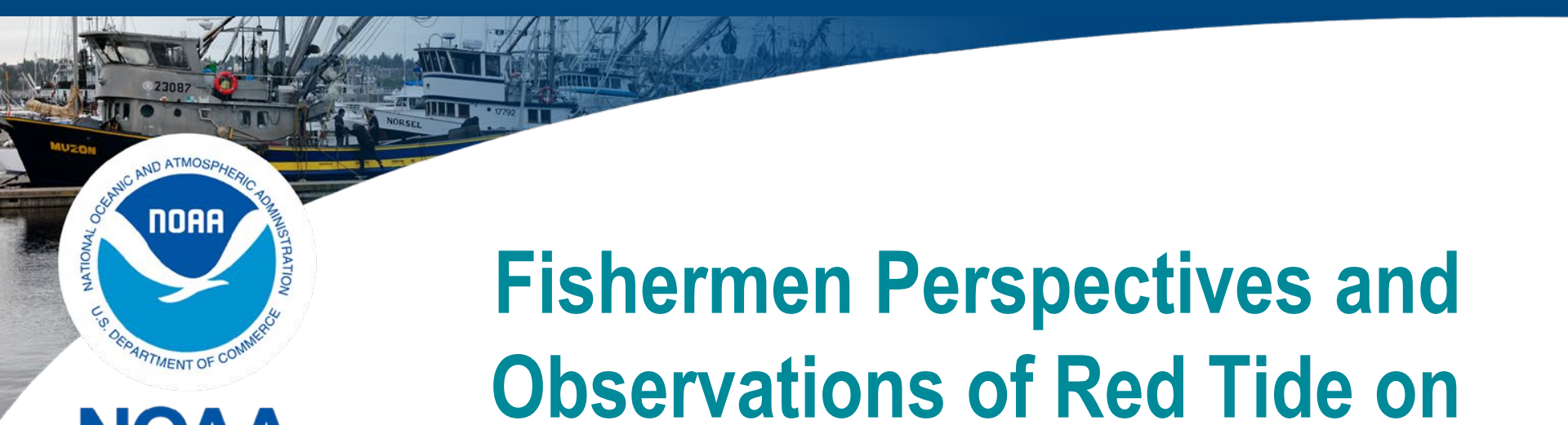


NOAA FISHERIES

Fishermen Perspectives and Observations of Red Tide on the West Florida Shelf

Matt McPherson, Mandy Karnauskas
NOAA Southeast Fishery Science Center

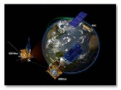
Harmful Algal Bloom Task Force Meeting
Thursday, October 8, 2020

Who we are

Department of Commerce

NOAA

- National Weather Service
- National Environmental Satellite Data & Information Service



- Oceanic & Atmospheric Research
  - Atlantic Oceanographic and Meteorological Laboratory

Chris Kelble

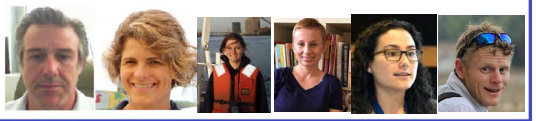
- National Ocean Service
  - National Centers for Coastal Ocean Science

Quay Dortch
Richard Stumpf

- Office of Marine and Aviation Operations
  - Southeast Regional Office

Mike Jepson

- National Marine Fisheries Service
  - Southeast Fisheries Science Center

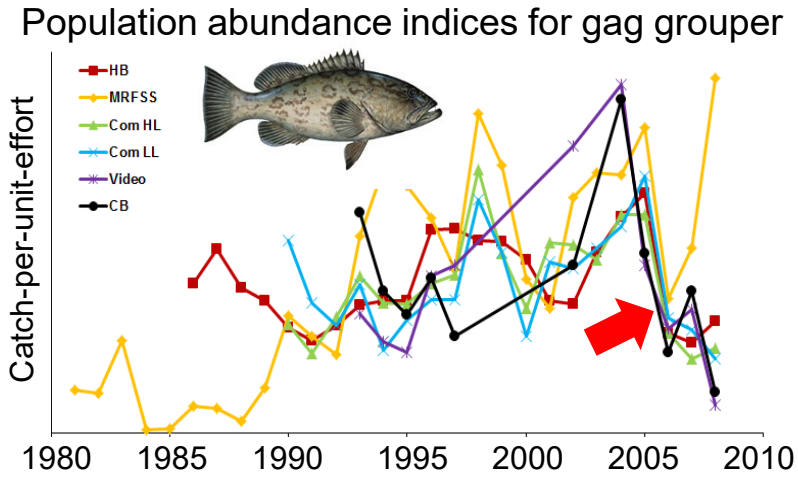


Skyler Sagarese
Suzana Blake
Adyan Rios
John Walter

Why NOAA Fisheries is involved in HABs

Our mandates:

