



Stakeholder Panel 2

Healthy Ecosystems and Human Health & Safety

Steve Sempier, Facilitator

Panelists: Brian Dzwonkowski, Eric Milbrandt, Chuanmin Hu



Alabama Real-time Coastal Observing System (ARCOS)

Brian Dzwonkowski (Lead Scientist)
Pat David (Data Architect)
Josh Goff (Marine Operations)
AJ Stewart and Cameron Tyler (Technicians)

GCOOS Strategic Plan Focus Areas

Coastal Hazards
Healthy Ecosystems and Living Resources
Human Health & Safety



GCOOS Virtual Members Meeting, November 13, 2025



Dauphin Island Sea Lab

Project Focus

Collection and distribution of meteorological and water quality data in coastal Alabama and the surrounding region



Type of Data Generated



Fixed stations and moored buoys

- Meteorological data - Air temperature, Humidity, Barometric pressure, Wind speed and direction, Incoming solar radiation, and Photosynthetically activity radiation.
- Water quality data - Water level, Temperature, Salinity, Dissolved Oxygen, and Turbidity
- Wave data – Offshore (working on a bay site)

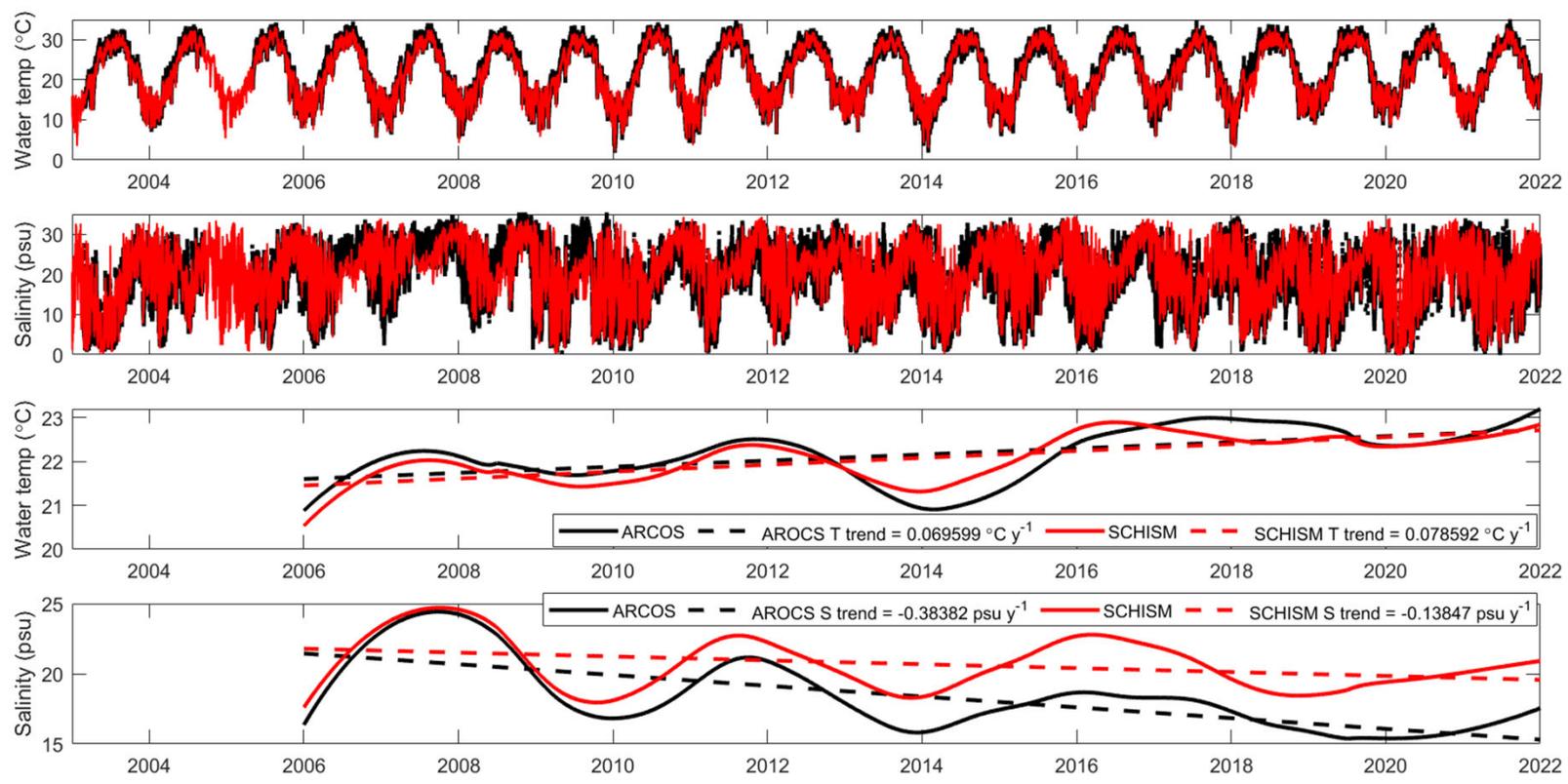


Type of Data Generated



Fixed stations and moored buoys

- Long duration sites – 20 plus years at several sites



Courtesy of Zhilong Liu



Data Application



Mobile BayKeeper – Salinity and turbidity data for issues related to ship channel expansion and thin layer placement of dredged materials

Navy Cove Oyster Company – Dissolved oxygen and salinity data using in commercial management of oyster farms

Charter boat captains – Wind and wave data for daily operations

Mobile Bar Pilots – Wind and wave data for operational decisions

Alabama Department of Transportation – HMS Ferries – Wind data for daily operations

