

DinoSHIELD: A Natural Approach to Control Red Tide

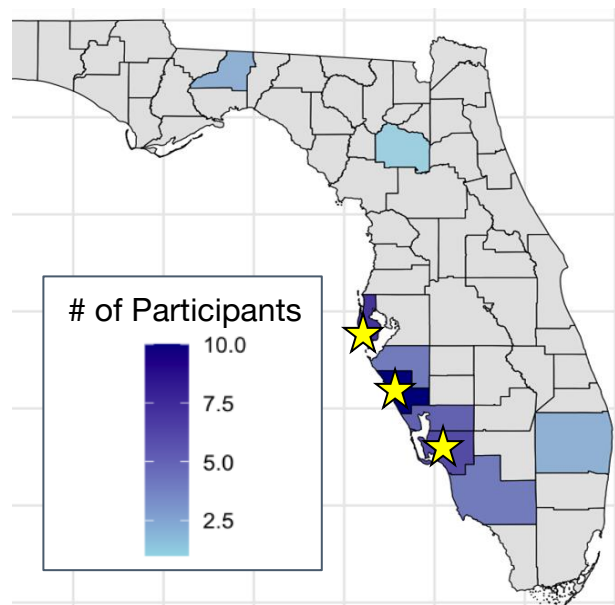
August 2024 Workshop Series: Summary of Actionable Feedback

DinoSHIELD is a red-tide specific harmful algal bloom (HAB) control technology which relies on a naturally occurring algicidal bacterium (*Shewanella* sp. IRI 160) embedded within a safe, non-toxic hydrogel. Through this combination, **DinoSHIELD** effectively limits the growth of harmful **Dino**flagellates, including those causing red tide, and **SHIELDs** the ecosystem from their negative impacts.

In August 2024, we hosted six, small-group workshops across three locations in southwest Florida on the research and development of DinoSHIELD. Workshops were targeted to southwest Florida red tide experts.

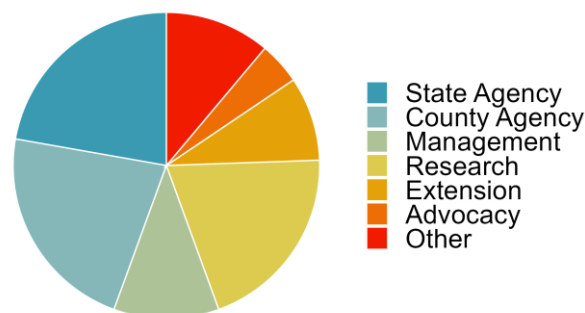
Workshop Goals

- **Establish and build connections** to foster mutual trust between researchers and DinoSHIELD end-users.
- **Identify research gaps** to enhance understanding of DinoSHIELD, strengthen confidence in the research process, and ensure its safety and sustainability.
- **Educate local experts** on DinoSHIELD to build community trust in the technology and garner support for future use in management programs.



Map of **participants' primary location of employment**. A total of 41 red tide experts attended, primarily from southwest Florida, with some statewide officials also represented.

We held **6** Workshops at **3** SW Florida Locations with **7** DinoSHIELD Researchers and a total of **41** Workshop Participants. During which **30,000** DinoSHIELD beads were produced!



Workshop participants **self-identified affiliations**. Workshops were targeted to red tide technical experts including state, county, and local resource managers; researchers; and conservationists.

An Environmentally Safe Strategy to Manage Red Tide

Each workshop consisted of:

- **Technical presentations** from DinoSHIELD researchers on the development of DinoSHIELD and scientific next steps.
- **Hands-on demonstrations** of technologies used to monitor the effectiveness of HAB control strategies, DinoSHIELD bead production, and an example of field deployment.
- **Listening sessions** to facilitate open dialogue between DinoSHIELD researchers and red tide technical experts.
- **Pre-and Post-workshop surveys** to quantitatively assess participants understanding of red tide controls and provide anonymous feedback on the DinoSHIELD technology.

Workshops were intentionally limited to less than 15 participants to facilitate candid discussions and open dialogue.

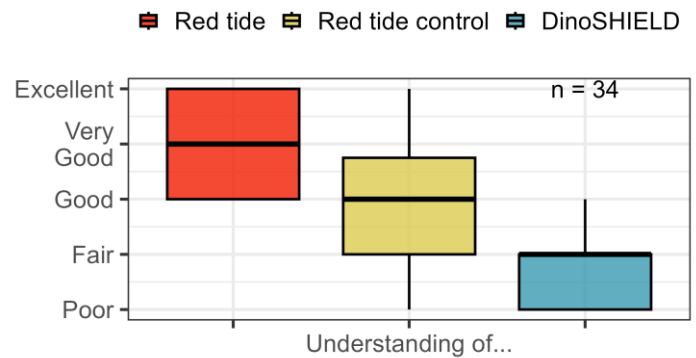
“This really won me over from being skeptical of the technology to being excited to see what the technology can do in the field.”



