

FLORIDA KEYS NATIONAL MARINE SANCTUARY ADVISORY COUNCIL

MEETING NOTES

Tuesday, April 18, 2023

***Marathon City Council Chambers
Marathon, FL 33050***

Attendees:

Council Members:

Citizen at Large – Upper Keys: Suzy Roebing (absent)
Citizen at Large – Middle Keys: George Garrett
Citizen at Large – Lower Keys: Mimi Stafford
Boating Industry: Ken Reda
Diving – Upper Keys: Elena Rodriguez
Diving – Lower Keys: Joe Weatherby (absent)
Fishing – Charter Fishing Flats Guide: Will Benson (absent)
Fishing – Charter Sports Fishing: Michael Nealis
Fishing – Commercial – Marine/Tropical: Ken Nedimyer
Fishing – Commercial – Shell/Scale: Daniel Padron
Fishing – Recreational: Karen Angle
Tourism – Upper Keys: Lisa Mongelia (absent)
Tourism – Lower Keys: Andy Newman
Conservation and Environment (seat 1): Ben Daughtry
Conservation and Environment (seat 2): Jerry Lorenz (absent)
Research and Monitoring: Erinn Muller
South Florida Ecosystem Restoration: Kelly Cox
Education and Outreach: Shelly Krueger
Submerged Cultural Resources: Diane Silvia
Elected County Official: Jim Scholl

Council Alternates (present):

Citizen at Large – Upper Keys: Dave Makepeace
Citizen at Large – Lower Keys: Stephen Patten
Conservation and Environment (seat 2): Caitlin Lustic
Fishing – Recreational: Gary Jennings
Tourism – Lower Keys: Eddie Kertis
South Florida Ecosystem Restoration: Marisa Carrozzo
Submerged Cultural Resources: Sara Ayers-Rigsby

Agency Representatives (present):

Florida DEP: Nick Parr, Mollie Sinnott
FWC Division of Marine Fisheries Management: CJ Sweetman
NOAA OLE: Justin Powell, Russell Keifer
US Coast Guard: LTJG Alex Hughes, ENS Jordan Haas
US Fish and Wildlife Service: Greg Boling
US Navy: Wendy Wheatley-Techmer

Municipalities (present):

City of Key Colony Beach: Vice Mayor Beth Ramsay-Vickrey

I. CALL TO ORDER, ROLL CALL, CHAIRPERSONS COMMENTS

The meeting was opened with the Pledge of Allegiance and called to order with roll call at 9:05 am. Council chair George Garrett welcomed the council and members of the public.

The chair introduced the agenda for this meeting as well as the notes from the February meeting for council approval, both were motioned, seconded, and subsequently approved. The agenda was amended to move the public comment opportunity to 2:15pm, so that community members would have the opportunity to hear updates before commenting. Karen Angle made the motion to approve the February notes with no edits, with a second from Mimi Stafford. Ken Nedimyer made the motion to adopt the agenda for this meeting with a second from Ben Daughtry.

Superintendent Sarah Fangman noted appreciation for those who were able to attend the grand opening of the Eco Discovery Center this past weekend.

George added that the Buoy Working Group convened for the first time last night. This will be an important part of implementing the Restoration Blueprint.

II. COUNCIL CHARTER RENEWAL DISCUSSION

Advisory Council coordinator, Liz Trueblood, led the council through an updated draft charter for edit and discussion. This charter renewal occurs every 5 years. Following this meeting, the charter will be reviewed by the national council coordinator, and the council will have a final chance to review and update if needed at the June meeting. After the June meeting, the final draft will be submitted to ONMS headquarters for approval.

Liz proposed a few topics for discussion within the charter revision:

Under the heading of Council officers, there is an opportunity to have a secretary within the Council. George Garrett noted that the FKNMS staff does a great job in this role. No members voiced interest in creating this role at this time.

Under the heading of potential member removal, in the past the FKNMS SAC has opted not to stipulate a specific number of missed meetings as the grounds for removal. Should this continue?

- Ken Nedimyer voiced that there should be a number stipulated, and suggested 4 meetings ($\frac{2}{3}$ of the year). If someone is too busy and cannot attend, we should consider replacing them with someone who is able to.
- Ben Daughtry seconded this idea. The meetings are important for sharing information and guiding the SAC's decision making. Agreed that we don't want to make this too punitive. Would this apply to alternates as well as members?
- David Makepeace noted that in a 'pre-zoom' world there are reasonable excuses to miss meetings. With the remote option now, missing 4 meetings is a sign that the individual may no longer be interested. Suggest 3 instead.
- Sarah Fangman noted that members can listen remotely, but full participation is not possible via webinar. If someone is not able to regularly attend, the consequence is that their constituency is missing out on valuable information and communication opportunities.
- George Garret agreed with David. As meetings are typically scheduled, 4 meetings would be 6 months. Alternates do not need to be here as frequently as long as the principals are. He recommends 3 meetings.
- Mimi inquired whether we've ever removed someone from the SAC. Sarah Fangman noted that more often individuals will self-select to step down due to an inability to continue serving on the council. Mimi agreed that gentle conversations with individuals who do not attend would be a good strategy.
- Ken Reda reflected on the last 3 meetings; if you had missed these meetings, you'd be uninformed about what the SAC is working on.
- Ken Nedimyer made a motion that 3 consecutive meetings be grounds for removal; this would not be mandatory but trigger a discussion with that individual. No attendance requirements for alternates unless they are called upon to fill in for their primary. David Makepeace seconded the motion and added a caveat - noting that there are circumstances that could prevent someone from attending 3 meetings. Should we consider an appeal process for someone in those circumstances to avoid losing valuable members of the group?
- Liz noted that the charter language is that the Superintendent "may" recommend removal; it also leaves space for a reasonable justification for missing meetings.