Alabama Department of Public Health Seafood division – daily maximum air and water temperature for oyster harvesting decisions

National Weather Service - Mobile Sector - Wind data for marine forecasts

Naval Research Laboratories – Stennis – Hydrographic and current velocity data for autonomous vehicle testing

NOAA CO-OPS – hydrographic data for model development and validation

NOAA Meteorological Development Laboratory – wave data for rip current forecasts



Key Findings & Challenges



Key Findings

- Power of monitoring dramatic increases as duration increases
 - More stakeholders
 - Better science
- Way of capturing rare extreme event data (e.g. hurricanes, floods)
- ARCOS data have been used in numerous scientific studies

Challenges

- Maintaining support for the full network can be difficult
- Periodic infusions of capital expenditures are needed
- Personnel turnover
- Hurricane damage can generate significant data gaps



Stakeholder Mission



National Weather Service - Mobile, AL
Jonathan L. Howell
Science and Operations Officer

NWS offices issue numerous statements, forecasts, and various other products each day for use by interests in the public, local governments, and the marine and aviation communities

Routine Products - Digital Gridded Forecasts (out to 7 days); County based Zone Forecasts (out to 7 days); Coastal Waters Forecast; Hazardous Weather Outlook

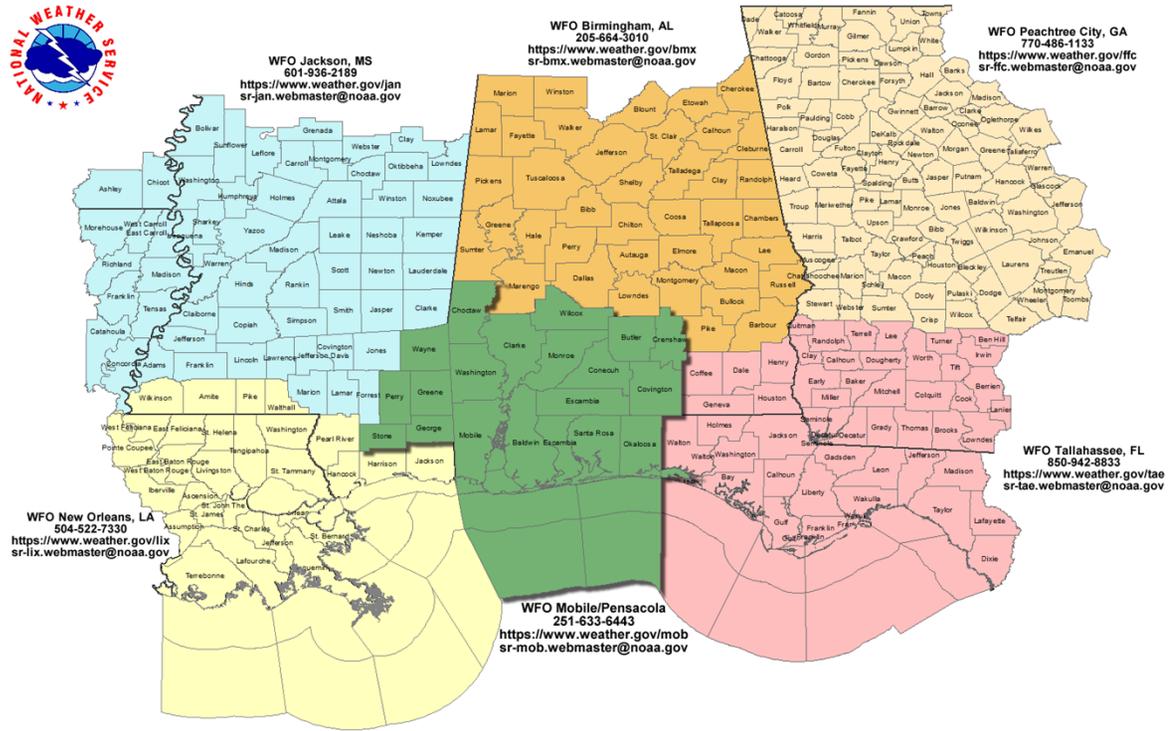
Non-routine products issued by the WFO include watches, warnings, and statements for a variety of weather types - Watches, warnings and statements for Tornadoes; Severe Thunderstorms; Flash Floods; River Floods; Hurricane; Winter Weather; High Wind; Excessive Heat; Dense Fog; Excessive Cold; Rip Currents

