Progress Report

Project Title: Southeast Coastal Ocean Observing Regional Association (SECOORA): Delivering actionable coastal and ocean information from high-quality science and observations for the Southeast

Award number: #NA21NOS0120097
Period of Activity: 07/01/2024 – 12/31/2024
Principal Investigator(s): Debra Hernandez, SECOORA Executive Director

I. PROJECT MILESTONES:
Milestone Table. Milestones from the SECOORA Year 4 Descope table are identified by SECOORA subsystem in Section II Progress and Accomplishments. High-level milestones/deliverables, accomplishments and any issues are included for each project. Status of each milestone/deliverable is reported as complete, on-track, or delayed. If the milestone is delayed, a justification for the delay and description of activities employed or to be employed to mitigate the delay are provided.

II. Progress and Accomplishments

Project and Task(s)	**Status**
GOVERANCE SUBSYSTEM	
Maintain the SECOORA governance and operational structure through implementation of SECOORA bylaws and Strategic Plan.	
Accomplishments: • The SECOORA Board Meeting was held December 10-11 in Charleston, SC. The Board reviewed and approved the 2026-2030 SECOORA Regional Coastal Ocean Observing System (RCOOS) Plan. This document will guide SECOORA investments in our coastal and ocean observing system for the next 5 years. • The Board and staff discussed the next IOOS 5-Year proposal development process, suggested funding breakdown between RCOOS components, and identified requirements for the Letters of Intent (LOI) and the LOI review criteria.	On-track
Maintain SECOORA's Certification as a RICE	
The RCOS MOA between SECOORA and NOAA was executed on 8/22/22. All documents submitted for certification are found here: https://secoora.org/certification/. The SECOORA By-Laws are available here: https://secoora.org/resources/by-laws/. The audit for Years 2023 and 2024 is available here: https://secoora.org/wp-	On-track

content/uploads/2025/01/FINAL-FY-24-SECOORA-AUDIT-06.30.24-.pdf	
Update the SECOORA RCOOS Plan	
Between June – December, the SECOORA Deputy Director, Science Committee, and subject matter experts updated the SECOORA RCOOS Plan for the 2026-2030 period. The 2026-2030 Regional Coastal Ocean Observing System Plan presents the SECOORA priorities for contributing to our improved understanding and management of valued coastal and ocean resources. This document is a revision to the 2020-2025 RCOOS Plan and will serve as a guide for future investments in our region's coastal ocean observing system. The updated document was shared broadly via email and social media along with a survey that allows stakeholders to provide feedback on the 2026-2030 priorities and identify any research areas that may not have been addressed. 23 people have completed the survey to date and results were positive. The SECOORA Board of Directors approved the revised RCOOS Plan at their December meeting. Staff are currently proof-reading and completing the final editing with the goal to have the document available on the SECOORA website in February 2025.	On-track
OBSERVING SUBSYSTEM	
HF Radar Operations & Maintenance	
SECOORA HF Radar (HFR) operators provide surface current data in near real-time from 20 HFRs with a targeted up-time of 85%. Hourly data is provided to SECOORA and to the HFR National Network. Operational and quality metrics are routinely checked. These include assessment of daily variations in coverage and uptime using metrics such as database latency, range of coverage, and number of solutions as implemented by the National HFR Network. The SECOORA HFR network supports both operational and research communities by providing high quality, ocean surface current data in near real-time. PIs in the SECOORA region operate CODAR and WERA systems. Progress report details are found in the following google drive worksheets: • The HFR report that details HFR operators, system status, and IT infrastructure needs by site is available here – review the worksheet titled "7-12 2024": https://docs.google.com/spreadsheets/d/1L1w00TPG1K7xXyh_iXXw6T7JaGT8rLZwnZMWfrnlXOI/edit?usp=sharing • The HFR annual expenditures report is found here: https://docs.google.com/spreadsheets/d/1o72wuTtcAqYz0uVewoxmcwn14rqqBwzxUJHTpkzVYqY/edit?usp=sharing • The HFR operators annual staffing report is found here: https://docs.google.com/spreadsheets/d/1dC4Tgh7x1BRLcFL62urO3sbWwp6FEUteO-c0J5OgwEw/edit?usp=sharing Issues: 1. SkIO has not reinstalled the CAT HFR which was destroyed by a wildfire in 2022. The reinstallation for CAT is stalled due to issues getting power and internet at the site. 2. SkIO operates the JEK HFR also. JEK is offline due to a failure of the frequency control rack (FCR) caused by a power supply issue, along with several other material issues	On-track

that may have been caused by saltwater incursion into the shed. In early 2024, significant bench testing revealed failures of the power amplifier (PA), power supply, fans, and power supply to the FCR. The power supply and PA were fixed. In the current reporting period, troubleshooting on the FCR determined one or more grounds in the DC power system was causing issues with the supply of power to the CPCI, resulting in the computer faulting and restarting when system power draw exceeded a certain threshold. The SkIO technician is working to repair the FCR, and if successful, will be able to test the whole system to determine if all the repairs worked and identify if there are more problems that need troubleshooting. SkIO has a new 4:1 splitter if the repaired one at JEK does not work, but they do not have a working spare 13.5 MHz PA if the repairs to the JEK PA were not successful. SkIO has determined that the poor condition of JEK is due to this site flooding when a significant hurricane (or winter storm) passes close offshore of the island. The beach at the radar site has completely eroded, and there is now a riprap seawall as the only barrier between the radar and the surf. Given the occasional salt-water intrusion into the equipment room, we suspect rack failures like that found in the FCR are probable to occur again unless steps are taken to shield the equipment. Future discussions with the site property managers will explore options for protection of indoor/outdoor components of the system.	
SECOORA Glider Network	
The SECOORA glider team includes SkIO, the University of South Florida (USF), UNC-Chapel Hill (UNC-CH), and Georgia Tech. See table **IOOS, NOAA, Other Agency Funding** for details on Navy glider support, Hurricane glider support, and the OMAO Saildrone-Glider project. Accomplishments: • Two SECOORA supported missions were completed (see table below). All data are submitted to the National Glider DAC and the glider data can be found on the SECOORA Data Portal. • PIs Edwards (SkIO) and Lembke (USF) coordinate with national glider efforts, including participating on weekly hurricane glider calls. PIs have encouraged broad participation in UG2 working group and SkIO technician K. Dreger serves on the steering committee for the UG2 (term 2023-2025) community. • The Georgia Tech (GT) glider team members continue to integrate smart piloting strategies into operations. R. Yang (GT student) is testing the anomaly detection software by conducting an analysis of the software based on 2024 missions and is preparing a manuscript titled “OceanPlan: Hierarchical Planning and Replanning for Natural Language AUV Piloting in Large-Scale Unexplored Ocean Environments”. Yang will present on this work at the 18th International Conference on Underwater Networks & Systems. • C. Baldwin, a SkIO fall intern participated in UGA’s Semester@Skidaway, a residential semester that integrates research, field/offshore opportunities, and course work at SkIO. Baldwin participated in glider work offshore and contributed to the SkIO glider program activities (August-December 2024).	On-track

Team Lead	Glider Name	Deployment Date	Recovery Date	Days in Water
USF	Sam	7/19/24	8/17/24	30
USF	Sam	10/14/24	10/25/24	9

Issues
The October Sam mission was cut short due to a failure with the digifin.

Sustain the SECOORA Real-Time and Non-Real-Time Mooring Network

On-track

All real-time moorings/instrumentation have a targeted up-time of 85%.

UNCW maintains 12 real-time moorings and 1 non-real-time mooring (OB27M) along the coasts of NC and SC. OB27M data is provided to SECOORA via Research Workspace twice a year. Real-time quality-controlled (QC) data is provided to SECOORA and Axiom Data Science makes the data available to NDBC via ERDDAP server. Non-real time data from the seafloor OB27M station are provided to Axiom twice each year.