Keeping YOU Informed

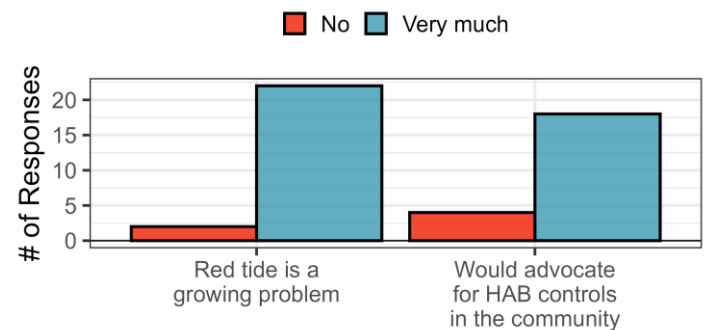
As the DinoSHIELD technology continues to develop, we are **committed to keeping YOU informed and incorporating your feedback into ongoing DinoSHIELD research**. The questions and comments from the listening sessions and post-workshop surveys, will guide on-going DinoSHIELD research as we move towards full-scale permitting and commercialization.

Pre-workshop Understanding



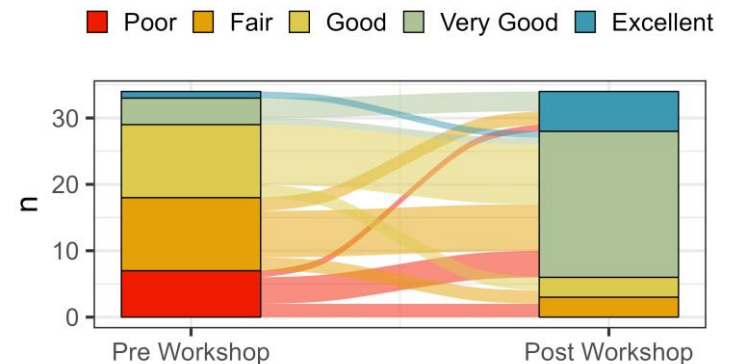
Pre-workshop surveys showed southwest Florida red tide experts were **already familiar with the impacts of red tide**, but had less understanding of red tide control methods, **and were least aware of the DinoSHIELD technology prior to the workshops**.

Pre-workshop Beliefs



Despite limited understanding of red tide control methods, participants were **highly supportive of using HAB controls in their communities**.

Level of Comfort



Following the workshops, participants were **more comfortable using DinoSHIELD** as a potential red tide control strategy in southwest Florida.

Removable, Slow-Release Strategy for HAB Mitigation

Incorporating YOUR feedback into DinoSHIELD R&D

Short-term Research Goals

Field demonstration in SW Florida, red tide impaired waters
Pending bloom conditions; local and federal permitting; and
research infrastructure

Long-term Research Goals

Identify methods to recharge
and recycle DinoSHIELDS

Working towards technology transition

Investigate algicide release
from DinoSHIELDS

Quantify stability & degradation
of DinoSHIELD

Investigate biodegradable materials
for DinoSHIELD deployment

“Love the work, initiative, + passion. It [DinoSHIELD] has great potential. Maybe we could test in our lab or elsewhere in our jurisdiction.”



Future DinoSHIELD Updates

- **Spring 2025:** Research update and recent publication summary
- **Summer 2025:** Updated web-presence for a ‘one-stop shop’ of DinoSHIELD information
- **Field Campaign:** Information, talking points, and FAQs to provide to the red tide technical community
- **Summer 2026:** Host workshop series for diverse stakeholders

The combination of small-group workshops plus surveys were vital to quantitatively and qualitatively assess the receptiveness of southwest Florida red tide experts to this novel, biological HAB control strategy. **By providing multiple opportunities for feedback, we were able to identify actionable next steps for DinoSHIELD research and development based on YOUR feedback and questions.**

Learn More About DinoSHIELD!

Find more information about DinoSHIELD on our current [project webpage](#), including a [factsheet](#) and [introductory video](#).

For more information about the projects leading to the DinoSHIELD technology, see the project summaries from [2010](#) & [2015](#) funded via NOAA NCCOS’s [Prevention, Control, and Mitigation of HABs Program](#).

Peer-reviewed publications, to-date, on the DinoSHIELD technology can be found in:

Algicidal Efficacy: Hare et al. [2005](#); Pokrzywinski et al. [2012](#); Wang & Coyne [2022](#)

Cell Mechanism: Tilney et al. [2014a](#); Pokrzywinski et al. [2017a](#), [2017b](#); Wang & Coyne [2023](#)

Toxicology: Tilney et al. [2014b](#); Ternon et al. [2018](#); Simons et al. [2021](#)

Technology Development: Wang & Coyne [2020](#); Fernando et al. [2024](#)

