

140th Meeting of the South Carolina Aquatic Plant Management Council

Attendance:

Council Members: Julie Holling, Willie Simmons, Chad Altman, Bill Marshall, Casey Moorers, Stacy Scherman, Chris Stout, Adam Leaphart, Tammy Lognion

Guests: Emily Cope, Matthew Puckhaber, Jay Tenney, Levi Kaczka, Brian Lynch, Chad Holbrook, Molly Kneece, Carl Bussells, Allan Stack, Ernie Guerry, Judson Riser, Billy Dukes, Lee Hendon

Location: Rembert C. Dennis Wildlife Center, 305 Black Oak Rd, Bonneau, SC 29431 & WebEx

Call to Order: 10:09 a.m. 11/15/2022

Minutes:

Chairman Holling called the 140th meeting of the Aquatic Plant Management Council (Council) to order. She introduced herself and asked everyone in the room and on WebEx to introduce themselves. After introductions were made, Ms. Holling thanked everyone for coming out either in person or via Webex. She appreciated everyone taking their time to do this.

Ms. Holling moved to the review of minutes for the last two meetings. She started with the January 11th, 138th meeting. She asked the Council if anybody had any corrections to those minutes. Ms. Holling apologized for the minutes being very lengthy, but everybody talks a lot. She asked again if anybody has any corrections. Mr. Marshall made a motion to accept the 138th meeting minutes as written if that was in order. Ms. Holling said it was and thanked Mr. Marshall. Ms. Moorers second the motion. Ms. Holling thanked Ms. Moorers for the second and called for a vote. The motion to approve the 138th Aquatic Plant Management Meeting minutes as written passed unanimously.

Ms. Holling moved on to the 139th meeting in March. She asked the Council if there were any corrections. There was no response, so she asked for a motion to approve. Ms. Moorers made the motion to approve the 139th meeting minutes as they are written. Mr. Marshall seconded that motion. Ms. Holling thanked Ms. Moorers and Mr. Marshall for doing that and called for a vote. The motion to approve the 139th Aquatic Plant Management Meeting minutes as written passed unanimously.

Ms. Holling moved on to the public comment section of the agenda. She stated she did not get any requests to speak before the meeting but asked if anybody from the public would like to make any comments. Since there were none, Ms. Holling moved on to the recap of the 2022 Aquatic Control Operations. We will start with Santee Cooper (S-C) and gave the floor to Ms. Moorers.

Ms. Moorers stated the slides presented today are a recap of what we have treated since 2021. These numbers were pulled on November 3rd. As you all know, we have been battling *Salvinia* and that has been a year-round battle. These acreages will increase through November and into December. The biggest number you are looking at is going to be giant salvinia. Compared to last year, we treated right at 3,200 acres of giant salvinia and this year we are

already up to 5,000. There are big efforts from her group. This includes airboat contract work and does not include any aerial helicopter work. All these numbers are airboat work. The amount of *Hydrilla* that we treated this year is up just a little bit from 2021. In 2021, we did 186 acres of *Hydrilla* and 75 acres of water hyacinth. We did not split out water hyacinth because a lot of areas where we are treating water hyacinth are mixed with *Salvinia* and other species. We have not teased those numbers out yet. When we get to the end of the year and we meet in January or February, we will tease those numbers out for you. The total, as of November 3rd, is 5,900 acres of invasives treated in comparison to 3,700 last year. Treatment of giant salvinia alone was about a 53% increase from 2021. *Salvinia* is our biggest issue right now at S-C.

Ms. Moorer pointed out that as of October, S-C had spent \$900,000 in herbicide alone. In airboat applications, it was right at \$310,000, and \$110,000 on grass carp. Those numbers did not include any of the restoration or habitat enhancement work that S-C has done. It does not include our greenhouse operations that we are doing with the weevils. It does not include water quality testing. This is solely just our invasive species and does not include what we would consider nuisance vegetation in residential areas. There has been a big increase from 2021.

Ms. Moorer moved into S-C multispectral survey work that was done this year. This data was collected by satellite from August 25-31. These are the numbers that we are seeing on the system currently. She reminded everyone that this is just a piece of the puzzle. This multispectral is different from when we were collecting hyperspectral by fixed wing plane. We had a conference call yesterday with our vendor so we could really understand if we could tease out these mixed stands. What we are seeing on the system is *Hydrilla* mixed in with a lot of our *Vallisneria* (val or eelgrass). We have plenty of val and a lot of good native vegetation, and then in a lot of places, we are seeing *Hydrilla* mixed in. We are seeing some standalone stands of *Hydrilla* as well. We are trying to get a handle on how we can tease that number out. When we did our ground truthing this year, we went out, dropped points and took a look at where we were. We quantified the coverage of the mixture in that area by saying we are looking at 10% coverage of *Hydrilla*, 90% val or whatever was there. Those were just single points within the stands.

Ms. Moorer said *Salvinia* obviously increased from last year. You already saw that S-C treated 5,000 acres. A lot of that is not being captured because it is under the tree canopy or mixed in other vegetation and not being teased out. She noted that was common and giant salvinia together. She said *Hydrilla* increased by 48%. Last year, we picked up 52 acres on multispectral. That does not mean that there is only 52 acres or 77 acres of *Hydrilla* out there, but that is what we were able to pick up on multispectral. We treated a good bit of *Hydrilla*, a little bit more than we did last year. We treated 300 acres of hyacinth and 210 acres of alligatorweed and primrose. S-C really does not target water primrose and alligatorweed unless it is causing access problems. The invasives that S-C really targets the most to spray are giant salvinia, some crested floating heart and some *Hydrilla* where it is causing navigation issues or access issues. There was a bit of an increase on the amount of invasives that we mapped this year. This does not include boat survey work.

Ms. Moorer noted something that we talked through yesterday with our vendor. S-C asked their vendor how we can capture these areas of mixed stands, how can we survey better to get more data to add more pieces to the puzzle and get a better overview of what is really going on in the system. The S-C staff knows there is more than 70 some acres of *Hydrilla* out there, but this multispectral is limited in what it could do. There are some opportunities that maybe we could collect some data using our drone. Both Mr. Guerry and Mr. Bussells are licensed drone operators on the S-C team. We will be looking at some software to purchase to collect data and

send it to ReMetrix, our vendor, and have them analyze those areas to see if we can collect more and better data to give us a better idea of what is truly out there.

Ms. Moorer moved to S-C native species. We did have an increase in eelgrass. She hopes the weather holds off and we get to go out today and everybody gets to see that. It is remarkable the amount of native vegetation that we have on the system. It looks great. We had a 1/10 percent increase to the percentage coverage from where we were last year. We were at 14.39% native beneficial vegetation mapped this year through multispectral. In 2021, we were looking at 14.27%. That is a tenth of a percent increase. Some of that vegetation is not going to be picked up because it is under canopy. Some of it is mixed in with *Salvinia* and being able to tease that out is one of the challenges with multispectral. She explained the difference between multispectral versus hyperspectral. With multispectral, there are four bands: red, green, blue and infrared. With hyperspectral, you have 15 to 16 bands, which gives you more capability to tease out those signatures of the different species when you have a mixed population in an area. She asked if there were any questions. There were none.

Ms. Moorer pointed to a map of *Hydrilla* and stated this is difficult to see but is an overview of where we have picked it up from this year's multispectral survey. The red polygons and dots are the distribution. It is hard to quantify that, but it is really about distribution. In this image you do see much more of a distribution. A lot of these areas we have treated and some areas that we did treat did not show up. In Taw Caw impoundment, we treated 155 acres of *Hydrilla* that was causing some issues for a commercial nursery which has an intake at that impoundment, and they had trouble pulling in water. S-C treated that impoundment with ProcettaCOR as there was coontail mixed in. To protect the coontail, S-C did go in with a ProcettaCOR treatment. She noted this area did not show up when this data was collected, and it was treated after that. That is an example of where you have that mixed vegetation with two different signatures. It is hard to tease that out and it may be a water quality or clarity issue. This season has been very clear water for us. She said she did not know that it is really an issue this year with water clarity, so much as, maybe some mixed stands or something that we are missing with the limited number of bands.

