

FINAL

**MINUTES OF THE MEETING  
of the  
HARRIS CHAIN OF LAKES RESTORATION COUNCIL  
July 10, 2015**

The regular meeting of the Harris Chain of Lakes Restoration Council (Council) was held at 9:04 a.m. on July 10, 2015 at the Lake County Board of County Commissioner Chambers, 315 West Main Street, Tavares, Florida.

**Members Present**

Skip Goerner, Chairman  
Don Nicholson  
Stephanie Bishop  
Sid Grow

**Members Absent**

Hugh (Dave) Davis II  
Dr. Ed Schlein  
Robert Johnson  
Keith Truenow, Secretary

John Stump, ex officio member

**1. CALL TO ORDER**

Chairman Goerner called the meeting to order at 9:04 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**

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

**4. APPROVAL OF MINUTES**

Discussion and approval of the April 3, 2015 and May 1, 2015 minutes was tabled because there was no quorum.

**5. PUBLIC COMMENTS**

No public comments

**6. PRESENTATIONS / ACTION ITEMS**

**A. Briefing by LAKEWATCH on involvement with minimum flows and levels (MFLs) –  
Mark Hoyer, Director**

Chairman Goerner welcomed Mark Hoyer, LAKEWATCH. Mr. Hoyer presented a briefing on lake levels and LAKEWATCH involvement with MFLs. Mr. Hoyer first addressed a question previously posed to him by the Council about whether LAKEWATCH was conducting water quality sampling in Lake County. Mr. Hoyer showed a table of the lakes within the Lake County that were being sampled on a monthly basis.

Mr. Hoyer noted that he was also previously asked to compare water quality data from Lake Apopka collected by both LAKEWATCH and the St. Johns River Water Management District (SJRWMD). Graphs of phosphate and chlorophyll concentrations showed that the data from both

groups showed similar trends, indicating that the data was consistently measured between the two groups. Mr. Hoyer remarked that the fact that both groups were producing similar data showed that the volunteer LAKEWATCH workers were doing a good job of collecting water samples.

Mr. Hoyer then presented a slide on lake levels in which he introduced lake morphology, lake ecology with changing lake levels, lake level stabilization, and stakeholders views of lake levels as his topics of discussion. Mr. Hoyer introduced a slide showing the bottom configuration (hypsographic curve) for Orange Lake and Lake Santa Fe in Alachua County. Mr. Hoyer described Orange Lake as a shallow lake, where a one meter drop in lake level drop would expose 40% of the lake surface area. In contrast, a one meter drop in lake level for Santa Fe Lake would only result in an 11% exposure of the lake surface area. The graphs show the importance of lake morphology when considering lake level drawdown or decreasing rainfall.

Mr. Hoyer introduced a slide showing graphs of water chemistry constituents (secchi depth, chlorophyll, total nitrogen, and total phosphorus) vs. lake level for 85 lakes. The data period of records ranged from 7 to 175 monthly measurements. In analyzing the data, Mr. Hoyer discovered that the lakes function differently, noting that in Trout Lake, nutrient concentrations decrease as lake levels increase, whereas in Lake Winnimissett, nutrient concentrations increase as lake level increased. Other lakes, such as Lake Santa Fe, showed no significant change in nutrient concentrations with changes in lake level. The research shows that lakes function differently in response to lake level changes, and that they have different limnological characteristics.

Mr. Hoyer discussed two possible mechanisms for these differences. Mr. Hoyer described a series of graphs of aquatic plants vs. chlorophyll as a function of lake bottom, before and after grass carp were introduced in the lake to remove vegetation. The graphs show that in shallow lakes both chlorophyll and nutrients decrease as the number of aquatic plants increase. The aquatic plants outcompete open water algae for nutrients resulting in clear water. The reverse situation occurs once grass carp are introduced. The fish remove the aquatic vegetation, with the resulting nutrient load then being available for rapid algal growth, blooms and reduced water clarity. Mr. Hoyer surmised that in shallow lakes, as lake levels decrease, more lake surface area is exposed to light penetration and aquatic vegetation expands outcompeting the algae for nutrients.

A slide showing chlorophyll vs. lake stage for Newnan's Lake showed high water levels in 1997 followed by low lake levels in 1998, associated with a decrease with rainfall. In this case with levels low there was a resuspension of sediments and nutrient release resulting in high chlorophyll concentrations. The importance of these findings is to note that when having a water drawdown lakes can function differently. When trying to key water drawdowns to maintain a particular trophic state it is important to know the morphology and limnological properties of the lake.

