

**WATER QUALITY PROTECTION PROGRAM CANAL RESTORATION ADVISORY  
SUBCOMMITTEE**

**May 23, 2018, 9 AM**

**Marathon City Hall 9805 Overseas Highway, Marathon, Florida, 33050**

**MEETING MINUTES**

**In attendance (members and speakers): Gus Rios, Charlie Causey, Billy Causey, Stephen Blackburn, John Deneale, John Hunt, Rhonda Haag, Greg Corning, Seth Lawless, Peter Frezza, Henry Briceno and Sarah Wilson.**

**1. Introduction and Approval of the February 23rd, 2018 Meeting Minutes – 9:00 AM**

Motion by Hunt, second by B. Causey. Minutes approved.

**2. Canal Demonstration Monitoring Program Final Report Update by FIU**

• Benthic/Biological Monitoring Report – Sarah Wilson lab manager for sea grass ecosystems presenting for FIU for Dr. Jim Fourqurean (in the field) – 9:15 a.m.

Gave presentation yesterday at Steering Committee meeting with post Hurricane Irma updates. 19 canals that were sampled during this study. **Benthic Habitat Monitoring in Canals**

For the benthic habitat monitoring in the 19 canals (7 treatments), Sara Wilson explained that a benthic community assessment is conducted along with sediment (muck) measurements. The last sampling event was after Hurricane Irma. Canals were filled with debris and in some cases, it wasn't safe to put divers in the water. In some oceanside canals, they observed large deposits of sediments. These deposits will change the circulation and other things about that canal.

Fall sampling was pushed back because of the storm. Data are currently being analyzed and will be available in June in a report. Benthic monitoring data were collected to measure changes before and after remediation in control and the remediated canals.

The following results were described for the various treatment pairs of canals—one treated and one control for each method or combination of methods.

- Backfilling led to significant changes improvements in water chemistry in the treated canal. No major differences in benthic communities outside of the canal mouths were detected.
- The weed curtain treatment did not produce a reduction in dry bulk density. The treated canal showed an increase in organic carbon in the sediments (muck). This unexpected result may be due to greater loading of organic matter from wrack deposits. No major differences were observed in benthic communities inside versus outside of canal mouths. These data do not show improvements due to the weed curtain.
- The dredge treatment (muck removal) did not produce major benthic community differences between treatment and control canals. But, significant differences in dry bulk density, muck depth and sediment organic carbon were detected in the treated canal. Data indicate less muck in the treated canal.
- The culvert treatment data did not demonstrate a lasting impact from culvert installation. There were some changes after culvert installation, but they did not last. Some

differences in sediment dry bulk, muck depth, etc. were observed but don't appear to be related to culvert installation.

- The dredging treatment applied in Big Pine Key showed marked improvements in dry bulk density, muck depth and sediment organic Carbon. Seagrasses adjacent to the treated canal may have been experiencing greater light availability, but more data are needed to confirm this observation. For more information, visit <http://seagrass.fiu.edu/canals.htm>.

**Final report expected end of June 2018.** Halfway through the final batch of sampling.

Comments and Questions from Subcommittee:

C. Causey – was treatment only effective with backfill and muck removal technologies? Wilson – Right now, that is what the data is showing. Waiting for data coming from other canals. De Neale – is it too early for us to detect changes? Briceno – we don't know the characteristics of the muck; we don't know if we are putting enough dissolved oxygen in to effect changes. There was more frequent monitoring in the past, sampling is erratic now; during the Little Venice Study, we used to sample every week. Bacteria content was the only indicator that showed changes in the way we expected. Hunt – do not expect to see immediate changes in canal nutrients regardless of the actions taken. It may be slow to occur/ may need more time after remediation. DeNeale – how much longer do we need to monitor? i.e. year-to-year vs. monitoring it five years from now. C. Causey – I think John is hitting the nail on the head. Little Venice took at least three years after sewers were constructed before we could see any data changes. Looking at this on seagrass, that the only canal technology that is successful in changing this data was dredge and fill. Data is conflicting and inconclusive. We are about to make recommendations to others, and we need another year of monitoring to make sure we give the right recommendations and get funding better lined up to help the communities. I am suggesting that we consider additional monitoring with RAD money or county participation to give us time to learn more. B. Causey – we can't expect immediate changes. Hunt – Requested that investigators provide canal pair comparisons of pre-and post remediation conditions. It would be nice to have canal pair synthesis on one table combined, including pre and post remediation phases for both the water quality and benthic monitoring combined. We can jump to conclusions based on one study or the other, and we should be comparing both. Canal by canal information would be useful. Question: what about benthic communities outside the canals, what are our expectations? based on information presented by FIU, seagrass growth started at 10 meters and 50 meters from canal mouth, was that observed before and after change? Wilson – I haven't analyzed that over time yet. I can see if it is moving and looking at the relative dominance of seagrass vs. another species. Can look at the elemental criteria and nutrient limitation that can be looked at over time. Hunt – if we remediate one canal, what would be the expectation for changes to the offshore halo zone from that one canal? Wilson – I am not sure; I don't think we have data that there will be a halo and our data doesn't measure that and I don't know if we would see a change from just remediating one canal. Hunt – maybe a neighborhood needs to be remediated to see a change. Hunt – how do we weigh what is happening outside the canals? Wilson – maybe coming up with an index of the different criteria to weigh the criteria. Rios – I hope Fourqurean and Briceno will get together to compare their data for an executive summary. Would be a good opportunity to look at data correlation between the two reports.

