Red Tide Mitigation & Technology Development Initiative
Technology Advisory Council Public Meeting

January 16, 2026 9:00am-1:00pm EST

To Join Zoom:

https://us06web.zoom.us/j/84112119562?pwd=RS2oM9xyIJmxbCwkGhGPJVUKFxlAak.1

This meeting is open to the public.

1. Welcome
2. Technical Checks and Council Role Call
3. Agenda Overview
4. Review of previous Technology Advisory Council meetings
5. Initiative Reporting
6. Initiative Research Progress
7. Project Updates
    a. Cindy Heil- “Scientific Liaison”
    b. Andy Eggebrecht/Cameron Morris- “Emerge/Simeon Global”
    c. Jessica Frost- “Efficacy of Lake Guard Oxy Against *Karenia brevis* Development”
    d. Steve McKenzie- “Innovative Use of Advance Oxidation, Nanobubble-Cavitation for Rapid Deployment”
    e. Dana Wetzel- “Natural Compound Control and Mitigation for Red Tide Blooms"
    f. David Spiers- “Non-toxic Biodegradable Formulation for Mitigation of Red Tide Cells and Toxins”
    g. Don Anderson- “Field application of a modified clay for Karenia brevis bloom control”
8. Public Comments

Florida Red Tide Mitigation and Technology Development Initiative
Technology Advisory Council Public Webinar– January 16th, 2026 9:00 am-1:00 pm EST

In Attendance: Dr. Michael P. Crosby, Dr. Katherine Hubbard, Dr. Kathleen Rein, David Whiting, Kevin Claridge, Lizabeth Longstreet, & see additional Attendee List included at the end of these meeting minutes.

Presenters: Kevin Claridge, Dr. Cynthia Heil, Andy Eggebrecht, Cameron Morris, Dr. Jessica Frost, Steve McKenzie, Dr. Dana Wetzel, David Spiers, Dr. Don Anderson

Meeting Minutes:

Welcome, Webinar Meeting Logistics, & Agenda Overview

- Kevin Claridge welcomes the TAC members and presenters and reviewed the agenda
- TAC role call:
    - Dr. Kathleen Rein- Present
    - Dr. Katherine Hubbard- Present
    - Dave Whiting- Present
    - Dr. Michael Crosby- Absent; joining later

Red Tide Initiative Overview and TAC Requirements

- Mote continues testing in Year 7 of the Initiative focused on deployment
- Mote is looking at all the steps involved with producing a mitigation product, including lab research, regulatory steps, intellectual property, deployment, community engagement, etc
- TAC role and requirements in statute- to provide recommendations to Mote on the Initiative
- Florida Sunshine Law
- Florida Administrative Register notice- posted on January 2, 2026
- Meeting Minutes
- Tiered testing- Tier 1 (literature review and lab research), tier 2 (mesocosm, raceways), tier 3 (nearshore pilot testing), tier 4 (commercialization)
    - HAB-CTI utilizes tier 1 and 2 while Initiative spans tiers 1-4
- Red Tide Initiative Facility
- Regulatory Agencies and Permitting of mitigation products
    - New box for regulatory fees and intellectual property

- Red Tide Initiative Progress
    - Accomplishments and Priorities Report posted January 15, 2026
    - Next workshop June 11-12, 2026
- Partners
- List of current projects ready for Tier 3 (field) testing
- Looking Ahead
- US HAB Control Technologies Incubator
    - Clearinghouse under development to provide information on regulations and permitting concerning HAB mitigation
    - Received 40+ LOIs for 2026
    - Projects cover variety of harmful algal blooms around the U.S.
    - Hired Clearinghouse Coordinator position to further develop website

<u>Dr. Cindy Heil- Scientific Liaison</u>

- The role of the scientific liaison is to provide synthesis of research projects
- Dr. Heil has extensive background in HAB research and is funded under numerous grant programs
- Primary focus has been to develop protocols for Tier 3 deployment testing which includes a long list of considerations
- Developed case scenarios to adapt testing to canals, bays, and open water including specified sampling stations and timepoints
- Assembled a broad range of monitoring parameters from Tier 1 and 2 testing and suggestions from reviewers to include in deployment testing and finalized a list for tier 3
- All data recorded during deployment testing is recorded in the LIMs system
- Success of red tide mitigation involves science, performance, and economic/socio-economic based metrics
- Current plans are to complete one deployment per month, one deployment already occurred in November.