Accomplishments:

- UNCW conducted a buoy turnarounds during this reporting period: SUN2WAVE on 07/08/24 and 10/22/24, CAP2WAVE and CHR60WAVE on 8/20/24, FRP2WAVE on 11/12/24, LEJ3 on 11/19/24.
- Engagement continues with Fripp Island Sea Rescue. UNCW is working with the Sea Rescue to train them to assist with minor maintenance and provide intel on any physical damage to the FRP2 and FRP2WAVE buoys. Fripp Island Sea Rescue is actively working in their region to promote awareness of the buoy positions with the commercial and recreational fishing communities to reduce vessel strikes.
- UNCW supports the FACT Network (ATN) by incorporating acoustic receivers on 4 existing Onslow Bay, NC moorings. The OB27 Vemco receiver was swapped on 07/29/24 and LEJ3 Vemco was swapped on 11/19/24. All data were downloaded and provided to FACT.
- Through non-SECOORA funding, CORMP deployed and tested a new wave buoy manufactured by Obscape. The buoy was co-located with the Datawell buoy at the ILM2WAVE site on 07/30/24, swapped on 9/24/24, and recovered on 11/7/24. The data will be analyzed by Dr. Joe Long to determine its correlation to the Datawell buoy. CORMP technicians worked with Obscape staff to troubleshoot some issues in the firmware and GPS connectivity. If data is determined to be accurate and reliable this buoy may serve as a new low-cost wave buoy option for UNCW faculty research or CORMP deployments.
- UNCW up-time statistics for 7/1/24 – 12/31/24 for real-time moorings:

	ILM2	ILM3	LEJ3	SUN2	CAP2	FRP2	CHR60
Air Temperature	99%	35%	66%	99%	100%	100%	100%
Air Pressure	99%	61%	66%	99%	100%	100%	100%
Wind Speed, Gust, Direction	99%	61%	66%	99%	100%	100%	100%
Salinity	81%	61%	66%	99%	100%	100%	99%
Surface Water Temperature	81%	61%	66%	99%	100%	100%	99%
Waves	99%	N/A	86%	78%	73%	92%	100%
ILM2, LEJ3, SUN2, CAP2, & CHR60 have two buoys on site: a met buoy and a wave buoy							

Issues:

- ILM2's SBE-16 CTD lost power on 11/27/24. Plans to replace the buoy have been delayed due bad weather as well as shifting ship time availablity. Replacement of the buoy is planned ASAP.
- The ILM3 buoy experienced a power system failure and failure of both meteorological sensors. Spare meteorological sensors were not available due to an internal UNCW purchasing issue. The purchasing issue has been resolved and new sensors will be ordered during January 2025. The CTD data logged internally, and data will be downloaded and shared with SECOORA after QA/QC.
- LEJ3 experienced failure to both meteorological sensors. As discussed with ILM3 meteorological sensors, a purchasing issue delayed the purchase of the new sensors.
- SUN2WAVE buoy experienced a mooring failure due to vessel strikes twice during this reporting period. The site was down from 6/24/24-7/7/24 and 12/17/24-1/7/25.
- CAP2WAVE buoy had a mooring failure due to a vessel strike on 7/30/24. It was replaced on 8/28/24. It currently has a power failure due to fouling, beginning on 12/11/24. Replacement/maintenance is planned in early 2025.

USF maintains 2 real-time buoys (C10 & C12) and 2 non-real time moorings (C11 & C15) with SECOORA funding and leverages SECOORA funding with other grants to maintain 2 additional real-time buoys (C13 and C22). All systems are located on the West Florida Shelf (WFS) and, together with modeling efforts, help describe and understand the circulation of the WFS and the role that circulation plays in shelf ecology and other matters of societal concern (e.g., HAB bloom dynamics). QC flags based on QARTOD standards are provided to SECOORA with the real-time data. Real-time data flows to SECOORA and Axiom makes the data available to NDBC via ERDDAP server. Non-real-time data are shared via Research Workspace annually.

Accomplishments:

- Two research cruises on Florida Institute of Oceanography's (FIO) R/V *Weatherbird II* were executed during the reporting period, the first was conducted 7/29-8/1/2024 and the second 10/21-10/23/2024. All funded stations except for the non-real time C11 were serviced on these cruises. Moorings were recovered successfully, and new systems were deployed safely. Data has been downloaded from the non-real time instruments and was shared with Axiom.
- Stations C10, C11, C12 and C15 were all initially deployed in 1998 and now have near continuous data records of 26 years in length.
- USF partnered with FIO to offer the course Field Oceanography during the Fall 2024 semester. Students played lead roles in mooring cruise planning, sensor system assembly and testing, and ultimately cruise execution. The final project for the course was a comprehensive cruise report.

USF up-time statistics for 7/1/24-12/31/24 for real-time buoys:

USF	C10	C12	C13	C22
Wind	91%	50%	42%	68%
Air Pressure	91%	50%	42%	68%
Water Temperature	91%	40%	42%	40%
Salinity (Surface)	91%	40%	42%	40%
Air Temperature	91%	50%	42%	68%
Relative Humidity	91%	50%	42%	68%

Longwave Radiation	91%	N/A	N/A	N/A
Shortwave Radiation	91%	N/A	N/A	N/A
Currents (ADCP)	88%	50%	40%	48%

Issues:
Hurricanes caused significant damages to buoys this reporting period.

- Total up-time for station C10 exceeded 90% even with severe damage sustained from hurricanes Helene and Milton.
- C12 up time was significantly impacted due to direct hits by 3 hurricanes (Debby, Helene and Milton).
- Stations C13 and C22 were impacted due to the combined effects of the passage of Hurricane Milton and difficulties in servicing these two buoys due to transit distance (110 and 150 nm respectively).
- Ship time, personnel time, and instrument spares were used to respond to the damage caused by hurricanes and ensure these important observing platforms can be repaired. However, the use of spares has depleted the sensors available for future use.

Expand the SECOORA Real-time Observing Network

On-track

Water Level Initiative: The SECOORA water level team members funded through the IOOS Core award include partners from the American Shore and Beach Preservation Association (ASBPA)/Hohonu and Georgia Tech. Partners from Coastal Carolina University (CCU)/Florida Atlantic University (FAU), and Florida International University (FIU) are funded through the SECOORA BIL award.

Water level sensor locations can be viewed here: https://wl.secoora.org.

Georgia Tech (GT) Accomplishments:

- Developing a new QA/QC process to integrate quality control flags with the GT water level data submitted to SECOORA.
- Students have been assisting with QARTOD tests and have helped to implement the following: Timing/Gap Test, Syntax Test, Location Test, Gross Range Test, Spike Test, Rate of Change Test, and Flat Line Test.
- K-12 programming continues to be an important part of this project.
  - GT led sensor design activities and semester long projects with Effingham Career Academy and Jenkins High School.
  - Conducted Earth Day community outreach events that included activities with water level sensor kits for K-12 students.
  - PI Clark led a two-week summer camp entitled “IoT and YOU” for middle and high school students to learn about environmental sensors and how to build them using Arduino-based kits. This includes water level and rain gauges for a “smart rain barrel” demonstration project.
  - PI Clark began deployment of six TempestOne weather stations purchased with SECOORA funding last year. These are intended for installation at schools throughout the Georgia coastal counties to increase student engagement. Two have been deployed so far with a third being installed in January.

ASBPA/Hohonu Accomplishments

- Hohonu is operating 34 sensors in the SECOORA Region, automated QA/QC based upon QARTOD has been implemented and improved.

Uptime stats by operator and station are listed below:

Station Name	Owner	Uptime (%)
Fernandina Beach, FL A	GT	65%
Fernandina Beach, FL B	GT	60%
St Mary's Waterfront Pavilion, GA	GT	85%
North River Causeway, GA	GT	40%
Meeting Street Boat Ramp, GA	GT	50%
Montgomery Cross Road at Vernon River, GA	GT	50%
Tybee Island 4 H Center Dock, GA	GT	95%
Hunt Drive at Burnside Island, GA	GT	80%
Shipyard Road, Savannah, GA	GT	60%
Solomon Bridge, Savannah, GA	GT	70%
Hwy 80 at Chimney Creek, GA	GT	50%
Turner Creek Boat Ramp, GA	GT	90%
Walthour Road, Savannah, GA	GT	60%
Lazaretto Creek Fishing Pier, Savannah, GA	GT	60%
Catalina Drive, Savannah, GA	GT	60%
Hwy 17 at Salt Creek, Savannah, GA	GT	0%
UGA Marine Extension, GA	GT	80%
Currituck County, NC	Hohonu	99%
Fernandina Beach, FL	Hohonu	100%
Holden Beach, NC	Hohonu	100%
Surf City, NC	Hohonu	100%
Bald Head Island	Hohonu	100%
Topsail Beach, NC	Hohonu	98%
Emerald Isle, NC	Hohonu	100%
Fort Raleigh National Historic Site, NC	Hohonu	99%
Collington Creek Inn, Kill Devil Hills, NC	Hohonu	98%
Washington Acres Boat Ramp, NC	Hohonu	100%
Snow's Cut Bridge, NC	Hohonu	40%
Duck, NC	Hohonu	100%
Hammocks Beach State Park, NC	Hohonu	99%
New Bern, NC	Hohonu	100%
Cape Lookout National Seashore, NC	Hohonu	100%
Ocean Isle Beach, NC	Hohonu	100%
Hilton Head, SC	Hohonu	99%
Beaufort, SC	Hohonu	95%
Oyster Landing (N Inlet Estuary), SC	Hohonu	100%
North Myrtle Beach, SC	Hohonu	99%
The Citadel, Ashley River, SC	Hohonu	100%
Fripp Island, SC	Hohonu	71%

Marine Corp Recruit Depot Parris Island, SC	Hohonu	100%
Georgetown, SC	Hohonu	100%
Port Royal Sound Foundation SC	Hohonu	99%
Mexico Beach, FL	Hohonu	100%
Captiva Island, FL	Hohonu	100%
Sanibel, FL	Hohonu	94%
John's Pass, FL	Hohonu	32%

GT is continuing to chase reliability issues and moving towards a more sustainable model of fewer total water level sensors overall but with prioritization on reliability for sensors in key locations. One unexpected issue GT encountered this period was the widespread, long-term power outage across four of the main counties in our service area after Hurricane Helene. While the equipment loss was minimal, the data service outage was longer than expected.