- **Water Quality Monitoring Report** – Dr. Henry Briceno, FIU – 10:05AM

Presented PowerPoint. Depth (most canals are 10-15 feet) nasty waters no matter where the canal is located. The poor quality of sediment present is an indication of the magnitude of the problems. Remediation methods included: Culvert, air curtain, backfilling. Any should bring changes, some more drastic than the other, but should be delivering some result. Showed diagram with remedial action, goal, tools, and changes. Monitored by chemical analysis of water samples, profiles of water columns, and diel measurements (24 hours sampling taken every 10 minutes). **Canal 28 control, and 29 backfilled.** Showed sample locations above the muck at several depths in a 12-14 foot profile with data shown before and after remediation, Diel experiments, and DO saturation, nutrients as well as other variables. After remediation, the nitrates increased, but then went down by the end of the study period. Compared with the control, it also goes down around the same time. **Canal 472** is in good shape. There is too much ambiguity to say if that it is good or not. Greg Corning – Did you consider other factors like sewer, lack of rain, runoff? Briceno – no correlation with weather, but yes to sewer. Showed slide on profiles in the water column - These are deep canals and he observed changes in salinity with depth. Towards the canal bottom, chemical reactions cause pH to be too low and then organisms cannot live in these anoxic conditions with low pH. Hunt – were the same parameters measured each time? Briceno – no, but the rest of the parameters were measured every time, everywhere. Hunt – compelling data, want to see the before and after for every canal. As a committee in terms of restoration, to move forward we need to see what we can really achieve from canal restoration. What approach worked best. For instance, we want to see more light penetration, higher DO, normal pH, etc. These data may be a better indicator of canal water quality than the nutrient data and it could provide the information we need to help us make decisions for our objectives of canal restoration. **Canal 266 organic removal** – ranged 50 to 60 percent DO saturation (good) and down to 42. After remediation, water was lower in O<sub>2</sub> content than before. Wilson – would seasonality affect this? Briceno – yes, sampling was done throughout the year, including all seasons, starting 2014 through March this year, 2018. **Canal 29 backfilling** – showed different dates and profiles of data taken and the differences. Backfilling showed significant improvement in DO and water clarity after restoration when compared to **control canal 28**. **Canal 148** – pH went the wrong way. **Canals 290 and 266** – one went down and one went up. **Canals 272 and 277** connected – both good. **Canal 287** – air curtain and aeration. All data needs to be taken at the same depths. Rios – these canals in the Keys are very variable. To get a pattern with nutrients is very difficult due to natural organic loading from sea weed inputs. In Little Venice canals– before and after study – no significant differences observed in nutrient concentrations. Briceno – most profiles were measured the same day or one day off. For Diels, we can only do two canals, the control and remediation. How long does it take to change one of these parameters? Showed Diel diagram – **canal 266** – gives us longer and more observations. **Summary:** remediation projects may be well designed and fully implemented, but expected changes may not show conclusive results at this time. Backfilling showed positive results during the study period. For other technologies we may need a longer monitoring period after remediation in order to observe measurable changes in water quality. Every canal has its own personality and show variable conditions. B. Causey – I hope we are coming up with a menu of different technologies that can be applied to canals and not just one overall fix all. Be able to pick and choose what will work best for different canals. Briceno – Final report will be available soon. Data will be on the tables; website will be updated.