Mr. Hoyer next showed a graph of Lake Tohopekaliga (Toho) water levels from 1940 to 2010 in which water levels fluctuated up to 9 feet. In 1964 a control structure was installed to stabilize water levels. The structure stabilized highs, but there will always be lows as a function of rainfall. Mr. Hoyer noted that the loss off periodic high water levels eliminates the transport of vegetation up onto the sides of the lake, somewhat of a natural cleaning mechanism to reset lake succession. This loss of transport eventually led to large floating tussock islands and masses of aquatic vegetation choking the lake. In 1996 the lake level was drawn down and the lake bed was scoured to remove muck and vegetative buildup in an effort to artificially reset the lake succession. Mr. Hoyer showed pictures of the lake from 1994 and 1996, as well as pictures of the \$8 million

excavation and restoration project, as it was underway. Mr. Hoyer noted that there is hydrilla in the lake, but there is good growth of native vegetation as well.

The last slide of Mr. Hoyer's presentation showed a bar graph of the survey results of lake user's perceptions regarding impacts of lake level on lake aesthetics and recreational uses. The graph depicted the percent of responses vs. the percent of time that a water level was at a given height. The survey consisted of three questions, of which there were 1,000 respondents. The respondents included fishermen, residents, volunteers and DEP staff. The survey showed that respondents do not mind high water levels, but that they do not prefer low water levels. This survey was used by SJRWMD to help set recreational water levels to accommodate the needs of the public.

Chairman Goerner had questions about Lake Apopka, remarking that it does not react to rainfall as quickly as other lakes. Chairman Goerner asked about what types of records were available before farming began in the 1940s. Dr. Rolly Fulton (SJRWMD) responded that there were records back to the 1930s. Chairman Goerner remarked that he would like to talk about lake levels. Chairman Goerner further noted that Lake Griffin had been tested for 20 years, and that there are many records on the Harris Chain of Lakes. Chairman Goerner requested to view graphs of water quality parameters (secchi and nutrients) of the major (Harris) lakes and Lake Apopka. The purpose is to see if there are long-term improvements on the Harris Chain from 20 years ago to present day.

Chairman Goerner inquired about Mr. Hoyer's involvement with MFLs. Mr. Hoyer remarked that he does not work on lake levels and is not involved with MFL standards development. Chairman Goerner noted that with Mr. Hoyer's background, and his membership on the technical advisory group, that his input was important.

Councilman Nicholson commented on the bathymetric maps noting that most lakes are pan shaped. Mr. Hoyer noted that sinkholes are different, and are easier to manage because of their depth. Councilman Nicholson further discussed flocculent materials and their different densities, from peat materials, to putty-like materials, inquiring as to what sediment density is most effective for removal. Chairman Goerner noted that the presentation by Dr. Canfield would be addressing sediments.

John Stump referred Mr. Hoyer back to the slide on grass carp. He inquired as to what is the downside of grass carp. Mr. Hoyer responded that small numbers of grass carp can maintain vegetation, but with too many carp, plant materials are rapidly lost. The loss of habitat affects bass populations, as the vegetation provides cover for bass fry. If a lake is not used for fishing, then many owners may prefer grass carp over herbicides or mechanical harvesting.

#### **B. An Old/New Technology for Rapidly Dewatering Sediments with a Small Footprint -The Wedge Wire Solution – Dan Canfield, PhD, University of Florida**

Chairman Goerner welcomed Dr. Dan Canfield, University of Florida. Dr. Canfield gave a presentation on old and new technologies for rapidly dewatering sediments. Dr. Canfield introduced Mr. Mark Robertson, a biofiltration expert who has been assisting him with studies of dewatering technology.

Dr. Canfield noted that the last presentation he made to the Council was concerning a demonstration project on rapid dewatering treatment of sediments dredged from Lake Apopka. Dr.

Canfield reviewed the history of Lake Apopka referring to the 2009 report by the Council to the Legislature recommending research into dredging projects that utilize advanced dewatering and sediment reuse systems that occupy a small footprint. In 2010 there were only two systems available. Dr. Canfield showed a slide of the Genesis Rapid Dewatering System that required numerous operating personnel and much equipment at considerable expense. The problem with the Genesis system was that fine residual sediments could not be dewatered fast enough. The second system Dr. Canfield described was the Clean-to-Green system. The problem with this system was that the wet peat residue was too wet to move. The peat had to be stockpiled until dried out. There was also no water available to remove residual fine sediments. At end of the project they tried a dewatering tower that used a cation polymer to trap fine sediments. This system was not approved by DEP. Dr. Canfield also showed a slide of geotubes which again were large, messy, and expensive.

