



National Perspective on HAB Observing Quay Dortch NOAA/CSS

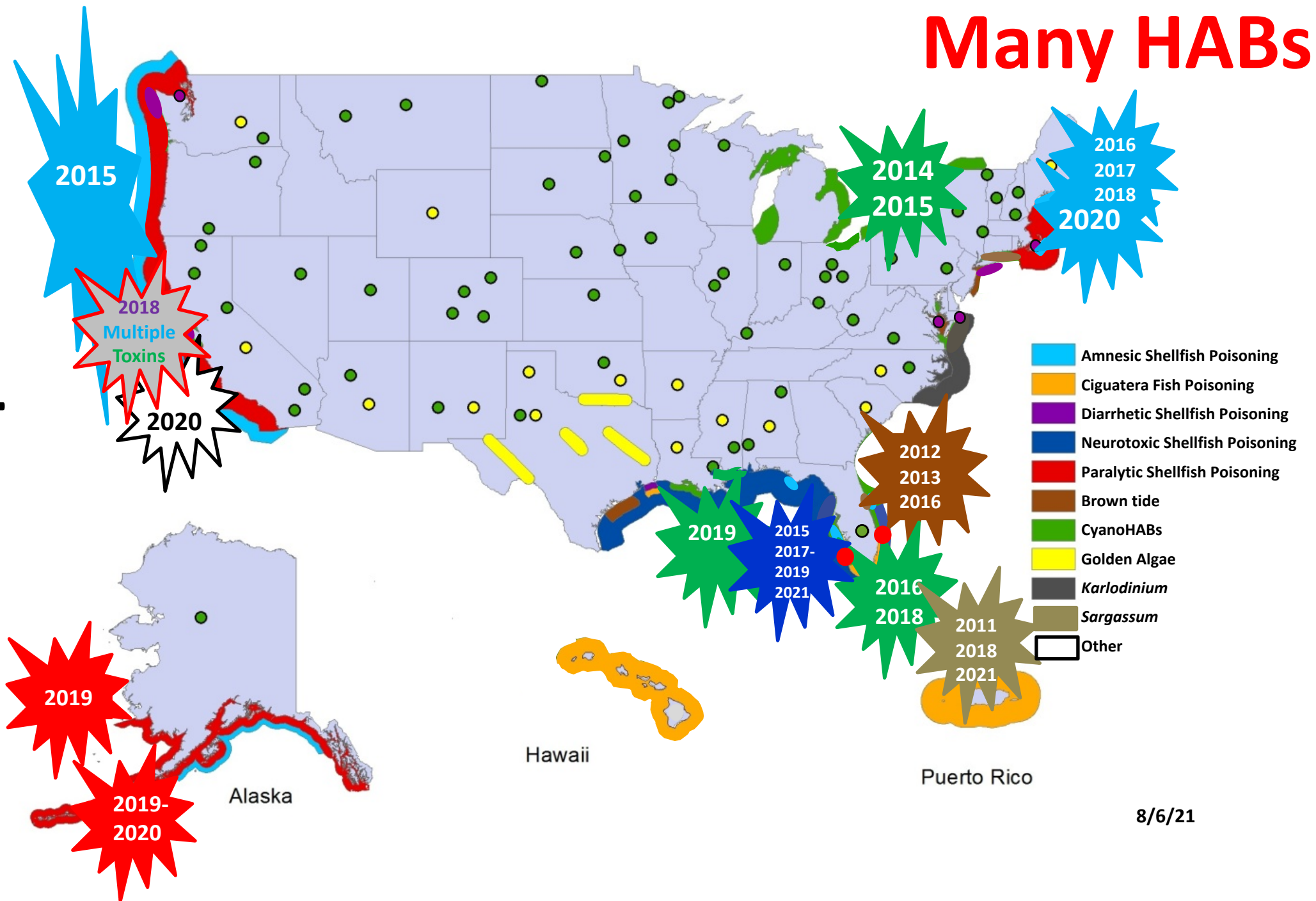
Background

- 1986-2002 Researcher LUMCON—All HABs, especially *Pseudo-nitzschia*, *Karenia*, *Dinophysis*, cyanos, *Alexandrium monilatum*
- 2003-2020 NOAA ECOHAB & PCMHAB Program Manager—national perspective on HABs, development NHABON
- 2020 to present NOAA/CSS Sr HAB Scientist—development and implementation of NHABON













