



**CHNEP Management Committee Meeting  
Friday January 14<sup>th</sup>, 2022  
Hybrid In-person & Virtual Web Meeting**

**Management Committee Meeting Draft Minutes  
January 14, 2022**

**Members Present:**

Ernesto Lasso de la Vega	CHNEP TAC Representative
Claire Jubb	Charlotte County
Maya Robert	City of Cape Coral
Rachel Hart	U.S. Environmental Protection Agency (EPA) Region 4
Heather Stafford	Florida Department of Environmental Protection Coastal Office
<b>Corey Anderson</b>	Florida Fish and Wildlife Conservation Commission (FWC)
Jeff Devine (alt.)	West Coast Inland Navigation District (WCIND)
Justin McBride	West Coast Inland Navigation District (WCIND)
Phil Flood	South Florida Water Management District (SFWMD)
Roland Ottolini	Lee County
Amanda Boone	Sarasota County
Laura Gibson	City of Bonita Springs
James Ink	City of Fort Myers
Holly Milbrandt	City of Sanibel
Devon Moore (alt)	City of Winter Haven
Misty Nichols	Gasparilla Island Conservation and Improvement Association
Vivianna Bendixson	Southwest Florida Water Management District (SWFWMD)
April DaSilva (alt.)	Central Florida Regional Planning Council (CFRPC)
Phillip Stevens	Florida Fish and Wildlife Conservation Commission (FWC)

**Others Present:**

Jennifer Hecker	Coastal & Heartland National Estuary Partnership (CHNEP)
Nicole Iadevaia	Coastal & Heartland National Estuary Partnership (CHNEP)
Andrew Webb	Coastal & Heartland National Estuary Partnership (CHNEP)
Sarina Weiss	Coastal & Heartland National Estuary Partnership (CHNEP)
Sophia Brown	Coastal & Heartland National Estuary Partnership (CHNEP)
Kate Hubbard	Florida Fish and Wildlife Conservation Commission (FWC)
Miles Medina	University of Florida
Mary Lusk	University of Florida
Mike Parsons	Florida Gulf Coast University (FGCU)
Paul Dean	Pinellas County Government
Harry Phillips	City of Cape Coral

**Agenda Item #1 – Call to Order and Introductions — Corey Anderson, Co-Chair**

Co-chair Corey Anderson called the meeting to order at 9:00 am. Introductions were then made.

**Agenda Item #2 – Agenda Additions or Deletions — Corey Anderson, Co-Chair**

There were no additions or deletions to the agenda.

**CLAIRE JUBB MOVED, SECONDED BY PHIL FLOOD TO ADOPT THE AGENDA AS PRESENTED. THE MOTION WAS CARRIED UNANIMOUSLY WITH NO FURTHER DISCUSSION.**

**Agenda Item #3 – Public Comments on Agenda Items – Corey Anderson, Co-Chair**

No public comments on agenda items were made.

**Agenda Item #4 – Management Committee September 10, 2021 Meeting Minutes — Corey Anderson, Co-Chair**

Committee member Holly Milbrandt suggested that her name be removed from the “Members Present” list as she did not attend the September 10<sup>th</sup>, 2021 Management Committee Meeting. No further edits were made to the September 10<sup>th</sup>, 2021 Management Committee Meeting Minutes.

**HOLLY MILBRANDT MOVED, SECONDED BY CLAIRE JUBB TO APPROVE THE MINUTES AS AMENDED. THE MOTION WAS CARRIED UNANIMOUSLY WITH NO FURTHER DISCUSSION.**

**Agenda Item #5 – TAC Report— Ernesto Lasso de la Vega, TAC Co-Chair**

Ernesto Lasso de la Vega, TAC Co-Chair, presented the highlights from the Technical Advisory Committee (TAC) meeting, held December 2<sup>nd</sup>, 2021. There were no items for TAC input pertaining to Management Committee agenda items this cycle. The TAC meeting included many important technical presentations and discussions, including a report from the CHNEP Habitat Conservation Subcommittee (or HCS). The HCS is holding a series of workshops to support the NOAA RESTORE funded “Place Based Fishery Conservation in Charlotte Harbor” project. Mr. Corey Anderson from FWC provided the TAC with an update on the initial progress of the project, which aimed to extend CHNEP’s Habitat Restoration Needs (HRN) Plan into place-based, topic-focused conservation plans and actions. The project focused on discrete sport fish nursery habitats in Charlotte County. This group will be working over the next year to establish specific strategic locations to focus on as well as recommendations for protecting and restoring those habitats. TAC members had several comments regarding where additional data could be found during the data gathering stage and expressed interest in participating in future workshops.

Mr. John Cassani provided the TAC with a review of the “Regional Water Quality Impairment Assessment” report produced by the Calusa Waterkeeper, which was issued last March. The report summarizes water quality impairments in 9 counties using FDEP assessment criteria. The study found that urban population growth and associated development correlate with increases in water quality impairments in most southwest Florida counties. TAC members had questions regarding the FDEP impairment process as well as the value of ‘Reasonable Assurance Plans’ in the place of a BMAP.

Dr. Darren Rumbold from FGCU presented findings of a recently completed study on the effect of prolonged low-salinity water on the Eastern Oyster with short intervals of high salinity to recover. Information from the study could assist resource managers in the Caloosahatchee basin

to maximize discharge volume without undermining the sustainability of oyster reefs in the area. The study found that low-salinity stress was exacerbated at higher temperatures for both adult and spat and therefore recommended salinities and durations differ seasonally. TAC members asked if there was a study that also considered the impacts of sea level rise on the salinity in the Caloosahatchee downstream of the lock.

Ms. Nicole Burns and Mr. Anthony Gillis from FWC provided committee members with information about the FWC “Florida Ecological Report Cards” for Marine & Estuarine and Terrestrial & Freshwater Habitat. These provide a habitat-based framework to evaluate the current condition and desired future condition of a set of Conservation ‘Assets.’ The report cards assess the status, trend, current and emerging threats, and limiting factors for Florida’s natural and cultural resources by setting measurable conservation goals and tracking progress toward meeting those goals. TAC members commented that these Report Cards are very valuable, and suggested assessing the conservation assets on a regional scale by dividing Florida into even more regions in future Report Card versions.