SECOORA Biological Data Collection

University of South Carolina Beaufort (USCB) operates and maintains the SC estuarine soundscape observatory (https://sound.secoora.org/). The team operates passive acoustic recorders located in the May River (3 stations), Charleston Harbor (3 stations), Chechessee Creek (1 station), Colleton River (1 station), and North Inlet-Winyah Bay NERR (1 station, decommissioned on 6/29/23). The team plans to redeploy the station that was originally deployed at North Inlet-Winyah Bay NERR to a research area off Pritchard's Island, SC. Potential site locations were evaluated and a new EC questionnaire will be submitted during the next reporting period for the new site.

Each platform consists of a passive acoustic recorder (DSG-Oceans or Loggerhead Instruments LS1), water level logger (HOBO), and a water temperature logger (HOBO). The DSG-Oceans or LS1s (gain set to 14 dB; HTI 96-min sensitivity -180 dBV re 1 µPa) record sound for 2 min every 1 hour (24 wav files/day) at a sampling rate of 80 or 96 kHz, respectively. Specific accomplishments include:

- The team manually reviewed 14,460 sound (or wav) files for biological sounds and noise occurrences during this project period. For manual review, the team subsamples and analyzes wav files every two hours, which equates to 12 wav files/day at each station.
- USCB performed sound pressure level (SPL) analysis on 28,951 wav files. SPL analysis is completed on every wav file (i.e., every 20 mins or 1 hour).

On-track

DMAC AND MODELING & ANALYSIS SUBSYSTEMS

SECOORA DMAC subsystem

Axiom Data Science is the SECOORA data management team. The annual data management update for 2024 is included as Appendix A. The 2024 SECOORA Asset Inventory has been uploaded as a separate Excel file with this progress report.

On-track

Axiom provides the following support on an on-going, annual basis:
• Maintain, operate, and develop SECOORA cyberinfrastructure to sustain long-term data stewardship for partners and stakeholders.
• Maintain IOOS compliant services and applications for integration with national products.
  ○ THREDDS 4.6.15 - https://thredds.secoora.org
  ○ ERDDAP 2.02 - https://erddap.secoora.org
  ○ SECOORA ISO WAF - https://thredds.secoora.org/iso
  ○ NCEI Archive - https://ncei.axiomdatascience.com/secoora/
• Maintain the Glider System for the management of SECOORA glider assets. The SECOORA glider data is available for visualization in the portal (here), and data is submitted to the National Glider DAC (GDAC) during glider missions.
• Support data ingestion and data standardization for the Water Level Network. Data are flowing from PIs to Axiom via transfer pathways (e.g., APIs) and are then ingested into the ERDDAP server and displayed on the SECOORA website.
• Promote data standardization and automation through Research Workspace (RW) and standardized data ingestion processes for SECOORA-operated and non-SECOORA data assets, including moored sensors, ship-based sensors, gliders, HFR, models, and historical legacy time series data sets.
• Promote data discovery and public access through the SECOORA data catalog and data portal (https://portal.secoora.org).
  ○ Continued implementation of model data & virtual sensor updates focused on improving the handling of gridded data and stability of virtual sensor functionality on the data portal. Hosted an internal planning session focused on improving data access and serving of large model datasets.
  ○ Programmatically monitoring health of THREDDS-served datasets to access possibilities for improvements
  ○ Working on a binning service to improve visualizations of large datasets.
• Strengthen data stewardship within SECOORA to improve data quality, access, attribution, exchange, delivery, and storage.
  ○ Axiom started developing a new public Sensor Service API that provides access to Axiom's sensor data in a format similar to that of ERDDAP. This API is offering a solution for manually and programmatically accessing and downloading oceanographic sensor data with easy access to both near real-time and historical measurements.
• Implement real-time sensor QARTOD compliant quality control systems.
• Annually archive physical oceanographic, biogeochemical, and meteorological data with NOAA's NCEI.	

CNAPS Model	
The CNAPS model is operated and maintained by NC State University (NCSU) and Fathom Science. • The project team is maintaining the CNAPS model and they have been collaborating closely with Dr. Cristina Forbes of US Coast Guard on SAR modeling to support SAR operations.	On-Track

• Now that AWS operations and data distribution servers are running stably, the primary goal is to identify and procure a new web service to bring the CNAPS nowcast/forecast web presentation back online for the oceanographic community and beyond.	
WFS Model	
The USF team continues to provide the West Florida Coastal Ocean Model (WFCOM) and the Tampa Bay Coastal Ocean Model (TBCOM) daily nowcast/forecast systems. These models produce simulated currents, water temperature, and sea surface height fields. Both WFCOM and TBCOM are available here: http://ocgweb.marine.usf.edu as well as being transmitted via THREDDS server to NOAA GOODS. Specific accomplishments include: • USF improved the WFCOM-based water level projection product for the entire west Florida coast: http://ocgweb.marine.usf.edu/Models/WFCOM4/SeaLevel/. This is based on the daily automated WFCOM nowcast/forecast system and the tide gauge data that are mostly provided from NOAA Tides and Currents. The model provides a comparison of the observed water level and model simulated water level over 5 days as well as a 3-day water level forecast. The water level veracity test and forecast product serves as important guidance to government agencies and local communities for consideration in decision-making, particularly, during events of hurricanes and tropical storms (coastal flooding due to storm surges). • USF developed a TBCOM-flooding model by expanding the model grid onto the land so that storm related flooding/inundation on the coast can be simulated. During Hurricane Helene, the TBCOM-flooding model provided excellent inundation forecasts 2-days in advance. The forecast was shared on the lab's website: http://ocgweb.marine.usf.edu/Models/TBCOM/Flooding/tpb.html • The red tide short-term tracking and forecast product was improved with the help of an undergraduate intern. Google Maps is used as the background instead of the plain background that was generated more than 10 years ago. Animations also are now available. http://ocgweb.marine.usf.edu/Models/WFCOM4/HAB_tracking/	On-track
AI Portal	
Florida Wildlife Research Institute (FWRI) and Axiom Data Science are building an artificial intelligence annotation data portal (AI portal). This year, the team is refining the look and feel of the content in the AI Gateway, publicizing the final version based on domain expert and end-user requirements, and continuing to advance interactive use cases. Accomplishments for the reporting period: • The team is continuing to explore applications of conversational agents as interactive training tools that could soon act as intermediaries between researchers and documentation. Workflows for using APIs for generalized transformer models have been explored for text-to-text (Ollama, OpenAI, Anthropic, Hugging Face), text-to-image (Hugging Face), and image-to-text (Hugging Face) models. Quarto has been identified and applied as a powerful tool for publishing reproducible workflow documentation.	On-track

• Working groups for usage of imagery alongside taxonomic occurrence data published in OBIS, GBIF, and Ecotaxa have been formed and attended. Methods for publishing large volumes of planktonic occurrence data are in development. • The team has continued building real-world use cases that will be featured on the AI Gateway. The acoustics use case is the development of an AI 'boat detector' from underwater hydrophone data. During the reporting period, the AI model was trained with a recall accuracy of ~85% and a false negative rate of less than 5%. Additionally, the training workflow was developed to include an 'active learning' component, where the program identifies the lowest confidence classifications for the user to manually label. This active learning step allows for users to limit the amount of manual labelling by helping the model with the most difficult snippets of sound which gives the most bang for their buck with training. • The team advanced the development of an unsupervised, open-source machine learning algorithm for photo-quadrat recognition and benthic image cropping: Quadrant Recognition and Cropping Tool. This tool enables batch processing of large photo-quadrat datasets in an automated and standardized fashion. This is a Python-based package applying Pytorch libraries that automatically: 1) recognizes the quadrat frame in an image using edge detection method; 2) identifies the internal edges of the frame; 3) defines an 1,700 x 1,700 pixel section within the quadrat that excludes the frame; 4) crops images using these edges; and 5) stores the cropped image in dedicated sub-directories. The tool is available in this Github repository: https://github.com/linobigatti/quadrantrecon?tab=readme-ov-file	
SEAMAP-SA Data and Analysis	
The SCDNR SEAMAP-SA staff and Axiom are converting fishery and turtle data into DarwinCore format for ingestion into the SECOORA data portal and sharing on the MBON data portal. Accomplishments include: • Conversion to Darwin Core terminology was finalized and approved by Axiom. Best approaches for data user report/extraction outputs were discussed and finalized by SEAMAP-SA data management staff and Axiom. Reef Fish Survey data was used as an initial trial of single year data. Updates to this test data set were performed as needed based on feedback from Axiom. • The complete Reef Fish Survey data set (years 1990-2022) was submitted to Axiom to test upload speeds, code table relationships, etc. Updates to this test data set were performed based on feedback from Axiom. Axiom noted that the length frequency upload took a considerable amount of time. This was expected since this table is the largest of all the data tables and this test included 30+ years of length frequency data. Standard updates in the future for each new year of data will not have equivalent time demands. • Remaining surveys (Coastal Trawl Survey, Pamlico Sound Survey, Longline surveys) were prepared and single year data were submitted to Axiom for testing. • Complete data sets for the remaining surveys will be provided when single year data set trials are successfully completed by Axiom and any changes based on Axiom feedback are implemented by the SEAMAP-SA data managers. • Testing of the SEAMAP-SA data portal for test downloads and data summaries has begun using a newly provided data set from one of the four SEAMAP-SA surveys.	On-track

