

Mote Examples

- Florida Red Tide Mitigation and Technology Development Initiative
- United States Harmful Algal Bloom Control Technologies Incubator
- Florida Seagrass Restoration Technology Development Initiative



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Initiatives/Incubators as Catalysts for Advancing Applied Science

City of Holmes Beach Clean Water Committee

Kevin Claridge
Vice President, Mote Marine Laboratory
February 14, 2024



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Florida Red Tide Mitigation and Technology Development Initiative



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Incubator/Accelerators/Initiatives

- Relatively Time Certain for Results
 - Statute or Funding Limited
- Targeted Objective
 - Field Deployment
 - Preparation for Next Step/Funding
 - Accountability Reporting
 - Public Perception
- Opportunity to Springboard off Existing Info/Partners
 - Published Literature
 - Recharge/Introduce Collaborators
- Government Managed vs. Contracted Effort
- Important to understand all the puzzle pieces early!

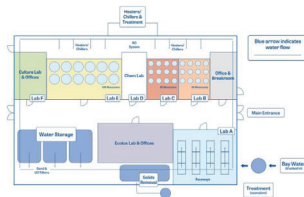


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Mitigation and Technology Development Facility

- Mote Aquaculture Research Park
- 150K gallons treated and recirculated seawater from the bay
- Tiered safe setting research through lab-based, large-scale 5ft and 10ft mesocosms, and raceways
- Ecotoxicology Lab
- Large volumes of *Karenia brevis*
- Ecosystem-based testing of mitigation compounds in a controlled setting to prepare for field implementation
- Enhanced air treatment, PPE provided, and air testing for toxins
- Do no additional health or environmental harm
- No charge for facility use, culture, and assistance as part of Initiative
- Boom and Linnocorrals available



Research Mesocosms



Research Raceways



Red Tide Culture



Facility Grand Opening



Partnership Signage



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Florida Red Tide Initiative Overview

- Signed by Florida Governor in June 2019
 - 379.2273 Florida Statutes
 - Mote partnership with Florida Fish and Wildlife Conservation Commission, Research Institute
- \$18 million over 6 years (\$3 million per year)
 - In Year 5, Sunsets March 2025
- Numerous Reporting Requirements
- Legislative Intent:
 - develop mitigation technologies and approaches to address the impacts of red tide on coastal environments and communities in Florida
- General Structure:
 - Lab space, *Karenia brevis* culture, raceways and mesocosms for:
 - Projects leading to red tide mitigation tools
- Initiative and Beyond
 - Regulatory Oversight
 - Field Implementation



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Tiered Research Process



----- US HAB Incubator Funding -----

----- Other Funding -----

----- NOAA: Phase I -----

----- Phase II -----

----- Phase III -----

Florida: Tier 1

Tier 2

Tier 3

Tier 4

Laboratory Experiments & Literature Search



- Effects on the Cells and Toxins in the Lab
- Previous International Use
- Existing Regulatory Approvals

Mesocosms, Raceways & Collaborations



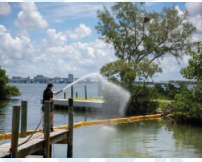
- Effective with Natural Communities
- Ecological Impacts
- Human Health Concerns
- Logistical Issues
- Economically Feasible

Canals/Marinas Linnocorrals/Boom Nearshore/Offshore



- Pilot Studies
- Field Demonstrations
- Federal/State/Local Regulatory Approvals
- Engineering Needed
- Public Interactions

Commercialize Monitor



- Customers
- Intellectual Property
- Efficiency Scaling
- State/Local Budgets
- Deployment Contractors