- Magnuson-Stevens Act
- Endangered Species Act
- Marine Mammal Protection Act



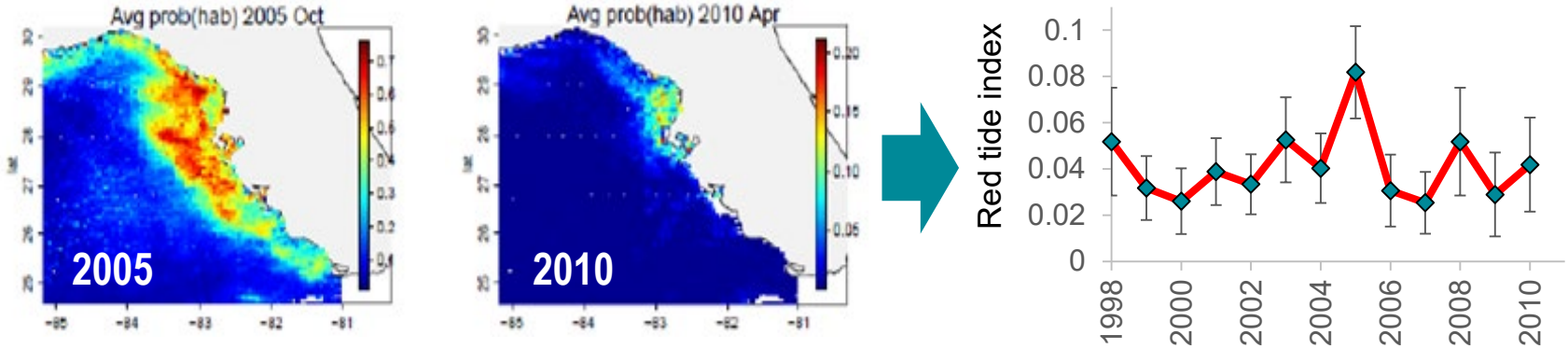
Issues:

- Major events kill ~30% of some fish stocks, linked to marine mammal Unusual Mortality Events, impacts listed species
- Pressure from stakeholders to address external drivers impacting economically important species
- Moving to more holistic management, e.g., ecosystem-based fisheries management (EBFM)

Ecosystem-based fisheries management

EBFM requires us to account for and manage in light of factors other than fishing that impact stocks

- Red tide index developed and used in stock assessment models which guide management



Walter et al. 2013

- More recent work has focused on how red tide impacts not only **fish**, but **fishery**

Local knowledge offers unique perspective

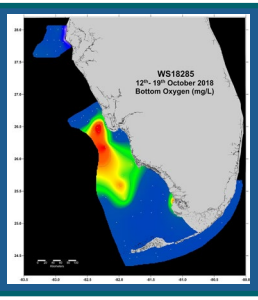
Fishermen are on the water every day and have decades of experience observing red tide events

- Intimate knowledge of red tide impacts on ecosystems and society
- Direct observations on what factors may reduce red tide severity
- Source of novel hypotheses on red tide ecology
- Increased potential for real-time monitoring to fill key information gaps

What can we contribute to the Task Force?

SEFSC research efforts → HAB Task Force mandates

Rapid response and research



Incorporating local knowledge

Coordinated monitoring effort

The HAB Task Force will prioritize and recommend:

- "actions to reduce excess loads of nutrients…developed in collaboration with…stakeholders"
- "improvements to current policies and procedures that prevent or mitigate the impacts of HABs on…ecosystem sustainability, economic viability…"
- "enhancements to communication, coordination, cooperation, and collaboration among stakeholders…"
- "strategic research into the biology and ecology of species creating HABs; detection, tracking, modeling, and prediction of blooms…"

https://myfwc.com/research/redtide/taskforce/

Incorporating local knowledge - methods

- 62 oral histories & mapping
- snowball sampling method
- commercial and for-hire fishermen

Goals:

- How has red tide varied in time and space?
- What have been the impacts of red tides on fish populations, habitats, fisheries, fishing businesses and communities?
- How have fishermen and fishing businesses adapted to red tide?