<u>TAC Comments for Scientific Liaison</u>

- Kate- Did you consider the tidal stage and the spatial scale of the sampling to determine efficacy?
- Cindy- Tide was a consideration in the November deployment but we did learn that our control station needed to be a little further away. We do consider tides, area and depths for each deployment. We will also use a drifter for the next deployment to monitor water movement.

- Kate- Wind is also important and knowing the general direction. There are wind models that show that wind is very impactful in bays.
- Cindy- We also look at the wind and is the reason we delayed the first deployment.
- Dave- Surprised Mote is using the LIMs system, is yours optimized for your projects and is there a way to do the analytical analyses?
- Cindy- We currently use it for NELAC work so it was already familiar with the teams and easy to use. Will have to follow up with Dr Emily Hall, but can move data over to a different system. Cindy willing to discuss with Dave on other systems.
- Kelly- Do you have a standardized protocol that your using during deployments for nontarget species like higher organisms and invertebrates?
- Cindy- The list of parameters does include other organisms including PAM to look at other phytoplankton. We considered protocols for higher organisms but the limit is time, expertise, and money. Tier 2 already looked at some of the invertebrates, but we do have manatee/vertebrate observer for deployments. It would be nice to do a full benthic study but we are limited in what's currently possible.
- Dr Crosby- want to provide a few general comments due to late attendance
    - The Initiative was intended as a 6-year Initiative and Mote has developed a basic toolbox and met the goals of the Initiative however we were not ready to deploy mitigation products at the end of the 6 years and there was much more work to be done to understand tier 3 and 4- specifically how do we deploy products and monitor effectiveness of mitigation products
    - Need to move away from identifying "new" compounds and focus more on deployment and not "doing greater harm than red tide"
    - The Initiative had a late start to the new year of funding but we are caught up now and projects are underway for tier 3 and 4
    - Mote is also working with many partners across the world and the Initiative is a model for HAB mitigation, specifically for the HABCTI, Australia, Chile, California.
- Kelly- Permitting is so complicated and filling the knowledge gap is necessary, but sounds like you needed someone to fill that position yesterday. Were the funding delays part of why you just hired?
- Kevin- We had a consultant helping us under the Red Tide Initiative but the position we mentioned earlier was largely for the federal HABCTI program to fill the Clearinghouse position. This hasn't impacted the Initiative progress.
- Dr Crosby- The leveraging and partnerships are key to the success of the Initiative
- Kate- Following up on Kelly's comment on the different trophic levels, there was guidance from the HAB Task Force, but it would be good to map out the protocol of what we could do to monitor organisms in the future
- Dr Crosby- Does FWC or DEP already have these protocols that we could utilize?

- Kate- The diversity of treatments and ecosystems make it unique so existing protocols may not cover all aspects. It's hard to do but there needs to be some coordination between agencies and the working group
- Cindy- We are sampling up to a week, beyond that it's logistically hard. But we should have some way to monitor.
- Dave- Moving from pilot to full scale mitigation in freshwater systems, we noticed that its very difficult to analyze effectiveness when there's new biomass consistently coming in to the treatment area
- Dr Crosby- We can employ advancements in AI to model HAB biomass movement in a mitigation treatment area to address this. It will take advanced technology to answer some of these questions.
- Heil- We are doing single deployments but we are discussing if we need to reapply in future deployments.

<u>Andy Eggebrecht/Cameron Morris- Emerge/Simeon Global</u>

- Andy is the president and founder of Emerge Marine which is a marine emergency response company. Assisting the Initiative with deployments and scalability.
- Developed a spreader system for the granular product Lake Guard Oxy to provide dependable application rate and location of product
- Utilized a Gandy sprayer mounted on a barge and the MV Guardian to assist with application of product to analysis of results
- Cameron Morris is the owner of Simeon Global Consulting firm and have a lot of experience in emergency response
- Red tide bloom response mirrored response to hurricanes and Covid, so requires a lot of federal and state coordination
- Developed a playbook with lessons learned that can be handed over to state agency to provide protocols and information on deployments/mitigation. Will continue to update as Initiative progresses.
- Playbook provides framework for best practices for different mitigation products in different scenarios
- Now developing protocol for liquid product for next deployment

<u>TAC comments for Emerge/SGC</u>

- Dr Crosby- Your work is spot on to help us deliver these mitigation products and protocols to fruition and we thank you for your assistance and your in-kind contributions

- Kate- This presentation gives us a great start on how to map out tier 4 and incorporating the economic decisions and business model into the playbook would be helpful
- Andy- The economics are being considered although we didn't touch on it today.