Finally, Mr. Marcelo Lago provided the TAC with an overview of the South Lee County Hydrological Modeling Tool, which is a science-based, data-driven integrated surface/groundwater hydrologic model that is capable of simulating both dry and wet season water levels and flows. The project purpose was to model and provide recommendations for resource managers in the area to strategically restore wetlands and natural water storage areas to help improve water quality and environmental conditions in the area and to increase natural water storage and which will help during flooding events.

#### **Agenda Item #6 – CAC Report— Debi Osborne, CAC Co-Chair**

Ernesto Lasso de la Vega, filling in for the CAC Co-Chair, presented the highlights from the Citizens Advisory Committee (CAC) meeting, held on December 15th, 2021. There were no items for CAC input pertaining to Management Committee agenda items this cycle. The CAC meeting included an overview of new conservation grant applications, a climate change needs assessment survey round table discussion, an outreach video about the Gateway to Myakka Marsh Restoration, and a presentation on the Regional Water Quality Assessment.

There were four applications for the Winter FY2022 Conservation Grant Cycle. These included:

1. A project to include Charlotte Harbor in the online Go Hydrology Journal that will help increase public water awareness and engagement. This was recommended for full funding.
2. The second application is for the 2022 Great American Cleanup – Clean YOUR Block event that will be encouraging people to commit to keeping their block clean. This was also recommended for full funding.
3. The third application was to provide scholarships and materials for 24 underserved children to attend the Lovers Key Eco-Arts Camp. This was recommended to fund the full cost for scholarships for 12 campers that would be identified by a third party organization that serves underserved communities and assurance that transportation will need to be provided.
4. The last application is for the Myakka River Management Coordinating Council website which serves as an educational resource about the watersheds in the CHNEP program area, this was recommended to be fully funded.

CAC members discussed a climate change needs assessment project the committee will kick off this spring. Bridget Washburn (CAC rep to Glades County) provided a background on how a Climate Change Needs Assessment survey can be used to gauge the status of local communities

in regards to their level of sustainability and resiliency. The results of the survey can then help CHNEP staff and partners to gather project ideas for upcoming resiliency funding opportunities and help those communities in securing funds for resiliency related projects. Committee members will use the survey as a starting point for a conversation with local community or governmental leaders to gather information. Additionally, CAC members saw an educational outreach video created by the Conservation Foundation of the Gulf Coast about the recently completed Gateway to Myakka Marsh Restoration project-the video can be viewed on the CHNEP YouTube and CFGC Facebook.

Members also heard presentations about new outreach tools created by CHNEP staff including Seagrass Fact Sheets and a Kids Activity Book. Lastly, Mr. John Cassani from Calusa Waterkeeper provided a review of the regional impairment assessment by the Calusa Waterkeeper, which was issued last March and engaged CAC members to share the report and information with community members and leaders in their represented counties which were all included in the report.

#### **Agenda Item #7 – CHNEP Update — Jennifer Hecker, CHNEP**

CHNEP's Executive Director, Ms. Jennifer Hecker, presented on programmatic activity occurring since the last Management Committee meeting. Highlights are as follows:

Financial support continues to be a priority. CHNEP staff prepared customized 2022 invoice letters to all 10 counties and 25 cities in the CHNEP area. These packets included the FY21 invoices, CHNEP CCMP Summary, 2021 Legislative Priorities, and project fact sheets. Additionally, CHNEP received \$3,056 in private donations and four (4) grant applications, completed six (6) grant progress reports, had one (1) grant proposal selected for funding and one (1) grant awarded.

Other finance and administrative highlights include:

- Invited to and drafted grant proposal with the City of Punta Gorda and The Nature Conservancy to submit to FDEP for the “Tiki Point Living Shoreline Restoration Project”
- Invited to and drafted grant proposal to submit to the FDEP for the “Wild Turkey Strand Preserve Restoration Project”
- CHNEP, as a National Estuary Partnership, bipartisan federal infrastructure funding of \$915,000/year for 5 years.
- Amended FY21 and finalized FY22 budgets which were approved by the Policy Committee
- FY22 budget approved by the City of Punta Gorda
- CHNEP was awarded EPA FY22 grant funding agreement
- Submitted letters to SWFWMD to define TBD projects in FY19 & FY21 agreements as the Myakka Headwaters Pilot Project
- Submitted FY2021 NEPORT Habitat and Leveraging entries with over 70 submissions
- Input requisitions to the City's procurement process for continuing projects that start October 1<sup>st</sup> through FY22
- Input requisition for “Updating & Expanding the Functionality of the CHNEP's Water Quality Trend Analysis”
- Closed out FY21 by carrying over purchase orders and re-appropriating funds as necessary for FY22

CHNEP hosted the FY21 CHNEP Fall Management Committee Meetings and FY22 TAC and CAC Management Committee meetings, as well as the Coastal Charlotte Harbor Monitoring

Network Annual Meeting, the Responding to Rising Waters Webinar, and the CHNEP 2022 Nature Calendar Photo Selection Meeting. CHNEP also participated in several partnership meetings to provide comments and technical support. These include: ANEP Board, Water Quality Audit FDEP, Charlotte Harbor Flatwoods Initiative, Charlotte Harbor Flatwoods Hydrological Modeling Project Management Meetings, South Lee County Hydrological Modeling Project Management Meetings, CHNEP Water Atlas Meetings, EJ/DEI Planning and Workgroup Meetings, EPA Nutrients & Climate Working Groups, Coastal Acidification Network Meetings, Myakka Headwaters Restoration Site Visit, University of Florida Center for Coastal Solutions Data Analysis Project Meeting, Meeting with Village of Estero regarding FDEO CDBG-MIT Resiliency Funding projects, Everglades Working Group/Science Coordination Group Meeting, Southwest Florida Estuarine Restoration Team (SWERT) Steering Committee, SWFL Regional Resiliency Compact Meeting, Living Shoreline Restoration Project Meeting, Science and Environmental Council Meeting, Myakka River Management Coordinating Council Meeting, Southwest Florida Seagrass Working Group, and the Charlotte Harbor Flatwoods Hydrological Modeling Project Site Visit. Staff presented on a variety of topics for the Southwest Florida Seagrass Working Group, Coastal & Estuarine Research Federation (CERF) 2021 Conference, Punta Gorda Isles Civic Association, Team Punta Gorda, Peace River Audubon Society, Punta Gorda Garden Clubs, Florida Lake Management Society State Conference, Florida Redfish Symposium, the Florida Department of Environmental Protection Webinar “Get to know CHNEP and Sarasota Bay Estuaries”, and the Southeast Ocean and Coastal Acidification Network (SOCAN). These partner meetings and presentations have garnered media which include:

- 10/21 Seagrass restoration in Caloosahatchee River provides many benefits – News-Press
- 10/21 Water Quality – Team Punta Gorda Volunteers For a Better Community

In regards to public outreach, CHNEP finalized the design and sent the 2022 Nature Calendar to the printer, completed seagrass loss maps for CHNEP basins for the Water Atlas and Fall Harbor Happenings magazine, and designed the CHNEP Kid’s Activity Book that features environmental education and activities. In addition, CHNEP updated project factsheets for recently completed projects, created and updated Seagrass Fact Sheets for CHNEP estuaries with 2020 data, and created an FDEO CDBG-MIT Resiliency Funding Fact Sheet. CHNEP has 72 new Facebook followers, 6,376 subscribers to educational mailings, and had 1,207 unique visitors to the CHNEP website.

