132nd Meeting of the South Carolina Aquatic Plant Management Council

Attendance:

Council Members: Chris Page, Willie Simmons, Chad Altman, Adam Leaphart, Bill Marshall, Tammy Lognion, Casey Moorer, Matthew Lawson, Sara Carper (representing DHEC OCRM)

Guests: Julie Holling, Matthew Puckhaber, Carl Bussells, Brian Lynch, Allan Stack, Ernie Guerry, Judson Riser, Levi Kaczka, Harrison Browder, Eric Gulledge, Chip Davis, Bobby Johnson, Randy Kelley, Stacy Scherman

Location: Santee Cooper Environmental Resources Building, 1 Riverwood Dr., Moncks Corner, SC 29461

Call to Order: 10:33 am 12/03/19

Minutes:

Chairman Chris Page called to order the 132nd Meeting of the South Carolina (SC) Aquatic Plant Management Council (Council). He asked everyone to introduce themselves and tell who they are representing, including the four people on the phone. Once that was done, he noted that the people on the phone are members of the Council and a quorum was present in case we need to vote on anything. This is just an informative session to talk about what happened last year and to start to get an idea of what we are looking at for next year regarding the management plan and any topics we may want to hear about in the 2020 Council meetings. We tried to do this meeting at the SC Aquatic Plant Management Society (SCAPMS) meeting as a side agenda item, but we did not have a quorum, so we could not do any official business. He noted what is in the meeting packet today: an agenda, and the minutes of the last meeting. We will get to those minutes in a moment, but we will open the floor for public comments. He gave the floor to Mr. Randy Kelley.

Mr. Kelley appreciated the opportunity to be here. He found out about it last week from Dwayne Porter at the University of South Carolina's (USC) School of Environmental Health Sciences (SEHS). Mr. Kelley is here representing Water Watch of Lake Wateree. It is a volunteer water quality monitoring organization that has been in effect, not consistently, but with a 5 year gap, and been monitoring water on the lake since about 1999. As far as he knows, it is one of the oldest and longest lasting volunteer monitoring organizations in the state. It is funded, for the most part, by the Lake Wateree Association, which is an open membership group on the lake that consists mainly of home owners, but also commercial and other stakeholders. Anybody can be a member of it.

Mr. Kelley is here today to raise awareness of about a significant, growing concern about algae, specifically *Lyngbya*, on Lake Wateree. We started seeing pretty significant mats of

Lyngbya back in 2014. Through our partnership with the USC SEHS, we started paying a lot of attention to it and even have been doing some specific work to try to identify nutrient limitation and that sort of thing, as well as shoreline mapping. There is quite a bit of research that is on our web site, if you care to go look at it, which you can do by Googling "Water Watch of Lake Wateree." It is a ridiculously long web address, because it is a free google site. All of our reports and a good bit of information about Lake Wateree and the USC research is there.

The concern Mr. Kelley wanted to address today is that the algae continues to grow and spread pretty consistently year by year. While we see some ebbs and flows related to water flow, water level and weather changes, especially heavy rainfall events, the overall trend is on the increase. We believe, based on more than a scientific guess, because pretty good information supports it, there is a continuous increase in the inflow of nutrients coming from upstream. You can talk about global warming and climate change, but those tend to be controversial topics. Regardless of whether that is happening or not, the one indisputable fact is that upstream from Lake Wateree, in the Catawba River basin, the population is exploding. If you look at the period from 2000 through projected 2030, the Charlotte metro area is going to increase by probably fifty percent. By 2030, there will be some 2.5-2.7 million people living in the upper basin, where it is now well under 2 million. We have got less permeability, with more roofs and asphalt, so there is more runoff and nutrients going into the basin. Unfortunately, Lake Wateree is at the end of the Duke impoundment system and so much of this stuff ends up there.

Mr. Kelley noted that the lake and the basin are a primary source of drinking water. If you go talk to people at the Camden or Lugoff-Elgin water treatment facilities, they will tell you that algae is getting to be a very serious concern and they are actually having to start to deal with it as they process drinking water. It is a lot more than an aesthetic, ability to use the lake for recreation, or property value issue. It is all those things, but it will also soon become a safety hazard from the standpoint of drinking water. We are very concerned about it. There is a lot of frustration in trying to understand which regulatory agency is doing what to study it, understand it, and ultimately treat it. He appealed to the Council to help the citizenry understand who is doing what and how do we get a coordinated effort to deal with it. It almost seems like it is an insurmountable problem because the increase in nutrient inflow seems inevitable and impossible to stop, but he really feels like Lake Wateree is like the canary in the coal mine or the tip of the iceberg. We are probably seeing more of it than anyone else right now. As far as he knows, the SC Department of Health and Environmental Control (DHEC) has only issued one warning for harmful algal blooms and that came earlier this year on Lake Wateree, but you can be sure that it is going to be in other places, will get worse, and will be a health issue in addition to all the other things. He noted that DHEC has increased their monitoring and indicated to the Water Watch group that they are suspicious of point sources upstream. The information seems to be increasing. We sense that there is a strong spirit of cooperation and a lot more awareness. He asked if there is a plan, as the stakeholders would like to know more about what is happening.

Mr. Page addressed those with a couple comments. He discussed a similar situation on Lake Greenwood about 20 years ago involving *Pithophora*. It took a while to locate the source

of the nutrient load, which was a sewage plant upstream, but once that problem got corrected, it was easier to go in and treat that algae and eliminate it. Since that 20 years has gone by, we have not had that algae problem again. That being said, *Lyngbya* is a little tougher than *Pithophora*. It requires constant dosing of copper, which is going to affect the environment just about as bad as the algae, especially if you have to treat large areas. Until you get the source identified, you cannot really treat it because you are just going to be chasing your tail with repeated, almost weekly treatments that would only know it back temporarily.

Mr. Page said the other issue is the drinking water. There has been an increase in blue-green algae across the state, which has become more problematic in the last ten years. Whether it is from climate change or just more nutrient load in the system is a good question and may be a little of both. He asked Santee Cooper (S-C) if they had treated for algae problems. Mr. Bussells said they had not had those loading problems. Mr. Page said the City of Charleston has had those loading problems. Beaufort-Jasper has also had loading problems and even created a separate lake storage system they could treat before the water came into their treatment plant. This is more likely a problem with blue-green algae that produce geosmins and methylisoborneol (MIBs), causing taste and odor issues. Anderson has had it in Lake Hartwell. Spartanburg has had it in Lake Bowen and Reservoir #1. They have implemented a $27 million plan and they have additional project that will bring the total up to $40+ million to clean the water for drinking. Clean drinking water is the number one problem. If you cannot swim in it, that is fine. If you cannot drink it, we are all in trouble. Most recently, West Columbia and Lexington have had that problem. He said part of the reason they are having problems is the intake location, which he described. Some of the problems are with the infrastructure and repairs to those often get put on the back burner.

Mr. Page thinks the biggest problem at Lake Wateree is the identification of that source. If we can identify the source and limit the nutrient load coming in, he thinks we can then remediate the algae. There are multiple ways to remediate it other than copper, including manual removal and hydro dredging, both of which are difficult and expensive. He provided details on how each of these processes worked. His other issue right now is Duke, and he has said this to their representative. That is a Duke lake. Duke does not want to spend any money for some reason. Duke has quit doing any maintenance in most areas, even in North Carolina. They have almost gone to a zero dollar situation, which he does not think they should be doing, morally or legally. He is not a lawyer and does not know what the FERC license says, but somewhere in there, they have a responsibility to that lake system.