Fishermen perspectives – general themes

Red tide typically discussed in the context of larger water quality issues

- Other phytoplankton blooms (e.g., yellow, brown water), darkwater events
- Low oxygen areas
- Red tide events themselves have a range of characteristics

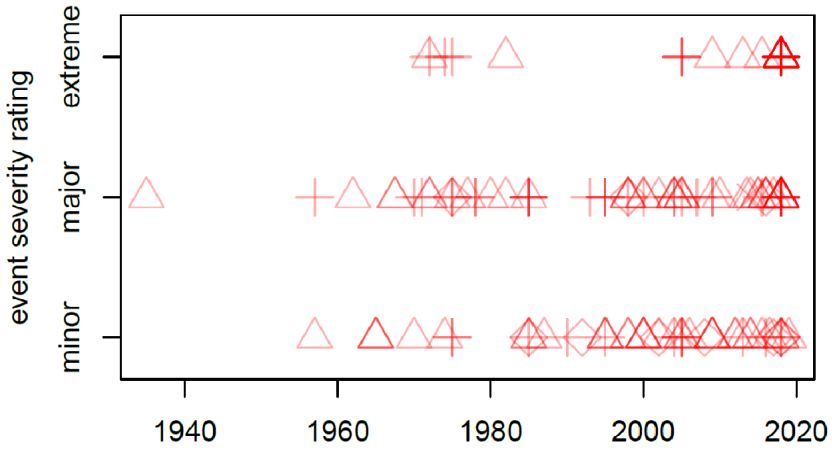
"I've never seen dolphins and manatees and turtles die in this kind of rate. There's something in there that come off this one. If it's red tide, I want to know if it's red tide to be honest with you. It was something bad. It killed the coral. It killed everything offshore where my traps are. There's nothing alive on the bottom. Nothing, no clams, no coral, no starfish, no sea urchins." (Pine Island stone crabber, in reference to 2018 event)

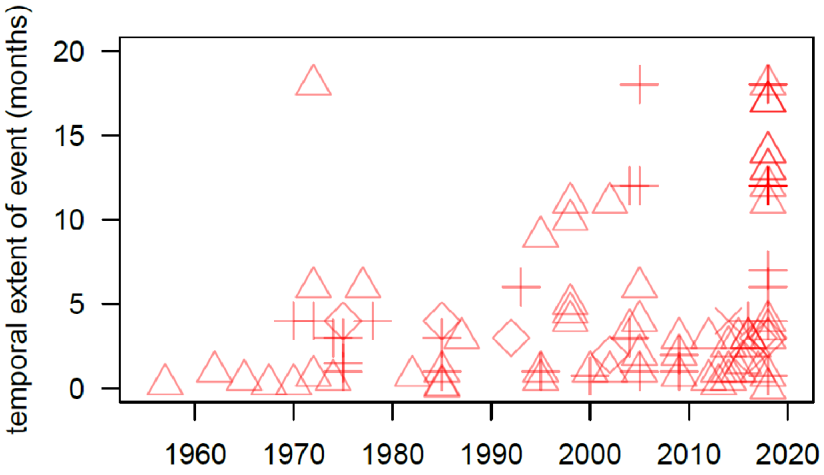
Perceived as a commonly-occurring, natural part of the ecosystem, but many concerns about blooms becoming exacerbated by human factors