Dr. Canfield proceeded to introduce and present a slide on a dewatering device found by Mark Robertson at a dairy farm in Lecanto. The device is a parabolic rundown screen in which wastewater (in this case manure) is pumped across the top of the device. As the slurry runs down the screen, water is sheared off through small holes in the screen. Dr. Canfield remarked that it is a 50 year old technology with no moving parts and is extensively used in Europe but not in America. Dr. Canfield showed a series of slides of the devices of various sizes with varying dewatering capabilities, as well as its' use on a 500 cow dairy farm in California. Chairman Goerner noted that there was no slump and very little water in the resulting manure piles.

Mr. Stump inquired about the process time, as the video appeared to show that that the mostly dry material comes right out. Dr. Canfield agreed that process works quickly, noting that the screen at the dairy has been in use for 10 years and only needs washing when it is stopped. The dairy crews only wash the screen once a day.

Dr. Canfield moved on to a slide about the Dino Six dredge. This is a dredge that will run in canals. The problem is where to put the mud from the canal. Dr. Canfield proposed that incorporating a parabolic rundown screen into the dredging process offers the opportunity to haul mostly dry material away quickly.

Dr. Canfield returned to a question about how many fines come out on the screens. He noted that new polymers have been developed that clump fines very quickly and adding a dewatering tower could help in fine sediment removal. Dr. Canfield noted that Mr. Robertson is using a screen down to 20 microns while the dairy is only using a 250 micron screen. Mark has screen down to 20 microns. Dr. Canfield concluded by stating that if the Council is interested in pursuing this technology, it could be a solution to the dredge spoil problem; but they would need to seek state money.

Chairman Goerner noted that the farmers were recycling the high nutrient wastewater to grow corn for feed. Dredge water from the lake could be returned immediately if clean enough, and the recovered material could be trucked to the Lake Apopka northshore for buildup. What needs to be investigated is how clean the water is coming from the screen.

Dr. Canfield showed another video in which a vibrator was added to the treatment train to further dry the material. Chairman Goerner noted that while the resulting material was not completely dry, it was dry enough to truck away. He then questioned how this process would work with sediment

from dredging. Dr. Canfield reported that it all depends on the size of the screen opening. He noted that wedgewire is being used in Avon Park in which peat that comes off the wire is being collected and hauled off for sale. Dr. Canfield acknowledged that there are nuances of screen use, and that it is catching on, but that there are different needs for different materials. He sees the rundown screen and an opportunity for small footprint treatment rather than the long process associated with traditional dredging.

Mr. Stump noted that dredge tailings have more sediment than a dairy operation. He suggested sampling to check sediment mineral loads in a soil lab. Mr. Robertson remarked that he has his own test rig that is being used for fish farmers, and that it could easily dovetail to dredging operations. He suggested that multiple staging would likely be good method of operation.

Chairman Goerner discussed the cost of dredging 400,000 yards of material for \$7 million. If material could be consolidated quicker, then it could be trucked away. Furthermore, it could be staged in one location; a simple solution for less cost. Dr. Canfield suggested that the Council undertake a demonstration test piggybacking from an existing dredge line from the lake and run dredge water through the system and assess the outputs. Chairman Goerner inquired about the time needed to establish a testing project. Mr. Robertson stated that in 2-3 months a 3' x5' box could be ready to test. Mr. Stump offered that a three month turnaround sounded optimistic. He inquired about the availability of a small turnkey system rather than a custom build. Chairman Goerner suggested building something similar to the agricultural products that can filter 1,000 gallons per minute. Chairman Goerner requested to see any white papers on existing projects.

In closing, Chairman Goerner suggested that Dr. Canfield keep the Council informed of progress with a test system and that the Council could talk to Senator Hayes about the possibility of funding for a demonstration project.

## **7. COUNCIL & AGENCY QUESTIONS & ANSWERS**

Mike Perry (LCWA) discussed the lake levels in the Harris Chain. Mr. Perry presented a graph showing Lake Griffin lake level stage and rainfall stage, noting a decline in both stages. Mr. Perry noted that the middle lakes showed a similar trend, with slightly more of a decline from regulation schedule, though still above the minimum desirable level. Mr. Perry reported that Lake Apopka was at or below the minimum desirable elevation and one foot below regulation schedule. Current rainfall total was reported at 4.25 inches, low for county rainfall. Mr. Perry presented a slide of the distribution of rainfall in Lake County that showed some areas of the County with a rain surplus, with some areas in rain deficit.