At present, the data structure and extraction datasets appear to be behaving as intended. The portal is user-friendly and provides multiple data outputs desired by future data users. • Axiom has begun preparing a method for zipped data delivery where data users will receive a time-stamped zipped file with their selected dataset and relevant metadata. Axiom is also seeking the best approach for providing general summaries of data types used and downloaded by portal users. These resources were listed as highly desired by SEAMAP-SA during initial project development in 2019.	
OUTREACH, ENGAGEMENT, PRODUCT DESIGN SUBSYSTEM	
Support Community Driven Networks	
See "NOAA, IOOS, Other Agency Funding" table, starting on page 13	
SECOORA Outreach and Engagement	

• The outreach one-pager addressing the 2024 hurricane season can be accessed here: https://secoora.org/wp-content/uploads/2025/01/Final-Hurricane-helene-impacts-And-observations.pdf
• SECOORA released 14 news stories on the website: https://secoora.org/news/
• SECOORA hosted a webinar for the Coastal Observing in Your Community Webinar Series in August with Dr. Leila Hashemi-Beni, North Carolina Agricultural & Technical State University. https://secoora.org/webinar-series-index/
• SECOORA concluded the collaborative OA/MBON webinar series (5 total) with GCOOS in July and August: https://secoora.org/gcoos-secoora-joint-webinar-series-building-synergy-across-the-us-mbon-ocean-acidification-networks/
• Details on media engagement and outreach for SECOORA staff and project PIs are found here (on the tab labeled 7/1/24-12/31/24): https://docs.google.com/spreadsheets/d/189a6FgoOAjMvGxDxmYuf0QnEoHuPXgpNqjMWn5YFv94/edit?usp=sharing
• The 2024 SECOORA Data Challenge was hosted in the fall, receiving 5 applications. Two winners were selected for funding, which will be executed in January 2025. https://secoora.org/winners-of-2024-secoora-data-challenge/
  ○ Matthew Hatami, University of South Carolina Graduate Student
  ○ Prasun Banerjee and Ananya Shetty, Georgia Tech Undergraduate Students
	On-track

Product Development	
Water Level Network User Interface (SECOORA): SECOORA contracted Second Creek Consulting to develop a website and individual water level station pages which is available here: https://wl.secoora.org. Updates this reporting period include the addition of user registrations for monitoring notifications for each of the SECOORA stations.	On-track
SECOORA developed data products and websites:	On-Track

• The SECOORA Hurricane Resources page (https://secoora.org/hurricane-resources/) was for the 2024 Hurricane Season. • Axiom updated the Eyes on the Storm site for all 13 tropical storms and hurricanes that impacted the Southeast this season.	
The How's the Beach (HTB) project team is comprised of representative from three existing products: HTB (University of South Carolina (UofSC)), ShellCast (NCSU), and Beach Condition Reporting System (BCRS, Mote Marine Laboratory). Specific accomplishments this period include: • The HTB team has continued planning for the water quality monitoring workshop. The workshop is now scheduled for January 30-21, 2025 in Wilmington, NC. The HTB team partnered with SECOORA, the NOAA Office of Coastal Management, and the Association of Floodplain Managers to host the workshop in conjunction with the 2025 Coastal GeoTools Conference. • Officials at NOAA NWS, UC Santa Cruz, Volusia County Ocean Rescue, and Jacksonville Beach Ocean Rescue were engaged to provide feedback to the team to standardize rip current reporting and scalability, as well as to create an automated rip current detection and forecast model for implementation on the BCRS site. Mote Marine Laboratory staff assisted with beta testing the UC Santa Cruz "Rip Finder App". • The ShellCast expansion into Florida was completed, but changes are being made in response to feedback from the Florida Department of Agriculture and Consumer (FDACS) Services. The primary update involves accounting for seasonal changes in closure criteria of select harvest areas; NC and SC do not have seasonally variable closure criteria, so accounting for seasonality required several changes to our analysis workflow. Once all requested changes are completed and FDACS has no additional feedback, we will disseminate more broadly. • BCRS back-end code is currently undergoing dependency updates to allow seamless integration of HTB and ShellCast data layers. • The BCRS team is expanding their Beach Ambassadors program to include ambassadors for Sombrero Beach, FL, Bahia Honda State Park, FL, John's Pass, FL, and Ferry Landing Park, NC. Beach Ambassadors are trained volunteers who submit beach conditions reports based on their trained observations. Our Beach Ambassadors consist of lifeguards, city/county personnel, park staff, and members of the public who have regular access to a reporting location.	On-track
The UNCW developed Situational Awareness Tool (SAST): NWS Staff continue to create alerts based off real-time data to forecast rip current and flooding events using SAST. During the reporting period, 1,695 automated alerts were generated. The system has been improved to allow users to create and maintain their own accounts; originally account registration was only possible by contacting the UNCW web administrator.	On-track

IOOS, NOAA, Other Agency Funding	
Funding Area/Recipient	**Task and status update – See Appendix J for ASAP draws by funding line**

Regional Ocean Partnership, Lead PI Debra Hernandez, SECOORA	Status: On-track Accomplishments: • Southeast and Caribbean Disaster Resilience Partnership (SCDRP) – Note that SCDRP is funded through ROP funds as well as SECART funding. ○ Status: On-track ○ See Appendix A • Marine Heat: SECOORA is working with CARICOOS, GCOOS, and FACT to analyze surface and subsurface temperature data across regions to evaluate marine heatwaves and their impacts on key ecosystems. SECOORA is advertising for a graduate student or post doc to lead the data analysis efforts and work collaboratively with the other RAs. The posting is found here: https://secoora.org/fact/marine-heat-wave-student-position-opportunity/. The opportunity closes on 2/7/25 and we hope to have a student hired by late February. ○ On-track • Sea Grant engagement in the Southeast: ○ Complete: 12/31/2024 – note that Sea Grant teams will remain engaged in the water level initiative through IRA funding. All work will move to that award. ○ The four Sea Grant teams (NC, SC, GA, and FL) continue to meet bi-monthly to discuss water level sensor needs and provide feedback on the SECOORA water level website (wl.secoora.org). ○ NC Sea Grant, City of Wilmington, UNCW, and SECOORA are collaborating on a Community Collaborative Research Grant proposal that was selected for funding in April 2024. As part of this effort, SECOORA installed a water level sensor in an urban underserved area of Wilmington on Burnt Mill Creek, on the Love Grove Bridge. Data for this station is available here. SECOORA and NC Sea Grant staff also met with local community partners at an outreach event hosted in 11/9/2024 at the DREAMS Center for Education in Wilmington. ○ SC Sea Grant staff and SECOORA staff met in person for a field trip to review previous water level sensor installations. The group also discussed which locations may benefit from supplemental sensors (i.e., meteorological sensors, cameras). Supplemental sensors are being included in discussions with communities that are interested in having a water level sensor installed.
SECOORA-SECART support for SCDRP	SCDRP –Note that SCDRP is funded through ROP funds as well as SECART funding. ○ Status: On-track ○ See Appendix B
Marine Life/SECOORA	Data Wrangler for the FACT Network ○ Status: On-track ○ See Appendix C
OA/University of Georgia	OAP allotment to support the NOAA Ocean Acidification Observing Network (NOA-ON) Grey's Reef (PI Scott Noakes, UGA)