Mr. Page said there is the other side of that: where does the responsibility lie with the state? We do not know that for sure. If, as an individual homeowner on Lake Wateree, you wanted to treat, you would simply have to get permission from Duke to treat your cove. That is the problem he has with the way the law is written. Mr. Kelley said he did not think people are aware of that. Mr. Page said Clemson's Regulatory Services says that the owner of the waterbody can give permission to anybody to treat with a certified applicator. Now, here is the legal part of that: do not all waters in the state of SC belong to the state or federal government?

Where do we come into that picture? The SC Department of Natural Resources (DNR) is responsible for the fish and wildlife. They are not necessarily responsible for the water, per se. The courts will have to resolve it. What scares him about that is you may have a cove with 12 homeowners and each of them may get permission to hire an applicator. There are twelve applicators out there at different times, spraying 12 different things or maybe the same thing. You automatically violated the label law by spraying the same thing in the same area multiple times, because there is a limit on what you can use. Without some oversight somewhere, you cannot do that. The oversight goes back to the owner of the waterbody. He has had this discussion with Tim Drake at Clemson until he is blue in the face. Mr. Drake says he understands Mr. Page's point, but that is their position and they cannot put anything else out there because that is what their legal department says.

Mr. Kelley said if it gives the Council any peace of mind, we do a good bit of community outreach and our statement is that we do not want anyone doing any chemical treating whatsoever. We cannot do any legally without DNR approval, or that is what our research determined. It is fine with us if it stays that way. We do not think chemical treatment is the way to go. We have some cowboys out there that will do their own thing and there is plenty of evidence out there that it is getting treated by individuals from time to time. Mr. Page said that is absolutely against the law, because if they are not a certified applicator, they cannot do the work. That is a legal quandary, which he has addressed with different people across the state. He does not really know how to handle it. He sees that as a permit situation, because they have to provide detailed information to get permission, according to Clemson, but they do not want to call that a permit. If a property owner has to call the lake owner to get permission, and has to provide information on what is being used, where it is being using, how much is being used, and who the contractor is, is that not a permit? It is the same information that is on a permit, even though they are not calling it a permit. Mr. Kelley said it only does harm to the water, to the shoreline, and at best, it is a temporary fix. As long as the nutrients are still coming in, it is not going to prevent it from coming back.

Ms. Moorer said that control program should be two phased, from an aquatic plant management stand point. Herbicides are a great tool and can be effective on *Lyngbya*, but, as Mr. Page said, if you are going to do the herbicide treatment, you also need to address the source. If you protect the source of that nutrient loading or cannot locate it, there will always be a continuous cycle. She would not shy away from herbicide use on *Lyngbya*. At S-C, herbicides are used on *Lyngbya* in areas. It is a different situation and different reservoir, but it is a good tool and it can be safe and effective. That is something you need to consider when you are talking about that, as well as the source of the nutrient loading. Mr. Page said S-C is not getting as much of a constant nutrient loading as they are having. Ms. Moorer said she does not know their water quality, but the S-C system is nutrient rich. Mr. Page said when it first showed up, they knew it was loading, but they could not determine a source, either point or non-point. They identified all the locations it might be coming from, but there was nothing in the area that was causing that increase.

Ms. Moorer asked if there been any mapping on the lake as far as acreage of *Lyngbya*. Mr. Page thinks that has been done. Mr. Kelley said they started doing shoreline surveys from the water in September. He thinks there are 240 miles of shoreline. We have maps that go back to 2015. The methodology keeps changing, so it is hard to look from one map to another. This year, we went to GIS using Google Earth Pro. We have a grad student that is doing all the charting for us. He held up a map that he was not sure if everyone could see it. What is in blue is mats all around the lake that we recorded in September of this year. The orange is from July of this year. We try to survey early in the warm season and late in the warm season, and do a comparison. Obviously, you see a lot more in September than you do in July. If you look at it over the years, you see more and more points on the map that were not there at all before. It used to be more toward the southern end where the water had more time to warm up, sediment settled out, and the water got clearer. The growing conditions were better down there. Now, farther and farther upstream and closer to the main flow of the lake, you are seeing it in almost every cove where there is any calmness of water at all and shallowness. It is spreading. If you coordinate that with the trend lines of nitrogen and phosphorous, it all really fits together. It is pretty obvious to see what is happening, but the big issue is where it is coming from. In casual conversations with DHEC folks, it seems like they are aware of point sources somewhere upstream, and it cannot be all that far upstream, but what are they and what is being done to address them is what we do not know. He thinks people know, but we do not know. We do not need to know where it is. We just need to know that it is being addressed.

Mr. Altman said a lot of that information is coming out of his section in the Bureau of Water. We have hired Emily Bores as our algae expert. She just came back from a training session in Maine. She mainly does harmful algae blooms. She talks with Dr. Porter all the time. Mr. Altman is not involved with them much, but sees them often when both of them are loading boats early in the morning. He knows that the modelers, Total Maximum Daily Load folks, and surface water people are headed to Lake Wateree to try to find a source. Mr. Page said that is the key. Mr. Altman said they are working their way through the system, trying to find a source. They are doing what they can with the available staff, and we are strung out all over the place. They have been working on Lake Wateree and he thinks they were doing some work all the way up to Fishing Creek Lake. Mr. Kelley said he thinks that, if Jeff Scott is telling him accurately, Mike Marcus is going to come out and do the next monitoring run with them in December. Mr. Altman said Dr. Marcus will do that. He is hands on.

Mr. Page said he talked with Brett Hardis with Duke Energy to look into a drawdown on that lake. He knows that is not something that people that live on coves really want to see, but a drawdown has a tendency to pack the sediment and not allow nutrients to escape from the sediment as easily. It also allows sunlight to degrade the sediment packages to take some of those nutrient levels out. It is actually a best management practice of a fishing lake to do drawdowns periodically. Mr. Kelley asked what level of drawdown would be done. Mr. Page was not sure, but Dr. Hardis was going to look into it. Mr. Page has not heard back from him. They spoke in October, so Dr. Hardis has probably been busy.

Mr. Page does not know what levels are possible on Lake Wateree. He knows what is possible on a lot of other lakes that we have been around, like Lake Murray. He knows it can go down 15-20 feet, although that cannot occur anymore because the FERC license limits it to about 10 feet. He discussed in detail how the Lake Murray Association (LMA) worked to get that change made despite the detrimental effect it would have on the efficacy of the drawdowns. He hopes the same things does not happen at Lake Wateree.

Mr. Page said if you look at any historical manuals for fisheries over the last hundred years, every one of them says you should do a periodic drawdown of the lake. Mr. Kelley asked if 15 feet is recommended. Mr. Page said 15 feet is what he wanted Murray to do. He has not looked at Lake Wateree. He was waiting on Dr. Hardis to get back to him to look at the depth it would need to be. He asked Mr. Kelley at what depth most of those coves would be exposed. Mr. Kelley said it is down about 5 feet right now and that is about as low as he has ever seen it. He is seeing shoals exposed now that are usually underwater. The lake is probably at 95 feet right now, and because it is a shallow lake with a gradual decline from the shore, you probably have 20-25 feet of the bottom exposed in most areas. Anything from this point is going to have a real significant effect and would be very helpful. Mr. Page said that may be Mr. Hardis doing some of that and he just has not told Mr. Page or provided the information requested. Mr. Kelley said that where it is right now is certainly going to be helpful, but it needs more. It needs a good bit more. He does not know what the limit is either, because of the dam limit. They could probably draw it down to whatever the water treatment facilities could deal with.

Ms. Moorer said from a Council standpoint, maybe we could facilitate a meeting between Mr. Altman, Dr. Hardis, and Water Watch to try to connect the dots, since Water Watch and DHEC are doing nutrient studies and Dr. Hardis is the manager at Duke over their aquatic plant management program.