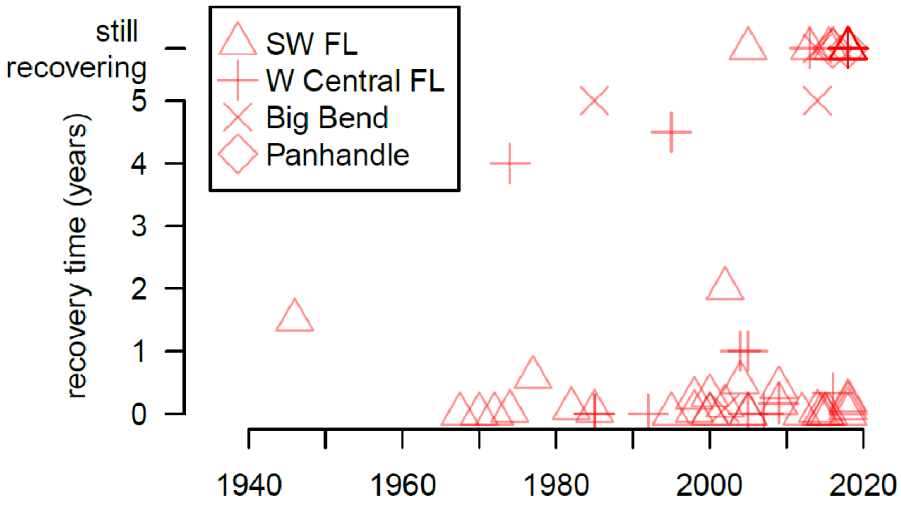
"I think that red tide is 100% confirmed as a natural blooming thing. It is however, definitely accelerated and fed by human beings." (Sarasota fisherman)

Fishermen perspectives – trends

Red tide events generally perceived to be increasing in severity, temporal extent, and ecosystem recovery time







Fishermen perspectives - ecological impacts

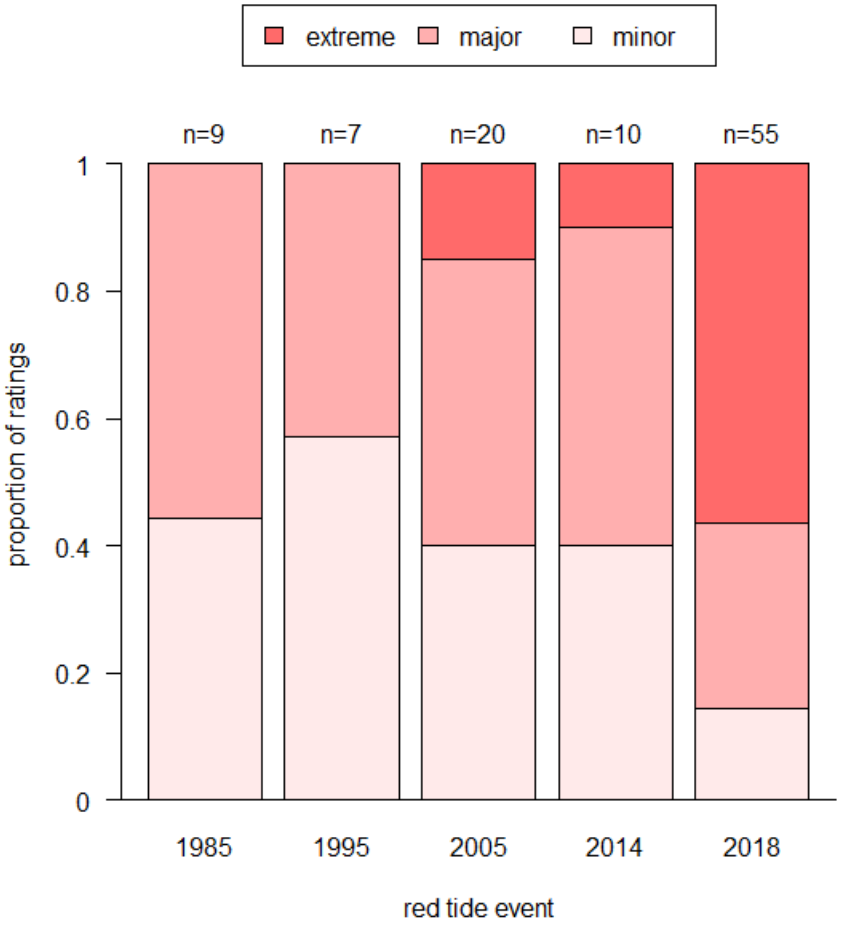


Figure 1. Years with significant red tide events identified by 10 or more interviewees.