#### **4. Public Comment – 11:15 to 11:30 a.m.**

Larry Largerne – Canal 266 Big Pine Key – dead end canal facing East opening into Bogey Channel. Since Irma, the pumps running the air curtain were destroyed, so just muck removal is being considered. Canal residents would like the air curtain to be replaced. Now we have nothing to stop the sea weed and with the southeast wind, the canal stays packed with seaweed every day. The methodology still allowed the seaweed to enter because the wind vein would turn off and then the seaweed would creep in when the wind would be turned off. Homeowner participation? Proposing the County comes up with an assessment for all canal residents to make sure everyone pays for the improvements.

Bob Clampett – Canal 338 Cudjoe Key – Contacted Renee Kwiat in DEP Fort Myers Office regarding the hurricane debris in his canal. Do we know where the contractors for debris removal are at so that we can know when we will get help? Rhonda and Gus will check into this.

Additional comments by Mr. Clampett: In Feb. 2016, we put an air curtain – how many privately funded, non-government entities have applied for and been granted to put one in? B. Causey – I don't know that information, but we as a community pay \$50 per canal space and contribute it annually to a fund and neighborhood volunteers keep it going. It's the best functioning air systems we got. Clampett – I appreciate the data brought forward, nine demonstration projects, budget millions of dollars, but we are underfunding a resource that needs more support. Can't even get boats out of canal (referring to hurricane debris and seaweed in canal), it stinks. When will comprehensive plan be made to identify these needs past the initial demonstration projects? B. Causey – The county has put more money into this restoration than any other entity to help water quality and quality of life. RESTORE funding trickling in. DeNeale – Islamorada and Marathon are putting it into their plans. Irma put a crimp on us and now it's possible to experience one-year delay, while hurricane debris is removed from canals and waterways.

#### **Village of Islamorada new Subcommittee member**

Seth Lawless, Village Manager, announced that Susan Sprunt is no longer with the Village and Peter Frezza will replace Susan as the Village representative in the Subcommittee. Peter has extensive knowledge of the ecology of the Florida Keys.

#### **5. Review Current Progress of Canal Restoration Projects and Lessons Learned –**

Presentation by AMEC and group discussion

Rios – we are moving into next phase and updating the Canal Management Master Plan using the data obtained during the demonstration projects. Based on the information presented by FIU today, backfilling seems to be showing most significant improvements to water quality and benthic communities. Culverts have also shown some improvements in water circulation and DO but no conclusive results yet for the other technologies used in the demo projects.

Corning – we had to get additional data and where we were getting them and how they were being evaluated. If considered out of compliance with DEP water quality standards, then 2017 averaging the three samples – but the data could be good at the top and bad at the bottom, skewing the results. We need to turn this to a guidance document to be used as a tool to balance

funding. B. Causey – are you comfortable to make recommendations based on what you know so far? Corning – we need to see the final reports of what FIU presents. Data is inconclusive in some of the technologies. The master plan needs cost effectiveness and the results and how they are improving the water quality and dissolved Oxygen. Each is unique and plays on how the county and municipalities can use this data.

#### **5. Mission and Future Direction of the Subcommittee - Group Discussion – 11:35 a.m.**

Rios: Steering Committee passed a motion to support updating the County’s Canal Management Master including using information learned from Demonstration projects to canals. The Canal Subcommittee was appointed by the Steering Committee to oversee the implementation of demonstration projects and work with the County, municipalities and stakeholders to develop a canal management master plan (CMMP) as well as identify sources of funding. Our Subcommittee we will not review and select individual proposals for projects because our role is advisory and we don’t have the expertise to act in that capacity. The updated CMMP will be used by the County and other local governments and their consultants to guide the selection of individual projects. We can move forward with the updates – the next task is what do we need to do to update the Plan for the county, cities, and the stakeholders. Do we need more monitoring, and if so, what do we need to make better decisions in the future?