Stakeholder Mission



National Weather Service - Mobile, AL
 Jonathan L. Howell
 Science and Operations Officer

NWS WFO Mobile/Pensacola is responsible for hydrometeorological (e.g. weather and water) forecast and warning services for 20 counties - 5 counties in southeast Mississippi, 12 counties in south Alabama, and 3 counties in the northwest Florida panhandle. The area of responsibility also covers 5 bays and sounds and the coastal waters out to 60 nautical miles.





Stakeholder Needs

Weather and wave data across coastal region and the Mississippi Bight

Stakeholder Data Applications

Support products delivered

- e.g. Mobile Bay forecast is broken up into Northern Bay and Southern Bay forecasts due, in part, to ARCOS data

Stakeholder Challenges

- More weather data in the coastal ocean
- Wave data in specific locations for NOAA rip current models



RECON: River, Estuary and Coastal Observing Network

PI: Eric Milbrandt, PhD

Stakeholder: Allie Pecenka

Sanibel Captiva Conservation Foundation (SCCF)

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GCOOS Strategic Plan Focus Areas:

Healthy Ecosystems and Human Health & Safety



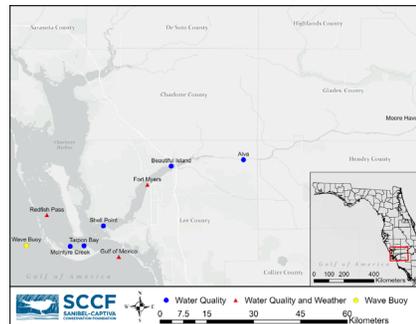
Project Focus



Goal: Provide continuous real-time water quality and weather data to inform coastal managers and identify coastal hazards.

- Objective 1: Clean, calibrate, and maintain sensors in the marine environment
- Objective 2: Deliver real-time and archived data to GCOOS and a dedicated website <http://recon.sccf.org> with custom graphing, time series analysis and boating forecasts
- Objective 3: Provide data and products to stakeholders for weekly condition reports, modeling, and data to support the tourism-based economy.

Stakeholders:



Types of Data Generated

Hourly Data from 8 sites

Water Quality
Water Temperature
Salinity
Dissolved Oxygen
Chlorophyll a
Turbidity
Elevation (NAVD 88)
Depth
FDOM

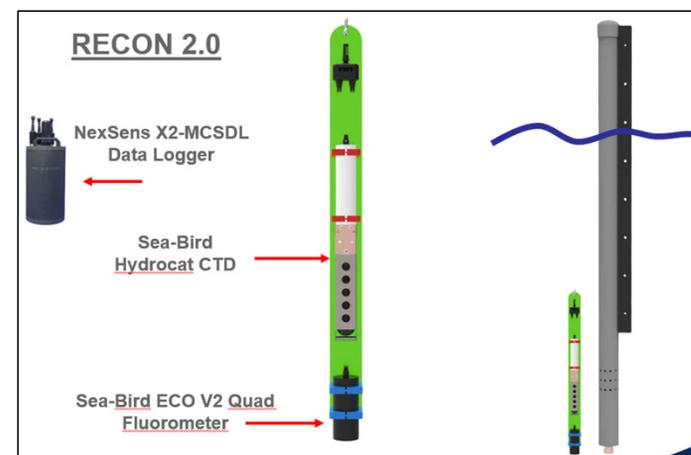
15 min. Data from 3 sites

Weather
Air Temperature
Barometric Pressure
Wind Speed
Wind Direction
Wind Gust
Relative Humidity



