

**Florida Red Tide Mitigation and Technology Development**

**Initiative Technical Advisory Council Meeting**

**Feb. 18, 2022, 9:00am-12:00pm EST**

1. Meeting Facilitation
2. Role Call and Chair Remarks
3. Red Tide Initiative Overview
4. Research Process
5. Mitigation and Technology Development Facility
6. Projects at a Glance
7. Initiative Reporting
8. 4th Request for Proposals and Webinar
9. Promising Tools and Technologies
10. Looking Ahead
11. Public and Partner Comments
12. Closing Remarks
13. Facility Tour

Date: 2/18/22

Time: 9AM – 10:37 AM EST

Location: MAP Conference Room/Zoom Meeting

Minutes Taken By: Katherine Felch

Present:

Dr. Donald Anderson	Dr. Michael Barbour	Kevin Claridge	Dr. Michael Crosby
Dr. Julia Darcy	Katherine Felch	Kelly Gallagher	Dr. Cynthia Heil
Dr. Katherine Hubbard	Steven H.	Dr. Sherry Larkin	Lizabeth Longstreet
Dr. James Powell	Dr. Dana Wetzal	David Whiting	Neil Williams

**Meeting Minutes:**

- Opening Remarks from Dr. Crosby
  - a. Welcome to MAP- Mote's 200-acre research facility that works on aquaculture, aquaponics, and coral, and red tide research
  - b. A thank you to the Governor and Legislature for their support and vision
  - c. Brief overview of what is happening at MAP

- i. tiered testing phases
    - ii. synergy of scientific concepts
    - iii. funding
    - iv. understanding hurdles and increasing communication
    - v. managing growing media and political interest
  - d. Workshop to be hosted at MAP late summer 2022 for RTI scientists and engineers
- Red Tide Initiative Overview
  - a. Signed into law by Gov. DeSantis June 2019
  - b. Partnership with Mote Marine Lab, Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute
  - c. \$18mil over 6 years contracted by FWC/FWRI to Mote
    - i. Reporting requirements: FWC Contract, TAC, and Annual Report
  - d. Intent: develop mitigation technologies and approaches to address the impacts of red tide on coastal environments and communities in Florida
  - e. General Structure:
    - i. Lab space for *Karenia brevis* culture and mesocosms
    - ii. Projects leading to red tide mitigation tools
- Tiered Research Process
  - a. Tier 1: Lab experiments and Literature search
  - b. Tier 2: Mesocosms Raceways
  - c. Tier 3: Canals/Marinas Nearshore and Offshore
- Mitigation and Technology Development Facility
  - a. Mote Aquaculture Research Park
  - b. 150K gallons treated and recirculated seawater
  - c. Tiered lab-based, large-scale research
  - d. Ecosystem-based testing of mitigation compounds in controlled setting to prep for field implementation
  - e. Do no additional health or environmental harm
  - f. No charge for facility use, culture, and assistance
- Projects at a Glance
  - a. Year 1 and 2 Project Summaries
    - i. see slides for comprehensive list
  - b. Year 3 Projects
    - i. 32 projects to date
    - ii. Dr. Crosby commented on need for quick deployment of technology to patchy blooms
    - iii. Thus far, discussions with permitting agencies have been positive
- Initiative Reporting
  - a. Every Jan 15 (starting 2021)

- b. Report containing overview of accomplishments to date and priorities for subsequent years
  - c. Sent to Governor, President of the Senate, Speaker of the House, Secretary of Environmental Protection, and Executive Director of FWC
- 4<sup>th</sup> Request for Proposals
    - a. Mote may use a portion of awarded funds to facilitate additional engagement with other pertinent marine science and technology development organizations
    - b. Open to any/all interested parties
    - c. Currently Ongoing February 11<sup>th</sup> – April 15<sup>th</sup>
    - d. Kevin Claridge hosting a webinar for the RFP February 24<sup>th</sup> at 10 AM
    - e. Partner Led Proposal Review Process:
      - i. NOAA, EPA, FWC, DEP, Universities, Estuary Programs, private consultants, Mote
    - f. Subcontracts from Mote- 50%, 25% at Interim Report, 25% at Final Report
- Red Tide Initiative Progress
    - a. 125+ potential mitigation compounds examined for tiered testing
    - b. 4 RFP's and 3 webinars
    - c. 5 TAC meetings
    - d. 70+ proposals reviewed
    - e. 25+ projects underway
    - f. 16 funded external partners
    - g. 20+ business, academic and agencies
    - h. Mitigation tools to fast track
    - i. Research Facility Constructed
    - j. Private/Federal Funding Leveraged
    - k. Public website and Technology Advisory Council Meetings
    - l. Report to Governor, Legislature, and agencies on accomplishments and priorities
- Promising Mitigation Tools
    - a. Dr. Dana Wetzel presented on Biological Manipulation of Red Tide – Nature vs Nature
      - i. 6 kinds of algicidal treatments on *K. brevis* with 100% mortality within 5 minutes
    - b. Steven from Prescott Clean Water presented on Ozonix
      - i. Technology used for bacterial control on oil and gas sites for 20 years
      - ii. Collaboration with Mote allowed for testing on *K. brevis*, very effective at reducing brevetoxin and cell concentration
      - iii. Focusing on live animal testing, potential deployment, and nutrient reduction
      - iv. Data show 60-93% reduction in nitrate and phosphorus
      - v. May be used in Indian River Lagoon
    - c. Dr. Cynthia Heil presented on Curcumin testing
      - i. Other than for human health, curcumin (an extract of turmeric root), is used in fish aquaculture for larval growth
      - ii. Within 24 hours brevetoxin greatly reduced
      - iii. Many other applications for *K. brevis* transform toxin into Pb-Tx-2 or Pb-Tx-3
        - 1. Benefit of curcumin is that it depletes brevetoxin without transforming it