- George noted that Sarah would be responsible for having these conversations with members who have not been participating, then determine if they should remain on the council or step down.
- Beth Ramsay-Vickrey also suggested that the municipalities often designate alternates as attendance purposes; the primary is the Mayor who rarely attends meetings. This should be accounted for, otherwise, as written, the Mayor gets kicked out.
- George Garrett noted that this may be different for voting seats.
- Sarah Fangman noted that alternates are also intended to help provide a pathway for new members to become primaries. This means it is important for alternates to attend as well; they also need to be ready to step in.
- David Makepeace recommended that this apply to alternates and primaries.
- Ken Reda noted that alternates provide great value to the SAC, even if they are not voting members. It is important for alternates to be included in this policy; meeting attendance is important for the learning process.
- Elena Rodriguez agreed that alternates should be included in a minimum attendance requirement per year.
- Mimi noted that the intention of this is not removal, but to encourage active participation in the meetings.
- **Ken amended the motion to include alternates and primaries, with 3 meetings being the threshold. David Makepeace seconded the motion. The motion passed with no opposition. Text was added to the charter draft to reflect this.**
- Marissa Corrozo asked for clarification as to whether attendance includes virtual participation?
 - George noted that the current meeting structure requires in person attendance to be an active participant.
 - Ken further clarified that under the current circumstances listening into the webinar does not qualify as attendance. If a COVID-type scenario reemerged, this would be accommodated for virtual participation.
 - Liz clarified that these are in-person meetings, so in-person attendance is what is needed. If we have a future virtual meeting, attendance in that virtual forum would count.
- Karen Angle noted that the elected officials are subject to the same appointment and removal procedures, as currently noted in the charter. Should this be modified considering Beth Ramsay-Vickrey's point?
- George noted that elected county officials do have voting capability; other government seats do not have a voting position. The lack of voting capability may be why we have less regular attendance from some of the elected officials.

- Beth noted that elected officials represent their districts, perhaps they should have voting capability as well. Request this be considered - that the non-voting municipalities be given an opportunity to vote.
- Ben Daughtry disagreed, but would be happy to place Beth in a voting seat if one was available given her participation. This is a group of people who represent the public. We don't have voting among the agencies; would like to keep voting seats as they currently exist. George Garrett shows how there is an opportunity for anyone to become a voting member without having to represent their specific municipality.
- Beth countered that the difference between the municipalities and other agencies is that they are elected.
- Shelly expressed concern that if voting is given to these other seats, it may affect ability to achieve quorum.
- George repeated that the SAC tends to be a citizens body, whereas the WQPP Steering Committee is more of a government body with a few citizen seats.
- Ben Daughtry offered that we should determine if the municipalities do want official voting capability, and would be willing to officially cast a vote on what may be controversial topics. Alternatively, they could abstain from a vote.
- Karen Angle: Page 3 - Advisory Council Membership section discusses numbers; we cannot exceed 36. We have 20 voting members compared to 15 in other sanctuaries. Is it even possible to add additional voting members?
 - Liz opined that the SAC would likely be encouraged to stay within 20 voting members, although with a strong enough case it could be considered. We are the biggest council in the system.
- Jim Scholl noted that FKNMSPA does not mention elected officials; the 20 comes from the list in the law.
- George Garrett noted this comment and suggested moving on to the next topic.

Next steps: Liz will incorporate the suggestions into the charter and send it to the council for review. Following that input, the National SAC Coordinator will review. Any red flags will be returned to the SAC, or a final draft if all edits are accepted, prior to the June meeting.

III. ADVISORY COUNCIL BUOY WORKING GROUP UPDATE AND DISCUSSION

Liz provided an overview of the first buoy working group meeting last night, April 17. The working group introduced themselves, received a high-level overview from Sarah Fangman and Brady Booton about the FKNMS buoy operations, followed by a discussion.

New buoys going out will have a new sticker with a phone number and an email address, which offers a new channel to report missing or compromised buoys. There was a lot of discussion

surrounding reducing conflict among different user groups while still allowing access, as well as safety. Liz will share these contact addresses with the council.

The working group will next meet at the end of April. Prior to that, the chairs and the staff lead - Nina Garfield - will review the notes and feedback and incorporate them into the next steps for that group.

George added that most discussion last night surrounded the SPA mooring buoys. There was also discussion about channel markers and the impacts they have, as far as use for access to the backcountry. Further discussion surrounded adding mooring buoys in the backcountry, as on popular weekends there may be hundreds of boats at places like the Content Keys. The concept of marking in shallow water was new within FKNMS. When similar markers were first installed, they were 'gated' so that people who are less familiar with channel markers could use them effectively. Having a route to the backcountry was one consideration.

Sarah noted that solutions were offered that recognized the limited capacity of FKNMS. While we have a large wish list, there are limitations in our ability to add and maintain that full list. Predicts that the next generation of our buoy and marking system will require new and creative ways to execute this. There were creative ideas about notification of buoys that were about to fail (it's easier to fix before the failure point happens), etc. Part of the challenge will be prioritizing among the great ideas discussed. Right now we have a 6-person team that maintains all of the buoys. If we have a lot more added, we need to increase staff or get creative and work with the community to determine how to effectively do that. We are also planning how to engage the community on this topic. Education is also an important piece, as proper use helps maintain the system.

Liz reiterated that the goal is for this working group to present their recommendations to the council by late summer.

Council Discussion / Q&A:

- Mimi Stafford encouraged urgency. She is dismayed at the number of new prop scars every time she goes to the backcountry. There is a need to help people avoid damaging the resources further.
- Andy Newman inquired if there was any collaboration with NPS in the Upper Keys. The NPS is planning new markers/buoys in their Management Plan.
 - Sarah noted that each agency is focused on their own managed areas.
 - Regarding channel markers, George added that in very shallow waters they have markers that indicate where to go with flags, but these differ from normal navigational markers.