Mr. Page noted how our program works. Normally, we are called in by the entity that owns the lake, not the homeowners or anyone else. In your case, it would be Duke, requesting us to come in to do cost share work with them. Like he said, he would not mind doing that, but he does not want to go out there and chase my tail without solving some of the nutrient load problems, because we have three people on staff and we run the state, every public water body in the state, including most lakes and rivers. We spend a lot of time down this way.

Mr. Kelley said he was here to be the squeaky wheel. Mr. Page understood that and it takes that sometimes. You have to stick with it. Mr. Kelley said they do not know Dr. Hardis as well as some of you do. We have been introduced to him since he came on fairly recently to Duke. Mr. Page thought it was about 6-8 months ago and provided some background on Dr. Hardis. Mr. Kelley said we could approach him from our organization's point of view and encourage him. Mr. Page asked if Duke attend the Lake Watch meetings. Mr. Kelley said they attend most of them. He said he did not think Dr. Hardis had attended one, and it is usually not a water science type person. It is usually someone like Rick Gerand, who is the VP of Communications for SC.

Mr. Page said that might not be a bad person to have there. At meetings in the future, you might need to start talking to him about Duke and start hammering him about that because that is where it is going to come from. If Duke comes up with a pot of money, they could put an applicator out there right now, treating 24/7. Mr. Kelley said it is like you said before. They eliminated the mosquito control program a couple years ago and have been cutting back as hard as they can. Mr. Page said they are shirking their public responsibility, in his opinion, and he knows he should not have those opinions while sitting at the front of this table. Mr. Kelley said he is not alone, but we do have a relationship to maintain with them. It cannot be all confrontational. It has got to be cooperative, as much as we can. We like to tell them where we think they are messing up, and complement them when they are doing good things. Mr. Page hopes there can be some meaningful compromise. Mr. Kelley agreed and said hopefully it also means getting something done.

Mr. Page said he has been keeping up with the issues on Lake Wateree, but just has not been to the meetings. He knows Dr. Porter well, too, and has known him since he was a student. Mr. Kelley said one of the best things that has happened is they have gotten a huge grant from the National Institute of Environmental Health and Sciences. They have gotten about $6 million. The primary focus is coastal waters and the impact on human health, but there is a big piece of it that deals with Lake Wateree here and Lake Waco down at Baylor in Texas. Those are the two main field lab sites where they are doing a lot of research on the toxicity of algae and other water organisms. Fortunately, they are using Wateree as a site for doing a lot of research and algae is the focus there. It is like we have to learn a lot before we can do anything. That is frustrating. He thinks the elephant in the room is the upstream sources.

Mr. Page spoke at length about potential sources, why those become problematic, sometimes unintentionally, and what can be done to resolve the nutrient problem once the source is found and resolved. He thanked Mr. Kelley for coming. Mr. Kelley said it was a great discussion. He really appreciated the response. He left the map he brought, along with his contact information. Mr. Page said he would be keeping an eye on it and talking with Dr. Hardis and various sources at USC and DHEC.

Mr. Page thanked S-C for providing the room, the snacks and coffee. He reminded Ms. Moorer that SCAPMS approved money to cover those expenses several years ago. He said having a meeting in the Columbia office is a pain, because there is no parking. That is why we are doing remote meetings and trying to cover most of the state with the meetings. He asked if there were any more comments. There were none. He said we would take a five minute break and return to discuss the minutes.

Mr. Page called the meeting back to order. He asked if anyone needed more time to look at the minutes. Ms. Moorer made a motion to accept the minutes. Ms. Lognion seconded the motion. Mr. Page said we have a motion on the floor to accept the minutes as written, with no changes that we know of. If we look at them again and see any typos, we will correct those

before saving the final. We have a second. He called for a vote. The motion carried unanimously. Mr. Page turned the floor over to Ms. Moorer for the S-C update.

Ms. Moorer said this is a quick overview of what we did at S-C for the 2019 season. We are going to start off with our totals of what we treated this year. We got about 1,400 acres of invasives this year. This is a combination of our in-house crews and our contract crews with Estate Management. The difference in 2018 and 2019 is our crested floating heart (CFH) numbers went up, as did our giant salvinia numbers. Last year, we treated under 100 acres of giant salvinia and we are close to 600 acres this year. In 2018, we treated about 150 acres of *Hydrilla*, and we are down to about 30 acres this year. We were spot treating *Hydrilla* with ProcellaCOR, which is the new herbicide that hit the market in 2018 that is very selective and will not damage most of our natives. *Vallisneria* (val or eel grass) is fine with ProcellaCOR. It will bang up our pond weeds and naiads, but they recover pretty quickly. It will take out the *Hydrilla*, so we have been using some of that this year. Our water hyacinth numbers were much lower this year than they were last year. We also treated about 600 acres of *Phragmites*, but that was not on the S-C lake system. It was at our generating facilities at Winyah Bay in Georgetown.

Ms. Moorer moved on to do a quick overview of a project we did this year with DNR. Judson Riser oversaw this project and planned it for us. He may, at the next meeting, take the opportunity to do a full presentation to share all the details. The slides she is going to show are just a high level of what we have done on the system. One of our goals this year was to do some native vegetation planting across our system. At the Council meeting up at Greenwood State Park, there were a lot of homeowners there concerned with *Vallisneria*. Mr. Page hooked us up with some polygons where we could go harvest these sites, and Julie Davis, as well, that manages Lake Greenwood. Our mission was to increase the beneficial native vegetation on Marion and Moultrie to provide more diverse habitat for all the wildlife we have.

Ms. Moorer said in May, around Memorial Day Weekend, we went up to Lake Greenwood and we took the polygons we got from Mr. Page and Ms. Davis and we went out and harvested some val. Basically, we went out, threw some rakes in water from waist deep to above our heads, dove down and pulled up mats of *Vallisneria*. We transferred it into totes and brought it back to the house we were staying at, packed it up and hauled it back to Lake Moultrie and Lake Marion. The next day, we went out in two teams, and this is where we did the cooperative work with DNR Region 4. We had two transplanting teams that went out. We had four sites on each reservoir. She showed the Lake Marion sites. We selected sites where we looked at past hyperspectral imagery to see where we had good val before, looking at sediment, water quality, and things like that. We did not have val in those areas recently, so that is why we selected these areas. We built 10’ x 10’ exclosures to help protect the plants and used peat pots to plant them. There were 12 plants per site. The Marion sites were on the south side from Spier’s Landing west to the Eutaw Springs area. On Moultrie, one site was near the Hatchery and the other three were on the north side where we had good val habitat before. We actually had a lot more this year. We will not take all the glory from Mother Nature. She did a lot of the

work for us, helping us out with the expansion of the val that we are seeing. The planting sites were monitored monthly to see how successful we were. She showed a video from one of the GoPro cameras that were used to help monitor the sites, which showed how the val is expanding from month to month, as well as the orange netting and the t-posts used for the exclosures. She said they did get input from some of our public interest groups, some waterfowl groups. We also did this with Watershield, which is a good waterfowl food. You can see the val spreading across the bottom, where we started with 12 pots per 10' x 10' area. She asked Mr. Riser if this was the video with the fish in it. Mr. Riser pointed out a bed, but thought there was another video that shows a small bluegill. He said it was amazing. Every time you went to those exclosures, you would see a school of golden shiners or something else in there. The vegetation was like a magnet. It was cool to see.

Ms. Moorer said this is a project they are going to continue. Some of those sites were pretty successful. We did lose a few due to low water and Lyngbya took over a few. We did have *Hydrilla* in a few of those that were spot treated with ProcellaCOR. It did take out the *Hydrilla*, but there was some regrowth and we are thinking that was from tubers. It did prove that we could spot treat *Hydrilla* within in those sites and not damage our eel grass. Mr. Riser may, at the next meeting, keep you updated. It is a project we want to continue doing. Right now, our natives are doing really well on the system. We cannot do a better job than Mother Nature, but if we can transplant and move these plants around to places where we do not have them right now, that is the goal. Upper Marion is one of the spots that we are really interested in doing more.