Additionally, CHNEP hosted monthly volunteer events including citizen science training for the “Florida Horseshoe Crab Watch”, International Coastal Cleanup Day at Ponce de Leon Park, a Kid’s Sustainable Fishing Clinic at the Arcadia Rodeo, and an Earth Echo Water Challenge at Gilchrist Park. CHNEP also had an educational booth at the Wildcat Tailgate in Polk County and at the Miakka Hootenanny in Sarasota County as well as sponsored and hosted a virtual booth at the 16<sup>th</sup> Annual Sustainable Communities Workshop.

CHNEP will be hosting the 2022 Southwest Florida Climate Summit, a public event to share knowledge, showcase climate action, engage leadership across sectors, and mobilize collaboration throughout the region. The 2022 Southwest Florida Climate Summit will be held virtually and in-person at the Collaboratory in downtown Fort Myers. Advance registration is required and will open on February 1<sup>st</sup> at [www.chnep.org/2022-climate-summit](http://www.chnep.org/2022-climate-summit).

Ms. Hecker shared updated from the Florida HAB Task Force. Highlights are as follows: The recently released second consensus document includes updated recommendations for public health, communications, management and response, and research as well as long term focal areas

and an update on the progress made since the first consensus document. In regards to Public Health, the task force recommends providing DOH with resources needed to make multiple improvements in protection of public health. In regards to communications, the task force recommends providing the HAB Communications Working Group with the resources needed to take key actions that improve communications about red tide and other HABs.

The recommendations for management and response include:

- Providing the HAB Task Force, state management entities, and other relevant groups with the resources needed to reduce harm from red tide and other HABs
- State entities, local governments, and other partners and stakeholders should review and document current practices to detect red tide and other HABs, opportunities for improvements, resources needed for earlier and more accurate warnings, and develop a comprehensive response plan supported by monitoring and streamlined permitting for control and mitigation

Recommendations for management response and research include:

- Improve ability to evaluate severity of red tides and broad socioeconomic impacts
- Design investigations that yield an understanding of red tide sufficient to guide adaptive management.
- Models to predict start, progress and end of blooms; early detection projects
- Evaluation of strategies and approaches to control blooms and mitigate impacts

Committee members thanked CHNEP staff for all of their hard work since the last cycle. A committee member asked if the Kid's Activity Book is available digitally, to which Ms. Hecker replied that there is a digital copy as well as several copies of the Kid's Activity Book available at the CHNEP office.

#### **Agenda Item #8 – Amended FY2022 Work Plan & Budget — Andrew Webb, CHNEP**

Andrew Webb, CHNEP Finance & Grants Specialist, presented the initial FY22 Work Plan and Budget which was approved by the Management Conference in the spring 2021 meeting cycle. As is customary, the CHNEP annual Work Plans and Budgets need to be amended as updated information is available and as needed due to funding or project changes. As a result, the FY22 Amended Work Plan was presented for review with the following amendments since last cycle:

To reflect the award of the Federal NEP Competitive Grant Funding that is administered by Restore America's Estuaries (RAE), a line item titled 'NEP Competitive Grant Funding (RAE)' was added to Tables 1 and 2 in the amount of \$129,213. A line item titled 'Federal Infrastructure Funding' was added to Tables 1 and 2 in the amount of \$915,000 to reflect funding to be received from the U.S. EPA after the passing of the Bipartisan Infrastructure Funding bill. These changes result in the Total Federal funding to increase to \$1,744,213.

To reflect funding that will be received by Fish & Wildlife Foundation of Florida for the Place-based Fisheries Conservation in Charlotte Harbor data that will be added to the Water Atlas, the Partner Contributions (local) was increased by \$5,000 in Revenue portion of Table 1 and a line item titled 'Fish & Wildlife Foundation of Florida' was added for the amount of \$5,000 in the Non-Federal Funding Source portion of Table 2.

On the Expense portion of Table 1, the Research & Restoration Contracts has been updated to \$1,299,796. This is an increase of \$129,213, \$5,000, and \$915,000 that results from the award of the RAE grant, the funding from Fish & Wildlife Foundation of Florida for the Water Atlas, and

the Bipartisan Infrastructure Funding. The above changes have also increased the Total Cooperative Funding in Table 2 as well as the Total Revenue and Expenditures to \$2,089,713.

The projects and increased funding mentioned above are also reflected in the CHNEP Research & Restoration Technical Project Funding (Table 5). Further additions and updates to Table 5 included updating the amount of the 'LCHFI Hydrologic Restoration' that is funded by SWFWMD to \$14,805 in FY20 portion. This is a decrease of \$24,704 and is due to that amount being reimbursed by the SWFWMD for tasks that have been closed out. A line item was added for 'CHNEP Water Atlas Updating & Expanding Water Quality Analysis Trends' in the amount of \$49,959 to reflect a project with the University of Florida and was funded from previous EPA 'TBD Project' funds. Additionally, the 'CHNEP Water Atlas Maintenance & Improvements' was updated to \$88,038. This is an increase of \$4,968 and is funded from previous EPA 'TBD Project' funds. As a result of the increased funding to these two CHNEP Water Atlas projects, the total amount of TBD project funds decreased to \$12,346. The above changes have resulted in the overall FY22 Total to increase to \$1,299,796 in Table 5.

A line item was added on Task 1 'Policy Conference: Administration, Finance, Operations' for the amount of \$75,000 of FY21 Carryover Funds to work with the City of Punta Gorda on increasing Admin. This reflects fees to fund the hiring of a City Procurement specialist to work on CHNEP projects due to large increases in funding coming to the program and the continuing need for projects to move swiftly through the procurement process. A Program & Grant Specialist was added to the CHNEP organizational chart to add CHNEP internal staff given additional work load associated with doubling of budget and added related projects, as well as to assist with grant writing to continue to expand and increase funding.