Ms. Moorer moved to Lake Moultrie. You will see the Hatchery WMA where the Department of Natural Resources (DNR) did some treatments in there for *Salvinia* and *Hydrilla*. You see that lighten up pretty good through there, as well as the northern side of Moultrie. Some places where we wanted to take you today was putting in at Angel's Landing and running back over towards Stony Bay and Sandy Beach area. There is a lot of val there. There is a lot of *Hydrilla* there too, but also *Salvinia* and other things that are kind of a representative of what is going on across the system, especially on Moultrie.

Ms. Moorer shifted to the native submersed aquatic vegetation that was mapped. The map is lit up. Above Interstate 95, where we have a lot of inflows coming into the system, it is more difficult for vegetation to get established, especially submerged species, in that area. There is also a lot of tree canopy up there, so you are not going to pick up what is under the canopy. We are excited about this map. It looks great from what our staff are seeing on the system from a native species standpoint. It is exciting to see that we are making a real comeback with our native species. Water quality and Mother Nature has been on our side with clear water and low turbidity when it comes to promoting natives, but the flip side of that is it has also been against us with invasives. *Hydrilla*, specifically, can do well in those conditions, and *Salvinia* is thriving right now, as well.

Mr. Marshall asked Ms. Moorer if she could speak to the comeback and what sort of acreages was she referring to. Ms. Moorer responded that we went from last year mapped natives of 14.27% out of 159,500 acres. This is the number that we use for total acreage because that is the acreage mapped. We take all our native species, adding up all the numbers on the native species slide, and dividing that by 159,500, which gives us that percentage. In 2021, we were at 14.27%. There was a tenth of a percent increase in there. Do we know that there is a lot more than that on the system? Yes, but this is only one piece of the puzzle that we have from multispectral. Last year was the same way. The number that we gave last year, the 14.27%, was only multispectral. This did not include any hand drawn polygons by boat surveys or anything. It was just the number that our vendor gave us. We did the same thing this year to try and be consistent. One important thing that she really wants folks to understand is this is just a piece. There is more out there. It is just a matter of us capturing it. Whether we do it through drone or try to do it with boat surveys where we are physically drawing polygons on the system, it takes resources and people to do and right now we are treating 5,000 acres of *Salvinia*. She would like to have more boat surveys and have that piece of the puzzle. It is just a matter of if we can do it. This multispectral survey cost \$70,000 a year. The last bid we got for the fixed wing hyperspectral survey we used to do was around \$120,000 and that was in 2019. She imagined that number would be probably much higher now with fuel costs and having a plane fly it.

Ms. Moorer moved on to the last couple slides. These are just some pictures in case we do not get to go out today of what we are seeing around the system. We are seeing *Hydrilla*. We also have a new invasive that we found this year. On the next slide is Eurasian watermilfoil. Our team was out treating in the Potato Creek area and came across this plant, that looks like Eurasian watermilfoil. We took it and sent it to Montana and Dr. Ryan Booms and had a genetic test done on it to see if it was hybrid. It is a real issue in the northeast. Unfortunately, it is the true Eurasian watermilfoil. One good thing about Eurasian watermilfoil is it is rooted and is very susceptible to ProcettaCOR and some other products that we already have in our toolbox. It is a concern, and it did get treated. Clipper or Flumi is very active on it, as well. We did find a decent area whenever we were ground truthing that we wanted to get treated, too. That is all near the Wyboo and Potato Creek side or northern section of Lake Marion. We beat our record of an invasive every ten years. We had *Salvinia* in 2017 and in 2022 we got Eurasian watermilfoil. She moved on a couple more pictures of what her staff was seeing out there, including water hyacinth. That is probably the 300 acres that showed up on imagery, but a lot of that is being treated. We use Estate Management as an airboat contractor. The majority of the work they are doing is above I-95 or into the Stump Hole area, nonresidential areas, targeting *Salvinia* and water hyacinth. They stay in Ellore, so they can get to the landing quick and that is where they can turn the most acres for us. The S-C teams are also treating nonresidential areas across the whole system, but a lot around lower Marion and the northern side over at Taw Caw and the refuge areas.

Ms. Moorer moved to the next slide. The picture on the left is some *Salvinia*. You cannot see this picture on the right very well. Mr. Stack was out treating some *Salvinia* and that little bass was on top of the *Salvinia* flopping around. Mr. Stack picked him up, kissed him, put him back and told him he would catch him later after he got a little bigger. Ms. Moorer stated that is all she had. That really is just a quick preliminary update. We will have the finalized numbers probably in January or February before we start making recommendations and talking through what 2023 will hold for us. If we cannot get out today, she encouraged everyone to come out anytime with us. She hoped we can get out today because she thinks you will be impressed by

what we are seeing on the system and then the percent of increase that we have had in *Hydrilla* across the system. We are trying to find a way to have those two things coexist. We are trying to find that balance. We know that if we try to eradicate *Hydrilla* and we are stocking a lot of grass carp, that is going to be a detriment to our natives. We are trying to find that balance that keeps enough carp in the system to keep *Hydrilla* suppressed enough that our natives can thrive.

Ms. Moorer asked her team if they had anything to add. Mr. Bussells added that we were discussing the difference in percent coverage of last year and this year. While on paper it seems like a small percent difference. He thought a lot of that acreage of eel grass and a lot of other natives might have only been a few inches tall last year, but you are still getting that signal. This year you can tell, just anecdotally riding around out there, there is a lot more topped out or mature native vegetation.

Mr. Bussells asked Ms. Moorer how many complaint calls we got. Ms. Moorer said we have not gotten that much. Our waterfowlers and most of our anglers are happy. Mr. Stack fishes competitively and a lot of what he hears is people having to change the way they fish. Our residential and commercial leaseholders will call if they are having an issue with navigation and that vegetation is blocking their boat or pier. Normally, on average we have about 100 to 120 calls a year. We are up to 410 as of today. We have people calling in requesting treatment and a lot of it has been val, and *Salvinia*. We had much more *Salvinia* in residential areas than we have had in the past following Hurricane Ian with inflows pushing out vegetation from the swamp. We did have a helicopter here when we were doing the Super Flats partnership work in October. Unfortunately, the *Salvinia* did not flush out in a location where we could hit it with the helicopter when it is here. A couple of years ago we had that opportunity. The helicopter was here doing work and crossed over I-95 and there was a raft of *Salvinia* floating from the inflows following the hurricane. We could do the treatment because we had the herbicide on hand. We were able to treat 200 acres with the helicopter. That did not happen for us this year. There has been an increase in calls and most of them have been val and *Salvinia*. We do our best not to treat the val and to educate people on why you want it, why it should be there, and how to trim your motor up to get through it. Some areas need to be treated. If it is a permitted swimming area, you cannot have vegetation in your swimming area. Rock Pond, for example, is our largest commercial lease holder. She camped there on 4th of July, and the val was waist deep and people were swimming in it. If DHEC was to come out, that would have to be void of vegetation. Our plan for this year is to start early in the season and treat that val within the swimming area to keep it at bay. It is the same thing around people's docks where they are swimming and using their docks, and access is a problem because of vegetation. We would spot treat those areas and that takes time. That slows us down when we are out just hopping and skipping, trying to spot treat these areas. That is not something that we use contractors for. We want our team to be the face of S-C that if they have to interact with homeowners. They can educate the homeowners, know that we are promoting natives, what herbicide they are using, and answer those types of questions.

