FINAL

MINUTES OF THE MEETING
of the
HARRIS CHAIN OF LAKES RESTORATION COUNCIL
April 1, 2016

The regular meeting of the Harris Chain of Lakes Restoration Council (Council) was held at 9:01 a.m. on April 1, 2016 at the Lake County Board of County Commissioner Chambers, 315 West Main Street, Tavares, Florida.

Council Members Present	Council Members Absent
Skip Goerner, Vice-Chairman	Robert Johnson, Chairman
Don Nicholson	Hugh Davis
Sid Grow	Dr. Ed Schlein
Keith Truenow	Stephanie Bishop

John Stump, ex officio member

TAG Members Present	TAG Members Absent
Roland Fulton (SJRWMD)	Stephen Tonjes (FDOT)
Dennis Renfro (FWC)	
Kevin Coyne (DEP)	
Mike Perry (LCWA)	
Mark Hoyer (UF)	

1. CALL TO ORDER

Vice-Chairman Goerner called the meeting to order at 9:01 a.m.

2. INVOCATION AND PLEDGE OF ALLEGIANCE

Councilman Nicholson gave the invocation. The Pledge of Allegiance followed.

3. COUNCIL ROLL CALL; REMINDER FOR OTHERS TO SIGN IN

Vice-Chairman Goerner called the roll. Council members Johnson, Davis, Schlein, and Bishop were absent. Stephen Tonjes (DOT) of the Technical Advisory Group (TAG) was absent.

Vice-Chairman Goerner asked to remove Tonjes from list

4. APPROVAL OF MINUTES

There was no quorum for approval of minutes.

5. PRESENTATIONS / ACTION ITEMS

A. Ferthaul Florida RS – Water Treatment Through Cavitation – Mike Ramsay, Ferthaul Florida RS

Vice Chairman Goerner introduced speaker Mike Ramsay from Ferthaul Florida RS, inquiring as to whether there had been a change in the corporation. Mr. Ramsay acknowledged Ferthaul Florida RS was no longer affiliated with Mr. Nick Szabo. Mr. Ramsay provided an overview of the Ferthaul project in Florida, noting they performed a free pilot study on Lake Apopka in 2015, in which water

and muck were suctioned directly from lake and treated with Mitton Cavitation. Testing occurred over 43 days in winter 2015. Ferthaul processed 8,500,000 gallons of canal water and removed over 3 tons of phosphorous. Results were verified by DEP testing completed on water samples.

Mr. Ramsay briefly described cavitation as the formation of an empty space within a solid object or body. The extreme conditions of cavitation can break down pollutants and organic molecules. The collapse of cavities generates hydoxyl ions, which are useful in realizing many benefits in effluent treatment. Mr. Ramsay noted this type of water treatment occurs naturally in turbulent streams and waterfalls.

Mr. Ramsay discussed the importance of removing or reducing phosphorus and nitrogen with the notion of reducing phosphorus (P) and nitrogen (N) through reduction of agriculture use, reusing the P and N for agriculture, and recycling water back to the lake. To accomplish this, Mr. Ramsay described the processing the lower (sediment) layer of the lake. The plan is to remove the lower (sludge/muck) layer with the highest nutrient content, said to range from three to over 17 feet thick. Separate out the solids using parabolic screens and water treatment with cavitation, and then return the water to the lake at levels under 0.07 mg/L Phosphorus. The solids would be re-purposed with N and P available for agriculture.

Councilman Grow noted a 1% return of P to the lake from April 2015. Mr. Ramsay reported the criteria from SJRWMD had shifted from a percentage reduction to more quantifiable target. The new minimum standard from SJRWMD was 0.07 mg/L. Vice-chairman Goerner inquired if SJRWMD has data on how much P remains in the bottom of Lake Apopka. Dr. Fulton reported several studies were completed in the late 1990s, in particular sediment studies by Reddy and Shelsky. Goerner requested the studies. Dr. Fulton noted the studies were on the SJRWMD website and could be provided by staff. Mr. Ramsay noted the previous estimate of cost to remove P was $500/lb P, but the current estimate, based on actual test results was $80/lb P. Mr. Ramsay noted the reduction was due to scaling up the process, and processing the water in parallel.

Mr. Ramsay continued the description of the 2015 pilot project, which used a barge with a pump to suction influent from the lakes into two 2500-gallon holding tanks. The influent would be processed by the Mitton cavitation valve and returned to a second 2500-gallon tank. The testing are was located in the area of the marsh flow way along the northwest shore of Lake Apopka.

