Harmful Algal Bloom Task Force Meeting
April 6, 2021 Quarterly Meeting (9:00 a.m. - 3:00 p.m. EST)

In Attendance, HAB Task Force members: Leanne Flewelling, Donald Anderson, Rick Clark, Duane De Freese, Quay Dortch, Jill Fleiger, Charles Jacoby, Barbara Kirkpatrick, Sherry Larkin, Andrew Reich, Rhonda Watkins, David Whiting

Guests and presenters: Kevin Claridge and Cindy Heil, Mote Marine Laboratory; Christine Angelini, UF Center for Coastal Studies; Kate Hubbard, FWC-FWRI; Meghan Abbott, FWC-FWRI

Public participants: 20 in virtual meeting room, also live streamed by Florida Channel

Minutes

9:00-9:19 a.m. Welcome and introductions

Leanne Flewelling welcomed attendees, guest speakers and members of the public. She noted the public comment period is scheduled for 1:30 p.m. and members of the public can comment anytime using the online form at www.MyFWC.com/HABTaskForce.

Flewelling conducted roll call of members, all present.

Flewelling reviewed the agenda and noted Dave Whiting will speak first to provide an update on Piney Point.

Whiting provided an overview of the Piney Point situation and response efforts. He noted there is a webpage dedicated to the event with daily updates available on the Protecting Florida together site, www.protectingfloridatogether.gov/pineypointupdate

Questions from the HAB Task Force:

- Rhonda Watkins asked when the website is updated as this morning it did not show current algae sampling or radiological or metals numbers, or nutrient parameters.
    - Whiting noted there is a lag between collection of samples and analysis of results.
- Quay Dortch asked if there have been any signs of a bloom forming.
    - Whiting replied the water itself in the containment area did have algae growing in it, but he is not aware of any blooms yet from release of water into the bay.
- Duane De Freese asked if we are drawing down enough water to possibly prevent a wall collapse.
    - Whiting noted the report as of yesterday did not indicate but the Manatee County represented noted the next 24-48 hour were critical.
- Flewelling asked if they are going to double the rate of the discharge from 35million gallons per day.
    - Whiting noted it may have doubled already, he is not sure of the release value. There are at least 26 different pumps going and vacuum trucks in use.
- Barb Kirkpatrick asked why we are seeing record amounts of volume during the dry season.

    - Whiting noted it is due to a failure at the facility of the south containment liner. The water in that south containment are includes salt water from when Port Manatee did some dredging, it was no longer an active phosphogypsum mining site but a housing area for the dredge fill.

Flewelling asked if there were any further questions. Hearing none, she thanked Whiting and introduced Kevin Claridge to present.

9:19 - 10:03 a.m. Partner updates

Kevin Claridge, provided an update on the Florida Red Tide Mitigation and Technology Development Initiative led by Mote Marine Laboratory. Cindy Heil presented example of two research projects, slides on *Ulva* and QUATs.

Questions from the HAB Task Force:

- Don Anderson asked, as someone using the mecocosm facility, how worker health and safety is being addressed with threat of exposure to *Karenia* toxins.
    - Claridge noted they want to ensure a safe working environment and are working to install more measures to reduce threat of aerosol exposure such as installing curtains to contain areas.
- Anderson asked about the RFP funding cycle and price range. He noted other programs increase funding as projects move from pilot to field stages as there are additional expenses when projects scale up.
    - Claridge noted Mote is investigating access to vessels to support projects as they move to field testing and speaking with FWC for increased funding for promising projects.
- Kirkpatrick inquired about environmental conditions related to cell count density and toxicity changes in baseline studies, controls and measure data to determine how organism is responding in respect to lab versus environment.
    - Claridge noted that they are still investigating with partners to stabilize the system to effectively tests organisms.
    - Anderson noted there are two parts to the facility, culturing and mecocosm. The culturing growth is excellent, the mecocosm is determining how to maintain adequate oxygen levels needed for animals without destroying *Karenia*.
- Kirkpatrick inquired about facility funding and staff support.
    - Claridge noted approximately $1-million was invested to building the facility and one FTE is supporting lab facilities and culturing.
- Andy Reich followed-up on the health and safety protocols to protect workers in the confined environment of the facility. Asked if Mote can provide more information on the measures and plans to control for sources of exposure before the facility is in full use such as data on the brevetoxin aerosolization in these facilities, as PPE is usually last measure of protection and the preference is to try to limit potential exposures first.
    - Kirkpatrick asked if air handlers have been tested at the facility.
    - Claridge noted he will have to report back as they move forward with establishing the facility prior to full testing use.
- Anderson asked about plans for helping with permitting challenges that will come up as they move to field testing. Suggested Mote work with new NOAA group.
    - Dortch noted NOAA's new HAB program includes development of support for investigators on how to address regulatory issues, and they have been in discussion with Mote.