Ms. Moorer said we actually found a huge plot of val that we did not know about, but we did this same type of project back in 2013. We used a different planting technique that we did not think was as successful as this planting technique, but we do not know how to explain this val up there above Pack's Landing, other than that is where we did a lot of transplanting in 2013. Mr. Page asked if that was where we wrapped the tubers in cheesecloth. Ms. Moorer confirmed that and noted the mention of tubers reminded her of something else. When we harvested this val from Lake Greenwood, because they do have *Hydrilla* present on their system, we did screen the plants. It took us two days to plant everything. One team was screening the plants and the other team was planting the plants, to make sure we were transplanting what we wanted to transplant and not *Hydrilla*. She asked if there were any questions about that. Any more, Mr. Riser will be happy to tell you more about how we planted. It was successful. We had lots of input from some of our chemical manufacturers, NC State, and a bunch of other people.

Ms. Moorer moved on to the 2019 *Hydrilla* survey. For several years, we have been doing hyperspectral imagery at S-C. In years past, we have been using fixed wing aircraft to collect that data with the Galileo Group. Years ago, ReMetrix was involved with that and then we went straight to the Galileo Group. This year, we had a marked increase in price of about 30 percent. It was going to be very costly for S-C to do this survey, so we reached out to other people in the industry to see what other options were out there. We wanted to stay with hyperspectral, because it is a great technology. The costly portion of that is the collection of the

data, with that fixed wing aircraft being here. We are in the south. We are close to the coast. Sometimes we would get impacted by hurricanes or severe weather events, so that would mean we would not be able to collect that data. Hyperspectral can only penetrate, at best, three feet of the water column. If you have high turbidity or high inflow causing high turbidity, you have gaps in the data. In 2018, we had a gap in our data. In 2015, we had a gap in the data, because we could not collect the data at that time.

Ms. Moorer said what we have done is gone to satellite collection, which is a new technology that ReMetrix is offering now. It uses hyperspectral, but is collected through satellite, which may pass by every two weeks, and are collecting data. The benefit to that is that we can select out when we want to look for submersed vegetation. If we are looking for *Hydrilla*, we will do it later in the season, when it is topped out. If we want to look for pad plants such as water lily or water shield, we would do that earlier in the season, before the end of their growing season. Instead of just focusing on a late September or early October flight, we can break it up throughout the year. The cost is much less because of the satellite collection is not a fixed wing aircraft at Berkeley Airport sitting on the tarmac waiting for no cloud coverage.

Ms. Moorer noted the next few slides are the preliminary data we got back from ReMetrix. It is just *Hydrilla*. At the next meeting, we will have the final package that will include all the submersed vegetation and all the other invasives we are managing on the S-C system. Right now, between Moultrie and Marion, our preliminary data shows 143 acres of *Hydrilla*. That is topped out *Hydrilla*. That is *Hydrilla* that is within three feet of the surface of the water. We are going to go through that. You will see the hot spots. The far left polygon is upper Bee Tree Lake. That is one of the areas we have spot treated this season. That lower area was also treated as well. Mr. Page asked if Bee Tree Lake was one of the areas we did cutgrass control. Ms. Moorer said it is. Here is the double edged sword of that. That place was inundated with cutgrass. There was just a channel through there that we kept open for years. A few years ago, we did a cooperative project with DNR and the Waterfowl Association. We decided to do some cutgrass work on the system and Bee Tree Lake was one of the places we did it. We opened up potholes in there. Now, those potholes are full of *Hydrilla* and giant salvinia. We removed one thing and something else moved in. That is just the nature of it. Both of these areas were spot treated this year.

Mr. Page said it basically exposes the area to sunlight and the plants can then grow. In that situation, it was covered up with cutgrass and there was nothing penetrating that thick layer of cutgrass. Ms. Moorer said one problem we had up there at Bee Tree Lake was we did transplant some watershield up there and we were really happy about how well it was doing. But then we had *Salvinia* and *Hydrilla* in there that had to be treated, and that impacted the watershield. Unfortunately, we were not able to get the native established because we were having to treat invasives.

Ms. Moorer said on Lake Moultrie, you will see on that northern side is where we found most of the *Hydrilla*. We have not spot treated on Moultrie this year. In 2018, that is where we

spent most of that 150 acres we treated with ProcellaCOR. On this map, we did find a little patch at the Hatchery and in that far left corner at Duck Pond, which is a hot spot for *Hydrilla* that we have had in the past. She showed some zoomed in maps of those areas. These polygons are topped out *Hydrilla*. In the next few slides, you will see what we found when we were doing our ground-truthing surveys. We would throw a rake. It would be val and the val would look awesome, but you would also find a sprig of *Hydrilla*. Those sprigs of *Hydrilla* that we were finding along the shoreline, mixed in with the val are not counted in the 143 acres. That 143 acres is topped out. She wanted everyone to keep that in mind that a topped out hydrilla acre is different than one of these.

Ms. Moorer noted we are going to talk in distribution when you look at these slides. You will see a bunch of H's. That is where we threw a rake and we picked up *Hydrilla*. It could be mixed in with val or some other native species. It may not be topped out, but we threw a rake and found *Hydrilla*. You will see it concentrated up on Lake Marion, the upper portion, and then around Jack's. Here is a zoomed in shot around Persanti Cut, which might mean something to Mr. Simmons, since it is close to Hickory Top. On Lake Moultrie, you will see the same thing. The majority of the rake tosses we did got *Hydrilla* on the northern portion of the lake. What you will see in the next few slides is a lot of the H's she point to, which are topped out val. It looks great and you would ride through there and think it is all val. You toss a rake and you are going to pull up a sprig of *Hydrilla*. She showed several pictures of those areas. In places like this, you might ask if we are going to go in and treat with ProcellaCOR. The answer is not necessarily. It is so sparse in those area that you cannot justify the expense to treat that whole entire area. Where we did spot treat was where we found good stands of hydrilla that we knew was there and it would make a good impact. In 2018, Mr. Guerry treated a place over at Angel's Cove that was about 50-60 acres. It was all val and bacopa, which we wanted to keep, but the *Hydrilla* was pretty dense in there, so it was justifiable. We did not was to lose that whole cove of val to *Hydrilla*.

Ms. Moorer said we will get into where we are at and what we are thinking for our grass carp stocking numbers. We are not going to vote on anything today, but just to get the Council to start thinking about where we are going to be in 2020. She described the process of getting the plan approved and that S-C needs that process to move fairly quickly. That allows for the grass carp can be stocked as early in the year as possible, so they will be most effective.

Ms. Moorer spoke about where we are at right now in 2019. This 41,000 number is after mortality has been applied and the 10,000 we stocked in the spring. The 41,000 is the standing stock right now. You will see we were at 568 on hydrilla in 2017. We did not have any data in 2018, so there is not a point there. The 143 acres for 2019 is preliminary, which could go up some, but will not go up significantly. We will tweak it some as we do more ground truthing, but it will not be anything substantial.