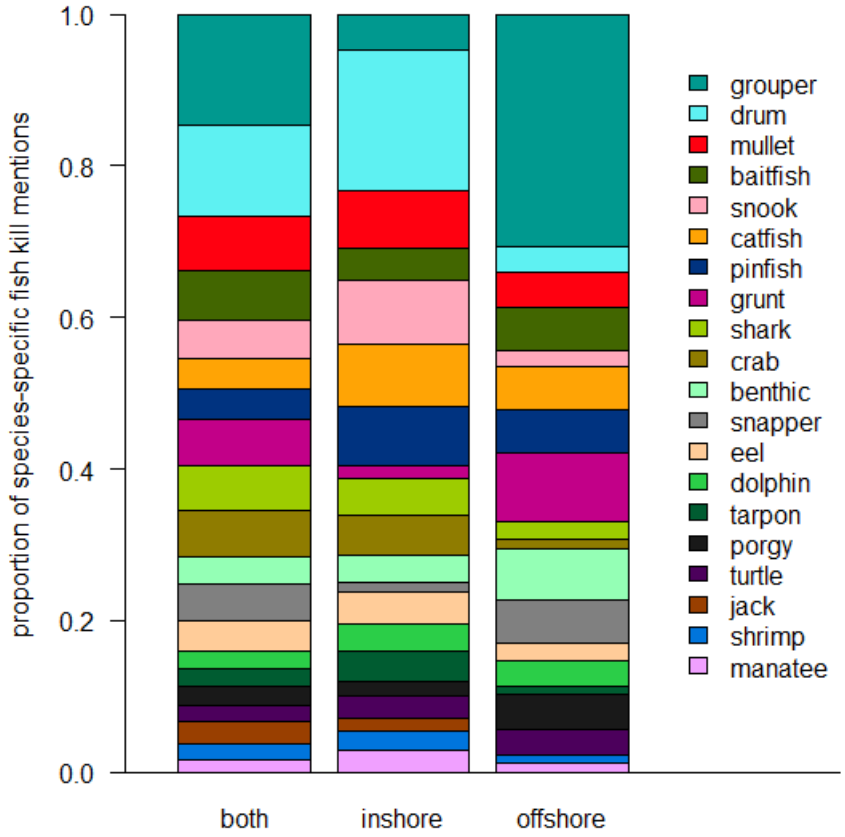


Figure 2. Relative frequency of interviewee mentions of species that are observed to be affected by red tide.

Fishermen perspectives – socioeconomic concerns

Broad concern about health affects and impacts

"During the season I was constantly coughing and phlegmy just a lot more than normal. It was not good and I'm pretty sure most of us were affected." (fisherman from Naples, 2018 event)

Broad concerns about lingering impact of negative publicity on local tourism

"The media blew it so far out, it about wiped out the charter boat fishermen last year." (fisherman from Ft. Myers Beach, 2018 event)

"The news did a good job of telling the red tide was here, but didn't say much when it was gone." (fisherman from Sarasota, 2018 event)

Uncertainty about how quickly the habitat and fisheries will recover is a major decision factor for fishermen

Fishermen perspectives – business impacts

Adaptation to Typical Events

- Fish around patchy blooms
- Extended gear deployment, trial and error
- Move to fish offshore or inshore, north or south; temporarily change target species
- Temporarily delay harvesting clams and shellfish

Adaptation to Extreme Events

- Move fishing location (often very far from home port)
- Fish in deeper areas; redirect effort to other species
- run charters to fish in the "backcountry"

resilience begins to break down… resilience gone

- Stop fishing and get temporary job (construction, Uber, Home Depot)
- Get job as captain/crew in a different area of the country
- switch from commercial to charter fishing, ecotourism, photo tourism

- Sell gear and equipment and leave the industry
- Retire
- Clam and shellfish harvests completely lost, aquaculture businesses shut down

Fishermen perspectives – adaptation factors

Ability to adapt and keep fishing or drop out depends on range of factors:

Access to financial capital

"Permits is number one, and just like anything else, and the economy has really gone up, permits are pretty expensive more fuel, more overhead, more maintenance or tracking devices." (regarding costs of having to go fish offshore, fisherman from Sarasota)