    - Claridge confirmed discussions with NOAA, and other agencies such as EPA.
- Flewelling asked if there were plans for the final years of the 6-year endeavor to invest in most promising projects rather than continue the open RFP for new projects. She further inquired if this year 3 RFP is the first opportunity for projects funded in year 1 to seek additional support for next stages.
    - Claridge noted the plan is to fast track promising projects, with a diversity of strategies in mind. Year 4 funding should move existing promising projects in to tier 2 and 3 of project phases.
- Whiting noted if some of these might have applications in fresh water the DEP may have interest. For example, in emergency situations such as Piney Point there may be opportunities to apply possible mitigation or control strategies with innovative technologies if methods are transferable from salt to fres.

10:03–10:45 a.m. Presentations

Christine Angelini, presented "Center for Coastal Solutions at University of Florida"

Questions from the HAB Task Force:

- Watkins inquired if Angelini knew what kind of probes are being used for real time water quality monitoring in Charlotte Harbor
    - Angelini noted that they are working with the RECON network with main base being maintained by the Sanibel Captiva Conservation Foundation.
    - Flewelling followed up asking for details on the measurements being captured at the SCCF stations, are there nutrient data, sensors, what is the resolution of that temporally to feed a forecast.
    - Angelini noted she is not the best to answer this, but the RECON network captures various parameters from a network of stations with monthly grab samples and various water quality samples, along with wind database information. Where CCS is going with the forecasting model is hindcasting, drawing in on historic data for models to forecast reliably to calibrate northern region effectively with existing data gaps.
- Whiting stressed he agreed with the importance of building in the policy and community aspect to ensure continued work with public stakeholders for information that meets their needs and educate on the benefits of these programs and products.
    - Angelini noted the 5-10 year vision includes work with local decision makers and diverse stakeholders to ensure communication needs are considered and effective information is captured for decision making. It is an integrated and sustained partnerships with agencies and public.
- De Freese noted there are 4 NEPs, 3 national estuarine reserves and other efforts that CCS should be aware of to ensure there is not a duplication of efforts. Urged Angelini to reach out to IRL and Sarasota and Tampa Bay to get a recap
    - Angelini agreed, and noted their initial focus was on needs and wants for the region but does not want to duplicate other state efforts.
- Dortch echoed the risk of duplicative efforts, for example NOAA "every beach every day" plans for the future.

    - Angelini noted CCS is working closely with NOAA coast watch on proposals. She added CCS is in the beginning stages and looking to expand partnerships and knowledge.
- Kirkpatrick noted she did not see tourism specifically identified, and early engagement with this sector is important as they represent unique view and challenges.
    - Angelini noted they have engaged Visit Sarasota to discuss some challenges and agreed to continue similar efforts.
- Sherry Larkin gave an overview of the larger program connections with Florida Sea Grant and joint commitment to the critical importance of messaging. Sea Grant is additionally hiring a NOAA HAB liaison starting May 1 who will work with various stakeholders and be posted at Mote Marine Laboratory including working with policy analyst to make these connections and ensure communication and knowledge flows effectively to prevent duplication.

Flewelling asked if there were further questions. Hearing none, she called for a 15 minute break.

Break 10:45 – 11:00 a.m.

Flewelling noted Don Anderson had to step out for approximately 45 minutes. She welcomed Cindy Heil, Mote Marine Laboratory to present and discuss further past research for the HAB Task Force to consider.