Mr. Marshall asked Ms. Moorer what were the main changes you saw in *Salvinia* distribution from last year to this year, since that is our big challenge. It was in upper Lake Marion. Ms. Moorer responded that it has moved. She pulled numbers the other day. It was 5.5 acres in 2017 that we treated, then it went to around 500, and then it went to 1000. Ms. Moorer noted really the change in that is the pure biomass and the exponential growth rate. After we first found giant salvinia in 2017, we had that harsh winter. We did not find *Salvinia* back on our system until about July of the next year. This year, *Salvinia* was present year-round. It might

have been senesced, but the plant was there. As soon as the temperatures warmed up, it was back growing. Right now, at this time of year when the growth rates are starting to slow down, this is where we can make headway. All summer, when they were spraying 5,000 acres, all they were doing was putting a Band-Aid on it to keep it at bay, protecting navigation, and people's access. We did not stock weevils this year. We did get our greenhouse operational, and Mr. Riser has got some numbers on that if you want an update. We are hoping that next year we will start early spring stocking weevils. We are going to overwinter them in our greenhouse at Moncks Corner and hope that is going to put enough pressure on the plant that we can keep up with it with herbicide, just to slow that growth rate down. You are talking about a plant that can double in biomass in 48 hours.

Mr. Marshall asked if it was spreading further down the system. Ms. Moorer said it is everywhere. You could walk to anybody's shoreline and find a piece. Mr. Marshall asked about downstream. Ms. Moorer responded that we have seen it below the Santee spillway, but it was just a patch that had come over the spillway. We have not seen it when we are surveying. We do not really survey those areas. That is Ms. Holling's area. She thinks they have surveyed and did not find anything. She hoped that for the Cooper River that *Salvinia* hits salinity and then it will not be a problem because you have flow. If it gets in rice fields, she thinks it is going to be an issue for sure. It is going to be an issue for the state. It is going to be an issue for the southeast. It is just a matter of time. We talked about those numbers earlier. Well over \$1,000,000 was spent on *Salvinia* and other invasives. That did not include the greenhouse operations cost. Her team at S-C is pursuing some federal funding and seeing if they can partner with some folks to try and bring more money into the invasive species program at S-C. Nothing is set in stone yet, but it is something we are exploring. Mostly everybody here knows S-C is under a rate freeze through 2024. Our budgets are very tight, but we still have a responsibility and a mandate to control invasive species on Lake Marion and Lake Moultrie.

Ms. Moorer noted Ms. Holling and DNR partnered with us this year. They did some good work in the Santee Cooper WMA and some of the other areas. It was *Salvinia* that they treated, and she appreciated that. Any help we can get, a partnership with Clemson or whoever. We are trying to find any agency or any group that we can partner up with. We partnered for the Super Flats work with Ms. Kneece and Mr. Dukes of DNR, South Carolina (SC) Waterfowl Association, and SC Ducks Unlimited. We still have that partnership going for habitat enhancement so we can still have a piece of our program be about enhancing wildlife habitat. She concluded that invasive species management eats up a lot of our budget and time as compared to enhancing wildlife.

Ms. Holling noted that our group did a good bit of work on Santee Cooper WMA, the Hatchery WMA and Potato Creek impoundment. Potato Creek impoundment really does not do a whole lot for the system, but the other two they are very attached to the lake, so that is why we hit those fairly hard.

Mr. Simmons asked Ms. Moorer if they hit Hickory Top. Ms. Moorer responded we hit that part with the helicopter work when we did Super Flat work. Ms. Holling stated we have not been into there. Ms. Moorer noted they treated Lizards Cut but not at the landing. She did not believe we have done any work on the actual landing. She was sure it needs it. We usually try to hit those areas right around duck season when we know that landing is heavily used. Mr. Simmons stated the last time he was there the vegetation was pretty thick and he thought it should probably be sprayed. Ms. Moorer said we try to hit those areas to keep people from

hitchhiking vegetation or people dragging plants all over because they come here and hunt and then go somewhere else.

Ms. Holling gave the floor to Ms. Moorer for S-C thoughts on grass carp. Ms. Moorer stated our team talked through it. She would like to get the Council's input, especially if you get to go out today. We have a marked increase that was detected on multispectral. There was an increase in what we have treated in *Hydrilla*. Ms. Moorer informed the Council that she was not comfortable sticking with 10,000 this year. She did not know what that number is. She would lean towards replacing mortality. She did not know how you guys feel about it but wanted to talk through it with everybody here. Everyone is very familiar with the system and the history of it. One thing that we have going for us is that we have had consistency since 2017. We have done 10,000 fish per year. Replacing mortality is right around 11,000, so it is not a marked increase. It would not be my recommendation to decrease the population any more than we already have. We have to think through having a good a buffer because this year was clear water, so *Hydrilla* was able to thrive. Our natives were able to thrive. Next year, we might have clear water. We might have turbid high water and that might help us out on *Hydrilla*, but it is also going to hurt our natives. She would like to talk through it with you, get input from Mr. Kaczka and gather what they are seeing on the system, what they are seeing in the carp, and talk through it with everybody.

Mr. Kaczka said this is not really related to stocking numbers, but he is going to give an update at the January meeting. We are sort of limited with just the number fish we have. He thinks we need to get more fish each year to really comment on mortality rates. He has been trying to look at different variables that affect grass carp condition, such as health and seasonality. We were just collecting fish during a two- or three-month window. Now we are trying to collect them throughout the year. Theoretically, a fish in July or August is probably going to be in better health than February. One thing he wanted to do for his analysis for the January meeting was look at the date of collection and include a variable that is sort of like a growing season. He asked S-C staff if they have a date, a water temperature, or air temperature where you say this is when we stop spraying because plants are not photosynthesizing, and the growing season is sort of over. He might be able to use that to determine when we would expect grass carp health to not be as good during the year versus the peak of growing season.

Ms. Moorer commented we do. It does not necessarily mean that we stop treatment, but we stop using systemic herbicides. When the water temperature is probably getting in the low 60s is when you really start thinking about moving to a contact herbicide because then you are just burning biomass. The plants are not pulling in nutrients but starting to senesce. It does not make sense to use a systemic herbicide because if you are using a systemic herbicide, you want your plant to be actively growing and moving that herbicide through the plant. There is a cut off. For emergent stuff, that is usually like a couple of hard frosts. For submersed species, it is going to be more about water temperature when we make that change. It is the same thing with *Salvinia*. We just switched to contacts on November 1st when we had that cold snap and then we got two weekends of 80-degree weather again. It is usually around November. She would think, from an aquatic plant perspective, you are going to have the most biomass by September and November that you are going to get with submersed species because they had all season to grow. There is not going to be near as much biomass in May when the warm temperatures are just starting to take off. Water quality is going to affect all that. Usually by September or October, that is the time frame that you are going to have the most biomass of submersed species for the year. Then things are going to start senescing and dying back. She would think a grass carp

would probably be at its peak in that time frame whenever they are maybe not having to move around as much to find the vegetation and there is more biomass there for them. She would think early spring and the winter would be the toughest times for them because they are having to search out new growth, but that is just her opinion.

Mr. Kaczka said he knows it is not going to be perfect but to look at the low 60s would be good. Fish in September ought to be in better condition than fish in March. That is just something that would be easy to work in there. It is just adding a line to the spreadsheet. Ms. Moorer asked Mr. Kaczka if he wanted data, since they sample over 35 stations monthly across the whole system. Mr. Kaczka noted he had some data from Mr. Bussells from a few months back. Mr. Bussells stated he could send Mr. Kaczka more data from this year.

Ms. Moorer said it might be helpful for us to send you the data and a map of our locations where vegetation is growing and is shallower. She noted that Mr. Bussells has all that already mapped out and it is easy to use in a variety of software applications. There is usually a profile on anything over 4 meters, so there are multiple temperatures at a location.

Mr. Bussells said we can give you a composite sample for all our regular samples besides streams. He would pull the Secchi disk and turbidity readings and some of those other numbers and get them to you. In recent memory, we had a Secchi depth in Lake Moultrie of over 10 feet. Our Secchi disk just was not long enough to get a reading. We have seen some very clear water this season and that is where we are seeing the results of it.

Ms. Moorer asked if the Council would like an update on the weevils. It is a neat operation, and everybody has worked hard to get that going. She is excited to see what it brings for us next season. She said Mr. Riser has some numbers of where we are and she gave to floor to him to give the update.