Analyses completed by the Department of Environmental Protection (DEP) showed that based on comparing the analytical chemistry sample results for the incoming dredge material (influent) and post-process water (effluent), the pilot plant removed total phosphorus from 8.0 mg P/L in the influent sample to 0.25 mg P/L in the effluent sample. Similarly, total nitrogen was reduced from 150 mg N/L to approximately 4.4 mg N/L. DEP reported the results from the pilot project were successful in reducing total phosphorus and total nitrogen.

Photographs presented by Mr. Ramsay showed differences in water clarity in pre- and post-treatment water samples from both the bottom of the lake and the top of the lake. Vice-Chairman Goerner inquired as to how big would the processing footprint need to be for cost effectiveness, noting the value of the process is that cleaned water is returned to the lake. Mr. Ramsay noted Ferthaul will not process the entire lake but focus on bottom sediments. Ferthaul could process more than 1 million gal/day. The issue is how much dredging to undertake over a given period based on the accommodations needed by different user groups. Examples included bird nesting and fish spawning.

Councilman Truenow inquired how P was removed from the material. Some P is removed from the slurry, while other P is removed via sedimentation after cavitation. Mr. Bill Hooper, Ferthaul, noted phosphate ends up as a solid that is removed after cavitation. Mr. Hooper noted further improvements in the system in last 3 months, doubling efficiency. The current processing cost is estimated at 1.7 cents/gallon.

Mr. John Stump inquired as to the time delay with lab analyses presented by Mr. Ramsay. Mr. Ramsay reported the Flowers lab was the choice of SJRWMD and DEP, though Ferthaul moved to additional testing onsite to facilitate timely processing modifications. Councilman Nicholson, in noting how impressive the system was operating, inquired as to the sterility of treated water. Mr. Ramsay reported the water is sterile after treatment by cavitation, noting one test result showed the cleanest water in state. Mr. Ramsay noted water returning to the lake has a high dissolved oxygen (DO) concentration, as the water is aerated using laminar flow air stones provided by the Allied Group.

Vice-Chairman Goerner called on members of the technical advisory group (TAG) for comments. Mark Hoyer, UF, observed there were impressive reductions in phosphorus from the process, and DO results in the lake were good. Mr. Hoyer noted Dr. Dan Canfield indicated there was good progress being made. Mr. Hoyer requested an email copy of the report.

Mike Perry, Lake County Water Authority (LCWA), remarked he had visited the processing site. The difference with this process is P is actually removed offsite. Mr. Perry's opinion was the process looks promising and $80/lb P removed is better than current LCWA costs of several hundred dollars/lb.

Mr. Ramsay asked if there was a proper ratio of dissolved phosphorus solids to total phosphorus concentrations. Mr. Perry remarked a higher ratio of dissolved phosphorus to total phosphorus is more beneficial to the environment, and Dr. Fulton noted most of the phosphorus in the water column is available for biological use. In sediments, the phosphorus is bound, so it is not available for phytoplankton use. Vice-Chairman Goerner questioned whether this process increases the amount of dissolved P. Dr. Fulton noted he would have to review the report.

Mr. Kevin Coyne, DEP, noted he had seen some of the system and data. He noted there would be much byproduct and marketability appears good. Councilman Truenow agreed there is a use and market for the material. Mr. Hooper noted there is market if enough product can be made available.

There was general discussion about product moisture content and limits necessary for transport. Mr. Ramsay reiterated the process is a one-way system. Dewatered product is immediately removed offsite. There is no onsite storage.

Vice-Chairman Goerner inquired what would it take to make a difference on Lake Apopka, i.e. how many gallons of water need to be treated? Mr. Ramsay noted it depends on how much money is available. Ferthaul is capable of removing as much as desired as it is simply a matter of scaling up accordingly.

Dennis Renfro, FWC, had no immediate questions, deferring comment until he had read the report. Mr. Renfro noted he would like to visit site. The Council agreed and requested Susan Davis to coordinate a site visit.