#### **6. Review Current Status of Canal Management Master Plan (CMMP) and Necessary Updates – 11:45 a.m.**

- Brief Review of Current CMMP (Presentation by AMEC)
- Review Program Priorities and Necessary Updates to the CMMP
- Water Quality Monitoring Plan to Assess Progress and Successful Implementation of Canal Restoration
- Identify Funding Sources to Implement CCMP Update and Follow-Up Actions
- Next Steps and Tasks for the Subcommittee

B. Causey – Recommends using Wastewater Master Plan technology model, and have technical advisory committee provide technical review and comments. Input from other people that will have experts as we talk about options. Rios – We need engineering expertise. Requests to provide experts. Do we need to look at wastewater issues, is there a different level of expertise, do we have a representative from South Florida Water Management District? Blackburn – reassignment, I guess right now I would say no since they aren’t attending the meetings. Rios – who do we need to add to this group. Showed presentation of topics that needed to be addressed to update the current master plan. We need to update the data bases. There is an inventory of technologies in the original plan. Corning – Looking at alternative technologies from other studies, like different aeration technologies, augmented aeration, analyzing the results from FIU will have to be looked at and included in the update. Using that data, then we can determine the effectiveness of the technologies. Maybe things need to be combined, etc. Rios – We have to take Irma into consideration, do we need to wait until debris is removed from canals? We don’t have a date on when that debris will come out and how will affect monitoring and implementing additional projects. Corning – we need to determine the path of what this document will do. Guidance document, county and municipalities can use that data to make their own plans. Rios – resiliency for more storms and that we speak about the specific topics. Corning – revised list on

update, but direction hasn't been given. Rios – we have to hammer down the specific tasks for funding or grant proposal. Most important thing is updating the database for the master plan. Corning – 2013 data was on limited amount of money and 2017 filled in the gaps, so now we have data for every canal. Need to figure out how to continue this and keep it updated. Data that FIU has is specific to the demonstration projects but doesn't do anything for the entire database of canals, it is just a handful, but that data can be applied for decision making. Hunt – this plan needs to be a guidance document. Single most important items that this committee can do is determine the objectives of canal restoration. We have data on from these studies, and the committee should do and that Corning can use for the grant proposals and include a small working group that can be utilized to develop objectives for canal restoration. Light, nutrients, overall look of the canal, to provide guidance to essential technologies that have to occur to get to the end result ie maximum depth recommendation. Critical moving forward. Public vs. Private funding – challenges to getting homeowners to agree to pay long term costs, access. Criteria and objectives don't change but private side can focus on the other side. Data shows air curtains might not be working. Complexity is considerable. DeNeale – water quality protection plan – we are fixing stuff. If you want politicians to go to people, we want to see the “p” protection and how we maintain good water quality in these canals. I need simple steps on recommendations. C. Causey – When will we know definitely that it is working? – we would like to have better data to recognize impact, the monitoring to answer these questions is 3-5 years out. At some point in time there will need to be a “no regrets” kind of approach with a reasonable level of certainty. C. Causey – would another year of monitoring make a difference? Hunt – NO. We are at a reset because of Hurricane Irma. Some of the pre-remediation monitoring such a short timeframe that there is really no good baseline. You need enough before data to establish that impact. criteria are all inconclusive, we need to advance to the next phase with a little bit of monitoring. We need to head into phase two. Blackburn – we learned quite a lot, like organic removal works. We know it doesn't work on deeper canal, culverts work, backfilling works, bubblers - the jury is still out, I think we have learned a lot. Hunt – we need the synthetic table because it will be useful in the development of the next plan. Rios – need to know what municipalities and county want on the plan, too. Looking for a measurable result. Corning – writing grant and if proposal is successful then the funds won't be available until Sept. 30 and project will last a year or so. Hunt – we need to get out of the business of approving individual projects and just give feedback from the working group. Corning – if EPA funding doesn't come through we will look to DEP. Hunt – Revise no, certain situations where monitoring will provide guidance. It doesn't make sense to continue monitoring 266 in my opinion. We can be judicious on what and where to monitor. Wilson – monitoring the wrack and the muck that is coming into the canals, skimming really needs to be considered. ie skimming every two weeks before it settles on the bottom and if that would help to keep it from settling from the bottom, old material eventually coming out and not adding more to the bottom. Hunt – that would be a research project, more so than monitoring. Would fall under the special studies RFP according to Blackburn. C. Causey – Can DEP money go toward special studies, too. Maybe get more bang for our buck. That frees up more meaningful amount of money for leveraging lines. The DEP money has a one year window. Corning - Canal skimming program started in Key Largo for 86 canals and data should be coming in next week from the contracted company. Hunt – how quickly, minimum frequency before it sinks. B. Causey – I want to put my weed gate up against that skimming. Corning – two different methodologies. Rios - During the next meeting we need to focus on the development of the updated Canal Master Plan.

7. Meeting adjourned at 1 p.m.