

Florida Red Tide Mitigation and Technology Development Initiative

Technical Advisory Council Public Meeting

July 22, 2021, 9:00am-12:00pm EST

To Join Zoom:

<https://zoom.us/j/92544632867?pwd=U09uaFE0QmZJQ01YSVI0cDhBSFMrZz09>

Meeting ID: 925 4463 2867

Passcode: 353113

This meeting is open to the public.

1. Welcome
2. Technical Checks and Council Role Call
3. Agenda Overview
4. Review of previous Technical Advisory Council meetings
5. Initiative Reporting
6. Initiative Research Progress
7. Request for Proposals
8. Promising Tools and Technologies
9. Looking Ahead
10. Public Comments
11. Research Partner Comments
12. Mote Aquaculture Research Park Mesocosm and Culture Lab Tour

**Florida Red Tide Mitigation and Technology Development Initiative
Technical Advisory Council Public Meeting – July 22nd, 2021, 9:00 am-12:00 pm EST**

In-person Attendance: Dr. Michael P. Crosby, Dr. James Powell, Dr. Katherine Hubbard, David Whiting, Kevin Claridge, Kayla Bernier, Liz Longstreet, Betty Staugler, James Ivey, & *see additional Zoom Attendee List included at the end of these meeting minutes.*

Meeting Minutes:

Welcome, Webinar Meeting Logistics, & Agenda Overview

- Welcome remarks by Dr. Crosby
- Kevin Claridge reviewed the Agenda for this meeting.

Review of previous TAC Meetings

- Overview of the Red Tide Initiative and Statute (379.2273 FS)
- Role of the TAC
- Sunshine and Public Record Laws
- Meeting Minutes and Presentations
 - Red Tide Initiative Website on Mote.org
- Florida Red Tide Background
- Statutory Reporting Requirements
- FWC Contract
- Initiative Outreach
- Year 1 and Year 2 Project Presentations and Updates
- Looking Ahead and Next Steps Briefings

Initiative Required Reporting

379.2273(2)(d) Florida Statutes:

Beginning January 15, 2021, and each January 15 thereafter until its expiration, the initiative shall submit a report that contains an overview of its accomplishments to date and priorities for subsequent years to the Governor, the President of the Senate, the Speaker of the House of Representatives, the Secretary of Environmental Protection, and the Executive Director of the Fish and Wildlife Conservation Commission.

FWC-FWRI Contract Reports:

Regular partnership interaction and reports with FWC

Red Tide Initiative Research Progress

Early Progress

- **125+** Potential Mitigation Compounds examined for Tiered Testing
- **70+** Proposals Reviewed
- **25+** Projects Underway
- **20+** Business, Academic and Agency Partners
- **Mitigation Tools to Fast Track**
- Research Facility Constructed
- Private/Federal Funding Leveraged
- Public Website and Technology Advisory Council Meetings
- Report to Governor, Legislature, and Agencies on Accomplishments and Priorities

Tiered Testing Approach

- Tier 1 – Laboratory Experiments
 - Does it kill cells and eliminate toxins in the lab?
- Tier 2 – Mesocosm Raceways
 - Is it effective with natural communities?
 - Are there adverse impacts?
 - Logistical issues?
 - Economically feasible?
- Tier 3 – Canal, Nearshore, Offshore
 - Pilot Studies
 - Field Demonstrations
 - Federal/State/Local Regulatory Approvals

Request for Proposals

- 379.2273(2)(c)(1) Florida Statutes: Mote may use a portion of awarded funds to facilitate additional engagement with other pertinent marine science and technology development organizations...
- Open to any/all interested parties to **bring international best and brightest ideas**
- Proposal guidelines and proposal submission:
 - Mote.org
 - **3 Request For Proposals** and 3 Webinars
 - **Coordinating efforts** to maximize research success through partnership and **avoid duplication**
 - Support not to exceed 1 year – may request longer in next RFP – **several continuing**
- Use of Mote facilities/infrastructure is **available at no charge**
- 20 proposals Year 1; 26 proposals Year 2; **19 proposals in Year 3**
- Partner Led Proposal Review Process:

- **Diverse reviewer expertise** from NOAA, EPA, FWC, DEP, Universities, Estuary Programs, private consultants, and Mote
- Each scientist reviewed 3-5 proposals using provided questionnaire
- Additional Non-Conflicted Mote Scientist Review and **Encouraged Coordination**
 - Organized and provided all reviews together for Dr. Crosby
 - **Presenting to TAC for guidance**
- Subcontracts from Mote – 50%, 25% at Interim Report, 25% at Final Report

Year 1 and 2 Projects (some tentatively continuing Year 3)