Chairman Goerner inquired about the status of Lake Apopka. Dr. Fulton noted that SJRWMD has rain gauges around Lake Apopka. Chairman Goerner was curious because Lake Apopka has lost twice the elevation as the middle lakes, and that perhaps water retained in the flowway is a problem. Dr. Fulton noted that the eastern half of lake loses water to groundwater. Chairman Goerner requested information on water levels on Lake Apopka before farming became widespread. Chairman Goerner commented that close to 60 billion gallons of water per year left are left on the marshes, and that there is no recharge to the aquifer on the north shore of the lake and that it must have an impact. Chairman Goerner further commented that keeping water on the marsh is impacting the entire chain of lakes because water from the headwaters (Lake Apopka) is being retained. Dr. Fulton reported that SJRWMD staff members Mike Cullum and Dale Smith

previously did a presentation on the lake water budget and that he did not have any further information to provide.

Chairman Goerner continued to discuss the recharge issue, noting that reconnection of the flowway was essential to the health of Lake Apopka and downstream. And will be an important component in MFLs development. Chairman Goerner commented that he would like to restore the marsh like it was naturally, including restoring sawgrass. Mr. Perry discussed varying rainfall on the lake noting that in 2010 there was peak discharge from the lake but there was little water to the south. Mr. Perry noted that it is not just how much rainfall there is but where the rain falls.

Dr. Fulton was asked to provide historic lake level information. Councilman Nicholson requested that the data be coordinated with spring discharge.

Public commenter Russ Melling commented that population growth is a major input into water bodies. Mr. Melling noted that water was the major issue in this state. Chairman Goerner reiterated that 23,000 acres of water is not getting to the lake. Dr. Fulton compared Lake Apopka to Lake Yale, which has similar limited drainage, both losing water to the aquifer. Lake Yale has no north shore flowway, yet both are still losing water. Chairman Goerner disagreed.

Mr. Perry continued with his update noting that a recent Style magazine issue discussed the value of water in the area. The article included a picture of fishing, and comments by an angler that the biggest fish are caught in the Harris Chain. The article further noted that the anglers' favorite lake was Griffin because of the stocking of bass by the Florida Fish and Wildlife Conservation Commission (FWC). Mr. Perry noted that the public are now appreciating lakes more. Mr. Perry noted that LCWA has \$5,000 in their budget for the Harris Council and that there is still \$10,000 currently available for use in the current budget.

Dennis Renfro (FWC) reported that there are currently eighteen fish attractors to currently fish around. Chairman Goerner noted that he had checked a number of attractors with a new fish finder and observed fish around every attractor that he visited.

In other news, Mr. Renfro reported that a hydroflow project on 250 acres in Magnolia Park is still in permitting. They are working to breach and reconnect area 3 of Emeraldal. Mr. Renfro then showed a video of a Lake Apopka tour filmed via a drone as a tourism promotion for tourism directors at a convention in Orlando. Chairman Goerner disapproved of the video, as it showed a diked lake rather than a reconnected marsh.

David Whiting, Florida Department of Environmental Protection (DEP), commented on Dr. Canfield's presentation noting that he had worked with Dr. Canfield on the Clean-to-Green project. Mr. Whiting remarked that when looking at different technologies (for sediment removal and dewatering) there is not a silver bullet answer noting that most current solutions cannot adequately remove ammonia out of systems. Multiple technologies will often be needed to get a viable end result.

Mr. Whiting reported that DEP has developed a process to centralize the review of new technologies that are assessed from different departments within the state. They are doing reviews for efficacy and safety as a product submitted for assessment.

Dr. Fulton updated the Council on the SJRWMD schedule of activities for Lake Apopka. Dr. Fulton noted that dredging at Beauclair will begin in October. Dr. Fulton reported that the Lake Apopka wildlife drive is open and has 1,500 vehicles and 3,800 visitors to date. Dr. Fulton noted that the Emeralda proposal to peat mine has been revived and that SJRWMD staff are reviewing the proposal. The property under consideration is the former Long Farms parcels located east of area 3 off SR 452.

**8. COUNCIL MEMBER COMMENTS**

A. No Comments

B. Discussion of Next Scheduled Meeting

Denis Frazel, Council administrative support staff, reported that he would present an outline for the annual report at the next meeting. Chairman Goerner requested that Dr. Fulton present information on Lake Apopka restoration area rainfall.

Councilman Nicholson suggested that the Council support the pilot project proposed by Dr. Canfield. John Stump inquired as to whether the Beauclair canal dredging work could be dovetailed with Dr. Canfield's proposal.

Dr. Frazel reported that he would check on the availability of Heath Rauschenberger, U.S. Fish and Wildlife Service, for a presentation on Lake Apopka bird mortality.

**9. ADJOURNMENT**

The meeting adjourned at 12:20 p.m.