Many HABs

2014-
2021



Many Impacts

	Name	Human & Animal Poisoning	Fish Kills	Water Discoloration
	Amnesic Shellfish Poisoning (ASP)	Yes*	No	No
	Ciguatera Fish Poisoning (CFP)	Yes	No	No
	Diarrhetic Shellfish Poisoning (DSP)	Yes	No	No
	Neurotoxic Shellfish Poisoning (NSP)	Yes*	Yes	Yes
	Paralytic Shellfish Poisoning (PSP)	Yes*	Yes	Yes
	Brown Tide	No	Yes	Yes
	CyanoHABs	Yes*	Yes	Yes
	Golden Alga	No	Yes	Yes
	<i>Karlodinium</i>	No	Yes	Yes
	<i>Sargassum</i> (beaching)	No	?	High Biomass Hypoxia

***Human or animal deaths**

Many Stake Holders

Stake Holder

- State public health/shellfish manager
- Drinking water authority
- Fin fish/Shellfish aquaculture & harvesters & fishers
- Recreational use—beach goer, charter fishing, dive boats
- Tourism—restaurants, hotels & B&Bs, attractions
- Real estate—rentals and sales
- Scientists
- Public



Obs/Prediction Needs

- Toxins in shellfish, early warning toxic event
- Early warning toxins in source water
- Early warning toxic & fish/shellfish-killing HABs
- Early warning toxic aerosols, foul smells, discolored water, fouled beaches, closures
- Same as above
- Understanding how HABs impact them?
- Data
- Easily understood, accurate information