1. Dr. Kathryn J. Coyne, University of Delaware: *Optimizing production of a dinoflagellate-specific **algicide** for control of *Karenia brevis**
2. Dr. Sumit Chakraborty, Mote Marine Laboratory, *Development and Validation of New and Existing Technologies: Expanding PHySS's (Programmable Hyperspectral **Seawater Scanner- PHySS(2.0))** Role in Mitigation of Harmful Impacts Caused by the Florida Red Tide*
3. Dr. Allen Place (Taylor Armstrong presenting), University of Maryland: *Pushing *Karenia* Over the Edge with Beer Derived **Flavonoids***
4. Dr. William Haskell, Mote Marine Laboratory, ***Automated in situ Advanced Sensing** Technology Development for Red Tide Mitigation and Control (PHySS-C)*
5. Dr. Vijay John, Tulane University: *A Thin Shroud with Integrated **Algaecide to Flocculate and Sink** *Karenia brevis**
6. Dr. Richard Pierce, Mote Marine Laboratory, *Testing the **Efficacy of Products for Mitigating** Harmful Effects of *Karenia brevis* Red Tide Events along the Florida Gulf Coast*
7. Dr. Don Anderson, Woods Hole Oceanographic Institute: *Fate and Effects of *Karenia brevis* Cells, Toxins, and Nutrients Following **Clay Application** for Bloom Control*
8. Dr. Vincent Lovko, Mote Marine Laboratory, *Developing **UAV-based Red Tide Detection** System*
9. Dr. Michael Parsons, Florida Gulf Coast University: *Examining the Feasibility of **Removing and Composting Fish Carcasses** to Mitigate Red Tide*
10. Sarah Caywood and Aspen Cook, Mote Marine Laboratory, *Expansion and Updates to the **Beach Condition Reporting System***
11. Dr. Dana Wetzel, Mote Marine Laboratory, ***Natural Compound Control** and Mitigation for Red Tide*
12. Neil Williams, nTec solutions LLC: *A Chemical-Free Red Tide Mitigation Technology Utilizing **UV-C LEDs***

13. Dr. Vincent Lovko, Mote Marine Laboratory, *BloomZoom: A Portable **Phone-based Microscope for Quantitative Detection** of *K. brevis* Through Citizen Science*
14. Dr. Alexis Wells Carpenter, AxNano LLC: *Evaluation of Controlled Release **Oxidants** for Red Tide Treatment and Mitigation*
15. Ralph Elliott, Ecological Laboratories: ***Microbe-Lift** Mitigation 96 Hour Testing with *K brevis**
16. Dr. Cynthia Heil, Mote Marine Laboratory, *Citizen Science Detection and Quantification of Florida Red Tides via Personal and **Smartphone-enabled PCR Technology***
17. Dr. Regina Rodriguez, Carbonxt: *In-situ Mitigation of Florida Red Tide via **Activated Carbon***
18. Dr. Cynthia Heil, Mote Marine Laboratory, *Evaluation of **QUAT Efficacy** for Red Tide Mitigation*
19. Annarie Lyles, Solaris Cybernetics, LLC: *Efficacy of **EVIE Robot** against *K. brevis**
20. Dr. Dana Wetzel, Mote Marine Laboratory, *A Rapid Field Red Tide Toxin **Biosensor for Commercially Important Shellfish and Seawater***
21. Dr. Jamie Lead, University of South Carolina: *A preliminary study to assess the feasibility of a **nanotechnology** approach to the removal of *Karenia brevis* cells and brevetoxin from estuarine and marine waters*
22. Dr. George Philippidis, University of South Florida: *Bioprospecting of natural **algicidal bacteria** associated with Harmful Algal Blooms to develop a sustainable mitigation strategy for red tides*

Tentative Year 3 Projects (will send abstracts to TAC for recommendations)

1. Dr. Jennifer McCall, University of North Carolina at Wilmington, *Enabling **accurate field-based testing for shellfish farmers** with optimized toxin extraction and stable standards*
2. Dr. William Haskell, Mote Marine Laboratory, *Development of a low-cost propelled autonomous **underwater vehicle for red tide mitigation** and early response*
3. Dr. George Philippidis, University of South Florida, *Red tide mitigation through natural **algicidal bacteria** suppression of *K. brevis* during HAB progression*
4. Dr. Julia Darcy, AxNano LLC, *Controlled Release **Oxidants** for Red Tide Treatment and Mitigation*
5. Dr. Vijay John, Tulane University, *A Thin Shroud with **Integrated Algaecide to Flocculate and Sink** *Karenia Brevis**

6. Dr. Kathryn Coyne, University of Delaware, *Continued development of **bacteria-derived algicidal compounds** for mitigation of *Karenia brevis**
7. Dr. James Ivey, University of South Florida, *Karenia Mitigation Platform: means and method for enhancing, vetting, and **deploying red tide mitigation technologies** within open water conditions.*
8. Dr. Donald Anderson, Woods Hole Oceanographic Institute, *Fate and Effects of *Karenia brevis* Cells, Toxins, and Nutrients Following **Clay***
9. Thoram Charanda, Prescott Clean Water Technologies, LLC, *Innovative Use of Advance **Oxidation, Nanobubble-Cavitation** for Rapid Deployment to Restore Severely Impacted Red Tide Areas Back to Natural Conditions*
10. Vinay Patel, Enviro Science Technologies, Inc, *Establishing the Efficacy of **SEBS (Specific Enzyme Bacterial System)** for *K. brevis* Cell and Brevetoxin Mitigation*

Questions from the Technical Advisory Council:

