Florida Red Tide Mitigation and Technology Development Initiative

Harmful Algal Bloom Task Force Meeting

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HAB Task Force Meeting

- Overview
- Progress
- Technical Advisory Council
- Mesocosm/Culture Lab Facility
- Mote Led Projects
- Partner Led Projects
- Q&A

HAB Task Force Consensus Document #1: Recommendation: Research

We recommend that the state support enhanced and sustained ocean observations to improve forecasts and expand management options, development of an ensemble of red tide models, creation of technologies for detecting blooms and their impacts in real time, and research into mitigation and control of algal blooms at various spatial scales.

Red Tide Initiative Overview

- Signed into law in June 2019
  - 379.2273 Florida Statutes
  - Mote partnership with FWC FWRI
- $18M over 6 yrs ($3M/yr)
- Legislative intent:
  - develop **prevention, control, and mitigation** technologies and approaches to address the impacts of red tide on coastal environments and communities in Florida

Red Tide Initiative Progress

- Administrative Structure
  - Mote Staffing, FWC Contract and Invoicing
- Three Parts
  - Mesocosm and Culture Facilities
  - Mote Led Projects
    - Year 1 well underway despite COVID-19 hurdles
    - Year 2 selected
  - Partner Led Projects
    - Two Request For Proposals and Two Webinars
      - Year 1 subcontracted and underway
      - Year 2 closes June 30

- Outreach
  - press releases, speaking events, conferences, meetings, forums, partner newsletters, webinars, agency websites, and the Mote Red Tide Initiative website
- Technical Advisory Council Meetings
  - Two meetings on Jan 17th and April 3rd
  - Presentations and Minutes on Mote Red Tide Initiative website

Technical Advisory Council

Dr. Michael P. Crosby, Chair – Mote President & CEO

Dr. James Powell – House Speaker Appt

Dr. James Sullivan – Senate President Appt

Dr. Katherine Hubbard – FWC Appt

David Whiting – DEP Appt

Governor Appointee Pending

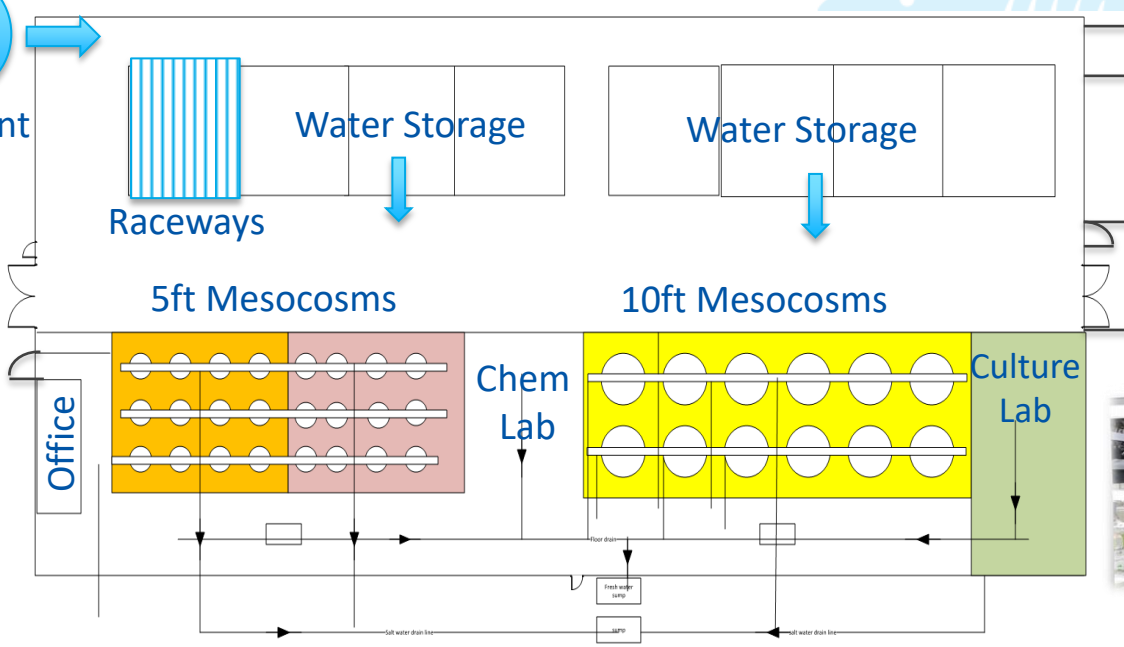
Next Meeting Sept 2020

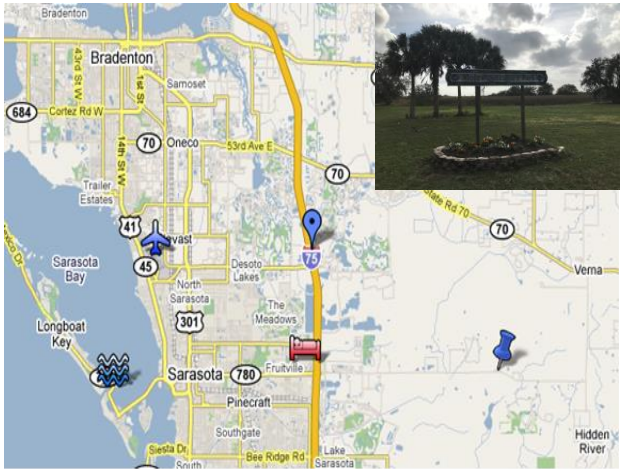
Mesocosm/Culture Lab Facility

- Provide multi-scale, multi-user red tide research infrastructure for Initiative scientists
- Mesocosm ecosystem-based (species, water quality, etc.) testing of mitigation compounds in a controlled setting
- Consistent production of large volumes of *K. brevis*