11:00 a.m. –11:56 a.m. Presentations continued

Cindy Heil, Mote, presented "ECOHAB: Life and death of *Karenia brevis* blooms in the eastern Gulf of Mexico"

Heil noted some outstanding questions and future research goals that also address public interest in regards to *Karenia* with a focus on nutrients are captured in her final slides.

Questions from the HAB Task Force:

- Watkins asked how much work could be done isotope monitoring within a *Karenia* bloom to check for nutrient sources
    - Heil noted there has been at least one project that has looked at this as part of the first ECOHAB and it depends on where you measure the bloom. Generally from the 10m isobath offshore the stable isotope signature is 4-5, it decreases as you go offshore. Inshore is basically a smear of different sources e.g., if you take from the base of the Caloosahatchee River it will mirror agricultural inputs, canals in Tampa Bay will be land derived. So stable isotopes are good at tracking them near shore or very far offshore but for big blooms seem to integrate the signal so you can't really point a finger.
    - Watkins noted another project that tracked isotopes on the algae itself and if that was something that could be done with *Karenia*.
    - Heil noted they have tried but it is difficult as they are not fixed. It can be done with anchored macroalgae but *Karenia* are moving. If you are immediately adjacent to a source it will likely reflect that source but with larger blooms it is a very smeared signal.

- Flewelling asked if you can use sentinels instead of cells that move around such as anchored shellfish to look at isotopic signatures.
    - Heil noted you may be able to do that with cells in diffusion chambers or dialysis tubing, and this might be worth a try as some way to contain it but studies are not yet planned. She noted when you contain *Karenia* there is about a 50% chance it will die.
    - Whiting noted they have done this with freshwater algae in dialysis tubing and you get growth on the exterior of the tubing that competes for nutrients with cyano so it gets confounded very quickly that way.
    - Heil noted you would have to keep the time scale very short.
- Dortch asked if they are doing any basic flux work in the new project, such as wet year to dry year groundwater flux.
    - Heil noted they are not in this project. Kelly Dixon did some dedicated work on that published in the special issue of Harmful Algae but she is not aware of anyone during further work. There is a paper published on groundwater. Only one study on benthic flux but prior to that the models were using Georgia values. More measurements are needed in the SW region, particularly as an area that is so porous, groundwater has been suggested as a contributing source where fertilizer goes but needs to be looked at further.
    - Heil noted some elements of Brian Lapointe's macroalgae work. She noted the one isotope value taken for nutrient sources at riverbed mouth did point to agricultural sources, but blooms stretch to huge areas beyond that so there are still questions about localized impacts from nearshore sources versus the broader impacts in the larger areas i.e., if you alleviate or remove local sources with it have an impact on the larger bloom or just inshore. Also the question of one large input at once versus chronic inputs like stormwater, does that make a difference.
    - Heil noted they had looked at Piney Point releases in past years, which was different effluents and nutrients at that time, and it did impact other blooms but *Karenia* did not bloom.
- Dortch asked Whiting if salinities in Piney Point could support *Karenia*, the color looks like cyanobacteria.
    - Whiting noted salinity is not that high, noted chloride and conductivity levels, so would think not but they are looking at samples.
- Reich inquired if discussion of macroalgae includes sargassum.
    - Heil not aware of any work looking into coastal inputs effects on of sargassum. They tend to consider sargassum as offshore events.
- Whiting asked about the map that overlayed impaired waters with number of months of blooms present over the 20 years. Inquired if those impaired waters from nutrients versus another source like mercury or bacteria, to confirm what she was mapping. He additionally inquired about her use of the term correlation as there are impaired waters statewide.
    - Heil noted she would have to check the original paper in terms of impairment to confirm but she believes nutrients. The frequency of the blooms in that region

versus the water quality issues. Correlation is the wrong word, rather association, admitting there are other factors that may influence *Karenia* blooms in that area such as local hydrodynamics, salinity-temperature fronts that keep blooms nearshore, coastal inputs e.g., phosophorus rich north region, move south to Caloosahatchee and everglades organic nitrogens, all of which *Karenia* can use resulting in a favorable coastal region for *Karenia*. Question is blooms occur most frequently in the SW, and there are water impairment in that region and a lot of managed flow from the river so a lot of people use that map to make correlation but that is incorrect.