Mr. Riser gave a quick recap on the greenhouse, which was completed last December. The house was fully fabricated and ready for everything to be going by February. By March, we had tanks full of giant salvinia. We started with a handful and within a month, it was slam full. We got our first batch of weevils from Dr. Diaz at LSU on June 8th. We got around 1,800 then. In June, we got around 1,200 or so more from the Army Corps in Texas. Our starting adult weevil population was around 3,000 adults. Julie Nachtrieb from the US Army Corps came and visited with us in September, spent a week with us and taught us how we can numerically count them. We got one batch dried and counted on October 20th, so those are the numbers he has. We are going to do another counting in December. Right now, we have around 3,831 adults. We have 21,680 larvae, so they are reproducing, with a total of around 25,511 weevils with adults and larvae combined. We do not see a whole lot more adults, but the larvae are there. We are anticipating our check in December will see a good, healthy stand. We need the water temperature to be consistently about 65°F to stock. In the spring, that is roughly around April 1st, so we are shooting for that. The way we are going to determine whether we are ready to stock is based on how many weevils we have per square meter. Right now, in our best tank (tank 2) we have around 152 adults per square meter and then around 591 larvae per square meter. We need around 300 adults per square meter and around 800 larvae per square meter to stock. We are not there yet but are hoping to have that in our tanks. Right now, there are weevils in five of the six tanks. We moved weevils into two of the tanks after we got this data. We will have those tanks represented in December. We are hopeful that they keep moving along. It is working. Hopefully, it works fast enough. We are learning stuff every day and what we can do better. If you are nearby, come by and visit. He would love to show you the greenhouse and what we have going on. This greenhouse operation is quite an operation to see.

Mr. Marshall said you are talking about your production of those critters. He asked how their performance is on consuming the plants and what are we hoping to happen out there.

Mr. Riser said once we start putting the weevils in the wild, this is a long-term game. You would not expect to see anything for maybe four to five years. The animal does not want to destroy its food supply. It is going to take the numbers down and then it is going to be the boom-and-bust kind of cycle. We see damage in the greenhouse, which has got me a little nervous now. In some of the tanks where the weevil numbers went up, you would expect the plants to continue to look worse and crash. He sees new growth in certain areas where he was hoping they would be starting to sink. We are trying to tease that out. Where you get your control is when the larvae burrow into the rhizome of the plant and kill it, but the plant is very robust, and it just takes a tiny little bit to start new growth. In short, this will probably be a good strategy for us to use in those areas there are a bunch of small cypress trees where we cannot reach in there to spray. We will get in there around Hickory Top, way out in the woods. We will go and spread weevils out in there. As far as residential and navigation areas, we are going to have to use herbicides. It will not work quickly enough for us to get a hold on it. It is going to be a part of integrated pest management.

Ms. Moorer put some perspective on that. She believes Louisiana started a weevil stocking program around 10 years ago. About two years ago, right before the harsh winter that they had, they were seeing good control of *Salvinia* in Louisiana because they had a wild population going. They had mild winters, the weevils were surviving in the wild, multiplying on their own and spreading. Then they had the cold winter in Texas and Louisiana last year and they lost their wild population. They are starting back over. It is not a silver bullet. It is more about what natural predator pressure it can put on that plant and that limits the growth rate. The weevils are not a silver bullet but a good piece of an integrated pest management program.

Mr. Marshall asked if we are pioneering using these critters at this latitude. Ms. Moorer said yes. What we were spending on trying to bring these weevils in from LSU that were reared there, will likely be recouped within five years of building our greenhouse. We did not add staff and everything in the greenhouses is almost automated. We are struggling right now to get on S-C's network. However, we can monitor the greenhouse remotely. It has added some pressure to our group, but we did not have to add staff yet. She would love to see another state agency or organization equivalent to what our Clemson extension is in Louisiana. They grow ponds with weevils, and they have open days for the public. People bring Rubbermaid containers and they get *Salvinia* with weevils on it. They take it out and put it in their farm ponds or wherever because *Salvinia* is such an issue for the state. Mr. Holbrook and Mr. Guerry went down last year to get our weevils for us. They drove to Louisiana and drove straight back from Louisiana with over 20 totes of weevils. That is what they did. They went and harvested out of ponds.

Mr. Holbrook spoke to Mr. Marshall's question about pioneering at this latitude. Lake Sam Rayburn in Texas is close to our latitude, and they are further inland than we are. You would think they are a little cooler than we are. They stock salvinia weevils on Lake Sam Rayburn and have seen some weevils overwintering there.

Ms. Moorer is hopefully they adapt and they like the low country. Mr. Riser noted the key is the overwintering part. We are going to continue to stock every year anyway, but it would be good if we can get populations to persist out there. An adult weevil can live anywhere from 3 to 8 months. Once the temperature drops, they are going to stop breeding. If that adult can get down and get insulated from the cold, in theory, if the plant can survive, the weevils should be able to survive also. If we have some robust weevils that live long enough, and we do not have

some crazy freezes that knock them all out, we hope to have some by April that can start the cycle again. Ms. Moorer said we are kind of hedging our bets on both sides. A harsh winter could help us, as could a mild winter when we might have some weevils over winter and continue to the next season. Mr. Riser asked the Council if they had any questions.

Ms. Holling thanked Ms. Moorer and the rest of her S-C staff for their presentation. She said she was going off agenda for just a minute. First, she apologized to our Webex group. She forgot to share Ms. Moorer's presentation but would do so via email in PDF format per Ms. Moorer's request.

Ms. Holling said that out of curiosity, she decided to run some numbers on different stocking rates for the S-C lakes. This black line is if we stock no grass carp. We know from information that Mr. Page looked at previously, that the 1:8 ratio does not work. Currently, if we continued on the yellow line with the 10,000 fish per year, we are going to continue to go down and kind of flatten out a little below the 1:5 ratio, which is 32,000 in the system. Right now, we are a little below 35,000 and if we do maintenance of a little over 11,000 fish per year, we will stay right where we are. If we chose to do just some little up, if we see an increase in *Hydrilla*, and went up to 12,000 fish per year on that green line, we will top out at a little over 37,000, which is closer to the 1:4 ratio. If we went to 13,000 and this is up until 2040, we kind of flatten out a little over 40,000, which is the 1:4 ratio. She threw the 15,000 fish per year in there just for the heck of it. That gets us probably well above the number that we need to have in the system, but she just wanted the Council to see that information just as a reference to see where different rates might put us. She asked if anybody had any questions about that. She created that because of Mr. Marshall's comment at the last meeting about a graph that Mr. Page had done back when we were discussing doing the 10,000 fish per year for five years. Since there were no questions, Ms. Holling moved to the next item on the agenda, DNR's aquatic control operations. She started to give the floor to Mr. Puckhaber but paused to point out that we did add Mr. Tenney over there in the corner to our program. He has only been with us for a couple months and he has been out with Mr. Puckhaber a good bit, learning a good bit, and hopefully that will continue over the winter and into next year. She then gave the floor to Mr. Puckhaber.

Mr. Puckhaber said the first slide is control by species. All these numbers presented on the chart are from the calendar year 2022. The species are going to be the primary species, but most of these might be a combination. You might have alligatorweed, water hyacinth, primrose, and *Salvinia* mixed in an area. We would just take the dominant species. The total acreage is down, but the total cost has gone up. That is because herbicide and labor costs have all gone up. As you see on the chart, water hyacinth has taken an uptick. Primrose has taken an uptick and also giant salvinia. That is kind of alarming to us. We were unable to put alligatorweed flea beetles on the list this year because the Corps of Engineers was unable to produce enough. They had a hard winter in Florida that dropped the population down. We were unable to receive some this year. Next year, we hopefully are going to get some alligatorweed flea beetles. We have got about five sites already on five water bodies for possible flea beetle stocking. We did treat native vegetation, 67 acres. Out of that, 55 acres were spatterdock treatments on a couple of waterbodies. That was for navigation in kayak areas, but also for opening up waters around duck boxes. He did put *Phragmites* down there. That was for Santee Coastal Reserve WMA and that big chunk of money came out of their budget, not ours. The other remaining of the 67 acres were duckweed and bladderwort treatments. Again, that was to open up fishing and swimming areas. If we did take the native vegetation out, you are looking at around just under 1200 acres of total acreage and then a little bit over \$190,000 total spent.