Nutrient Data from 2 sites

Nutrients
NOx (hourly) SUNA v.2
Nox (every 2 hrs) WIZ



Data Application



Weekly Conditions Report

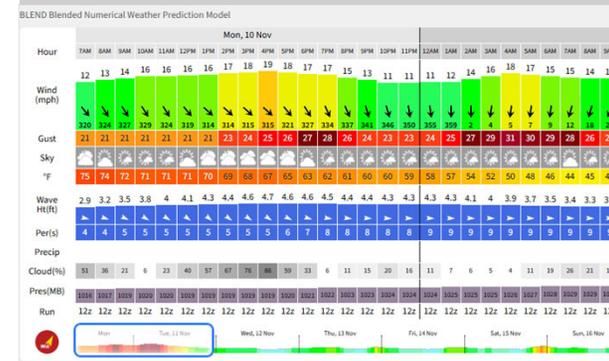
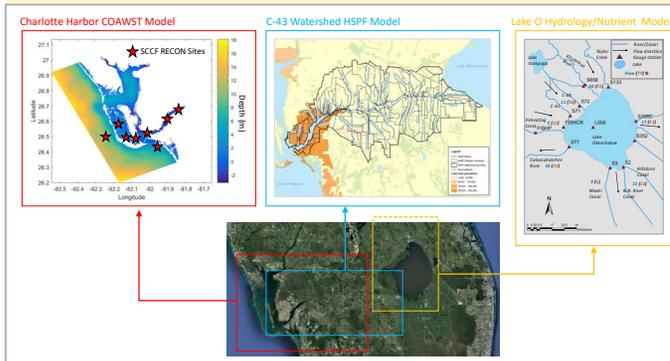
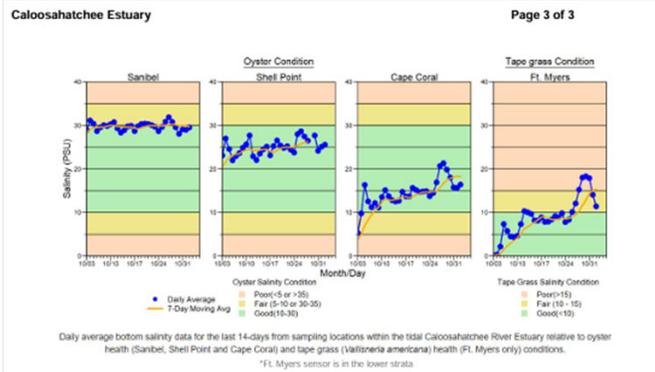
- Weekly stakeholder call and memo sent to SFL water managers
- HABScope samples 2-3X/week during red tide bloom events

Model Development

- Coupling Lake Estuary Watershed (CLEW) (D. Kaplan, M. Olabarrieta)
- Oyster larval transport (B. Dye, F. Jose)
- Realtors model of water clarity linked to real estate values

Boating Information

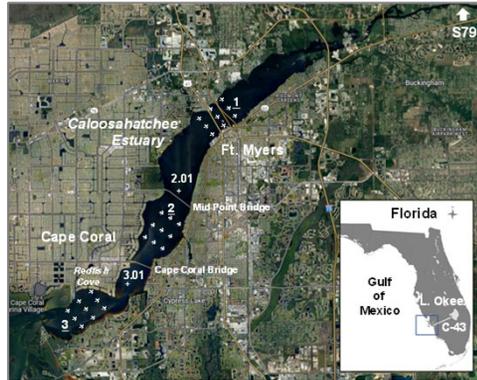
- RECON website pulls NOAA boater forecasts for use
- Data shared with WindAlert and other commercial outlets



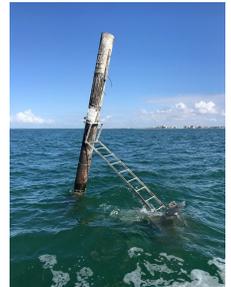
Key Findings & Challenges

Key Findings

- Continuous and real-time data are critical for avoiding long term harm to ecosystems



Challenges



- Real-time data critical for hazard avoidance
- Continuous data collected during hurricanes has informed new policies and plans

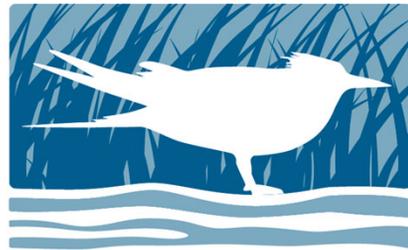




Stakeholder Mission



“To protect & care for Southwest Florida’s coastal ecosystems”



SCCF
SANIBEL-CAPTIVA
CONSERVATION FOUNDATION



- Program areas include:
 - Coastal Wildlife (Sea Turtles, Shorebirds)
 - Environmental Education (Adult programming, Sanibel Sea School, Native Landscapes & Garden Center, Coastal Watch)
 - Environmental Policy & Advocacy
 - Marine Laboratory
 - Wildlife & Habitat Management