	○ Status: On-track ○ See Appendix D
OA/SECOORA	OAP allotment of project resources in support of the Southeast Ocean and Coastal Acidification Network for FY24 and FY25 (PI Emily Noakes) ○ Status: On-track ○ See Appendix E
HFR retuning/testing/ additional work and/or recap HFR station	Status: On-track Accomplishments: Funding was used by SECOORA to purchase supplies (A/C units for UM; a new CPCI for FIT; modems, cables, and antennae for USF) and to purchase on-line support from CODAR for ECU/CSI and USF. SECOORA is holding off purchasing additional items until planning for the FL outreach event occurs and costs for this effort identified. Delayed: hosting outreach event in FL The IOOS program office suggested that SECOORA host and outreach event for communities along the Space Coast of FL since four (4) HFR were installed. IOOS, SECOORA, and SkIO have engaged with NASA's Kennedy Space Center regarding hosting the event; however, communications stalled after Hurricane's Milton and Helene, as KSC had to conduct storm preparation and post-storm clean-up. We anticipate restarting communications in Feb 2025. If KSC is not an option for hosting the event, we will identify other community partners who may be interested.
Harmful Algal Blooms (HABS)	PI Michael Parson, Florida Gulf Coast University, Maintain and enhance the network of long-term water quality and HAB monitoring stations in southwest Florida (SWFL). ○ Status: On-track ○ See Appendix F PI Natalie Cohen, UGA Marine Extension, Identify environmental conditions that are conducive to HAB formation in Georgia estuaries. ○ Status: On-track ○ See Appendix G
SECOORA – Vembu Subramanian Scholarship	SECOORA hosted the 2024 Vembu Subramanian Scholarship and received 7 applications and selected four winners. Sub-awards to winners will be executed in January 2025. Winners include: ○ Mallory Mintz, UGA SkIO Graduate Student ○ Celina Ceballos, FGCU Graduate Student ○ Anna Weber, FIT Post-Doc ○ Jamie Long, UNC Chapel Hill Undergraduate Student
Modeling/UNC-Chapel Hill	PIs Brian Blanton & Rick Leuttich ○ Status: On-track ○ See Appendix H
Modeling/University of North Florida	NOTE – the project team changed and the subaward was issued to PI Tejeda with the University of South Florida. ○ Status: On-track

	○ See Appendix I
Modeling/ University of South Florida)	PI Yonggang Liu ○ Status: On-track ○ See Appendix J
DMAC	Lead PI: Filipe Fernandes ○ Status: On-track ○ See Appendix K
Gliders/SECOORA	Lead PI: Catherine Edwards, UGA SkIO to support glider deployments and recoveries during the 2024 and 2025 seasons. (OMAO: Navy gliders) ○ Status: On-track ○ See Appendix L
Gliders/SECOORA	Lead PI: Catherine Edwards, UGA SkIO to support OMAO-OAR RFP Saildrone-Glider project ○ Status: On-track ○ See Appendix M
Gliders/SECOORA	Lead PI: Catherine Edwards, UGA SkIO to support Hurricane Glider operations (two funding lines) ○ Status: On-track ○ See Appendix N
HABS – partial funding of pan regional Sargassum project, lead PI, Chuanmin Hu, USF	Lead PI: Chuanmin Hu, USF ○ Status: On-track ○ See Appendix O
Marine Biodiversity Observations Network – funding from Yrs 1&2	Lead PI: Neil Hammerschlag ○ Status: Delayed ○ See Appendix P

III. PROJECT CHALLENGES/MODIFICATIONS:

- HFR and buoy equipment sparing and supplies have been negatively impacted by Hurricanes Helene and Milton. Future system up-times may be impacted if supplemental funding is not made available.

IV. PUBLICATIONS:

See Google Drive links for a list of Peer Reviewed Publications. See the 2024 Publications tab: https://docs.google.com/spreadsheets/d/1k1Z_u7olTH24HyqNxFI7bpb73gYMubSpDJeD6J2XaPo/edit?usp=sharing

V. BUDGET SUMMARY:

- Were the oldest ASAP TAS BETC accounting lines invoiced first?
  - This is Year 4 of the award. SECOORA is spending down Year 1, 2, 3, and 4 ASAP TAS BETC lines. See Appendix Q.
- Give details on any delays with initiating a contract/subaward. Note any issues with the previous year funds or other issues that occurred during the reporting period. Will this result with a work stoppage or cause significant problems with the partnership?

    - SECOORA has issued all Year 4 subawards and subcontracts related to this award.
- Give a brief update on project invoicing for the reporting period. Were there any delays with invoicing or payment?
    - SECOORA continues to receive all year invoices. There is always a delay between when a subawardee conducts work and when SECOORA is given an invoice for that work. SECOORA regularly monitors invoicing frequencies with subawardees/subcontractors. Most subawardees invoice quarterly.
- Provide details on any property or equipment charged directly to the award having a useful life of more than one year and an acquisition cost of $5,000 or more per unit during the period.
    - No equipment was purchased by SECOORA during this reporting period.
- Include changes in key scientific, technical or management personnel, not included in certification.
    - No changes have been made this reporting period.
- Include changes to the organizational structure such as: changes in status or partners organizations and points of contact.
    - No changes to organizational structure have been made this reporting period.
- Provide an update about travel completed during the reporting period.
  Examples of travel completed during the reporting period include:
    - Hernandez and Dorton participated in the IOOS Association Meeting held in Juneau, AK, September 3-6.
    - SECOORA staff participated in a team meeting and staff retreat, in Charleston, SC, October 6-8.
    - Hernandez, Dorton, and Alsbrooks met in Charleston, SC September 16-17 for a water level planning meeting.
    - Dorton and Jass participated in the NC Sea Grant Coastal Conference hosted in New Bern, NC, November 13-14.
    - SECOORA staff participated in the December Board meeting, hosted in Charleston, December 9-12.
- What are the total travel expenditures to date on the award though the reporting period?
    - Total travel expenditures through December 31, 2024 equal $128,225.39.
- Are there any plans to initiate a new partnership (contract or subaward) during the next reporting period?
    - No

VII. SUCCESS STORIES

- Success stories can be found on this spreadsheet on the “2024 7-12” tab: https://docs.google.com/spreadsheets/d/1eq_yczZY0h3xciWp4jirHrv1P5KasEXBpQ-MYHap_sc/edit?gid=683531107#gid=683531107

End Report

APPENDIX A: 2024 SECOORA DMAC Annual Progress Report

ACTIVITIES DURING THE REPORTING PERIOD

REPORTING PERIOD: January 2024 - December 2024

Provide a summary of any DMAC implementation activities undertaken over the previous year.

Task 1: Base DMAC Services

Objective 1. Core Cyberinfrastructure Support- Ongoing

- The Axiom data system is the back-bone of the cyber infrastructure that is leveraged to acquire, archive and share SECOORA data and information products. The open-source interoperability and data stewardship systems of the SECOORA infrastructure were maintained to provide full-lifecycle data management services.
- Throughout this performance period project, Axiom:
    - ensured that the SECOORA Data System was healthy, secure, and monitored; provided technical support to system problems; and mapped out future upgrade strategies.
    - maintained ongoing continuous performance of the SECOORA data system following IOOS DMAC guidelines.

Objective 2. Cyberinfrastructure Enhancements - Completed

- Maintained IOOS compliant services and applications for integration with national products.
    - THREDDS 4.6.15 - https://thredds.secoora.org
    - ERDDAP 2.25_1 - https://erddap.secoora.org
    - SECOORA ISO WAF - https://thredds.secoora.org/iso
    - NCEI Archive - https://ncei.axiomdatascience.com/secoora/
- Upgraded database servers for core metadata systems.
- Old generation data file storage system fully decommissioned and removed.
- Updated rsync data transfer method to streamline and automate large data transfer to Research Workspace.
- Implemented new storage appliance configuration to improve stability in high usage applications, provisioned additional storage for HFR data, and completed full update of data storage for data ingests to improve performance.
- Continued implementation of model data & virtual sensor updates focused on improving the handling of gridded data and stability of virtual sensor functionality on the data portal. Hosted an internal planning session focused on improving data access and serving of large model datasets.
- Enhanced data center servers for model processing.
- Working on a binning service to improve visualizations of large datasets.
- Updated search to ensure GHRSST is top result for “sea surface temperature” and “SST” search results.
- Programmatically monitoring the health of THREDDS-served datasets to assess possibilities for improvements.

- Continued working on the ERDDAP source code clean up.
- Improved delayed-mode glider mission submissions.
- Started developing a new API to support water level data transfer to Axiom.
- Axiom started developing a new public Sensor Service API that provides access to Axiom's sensor data in a format similar to that of ERDDAP. This API is offering a solution for manually and programmatically accessing and downloading oceanographic sensor data with easy access to both near real-time and historical measurements.
- Expanded SECOORA data portal holdings to include:
    - Water level stations for Southeast Water Level Network
    - Biscayne Bay, Treasure shores HFR, Hightower HFR
- Maintained the SECOORA Glider System for the management of SECOORA glider assets (Bass, Modena, Pelagia, Ramses, Salacia, Saltdawg, Angus, and Franklin). The SECOORA glider data was updated for visualization in the portal (here), as well as submitted to the DAC. Progress was made in improving collaboration with the DAC on running QC on glider data.

Objective 3. DMAC Support to Existing Programs- Completed

- Maintained bi-monthly DMAC progress calls with SECOORA staff.
- Participated in all SECOORA regularly scheduled PI calls.
- Maintained the Jira SECOORA DMAC task board to track all data management work progress.
- Maintained the Jira SECOORA DMAC feedback board to track and manage portal feedback.
- Maintained, documented, and improved upon the existing SECOORA Glider System.

Objective 4. Develop New Products and Capabilities- Completed

- Improved sensor status dashboard to monitor and troubleshoot data ingests.
- Maintained technical support for the FACT team, including:
    - Supported the OTN FACT Node at SECOORA, which included progress towards making the FACT data discoverable through the IOOS Animal Telemetry Network data portal.
    - Maintained and updated the DaViT tool; a visualization tool for species diversity and distribution that will be used to inform the general public and fisheries managers.
- To increase reliability and timely presentation of sensor data for ingestion by NDBC, Axiom maintained an operational ERDDAP deployment for high priority data sets.