Ms. Moorer asked what is your miscellaneous. Mr. Puckhaber responded with miscellaneous 35 acres. That is where the combination of three plants would be and if there was milfoil. He noted he did not put Eurasian milfoil in there because we did treat some Eurasian milfoil on the Potato Creek impoundment and the Hatchery WMA. The other reason is when you go to state parks, you have sandhill milfoil which is a native and he did not want to confuse anyone.

Mr. Bussells asked how much Eurasian Milfoil did you see in Potato Creek. Mr. Puckhaber replied it was a little and it was in spots. It was not all over the impoundment. For Potato Creek, our purpose there was at the landing that has a tussock. We wanted to open that up for more navigation. The other purpose was to open water around the duck boxes.

Mr. Puckhaber moved on to the next slide, which was control by water body. The target species for Ashepoo River was water hyacinth and alligatorweed. The acreage is down because salinity held its course up to the Highway 17 bridge this year. That allowed us to focus more on the sister rivers of ACE basin, especially the Combahee River, which is a new waterbody. We mentioned at the last fall Council meeting that we wanted to take a heavier look at it this year. We did see, in the upper part of Ashepoo River, natives start to flourish. He stated we are seeing a lot more pickerelweed, frog's bit, smartweed and other natives on that river. The other great thing about the 72 acres, was those acres were above the Highway 17 bridge. The acreage did not include anything below. He thinks there are 23 miles worth of river miles below the bridge. He moved on to Back River and the 191 acres. He noted that is going to be water hyacinth, *Hydrilla*, fanwort, and water primrose. The focus of the 191 acres was buffer zone, tussocks, and navigation areas. The next one is Black River and Black Mingo. Similar to Back River, we are seeing mostly water hyacinth, alligatorweed, and primrose. Our objective was the same thing. We wanted to open up navigation and clear out boat paths, especially around the landings. The Combahee River was a new river that we did add to this year. We started surveying late November of last year and was one of the first waterbodies we treated this year. We knew coming in, it was going to be a concern. Unlike the Ashepoo, the salinity levels there were higher above the Highway 17 bridge. We were seeing 15 parts per thousand (ppt) above Highway 17, whereas Ashepoo River was 0 ppt.

Mr. Puckhaber shifted to the Cooper River. Because of the flow coming out of the S-C lakes and all the places giant salvinia can get into, it gives us major concern. The species treated there are going to be *Hydrilla*, *Elodea*, fanwort, water hyacinth, and water primrose. The next waterbody is Goose Creek. This is one of our most diverse systems. It has got a wide variety of species. It is a great field trip to go on that we can take you to anytime. Those species are water hyacinth, spatterdock, duckweed, common salvinia, and water lettuce. We treated *Hygrophila* last year. We did not see it any this year.

Mr. Puckhaber said the next two waterbodies are Lake Cunningham and Lake Lyman. Lake Cunningham was on the management plan. Lake Lyman was not on the plan. The Council was notified about that treatment this year. Lake Lyman's 40 acres was a creeping-willow primrose issue that was blocking navigation around docks and bridges. Startex-Jackson-Wellford-Duncan Water District (SJWD) called us, and we went out there in September and did an herbicide treatment. They did purchase an Eco-Harvester. They were working with us on trying to control the vegetation. We have done an integrated management plan for three to five years. We want to spray with herbicides. They also need to dredge some of that sedimentation out. Santee Coastal Reserve, as he said before, was *Phragmites*. On the Santee Cooper WMA, 150 acres of the total 254 acres was giant salvinia.

Mr. Puckhaber moved on to the state parks. The majority of those 51 acres was algae and bladderwort, but some of it was spatterdock, milfoil, and duckweed. The purpose was to clear out edges and submerged vegetation from swimming and fishing areas. Some of that was treating *Phragmites* on Huntington Beach State Park. They wanted to open waters around the island for the birds. The Waccamaw River was 168 acres. Water hyacinth was a major issue there. We would like to thank Mother Nature because Hurricane Ian pushed some salt up and flushed it back out after our treatment. Common salvinia is taking an uptick around Samworth WMA and in those impoundments, but we are not seeing that as a major issue.

Mr. Puckhaber thanked Ms. Scherman because she helped a lot with the State Parks. She got her hands dirty. She went out there and started spraying and getting her feet in the water while we were doing an herbicide treatment.

Mr. Puckhaber pivoted to triploid grass carp. Most of this was maintenance stocking. Crackerneck WMA was an initial stocking because of bladderwort, and they had some predators in there. The total stocking was 2900 roughly. Lake Murray is taking a heavy portion of that.

Ms. Moorer asked what were your ratios on that. Mr. Puckhaber asked if she was talking about Lake Murray. Ms. Moorer stated yes and asked what the target ratios are. Mr. Puckhaber noted he thinks one to five or one to six. Ms. Holling confirmed by saying it is one to six for those interior lakes like Lake Murray and Greenwood. Bowen, and Spartanburg Reservoir One may be one to five, but she would have to confirm that.

Ms. Moorer asked if when you say maintenance, you are replacing mortality. Ms. Holling responded yes, we are replacing mortality. Ms. Moorer asked if we were using 32% or another percent. Ms. Holling stated we are still using 32%.

Mr. Puckhaber noted we also seen Illinois pondweed pop up around Lake Murray. We did get a bunch of calls for that species. It was around people's docks. The other species we are seeing is brittle naiad, which is a native.

Mr. Riser had a question about the Goose Creek Reservoir. He was curious about the 800, which is pretty large number compared to the other places. He asked if that is to control *Hydrilla*. Mr. Puckhaber confirmed it was for *Hydrilla*.

Ms. Holling chimed in by saying the part of the reason that we are putting 800 grass carp in there is because that flows directly to the saltwater. There are a few that will hang around in there, but the majority of them are probably just jumping the dam. For that reason, we always put a good number in there. Charleston Water has requested that we not stock in 2023. We are going to keep an eye on it. If we start seeing *Hydrilla* popping back up, we will go back into stocking mode. Ms. Moorer asked Ms. Holling why they requested not to stock next year. Ms. Holling stated they did not really give me a reason. She thinks part of it is cost and part of it is not seeing a whole lot of *Hydrilla*. Ms. Moorer asked if they are cost-sharing with you. Ms. Holling said they are cost-sharing that with us. We are not seeing a whole lot of *Hydrilla* in there. The last few times that we have thrown rakes, we have not seen anything. Ms. Holling thought the population of *Hydrilla* may be eradicated, but there are no guarantees with that.

Mr. Puckhaber stated the last slide is just our basic challenges. Like Ms. Holling said, we are back to a three-man staff with Mr. Tenney. He has been a great addition. He is trying to learn the water bodies and learning the plants as quickly as possible. He has been a great addition. Like he said earlier, Mother Nature and Hurricane Ian did help salinity, which has moved up in the Ashpoo and Combahee rivers, so we are not treating as many river miles. Seeing salinity move up is a big key and big benefit to us. The negative part is the limited budget. It does come from a gas tax. We get a small portion of that water recreation money and it varies from year to

year. That covers our program expenses and our treatments, but our expenses have gone up for herbicide and labor. For our public outreach each year, we go to SEWE (Southeastern Wildlife Expo) in Charleston and the Palmetto Sportsman's Classic. Part of that is just to put a face to a program and get our name out there and answer any questions. Most of the responses have been positive, but we do get negative comments. We also get phone calls about alligators and stuff like that. Lastly, we do answer emails. Right now, we do not have an office phone, so the way to get in touch with us is e-mail. He offered to answer any questions. There was a brief discussion regarding the office phone line.

Ms. Holling moved to the next item on our agenda, the statewide waterfowl update by Ms. Kneece. After pulling up her presentation and sharing it on WebEx, she gave the floor to Ms. Kneece.

Ms. Kneece thanked everyone for having her and thanked Ms. Holling for inviting her to talk about waterfowl for a little bit here in SC. She knows this is often a topic that comes up amongst this group, sometimes contentious, sometimes not. She wanted to introduce you all to the statewide waterfowl program, kind of talk about what her new position is, how that kind of came to be, a little bit about who she is, and kind of the path forward that we are taking with the waterfowl program within SC DNR.