Regional Differences Observing Assets and Products

Obs & Models

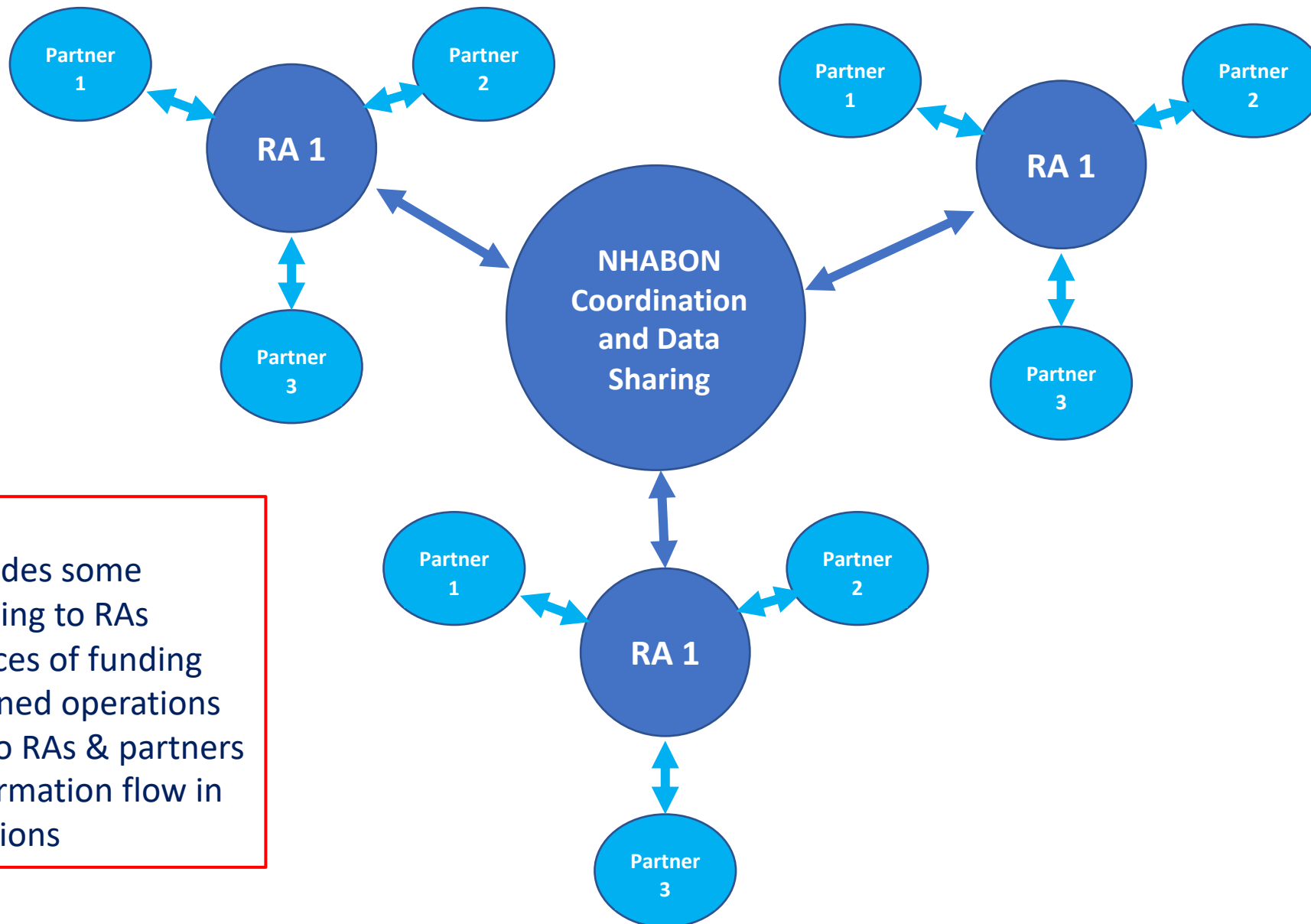
- Environmental sample processor (ESP) for *Alexandrium* cell & toxin detection & models shellfish toxicity
- HABscope cell counts, hydrographic models & wind, satellite remote sensing
- Imaging Flow Cytobot *Dinophysis* counts at sentinel site
- *Pseudo-nitzschia* cell counts, domoic acid (DA) in water, hydrographic models
- Satellite remote sensing, manual and ESP cell counts & toxin detection, developing toxicity models

Products

- ME PSP toxins in water adjacent to shellfish beds (& in shellfish)
- FL *Karenia* Respiratory forecast “every beach every day”
- TX Early warning new occurrence Diarrhetic Shellfish Poisoning
- WA/OR HAB Bulletin Green Yellow Red & rationale for warning DA in shellfish
- OH Lake Erie Bulletin with CyanoHAB biomass (aim for toxicity at drinking water intakes)