Ms. Moorer stated in 2017, the Council agreed to start stocking 10,000 fish on the S-C system in order to start backing our population down, but not stop stocking like we did in the

early 2000s. That is what we want to avoid, and that is what the Council agreed on. We started slowing our curve, so we can back into that ideal number and not do these knee jerk type of management moves on the S-C system. Ms. Moorer stated this chart shows you in 2019, the S-C lakes had 41,000 grass carp. This other column shows that 13,000 fish are needed to replace the 32% of mortality of the 41,000 standing stock. From our management standpoint, what we are seeing on the S-C system, with native vegetation recovering and *Hydrilla* at bay right now, we are very close to needing to replacing mortality and that population might be the right spot for S-C system. There are so many things that come into play when you think about the things that happen in 2015, 2016, and 2017. We had a flood. We had Hurricane Matthew. We had Hurricane Florence and Hurricane Dorian. We had a weather event each of those years. Water quality conditions play a big role in the growth of aquatics plants. We saw that last year with Crested Floating Heart (CFH) that we did not have much acreage. We thought we had it whipped, and then this year it was right back. Mr. Davis can tell you they treated more CFH this year than they did in previous years. We realized that water quality is an environmental condition we need to consider. Right now, the way the plan is written, we can stock 10,000 fish, with an option to stock more in the fall if conditions warrant. If we get out in the system and we have this explosion of *Hydrilla*, we will have an opportunity to react to that. Mr. Kaczka will be giving us an update today on his grass carp survey. At the next meeting, he will have his finalize results. Those things all go into our reasoning whenever we are thinking about what we are going to stock.

Ms. Moorer said there are three impoundments on the system that we want to stock fish this year. There are more impoundments, but there are only three we want to stock. Fountain Lake is over in Eutawville area. It is mostly a residential impoundment. It is full of *Hydrilla*, naiads, and pondweeds. We spent a lot of time and money in there with herbicides. She does not remember stocking fish in Fountain Lake, but Mr. Davis might be able to help. Mr. Davis stated it has been stocked before, but it has been a while since it was stocked. Ms. Moorer stated this is a 53 acre lake and we want to stock 800 fish. That is 15 fish per acre. We would like to use that rate because it is so dense. It is strictly a residential area. In the zoomed in picture, you can see it is surround by houses except for this one back corner. There is no access to the lake except this corner right up here at the road, where the road crosses and has a culvert. It is not big enough for the fish to exit that system unless it is overflowing the road.

Ms. Moorer said Dean Swamp is the next impoundment. We did a lot of *Lyngbya* work in Dean Swamp over the past three years. At one time we had *Hydrilla* in there. It was controlled with a fluridone treatment in there and we put some fish in there as well. She stated the *Lyngbya* is probably keeping the *Hydrilla* suppressed for us in there. We do have some submersed edge vegetation. We are spending so much time and money on the *Lyngbya* program in there, it would be nice to go ahead replenish the stock of fish in there. It has been quite a few years since we stocked fish in there. The same would go for the water control structure there. It basically is a spillway and the water would have to be super high for the water to be able to spill. The rate for Dean Swamp is the 10 fish per acre.

Ms. Moorer said Church Branch is the same. It is another impoundment over in Wyboo, which is all residential. We do have a grass carp screen that was installed on that water control structure a few years ago by our construction services group. That is still intact and looks good. We would like to stock 10 fish to the acre in Church Branch as well.

Ms. Moorer moved to the last few slides of our giant salvinia battles over the past season. This is Bee Tree Lake area which also has *Hydrilla* in it. On the left is after treatment that we spent a lot of time in the summer doing. We spent all summer trying to take out *Salvinia* in there. We did do some systemic herbicides mixed in with a contact herbicide. The systemic rate we used was not high enough for in-water activity. It had slight in-water activity, but was not going to hang around. That was intentional. It is super expensive when you do a foliar application in there and try to keep ahead of it. The picture on the right was taken two weeks ago, when it was cold out. That is Bee Tree Lake now, after spending a lot of time in there. We are looking for things to do where we can have in-water activity and sustained in-water activity to work on *Salvinia*. Mr. Stack and others did touch up work with some diquat on that left side picture. That is a contact herbicide, which is relatively cheap, but not the safest to apply. That follow up treatment with the contact herbicide was to try to keep it at bay.

Ms. Moorer went on to the next slide of one of their fluridone/Sonar sites, where they having been treating giant salvinia. It is a systemic herbicide that has in-water activity. The problem with fluridone is that you have to keep a concentration for an extended period of time. In a system like S-C, the flow is not our friend. What we have done is identified these nursery areas, which are kind of backwater areas with a lot of Salvinia growing, where we can go in and do relatively small treatments. When she says small, she is talking like 30 acres or more. They treat the whole water column and we bump those treatments every thirty days. It is a really low rate. We were targeting 30 ppb (parts per billion). The max that you can put in an area for the season is 150 ppb. What we did is we broke 30ppb down to five treatments throughout the season. It was pretty successful. The left is pretreatment. The right side is mid treatment of those five bumps over five months. How fluridone acts on the plant is it bleaches the plant essentially, so that it cannot photosynthesize. These little white pieces are *Salvinia* and this lighter green is duckweed, which is also impacted by fluridone. It is definitely working in there and we were holding concertation long enough. The good thing about fluridone on *Salvinia* is that once it is affected by that thirty day ppb on the first treatment, it slows the growth rate down. That gives us a little more time to get ahead of it, because it reproduces so quickly. It is like 72 hours or less that it can double its biomass. When you look at Bee Tree Lake, you understand how fast it is growing and how it can get back to that. When we can keep some low concertation of fluridone in the water, it slows the growth down. In 2020, our game plan for *Salvinia* is to do some more fluridone treatments. Bee Tree Lake will be one. Coca Cola Slough will be another. That is one thing we worked with Mr. Simmons this year. There is an irrigation restriction on fluridone, so whenever he is pulling water into his impoundments, we have to be careful around that. It is a really low dose. She does not know if it would impact the irrigation, but we do not want to take a chance. Mr. Page asked Mr. Simmons what he was irrigating. Mr. Simmons stated it was corn. Mr. Page stated it would be alright. Ms. Moorer stated Bee Tree, Elliot, and

Coca Cola Slough and if we identify any other areas, we will continue that in the spring of 2020. The only issue is the fluridone treatment is not going to work in open water situations. We are still on the hunt for something. With Diquat, if you get it on it, you will kill it. It is just a matter of getting it on there and making sure you hit every little piece. Because the regrowth is quick, it is really hard to get ahead of it. She asked if there were any questions. There were none.

Mr. Page thanked Ms. Moorer and commended the work S-C has done in doing the planning over the years. He has been involved in some of those and they are not done helter-skelter. They were all tracked with GPS and the follow-up was there. He talked at length on various strengths of the hyperspectral satellite information, including the higher resolution imagery, the ability to look for different species at different times of the year, and the ability to merge data from multiple time frames into one data set. Ms. Moorer stated that ReMetrix is supposed to have all of our data sent to us by the end of December. At the next meeting, we will have our Vallisneria numbers, our native SAV (submersed aquatic vegetation), giant salvinia, CFH, and water hyacinth numbers as well.

Mr. Page thanked the team at S-C and told them great job on the transplanting of Vallisneria. Mr. Riser said it was our whole team. It was a lot of work with a lot of people. Mr. Page stated he was the lead, so he have to thank you. Ms. Moorer stated he was the lead.

Ms. Moorer mentioned that we have the B.A.S.S. Elite Series coming to the S-C systems in April 2020. We are really excited. She spoke about the outreach work they are planning on doing to ensure the participants are not spreading *Salvinia* or other invasives to other waterbodies. Ms. Moorer asked Mr. Page and Mr. Simmons if DNR might be able to help out and do courtesy boat checks. She feels that a lot of those fisherman already know about *Salvinia*, since they fish all over the nation. We are excited about them being here. They have not been here since 2006.