- iv. Moving into mesocosm testing March 2022
  - d. Dr. Cynthia Heil presented on QUATs
    - i. Used for cyanobacterial remediation but new for use on flagellates
    - ii. QUATs can adhere to a surface and be removed when done
    - iii. Data show reduction in toxins and cells within 24 hours
    - iv. Moving into mesocosm testing March 2022
  - e. Dr. Julia Darcy from AxNano presented on RemRx CRP
    - i. RemRx CRP was developed for groundwater remediation
    - ii. Benefit of this technology is a delivery of active ingredient over time vs shock to the system
    - iii. Found that oxidant most effective at 20 mg/L in tier 1 testing
    - iv. Mesocosm testing conducted in February 2022
      - 1. Data show decrease in cell concentration over 72 hours
    - v. Seeking to develop business strategy and understand path to market via 25 stakeholder interviews to date
      - 1. Everyone looks to DEP, FWC, and Mote for guidance
  - f. Neil Williams from nTec Solutions presented on UV-C LEDs
    - i. UV-C testing began at Florida International University
    - ii. UV-C LEDs developed and found that at high power setting decimated *K. brevis* cells
    - iii. Looking at power required in low power setting and amount of time in mesocosm testing
    - iv. For field deployment, potentially could use a trolley with solar panels
    - v. Steve from Prescott commented that many RTI projects are complementary and would be willing to work together in utilizing same deployment device for various technologies
    - vi. Dave Whiting commented that in the summer workshop will need to dedicate time specifically for logistics and help with regulatory aspects
- Red Tide Initiative – Looking Ahead
  - a. Oceans Day in Tallahassee
  - b. Submitted Governors Report in January
  - c. 4<sup>th</sup> RFP subawards June/July
  - d. 2022 Fall TAC meeting
  - e. MAP workshop planned for late summer 2022
  - f. Gulf of Mexico Conference April 25-28 Baton Rouge, LA
  - g. 2022 11<sup>th</sup> US Symposium on Harmful Algae Oct 23-28 Albany, NY
- Public Comments
  - a. Dr. Katherine Hubbard asked about the process for considering scalability/economic feasibility of technologies
    - i. Dr. Crosby replied that these discussions are in early stages and expertise will be needed not only on deployment but the cost of deployment
  - b. Dr. Katherine Hubbard also asked whether the RFP process will become more specialized as this 4<sup>th</sup> RFP remains broad

- i. Dr. Crosby answered that yes, the RFP will narrow down and the allocation of funds will shift to scalability in coming years
  - c. From Dr. Hubbard chat comment – “As you consider the RFP process, will there also be mechanisms for long-term studies and/or studies that allow the project teams to work together (these might require increased funding per project). Yet another follow up – I know that I have requested prioritization of longer-term studies and evaluation previously; I just wanted to mention this again at the halfway point, as this multi-year initiative presents unique opportunities for this type of effort.”
  - d. Dr. Larkin commented that in considering scalability will need to ask for cost of production as well as deliverables
  - e. Dr. Larkin also commented that the project-based website pages could use links to the other projects in order for efforts to progress and succeed
  - f. From Dr. Larkin - In considering the parallel hurdles of scalability and economic feasibility, will always need to keep in mind the unknown effects of mitigation technologies to the environment
  - g. Dave Whiting asked about the grant process with municipalities wanting to use mitigation technologies
    - i. Dr. Crosby replied that discussion is needed with agencies but that Mote is likely not going to be the answer; hoping to enhance or grow business enterprises but will need funding
  - h. Dr. Michael Barbour asked for guidance for the technical review panel on how to fund existing projects vs taking on new projects in the 4<sup>th</sup> RFP
    - i. Dr. Crosby replied that some projects will be off-ramped because the RTI needs deliverables and deployable technology
    - ii. Dr. Barbour commented that newly funded projects would need to be completed within the next 3 years
    - iii. Dr. Crosby responded that we can expect more effort to be put into engineering and logistics, while keeping the door open to new ideas
- Red Tide Mitigation and Technology Development Facility Tour