Ms. Kneece noted waterfowl hunters in SC are a small, but mighty group, and often a loud group. She is one of those people. She does what she does because ultimately, she is a duck hunter. Somehow in early 2000s, she found herself a wood duck in the Sandhills of SC and never looked back. She is from SC, growing up near Lake Murray. She is a Carolina girl through and through. She made her way to Clemson, thinking she was going to count trees for the rest of her life. Somewhere along the way, she got sidetracked and thought that waterfowl was really what she wanted to do for her professional career. She ended up at Mississippi State and completed her master's degree in waterfowl ecology there. She mostly studied them in the ACE Basin of SC. Being from SC and having studied extensively in the ACE basin, allows her to be very familiar with a lot of our aquatic systems here in SC. She started with SC in 2016 at DNR on our Samworth property, kind of trying to piece that puzzle back together there. She thinks we made a lot of positive strides.

Ms. Kneece said this past year, Representative Philip Lowe presented House Bill 4177, which essentially mandated that we have a waterfowl advisory committee again. It also increased our state duck stamp budget throughout the next five years. That will provide more funding for work on our WMA's and greater contributions to Ducks Unlimited Fall Flights program, which sends money to the breeding grounds to work on habitat and investments in those areas. It also created a statewide waterfowl position. SC has had kind of unofficial state waterfowl biologists' duties split up between different biologists for many years, but never really anybody that was 100% focused on statewide waterfowl responsibilities. We have always kind of shared those responsibilities among many staff members, along with WMA management and technical section guidance. This bill kind of brought a lot of waterfowl responsibilities under one person, which is the statewide waterfowl program manager. She has been in this position for a year and probably in the last four months really locked into this position as she transitioned out of Samworth. Essentially, this position is kind of 6 foundations or pillars. She was going to kind of talk through those and lead into some research and some partnership work.

Ms. Kneece noted that you can kind of look at policy rules and regulations as a large part of my job, as well as technical assistance. We embarked on a third-party review of our waterfowl areas. Opening the doors and seeing what we are doing good and what can we do better. Under

research and monitoring, she assists with some of our waterfowl lottery hunt oversight, investing time in developing partnerships and investing in constituent groups. That gives people an avenue to have concerns voiced and try to come to some good resolutions on some topics.

Ms. Kneece started with the policy and rules and regulations. A large part of what she does is give guidance to policy and rulemaking from a perspective of waterfowl science, management, and hunting opportunity. How this kind of goes into action is she serves as our state representative in the Atlantic Flyway Council technical section. This is where we get into the numbers, including how we determine what our waterfowl populations are, what is sustainable to hunt, how many days we are going to hunt, and how we go through and implement seasons, which for waterfowl is a complicated process. She serves as the voice for science and the hunters in SC on the Flyway technical section. Mr. Dukes serves in our council role, takes on a little more of the business side of things and makes sure that she does not get too out of check on her hunter's opinions and on her science.

Ms. Kneece said that within the Wildlife and Freshwater Fisheries section of DNR, we have a migratory game bird committee. This committee is where we bring our migratory bird minded DNR staff around the table. We pull apart what our seasons are going to be for the year, what we are hearing from hunters, and what are priority research topics for us within the agency. She hopes that she can bring some waterfowl science to this group. She is looking forward to engaging with this group more and learning more about what we do. There are a lot of very important things that happen in this room. Very challenging things that happen in this room. There are a lot of lot of user groups and a lot of needs to be met and finding balance in those things. She knows it was and it can sometimes be a complicated process, but she looks forward to being able to bring a waterfowl science-based voice to those discussions.

Ms. Kneece's favorite part of her job is technical assistance. She grew up on a farm in SC. She loves managing habitat. She loves having dirty boots, muddy boots. If she goes home at the end of the day and her boots are not muddy, she is generally not the happiest of happy. Part of the technical assistance extends to private landowners. She has had a number of private landowners in the past months reach out and ask for advice on how to manage their system, what things are good. No, you do not want to put *Hydrilla* in your ponds. She had somebody put water hyacinth in their pond. She told them to take it out. This also extends to our waterfowl WMAs. Fortunately, and unfortunately, she does not supervise anybody, but she does have great relationships with all of our waterfowl staff. She gets to spend time with them in the field. Her message to them is to let her share their headaches. She wants to help them solve the puzzle on their habitat management issues that are just constantly an issue that we are struggling gaining ground on, be it controlling primrose and alligatorweed or the phragmites at Santee Coastal Reserve that is just a constant problem. How can she help them improve their management and take some headaches off of their table so we can maybe take some steps forward.

Ms. Kneece talked about their third-party peer review process. They put a lot of time into it, really in the past year. Our goal with this third-party review was to invite expert insight from waterfowl managers across the southeast to come on our WMAs. We are opening the gates and even the books. We are taking them on airboat rides or on boat rides to whatever they need to see. We are showing them the good, the bad, and the ugly. They are looking at our infrastructure and our management plans. We are going to make them get their boots muddy.

Ms. Kneece noted we think we do a lot of things really well. We have a real lot of really knowledgeable staff when it comes to waterfowl and wetland management, but we are saying, "What things can we do better?" There are a lot of things about waterfowl that we cannot

control. We cannot control migrations. Controlling disturbance is a complicated process, but we can control our habitat in a lot of ways. And so, we are taking every step that we can forward to make sure that we are putting good habitat on the ground, so that it is the habitat that we need, quality habitat. We are also making sure that we have got the infrastructure to support that. When we do get the right winter, that we have got what we need to have healthy birds at the end of the winter and happy hunters.

Ms. Kneece said we have completed three reviews. One is completely done. We completed the review at Samworth WMA. For these reviews, we are pulling in a panel of three people, one expert from SC that is familiar with the specific management system that we are looking at to bring a local perspective to the table, and two folks from elsewhere in the Southeast to really take a good, unbiased look at what we are doing. Samworth WMA has been completed. That was a great experience and really reinforced a lot of the decisions that we made. In some ways, they encouraged us to shake some things up and try some new management tactics there. We completed a review of Bear Island WMA in the spring, as well as Wateree Heritage Preserve WMA and the new Nat Love Farm. Love Farm is a WMA that has some waterfowl habitat in Columbia. Bear Island, Wateree and Love Farm are in the review graphics phase. We hope to crank out those final products here in the next month or two. Santee Coastal Reserve and *Phragmites* has been brought up in some respects in this meeting. Santee Coastal Reserve is up on the table for review this spring. Her plan was to pull in some guys from Texas. They have got some good *Phragmites* experience there. Hopefully, we will have some good *Phragmites* discussions too when we do the review of Santee Coastal Reserve.

Ms. Kneece stated that generally what we are doing in these reviews, is that between properties, there are certain goals that are staying the same, but we are generally outlining five goals. We are taking a hard look at the management plans to see if there is anything that we are missing. We are getting these guys to evaluate the infrastructure. We know where the leaky trunks and the problem dikes are. We are going to show them those things. Then we want to get them to see what else they can find, because often you look at the same thing every day and you become kind of blind to certain issues. That is kind of the goal of this. We have them examine our water management and our site to service practices to make sure that we are getting the habitat results that we should be. Specific to Samworth WMA, almost 1000 acres of impounded wetland that you have to use boat access and barge equipment is a complicated site to reach. We got them to evaluate a natural plant management versus agri-crop management to find out what was best for that system. We were asking folks to say it works or not. We ask them to evaluate our invasive species control. As Ms. Holling mentioned, we have problems with common salvinia, alligatorweed, and primrose. They are constantly a problem within our impoundments and something that we constantly fight. We are trying to pull in other expertise and other opinions on ways to deal with those problems. This is a general picture of what we have done on Samworth and the vision as we go forward on these other properties. Our goal is to do this evaluation on all our waterfowl properties on a 5-to-7-year rotation. Hopefully, we can kind of bring in, in terms of this group, someone to look at aquatic management on our WMAs. What other states are doing may be something we can discuss around this table.