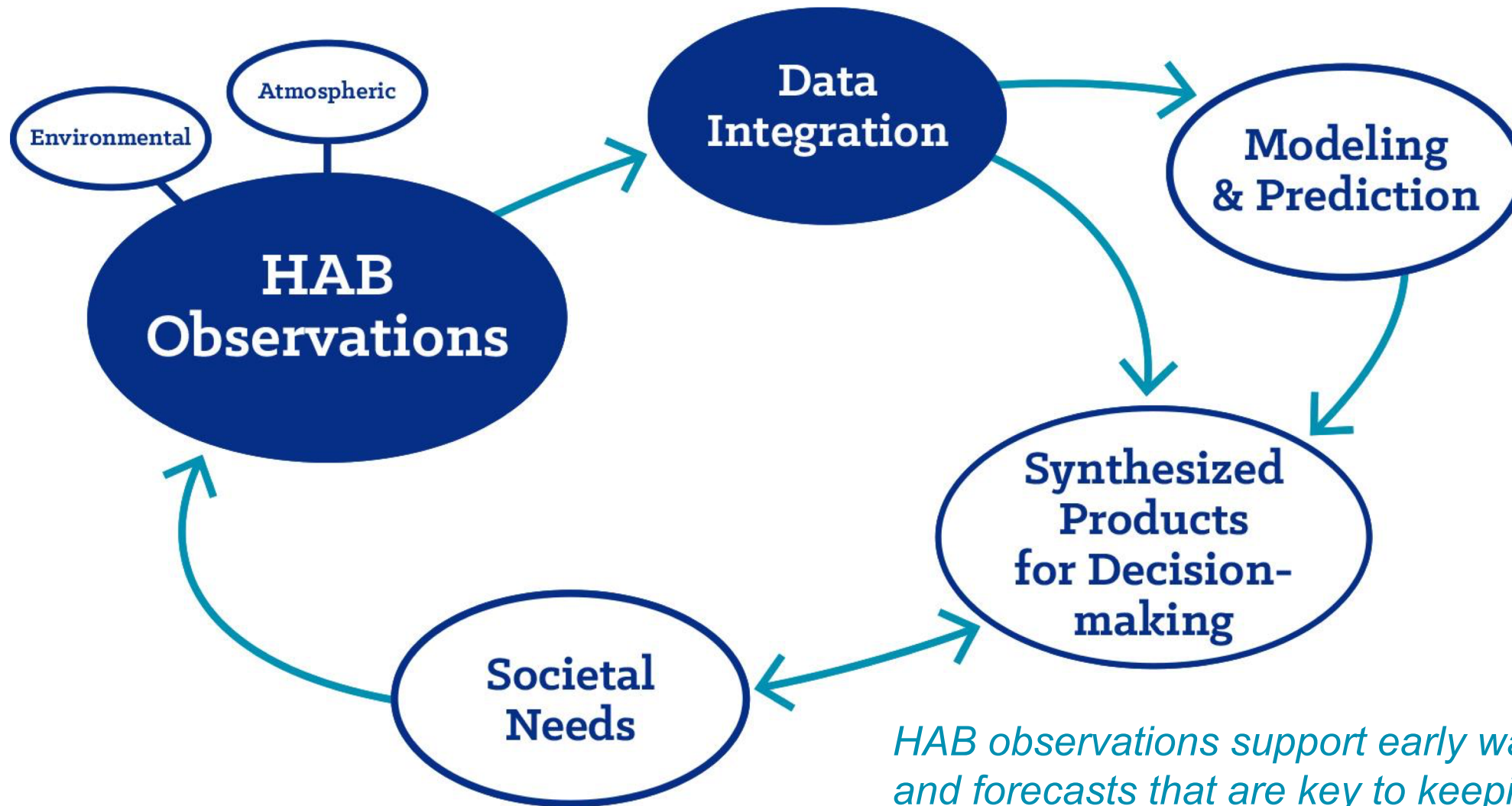


NHABON—a network of HAB Observations & Predictions



Regionally
NOAA IOOS provides some
sustained funding to RAs
Many other sources of funding
for both sustained operations
and research to RAs & partners
Funding and information flow in
multiple directions

Focus of the National HAB Observing Network



HAB observations support early warnings and forecasts that are key to keeping communities safe.



Congressional Interest HABs—HAB Pilot Projects

- Broad, bipartisan concern about HABs in Congress
- Increase appropriations across federal agencies for HAB research and response
- FY 20 included \$1M for HAB observing network pilots:
 - California - IFCB operational support
 - Northwest - supporting observations for the HAB Bulletin
 - Alaska - Coordinator for HAB sampling, observations, and communication statewide
 - Great Lakes - ESP operational support linked to developing toxin forecast in the HAB Bulletin; improve telemetry
 - Gulf of Mexico - HABscope operations and expansion supporting improved forecasts