Initiative Reporting

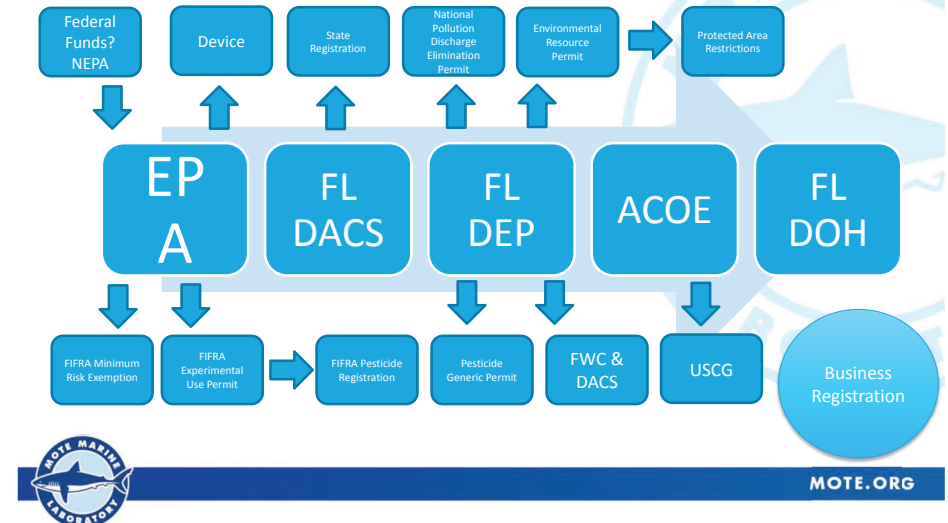
- **379.2273(2)(d) Florida Statutes:**
 - Beginning January 15, 2021, and each January 15 thereafter until its expiration, the initiative shall submit a report that contains an overview of its accomplishments to date and priorities for subsequent years to the Governor, the President of the Senate, the 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**
 - Technical and Financial
 - Regular partnership interactions
- **Project Interim and Final Reports**
 - Required by subaward contracts from Mote
- **Mote Red Tide Initiative Website**
 - Technology Advisory Council Presentations and Minutes
 - Regular Updates
 - Project Summaries



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Florida Harmful Algal Bloom Pilot Field Testing Regulatory Oversight



Red Tide Initiative – Looking Ahead

- Year 6 Field Deployment Funding
- Fall 2024 TAC Meeting
- Build Off Workshops
 - Deployment/Monitoring
 - Scalability
 - Economic Feasibility
 - Permitting/Compliance
- 2024 Workshop: Field Implementation
- Field Data, Monitoring, and Product Improvement
- US HAB Control Technologies Incubator
- DEP Innovative Technologies Grant Program
- Pending Legislation

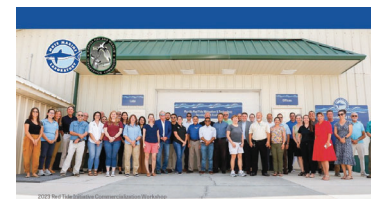


2022 Workshop



2023 Workshop

Red Tide Initiative Progress



ACCOMPLISHMENTS AND PRIORITIES REPORT JANUARY 2024

Red tides, or red tide harmful algal blooms, are a higher-than-normal concentration of microscopic algae that occur in oceans and coastal waters. Red tides in Florida have been documented since the 1900's and their likely impacts date back to records from Spanish explorers. In Florida, the toxin-producing *Karenia brevis* is the species causing most red tides. These blooms can have a variety of effects on life, lead to massive fish kills, cause human respiratory problems, close beaches, and detrimentally impact shellfish, fishing, hotel, restaurant, recreational, and tourism industries. This report is being provided to meet the requirement of 379.227(2)(4) Florida Statute, which states: "Beginning January 15, 2021, and each January 15 thereafter until its expiration (2025), 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."

MITIGATING RED TIDE IMPACTS FOR FLORIDA
The Florida Red Tide Mitigation and Technology Development Initiative is a partnership between Mote Marine Laboratory (MML) and the Florida Fish and Wildlife Conservation Commission (FWC) codified under 379.227(2)(4) Florida Statute that establishes an independent and coordinated effort among public and private research entities to develop prevention, control and mitigation technologies and approaches that will decrease the impacts of Florida red tide on the environment, economy and quality of life in Florida.

- ✓ 300+ Potential Mitigation Compounds Examined for Tiered Testing
- ✓ 5 Request For Proposals
- ✓ 7 Technology Advisory Council Meetings
- ✓ 100+ Proposals Reviewed
- ✓ 35+ Projects Underway or Completed
- ✓ Research Facility Constructed
- ✓ Private/Federal Funding Leveraged
- ✓ Public Website
- ✓ 2 Science to Commercialization Workshops
- ✓ 4 Reports to Governor, Legislature, and Agencies on Accomplishments/Priorities
- ✓ Approximately a dozen promising tools and technologies for field implementation

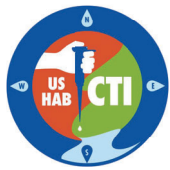
Available on Mote's Red Tide Initiative Website



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US HAB Control Technologies Incubator (US HAB CTI)