Social capital

"We're seasoned fishermen. We have a lot of contacts. People that didn't know, there are a lot of them went out of business. They couldn't survive, and they went out. But we had the contacts, and we had a boat that we could move and do the job. But the people without those contacts, they just –" (Steinhatchee fisherman)

"Fall backs"

"*I have fall backs because of my history of going back and forth to Maine. I was able to go up to Maine for a month and fish and run fairy boats and sail and stuff like that. And that made just enough money to basically make me keep my boat. Other guys weren't as lucky other guys didn't have that fall back."* (commercial fisherman from Sarasota)

Fishermen perspectives – adaptation factors

Ability to adapt and keep fishing or drop out depends on range of factors:

Persistence and "grit"

This red tide, a lot of guys quit because it got hard. What'd we do? Shook our head and looked around and went somewhere else. We made it work." (Steinhatchee fishermen)

"I've been chasing my tail making a living all my life and figuring out when – when I have a disaster, I figure a way to work around it and survive it." (fisherman from Cape Haze)

Creativity

"If you've got good rivers and creeks coming into it and that's what helped Tampa Bay which was so much. You've got the Hillsborough River, you got the Manatee River really helped, because the guides – most of the guides that are doing in-shore fishing are running all the way up to the Manatee River to fish now…" (for-hire fisherman from Sarasota)

Fishermen perspectives – causes

Much concern about general impacts of human population growth

"Bottom line, too many people per ecosystem -- that's the bottom line -- and they're still coming."

Factors commonly perceived to exacerbate blooms:

- Coastal development (e.g., boat traffic, canal construction, hardened shorelines)
- Wastewater from sewage leaks and septic tanks
- High precipitation events and runoff; watershed influences (e.g., agriculture, sewage, pesticides)
- Wind and current patterns
- Increasing temperatures, particularly lack of cold winters
- Caloosahatchee discharges
  - Some discharges lead to small blooms 5-7 days following -- "like clockwork"
  - Summer discharges + warm ocean temperatures problematic during existing blooms

Less common: Beach renourishment / dredging, submarine springs (small blooms)

Fishermen perspectives – solutions

Factors thought to reduce severity of red tide:

- **Improve overall water quality**
- Fertilizer bans during rainy season
- Improvements in sewage systems
- Clam and oyster restoration
- Natural / living shorelines

"You've got to do something with that [river discharge] water, just do something with it, you've got to try. And then, after that you've got to start chipping away at golf courses, my yard. Everybody has to try, and that's what it's going to take. There's not one thing that we can vote on that's going to fix it." (Naples fisherman)