- Andy Newman encouraged more mooring buoys offshore. TDC funded FKNMS for additional anchor installations and noted that we are almost at a new Fiscal Year.
- Stephen Patton inquired about discussion about other organizations sponsoring and managed buoys
 - Sarah answered that this came up, there is a lot more to discuss. There is a lot on the table and we need to decide what is possible. The idea of a fee-based system also came up.
- Elena Rodriguez: With advances in technology, is it possible to set up cameras in the backcountry to capture boaters who damage the bottom? Pennekamp has a coral camera; this is expensive, but that may be minimal compared to cost for Law Enforcement.
- NOAA Ofc. Kiefer weighed in on a question about citing people for mooring buoy misuse. If not obviously intentional, they proceed with an educational approach. If there is a blatant/intentional violation, they would consider issuing a fine. Regarding the backcountry, there are two NOAA officers who work with FWC and USFWS; next week they are adding a backcountry capable vessel so that will increase enforcement capability in that area.

IV. ECOLOGY AND IMPACTS OF THE GREAT ATLANTIC SARGASSUM BELT

Dr. Brian Lapointe, research professor at Florida Atlantic University's Harbor Branch Oceanographic Institute, has studied water quality and algae, including *Sargassum* in South Florida and the Caribbean for over 30 years. Dr. Lapointe started his career on a grant to grow *Sargassum* to investigate its use for biofuels, which included dosing experiments to identify response to nutrients. Ironically there are plenty of nutrients now in the Atlantic basin, which will be what is discussed today.

The Sargasso Sea & Global Change in Nutrient Supply in the Ocean: There is a subtropical gyre in the North Atlantic Ocean defined by boundary currents; this circulation goes up through the Caribbean and the Gulf of Mexico. Dr. John Hood Ryther published a paper called Nitrogen, Phosphorus and Eutrophication in the Coastal Marine Environment; this was the first paper to show that nitrogen was the limiting nutrient in the marine environment. He was the first to question whether replacing phosphorus in detergents and other products would be problematic for the marine system. There are two species of pelagic *Sargassum*: *S. fluitans* and *S. natans*. The Sargasso Sea actually has very low nutrient concentrations; this is a paradox as this area is strewn with floating *Sargassum*. Dr. Lapointe hypothesized that because of dynamic circulation in the basin, land-based nutrients enhance growth and support populations in the Sargasso Sea. Even small increases in nutrients from land are enough to allow *Sargassum* to grow, then they move into the Sargasso Sea which is nutrient poor so their growth rate goes down.

Human stresses on our planet include climate change, biochemical flows, land system changes, etc. There is a global increase in nutrients and loss in biodiversity. We are moving beyond the zone of uncertainty that these are major issues facing our planet - the two that are very high risk include reactive nitrogen that fuels harmful algal blooms and genetic diversity. Relevant to the Sargasso story, humans are adding tons of nitrogen (N) and phosphorus (P) to the ocean each year. The Redfield Ratio describes the ratio of chemical elements present in average phytoplankton biomass, and helps determine which nutrients are limiting in a localized system. The Redfield Ratio for the marine environment is 16:1 (N:P); whereas the human-contributed N:P ratio is 28:1.

NSF Grant: Productivity and Nutrition of Pelagic *Sargassum*: The NSF baseline study occurred in 1983-1989; post sampling occurred post 2010. Photosynthesis respiration rates were measured in *Sargassum*, and *Sargassum* tissues were measured for C:N:P (carbon:nitrogen:phosphorus) and metals. Findings indicated that the neritic zone (the relatively shallow part of the coastal ocean) had a higher rate of photosynthesis with increasing light than the oceanic zone. This translates into growth rates in that more photosynthesis = more growth. In the Dry Tortugas and Looe Key, plants could double in biomass in ~11 days compared to 50 days in the oceanic zone/Sargasso Sea. This is due to higher nitrogen in neritic areas. The C:N ratio goes down in higher nitrogen areas. *Sargassum* is nitrogen limited, so adding nitrogen means increased growth. They also saw a 3-fold elevation in C:P ratios, which indicate stronger P limitations in those oceanic areas too. The plants are more N limited in neritic areas compared to oceanic areas, relative to the Redfield Ratio of 16:1.

Sargassum mats have amazing biodiversity; these associated organisms conduct a lot of nutrient cycling. *Sargassum* provides habitat for over 100 invertebrate species and over 100 species of associated fishes, as well as endangered species such as juvenile sea turtles, including loggerheads. This is a unique community only found in the Atlantic Ocean. Fish excrete a lot of ammonium and phosphate, which in turn fertilize the *Sargassum*; this is part of the co-evolution of this community.

In the 1990s, a few groups began harvesting *Sargassum* and this was identified as a concern because landings of *Sargassum*-associated species (ie. mahi) were declining. As a result, the South Atlantic Fishery Management Council decided to create a fishery for *Sargassum* and phase out collections after 5 years. Due to these regulations *Sargassum* cannot be harvested from federal waters; but can legally be removed from the beach.

Sargassum Blooms in the Gulf of Mexico: In the late 1980s, we began to see *Sargassum* forming large blooms in the Gulf of Mexico and excess nitrogen from the Mississippi River fueled a dead zone in the area. These blooms were linked to excess nitrogen. At one point there was an 80 mile

long patch that clogged the intake pipe of the Crystal River nuclear power plant. A similar situation happened in the USVI last year with a Reverse Osmosis Plant.

The Great Atlantic *Sargassum* Belt: Gower and King were the first to use remote sensing for *Sargassum*, which showed seasonal growth from winter through the spring, then the *Sargassum* being carried by the Loop Current around Florida and into the Gulf Stream to the Sargasso Sea. In 2010, Johns et al. observed anomalous wind that transported this *Sargassum* from the Sargasso Sea toward the coast of Africa. The next year, 2011 saw the formation of the Great Atlantic *Sargassum* Belt which has grown over time; 2018 was a record year for the amount of *Sargassum* in that belt (22 million tons). The belt is 8850 km long and extends across the tropical Atlantic into the Caribbean Sea and Gulf of Mexico. In 2014 another change was observed in the form of increased nitrate flux from the Amazon Basin. The Amazon is the largest river and watershed on the planet and increased nutrients resulting from Amazon deforestation, fertilizer applications, and flooding extremes further fueled the blooms in this area. This has expanded in recent years. USF produces monthly outlook bulletins as they monitor, track and forecast *Sargassum* in the belt (<https://optics.marine.usf.edu/projects/saws.html>). Dr. Lapointe showed an animation of the seasonal formation of the belt, overlaid with river plumes from the coast of Africa and the Amazon. Researchers believe the nutrient plumes from rivers can play a major role in this increased biomass in the tropical Atlantic Ocean. The Florida Keys and Caribbean *Sargassum* we see on our beaches comes from distant origins as far as the coast of Africa.

