

The S. T. A. R. Project (Shellfish Thresholds, Aquaculture Resilience)



What is this project all about?

Coastal acidification and its associated co-stressors present a serious and credible threat to the success of both shellfish aquaculture and restoration in the Chesapeake Bay (CB).

Recent research provides a clearer understanding of the physiological sensitivity of different valuable shellfish species to ocean acidification (OA), but we still lack a basic understanding of how vulnerability differs across the range of shellfish-reliant stakeholders, specifically oyster & clam growers, watermen, state managers, and coastal restoration managers.

This basic knowledge gap motivates this Regional Vulnerability Assessment (RVA) in the Chesapeake Bay, which aims to: (1) assess the vulnerability of the oyster & clam aquaculture industry and oyster restoration to OA and other co-stressors, and (2) produce the information required by regional communities to aid in adaptation to these stressors.

Who is involved in the project?

The project team is led by Marjy Friedrichs at VIMS and is made up of VIMS researchers and outreach staff along with Oregon State University researchers (who have performed similar vulnerability assessments on the West Coast) and our NOAA Chesapeake Bay office partner. See Table 1. for the complete list of project team members

What partners are providing guidance?

The project has an Advisory Panel made up of stakeholders from Virginia and Maryland including state management agency staff, industry (aquaculture and public fishery), non-governmental organizations and restoration groups, and Federal restoration partners. See Table 2. for the current list. The Panel has helped to identify thresholds, or key limits that would impact oyster fishery/ restoration viability. These thresholds have been built into the map tool. The Panel is also assisting in identifying key stakeholders/groups and opportunities for gathering stakeholder input via the map tool. As this is a stakeholder-led process, we will continue to meet with the Panel to improve our OA mapping decision tool as well as our general research approach.

What is the OA mapping decision tool?

The mapping tool as the basis for observing and modeling water quality stressor impacts on shellfish in the CB. The map tool will improve over time, and our beta version has geo-spatial shellfish harvest data (Va only so far) and modeled environmental conditions. What we are ready to do now is ask shellfish growers and restoration managers to build into the map observational data from their experience. These could be positive or negative, such as an unusually high spat set to a significant mortality event. All of the observational

information coupled with the modeled water quality data will provide a tool useful for assessing the vulnerability of shellfish in CB.

What is the field component of the project?

The project team will be taking the mapping tool into the field and meeting up with as many shellfish stakeholders as possible to build observations of OA and other stressor impacts on shellfish in the CB. Meetings with growers and restoration managers will take place in a variety of ways including in person and virtual; group sessions and one-on-one. The project team is looking to build the observational portion of the map and will be flexible to ensure we maximize stakeholder participation.

What do you want from shellfish growers and restoration managers?

We are asking shellfish growers and restoration managers to provide observational data from their experience. We want stakeholders to use the map tool to identify unexpected changes witnessed in shellfish production (when, where and suspected cause). These changes could be good or bad and include things like production failures/success, die-offs/survival of cultured or wild animals, growth, etc. This information will be collected interactively by dropping pins directly onto a GIS-map and providing the information when prompted. All of the observational information coupled with the modeled water quality data will provide a tool useful for assessing the vulnerability of shellfish in CB.

What about confidentiality?

The project team is sensitive to the fact that growers might be hesitant to document specific events in association with their lease. The information input into the map will be kept behind the scenes and the public-facing map will only include generic summaries of information. No information will be tagged or identified to leases or companies.

Table 1. S.T.A.R. Project Team

Virginia Institute of Marine Science (VIMS)

- [Marjorie Friedrichs](#), Lead PI, Research Professor. Quantifying historical and future impacts of climate and land-use changes on hypoxia, acidification, and biogeochemistry in coastal and estuarine systems.
- [Emily Rivest](#), Assistant Professor. Global change biology and the intersection between physiological stress tolerance and environmental exposure.
- [Mark Brush](#), Associate Professor. Systems ecology and modeling.
- [Pierre St-Laurent](#), Associate Research Scientist. Biogeochemical Circulation Ocean Modeling
- [Karen Hudson](#), Shellfish Aquaculture Specialist. Outreach and Extension

Oregon State University

- [David Wrathall](#), Associate Professor. Risk and resilience studies; climate change adaptation; human migration; and political ecology.
- [Brian Katz](#), Research Assistant. GIS Analyst, Web cartographer

National Oceanic and Atmospheric Administration (NOAA)

- Bruce Vogt, Ecosystem Science Manager, NOAA Chesapeake Bay Office. Ecosystem Science and Synthesis

Table 2. S.T.A.R. Advisory Panel

Name	Affiliation	State	Focus
State Management			
Andrew Button	VMRC	VA	Restoration & aquaculture
Jody Baxter & Mitch Tarnowski	MDNR	MD	Restoration
NGO-restoration			
Chris Moore	CBF	VA	Restoration
Allison Colden	CBF	MD	Restoration
Bo Lusk	TNC	VA	Restoration & aquaculture- Eastern Shore (Bay/ Seaside)
Academia/Economics			
Scott Knoche	MSU	MD	Economics - MD
Federal Management			
Julie – Reichert-Nguyen	EPA/NOAA/ USGS CPB		
Industry –Private Fishery			
AJ Erskine	Cowart Seafood Corp. Bevens Oyster Co.	VA	Aquaculture – extensive & intensive
Bruce Vogt (Sr)	Vogt Oyster Co.	VA	Aquaculture – intensive (surface culture)