Stakeholder Needs

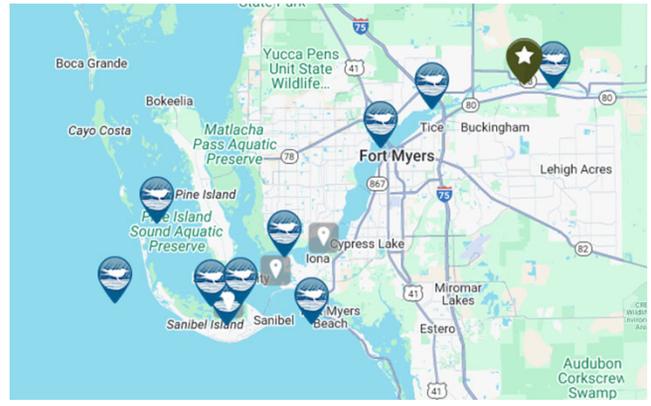
- **Real-time data regarding:**
 - FDOM
 - Chlorophyll
 - Dissolved Oxygen
 - Temperature

- **Salinity specific data**
 - 30-day moving avg. surface salinity at FMYB and weekly avg. salinity at Shell Point in order to inform suitability for indicator species in upper estuary (tape grass) and lower estuary (oysters and seagrass).

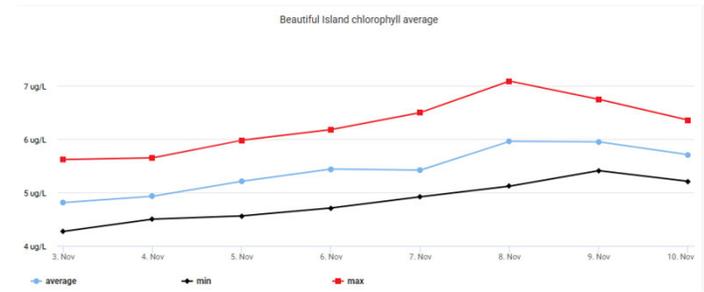
- **Locations**
 - All sites within and surrounding CRE, Sanibel & Captiva Islands

Additional data utilized from RECON sensors and website:

- Historic graphs
- Caloosahatchee 14 day flow
- Lake Level
- Percent Discharge
- RECON custom graphing tool



Locations of RECON sites throughout CRE



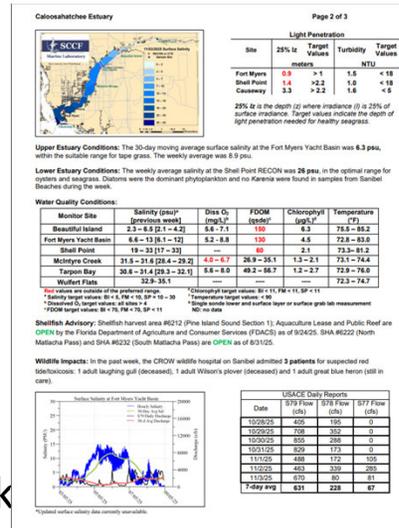
Custom graphing tool utilizing RECON data

Stakeholder Data Applications

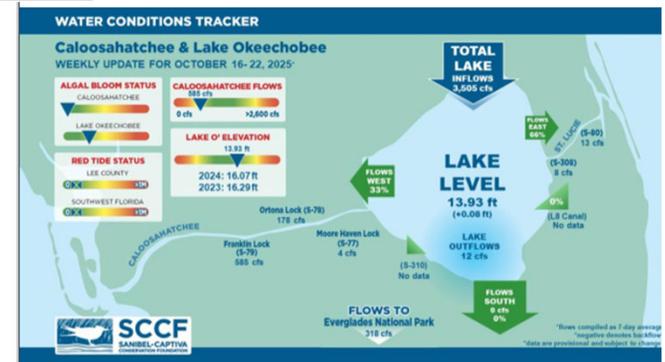


- Data presented during weekly West coast stakeholder call including staff from city/county, Ding Darling NWR, and other orgs.
- Discussion informs weekly Caloosahatchee Conditions Report- analysis of estuary and coastal conditions and recommendation for management of CRE system
- Received by USACE, SFWMD, FDEP and 1,000 members of public
- Salinity, for ex. helps inform flow needs at lock structures and cfs needed for estuary health
- Data also used in weekly water conditions update- email detailing CRE health sent to 10,000+ members of public/ week

Caloosahatchee Conditions Report



Water Conditions Tracker Graphic



Stakeholder Challenges



- Need for additional red tide monitoring in Gulf, including samples from further offshore to document origination of blooms
- Additional precipitation data flow data at various sites along Caloosahatchee River to inform levels of watershed runoff
- Additional NOAA water level stations needed for Charlotte Harbor and the region.