Increased Nitrogen Content and Altered Stoichiometry of *Sargassum*: Chemistry of *Sargassum* is a key driver fueling the growth. The carbon content has gone up - it grows faster and produces more carbon through photosynthesis. Nitrogen is the key limiting nutrient but as that has gone up by 35% since the 1980s, so has *Sargassum* biomass. Phosphorus has gone down as N went up, so the N:P ratio has gone up to 28:1 which is the same as the N:P ratio of human enrichment of the oceans. *Sargassum* appears to be a barometer of nutrient changes from the growing human population. The highest nitrogen inputs are associated with the winter which coincides with the maximum flows in the Mississippi and Florida runoff following the wet season. However, seasonality in *Sargassum* growth during the summer and fall no longer exists as it did in the 1980s. These plants grow faster year-round and form more biomass; this helps seed the following year which could explain how the Great Atlantic *Sargassum* Belt gets bigger year by year.

The Mississippi River isotopic signal matches almost exactly the tissue signal in the *Sargassum* collected in the Gulf of Mexico, which supports the hypothesis that this is a river source of nitrogen that fuels the blooms. There is also a lot of enriched nitrogen from both coasts of Florida (which may be wastewater or other human activities). Upwelling and atmospheric nitrogen can also contribute N to *Sargassum* offshore.

Phosphorus has gone down between the 1980s and 2010s. We have tried to mitigate phosphorus and have done a better job at that than with nitrogen. The N:P ratio can tell us about the source of the nutrients. The *Sargassum* N:P ratio has gone up in the Florida Keys; Florida Bay is very high with an N:P ratio of almost 100:1. At Looe Key, other macro algae species show similar increases in N:P ratio. Everglades National Park has gotten more water since 1940 as measured by USGS which has measured water inputs daily since 1939. Algal blooms in Florida Bay began in the 1980s when water deliveries increased. Everglades water has a N:P ratio of 260:1; which is believed to be a major factor contributing to nitrogen in FKNMS. FIU monitoring in FKNMS also shows total N:P ratios increasing from 2013-2020; N:P ratios were as high as 80:1 during the time period when Stony Coral Tissue Loss Disease moved through the Keys beginning in 2014. In addition to helping *Sargassum* grow, excess nitrogen is also stressful to corals.

Environmental and Human Health Impacts: There are a number of potential human impacts associated with *Sargassum*:

- Coastal acidification: as *Sargassum* biomass breaks down, it releases CO₂ and reduces pH nearshore.
- Anoxia/hypoxia: This results in dead zones with no or little oxygen, which affects fishery habitat. This is also responsible for the strong 'rotten egg' smell from hydrogen sulfide.
- We also see benthic algal blooms of other species developing in similar areas where there have been *Sargassum* strandings. Native benthic algae species also respond to the high nutrient conditions.
- Long term Looe Key nutrients: Following hurricane Irma, saw much more *Sargassum* coming into the area; the *Sargassum* could contribute to the higher nutrient values at Looe Key. Highest nutrient values at Looe coincide with large mats of *Sargassum*; some also comes from the mainland driving the N:P ratios up.
- Toxic hydrogen sulfide (H₂S) from *Sargassum*: This has been studied by others in some detail. Over 11k cases of acute exposure to H₂S were diagnosed in the islands of Guadalupe and Martinique between January and August 2018. This results in neurological, digestive and respiratory disorders.
- Arsenic presence: Because of the strong phosphorus limitation in *Sargassum*, as P goes down, the arsenic to P ratio goes up. These are chemical analogs. Arsenic is in the ocean naturally but is being taken up more and more by P-deficient plants.
- Loss of biodiversity: Also seeing a loss of biodiversity in *Sargassum* with the big blooms.

Sargassum in 2023: March 2023 appears to have exceeded March 2018 in terms of biomass: Set a new GASB record of 13M tons, and the bloom continues to grow as it moves through the Amazon plume. This year, we are already seeing *Sargassum* on our shorelines earlier than we expected. Satellite imagery is important to know this is coming; there is a lot of research and management being considered across the Caribbean. Management options include removal by hand and with heavy equipment (which has a negative effect of increasing beach erosion); there

is also is harvest and booming in other areas. There are other engineering efforts to sink *Sargassum* to the deep ocean which could also assist with carbon sequestration. Dr. Lapointe recently received a grant from EPA to continue monitoring and satellite imagery; will have a better understanding of when *Sargassum* is coming to shore as a result. For more information: <http://hboihablab.eweebly.com/>

Council Q&A / Discussion:

Q: Andy Newman inquired about the ‘Blob’ terminology. The sensationalistic news coverage has been a problem in the tourism industry. FAU is pushing a lot of the imagery out, which is good for them but not the TDC. Visitors are concerned about boats being able to come out. Where did the term ‘Blob’ come from? Is there anything we can do to taper the sensationalism on this? Are there any positive benefits for *Sargassum* coming in along uninhabited mangrove areas - does this help build new land areas?

A: Regarding the ‘Blob’ - Steve McQueen was in this movie in the 1980s. Kim Miller (Palm Beach Post Journalist) broke the story; she is a surfer and concerned about water quality issues in Florida. She saw the February bulletin from USF’s satellite data, which showed doubling in size from December to January, and wrote an article for the Palm Beach Post. An interviewee in Boynton Beach is the one that called it the ‘Blob’ which stuck. USA Today picked it up, and now that term is viral. Dr. Lapointe has tried to correct this in the media; as it is just a small % of the satellite image that is *Sargassum*. As for positives, engineers are interested in being part of the solution. Dr. Lapointe is working with several German engineers right now to convert this biomass to energy. They are attending a summit in June and will put together a proposal for this. Many Caribbean islands rely on diesel fuel right now for energy and this could be a game changer. Other benefits/options include reusing *Sargassum* for packaging as an alternative to single use plastics. It has characteristics that could make it a suitable alternative to plastics, similar to the corn-based materials some companies use.