Mr. Ramsay continued with his presentation of the second part of the project, conducted in the winter of 2015 on a Lake Apopka Canal. Canal water was treated using dual CAV/1000 Mitton valves up to 1,000,000 gals/day. The project treated influent with phosphorus concentrations ranging from 11.3 mg/l to 429 mg/l with a 99.5% removal efficiency. Cost for removal was reported at under $80 per lb of phosphorus. More than 3.5 metric tons of material were removed in 43 days from 8,500,000 gallons of canal water and muck. The resulting slurry is a usable product for agriculture, once composted. A series of tables and graphs were presented showing treatment results, the amount of phosphorus removed vs. gallons of water, and the daily phosphorus removal. Photographs showed the dredging area, the treatment site, the site configuration, and the effluent slurry off the parabolic rundown screen. Councilman Nicholson inspected soil sample at 5% moisture content provided by Ferthaul.

Mr. Ramsay described the reuse of the effluent on test cells on SJRWMD lands close to the canal. Effluent slurry was applied to 4 cells; one cell seeded with grass seed, two cells with thin layers of slurry applied and one cell with a thick layer of slurry. Two additional cells were left as controls. A series of photographs of the cells showed the slurry dries in 4 days, and the seeded area had 4" of growth in 9 days.

In summary, the project treated influent with phosphorus concentrations ranging from 11.3 mg/l to 429 mg/l with a 99.5% removal efficiency. Cost for removal was reported at under $80 per lb of phosphorus. More than 3.5 metric tons of material were removed in 43 days from 8,500,000 gallons of canal water and muck. Hooper added the drying system is available. Equipment is available at any scale. A representative from C and M dredging noted they have the capacity of moving 100 million gal/day.

6. COUNCIL & AGENCY QUESTIONS & ANSWERS

Mr. Perry reported on lake levels in Lake Apopka were elevated due to rainfall. SJRWMD was currently moving water out of Lake Apopka through the NuRF facility at about 19 cubic feet per second. Mr. Perry noted the superpond water levels at or above regulatory schedule. Lake Griffin water levels were below the regulatory schedule early in the month but rainfall had brought the levels back to regulation schedule. Mr. Perry reported the County budget process was starting and funds would be provided to Council.

Mr. Renfro reported the FWC restoration team met with working partners SJRWMD on Emeralda Island Restoration Area III, to finalize prepping for work on the interior levees and vegetation management before opening the exterior levees. Council requested a listing of which permits were needed. Mr. Renfro indicated he would find permits and reply. Vice-Chairman Goerner inquired about aquatic weed treatment on Lake Griffin. Mr. Renfro noted treatment was ongoing and was successful.

Vice-Chairman Goerner inquired if better or worse water quality was going to be introduced into Lake Griffin when the exterior levees were breached. Dr. Fulton reported the SJRWMD phosphorus concentration in Area III is 100 *u*g/L, lower than the 200 *u*g/L threshold. The northshore restoration area concentrations vary by area from 300-400 *u*g/L. Water entering the lake is much lower, about 100 ug/L. Mr. Renfro noted water from Griffin will move into the Emeralda area, not vice-versa. Another issue is floating islands, and whether to remove them or chop them up in place.

Dr. Fulton reported the SJRWMD Governing Board approved dredging of the McDonald Canal. SJRWMD has scheduled a teleconference to discuss Ocklawaha minimum flows and levels on May

12. On April 7 there would be a ribbon cutting to celebrate opening a new portion of the Apopka loop trail. Finally, Dr. Fulton reported SJRWMD cost-share applications for water quality and stormwater were being accepted.

Dr. Fulton noted water quality was good in the Chain of Lakes. Specifically, the Lake Apopka P target is 55 *u*g/l and since July, it has been below 100 *u*g/l. In January, it was 62 *u*g/L, and in February, it was 55 *u*g/L. This was likely associated with the higher water levels in the lake.

Mr. Hoyer reported a new website was due to open in the next several weeks in which water quality data and trends can be analyzed. Mr. Hoyer noted the Lake County LAKEWATCH coordinator fell ill so the slot needs filling.

Mr. Coyne presented an updated DEP sampling manual, noting on pg 157 the protocols for taking depth measurements. The data is available if requested.

7. COUNCIL MEMBER COMMENTS

Councilman Nicholson remarked Ferthaul was on the right track with water treatment and he hoped it would continue.

A. The Next Scheduled Meeting is tentatively scheduled for May 6, 2016. Council administrative staff identified tentative speakers for next month as Bruce Jaggers, FWC, and Dr. Dan Canfield, UF.

8. PUBLIC COMMENTS

None.

9. ADJOURNMENT

The meeting adjourned at 11:45 a.m.