The CHNEP is still waiting for funding guidance on the \$915,000 from the Bipartisan Infrastructure Funding, but has started conversations with partners about ideas for projects. These include assisting all 10 counties in the CHNEP program area in completing Climate Change Vulnerability Assessments (CCVAs, making them eligible for state funding), funding to start construction and complete the Tiki Point Living Shoreline Project in Punta Gorda, and a call for FY23 projects. A committee member asked if the Bipartisan Infrastructure Funding could be spent towards resiliency planning, to which Ms. Hecker responded that the expectation is to produce physical projects in addition to planning, so CHNEP would need to balance those with how the funding is expended and the CCVAs would be considered planning.

The Management Committee was asked to review the FY2022 Amended Work Plan & Budget to provide any input and a formal recommendation as to whether or not the Policy Committee should approve at their January 27, 2022 meeting.

**CLAIRE JUBB MOVED, SECONDED BY MAYA ROBERT TO RECOMMEND APPROVAL OF THE AMENDED FY2022 WORKPLAN & BUDGET. THE MOTION WAS UNANIMOUSLY APPROVED.**

**Agenda Item #9 – An overview of Red Tide (*Karenia brevis*) bloom dynamics — Dr. Kate Hubbard, Florida Fish and Wildlife Conservation Commission Center for Red Tide Research**

Dr. Kate Hubbard, who is a Research Scientist and Director of the Center for Red Tide Research and the Harmful Algal Bloom Monitoring and Research Program for the Florida Fish and Wildlife Conservation Commission-Fish and Wildlife Research Institute (FWC-FWRI), presented a

briefing on the latest red tide and harmful algal bloom (HAB) research and present a new suite of tools which can be used to better understand bloom dynamics and increase relevant observations. Highlights are as follows:

The marine alga *Karenia brevis*, commonly referred to as red tide, is a dinoflagellate with a long history of blooms in the Gulf of Mexico. The duration, location, and spatial extent of the bloom varies from year to year. *K. brevis* blooms along the southwest Florida Gulf Coast almost every year. Blooms commonly occur along the Coast of Mexico as well, and are less frequently observed along Florida's Panhandle and east coasts and the Texas coast. Marine HABs produce toxins and cause illness in humans. *K. brevis* produces brevetoxins, which can cause Neurotoxic Shellfish Poisoning if consumed and cause respiratory irritation when the toxins are aerosolized. Blooms can also cause wildlife mortality events, including fish, marine mammals, birds, and sea turtles. Blooms of *K. brevis* vary widely in terms of geographic extent, date of initiation, duration, and severity. This variability can be linked in part to local and regional environmental conditions, including ocean circulation prior to, during, and following a bloom, yet it is not yet possible to predict exactly when and where a bloom will initiate or terminate. Further complicating long-term predictions is the broad ecological niche that *K. brevis* occupies with respect to temperature, salinity, nutrient utilization, and light, as examined via laboratory and field studies. A suite of tools are now being used to help better understand bloom dynamics and increase relevant observations.

In southwest Florida, initiation of *K. brevis* blooms typically occur in the late summer and fall. However, initiation of blooms typically begin later in the Panhandle. *K. brevis* blooms start approximately 10-40 miles offshore at depth in the Gulf of Mexico during the wet season. As cells are brought onshore by deep ocean currents, the suite of nutrients onshore allow cells to grow. Red tide can cause ocean- and land-based nutrients to grow, and cells become concentrated nearshore and move toward the surface (upwelling). Research is being conducted to determine what causes a bloom to end ("termination").

Blooms occur near annually in southwest Florida, with the earliest reports in the 1800s. The longest red tide bloom on record lasted 30 months in 1994 through 1997. More recently, the 2017-2018 bloom event is the 5<sup>th</sup> longest on record, lasting 16 months and impacting 22 coastal counties on all three of Florida coasts. This past year, the 2020-2021 bloom event lasted 12 months and impacted around 17 coastal counties, all on Florida's west coast. Research is being conducted to determine whether long-lasting blooms are caused by advection or new initiation, or both. This research involves using oceanic circulation models and looking at the bottom currents to determine if circulation was conducive for pushing new cells onshore.

The life cycle/in situ growth rates of *K. brevis* are still not fully resolved, including the resting stage. *K. mikimotoi* has a record 50 year resting stage, found in coastal sediments from the coast of China dating back to the 1970s. This was determined using a combination of microscopy, probes, and quantitative PCR. The Center for Red Tide Research is working with partners to figure out if *K. brevis* also has a resting stage, and where these offshore beds reside. *K. brevis* has a flexible morphology – there are 3 different documented distinct cell types (singlet, spherical, paired). *K. brevis* is also flexible in terms of environmental conditions such as light, nutrients, temperature, and salinity. It's able to grow at a wide range of light levels, though prefer high light levels. However, at low salinity, cells can become stressed and form circular morphologies. Understanding the transition from intensive division periods to stressed periods will help to understand some of the drivers.

*K. brevis* can use diverse Nitrogen sources, at least 12 different nutrient sources may contribute to a bloom. Recent research involved predicting *K. brevis* blooms at seasonal time scales using circulation patterns in the loop current (sea surface height). Looking through time, scientists have found that when there is too much upwelling that occurs, there is less red tide, and that blooms typically occur when there is intermittent upwelling. Dr. Hubbard concluded that interdisciplinary tools and integrated observation networks are critical to advancing science for *K. brevis* and other HABs.

A committee member asked if the mentioned sediment analysis for resting stages will be done inshore as well, and what it would look like offshore in stress stages. Dr. Hubbard responded that they are looking both offshore and near-shore and that offshore is where there's most likely to be these types of reservoirs. Dr. Hubbard added that they typically see stress cells once bloom events start to die-out. Stress cells may be deposited in near shore environments but may be pushed offshore. In terms of what might have caused the cells to be stressed, salinity is the most prevalent factor in wetlands, but there are likely other factors. Dr. Hubbard added that FWC has a 5-year project funded by NOAA to understand what is going on during termination, and she suspects blooms termination will be just as complex as initiation.