- Flewelling asked when we have these large events like hurricanes or major spills or discharges, how long are those nutrients available for *Karenia* to use.
    - Heil suggested weeks to a month as it takes time for sediments to settle so initially see light limitation, then nutrient availability. When sediment settles, what has been seen nearshore first is diatom blooms primarily in the estuaries. So, unless there is an existing *Karenia* bloom, other species take up nutrients first.
    - Flewelling asked in Heil's opinion what is the most important information we need to know.
    - Heil said short term coastal nutrients, which we can strategize to address but then climate change which is more challenging.

Flewelling asked if there were any more questions. Hearing none, thanked Heil and moved ahead with the agenda.

11:56 a.m. - 12:25 p.m. Updates and HAB Task Force Discussion

Flewelling noted there is a new Chief Science Officer for the State of Florida, Dr. Mark Rains. She commented on the current red tide bloom noting it is fairly typical with the current FWC status map shows *Karenia* in many areas but not necessarily at blooms levels. She gave an overview of cell counts, regions, and impacts.

Flewelling provided updates on various initiatives ongoing related to priority items identified in the consensus document Initial recommendations regarding red tide (*Karenia brevis*) blooms:

- The 2nd edition of the Resource guide for public health response to HABs in Florida, TR-14, is progressing and anticipated for a May digital publication date.
- The HAB Communications Working Group has assembled a list of first points of contact that can be distributed to those who get inquiries so that they know where to get information or send the inquirers. They have initiated a list of questions that will like to first points of contacts, and members will be contributing to this list. They will be reviewing deliverables from the UF communications project with an eye to make recommendations to the HAB Task Force later this year. They have discussed the value of a memorandum of understanding or similar agreement among the agencies responsible for communication at the state level and recommend that such an agreement be pursued because it will enhance effectiveness and efficiency.
- The three projects funded through the FWC HAB grant program in 2020-21 are progressing.

- The UF Sea Grant communications project has made a lot of progress, including creating a draft compilation of communication and outreach products; developed usability surveys to evaluate red tide tool effectiveness of the Protecting Florida Together website, the Beach Conditions Reporting System and FWC red tide status reports; conducted focus groups with natural resources managers, public health officials, tourism, media and small businesses; and distributed surveys widely to Florida residents. Information, including how to participate, can be accessed on their webpage.
- FAU holographic imaging project has developed the AUTOHOLO instrument to detect and quantify *Karenia brevis* from water containing mixed populations of microalgae. Has been tested in a lab setting with cultures and bloom water samples, with some field deployments in SW Florida during the bloom event. They are improving the classifier to identify *K. brevis* by reconstructing holographic images and have done more than 1000 images. Also developed a deployable sled that the instrument can be attached to and towed through the water.
- UF aerosolized brevetoxin project overview given during Angelini's talk this morning related to their interest in what happens to the fate of toxins in aerosols. The field deployment tool, an assay to measure brevetoxins on the beach, that is funded is progressing but developing the antibodies to detect the aerosols was delayed but the production company. Expect this to be completed by July, so the test kit development will likely be completed by the end of the year but field testing and evaluation would require additional time and funding.
- Year 2 funding for all projects will depend on appropriations and year 1 outcomes.

Kate Hubbard, chair of Steering Committee, gave an update on the Florida HAB observing system workshop being planned for spring 2022. Focus of the workshop will focus on *K. brevis* observing and monitoring in Florida. A steering committee of 7 members was established and had an initial meeting. Members include state and federal representatives and members of both SECOORA and GCOOS, the two IOOS Regional Associations in Florida. The steering committee has diverse expertise related to HABs, drawing from diverse disciplines including but not limited to human health, oceanography, wildlife, communication and public outreach, and ecosystem assessment. It includes a few members of the Task Force. Workshop will focus on building a roadmap for Florida with the National blueprint for HAB observing and science that meets stakeholder needs. This workshop is anticipated to be a forum for building awareness across the research (and stakeholder) community regarding: *new/existing datastreams; new and/or collective assets; comprehensive consideration of impacts; knowledge, data, and/or technology gaps; expanded modeling and technology; improving ecosystem and public health management; improving accuracy of risk perception; and key discussion of tiered funding approach.*

HAB Task Force Questions on Updates

- Dortch inquired if UF CSS should be added to steering committee, and if the UF communications grant is participating in the HAB communications working group.