Q: The City of Key West PIO indicated that there are some regulations that prevent the City from touching the *Sargassum* until it hits the shoreline, for cleanup/management purposes. Seems like a boom would be an effective tool. Can we harvest before it hits the shoreline?

A: CJ Sweetman clarified that SAFMC has a zero harvest exemption in federal waters of the South Atlantic. This is not effective in state waters, so there is a possibility to harvest. This is an “unregulated species” so one would need a saltwater fisheries license to harvest up to 100 lbs. More than that requires additional licensing and the need to understand gear limitations for harvest. Many species are associated with *Sargassum* including dolphin, wahoo, greater amberjack, etc. Catch limits and size restrictions for these species would also apply to *Sargassum* harvest.

Q: George Garrett reminded the SAC about how *Sargassum* comes in and integrates into shorelines in natural areas. These helped build in the dunes that now have hammocks. These are an important part of Florida Keys Ecology.

Q: Sarah Fangman requested more information about efforts to track and predict where the *Sargassum* will go.

A: This is being done by the USF Optical Oceanography program. The images right now are not high resolution. They plan to use higher resolution imagery to more closely look at this as it comes from the Caribbean into the Loop Current so they can more accurately forecast when this is coming and how much. This will begin starting in July with a new EPA grant. Also looking at acquiring new drone technology that has resolution at 10s of centimeters that can fly the coast of Florida and the Caribbean to improve high resolution imagery. This will be a major breakthrough in monitoring and forecasting *Sargassum* strandings. There was an earlier mention of poor water quality on City of Key West public beaches in the last few days. When *Sargassum* comes ashore, any fecal contamination or additional nutrients in the water worsens the problem. Agencies may need to consider monitoring the beaches more frequently during these *Sargassum* blooms. Thankfully septic tanks have been removed or this would be much worse.

Q: Elena Rodriguez: Does this impact ocean heat retention or hurricane activity?

A: These thick mats are solar collectors - pigments capture sunlight and transduce that into heat energy. This "black body effect" may be why juvenile turtles like it because it's a little warmer than ambient water around it so it's a nice nursery habitat. This probably doesn't contribute to global sea temperatures but locally perhaps. It is interesting that this belt is in hurricane alley; unknown if anyone has looked at the linkage between heating in that belt and hurricane intensification.

Q: Elena Rodriguez: This is a global issue. Is there a comparison to similar problems in the Pacific?

A: There is one species that is forming blooms in the Yellow Sea/East China Sea. That is the only areas in the Pacific where they have the floating, pelagic macroalgal blooms comparable to the Atlantic Basin. Those blooms have also been linked to river discharges. Other observations may be that benthic algae that has been ripped up and become floating mats for a period of time.

Q: Karen Angle: Regarding the arsenic, is there a way to get rid of that?

A: Dr. LaPointe was not aware of anyone trying to curate the arsenic from the *Sargassum*. In Mexico they tried making adobe bricks out of *Sargassum*, but the arsenic became an issue because of aerosols coming off. Above 40 ppm arsenic, the *Sargassum* is not recommended for fertilizer use or for food products for human consumption. There are efforts to dilute this to reduce the concentration before application as fertilizer.

- George Garrett clarified the arsenic is naturally occurring in the ocean, just concentrated within the *Sargassum* when it becomes phosphorus deficient.

Q: Beth Ramsey-Vickrey: Overnight the City of Key Colony Beach will get *Sargassum* buildup of 12-24 inches in height and 5-7 feet in from the shoreline. There is concern about this affecting sea turtle habitat. Can they make it through *Sargassum* into the water?

A: Sea turtle biologists at FAU have studied the *Sargassum* mounding effect on hatchlings getting to the water on beaches. They reported a 20-25% failure rate where turtles could not get to the water. This is an issue, even more so in the Caribbean where up to 5 feet mound on the beach. We have seen even adult sea turtles die in leachate, likely due to high H₂S exposure. Groups do make pathways in some areas to help with safe passage from nests to the ocean.

Q: What was the company harvesting going to do with this?

A: Livestock and agricultural products. They were called Aqua 10 based in Beaufort, NC. They had a water extract of *Sargassum* used in the hog industry in NC.

Q: Mimi Stafford: Has done many beach cleanups over the years. If we can find a way to reduce the source, that may be the only way we're really going to address it. The solutions and technologies are fascinating, but can we capture nitrogen before it causes this problem?

A: We've done what we can locally with wastewater treatment. That gives us resilience other islands in the Caribbean don't have. Regarding the global nitrogen overload, that trajectory is upward despite efforts to reduce the human nitrogen footprint. Fossil fuels, human waste, and fertilizer runoff, are all part of that. Fertilizer and septic tanks are the largest contributors of N in Florida. The solution would be to try to get a handle on human waste in the top of the watershed; we've decreased fertilizer application by almost 50% in Florida over the past 20 years. Also looking at Congo River on the eastern side of the belt. There is mining, biomass burning, growing population, etc. If that is the source region/where this begins in early winter months, consider how to intervene. Trying to get funding in collaboration with colleagues in Woods Hole, but thus far not of interest to funding agencies.

Q: Ken Nedimyer noted that habitat limitation is a big deal for fisheries. Now that we have a lot of habitat, is there more production or recruitment? Has there been a positive fisheries impact?

A: This is counterintuitive. The model shows as N increases, biodiversity goes down. Barbados has a big flying fish and mahi industry that is being negatively impacted for many reasons - fewer fish per unit *Sargassum*, fouling gear, etc. Also believe there are intrinsic changes within the *Sargassum* community. The biodiversity of *Sargassum* is decreasing compared to the 1960s-80s when this was originally investigated in the Sargasso Sea area. Anoxia/hypoxia in the big mats at night could be a contributing factor.