Objective 5. External/Special Projects

Task 1: SEAMAP, Continuous; Ongoing

- Maintained a refreshed codebase to our staging server to continue to build out of reporting tool.
- Assessed and provided feedback on the Reef Fish Survey dataset.

- Ingested the refined Reef Fish Survey 1990-2022 dataset.

Task 2: FWRI, Continuous; Ongoing

- Maintained machine learning algorithms for detecting spawning coral in aquaria.
- Maintained codebase and documentation for development of future AI/ML projects.
- Continued development of AI/MI informational webpage to showcase data use cases.

Task 3: Water Level, Continuous; Ongoing

- Maintained data ingestion pathway for all PIs including metadata development for all sensor feeds.
- Upgraded the tide prediction data serving through ERDDAP which eliminated
- Maintained all sensor feeds in the SECORA data portal and developed tagging for the Southeast Water Level Network.

UPCOMING/PLANNED ACTIVITIES

Upcoming SECOORA DMAC activities include:

- Continue implementation of the components of the next gen portal.
- Ingest new datasets, as identified and prioritized by SECOORA.
- Support data submission, visualization, and metadata generation for SECOORA funded projects.
- Participate on behalf of SECOORA in state and regional groups as determined by SECOORA, as well as national IOOS and IOOS Association data. management committees and working groups and international organizations.
- Support existing products, as identified by SECOORA and its partners.

SUCCESSES OR CHALLENGES

SECOORA continues to persist a robust system for continuous integration of real-time observation stations (LINK). Below are metrics for 2024:

For comparison - SECOORA data portal metrics (January 1, 2024 – December 31, 2024):

- Sensor Stations
    - Total number of sensor stations: 1,789
    - Number of sensor types: 90
    - Number of affiliates: 96
    - Total stations with data from the past year: 1,002
- Moving Platforms
    - Total number of moving platforms: 89
    - Number of affiliates: 3
    - Total platforms with data from the past year: 12
- Data Layers
    - Total number of data layers: 781

    - Number of affiliates: 25
    - Total datasets with data from the past year: 109

For comparison - SECOORA data portal metrics (January 1, 2023 – December 31, 2023):

- Sensor Stations
    - Total number of sensor stations: 1,702
    - Number of sensor types: 90
    - Number of affiliates: 87
    - Total stations with data from the past year: 1,035
- Moving Platforms
    - Total number of moving platforms: 78
    - Number of affiliates: 3
    - Total platforms with data from the past year: 8
- Data Layers
    - Total number of data layers: 736
    - Number of affiliates: 24
    - Total datasets with data from the past year: 98

Appendix B: SCDRP

SECOORA PROGRESS REPORT: JULY 1 - DEC. 31, 2024

Status: Submitted (01/16/2025 01:21:46 PM)
Project PI: Heather McCarthy, SCDRP Executive Director
Project Title: Southeast & Caribbean Disaster Resilience Partnership

PROGRESS TOWARDS MEETING OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives. For each objective provide one of the following indicators: "Complete" and date of completion. "On-Track" or "Delayed" and anticipated date of completion. If an objective is delayed, a justification for the delay must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.*

The SCDRP Annual Meeting planning is underway:

- The SCDRP 9th Annual Meeting will be hosted in Wilmington, NC, February 4-5, 2025 at the Aloft Wilmington at the Coastline Center. Details about the meeting and the agenda are found here: https://www.scdrp.secoora.org/annual-meeting-2025
- A 30-member Steering Committee was formed and has met 6 times. Subcommittees were established to help with planning efforts.
    - The Field Trips Subcommittee is organizing a 2-hour educational fieldtrip to the *USS North Carolina* and surrounding Eagle Island area on Feb. 4. The field trip will encompass the historical significance of the area and ecological monitoring efforts.
    - The Education Subcommittee is working to facilitate the earning of Professional Development Hours and Continuing Education Units by attendees.
    - The Poster Session Subcommittee is organizing the poster session for the afternoon of Feb. 5.
    - The Mentorship Events Subcommittee is organizing a Cohort #1 Mentor/Mentee Meet-up and will recruit Cohort #2 participants for the SCDRP Mentorship Program.

Appendix C

SECOORA PROGRESS REPORT: JULY 1 - DEC 31, 2024

Status: Submitted (01/13/2025 03:38:49 PM)
Project PI: Joy Young
Project Title: FACT Data Wrangler

PROGRESS TOWARDS OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives and note if the objective is Complete, On-Track, or Delayed. If an objective is delayed, a justification for the delay (e.g., travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed to mitigate the delay.*

Priority 1:
Conduct two major (i.e. inter-network matching) telemetry data processing events. The first was in June (previous progress report)

- October push: 88 issues were processed as part of the push with 61.4% classified as loading and 26.1% classified as fixing. This is common but highlights the fluid nature of telemetry datasets and the importance of sustaining a system that errors may be fixed and applied retroactively to datasets. The Oct push included over 40 million new and updated detections.
- Overall, the FACT node currently has 214 projects, 326 contributors, 136 species, 3,770 active tags, 11,394 total tags, over 351 million detections and is using 469 GBs for database storage.

Collect and upload environmental data from array owners in conjunction with data processing events.

- June push: Temperature data from sensor- enabled receivers and external temperature sensors were uploaded to Research Workspace 26 July 2024. Of note, the temperature dataset increased by 696,081 observations (from 8.1 million to 8.8 million) from 523 stations and included 34 projects (up from 29) represented in the dataset.
- Oct push: Temperature data from sensor- enabled receivers and external temperature sensors were uploaded to Research Workspace 12 November 2024. The dataset included over 10.3 million observations – an increase of 16% since June 2024 and including data from two new projects. That brings the entire dataset to 608 unique sites – a 16% increase from June 2024.

Priority 2:
Work with PIs to resolve incomplete telemetry datasets (based on process under priority 1).

- During the Oct push, 26% of issues were related to ‘fixing’ already submitted data. Fixes included updating the database to change past coordinates, changing the code of a sentinel tag, removing duplicate downloads for many projects, changing the reported lengths of animals, and changing animal harvest dates.

PUBLICATIONS & CONFERENCE PRESENTATIONS

2 *List any published scientific papers, conference papers, or notable presentations given within the reporting period related to this award. This may include presentations at non-traditional venues. Do not include publications outside of the six-month reporting period. For presentations, include the title, name(s) of the*

presenter(s), date the presentation was made, and the venue (e.g., CERF, AGU). Also note whether the materials presented (e.g., PowerPoint® slides) remain available to SECOORA and IOOS and, if so, how they may be accessed (i.e., list the website address or online file sharing link such as Google Drive).

Conference presentations:

- "Party Wave Acoustic Telemetry: Fisheries Research through Collaboration and Knowledge Co-production". Co-hosted a workshop on collaborative acoustic telemetry at the American Fisheries Society annual meeting in Honolulu, Hawaii Sept 15-19, 2024. https://afsannualmeeting2024.fisheries.org/2024/03/22/party-wave-acoustic-telemetry-fisheries-research-through-collaboration-and-knowledge-co-production/
- "DaViT: bridging the gap to open data". Presentation at the Ocean Tracking Network Symposium. 25 September 2024. https://oceantrackingnetwork.org/wp-content/uploads/2024/09/Program-digital.pdf
- "FACT Update". Presentation on the Ocean Tracking Network International Data Management Committee. 27 October 2024.

MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH

3 *List any media coverage related to this award and include links to news stories and media coverage. Only include media coverage conducted within this six-month reporting period.*

Four social media posts pertaining to the FACT annual meeting, job alerts, and data submission deadlines were posted. See next page.

The FACT website was updated to include materials from the summer and winter 2021 meetings, an updated user agreement, new graphics on the acoustic telemetry resources page with links to study halls, and updated the news section on the website.

4 *Describe education or outreach materials related to this award that have been developed within this six month reporting period.*

Working with the Ocean Tracking Network International Data Management Committee, we led the creation of a survey to gather opinions on open access of telemetry data. the survey was submitted to Dalhousie University Ethics Committee for review. We expect revisions and/or acceptance in early spring 2025.

5 *Upload outreach and education materials developed during the reporting period. Please combine multiple outreach/education materials into one document*.
FACT_social_media_posts_Dec_2024.pdf (next page)

PRODUCT DEVELOPMENT & DELIVERY

6 *Provide a brief description of the status of all products or tools currently available or under development as part of this award. Use this section to report instances in which IOOS-funded science related to this project has been transitioned to support products developed by your organization or even beyond your organization. Also describe who is using the products and the number of users. Only report on work conducted within the six-month reporting cycle.*

The DaViT - FACT provided updated detection extractions for visualization in the DaViT in July and

October 2024. The DaViT is an online, interactive mapping tools that displays animal distribution and density with receiver arrays. We are working now to solidify lines of communication with Axiom regarding the DaViT. Recent turnover has limited out ability to know when the website has been updated.