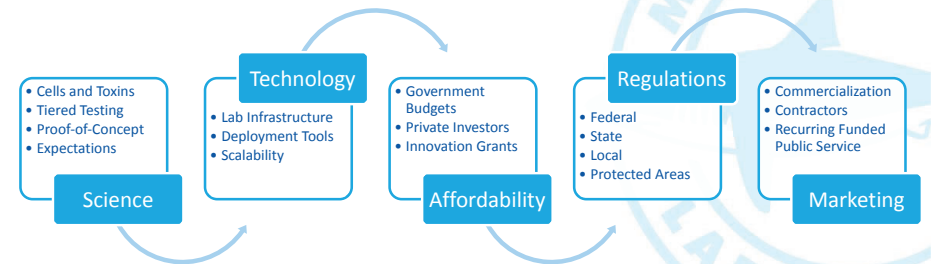
- 5 years with option to add 5 more years
- Partners:
 - National Oceanic and Atmospheric Administration
 - University of Maryland, Institute of Marine and Environmental Technology
 - Mote Marine Laboratory



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HAB Mitigation Science, Technology, Economics, or Regulations, Which Comes First?



All at the Same Time!



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US HAB CTI Objective

- Fund US extramural lab/tank-based proof of concept, innovative **freshwater and marine** HAB control tool and technology projects to assess their **real-world feasibility**
- Development and implementation of **scalable, environmentally acceptable, cost-effective** HAB control strategies
- Provide guidance to end users and stakeholders on **navigating the relevant licensing and permitting processes** via a Clearinghouse Website

Archive tool and technology project data for

resource management community



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US Harmful Algal Bloom Control Technologies Incubator



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Seagrass Initiative Overview

- Signed into law by Florida Governor DeSantis in July 2023
 - 403.93344 Florida Statutes
 - Partnership with DEP and UF
- \$10 million over 5 years contracted by DEP to Mote
- Legislative intent:
 - establish a collaborative and coordinated effort among public and private research entities to develop restoration technologies and approaches to address the loss of seagrass and the cascading ecological and economic impacts of that loss to communities in this state
 - department shall award funds specifically appropriated by the Legislature for the initiative to Mote Marine Laboratory, which shall function as the lead administrative component to achieve the goals of the initiative
 - initiative shall leverage state-appropriated funds with additional funds from private and federal sources
 - Mote Marine Laboratory and the University of Florida shall create a 10-year Florida Seagrass Restoration Plan to implement tools and technologies developed under the initiative



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US HAB CTI Progress



Year 1: 2023

Jan 31: Letter of Intent (65 Received - 11 Encouraged, 22 Maybe)
April 10: Full Proposals (25 Received)
June: Award Notifications (Total \$1M, not exceeding \$200K/ea.)
Sept 1: 1st Year Project Period Started

Year 2: 2024

Jan 9: Hosted Webinar
Feb 5: Letter of Intent Closed
April 15: Full Proposals Due
Sept 1: 2nd Year Project Period Starts

*Increased International collaborations

- GlobalHAB International Workshop on Solution to Control HABs in Marine and Estuarine Waters
- US, Asia, South America Writing Workshop for Call To Action and HAB Control Method Review

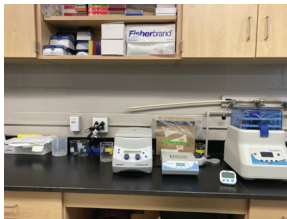


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Initiative Partner: University of Florida

- Department of Soil, Water, and Ecosystem Sciences
- Coastal and Marine Ecology Laboratory
- Dr. Laura Reynolds, Assistant Professor Coastal Ecology
- Genetics Lab for Seagrass Initiative



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Florida Seagrass Restoration Technology Development Initiative



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Initiative Reporting Requirements

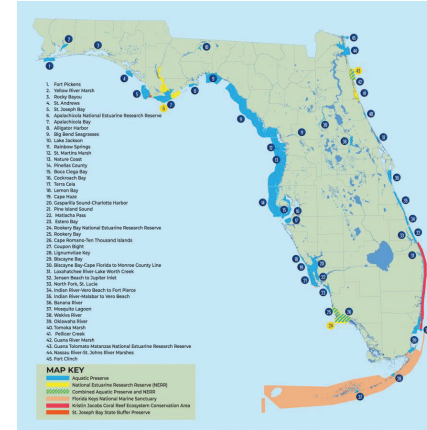
- Beginning **January 15, 2024**, and each January 15 thereafter until its expiration, **the initiative shall submit a report that contains an overview of its accomplishments** to date and priorities for subsequent years to the Governor, the President of the Senate, the Speaker of the House of Representatives, the Secretary of Environmental Protection, and the executive director of the Fish and Wildlife Conservation Commission.
- DEP Contract Technical and Financial Reports
- Public Website
- TAC Meetings – FAR, Presentations, Public Comments and Minutes
- Public Records