Congressional Interest HABs—HAB Pilot Projects

- Working Group established that can link pilot projects to the development of a national system (NHABON)
- FY 21 includes \$2.5M for pilots
 - ❑ Continued 4 original pilot projects with some enhancements
 - ❑ Added two new pilot projects
 - Northeast—purchase autonomous vehicle and test with IFCB
 - Southeast—in planning stage, add sensors & increase coastal stations, use of drones, and glider missions
 - ❑ Directed \$1M to Gulf of Mexico—continue current HABscope efforts, add IFCBs in underserved locations and autonomous vehicles, test in turbid waters

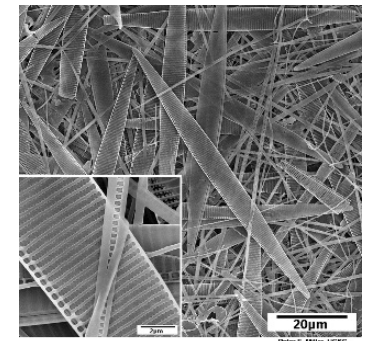
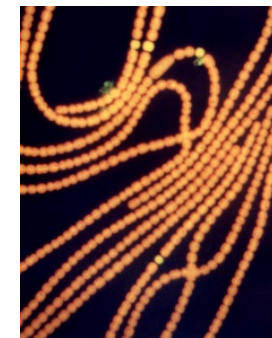




SECOORA

HAB Hotspots/Burning HAB Questions SE

- FL Indian River Lagoon IRL—highly eutrophic, many HABs, fish kills, discolored water, loss of seagrasses, manatee UME, closure recreational puffer fishery
- FL west coast (less often other locations)--*Karenia* spp.
- *Sargassum*—Caribbean & many other locations
- NC estuaries cyanotoxins & domoic acid in shellfish, probably all SE
- Absence of human health HAB events NC to FL in coastal zone—No HABs or problem waiting to bite us???
- Increasing aquaculture--HABs pose multiple threats
 - ❑ Toxic HABs causing harvesting closures
 - ❑ Fish/shellfish killing HABs





NOAA Programs to Help RAs & Partners Develop HAB Observing and Prediction

- **National Centers for Coastal Ocean Science**

- ❑ Ecology and Oceanography of HABs (ECOHAB)
- ❑ Monitoring and Event Response for HABs (MERHAB)
- ❑ Prevention, Control, and Mitigation of HABs (PCMHAB)
- ❑ HAB Event Response
- ❑ Internal research on HAB detection, monitoring & prediction
- ❑ Coastal Hypoxia Research Program (CHRP)

- **Integrated Ocean Observing System**

- ❑ Ocean Technology Transfer (OTT)
- ❑ Coastal and Ocean Modeling Testbed
- ❑ Pilot Projects and funding via the RA awards





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**Updates on HAB funding opportunities
provided US HAB List Serv**

CONTACT

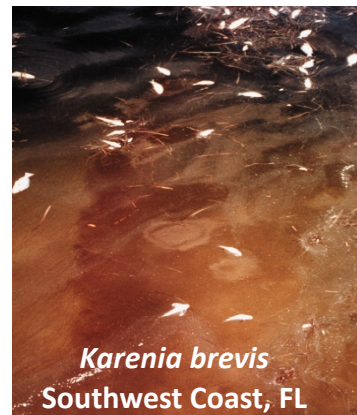
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Conclusions

- Many HABs, Many Impacts, Many Stakeholders—Need many different observations, platforms, and products
- Solution is a regionally-focused National HAB Observing Network
- SECOORA Draft HAB Plan will lead to a Pilot Project in NHABON





Resources

- Framework for National HAB Observing Network Workshop Report
https://cdn.coastalscience.noaa.gov/page-attachments/news/NHABON_Framewk_WkshpReport_12-18-20_Final.pdf
- Implementation Strategy for a National Harmful Algal Bloom Observing Network
http://www.ioosassociation.org/sites/nfra/files/NHABON_StrategyDocWeb_FEB_21.pdf
- NHABON Story Map <http://www.ioosassociation.org/nationalhabobserving>
- HAB Observing Group <http://www.ioosassociation.org/nationalhabobserving>