RWSC - The FACT Network was approached by the Regional Wildlife Science Collaborative for information on receiver deployments to create an online mapping tool for wind management (https://rwsc.org/map/). We worked with RWSC staff to create a survey form that was sent to FACT members to sign up to participate. After several more meeting with RWSC to establish formatting needs, the resulting dataset will be provided to RWSC in January 2025.

SUCCESS STORIES

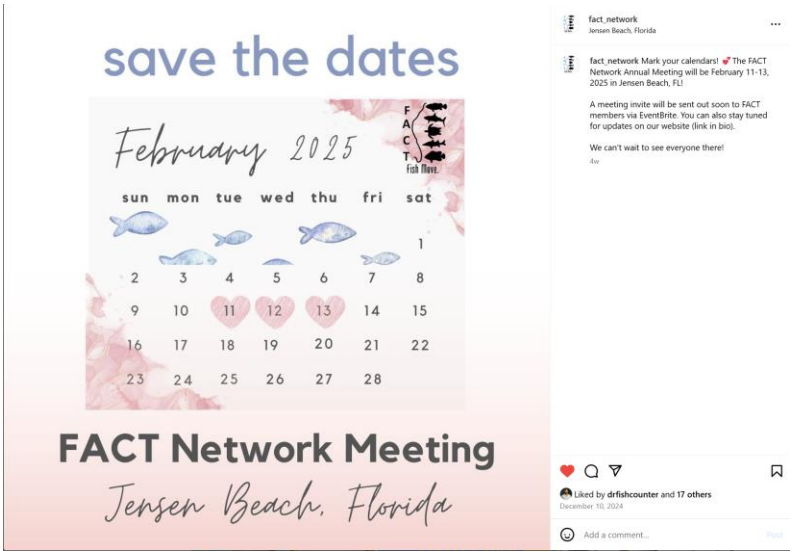
7 *Briefly describe any success stories that help convey the value of your project and the impact that it has made. Success stories should include how your project has benefited local/regional stakeholders. These stories may be used by SECOORA and the IOOS Office to respond to data calls, support presentations, or used as independent stories. Provide contact details (email addresses) for the PI and stakeholder(s) impacted.*

Everything is a success story! Each data push includes new projects and collaborators. 2024 was the lowest year with unmatched detections - suggesting that we can assign the majority of detections to animal metadata.

After the SECOORA PI call, we received inquiries from three organizations about placing acoustic receivers on ocean observing equipment. One group, UNCW (PI Lynn Leonard, lynnl@uncw.edu), was deploying two buoys off the east coast of FL within the week. We reached out to FACT members in the area and were able to 1) ship two receivers to a neighboring telemetry group, 2) the neighboring group installed the batteries and initialized the receivers, and 3) get the receivers to the oceanographers all in a few days. This required an amazing amount of collaborative effort and would not be possible without the network. The result was the deployment of two receivers along the east coast of Florida in novel locations.

Meeting related social media posts:

Dec 10, 2024 https://www.instagram.com/p/DDafDabRArQ/



Job related social media posts:

October 19, 2024 https://www.instagram.com/p/DBTtGYhR7FI/

Data Push social media posts:

September 23, 2024 https://www.instagram.com/p/DAQgQcnxOqA/?img_index=1

September 18, 2024 https://www.instagram.com/p/DAFG3GzvkOE/

Appendix D

SECOORA MOORINGS AND WATER LEVEL PROGRESS REPORT: JULY 1 - DECEMBER 31, 2024

Status: Submitted (12/17/2024 02:55:39 PM)
Project PI: Scott Noakes, UGA
Project Title: Grey's Reef OA mooring

ACCOMPLISHSMENTS TOWARDS OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and describe progress towards meeting the objectives. For each objective provide one of the following indicators: Complete, On-Track, or Delayed and anticipated date of completion. If an objective is delayed, a justification for the delay must be provided along with a new completion date and description of activities employed to mitigate the delay.*

The SAMI-pH mounted under the GRNMS buoy failed in mid-August. PMEL put the request on their list and began searching for a spare instrument to prepare for Gray's Reef. While waiting for the new SAMI, a trip to JY Reef was scheduled to search out Oculina coral colonies for potential marking for the monitoring project. Dives were made on the USS Daniels (both sections) and numerous healthy Oculina were seen and photographed. It was also noted that below deck on the Daniels there were examples of bleached corals that were thriving in a low light environment. This is contrary to corals living further south in the Florida Keys that need light for the symbiotic algae to grow on the corals.

PMEL sent a replacement SAMI-pH in late September but unfortunately, sea conditions between September to mid-December were conducive for buoy operations. On 12/19/24 the team was able to head offshore on Triton's Grace out of Kilkenny Marina, Georgia. Seas started out at 4 ft with a 7 second period and later opened up to 9-10 second period with little chop between. First on the list was to collect water samples at the GRNMS buoy with the first sample collected at 10:19 ET. Once collected, we headed to the Research Area to deploy the seafloor platform and sensors. The platform was lowered to the seafloor and then a search was made to find the concrete base.

The base was only about 20 ft from the original drop so moving the platform to the base was not too much of an effort. The concrete base was cleaned, and the platform was lowered onto the stainless-steel pins and bolted in place. The drop/marker line was tightened to make it easier for the crew to make a good drop with the instruments. The three instruments were lowered to the seafloor and the divers returned to mount them onto the platform. Upon completion, the divers disconnected the marker line and returned to the boat.

Upon return to the boat, we then moved back to the buoy to collect the second water sample at 13:05 ET. Once that was completed, the buoy was inspected for one: are conditions safe to work under the buoy and two: why has the Seabird suddenly stopped reporting. A quick inspection revealed that the Seabird cable had been cut on the instrument side of the connector

so onsite repair was not viable. It was then decided that divers could safely work under the buoy and proceeded to recover the old SAMI-pH and deploy the replacement.

The SAMI-pH was programmed to start logging at 21:05 GMT. Finally, the third and last water sample was collected at the buoy at 14:41 hr. On 12/20/24, the water samples were packaged for shipment to Mote Marine for analysis. Discussions have started with PMEL to find a replacement for the Seabird to replace the old unit.

The PI attended a meeting at Gray's Reef National Marine Sanctuary to discuss the Long-term monitoring plan. Discussions were centered on the overall plan, vessel and diver support. GRNMS indicated their interest in providing vessel and diver support, but currently do not have any operating vessels available. Also, at this time, their dive support is limited due to insufficient number of divers.

2 *Up-time statistics for each sensor/station should be uploaded as a Word or Excel document*

3 *Describe any problems/delays related to low (below 85%) up-time and provide a description of activities employed to mitigate the problem/delays.*
Sea conditions have kept us from making any offshore trips between Aug to Dec.

PUBLICATIONS & CONFERENCE PRESENTATIONS

4 *List any published scientific papers, conference papers, or notable presentations given within this six-month reporting period related to this award. This may include presentations provided at at non-traditional venues. Do not include publications outside of the six-month reporting period. For presentations, include the title, name(s) of the presenter(s), date the presentation was made, and the venue (e.g., CERF, AGU). Also note whether the materials presented (e.g., PowerPoint® slides) remain available to SECOORA and IOOS and, if so, how they may be accessed (i.e., list the website address or online file sharing link such as Google Drive).*

PI presented at the Gray's Reef National Marine Sanctuary Annual Science Symposium, 11/19/24.
The meeting was held at the Ocean Discovery Center in Savannah, GA.
Title: Carbon Dioxide Monitoring at GRNMS.

Appendix E

SECOORA PROGRESS REPORT: JULY 1 - DEC 31, 2024

Status: Submitted (01/14/2025 12:03:39 PM)
Project PIs: Emily Hall and Janet Reimer
Project Title: Southeast Ocean and Coastal Acidification Network (SOCAN)

PROGRESS TOWARDS OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives and note if the objective is Complete, On-Track, or Delayed. If an objective is delayed, a justification for the delay (e.g., travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed to mitigate the delay.*

1. ON-TRACK: SOCAN will continue to participate in more frequent collaboration among the CANs to assess research and monitoring gaps as well as overall social and economic vulnerabilities. SOCAN plans to work with GCAN to develop a comprehensive list of cultural groups who might be affected by acidification throughout the Southeast and overlapping areas of the Gulf of Mexico. SOCAN plans to work with MACAN to attend a workshop (hosted by MACAN) to meet with and discuss acidification needs, vulnerabilities, and education to overlapping cultural groups (e.g. the Gullah/Geechee Sea Island Coalition) in the Southeast.

2. ON TRACK: SOCAN will hold up to two virtual meetings or town halls per year within the FY24-27 funding cycle. The Executive Team will also travel to the SECOORA annual meetings and take part as SECOORA PI's. Each SOCAN virtual meeting will be made available on the SOCAN website.