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Initiative Partner: DEP Aquatic Preserve Program



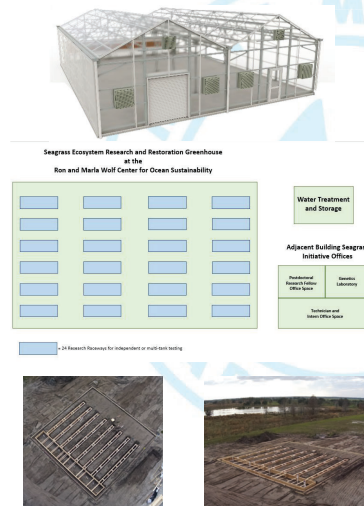
- Aquatic Preserve Act
 - 258.35-258.46 F.S.
 - “Ensure continuation of natural conditions of aesthetic, biological and scientific value”
- 42 Statewide Preserves
- 2.6 Million Acres
- Place-Based Experts on:
 - Natural resources, ecological trends, stressors, research conducted/underway, recreational uses, partners, stakeholders, etc.



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Initiative Research Infrastructure

- Provide multi-user seagrass research infrastructure for Initiative scientists
- Free of charge for Initiative projects
- Seagrass education and outreach
- Test variety of field stressors (e.g. temperature, clarity, light, salinity, nutrients, pH) in a controlled setting
- Assist determination of resilient seagrass genotypes
- Hold diversity of genotypes and ecotypes for research
- Additional raceway locations coming on-line soon in Florida Keys



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Seagrass Initiative Progress



- ✓ Administrative Structure
- ✓ Scientific Partners/Staff
- ✓ State Contract Drafted
- ✓ Launched Website
- ✓ Technology Advisory Council
- ✓ Request For Proposals
- ✓ Annual Report
- ✓ Greenhouse Infrastructure
- ✓ Genetics Lab Equipment
- ✓ Leveraged Funding



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Request For Proposal Priorities

- Year 1 of the Initiative will focus on:
 - examining the **genetic diversity of seagrass populations** and associated field stressors across Florida;
 - developing a **genetic library** of Florida seagrass;
 - **testing the resilience** of different statewide seagrass populations to multiple environmental stressors in controlled lab and nursery settings;
 - **examine existing seagrass restoration technologies** and/or conduct planning efforts and pursue regulatory approval for testing novel seagrass restoration technologies;
 - **organizing and encouraging collaboration** among the scientists and restoration practitioners working on Florida seagrass genetics to achieve the goals of the Initiative (this will be partially accomplished through this RFP, the Initiative Technology Advisory Council, and a forthcoming Initiative Workshop).



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Initiative Research Engagement

- 403.93344(3)(C)(1): Mote Marine Laboratory may, with the concurrence of the department, use a portion of the awarded funds to facilitate additional engagement with other pertinent marine science and technology development organizations in this state and around the world to pursue applied research and technology for the successful restoration of seagrass ecosystems.



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Request For Partner Research Proposals

- Open to any/all interested parties
- In accordance with Florida Sunshine and Public Record Laws
- Anticipated grant funding in year one is \$1M+
 - Likely \$50-\$250K for each grant, 4-8 organizations
 - Support not to exceed 1 year
 - may request longer in second year RFP
 - No Match Required
- Proposal guidelines/timelines:
 - Mote.org and proposals@seagrassinitiative.org
 - Opened December 1, 2023
 - Closed January 31, 2024
 - Notification of Awards in March 2024
 - Contracting in April 2024
 - Project Period May/June 2024 to May/June 2025
- Core infrastructure developed at Mote for projects
- Use of Mote facilities/infrastructure is free of charge
- Collaboration with Initiative Partners encouraged not required
- Proposal Reviewer Scientists:
 - DEP, UF, and Mote scientists
 - Each scientist will review proposals using provided questionnaire
 - Project updates will be provided during TAC meetings for comments/recommendations
- Projects will generally receive 50% of the awarded funds upon contract execution
 - 25% upon approval of the Interim Report
 - 25% upon approval of the Final Report



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