Dr. Jessica Frost- Lake Guard Oxy

- Bluegreen has tested Lake Guard Oxy- a floating granular hydrogen peroxide product-on *Karenia brevis* over the las couple years
- Data from tier 1 show by 4 hours *Karenia brevis* was completely eliminated at 36ppm
- Tier 2 showed by 24 hours 100% removal of cells and 80% reduction of toxins
- Also tested clams and urchins and showed no mortalities from the product
- Looked at migratory behavior of *Karenia* because it is a swimming organism and again found complete elimination of cells
- Conducted tier 3 deployment in Sapphire Shores in Sarasota on November 12, 2025
- Utilized Emerge's boats to deploy product and analyze water samples
- Phytoplankton results showed an initial reduction in normal phytoplankton numbers however there was a rebound later on
- There was a slight increase in hydrogen peroxide after deployment but at day 7 there were significant increases. Suggestions for this change include the drastic temperature difference over the 7 days and metabolic activity.
- In terms of other wildlife monitoring, there were no impacts observed, but Blue Green does have a portfolio of previous EPA testing on a variety of wildlife.

TAC comments for Lake Guard Oxy

- Kate- *Karenia* has a diel cycle, so are you consistently starting experiment during beginning of light cycle and how that translates to field?
- Jessica- Start time is usually 8-9am and that was consistent across tiers and cultures were in exponential phase
- Kate- Just want to note its important to consider in experiments as cells, toxins, and vertical migration will be impacted by the diel cycle
- Jessica- We try our best to be consistent in consideration of this
- Kate- Are you looking at bulk chlorophyll or other metrics of biomass?
- Jessica- Bulk chlorophyll is being tested but data is not yet available
- Kate- How was the concentration of the product determined?
- Jessica- Don't need to do acre feet because product is floating on the surface, but the product does dissolve so converted to acre feet with 1 foot depth to get the 36ppm dose

Steve Mckenzie- Ozonix

- Prescott has been testing Ozonix on red tide over the past five years
- Ozonix uses 4 technologies: hydrodynamic cavitation, ozone, acoustic cavitation, and electrochemical oxidation
- The technology is housed in a trailer with an inflow/outflow pipe to treat the water
- Ozone is the only regulated technology of the four so they removed ozone from the equation and still got good results with only compressed air, however this would've limited where the technology can be deployed, so they added ozone back in and received state permits to be allowed to deploy
- The trailer needed to be modified to be deployed on a barge, which Prescott and Emerge worked on together to prepare for a real deployment
- Plan to deploy Ozonix in San Carlos Bay the week of Jan 19th, but this is more logistical than real research as without bloom water the technology won't create as much ozone discharge
- With Emerge's technology they were able to track the deployment transect on the dry run and plan to utilize this during the deployment next week
- Some considerations Prescott wants to address in the future are what triggers a deployment, what defines success, and how do jurisdictions impact deployment with a moving bloom.
- The Ozonix equipment should be used in highly contaminated waters

TAC comments for Ozonix

- Kate- Glad we are incorporating ocean drifter to monitor currents because it's a dynamic area. How do you control for pulling in the same water multiple times?
- Steve- There's a minimum spread of 75 feet between intake and discharge pipes and as long as your moving forward you should be able to avoid this. You will see differences in water quality and ORP if you start taking in the same water.

Dr. Dana Wetzel- Clear

- Created a pathway for developing red tide algicide over the past 5 years which resulted in the Clear product
- Clear is a minimum risk pesticide
- Conducted a deployment in February 2025 during a red tide bloom in Venice, FL
- Saw a 60-80% reduction in *Karenia* cells and 30-60% in toxins, but very local results
- In the future, plan to deploy Clear below the surface and have been working with Emerge on this to develop an application device

- Clear is designed to be deployed in defined, localized areas with blooms
- Next steps include developing protocols for applying clear in different environments and anticipate deployment in coordination with Emerge

TAC comments for Clear

- Kate- Can you touch more on how the different formulations of Clear are targeted for each species?
- Dana- The inert ingredients are different which allow the product to be more effective on target species. Species-specific differences like armored cells or lipid protein layers that make certain species more resistant to the treatment can be targeted
- Kate- It would be important to look at chlorophyll. If you have methods pointed towards different functional groups then it's important to look at what happened to the other phytoplankton groups.
- Dana- Now that we have field protocols we can look at these.