        - Flewelling noted steering committee questions should be directed to Hubbard as chair.
        - Jacoby confirmed UF Sea Grant is actively participating in the communications working group.
- De Freese noted the 4 NEPs are finalizing workplans and inquired if monitoring workshop will need additional funding support for spring 2022.
    - Flewelling noted the initial planning with be *Karenia* centric but the long-term goals are for a broad statewide monitoring network.

Flewelling asked for final questions. Hearing none moved forward with the agenda to review the HAB Task Force initial priorities recommendation document. She indicated the goal is to review to update initial recommendations and have facilitated discussion identify any gaps that remain to be addressed specific to *Karenia* to provide an updated document that communicates progress as well as existing needs and potential priorities not addressed or identified by the end of the year.

- Whiting asked if a combined meeting with blue-green algae task force is being planned, with consideration of the HAB Task Force moving to expand priorities beyond *Karenia*.
    - Flewelling noted that this was discussed with Tom Frazer with a clear focus on nutrients. She will be reaching out to the new CSO to discuss further and see what can be coordinated. Flewelling noted it will be important to review and have an overview of the work that has been done on nutrients so we can move to the coastal nutrient question. She noted the July HAB Task Force meeting will continue to be *Karenia* focused, updating the initial recommendations, with a new document draft planned for the October meeting.

Flewelling opened the floor to HAB Task Force members for input on this 2021 meeting plan.

- Kirkpatrick indicated her support.
- Watkins noted support for a joint meeting with Blue Green Algae Task Force, and in light of nutrient presentations today, to be provided an update on the work they have done prior to making additional recommendations.
- Dortch recommended quick review of initial document first to identify where we are.
    - Flewelling noted that was intent of this afternoon to begin reviewing to update and possibly identify some new areas.

Lunch 12:25-1:30 p.m.

1:30-1:35 p.m. Public Comment Period

The public comment dial-in number with instructions were posted, and phone lines were opened for comment. None were received.

1:35 - 3:02 p.m. HAB Task Force Discussion

Flewelling opened the discussion for HAB Task Force members to review and discuss the initial priority recommendations related to red tide to determine progress to date. She noted this will serve as the platform to identify potential new priorities at the next meeting. Meghan Abbott was

invited to join the conversation. Recommendations were reviewed in order of the January 2020 consensus document:

Members provided updates on the two Public Health recommendations in the consensus document. First related to research and the second related to professional health training.

Research:

- FDOH anticipates 5-years of dedicated funding in state appropriations for HAB health initiatives
- FDOH funded 3 projects in the first year which are still active. Universities are looking at long-term health effects related to blue-green algae. New year projects are still to be determined. Currently none are specifically tied to brevetoxins.
- FDOH is additionally establishing a HAB health working group jointly funded by the CDC. A university has been contracted to facilitate the group but members are still to be determined. The group will assist with identifying HAB health research needs.
- Members noted there is still a need to focus on *Karenia* public health research and education.
- Members noted while there is interest in research related to dual exposure of COVID and aerosolized toxins, no projects have begun or been specifically funded.
- Members gave an update on the Roskamp brevetoxin exposure study presented at a previous meeting. The project is half-way through the 2-year preliminary data NIH funded grant. They recruited 200+ participants and collected blood samples. They are seeing early antibody signatures that may be indicators so investigating potential patterns of susceptibility. Based on initial data, they are likely to apply for longer term research funding.
- FWC's red tide program is also working with Mote to deploy more red tide aerosol monitors.