Fishermen perspectives – solutions

Strengthen communication and collaboration with fishermen

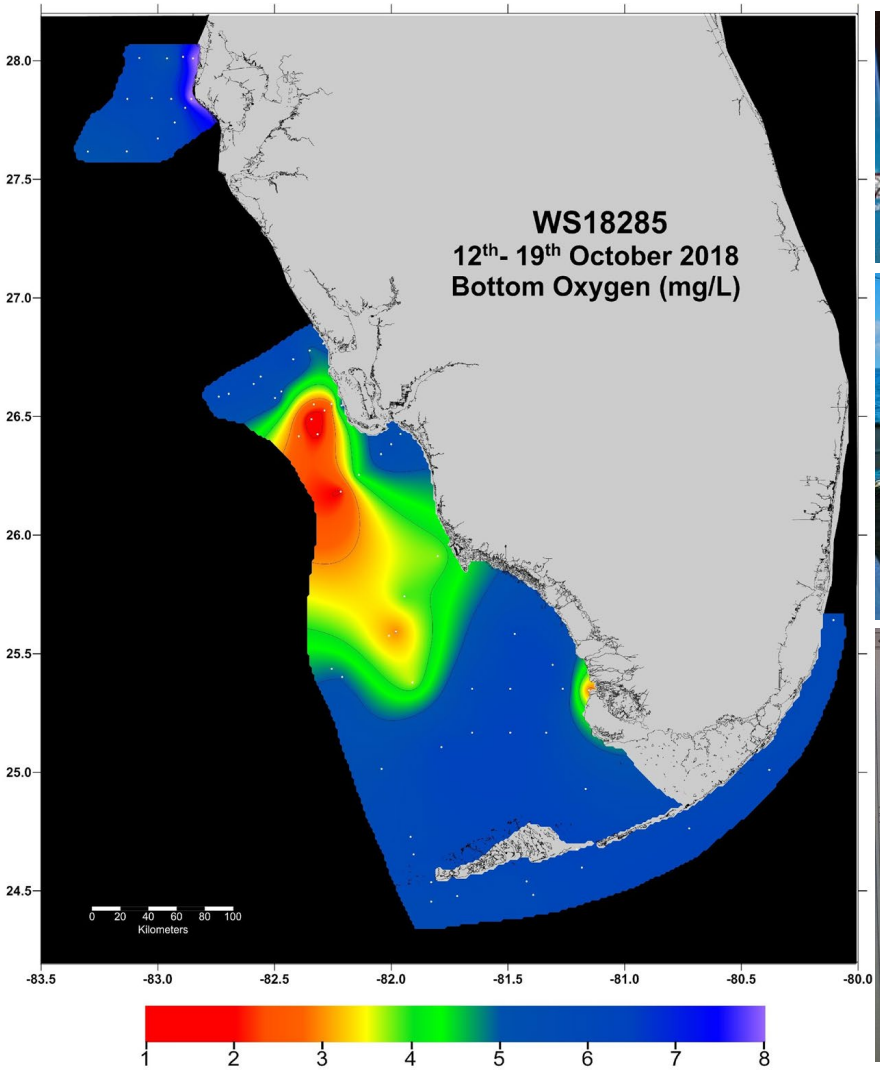
"I think that would be nice if you could just call someone and tell them what you saw and somebody would actually come and investigate it and check it out. I've tried to do this a lot of times because we're the ones that see this." (fisherman from Naples)

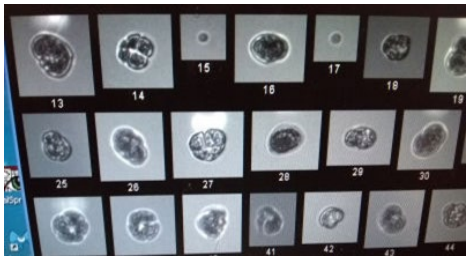
"My suggestion is if you're wanting to focus on the red tide, poor water quality, that kind of thing, there's almost every vessel that's federally registered, that's fishing in this area possibly would participate to some degree, okay?" (fisherman from Ft. Myers Beach)

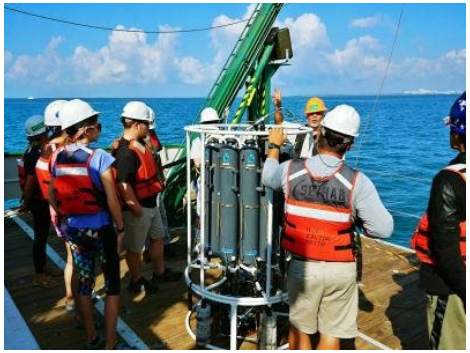
Provide better information to fishermen so they can minimize impacts

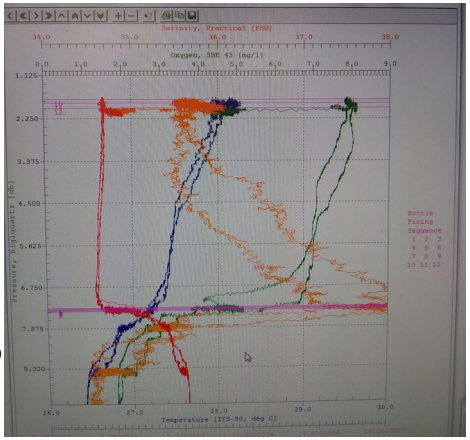
"Now, as far as helping us, the quicker we can react to circumstances, the better. And yes, more data needs to be collected… What can you do? Turn and put a shade over it to cool the water off? [Red tide] can't be controlled. The only thing that you could do to help a fisherman is tell these fishermen in the area that's impacted that they're catching fish north of the area, they're catching fish south of the area – it's the only thing you can do, other than give them some type of income assistance…" (Steinhatchee fisherman who had moved to Cortez)