Mr. Page spoke briefly about *Salvinia molesta*, including its form, growth pattern and reproduction. He also mentioned the native species, *Salvinia minima*, which is not nearly aggressive. Oddly, the new herbicide, ProcellaCOR, works on the native species, but not on *Salvinia molesta*. Mr. Lawson asked if PRT needs to post anything at their boat landings. Mr. Page stated a good policy at any state park would be to have people inspect their boats. S-C staff offered to provide examples of their signs and the file to have some made. Mr. Page stated that if *Salvinia molesta* in the park lakes, it will really be a problem. Ms. Moorer stated in a pond it would be much easier to control than a 170,000 acre reservoir system. Mr. Page thank Ms. Moorer. He asked the Council if there were any questions. There were none.

Mr. Page stated that Ms. Holling works for him. He gave her the floor. Ms. Holling stated she is not well versed as Ms. Moorer, so she needs notes. She stated she was not reading these numbers to you. She noted that are these numbers are for the calendar year and not the fiscal year of 2019. She noticed one thing. That is that our total is not much more than what Ms. Moorer and S-C did on the S-C lakes. The biggest difference is our water hyacinth is much

larger. All these species are the primary species being treated. Often there were other species mixed in. There were a few cases where there was not much else mixed in. The total acreage and cost, less than those *Phragmites* numbers, are down slightly from last year. Our *Hydrilla* cost went up a little bit from last year, because we either used ProcellaCOR or a combination of ProcellaCOR/Komeen and/or Clipper. That is for all those treatments. ProcellaCOR is one of our highest cost herbicide. We did treat about 20 more acres this year than last year of the *Hydrilla*. As I said before, water hyacinth is our most problematic species. Hopefully, that will not change too much, because I do not want to have to deal with giant salvinia. If you can tell, the photo in the background is of the Ashepoo River in 2018. The point where that picture was taken was about 200 to 300 feet wide, just to give you an idea of how much water hyacinth was on that tidal river system. The *Phragmites* control was all done on Santee Coastal Reserve. They paid for all of that and we did not do any cost sharing with them.

Ms. Holling reported by waterbody next. The Ashepoo River is all water hyacinth. That acreage is down due to an influx of salt water. We were also able to treat more of the old rice fields due to a treatment during the king tides. We do have some native species moving back into the upper reaches of that system. Back River Reservoir has a little mix in there, including water hyacinth, *Hydrilla*, fanwort, and some floating tussocks, which is just stuff that breaks loose during heavier water flows. Sometimes they float back and forth. Charleston Public Works (CPW) really does not like it when those get drawn into their intakes. We did slightly higher numbers on that system this year, because we were trying to knock back the water hyacinth especially around the William Station intake. Black River is water hyacinth and alligatorweed. Hopefully, we will be able to get some alligatorweed flea beetles next year to work on that alligatorweed in that system, so we will just have to deal with water hyacinth. On the Cooper River, we dealt with *Hydrilla*, *Egeria* or elodea, hyacinth, and primrose. Amazingly, the acreage was about the same as last year. Goose Creek Reservoir is our most diverse system. We are treating hyacinth, spatterdock, duckweed, *Hygrophila*, common salvinia, and water lettuce. A few of those are natives, but can be problematic on that system because it is shallow and parts of it are man-made canals. On Lake Murray, we had two acres of monecious *Hydrilla* pop up. That was found and treated late in the season. Waccamaw River is hyacinth. Primarily, we treated on the lower portion of the system between Brookgreen Gardens to Georgetown. That area is going to need some more treatment next year, because there is a lot of nursery areas in that system. Santee Coastal Reserve is all *Phragmites*. On the state park lakes, we dealt with algae, bladderwort, duckweed, and miscellaneous vegetation that is along the edges, as well as submersed vegetation to open up fishing, swimming, and boating areas. Ms. Holling spoke briefly about the background picture of the Governor's Pond at Charles Towne Landing State Park and some of the issues we are having with it. Mr. Page also made a few comments about it.

Ms. Holling moved on to the grass carp stockings. All of those are maintenance stockings except for the Spartanburg Reservoir One. That was pretty much an initial control stock for bladderwort. We have done a good bit of cooperative work with various organizations. We really do not have anything going on this year except for helping with the val on S-C.

Ms. Holling stated that our program does have airboat. She got to start using it a little more this year. Thank you to Ms. Moorer for some basic airboat instruction. Ms. Holling has continued to learned more as she drove more and that adds to what she has learned from watching and riding with our contractors. She had some interesting experiences there. This year, she also got a visual lesson on how dangerous it is to work on the Intracoastal Waterway. She explained what happened in the picture put in the presentation.

Ms. Holling said our challenges are that we are back down to three people, because we lost Lowell Hook to the Cohen Campbell Hatchery in Columbia. Hopefully, we will be able to hire another technician before next season and have them trained. She showed before and after pictures of Granddaddy Lake in the upper part of the Waccamaw River, explaining how the treatments were done.

Ms. Holling reminded us that Mother Nature can be our friend, as happened in the Ashepoo River Basin with the increase in salinity, as well as the treatment we did with the king tide, which was an inadvertent scheduling. The contractors were happy they could get to areas they had not be able to touch before. Getting into those nursery areas was great and hopefully will help a lot.

Ms. Holling said our budget is directly tied to gas purchases. We get a very small portion of the gas tax, and that number varies year to year. That has to cover staff, equipment, and other things, as well as the treatments.

Ms. Holling noted that public response is always sketchy sometimes. It is getting better but there are always people that do not like what we do. We do attend both Southeastern Wildlife Exposition (SEWE) in Charleston and the Palmetto Sportsmen's Classic in Columbia to promote our program and answer questions, in addition to what we get from phone calls and email. As part of that public outreach, this year we got some new displays, which she showed in a picture of most of them shortly after we got them.

Mr. Page thanked Ms. Holling for the presentation and expanded on some of the challenges she talked about. The Waccamaw River still has usable impoundments on it, including Brookgreen Gardens. Some of them allow the water hyacinth to grow until it fills in their impoundments. Then they open their gates and flush it out with the tide. It builds up in that public waterbody and people that cannot use their boats in some places. He believes Brookgreen Gardens is probably the origin of water hyacinth on the Waccamaw River from thirty to forty years ago when they had it as an ornamental. They probably caused that problem to start with. We cannot go into private impoundments to treat. In the case of Ashepoo River, many of those private impoundments have openings to the creek and to the navigable water, so we are able to get up in there and treat sometimes. Those guys have no way to treat or managing it in there. It is a lot different there than on the Waccamaw River, where some of them are letting it grow and then dumping it out when it gets to be a problem. Technically, it is against the law. We have recourse and Clemson has recourse, but it is almost impossible to determine if it was in the

impoundment first or if it came from the public waterbody. Who is actually responsible for it in the long run? If we catch someone with some of that on the boat transporting it somewhere, that is a different story. He briefly talked about how Clemson does nurseries inspections to ensure no invasives are being sold in the state.

Mr. Page gave the floor to Mr. Kaczka to talk about triploid grass carp health. Mr. Kaczka stated they got a little bit of a late start this year with our collections. The guide that we use to take us out was having boat and motor issues. We actually just finished up. We normally take five trips, but we took six this year. Our first trip got cut in half, so he did not charge us for that one. We just finished up the week before Thanksgiving. We have all of our otoliths from the fish sectioned, but we only have one read through. We need to go back, validate those and correct for any disagreements. The folks that have been doing this have been doing this for a couple of years, so I am confident the ages are going to be pretty close. We got 106 fish total for those six nights. We went to six different sites this year, which I think is one or two more than last year. There were three sites on each lake: around Blount's Landing, Big Oak Landing, and Cathead Landing on Lake Marion and around Angels Landing Campground, S&S Camp Ground, and Blacks Camp/Landing on Lake Moultrie. We had a pretty good age range, from 2 to 20 plus years old. As far as those 20 plus fish, it gets really hard to get an exact age when they are from one of those original stockings. Obliviously, those fish are living a lot longer than they were once thought to live on the system. Those 20 plus year old fish are from the original stocking, but he did not recall us, in the past couple of years, getting fish on the lower end spectrum, that two year old fish. About 23% of the fish we collected this year were of what Scott Lamprecht used to call "legacy fish" or fish from the original stocking. That is nearly a quarter of our fish, and there is some question with the condition of those fish as far as if they feed quite as efficiently as younger fish. So, about a quarter of our fish are those original stocking. Their numbers with their condition are suspect as comparing them to younger fish.