Professional Health Training

- Members noted work done in the past included a video series for training delivered to FPICs, medical professionals, CHDs, and some veterinarians. This can be done without the HAB health group, as it falls under the purview of the FDOH. It has been while since training was delivered, there may be some awareness but things can be done now with FPICs, medical experts who treat aerosol exposures for example.
- FDOH did a review of surveillance systems to determine it was capturing certain indicators. There is an opportunity to expand this to capture some BGA and RT. Important to do that in conversation with CDC who is working on national HAB coding for PICs.

Members discussed Public Health recommendations for a revised document.

- Determined both recommendations should remain as priorities with updates.
- Members recommended a third bullet related to occupational health and workforce safety be added. The recommendation would be to develop health guidance with those working in close proximity to blooms, even when we don't know thresholds e.g., staff at beach hotels, food services, on the water, particularly for potentially higher risk populations like pregnant women.

Members provided updates on the two Communications recommendations in the consensus document. The first related to develop a statewide outreach campaign and the second related to

Protecting Florida Together and web-based portals for the public and data portals for agency info sharing.

Communications plan:

- The funded UF communications project addresses items 1 and 2 and should result with a recommendation on how to go forward with the following numbers 3-5.
- The HAB communications working group is also developing products and will make formal recommendations based on UF outcomes.
- The FDOH conducted a statewide county survey on signage for HABs and is evaluating data to determine response

Web and data portals:

- The Protecting Florida Together continues to develop as an information portal, including emergency events.
- Members noted public facing data portals and others should be built to talk to each other for agency needs e.g., NOAA dashboard, blue-green algae dashboard.

- Members agreed to wait for outcomes of current work before determining next recommendations.

Members provided updates on three of the four Management and Response recommendations in the consensus document. The first relates to statewide response plans, the second related to coastal-ocean observing network, and the third related to DEP guidelines for permitting. Due to time constraints, the fourth relating to economic impact metrics was not discussed.

Statewide response plans:

- The blue-green algae task force recommendations requested clear outlines on information such as triggers, sampling, and how we communicate between agencies. The DEP is developing a document that will outline those points in response for cyanobacteria.
- Information resources being developed as part of the HAB health resource guide update include a planned table top exercise to test a response flow chart to an unknown HAB event involving state agencies, agency responsibility matrices, among other tools.
- The HAB communications group is developing contact lists and recommended an MOU with agencies for communications.

Florida HAB observing network:

- Planning is in progress for a spring 2022 workshop.
- The FWRI HAB grant program and Mote mitigation technology development initiative are supporting projects that explore and develop new tools.

DEP permitting guidelines:

- Mote mitigation technology development initiative has begun discussions with agencies and is working with NOAA related to expediting permitting in anticipation of field testing of pilot projects funded in this program.
- The Protecting Florida Together website hosts information on related grant programs and use those as the vehicle to manage expediting pilot or testing. However, EPA rules apply, and other limitations exist for how DEP can expedite or manage permitting to assist research and technology developers for specific sites and during rapid response. Some smaller scaler innovation tech projects have successfully moved quickly with

detailed information to assist review determination of impacts/risks. Challenge is application/introduction of materials.

- Members suggested this bullet may need to be revised to recommend legislative action. An example would be FDOH's blanket permit for emergency management for sediment in lakes during hurricanes. An executive order to support field testing of new technologies and in emergency response would assist at the state level, but marine oversight is federal level for open water treatments.

ACTION: Flewelling and Kirkpatrick to follow-up with Karen Steidinger related to past fish project permitting. Dortch to raise with HABHRCA in terms of how this would work at federal level to mirror at state level.

Flewelling noted, some members need to leave at 3 p.m. so the remaining discussion was tabled to the July 14 meeting. She welcomed final comments from members and noted additional actions for the July meeting.

De Freese noted the importance of considering our longer term goals for all Florida HABs as we move from *Karenia* priorities.

Other action items:

ACTION: Flewelling will summarize updates on discussed items to circulate in advance.

ACTION: Flewelling will reach out to CSO to discuss joint meeting with blue-green algae task force and specific topics to discuss/address.

ACTION: Flewelling will prepare a budget for fiscal year 2021-22 for the July meeting.

ACTION: Members to provide recommendations on July agenda items to Meghan Abbott.

Flewelling thanked members for their participation.

3:02 p.m. Meeting adjourned