#### **Agenda Item #10 – Land-based Nutrients' Effect on Duration and Intensity of Red Tide Events — Dr. Miles Medina, University of Florida**

Dr. Miles Medina, at the Center for Coastal Solutions at the University of Florida, presented findings from a recent study to identify systematic cause-and-effect relationships between red tide (*K. brevis*) and anthropogenic drivers. Highlights are as follows:

Red Tide (*Karenia brevis*) blooms on Florida's Gulf Coast have severely impacted regional ecosystems, coastal economies, and public health, and a scientific and policy debate has emerged as to whether these blooms are primarily natural or anthropogenic. Current hypotheses suggest that natural biological and oceanographic processes explain the initiation of blooms in the Gulf of Mexico and their transport toward Florida's coast, while anthropogenic nutrient inputs from urban and agricultural areas may intensify blooms once they arrive on the coast. However, past correlation studies have not found compelling evidence linking land-based nutrient inputs (river discharge) to coastal blooms.

A lack of correlation does not mean that there is no causality; in fact, causation without correlation can occur when interactions are state-dependent. There is good reason to suspect that finding a causal link between anthropogenic inputs and coastal *K. brevis* blooms may not be as simple as measuring correlations. Algae blooms represent a culmination of complex interacting processes, and correlation is not a reliable metric for interactions in complex systems. Their work transcends the limitations of traditional correlation analyses, using empirical methods based on signal processing and chaos theory to identify systematic cause-and-effect relationships between *K. brevis* and anthropogenic drivers. This is done by visualizing multiple related variables in Phase Space, in which the trajectory traces a manifold whose shape encodes the rules governing the variables' interactions. Looking at the behavior of blooms can tell us about the interactions that occurred at that time.

Their study hypothesized that 1) nutrient-enriched Caloosahatchee River discharges systematically intensify *K. brevis* blooms near Charlotte Harbor, and 2) this influence reaches upstream to Lake Okeechobee and the Kissimmee basin. The study found a complex but systematic pattern of behavior in *K. brevis* blooms near Charlotte Harbor and a dominant seasonal component,

indicating that systematic cause-and-effect relationships may be at work. The study also found that Nitrogen inputs from the Caloosahatchee River systematically influenced *K. brevis* blooms in 2012 through 2018. Subsequent causal analysis found that Caloosahatchee discharges and nitrogen inputs both systematically intensify blooms on the coast. River discharge was most influential during the earliest stages of blooms, while nitrogen inputs were most influential during the peak stage of blooms. Regarding the second hypothesis, the study found that the influence of nitrogen inputs on blooms can be traced upstream to Lake Okeechobee and the Kissimmee basin. Kissimmee River nitrogen inputs drive Lake Okeechobee nitrogen levels, which in turn drive nitrogen in the Caloosahatchee River. Therefore, the timing of Caloosahatchee discharges and nitrogen inputs relative to a bloom's stage of development is important.

In summary, nitrogen-enriched runoff from a vast, highly developed watershed consistently fuels *K. brevis* blooms near Charlotte Harbor, though correlations do not reliably capture this anthropogenic link. Discharges and nitrogen may act on blooms through distinct but synergistic mechanisms. Mitigating bloom intensity and duration will likely require holistic solutions that consider natural drivers, anthropogenic drivers, and their interactions. The Center for Coastal Solutions is working to identify sub-basins and land uses that contribute most strongly to blooms. Additionally, upcoming work will involve modeling alternative Lake Okeechobee operations and proposing changes to reduce coastal impacts (USACE) and simulating hydrodynamics in 3D to understand how Caloosahatchee discharges affect tidal exchange and circulation patterns in Charlotte Harbor.

Committee members thanked Dr. Medina for his excellent presentation and asked why the study was only focused on the Caloosahatchee River and not runoff from Florida's other river systems and from the land in general. Dr. Medina responded that this type of analysis is very intense and should be limited to one river/watershed at a time, though it would certainly be interesting to look at other rivers and watersheds and they are working on performing similar analyses further up the coast as well. Dr. Medina added that the Peace River and Myakka River are important contributors and likely are contributing to blooms, but these weren't included because this type of analysis requires a lot of consistent monitoring.

**Agenda Item #11 – Steps to Reducing Nutrients to Reduce Red Tide — Dr. Mary Lusk, University of Florida**

Dr. Mary Lusk, at the University of Florida in their Gulf Coast Research and Education Center, provided an overview of current and ongoing research at the UF Urban Soil and Water Quality Lab focused on watershed drivers that control the timing, magnitude, variability, and impact of nutrient transport in urban landscapes. Highlights are as follows:

Dr. Lusk explained that multiple sources of land-based nutrients can support Red Tide blooms in nearshore waters, questions remain about the watershed drivers that control the timing, magnitude, variability, and impact of nutrient transport in urban landscapes. Their research aims to characterize the nutrient removal efficacy of stormwater control measures as well as the role of non-fertilizer sources such as reclaimed water, vegetation, and atmospheric deposition in nitrogen enrichment of surface waters. The study also aimed to determine the chemical characterization of stormwater and wastewater effluents to identify specific compounds used by *Karenia brevis* for the development of appropriate management strategies.

Specifically, the study used nitrogen stable isotopes to track sources of nitrogen. Isotopes are atoms of the same element with a different number of neutrons and slightly different masses.

Through a process called isotopic fractionation, organisms preferentially use the lighter atoms and leave heavier ones behind. Previous research on the sources of nitrogen transport in urban stormwater runoff from residential catchments found that nitrate was nearly 20% of total nitrogen, and fertilizers were 37% of the nitrate. Their work expanded this research to look at medium-density and high-density residential neighborhoods, specifically within a watershed that is 56.2% urban. Within the residential study site, almost 30% is impervious surface area. Nutrients and material accumulate on these impervious surfaces during the dry season and then are flushed into surface waters by rainfall in the wet season (this is termed the “seasonal first flush”). The study observed multiple sources of nitrogen in waterfront lawn runoff, including atmosphere, fertilizer, soil, and pet waste. Previous studies looking at the composition of different forms of nitrogen within the total nitrogen load during the wet season found that organic nitrogen made up more than half of the total nitrogen load.

Regarding reclaimed water, data from a colleague in the UF Urban Soil and Water Quality lab looked at intensive residential runoff sampling over a one week period. This work was done in California and looks at nitrogen concentrations in urban runoff every 6 hours for a week. They found a daily pattern in which daily highs were at a time when the community was irrigating common areas with reclaimed water, and daily lows were at times when lawns were being irrigated with potable water. This issue can be avoided by using best management practices and educating the community on smart irrigation. For example, by not over-spraying and keeping irrigation equipment and sprinklers tuned so that water is applied only to pervious surfaces, not sidewalks and streets. This keeps nutrient laden reclaimed water from entering the runoff and making its way to surface waterbodies.

