. This would keep things simple and specific.
- The legislation and other documents exist to guide the plan/program. .

Motion (passed)
Jon Iglehart made a motion to have the steering committee appoint a subcommittee selected by the co-chairs to establish the process. If the subcommittee thinks having a facilitated meeting is a good idea, they have the authority to do so. The motion was seconded by Jon Hunt. Motion passed with no objections.

Some possible dates for a meeting in the first week of December were discussed.

Meeting adjourned.