Satellite Earth Observations in Support of GCOOS

PI: Chuanmin Hu
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GCOOS Strategic Plan Focus Areas:

Coastal Hazards, Healthy Ecosystems and Living Resources, Human Health and Safety, Red Tide Respiratory Forecast.

PI Project Focus

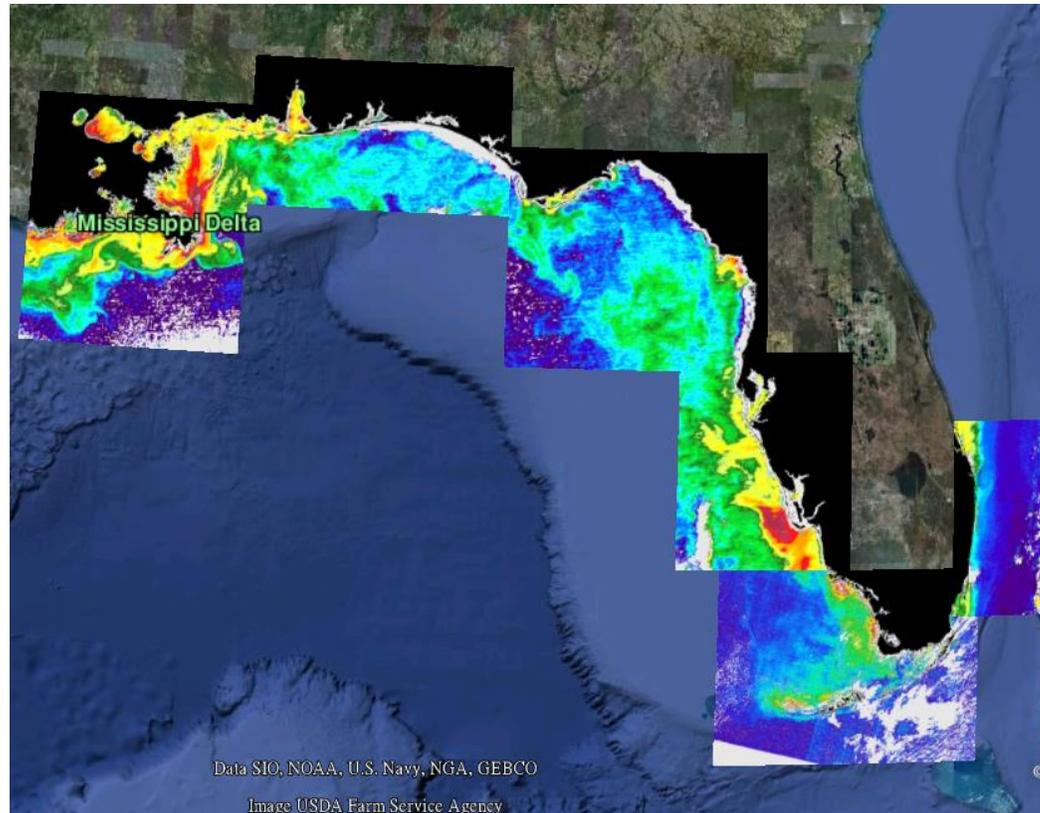
Goal: to continue and expand support of satellite remote sensing needs of GCOOS:

- To document long-term oceanographic change in several Essential Ocean Variables;
- To support monitoring and forecasting of various harmful algae blooms (*Karenia brevis*, cyanobacteria, and *Sargassum*) through providing near real-time, customized satellite imagery.

Type of Data Generated

SST, True color, False-color, nFLH, MCI, Secchi Depth, FAD, Cyano bloom, etc.
 These are for: Harmful Algal Blooms, water quality, *Sargassum* blooms

