



## Florida Red Tide Mitigation and Technology Development Initiative

The Florida Red Tide Mitigation and Technology Development Initiative, led by Mote Marine Laboratory, advances prevention, control, and mitigation technologies to reduce the impacts of Florida red tide. Since launching in 2019, the Initiative has funded more than 50 external partners, supported over 40 projects, and evaluated hundreds of potential mitigation compounds and technologies. Rigorous laboratory studies—including testing on representative coastal species—have identified several tools suitable for field evaluation.

Four projects have secured the required federal and state permits for pilot studies in Florida waters:

1. **CLEAR** - a plant-based, GRAS-certified biocide developed by Mote's Environmental Laboratory for Forensics.
2. **Xtreme** - a natural, non-toxic water treatment product developed by Heartland Energy Group.
3. **Lake Guard Oxy** - a sodium-percarbonate based product developed by Bluegreen Water Technologies.
4. **Ozonix** - a chemical-free water treatment system developed by Prescott Clean water Technologies that uses cavitation, ozone, and electrochemical processes.

*\*All four products demonstrated 100% elimination of Karenia cells between 1-24 hours during mesocosm experiments. See below.*

Since early 2025, Mote has conducted three field deployments: (1) Clear and Xtreme were applied on February 14th in red tide–impacted canals in Venice, Florida; (2) Lake Guard Oxy was applied on November 12th in the waters adjacent to Sapphire Shores Park in Sarasota, Florida; and (3) a logistical deployment of the Ozonix technology was conducted in December near Fort Myers, Florida. The February deployment coincided with an active bloom, enabling assessment of impacts on *K. brevis* cell concentrations and toxin levels. The subsequent, non-bloom deployments focused on logistics, protocol refinement, and improving readiness for future mitigation events.

Currently, CLEAR and Xtreme are approved for statewide use, while Ozonix and Lake Guard Oxy hold site-specific permits. Continued field research is necessary to understand how environmental conditions influence performance and to evaluate environmental effects. Additional deployments are planned throughout 2026.

Please see <https://mote.org/research/centers-of-excellence/red-tide-initiative/> for more information or contact Kevin Claridge at [KClaridge@mote.org](mailto:KClaridge@mote.org).



Efficacy of Products in Mesocosm Experiments:

Lake Guard Oxy: Application of LakeGuard ®Oxy Product at 36 mg/L was effective for the removal of K. brevis cells, with an 84.4% reduction in cell concentration at 3 hours and a 100% at 24 hours observed

Xtreme: Mesocosm results show that a 25 ppm dose of Xtreme product was able to eliminate 90 % of K. brevis cells within 4 hours, and 100% within 24 hours.

Ozonix: Lab studies show that Karenia cells were 100% eliminated as they pass through the water treatment system, and with the addition of modular processes such as ozone, the technology can also remove brevetoxins by 100% under 1 hour depending on dosage.

Clear: Mesocosm results show 100% mortality of Karenia cells within 15 minutes of applying Clear.

| <b>Parameters for Tier 2/Mesocosm Testing</b>           |
|---|
| Karenia brevis  |
| KB cell counts  |
| Brevetoxin concentrations in water (BTX-1, -2, -3, -B5) |
| Brevetoxin and metabolites in animal tissues            |
| <b>Water Quality</b>                                    |
| Temperature   |
| Salinity  |
| pH  |
| Dissolved Oxygen  |
| Turbidity   |
| TSS   |
| PAR or light attenuation                                |
| <b>Nutrients/Chemistry</b>                              |
| Dissolved: nitrate-nitrite, ammonia, orthophosphate     |
| Total: phosphorus, Nitrogen                             |
| Particulate: carbon, nitrogen, phosphorus               |
| silica  |
| CDOM  |
| dissolved organic carbon                                |
| total dissolved inorganic carbon                        |
| total alkalinity  |
| <b>Biology (species)</b>                                |
| hard clam   |
| blue crab   |
| sea urchin  |
| shrimp  |
| killifish   |
| phytoplankton community                                 |
| <b>Biology (impacts)</b>                                |
| mortality   |
| respiration   |
| behavior  |