Q: Ken Reda noted concerns from the boating industry about the quality of marinas in ocean front facilities. This seems to be inundated in spring and summer, is that somewhat the continued forecast? They have some methods to prevent this, such as air curtains (booms are not useful for navigation purposes) - but that only is effective up to 15 kts of wind. Some *Sargassum* is subsurface and still gets in. Are there other prevention methods?

A: There is a lot of research with the boom industry around the Caribbean. This will have to be part of the adaptation to the new normal; unknown if there is a specific product for this application. This should be coordinated with DEP and the agencies that have to permit these things; imagine we'll see an increase in these solutions moving forward. Regarding the seasonality - we've been seeing massive amounts beginning in May and peaking in July; it is unusual to see it starting this early in the season (the Blob story was in late February). We saw strandings on Smathers Beach as early as March 5th.

Q: George Garrett referenced FKWIA and Stewardship Act include funding for canals. Part of this is weed gates and air curtains so there is some money out there to help with the management.

Q: Shelly Krueger - regarding seasonality, this is driven by currents and sustained S/SE winds. Is this wind and current driven?

A: Circulation and winds play a big part, but they saw this forming between Africa and South America and for some reason it doubled in size from December to January. Don't think this had to do with wind/circulation, but could have come from wind last year and the transport of seed material off the coast of Africa in the last Fall of 2022, which would have allowed the bloom to start early. Wind plays a factor, but also has to do with increased overall *Sargassum* biomass.

V. SAC DISCUSSION: WEATHER STATION DECOMMISSIONING

Council chair George Garrett introduced this topic and invited Chip Kasper, meteorologist for NWS Key West, to provide some additional context. This topic was suggested by several members at the February meeting.

The Keys historically had five Coastal Marine Automated Network (C-MAN) stations that were located at Molasses Reef, Sombrero Reef, Long Key in FL Bay, Sand Key Light, and at the Dry Tortugas. These were established with funding from MacArthur Foundation and maintained with funding from NOAA SeaKeys stations. Hurricanes have interrupted these and required maintenance. Some of these stations are on historic light towers, which have now been condemned and require removal of any of that environmental equipment. USCG erected smaller towers for ATONs at some sites, but not at Molasses Reef. Once the equipment became non-operational there was no way to get to the light to fix it. They discussed moving this equipment

to a different platform, and at one point they had identified an alternate location at Mosquito Bank which has good marine exposure for wind and is a busy waterway.

The service change notice in January indicated that these would be decommissioned at Molasses and Pulaski Shoal. These have been decommissioned. Chip inquired with USCG and NOAA to understand what happened. There have been a lot of funding challenges with repairing ATONs, especially with hurricanes in recent years - the needs exceed capabilities. There were also communications challenges between USCG District 7 and the National Data Buoy Center. There is some room here to resolve this; encourage coordination among these entities to identify and relocate those stations to alternate platforms. Pulaski Shoal has a slightly different situation - the platform to get from boat to the tower is unsafe. Repairs are beyond the USCG ATON team's capability currently. Unknown if there are other resources to support this, or if there is a readily available alternate platform in the Dry Tortugas.

Council Discussion / Q&A:

Q: Andy Newman discussed his efforts to make contact with the Director of the NDBC, including a comprehensive letter submitted during the public comment period. The Molasses Reef site is so important for the area, he cannot understand the resistance to this. Suggested that the SAC consider a resolution of support to at least return the Upper Keys station.

Q: George Garrett emphasized the value of these stations. There is an advantage to having wind conditions 3-4 miles out vs. on the shoreline. To what extent is this a boating professional/personal use issue vs. a scientific and data use issue?

- Andy Newman proposed a resolution from the SAC to Sarah Fangmen to send correspondence to Dr. William Burnett in support of putting another weather data package somewhere in the Upper Keys. This is a necessary resource and doesn't cost a lot.
- George Garrett seconded this motion with an additional note that this should be expanded to include other areas.
- This will be brought forth to the next meeting agenda; this cannot be voted on today as it was not publicly noticed.

Q: Jim Scholl: These are old systems; is there new technology that could replace it?

A: These are point observations, in-situ. NWS uses a lot of data to do their forecasts, but a lack of these stations is like missing a tool in the toolbox. They help provide important additional data. This data does have a lot of uses for short-term forecasting, warnings, verification at the NWS, also used by boaters, etc. A point data source is a unique tool; having five is helpful.

Q: Nick Parr noted that DEP has partnered with FIU to install in-water monitoring at Sand Key, Sombrero, Molasses and Pulaski. These were intended to be paired with the C-MAN stations to have in-water measurements to complement the atmospheric measurements. They are planned to take temperature, pH, salinity, chl-a, turbidity and DO measurements.

Q: Andy Newman: Do any weather apps use information that comes from NOAA instrumentation?

A: The NWS does not have an app... apps get their information from a variety of sources. Most apps are money-making for their creators; whereas NOAA is concerned about public safety and science so our information is generated for those purposes.

VI. PUBLIC COMMENT

Name/Affiliation: Andy Newman on behalf of TDC

Comment: TDC will be having a series of public relations efforts for Earth Day. They are also beginning the public relations efforts for lobster mini season this year. Talk to Andy Newman for brochures. Printed 8,000 the first year, and 12,000 last year. FKNMS gets the bulk of the brochures, which are then distributed to dive shops. There is also a PDF at KeysLobsterSeason.com. Will be happy to give a presentation at the June meeting on this year's mini season efforts.

- George noted that the City of Marathon sets up at the boat ramps and hands out brochures to those who are putting their boats in the water. Challenges others to do a similar effort.
- Justin Powell requested addition of the Marine Explorer App on the brochure. Andy Newman noted there is a QR code to the website, but the App can be added to the website. He also noted that they encourage rental properties to send this information out to individuals with reservations before they travel to the Keys.

VII. SAC PLANNING SESSION

Liz introduced the next agenda item. The council has been focused on the Restoration Blueprint process and decision making for the last several years, but SAC involvement has now largely been completed until the final rule is released. This session was an opportunity for the SAC to provide input on topics for future meeting agendas.