Medium resolution coverage

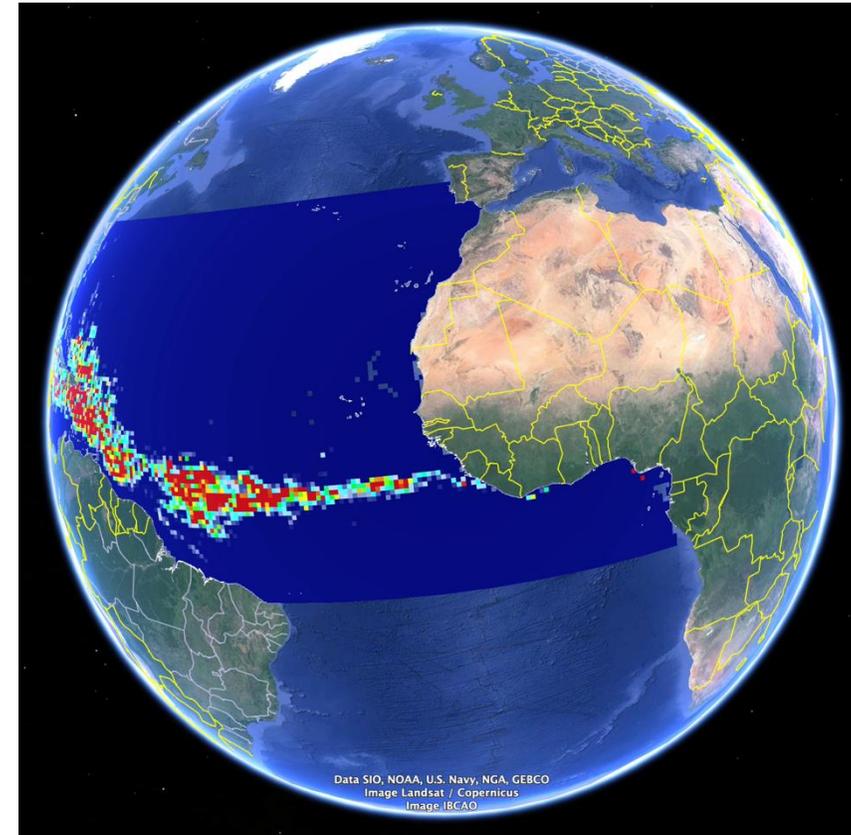
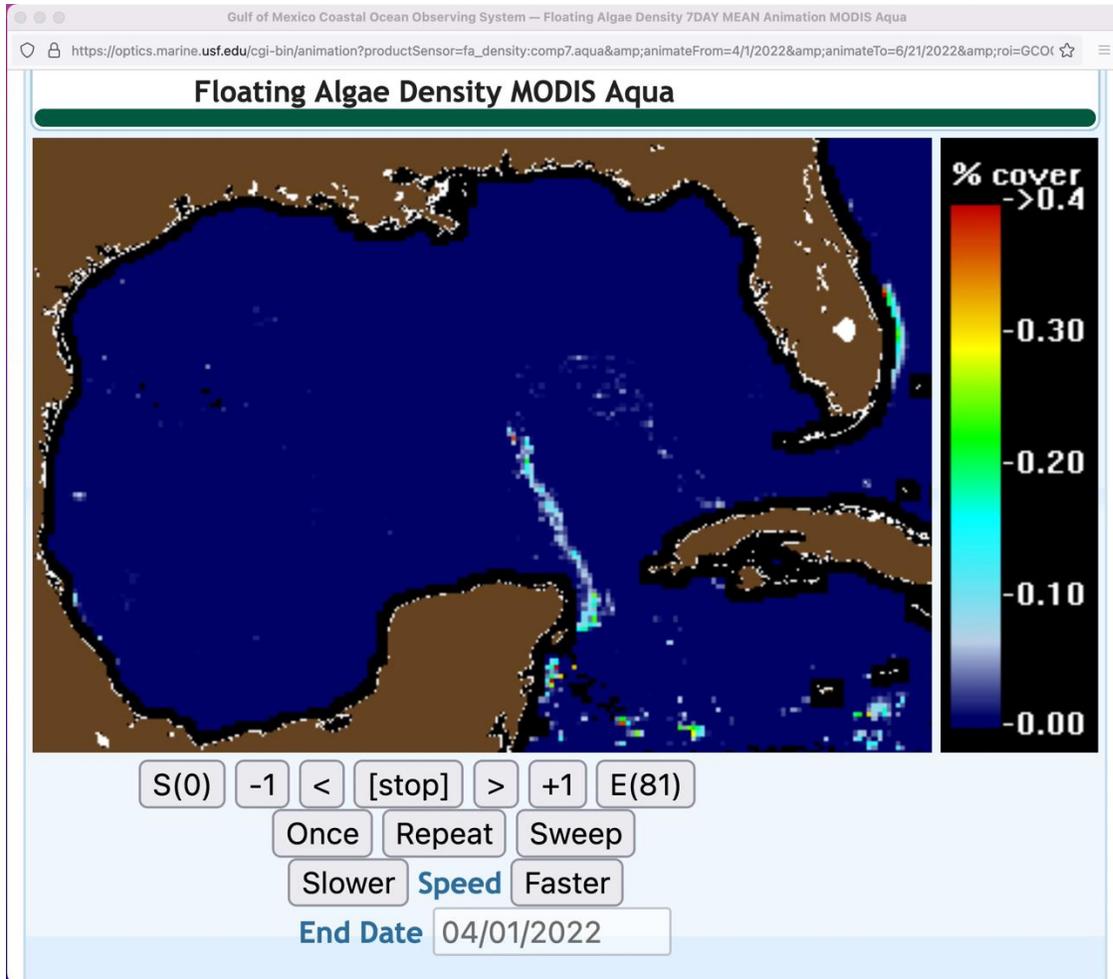