Ms. Kneece moved on to research and monitoring. She thinks this is something that will probably be of interest to this group. It is kind of a slow start, but she hopes a good start. She hopes to see, as we move forward, the waterfowl program really invest in applied research. Things, that on the backside, we can turn around and have a management action that we can put

in place in the field, whether that is control of invasives and better management for beneficial plants and things.

Ms. Kneece spoke about a project she has spent a good bit of time on over the past couple months and will be through the winter. The Atlantic Flyway technical section came up with a research project looking at eastern mallards. They have been in decline for the past 20 years, with a decline in populations of about 20%. That is specifically the northeast population. Mallards in eastern Canada seem to be stable or slightly increasing. We are really taking a hard look at what is going on with mallards in northeastern US, which winter throughout the Atlantic flyway. It was a big research project, putting GPS transmitters on mallards. We are going into our second year of marking. It will be over 600 birds that get marked throughout the flyway throughout the course of this project. We are targeting marking about 40 individuals here in SC. It is often of interest to hunters as they find out about this. You can Google “Atlantic flyway migration studies” and get the web page that shows the movements of these birds throughout the year. It makes you feel like you are in the right spot when you are trapping mallards in SC when you get black ducks on your bait sites.

Ms. Kneece showed kind of an interesting little duck tidbit. Here are the tracks of 3 mallards that were marked just off Lake Wateree in SC. You see they all kind of took individual routes. We generally think about 50% of mallards harvested in SC each year originate from the Great Lakes region. This bird in red really took an interesting route all the way up to Hudson Bay. These birds are starting to make some movements back down. This bird actually went offline. This data comes off cell towers. We had no contact with this bird from April and she was pretty convinced that it had died, but it popped back up last week, and we got all of this information. This is really interesting stuff.

Ms. Kneece moved on to the good stuff that we are doing here right here in our backyard. DNR is going into our fifth year investing into a wood duck nest box recruitment project right here on Lake Moultrie. That is in partnership with Clemson and Nemours Wildlife Foundation. It is a project that is much bigger than SC. It is spread across the Southeast. She thinks there are nine different states participating in this project. It includes intensive marking of hens, web tags of ducklings, trying to determine how many females are actually recruited out of nest boxes in the Southeast. For a female to be recruited, the female has to survive the winter, turn around, nest and contribute to the population the following year. How productive our wood duck boxes really are is what we are looking at here. To have that on a Southeast scale is really valuable information.

Ms. Kneece said we are going into the first year of a study this coming winter. Clemson is doing a natural cavity study of wood ducks. We are using a lot of LIDAR data and a lot of forest inventory. They are putting radio transmitters on some wood duck hens looking to locate cavities. We are getting dimensions of cavities and looking at stand characteristics to see what we should be managing for in forest types to contribute to population from natural cavities. We can even translate that back to the nest box study, to determine which is the most beneficial and where we should be investing our time and our money. Is it more natural cavities and stand characteristics or do we need to ramp up our wood duck box efforts?

Ms. Kneece spoke about a project this coming winter that just came online. She got a call a couple weeks ago from the University of Delaware. They are doing a green-winged teal project. It is focused in North Carolina, looking at winter movement, habitat use, and some bioenergetics work on green-winged teal. They really wanted to expand their sites into SC and wanted to know if we had anything available. Our folks at Tom Yawkey Wildlife Center were

able to come through on that. We will be doing some radio marking on green-winged teal in partnership with University of Delaware. This was something she was pretty excited about.

Ms. Kneece thinks that can kind of translate to this group. She had a lot of conversations with staff over the past couple months. We are real interested in winter movements of birds, and it is kind of an evolving conversation. She thinks those winter movements really can translate over to this group. We can take a kind of rough look at some disturbance issues, look at the habitat types that birds are using, and see what is most valuable in our natural systems. She thinks there is a lot of winter movement research that we could explore. She might have some good conversations with DNR staff moving forward over the next couple months and years. She would like to see a winter movement ecology study come about sometime in the next five years or so.

Ms. Kneece spoke about some anticipated research. She is really interested in applied research, especially things that our biologists can take and put into practice in the field. *Phragmites* has been mentioned a number of times. It is a huge problem at Santee Coastal Reserve. We have been spraying it there for over 30 years and it is the same patch over and over. If you look at the mapping and the imagery, it is really kind of depressing. We have invested so much in herbicide treatments that we are probably starting to see some resistance issues. Staff has brought to attention to that a number of times and is really interested in a *Phragmites* research project or some kind of more formal investigation there. She was planning to kind of put a little bit of time in that, spend time with Ms. Holling and her shop. Maybe see if we can turn this box upside down and look at it from a little different perspective. We are kind of going through a literature review phase right now, talking to folks, and gathering information from the Great Lakes and the Gulf Coast. With the third-party review, we are going to be pulling more Gulf Coast folks to take a hard look at Santee Coastal Reserve and how that place is managed. Maybe we can shake up our management practices a little bit, possibly hitting *Phragmites* a few different ways. If we do have an herbicide resistance issue, how do we go about that moving forward. Controlling *Phragmites* in that 24,000-acre waterfowl management area is very important to the success of how we manage that property for waterfowl.

Ms. Moorer asked if that had been treated annually. Ms. Kneece replied pretty much. There have been a couple of years when we have just not had the funds for it to be treated, but this stuff has been hit repeatedly for about 30 years. Ms. Holling said she thought the majority of these treatments have been fall treatments. Mr. Treptow has requested a helicopter treatment for in mid-May this next year. She does not know what all has been done in between those treatments. Ms. Kneece replied that Ms. Holling had not missed anything. Airboat treatments are done in places that we can get to. They did do some experimental drone application treatments this year, and she thinks they were pleased with that application. You cannot use a drone on a large scale where we treated 2500 acres. If they could have treated 5000 acres, they would have done it. It is a complex system and it is disheartening when you see *Phragmites* growing on the beach where it gets overwash. Ms. Moorer agreed, especially when you drive down the road and see it on main corridors on the coast. Ms. Kneece said she travels for flyway meetings and every state she has been to has *Phragmites*. We were in Vermont back in the end of the summer and it was growing in the parking lot, right off Lake Champlain. It is something we are going to be spending some more time on and pulling in our aquatic staff within DNR to participate in those conversations, as our waterfowl staff feels like we have educated ourselves to a point to have a good in-depth conversation on it.

Ms. Kneece wrapped up the applied research section. She is really interested in putting a lot of emphasis on and having conversations with staff and they are getting behind some projects. We put a lot of time, man hours, and money into our winter habitat management efforts, but we have never really had a metric to assess those habitat management areas and really see how successful our habitat management. We want to go beyond an area biologist or regional coordinator going out and saying, "It looks really good". Determining if we have improved from last year and determining if we have increased our coverage of whatever beneficial plant by X percent is what she is really interested in and there are a number of ways to do this. We are trying to find the way to do that efficiently, but with the most precision and accuracy that we can. That is to do fall habitat assessments on our waterfowl WMAs, where we go in and assess what our plant composition is, how many duck energy days we could potentially supply on that WMA or in that specific management unit. Then we can link that to wintering waterfowl abundances on our WMAs to kind of have a check and balance there. Are ducks using this area? If we got more use in pond A than pond B, we can look at our plant species composition. Sometimes with waterfowl, it is not that straightforward, but we can try to make some links there between our habitat and wintering abundances on WMAs. We need to look at things that we can do, even those wintering counts, quickly and efficiently. You could spend two weeks doing a ground count of Santee Coastal Reserve. It will be complicated to do so. We need to make sure that we can put some precision behind our habitat assessments and some wintering abundances on the WMAs. These are some things she is kind of locked in to exploring at a deeper level. Clemson just got a new co-op leader. She is excited to meet and invest some time with them to kind of see, from a research perspective, how we can move forward with some of these things.