Liz presented a list of topics that have come up over the past year, but that have not been covered in SAC meetings due to the heavy focus on the Restoration Blueprint, and asked the council what other topics they'd like to explore, and what concerns, if any, their constituents have raised.

Council Discussion:

- Elena Rodriguez noted that great speakers have come to SAC over the past 8 years. Would like to see updates on sponges, seagrasses, etc. The last data was presented pre-Irma; it'd be interesting to see the updates and this is an educational opportunity for individuals who were not here before 2017.
- Discussion of state agency updates:
 - Nick Parr: In August DEP will have a draft of the Coupon Bight Management Plan; would like to do that in this forum to solicit council and public input.
 - Ben Daughtry: Requested updates from FWC similarly, if anything big is coming down the pike.
 - CJ Sweetman: Noted there is a lot going on with FWC right now and would be happy to discuss with the SAC.
- George Garrett: Adaptive management; the SAC should discuss what this means in greater detail, including when to engage on issues. John Hunt has been working on a report with FWC about what we're doing with coral restoration protocols, priorities guidance, etc. Would like to hear about this.
- Collaborative research between NOAA, DWP on cultural resources in FKNMS.
- Ben Daughtry reiterated updates from the WQPP and MIR process. Other specific topics that this group would benefit from - please continue to think about requests and send them to Liz, cc chair.
- Sarah Fangman noted that while there are a lot of topics that the sanctuary wants input on, we also want to make sure the SAC can share their ideas. Once the Restoration Blueprint is final, we will still need to implement it so this will still be an important topic for the SAC. There are concepts that have been left out of the Restoration Blueprint because of a lack of public support - e.g., over crowded sites. There are things we didn't quite figure out how to resolve as part of the Restoration Blueprint, but we still need to deal with these issues. This could be part of the adaptive management discussion - take a few of these things on at a time vs. via a major overhaul process.
- George Garrett: Would like to look at oceanography regionally. We've put together a resolution on wastewater management to partners up north already. We need to look at this from a larger perspective, and discuss impacts to the Keys.
- Ken Reda: Look to things that give us positive momentum. We know the coral reef has degraded, water quality is challenging, etc. We need to look also at the good things that have happened. A couple years ago we had a presentation that showed aerial views of Tavernier Creek and Snake Creek since implementation of slow zones, and showed those areas rebounding. Stories on progress and hope are important.
- Daniel Padron: Explore boating licenses or online courses as a mechanism to protect the habitat and relieve enforcement pressure.
- George Garrett: There are two agencies in the Keys that are looking at additional water quality protective actions. City of Marathon is looking at potable water reuse, as is

KLWTD. This reduces effluent near shorelines. This also is relevant to issues with FKAA use restrictions.

VIII. AGENCY REPORTS

Superintendent's Report - Sarah Fangman:

- Thanks to those who attended a successful EDC reopening. This was a long time coming, within initial ideas for renovation first explored in 2017. Sarah reiterated the importance of getting more capacity to keep the doors open. The TDC provided partial funding for this effort.
- The Marine Preservation Society is a new non profit organization in the Florida Keys. They are hoping to raise money to support our marine environment. See marinepreservationsociety.org
- ONMS celebrated 50 years this year, and a poster was recently completed for the Florida Keys. This poster tried to capture a lot about this place in a single image; it also includes educational information. Printed copies will be available soon; hopefully at the next SAC meeting.
- Nina Garfield is temporarily supporting FKNMS through the Leadership Competency Development Program in the next several months. She is supporting the Buoy Working Group.
- The NMSF has two new staff: Courtney Benson and JD working on Mission: Iconic Reefs and Goal Clean Seas Florida Keys.

Florida Department of Environmental Protection - Nick Parr:

- Introduction to Mollie Sinnott, the new DEP Southeast Regional Administrator. Mollie oversees the DEP Coral Reef Conservation Program, Reef Injury Prevention Response Program, FKNMS, and Aquatic Preserves. Mollie will help represent needs to DEP leadership from the SAC and WQPP.
- DEP was awarded an EPA grant to conduct a tidal connection study and eventually restore tidal flow around Curry Hammock. This is a 3 year project to get this shovel ready; will do baseline study to show effect on WQ and the benthic community at that area and a reference site. There are other candidates around the Keys for tidal restoration and the results from this project can inform those.
- Working on an updated management plan for Coupon Bight Aquatic Preserve; this will incorporate input from last year's public scoping meeting. This will then be reviewed by a Management Committee. Hope to have a new draft ready by mid-July which will be posted and presented to the SAC for public comment at that point. This is a management plan, does not include rule making.
- Bahia Honda: Continue to work with UF on restoration of Miami Blue Butterfly. They are having an Earth Day celebration on Saturday, April 22nd, 10am - 2pm.

- Florida's Coral Reef: Launching a new PSA campaign this month and running through June. Will focus on awareness of FCR and link back to FloridasCoralReef.org which represents all interagency work on coral reefs. This website will also be translated into Spanish to increase accessibility.

Florida Fish and Wildlife Conservation Commission: Division of Marine Fisheries Management - CJ Sweetman:

Our next Commission meeting will be an in-person meeting held on May 10-11, 2023, in Miami. Relative to marine fisheries action items, staff will be providing a proposed final rule to reduce impacts of catch-and-release fishing on goliath grouper spawning aggregations off three locations in Martin and Palm Beach counties. We will also present a proposed final rule for management modifications to South Atlantic greater amberjack in state waters, which will modify commercial and import size limits and would create an April recreational spawning season closure. This action follows similar action taken by the South Atlantic Fishery Management Council in federal waters. There is also a non-fisheries related proposed final rule from our Boating and Waterways Section relevant to the Keys called the 'Monroe County Anchoring Limitation Area'. Recent legislative changes to Florida Statutes designated Monroe County as an anchoring limitation area and required the Commission to adopt rules establishing anchoring areas throughout the county. As such, staff will present a proposed final rule that will establish seven designated anchoring areas from Marathon in the Middle Keys to Key West, along with maximum allowable vessel drafts for these anchoring areas.