Their research also looked at the total dissolved organic and inorganic nitrogen concentration in stormwater runoff and runoff retention ponds. The study found that runoff treatment ponds may enhance the flux of labile dissolved organic nitrogen to downstream ecosystems. Future research is needed on better retention pond design and the role of littoral zone plants in nutrient uptake. It’s important for stormwater and resource managers to understand that runoff treatment ponds have very little nutrient removal.

The results and findings of this study have several implications for urban nutrient management. Multiple forms of nitrogen were observed in stormwater runoff including atmosphere, fertilizer, soil, and pet waste. Therefore, urban nutrient management should focus on preventing soil erosion, implementing street sweeping, pet waste management and good community housekeeping, and green infrastructure to reduce runoff. Assessing the nitrogen sources can further inform management on which forms of nitrogen to target for removal. In this study, dissolved organic nitrogen was the dominant form, which is largely sourced from the atmosphere. The study identified the sources of nitrate as atmosphere, organic matter, and fertilizers, indicating that successful management will require more than just fertilizer bans. Leaf litter and grass clippings largely contribute to particulate organic nitrogen, and management may involve street sweeping, urban BMPs, and filtration screens.

To fill data gaps and identify more specific nutrient management implications, the UF Urban Soil and Water Quality Lab is focused on three ongoing research projects. These include the effect of pond plantings on nutrient uptake, the role of atmospheric deposition on nitrogen and phosphorous runoff and utilization by *K. brevis*, and the role of reclaimed water on nutrients in stormwater and development of community education on smart irrigation practices.

**Agenda Item #12 – Effect of Decomposing Fish in Prolonging Red Tide Events – Dr. Mike Parsons, Florida Gulf Coast University**

Dr. Mike Parsons, Director of the FGCU Water School and appointed member of the state Blue-Green Algae Task Force, presented an overview of recent research to assess the effect of decomposing fish in prolonging red tide events and evaluate fish removal mitigation strategies. The project is part of the state-funded Florida Red Tide Mitigation & Technology Development Initiative. Highlights are as follows:

The study aimed to answer the question “is fish removal and composting a viable option to mitigate *Karenia brevis* blooms?” The project had three objectives: 1) reassess fish as a source of nutrients fueling red tide blooms; 2) conduct a cost-benefit analysis for a fish removal program to mitigate red tide blooms; and 3) evaluate composting as a means to process and repurpose collected fish carcasses for fertilizer use in the future. Fish decay experiments were conducted at the FGCU Vester Field station in order to calculate what the release rate would be. Nutrient release rates generally stabilized within 2 and 7 days after fish decay commenced. Salinity did not appear to have much of an effect on nutrient release rates, however, temperature had a clear effect on nutrient release rates (greater release rates at higher temperature). The results of the study indicated that nitrogen release rates (primarily ammonium) may be higher (48% higher) than previous studies estimated and that elevated ammonium concentrations are present in the vicinity of fish kills.

Fish kill clean-up costs ranged from \$2,400 to \$6,000 since 2018, whereas economic impacts were estimated to be nearly \$12 million per month in lost tourist-related revenues in Lee and Collier counties when red tide was at high concentrations. Therefore, removing dead fish may be an economical and effective means to mitigate red tide impacts in southwest Florida. Additional experiments were conducted in 2021 to evaluate composting strategies to repurpose dead fish. The experiment found that composting dead fish effectively removed red tide toxins (brevetoxins) and produced a nitrogen-rich fish meal which could be used as an organic (and nitrogen-neutral) fertilizer for the region.

In summary, dead fish are a major source of ammonium and the removal of dead fish may remove a major nutrient source, mitigating red tide. Fish removal appears to be economically feasible, and fish carcasses can potentially be repurposed into organic fertilizer via composting. Future work on this project will involve examining actual nutrient (and red tide) reductions associated with fish removal in the field, as well as the feasibility of large-scale fish composting and utilization as a local fertilizer resource.

Committee members thanked Dr. Parsons for his excellent presentation. A committee member asked if composting can be done locally and close to where fish were removed/collected, to which Dr. Parsons responded that composting would be done within the County. Dr. Parsons explained that there’s an organic fertilizer organization in Lee County, though it is not currently permitted to compost animal waste. He added that future work will involve looking into permits, as well as communication with composting companies to determine the logistics, cost, and ideal location.

**Agenda Item #13 – A Proactive Local Government Red Tide Response Example — Paul Dean, Pinellas County Government**

Paul Dean, Public Works Division Director for Pinellas County, presented an overview of the red tide emergency operational response program developed by Pinellas County to address the 2018 and 2020 bloom events. The presentation shared their approach and lessons they have learned,

including with regard to contractor management, working with local fisherman, water monitoring, citizen communication, and operational best practices. Highlights are as follows:

Pinellas County's red tide response program involved physically removing dead fish from its waters during the 2018 and 2020 red tide events. There were many challenges to carrying-out this operational response. For example, Pinellas County incorporates 14 coastal cities, 40 miles of intracoastal waterway with canals (both public and private), and 35 miles of beaches, many of which have limited access points for large equipment. Additionally, sea turtle nesting in May through October delayed fish removal until the beaches were cleared.

To overcome these challenges, they utilized public outreach and social media to help coordinate a red tide response. This involved providing regular updates and information to the public through the media, as well as providing links to resources and response tools for citizens to get involved. Publically available response tools included: a GIS Citizen App where citizens can report fish kills, smells, debris, and include pictures; a Dumpster App showing specific locations for citizens and municipalities to dump fish they collected; a respiratory forecast tool that predicts potential respiratory irritation at certain beaches; and a water quality monitoring tool.

The response required support from several different contractors, including the Pinellas County Debris Management Contractor who would typically address hurricanes. Aerial support was provided by the U.S. Coast Guard, Sheriff's Office, and the Florida Fish and Wildlife Conservation Commission (FWC), and provided a bird's eye view of our waterways. The response looked at satellite imagery of chlorophyll a (indicative of red tide concentrations) provided by the National Oceanic and Atmospheric Administration (NOAA), as well as models tracking red tide and ocean currents provided by the University of South Florida (USF). To carry out fish removal offshore, nearshore, and on beaches, they reached out to the community for local fishing charters, captains, shrimpers, UTV operators, etc. Daily coordination between all of these efforts was critical to an effective response. In response to the 2018 red tide event, the coordinated clean-up cost about \$7.5 million and removed 3,724,000 lbs. of dead fish. After learning from the obstacles involved in the coordinated clean-up in 2018, the response to the 2021 red tide event cost about \$3 million and removed 3,674,000 lbs. of dead fish.