Ms. Kneece said another part of research and monitoring that we are in charge of is statewide banding efforts and monitoring. That involves a lot of lot of preseason banding of wood ducks, mottled ducks, and black-bellied whistling ducks, which occurs from June to the end of September. Right now, we are doing a little winter banding to go along with this mallard research project. Most of our banding is focused on the preseason, during the summer. Banding priorities also kind of fall under her umbrella.

Ms. Kneece briefly spoke about the lottery hunt program, something that is very important to us and we put a lot of time and effort into it. We love when we see pictures of happy faces with waterfowl and happy dogs during duck season. Something that kind of interests her are our Category two (Cat-2) areas. In some areas, our only management control is controlling disturbance. There are some little things we can do there to improve habitat in some of those Cat-2 areas and some of them are simply no. It might be that those Cat-2 areas are difficult to manage because they may be a tidal creek and there is not a lot, management wise, that we can do in those areas. Some Cat-2 areas can or do have some plant and flood type programs. She is looking at those and seeing if we are at our potential there. Are we doing what we can do and doing that successfully or are there some little tweaks that we can make to maybe put a little more food on the ground in those areas.

Ms. Kneece stated she is interested in this group, what you do, and what happens on the lakes. She spent a day out on the lakes with Ms. Moorer about two months ago. She told Ms. Moorer to educate her on what they do, on aquatic plants and pretend she knew nothing. From that experience, she got a good rundown of management of aquatics on the lakes here, what Ms. Moorer and her staff do in their shop and their history of that, and a good overview of what they are doing with the weevils. She was very encouraged by the aquatics and the natives that we saw in the lake. Looking at it from waterfowl hunter perspective, she was over the moon with what

we saw from the natives. She looks forward to continuing and investing in this group and Ms. Moorer and her shop, learning more about what you do and kind of bringing the waterfowl perspective to the table.

Ms. Kneece shifted to the partnership groups. She noted the success of waterfowl in SC is largely due to many of these partner groups. It is not just a DNR job, a S-C job, a state parks job, or anybody else across this table. Waterfowl management is not something that can be tackled by one group. Success of our program is attributed to partners. She is really looking forward to continuing partnerships and building upon partnerships with a lot of groups in SC and outside of SC to make sure that we meet and exceed our goals. She wanted to highlight the Super Flats project. This project is exciting, and it is good to see some work going on in public water. She hears a lot from public hunters in SC. They might say "What more can you do for us?" or "You put a ton of effort on WMAs. What more can you do for the public hunter?" She is really encouraged by the partnership with SCDNR, S-C, SCWA, and state chapter of Ducks Unlimited in that project, and real impressed with the updates she is getting. Some of this long-term haul is going to require some return trips and a lot of maintenance. When we knock out cut grass, something else is coming in and then something else will come in. She is really excited about that partnership. Part of what she does will be kind of exploring other ways that maybe we can do some similar things in other areas for the benefit of a waterfowl and public land hunters.

Ms. Kneece finished with a quote from Norm Strung, "A symbiotic relationship exists between waterfowl and the waterfowler. The birds provide sport, relaxation and that indefinable something that comes over anyone who's ever watched a flight of canvasback against a gray sky. The hunter, in turn, provides for the well-being and very existence of the birds." As she has said, waterfowlers are a passionate group. It is her hope that she can bring to the Council the voice of science and a little bit of hunter perspective to the table as we tackle some complex issues in this room. She showed her contact information on the last slide. Maybe next time she presents, she can bring some more kind of hard number type stuff or what I have available. We are kind of developing research and kind of homing in some of our monitoring as she gets further into her job. Please feel free to reach out and she looks forward to engaging with you further. She just wanted to give the Council and everyone in this room an overview of where we are at and where we were going.

Mr. Riser told Ms. Kneece that we worked hand in hand with some Clemson grad students last year to spray cut grass in areas like the Jungle and the Cow Pasture. They mentioned that they rotate in and out of that and they got new folks that come in and out. He does not know who the new folks are or how to reach them, but please pass the word along that if they are out there and they see stuff like *Salvinia* choking out a duck box, or cut grass for that matter, to let us know. We will do what we can to open it up for them. Ms. Kneece agreed to that. We are working to hire the person that is going to be maintaining those boxes this year. When we get them on board, she will certainly put them in contact with you to make sure that you get to cross paths and give him the rundown on what to look for. She will certainly help facilitate that. Mr. Riser thanked her.

Mr. Dukes asked to speak, and Ms. Holling gave him the floor. Mr. Dukes wanted to thank the Council for inviting us and inviting Ms. Kneece to give the waterfowl program update. He knows there are some interests from some constituent groups. Nothing is more contentious than waterfowl in SC and in nuisance aquatic weed control. Unfortunately, those two are linked at the hip. Ms. Kneece works directly for him. As she said, she does not supervise anybody. She works directly for him as Chief of Wildlife in the Wildlife Section. When he wrote that job

description, it was jam packed. She just gave you an overview. He said nobody is going to take this job, but he kind of sucker Ms. Kneece into it. She has absolutely knocked it out of the park. She is uniquely qualified and expertly qualified for that position. She eats, breathes, sleeps ducks. She understands moving dirt and water control. More importantly than all, she is very much a critical thinker. He thinks you saw that with her presentation. She knows that everything that we do is linked to something else. She has done a great job there and moving that forward. One of the things that she is doing, she is charged with cooperating with all of our WMA managers. Also, she is amplifying and disseminating knowledge to those folks. At this moment, while we only have one state wildlife waterfowl program coordinator, we are trying to create a cadre of experts across the whole state. Ms. Kneece is doing a great job of communicating with them and disseminating that information and just really amplifying the footprint of her project and the knowledge that goes into it. He would like to mention too, that we did get a bump in the state duck stamp money. It actually tripled, but more money is going to Canada. In essence it doubled our duck stamp budget. We are still talking about \$500,000, which is not enough to fix one medium sized breach. We could spend every bit of that money on aquatic nuisance controls. We could spend it all on *Phragmites* on Santee Coastal Reserve, for that matter. Having said that, we do have other funding sources that we could bring to partnerships for aquatic nuisance control. The Super Flats project is just one example. Ms. Moorer mentioned earlier that she was happy she was working on habitat instead of just doing nuisance aquatic control. He would contend that everything you do for nuisance aquatic control either benefits habitat or benefits the hunter in terms of access. This is very complicated. He knows you would like to have something that takes out this and leaves that, but it does not always work that way. He is sure you will be hearing from Ms. Kneece again. She does a great job and represents the hunter's perspective. If people do not understand that she is on the same team as the waterfowler, that is their problem, not our problem.

Ms. Holling thanked Mr. Dukes and said she would keep him and Ms. Kneece in the loop as far as when we are having meetings and what is going on.

Ms. Moorer thanked Ms. Kneece for letting us tap into her knowledge from a S-C perspective. Please come back and spend all the time you want with us.

Ms. Holling asked if anybody had any other comments or questions regarding the waterfowl. There was no discussion.

Ms. Holling moved on to topics and dates for the 2023 council meetings. She is hoping to have an update from Mr. Kaczka on carp health next time. She thinks Ms. Moorer may have some more detailed information from ReMetrix for S-C. She is hoping to have the first meeting in mid- to late- January to review the draft plan. There are going to be a few additions to that plan. The following meeting will be to finalize the plan and will hopefully be in mid- to late-March. She asked the Council if anybody else had anything that they would like to see discussed during the next two meetings.

Ms. Moorer asked Ms. Holling if the finalized plan would be mid- to late-March. Ms. Holling replied yes, that would be the final. Ms. Moorer said that is fine. She was asking for timing on ordering grass carp. Ms. Holling said she was trying to get things moved along as quickly as possible so both of us can do our orders in a reasonable amount of time.

Ms. Holling asked the Council if anybody have any new business for the council. There was no comment. We will do a discussion of field trip and who wants to go after we adjourn. She asked if anybody had anything else before we have a motion to adjourn. There was no discussion.

Ms. Moorer made a motion to adjourn. Mr. Simmons seconded the motion. Ms. Holling called for a vote on the motion. The motion passed unanimously. Ms. Holling adjourned the meeting at 11:51am and thanked everyone for coming.