Mr. Kaczka said overall, the condition was 0.83. We are looking at a value of 1.00 being a fish of average condition, but, as has been mentioned at the meetings in the past, that metric was developed for grass carp on the S-C system right after the original stocking in 1994. Even though overall our fish seem to be below average, that is compared to fish that were of probably maximum health and maximum body fat. These are all preliminary outcomes. He will have something concrete in January. We can break that down by age group. For our fish that were 6 years old and younger, their condition was 0.96. That is a much closer comparison to those other fish originally used for developing this condition factor. The fish that were 7 years old to 11 years old, their condition average was 0.83, the same as the overall average. For those legacy fish, the 20 plus year old fish, you are looking at 0.74. There does seem to be a significant correlation between age and fish condition.

Mr. Kaczka stated one thing he has been thinking for the past couple of years, and he thinks he brought it up in a meeting or two before, is we are kind of limited on where we are collecting these fish from. You know we had six sites this year, but he thinks the majority of our fish came out on a night that he was not there. He believed Mr. Riser and Mr. Bussells were

there and they got 50 fish in one night. Basically, we are collecting about 100 fish from a pretty small area of the 170,000 acre total. These sites, other than Angels Landing Campground, really do not match up to areas where you guys see *Hydrilla* from year to year. One thing I would like to do, or to think about moving forward, is trying to collect these fish on our own without the need of a guide to take us out, or at least supplement the guide collection with our own. One area where we lack, and people that have been out know this, is we cannot really collect fish with bow fishing gear for ourselves, simply because we are not good at it. All the fish DNR and S-C collects when we go out in the evening, they are second shots after Dwayne and his folks shoot them one time, when they are at the surface.

Mr. Kaczka noticed something last year when we were getting ready for our bass electrofishing season. We were testing out our electrofishing boat to make sure everything was good to go for bass electrofishing in April. We were out Lake Moultrie in late February or early March, when the water temperatures are at their coldest. We were hitting a lot of grass carp and they were staying put on the surface. He thinks we have a timeframe between gill netting in February and bass shocking in late March/April that we potentially could collect a lot of fish and be able to go to areas other than where we go with Dwayne and his crew. Because we are going late at night, we cannot go to upper Lake Marion when we are traveling from down this way. It is just too difficult. One limitation of that idea is collecting fish from a time of the year when they are going to be at their lowest condition. But one thought he had was if we could go out this year and just see what numbers we can collect and if we can somehow correct for that difference by comparing the condition of fish of certain ages to same age range of fish later in the year where they are at their healthiest. If we can correct for that, we might be able to, moving forward, collect fish on our own. It would be less expensive to S-C. There might be a startup cost to put lights up on our boat or getting our own bows. He thinks it is something at least worth exploring, just given two points: that we are at the mercy of Dwayne and his crew, and also the spatial limitations of where we are collecting these fish from to describe a much larger system. That is what he had for today. These numbers will all be validated come January and he will have something in PowerPoint form to present. He know it is a little easier especially for the folks calling in to see that. Mr. Page thanked Mr. Kaczka for his presentation.

Ms. Moorer asked Mr. Kaczka if he knew what age the fish were when that study was done for the original condition factor, so if we can compare the same age and pull out those legacy fish that bring our condition factor down. She did not know if it is in the literature or where. Mr. Kaczka stated he thought the original condition factor was done in 1994. If they were first stocked in 1989 as a one year old fish, you are looking at a maximum six years old. He thinks all those fish were just grouped together, so they could be anywhere from one to six years old. If we compared to our less than or equal to six years old fish from this year in a condition of 0.96, it is much more of an apples to apples comparison, versus taking all of our fish, with a quarter of them being 20 plus years old. He thinks that is something to consider moving forward. Mr. Bussells noted that something that has not been updated in a long time is the mortality rate for this system. He asked Mr. Kaczka if that something they are interested in possibly recalculating in the next couple of years. Mr. Kaczka stated he was and discussed the

need to collect more fish from a more diverse area spatially and to get a more diverse age range. Higher collections from a larger area might help smooth out that curve and give us more confidence that our mortality estimate is in fact true. Mr. Page stated he likes comparing a six year old fish to six year old fish and made some comments regarding how the original factor was created.

Mr. Bussells spoke about the proposed winter time collections and suggested making some collections from the Cooper River and possibly some other areas to improve the knowledge base. Mr. Kaczka discussed the movement habit of grass carp, wondered if telemetry studies had been done and noted the need to make notes about the vegetation in the collection areas. Ms. Moorer stated there were some early studies and we were looking at doing that again with Troy Farmer at Clemson, but there are some issues with the expulsion of the tags that Dr. Farmer was going to look into. Mr. Page said Sam Chappelear did the first one on the S-C system for his master's thesis, and he did a pretty good study.

Ms. Moorer told Mr. Kaczka that S-C could help with sampling at different locations across the system with more boats or more resources. Mr. Kaczka repeated some comments about winter time collection of grass carp. Mr. Page asked Mr. Kaczka if one of Mr. Lamprecht's last samples was done in the winter. Ms. Moorer stated it was and consisted of 5 to 10 fish. Mr. Page asked if the relative health of those fish was way down. Ms. Moorer confirmed that, but it was also a very small sample size and was only at Big Oak. Mr. Page stated it would be nice to do a comparison and try it and see how they relate.

Mr. Kaczka stated that in January, these numbers will be validated, but he will also run some statistics looking at any significant differences, rather than just looking at 0.96 is larger than 0.83. We can look at ages and sites and maybe we can bring in what you guys are saying with vegetation compared to these individual sites where we are collecting. That should give us a better idea of what is going on, not just grouping them into one pot and saying this is the health of the population. Mr. Page relay some findings from the earlier research that is reflected in Mr. Kaczka's data. Mr. Kaczka noted again the condition of 0.74 for the oldest fish, and wondered how it compared to fish across the Southeast. He made some comments about when he started collecting these with Mr. Lamprecht. Ms. Moorer said she thought they were doing a great job. That information has been very helpful for us when we are making management decisions when it comes to grass carp.

Mr. Page thanked Mr. Kaczka. He thinks he can provide some additional funding for setting up a boat for additional collections. Mr. Kaczka said he would see what it would take. Mr. Page asked the Council members on the phone if they were still there. All the Council members on the phone responded with a yes. Mr. Page said we are almost done and thanked them for being on the line and for being patient.

Mr. Page moved on to Preliminary Insight for the 2020 Aquatic Plant Management Plan. He does not see many changes that we are going to have to make in the plan. He and Ms.

Moorer have had some discussions, but we will have more discussion about the carp. He thinks the 10,000 on the S-C system is good. He thinks the data has shown us we are getting close to that magic point where we are a balancing act. The early research from the US Army Corps of Engineers (Corps) said one fish for every eight surface acres. What he has found, looking at just the data we are trying to retrieve and the numbers of acres of *Hydrilla* and all kind of stuff, is it is closer to one fish per five surface acres. If he was S-C, he would not feel bad about 1 fish per 4 surface acres. Ms. Moorer stated that is where S-C is at right now. Mr. Page said he thinks in Lake Murray and Lake Greenwood, it is more like a 1:5 ratio, which is a little less than the S-C lakes. He thinks 1:5 will work in the S-C lakes. We have those numbers made up and we will show them at the next meeting. If you need them, we can probably print them out for you. It is kind of refined, that curve you saw a while ago. We are trying to do things the right way, finally. As he has said at almost every meeting, if we had stuck with our guns and been able to do the real science the first time, we would have had the answers. Instead of having answers 20 years ago, we are getting them now. Hopefully, we can finally figure some of this stuff out.