In summary, partnerships are essential for an effective red tide operational response program. Response plans and specific contractor agreements should be ready when a bloom occurs and should be adaptive to changes. Finally, communication is an important component of a red tide response plan and serves as a pathway for enhanced outreach and environmental education. For a successful response, Pinellas County used a multimedia approach and communicated every day for 3 months, as well as a Red Tide Summit.

Ms. Hecker thanked Mr. Dean for his inspiring presentation and commented that it is a great example of how to get out in front of these events in the future and set-up standing task order-based emergency response plans and contracts using the knowledge gained from today's meetings. Mr. Dean commented that committee members can reach out to him with questions and he would be happy to share their red tide emergency response plan and draft RFP.

**Agenda Item #14 – CHNEP Research & Restoration Projects Update — Nicole Iadevaia, CHNEP**

CHNEP's Research and Outreach Manager, Nicole Iadevaia, presented on updates to technical projects that are already underway, in-progress, or have been completed since the last cycle. Highlights are as follows:

CHNEP has closed-out several projects including the Quantifying the Water Quality Benefits of SAV project, the Gateway to Myakka Marsh Restoration, the South Lee County Hydrological Restoration Modeling project, and others. The CHNEP Water Atlas (<https://chnep.wateratlas.usf.edu/>) is an ongoing project which is funded on an annual basis and undergoes annual standard service including data management, site updates, revisions and enhancements. New features on the Water Atlas include the Habitat Restoration Needs page, the Habitat Resiliency to Climate Change Interactive StoryMap, and Seagrass pages. CHNEP seagrass pages were created to bring together all of the existing seagrass data in the CHNEP area. Additionally, new features will be added in 2022, including a Water Quality Dashboard and Numeric Nutrient Criteria (NNC) Calculator Tool.

The Cyanobacteria Rapid Response Pilot Project is an upcoming project that the CHNEP is funding and working in cooperation with FGCU and AquaFlex to respond to cyanobacteria blooms in the moment. The project will involve conducting research regarding the efficiency of new technologies in removing nutrients, cyanobacteria, and its associated toxins. It will be a large scale assessment of AquaFlex, open-cell foam technology, on the Caloosahatchee River. AquaFlex works by soaking up cyanobacteria out of the water without disrupting the water column or removing water that can then be disposed of. An independent study to collect water and air quality data before and after AquaFlex deployment will be conducted by FGCU to test the effectiveness of AquaFlex technology. The Environmental Protection Agency recently approved the Quality Assurance Plan for this project and project results will be shared with local governments for them to potentially use this technology as a mitigation technique.

The South Lee County Watershed Initiative Hydrological Restoration is a modeling project to create integrated surface/groundwater models for hydrological restoration of the South Lee County Watershed. This project aims to restore more natural water flows, improve water quality and environmental conditions, increase natural water storage and moderation of flooding events. All tasks for this project have been completed, except the draft and final reports. The draft report was presented to the South Lee County Watershed Initiative and comments have been received. Predicted climate impacts such as sea level rise and reduced river outflows may have negative impacts on the freshwater resources near the coast. Additionally, the predicted 1.64 inch increase in tidal water levels may result in future vegetation changes along the coastal boundary. The project is complete and the Final Report and appendices can be found on the CHNEP website.

The Charlotte Harbor Flatwoods Hydrological Restoration is a modeling project to create integrated surface/groundwater models for hydrological restoration of the Charlotte Harbor Flatwoods area. The goals of this project include sheet flow enhancement, natural flow enhancement, water quality improvement, groundwater recharge, and flooding reduction. Currently, all six data downloads have been completed and modeling of existing conditions is underway. Three future conditions scenarios are being considered to be modelled, which involve moving water south and east to restore optimum hydroperiods and incorporated predicted climate change impacts. The modelling of future scenarios will occur in spring 2022 with the Draft Report expected in June 2022 and the Final Report by August 2022.

Finally, the Myakka Headwaters Restoration project is an upcoming project to remove exotic invasive species and re-plant native species on the Myakka Headwaters property. The property is located in the Myakka Watershed and was recently conserved by the Conservation Foundation of the Gulf Coast (CFGC). The project is still in the scoping phase and will be in coordination with the SWFWMD and the CFGC.

The Wild Turkey Strand Restoration project is an upcoming project in Lee County to restore former agricultural lands and wetlands and upland habitat in the Wild Turkey Strand Preserve, part of the Lee County DRGR area. The project will help restore hydroperiods which will benefit ecosystem function and recharge. Design and permitting are funded by Lee County and CHNEP was awarded an RAE RESTORE Coastal Watershed Grant to the fund restoration activities.

Lastly, the Tiki Point Harborwalk Living Shoreline Pilot project is an upcoming project with the City of Punta Gorda to develop solutions to mitigate and adapt to the risks of flooding along the Charlotte Harbor shoreline by implementing nature-based features. The project will increase resilience and mitigate the risks of flooding and sea level rise using a hybrid nature-based solution to improve habitat and water quality, reduce erosion, and buffer storm effects. The CHNEP was awarded an FDEP Resilient Florida award to fund project activities.

Ms. Iadevaia concluded by pointing committee members to restoration project videos on the CHNEP website, including the RAE Coastal Watershed Grant Announcement for the Wild Turkey Strand Preserve Restoration, as well as a video created by the Conservation Foundation of the Gulf Coast (CFGC) which shows footage and provides background on the Myakka Headwaters property.

#### **Agenda Item #15 – Management Committee Membership Updates — Corey Anderson, Co-Chair**

Jeff Devine, West Coast Inland Navigation District (WCIND), commented that WCIND is moving forward with some smaller projects such as derelict vessel removal. WCIND recently went out with Rookery Bay and Aquatic Preserve office staff to locations where they may be able to do some cooperative projects with soil disposal and habitat restoration projects.

Vivianna Bendixson, Southwest Florida Water Management District (SWFWMD), commented that SWFWMD has been providing a lot of support and review on the ongoing CHNEP hydrological modeling projects, and she looks forward to seeing the results from those modelling efforts.