- Dr. Powell asked how many Projects had made it to Tier 3 testing thus far.
- Kevin said:
 - 1. Clay
 - 2. Ozonation
- Dr. Hubbard asked if there were any plans to study long term effects on the ecosystem such as in the mesocosms.
 - Kevin agreed that it would be good to study secondary or cumulative impacts.
 - Dr. Crosby agreed that it was important, but also stressed the fact that this would have to be done with the remaining Initiative timeline and funding, which could pose a problem. We could hold a call with DEP & FWC to discuss further.
 - Don Anderson added that the longest they could perform their studies in the mesocosms were for 96 hours. He said that it would be easiest to perform long term testing in the field vs mesocosm/lab testing phases.
- Dr. Hubbard asked if there has been any discussion on how to merge Projects together?
 - Kevin stated that, yes, he has been working with the PI's to determine who has similar work and/or could collaborate.
 - Dr. Hubbard suggested that this might be highlighted in future rfp's, but wasn't sure if it was necessary.
 - Dr. Crosby added that he always envisioned bringing together all of the PI's and Co-PI's for a 1 to 2 day Workshop in order to brainstorm and focus on collaborative efforts. He suggested possibly by the end of Year 3.

Promising Tools and Technologies (so far, continuing to Tier 2+ testing with regulatory approval and economically feasible considerations)

- Compounds
 - Several naturally occurring algae and bacteria
 - Curcumin and NonTox
 - Clay and several Clay integrations
 - Percarbonate
 - Quaternary Amine Compounds
 - Activated Carbon
- UV Light
- Ozonation
- Redevelopment/Expansion of Beach Conditions Reporting
- Seawater and Shellfish Biosensor

Looking Ahead

- Increasing number of projects moving to Tier 2
- FWC Contract Report due October 31st
- Sept 2021 Red Tide Facilities Event
- Culture Lab Technician starts Aug 4th
- Report to Governor, Legislature, Agencies by Jan 15th
- Year 4 RFP Winter 2021/22
 - Funding subcontracted in April 2022
- 2021 TAC Meetings
 - July 22 and December?
- Regulatory Steps and Field Tests
- Collaborative Outreach with PI's and Agencies

Public Comments: None

Research Partner Comments:

- Ralph Elliott mentioned that he thought DEP has a joint permitting program, but was not sure if it would relate to what is needed for the Initiative.
 - Kevin said it was a good point and there are conversations to be had.
- Betty Staugler introduced herself as the NOAA HAB Liaison, which is a new position funded by the National Sea Grant Office, with a 1:1 federal match from NCCOS and NOAA CoastWatch and housed within the Florida Sea Grant Program at UF. The focus of her position is to improve communication, collaboration, and capacity around HAB forecasting with a goal of enhancing decision-making across the nation. The project includes 9 Sea Grant Programs, 6 IOOS Regional Associations, the two federal partners

(Rick Stumpf from NCCOS and Veronica Lance with NOAA CoastWatch), state governments and eNGOs. She is based at Mote City Island Campus.

- Neil Williams commented that we need permitting available like fireman do; they don't need a permit in order to put out a fire.
- Ralph Elliott suggested that the tentative Workshop be held prior to the next RFP being released in the Winter, so PI's have the potential to meet/align ahead of submitting proposals.
 - Dr. Crosby said we would take that into consideration when working on the timing.

Final Council Member Questions/Remarks:

- Dr. Hubbard asked how communication is being handled in a project sense.
 - Dr. Crosby stated that the Mote Communications team has been working with the PI's and that Mote also works closely with FWC.
 - Kevin added that communications have mostly been happening organically, but of course, there is room for improvement as the Initiative evolves and more Projects are producing results.
 - Dr. Hubbard mentioned that NOAA had a prevention mitigation group that could be used as an example.

Mote Marine Laboratory Aquaculture Research Park Mesocosm and Culture Lab Tour

Kevin welcomed everyone who attended in person to participate in a tour of the Red Tide Facility at MAP. He offered separate tours in the future to those who attended virtually.

Adjourned - 10:30 am

A copy of the PowerPoint Presentation can be provided by contacting Kevin Claridge at kclaridge@mote.org.

Name (Original Name)	User Email	Total Duration (Minutes)	Guest
Mote Marine Laboratory/Kevin Claridge		112	No
Kayla Bernier	kbernier@mote.org	102	Yes
Ralph Elliott		97	Yes
Dave Whiting - FDEP		95	Yes
Neil		92	Yes
	13217499172	88	Yes
Naresh Mahamuni		87	Yes
Thoram Charanda	divinewater369@comcast.net	87	Yes
Jennifer McCall		86	Yes
Don Anderson	danderson@whoi.edu	84	Yes
Delvia Lukito		76	Yes
Gavin Lau	gslau99@gmail.com	85	Yes
Shoutao Xu		76	Yes
Kelly Rein	reink@fiu.edu	85	Yes
Vijay		85	Yes
katherine hubbard		82	Yes
worke		81	Yes
Julia Darcy		75	Yes
George Philippidis	gphilippidis@usf.edu	59	Yes