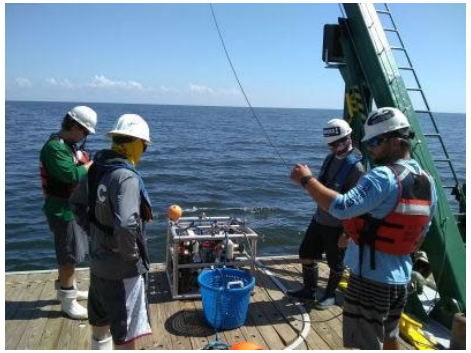
Rapid response and ecological research



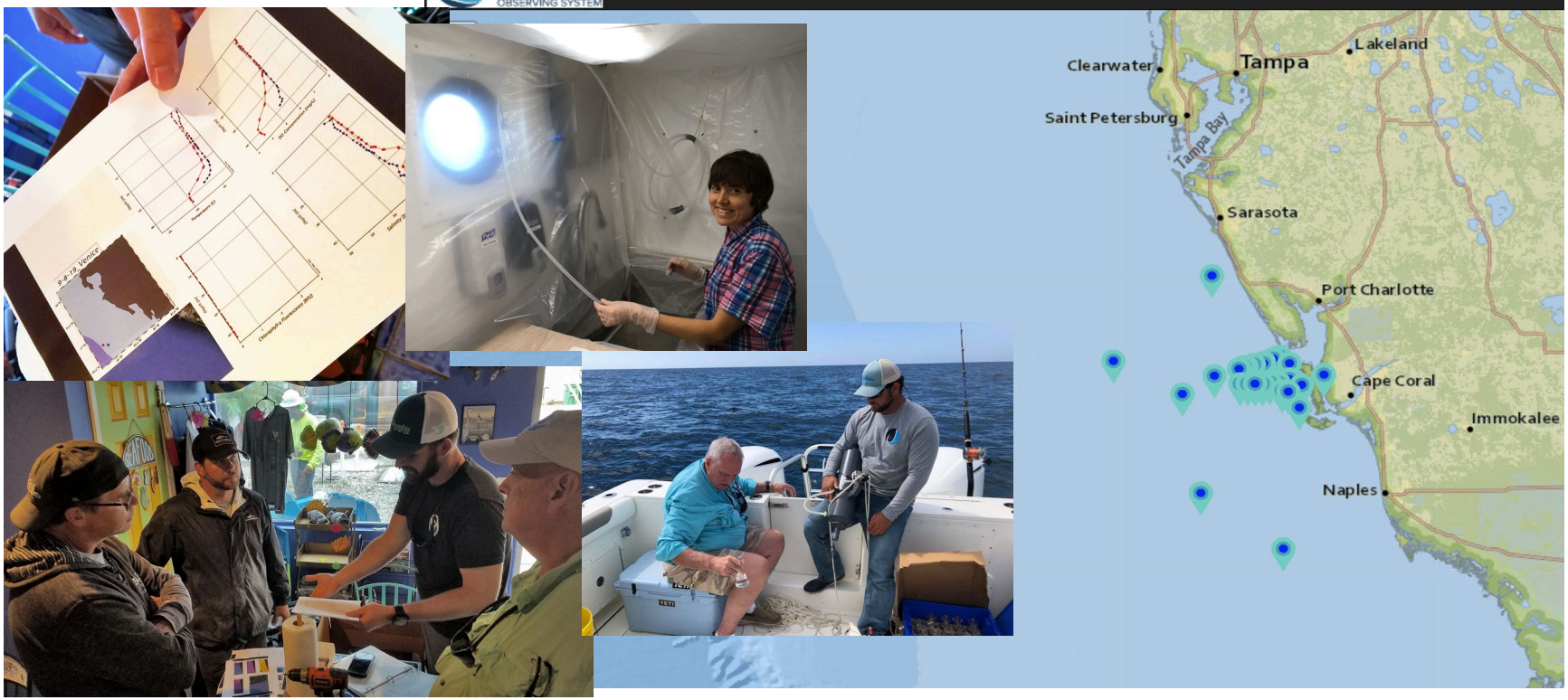








Coordinated monitoring effort



Acknowledgments

Walton Smith cruise participants and onshore coordinators

The fishermen, stakeholders and communities that have participated in this project