Amanda Boone, Sarasota County, commented that Sarasota County is in the middle of conducting their annual seagrass health assessment. The nest program is headed by Molly Holland has been doing some pond enhancements within the area to better manage the ponds and have them provide the natural treatment they should be providing. Lastly, the Alligator Creek Stream Restoration Project is coming along, with 30% design plans coming in soon to improve the water quality of lemon bay.

Phil Flood, South Florida Water Management District (SFWM), commented that the SFWM has been monitoring LOSOM, as well as ongoing monitoring of the Florida Legislature Kick-off Meeting this week. With the economy doing well, SFWM expects to see a lot of local projects funded this year.

Roland Ottolini, Lee County, commented that Lee County remains engaged with the LOSOM and has spent a lot of time on that. Lee County recently completed the Gator Slough and Yellow Fever Creek Interconnect project with the City of Cape Coral to divert excess flows from Gator Slough into the original headwaters of Yellow Fever Creek for water quality treatment projects. The County also completed a project on the canal L-3, which is a tributary to Whiskey Creek. This involved putting in a new weir structure to hold back the wet season water table and retrofitting an old industrial area with catch basins and techniques to reduce nutrients into the water way. Lee County is also proceeding with the Lakes Park Project, which aims to reduce the nutrients and bind up some of the legacy nutrients in the soils, and hopefully improve water clarity in the lake.

Rachel Hart, U.S. Environmental Protection Agency (EPA) Region 4, commented that Ms. Hecker and CHNEP staff are up-to-date with what EPA knows for the region so far regarding the Bipartisan Federal Infrastructure Funding. These funds are expected to come to EPA in February, and then will be dispersed to the NEPs and other programs shortly thereafter so that there can be progress made on projects by the start of the next fiscal year. Ms. Hart commented that it's great to see CHNEP's forward thinking on projects and getting the money in the work plan and budget.

Holly Milbrandt, City of Sanibel, commented that the City of Sanibel has also had their radar on the LOSOM. Ms. Milbrandt commented that she was excited to hear Mr. Medina's presentation and see that they're coordinating with the Corps and she has certainly been thinking about the impacts of red tide, if and how they should alter the LOSOM decisions. The City of Sanibel is currently out to bid for a living shoreline project along a stretch of road on Sanibel called Woodring Rd, which is on the Bay side of the island and experiences severe erosion due to large fetch from Pine Island Sound and the intracoastal. This is a project that the City of Sanibel has been trying to get accomplished for several years and for a variety of reasons have been unable to do so. However, the City of Sanibel got funding from the Florida Resilient Coastlines Program and they are hopeful that the bids will come in within the amount they are given for the project. Ms. Milbrandt concluded that she will be reaching out to Ms. Hecker about partnering together on this work.

Laura Gibson, City of Bonita Springs, had nothing to report.

April DaSilva, Central Florida Regional Planning Council (CFRPC) (alt. for Jennifer Codo-Salisbury), had no updates to report. Ms. DaSilva asked that committee members who are trying to reach Jennifer Codo-Salisbury reach out to Ms. DaSilva instead for help getting on Jennifer's schedule.

Corey Anderson, Florida Fish and Wildlife Conservation Commission (FWC), commented that, with the help of the NOAA Restore Program, CHNEP, and Charlotte County staff, FWC held the Habitat Conservation Subcommittee of the TAC on November 19<sup>th</sup> for planning sport fish habitat conservation, focused on Charlotte County. They held a really successful workshop and are looking forward to another workshop on February 8<sup>th</sup> to look at possible policy tools to achieve the objectives. Mr. Anderson thanked those involved for their work on this subcommittee. This is a bottom-up approach to look at fisheries habitat conservation. FWC is also taking a top-down approach to look at fisheries regulation using feedback received from stakeholders and anglers about incorporating environmental factors into FWC's longer-scaled fisheries management in order to be more proactive in setting harvest targets and regulations.

Claire Jubb, Charlotte County, commented that Charlotte County is moving forward quickly with their water quality management program and will be holding some public input sessions over the next few weeks to finalize those locations. Charlotte County is also holding a Water Quality Summit on March 7<sup>th</sup> and will focus on ongoing efforts in Charlotte County among various agencies and groups to improve water quality in the area. Ms. Jubb thanked those involved in the Water Quality Summit in advance. The El Jobean Septic-to-Sewer project is nearing completion and Charlotte County is actively planning the next phase (Lake View). The Board of County Commissioners are on the 25<sup>th</sup> which will effectively ban phosphate mining in Charlotte County. At the last Utilities Update and Workshop, in a discussion around aquaculture funding, the board approved the use of aquafunding to bring online advanced wastewater treatment to both the East Port and Burnt Store plans which are in expansion at the moment.

Maya Robert, City of Cape Coral, commented that the City of Cape Coral has been deploying a few water quality improvement projects, including deploying floating wetlands at about 5 locations, converting 10 large dry storm ponds into rain gardens. Additionally, the City is about to go out to bid for HAB bloom removal contractors in a proactive manner in case blooms occur (mostly focused on macroalgae and HAB blooms). Regarding the presentation about the use of isotopes to track the source of nutrients, the City voted to strengthen the fertilizer ordinance last year. However, Ms. Robert cautioned members that the presentation only focused on a fraction of the pool of nutrients present in water, which was a dissolved organic pool of nitrogen readily available in the environment. It contrasts with a very large pool of inorganic nutrients (both dissolved and particulate) that was not much talked about in terms of source. The link between the freshwater discharge and the availability in brackish and saltwater was not clearly made. The dissolved nitrogen pool is very active when it comes into contact with saltwater. It doesn't seem efficient to reduce the amount of fertilizer. Ms. Robert cautioned members to look at that data in more detail.

Ernesto Lasso de la Vega, CHNEP TAC Representative, had no update to report.

**Agenda Item #16 – Public Comment — Corey Anderson, Co-Chair**

There were no comments from the public.

**Agenda Item #17 – Future Meeting's Topics, Location and Date – Corey Anderson, Co-Chair**

The next meeting will be held on May 13<sup>th</sup>, 2022 and will be a hybrid virtual and in-person meeting, held at the Charlotte Harbor Utility Campus. The following meeting will be held on September 9<sup>th</sup> 2022.

**Agenda Item #18 – Adjourn – Corey Anderson, Co-Chair**

Meeting was adjourned at 12:35 pm.