High resolution coverage



Type of Data Generated

Example: *Sargassum* Watch System (<https://optics.marine.usf.edu/projects/saws.html>)



Data Application

SaWS Web access statistics (top 10 regions), 1/1/2025 – 5/20/2025

Region of Interest	Active users	US active users (%)	Non-US active users (%)	# of files viewed and downloaded	Total size of files (MB)
E Caribbean	758	48%	52%	231,145	219,441
GCOOS	356	87%	13%	222,197	177,758
Yucatan	516	38%	62%	170,801	62,699
Central W Atlantic	485	33%	67%	190,663	326,599
SECOORA	239	86%	14%	103,800	104,916
Upper Keys	197	88%	12%	5,780	131,976
Central E Atlantic	165	26%	74%	67,681	88,645
Lower Keys	183	90%	10%	3,579	50,709
Jamaica	207	41%	59%	38,750	17,222
Panama	145	23%	77%	34,043	9,896

Key Findings & Challenges



- SaWS provides critical information on *Sargassum* distributions and amounts
- Stakeholders range from governmental agencies, environmental groups, researchers, business owners, and general public
- *Sargassum* used to be local within the Gulf, but in recent years most *Sargassum* in the Gulf was transported from the Caribbean Sea
- There appear an increasing trend in *Sargassum* amount in the Gulf
- High-resolution imagery are available only in several selected regions, but more coverage is required
- Detection accuracy needs to be improved
- Funding is always limited

Stakeholder Mission



Stakeholders range from governmental agencies, environmental groups, business sectors, education/academia, public news media, and general public.

They each have their own mission.

Stakeholder Data Applications



Highgate Hotels: “I forward the monthly bulletin to our hotels in Florida and Puerto Rico, to help them anticipate what the next month will bring from a tourism impact perspective.”

The Park Board of Trustees of the City of Galveston: “We are able to keep an eye on conditions in order to prepare our Public Relations and Tourism teams to give the public and tourism industry a heads up. We also manage 32 miles of Galveston Island beachfront and this allows us to prepare for possible landings or inundations”

City of South Padre Island, Texas: “It gives our organization an idea of what to expect in the coming month, which in turn helps with management of our beach. We can begin to start planning how we might respond.”

Bonaire National Marine Park: “The SAWS products are used to predict/ estimate sargassum movement for the Bonaire National Marine Park [STINAPA] to help them manage their heavy equipment, deploy rangers, and volunteers to set booms and remove sargassum that comes ashore.”

Florida Power Plant: to keep an eye on potential clogging of the water intake system, “Being able to predict the timing of the arrival to deploy countermeasures efficiently.”

Friends of Palm Beach Inc. “I send GPS photos to the council members to show accumulation to protect our endangered sea turtle hatchlings and when the noxious fumes are too much for beachgoers. Having this watch allows for the awareness needed to be proactive in potential sargassum inundation.”

University of Southern Mississippi: “Used your composites and applied drifter currents to obtain a numerical prediction of quantity of arrival in the Lesser Antilles.”

NOAA AOML: “I have consulted these maps to provide operational guidance to colleagues searching for Sargassum offshore, roughly gauge where beaching might occur, and plan research activities.”

Florida International University: “I used to check on probabilities to have landings in the beaches we conduct research. And we use as a guideline for our Citizen Science programs.”

BBC Studios: “Having access to the portal, being able to view the data for free, as well as be guided by Chuanmin and the wider SaWS team has been instrumental in helping set up and organize one of the bigger shoots on the Blue Planet 3 series.”

Stakeholder Challenges



In general, stakeholders need more accurate monitoring, tracking, and forecasting capacity, especially in nearshore environments. This is mostly difficult due to limitations in the available resources (data, infrastructure, personnel, funding).

Panel Discussion Points

What is the greatest challenge or need (and potential solution) for improving stakeholder application of observation data?

How can we improve tracking of outcomes related to stakeholder data applications, and measure economic value of activities? We can do this for GCOOS funded activities. However, it is more difficult to track and measure outcomes from partnering organizations.