Bay Water

Treatment

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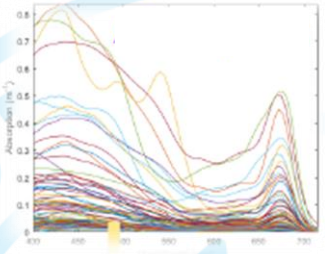
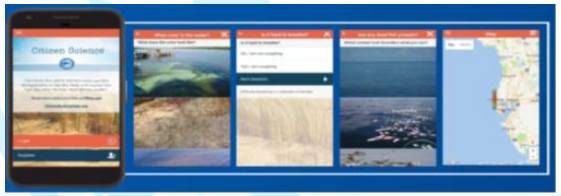
Mote Led Projects

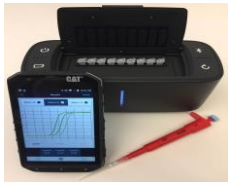


- **Programmable Hyperspectral Seawater Scanner (PHySS)**
  - Instrument to aid in the mitigation of red tide through early detection
  - Develop a phytoplankton spectral library

- **UAV-based Red Tide Detection System**
  - Airborne hyperspectral sensors for mapping of HABs
  - Conduct shore-based flights in local waters
  - Collect hyperspectral data, develop data processing scheme, instrument calibration and deliver proof-of-concept



- **Beach Condition Reporting System (BCRS)**
  - Reporting in hands of the pubic, businesses, and fisherman
  - Update/combine the BCRS with the Citizen Science is Cool App
- **User-friendly, smart phone integrated qPCR technology**
  - Development and validation of hand-held qPCR based *K. brevis* for integration into Citizen Science program



Mote Led Projects

- **Tiered approach to investigate to identify the most effective and ecologically sound products for red tide mitigation/control**
  - Lab-scale >>> Mesocosm-scale >>> Field application
- **Efficacy of Products:**
  - Macro and Micro Algal Allelopathy Studies
  - Chemical Products
  - Clay flocculation
- **Real-time nanotechnology for rapid brevetoxin detection in commercially important shellfish**
  - Leveraging NOAA funded work to identify antibodies for development of a rapid shellfish biosensor
- **Evaluation of Quaternary Ammonium Compounds**
  - Examine efficacy of 2 different QUATs previously used on HABs suitable for marine environments

Tier-1 Lab studies

Tier-2 Mesocosm- scale

Tier-3
Field application

Partner Led Projects

- Request For Proposals - open to any/all interested parties
- $1+ Million in Year 1 and Year 2 each
  - Support not to exceed 1 year, may extend in subsequent RFP's
- Proposal guidelines and proposal submission:
  - Mote.org
  - Webinars to advertise RFP and answer questions
  - Year 2 due June 30 to proposals@redtidemtdi.org (Lots of Interest!)
- Use of Mote facilities/infrastructure is encouraged
- Partner Led Proposal Review Process:
  - Diverse set of PhD level expertise from NOAA, EPA, FWC, DEP, Universities, Estuary Programs, and Mote
  - Each scientist reviews 3-5 proposals using provided questionnaire
  - Additional Non-Conflicted Mote Scientist Review
  - Presented to Technical Advisory Council
  - Final decision by Mote President & CEO

Year 1 Partner Led Projects

1. **Dr. Kathryn J. Coyne, University of Delaware: *Optimizing production of a dinoflagellate–specific algicide for control of Karenia brevis***
   - Identify algicidal amines (and risks) that have the greatest impact on *K brevis*

2. **Dr. Allen Place, University of Maryland: *Pushing Karenia Over the Edge with Beer Derived Flavonoids***
   - Impacts on *K brevis* cell growth and brevetoxin

3. **Dr. Vijay John, Tulane University: *A Thin Shroud with Integrated Algaecide to Flocculate and Sink Karenia brevis***
   - Lab and mesocosm flocculation and targeted algicide delivery

4. **Dr. Don Anderson, Woods Hole Oceanographic Institute: *Fate and Effects of Karenia brevis Cells, Toxins, and Nutrients Following Clay Application for Bloom Control***
   - *Long-term impact of K brevis, toxins, metals, benthic, and nutrients removed after clay application*

5. **Dr. Michael Parsons, Florida Gulf Coast University: *Examining the Feasibility of Removing and Composting Fish Carcasses to Mitigate Red Tide***
   - Quantify fish kill nutrients, cost/benefit analysis of fish removal, and evaluate composting dead fish

Thank You!

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