We will also present a proposed rule for snook regional management throughout the state. This approach follows previous agency actions taken for redfish and includes new management regions as well as snook regulations within each region. The proposed regulations within each region were based on an evaluation of the snook fishery using a suite of management metrics and public feedback gathered through multiple engagement efforts, including statewide public workshops.

Staff will also be providing several reports to the Commission. These include the Division of Marine Fisheries Management's Annual Workplan, where staff will review new and ongoing marine fisheries programs and management issues that we anticipate to be actively worked on during the 2023/2024 cycle. Staff will also provide council reports from the most recent Gulf of Mexico and South Atlantic Fishery Management Council meetings. The agenda for the May 2023 FWC Commission meeting can be accessed on our Commission meeting website at the following link:

<https://myfwc.com/about/commission/commission-meetings/may-2023/>

Q: Andy Newman: Do you have a sense of how many permits have been issued for Goliath Grouper?

A: All 200 that were available were issued. 50 issued out of ENP, 150 out of the rest of the state. This license is for the harvest of one fish during the season.

NOAA Office of Law Enforcement - EO Justin Powell:

- ATBA activity - there are a number of cases ongoing. Violators are international and local, and range from yachts to big tank vessels.
- OLE has a training coming up with FWC in May, which will include new officers.
- A new flats boat will be arriving this week, which will support TED patrols next week in the backcountry. Upcoming operation “TED-talk” will focus on shrimp vessels and TEDs in nets.
- Patrolled the airshow last weekend to deter fishing in closed areas and anchor impacts.
- Education is important; fines are a deterrent after education. The new FKNMS marine explorer app has been helpful.
 - Sarah Fangman noted that Capt. Will Benson passed along an enforcement concern, which NOAA OLE has since followed up upon. They try to take into account the issues that people have, even if it’s just a request to increase patrols in various areas.
- Have been working in backcountry with PWCs going where they are not supposed to in the backcountry. NOAA OLE is addressing via communication with rental businesses.

NAS KW - Wendy Wheatley-Techmer:

- NASKW Environmental held a shoreline cleanup at the end of Old Boca Chica Road and collected about 500 pounds of man-made debris including wooden spools, plastic sandwich bags, and soda cans from foreign countries.
- The installation began monitoring the beaches for sea turtle and shorebird nesting activity.
- The Defense Advanced Research Projects Agency (DARPA) and the University of Miami are teaming up to design a 100’ coral module structure to be installed off Boca Chica shoreline to support climate resiliency initiatives at NASKW.
- NASKW Environmental will be hosting a booth at the upcoming Bahia Honda State Park Earth Day Festival
- Finally, NAS KW’s long-time representative to the SAC, Ed Barham, will be retiring at the end of April.

USCG - LTJG Alex Hughes:

- Alex Hughes will be reassigned to New London, CT. ENS Jordan Haas will be the new living marine resources officer for Sector KW, and will take over SAC representative duties.
- Had a safety zone for the airshow; boat races are coming up, etc.
- Migrant flow has significantly decreased, so USCG assets can refocus on other missions

(drug interdictions, fisheries ops with NOAA OLE/FWC, illegal charters, etc.). Out of state assets that were brought in will be leaving the Keys. Unknown if the new legislation, the weather patterns, or having the large vessel assets are the reason for the slow down. They are operating under a belief that this is due to the new legislation, and that migrant flow will continue to decrease. Larger assets are leaving, but smaller vessels are still available to respond.

U.S.F.W.S. - Greg Boling:

- USFWS will be conducting a freshwater wetland restoration project on BPK.
- Through Coast Love volunteer group, just completed a coastal cleanup along Long Beach Road and removed ~1000 lbs of debris.
- The NWR completed a small marine debris cleanup along Watson Blvd.

Agency reports received by email appear at the end of the meeting notes.

VII. CLOSING REMARKS

George Garrett noted the Saturday, April 22 Earth Day events. The house at Crane Hammock has been renovated and will be open on Earth Day. Leadership Monroe County Class XXX will be graduating at Ocean Front Park in Marathon on April 29th, with tents, food trucks, bands, etc.

Monroe County TDC will host a hurricane preparedness workshop next month. The hurricane awareness tour is coming to Marathon airport May 5th.

Meeting adjourned at 2:35 pm.

APPENDIX I: Agency reports received by email:

NOAA National Marine Fisheries Service, Southeast Region - Lauren Waters:

- Protected Resources Updates:
 - Completed public comment period on proposed rule to list queen conch as threatened and NOAA Fisheries should have final listing determination later this year.
 - Completed public comment period on Nassau Grouper Critical Habitat and NOAA Fisheries should have final listing determination later this year.
 - Rice's Whale Critical Habitat proposed rule is at headquarters and will begin interagency review soon.
 - We have two new ESA listing petitions: Smalltail shark and Whitespotted eagle ray. The first stage of review, which NMFS is doing right now, is called the 90-day finding to see if listing may be warranted. If there is a positive finding, then the next step is to complete a more detailed status review before determining if exploring rulemaking is warranted.
- Fisheries Updates
 - Both the South Atlantic and Gulf Council are looking to update yellowtail snapper regulations. The Councils are responding to an assessment done by FWC, and Council's will consider changes to the catch limits, allocations, and jurisdictional allocations between the Gulf and South Atlantic.
 - The Southeast Fisheries Science Center recently released the South Atlantic Black Sea Bass Stock Assessment Report and it can be found online at the Southeast Data, Assessment, and Review (SEDAR) website, as SEDAR 76.
- Upcoming Council Meetings:
 - Gulf of Mexico Fishery Management Council will meet June 5 - 8 in Mobile, Alabama. The agenda has not been finalized but public comment will likely be Wednesday June 7th and will be available for virtual participants.
 - South Atlantic Fishery Management Council will meet June 12 - 16 in St. Augustine, Florida. The agenda has not been finalized yet but public comment will likely be Wednesday the 14th and will be available for virtual participants.
- Rule Making and Public Comment Opportunities:
 - Comments due May 1st on an Amendment to Revise Gulf of Mexico Greater Amberjack Catch Limits, Allocation, and Rebuilding Plan