David Spiers and Dr. Jennifer Toyoda- Xtreme

- Xtreme is a liquid product that is plant-derived and considered EPA minimum risk
- Heartland has conducted a few tier 3 studies, most recently in Venice FL in February 2025 during a red tide bloom
- Sampling occurred at 1- and 2-hrs post treatment at four stations and monitored for cell counts and toxins
- Deployment helped to define field protocols
- Xtreme dosing was based on total volume of water in the canal
- Cell concentrations varied across stations and results showed increase in abnormal cells that are indicative of product impacts
- Incoming tide did impact data so points out the importance of considering physical parameters when conducting deployments
- Xtreme was also tested on clams to look at toxins within tissues and depuration. Found that the Xtreme treatment prevented toxin accumulation in the clams
- The next deployment is planned for February and plans are underway to either apply in the FL panhandle during an active bloom or Tampa Bay. Deployment parameters and logistics will vary depending on the site selection.
- Ecotoxicology can also test other pollutants during these deployments
- Heartland is ready with product and distribution for these deployments

TAC comments for Xtreme

- Kate- Have you considered testing sediment in the field?

- Jennifer- We have done some sediment toxin studies in the lab but have not planned for the field
- Kate- It would be good to track toxin changes over time and any benthic impacts/resuspension. If you deploy again, will you integrate caged shellfish? Which would allow you to compare to your mesocosm studies, but would want there to be a bloom present.
- Jennifer- Would love to incorporate seagrass and shellfish studies
- Kate- Going back to abnormal cells, are you considering them viable or dead?
- Jennifer- We count abnormal cells as viable but the portion of abnormal cells helps us determine the trend in decline of cells
- David- Want to highlight some other applications. Xtreme also shown to be effective against the bird flu.

Dr. Don Anderson- Clay

- Have been testing the dispersal of clay for many years, its currently used internationally for bloom mitigation
- Completed tiers 1 and 2 using two different formulations of clay GCO3.5 and MCII
- Initial results using the MCII clay showed 95% reduction in cells but didn't decrease toxins, but with the addition of GCO clay the toxins were significantly reduced
- Applied for permits to apply GCO in the field and were approved for 5 sites in southwest Florida, but no bloom has been present
- Additional tests were conducted to look at the deposition of clay which was equivalent to addition of 2-3 sugar packets over a square meter. These results have been submitted to permitting agencies to acquire a statewide permit to be able to apply where a bloom occurs, rather than the 5 permitted sites.
- A field deployment will be conducted whether or not a bloom occurs to finalize this project

TAC comments for Clay

- Kate- Some treatments are surface application but clay is a sinking treatment, so would be interesting to do proof of concept studies to combat *Karenia* movement/diel processes?
- Don- Clays have ability to create a net to capture cells and have potential to remove cells throughout the water column. Need more data to do modeling and we would need to measure vertical distribution of cells before treatment

Public comments

- Kate- The discussions about vertical and diel migration are important and it would be good to include these considerations into the sampling plans. I want to commend the integration of in-situ tools for deployment and excited to see the results. Overall, its hard to know what future deployments will look like and if we will treat the same areas, or if we will use different methods so something to consider. It would also be good to have more information on how sites are selected.
- Liz- We will have to discuss with the internal groups on best ways to address those items.

Attendee List:

Dave Whiting
Kevin Claridge
Kate Hubbard
Cassandra Berntsen
Kelly Rein
Andy Eggebrecht
Jessica Frost
Don Anderson
Steve McKenzie
Jordan Martin
Cameron Morris
Cynthia Heil
Dail Laughinghouse
Sherry Larkin
Jake Siciliano
Meghan Abbott
Jessica Moretto
David Spiers
Dr. M. Crosby
Jennifer Toyoda
Dana Wetzel
Martina Rutti
Lizabeth Longstreet
Amber Bankes