Mr. Page said he is looking at the same thing on Lake Murray and those places. He is adjusting some numbers and really just looking at what we need to do to keep those numbers up there in the 1:5 ratio. In Lake Murray last year, we stocked 1,800 fish, with this year being about 2,000 fish, because there is a point in there where you have to stair steps to keep it even. That is keeping one fish per 5 surface acres. That is not a lot of fish, if you think about it. Mr. Page stated the other ones are roughly the same. We do need to make some maintenance stocking on Spartanburg Water Reservoir #1 with 25 fish. Last year, we put 1750 fish in for the initial control treatment. Lake York is going to need some more fish. Lake Croft will need some more fish. He has another couple places in the state parks where we need a few fish, but not very many. Lake Bowen needs 80 fish and that is just a maintenance stocking. It is basically not a lot of fish going to be added to the plan.

Mr. Page said we have been in the process of updating the plan. We are going to get together and go over it one more time. We are going to have the draft of the plan ready for you at least by the next meeting, probably before. He will, as always, cut out those sections that really have changes in them. We keep a lot stuff in the plan that we do not work on, but it is there just in case. *Lyngbya* is actually on the plan for Lake Wateree. It has been in there for several years, but it says zero dollars available for that right now, because we have not gotten through process that we discussed earlier. The problems we are going to have to face as a Council are the algae issues across the state, and the *Salvinia* issue that S-C has. We need to figure out ways to help S-C staff. He and Ms. Moorer have talked about some of the ways we can help her do some things around the lake, in some of the WMAs and things where we can directly spend the money. He has a couple other things, but will save them for new business.

Mr. Page asked the Council if they have anything you want to see any more information about. He knows, in the past, we had some people come in and talk about carp stuff. We also had people come in and talk about *Hydrilla* related to Vacuolar Myelinopathy (VM). He believes Dr. Susan Wilde is still working on that, and relating it to other issues, including human

health. He discussed the big toxic algae scare this year. He believes there are kits available to determine the toxicity of water, which are simple to use. Mr. Page asked if there were any topics like that the Council might want to see or hear about. There was no discussion. Mr. Page asked of there was any more discussion on the 2020 plan. He said it is very similar to last year's plan.

Mr. Page moved to other business. He asked Ms. Moorer if she wanted to talk about the timing of the next meeting now. He asked her what timeframe was needed for ReMetrix to get the data done. Ms. Moorer noted that ReMetrix will be done by the end of December. She would need a week or two to get through that data and then we can essentially meet in January. Mr. Page said he was looking at middle to late January, because people are busy after coming back from the holidays. Mr. Page asked if we have a holiday in January. Ms. Moorer said there is Martin Luther King Day. Ms. Lognion stated it is on the 20th, which is a Monday. Mr. Page asked if we could meet on a Wednesday or Thursday of that week or the next. He could send out a Doodle poll for the 15th, 16th, 22nd, and 23rd of January. Ms. Moorer asked if that gave you enough time to get the draft plan ready, so we can approve it and send it out for public comment. Mr. Page replied affirmatively. Ms. Moorer voiced her concerns for getting it out for public comment, so we can get through the procurement process. Mr. Page stated we can have our draft plan ready, so we all can look at it at the same time, make changes to that thing, and we can have an approved draft plan. Ms. Moorer stated she did not know if our recommendation is going to change any, because that 143 is preliminary. It is not going to change significantly. Mr. Page said even if it doubles, we are sitting probably sitting where we were. Ms. Moorer noted if it doubles, then she will have a little heartburn, but she thinks between 10,000 and 13,000 fish are what we are looking at for our recommendation. Mr. Page said that is a good number. The 13,000 shown a while ago was the mortality rate to keep it exactly where it is now. Putting in 10,000 would be still losing about 3,000 fish over time, plus the mortality. Ms. Moorer said we can digest all that whenever Mr. Kaczka presents his final numbers and take a look at that.

Mr. Page asked the Council if they had anything else new. There were no responses, so he checked with the people on the phone. They all responded with no. Ms. Lognion stated there is nothing major from Clemson Department of Pesticide Regulation. We are still trying to spread the word out to every aquatic license applicator out there, that if they are applying any pesticides to a waterbody that is used for drinking water, they have to contact the drinking water authority and we are recommending they call DNR, as well. We are trying to get the word out. Mr. Page provided information about an applicator was stopped on Back River Reservoir, in a private homeowner's canal that is linked to the reservoir. It just so happen that a CPW representative was out there. CPW does not want anything going in out there, since it is a drinking water supply, if they do not know about. Ms. Moorer said that is S-C's stance as well. We do not allow private applicators on S-C lakes. Mr. Page also talked about a call from Foster Lake Management, who had a property owner requesting a treatment in Lake Wylie, which is a Duke Energy lake. He referred them to Duke Energy.

Mr. Page noted this is an issue coming up more often. If you own a waterbody, or are you responsible for the waterbody, it is your call. S-C, it is your call, but it is a big issue with

lots of questions. Whose water is it? What about the fish and the invertebrates in the water? Who owns that and who is responsible for that? Is the company that owns the lake responsible for that, because they do not technically own the water? Who is ultimately responsible for it? Good questions. The way the law is written, they are responsible. That is another topic that is going to pop up on your radar in the future, as well is the algae problems, with taste and odor issues in drinking waterbodies. We are going to see more of that. If we need to discuss that more or do more at a later date, we will.

Mr. Bussells had one thing to discuss really quickly, since we have everyone in here. It is a long ways away, but the next SCAPMS meeting is going to be at the end of September and early October. It is a great thing for Council members to attend. We are starting to put the agenda together for it. If anybody has any talk ideas for that, anything they want to share with everybody at Clemson, anything you want to discuss, or anything valuable to students or applicators, please let me, Ms. Moorer, or Mr. Page know. Mr. Page would real like for the Council to have an opportunity to go to that whole meeting. We could have a kick out session where we can do our business and then come back to listen to all the great stuff that is presented. It is very informative and not just about killing weeds. There is a lot about fisheries, as well as the research being done on topics that we all talk about all the time. It is pretty interesting. He noted that Mr. Simmons and Mr. Lawson went and asked them how they liked it. Mr. Simmons said he enjoyed it and had a good time. Mr. Lawson responded that it was good. Mr. Page stated it expands and changes from year to year depending on the hot topics.

Mr. Page asked the Council if there is any other business. There was no discussion. He reviewed the potential dates for the next meeting, which will probably be more towards the middle of the state or upstate. He said we need to get that meeting done in that part of January, so that we can get that draft plan out for 30 days. We can hopefully approve it or make any needed changes to it and approve it in late February early March. Mr. Kaczka asked if that is going to be a two day meeting or one day meeting. Mr. Page stated it is just a one day meeting. If anyone needs a ride to a meeting outside Columbia, please contact us, as we usually have a spot or two available.

Mr. Page asked if there was any other business. There was none. He thanked everyone for being here and S-C for hosting the meeting space, and providing the refreshments and snacks. Mr. Page entertained a motion to adjourn. Ms. Moorer made a motion to adjourn. Ms. Lognion second that motion made by Ms. Moorer. Mr. Page called for a vote and the vote was passed unanimously. The meeting was adjourned at 12:50pm.