3. ON TRACK: SOCAN will continue to partner with researchers from Coastal Carolina University (CCU) after the Sea Grant funding, that was awarded to Mote Marine Laboratory with SOCAN as a collaborator, has ended to co-author papers related to the project.

4. ON TRACK: Emily Hall, Mote Marine Laboratory, was awarded IOOS BIL funding by SECOORA to purchase and deploy a SeapHOx on the seafloor at Looe Key, FL. SOCAN is a collaborator for the project. PIs Hall and Reimer will synthesize the data from the SeapHOx for temporal variability. SOCAN will seek further funding opportunities to supplement salary needs to update data, synthesize data, and produce data products.

5. ON TRACK: SOCAN will partner with MACAN to plan and host an underrepresented community listening session in either southern Virginia or northern North Carolina (where there is some regional overlap) with financial support from MACAN.

6. ON TRACK: SOCAN will host its biennial virtual workshop in 2025 focusing on the state-of-the-science and outreach education in the region, though if other funding becomes available, the meeting

will be held in-person.

7. ON TRACK: SOCAN will continue its social media presence on Twitter (X), Facebook, Instagram, the Ocean Acidification Information Exchange, and email updates to members.

8. COMPLETED: SOCAN will continue its core effort to submit appropriate funding proposals throughout FY24-27.

9. COMPLETED: As part of SOCAN's outreach efforts, abstracts will be submitted to at least one professional conference per year, which will focus on topics including, but not limited to, information gathered by SOCAN, research conducted through funds granted to SOCAN, and efforts made by SOCAN related to education/outreach.

10. ON TRACK: SOCAN will collaborate with GCAN over the next three years to produce a peer-reviewed manuscript that builds off of the SOCAN-GCAN Stakeholder Engagement Survey project.

MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH

https://mote.org/news/mote-leads-successful-sensor-deployment-initiative-to-improve-coral-reef-acidification-monitoring/

https://www.fox13news.com/news/sensor-deployed-florida-keys-monitor-ocean-acidification-protect-floridas-coral-reef-systems

https://www.electropages.com/blog/2024/10/florida-keys-sensor-should-help-scientists-with-coral-restoration

https://fla-keys.com/news/article/11786/find-out-whats-new-this-fall-in-the-florida-keys-key-west/

PRODUCT DEVELOPMENT & DELIVERY

3 Please provide a brief description of the status of all products or tools currently available or under development as part of this award. Include weblinks where available. Use this section to report instances in which IOOS-funded science related to this project has been transitioned to support products developed by your organization or even beyond your organization. For example, this might include models, apps, mapping tools, etc. that are being used by state or federal agencies to assist with decision support. Also describe who is using the products and the number of users.Only report on work conducted within the six month reporting cycle.

The SOCAN website is currently undergoing a re-vamp to be more user friendly to the US Southeast OA communities.

SUCCESS STORIES

4 *Briefly describe any success stories that help convey the value of your project and the impact that it has made. Success stories should include how your project has benefited local/regional stakeholders. These stories may be used by SECOORA and the IOOS Office to respond to data calls, support presentations, or used as independent stories. Provide contact details (email addresses) for the PI and stakeholder(s)*

impacted.

SOCAN has decided to revamp/revitalize our steering committee to include both science and stakeholder committee members. This has brought new life into how SOCAN is managed and how our messages are getting out throughout the US Southeast.

LEVERAGED FUNDING

5 *Provide a summary on project leveraging (i.e., how you leveraged your SECOORA award to receive other funding). Also include the proposal/project title, funding agency, amount of funding received, project start date and duration of the project. Only report on leveraging activities within the six month reporting cycle.*

This award to SOCAN was leveraged in a proposal to NOAA RESTORE, which (if funded) will include support from SOCAN in outreach and education efforts.

Appendix F

SECOORA PROGRESS REPORT: JULY 1 - DEC 31, 2024

Status: Submitted (01/13/2025 02:46:21 PM)
Project PI: Michael Parsons, FGCU
Project Title: Expansion of the Estero Bay HAB Water Quality Monitoring Network

PROGRESS TOWARDS OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives and note if the objective is Complete, On-Track, or Delayed. If an objective is delayed, a justification for the delay (e.g., travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed to mitigate the delay.*

The first objective to utilize a long-term augmented water quality sensor network as an early warning system for potential harmful algal blooms (HABs) and acute water quality events (e.g., run-off) has been completed. There are four YSI EXO2 sondes deployed at four live streaming fixed stations continually collecting water quality data every ten minutes at the Vester Field Station (Bonita Springs, FL), Gulf Star Marina (Fort Myers Beach, FL), New Pass Bridge (Fort Myers Beach, FL), and Sanibel Island's city dock (Sanibel Island, FL). During the last 6-months, the southwest Florida region was significantly impacted by two major hurricanes, Helene (September 26th, 2024) and Milton (October 5th, 2024), that caused catastrophic damage to the coastal and inland zones of the region. All four of our stations captured and live streamed storm surge impacts throughout the Estero Bay watershed. The information provided was significantly important to local stakeholders throughout the watershed (i.e., homeowners, business owners, policy makers, etc.). This is the first time our team has captured active live streaming regional storm surge impact to the southwest Florida community.

The second objective to use other tools to determine HABs, such as an Imaging FlowCytoBot (IFCB), is currently on-track. We have processed 96 samples on the IFCB to date and have 113 more to be processed to determine baseline and site-specific phytoplankton community composition. There is currently no digital database or library of the phytoplankton community in the southwest Florida region nor one with accompanying continuous environmental data, signifying an importance knowledge gap that the currently funded project is addressing. The FGCU team has also been deploying YSI ProSample P autosamplers at Vester Field Station, Gulf Star Marina, New Pass Bridge, and Sanibel Island on a routine basis to collect water samples at hour intervals over 24 hours at each site to compare against sonde-derived data. A total of 47 deployments have been completed since July 2024. All water are analyzed for color dissolved organic matter (ppb), turbidity (NTU), and chlorophyll a in vivo (ug/L) using a Turner Designs Trilogy fluorometer. Additionally, samples with the highest and lowest chlorophyll-a concentrations are preserved for IFCB analysis, total dissolved nitrogen, total dissolved phosphorous, inorganic nutrients (NH3, NO2, NO3, PO4, and SiO2), and extracted chlorophyll a analysis (EPA Method 445.0) for further examination of relationships between phytoplankton communities and water quality.

PUBLICATIONS & CONFERENCE PRESENTATIONS

2 *Please list any published scientific papers, conference papers, or notable presentations given within the reporting period related to this award. This may include presentations at non-traditional venues. For presentations, include the title, name(s) of the presenter(s), date the presentation was made, and the venue (e.g., CERF, AGU). Also note whether the materials presented (e.g., PowerPoint® slides) remain available to SECOORA and IOOS and, if so, how they may be accessed (i.e., list the website address or online file sharing link such as Google Drive).*

None to report.

MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH

3 *List any media coverage related to this award and include links to news stories and media coverage. Only include media coverage conducted within this six-month reporting period.*

WINK News. Algae bloom research turns into useful storm tool: https://winknews.com/2024/10/21/algae-bloom-research-useful-storm-tool/

Fox 4 News. NEW STUDY: Better understanding Chlorophyll changes could to earlier harmful algal bloom detection: https://www.youtube.com/watch?v=-JSXmTYMYFo

4 *Describe education or outreach materials related to this award that have been developed within this six month reporting period.*

The team created a product that shows the back-to-back storm surge impacts at the four live streaming stations throughout the southwest Florida region. This is a helpful visual to show how close these hurricanes occurred as well as the amount of water that inundated the region compared to the normal tidal variations.

5 *Upload outreach and education materials developed during the reporting period. Combine multiple outreach/education materials into one document.*
Storm_Surge__10.10.2024_.jpeg – found after the report

PRODUCT DEVELOPMENT & DELIVERY

6 *Provide a brief description of the status of all products or tools currently available or under development as part of this award. Include weblinks where available. Use this section to report instances in which IOOS-funded science related to this project has been transitioned to support products developed by your organization or even beyond your organization. For example, this might include models, apps, mapping tools, etc. that are being used by state or federal agencies to assist with decision support. Also describe who is using the products and the number of users. Only report on work conducted within the six month reporting cycle.*

The main output created and continually ongoing is the live streaming data logger fixed station output that is hosted and supported by WQdatalive.com. The public portal that can be accessed by any user online to visualize water quality data for the four fixed stations, Vester Field Station, Gulf Star Marina, New Pass Bridge, and Sanibel Island's City Dock. The other output that can be accessed online by any other user is on the Vester Field Station website, which shows current water quality at the four fixed stations. The

general user that would be able to access these data streams is the general public (homeowners, business owners, boaters, fishermen, beachgoers, etc.), Local resource managers (Lee County, Estero Bay Aquatic Preserve, etc.) state resource managers (Florida Fish and Wildlife Commission, Southwest Florida Water Management District, Florida Department of Environmental Protection).

SUCCESS STORIES

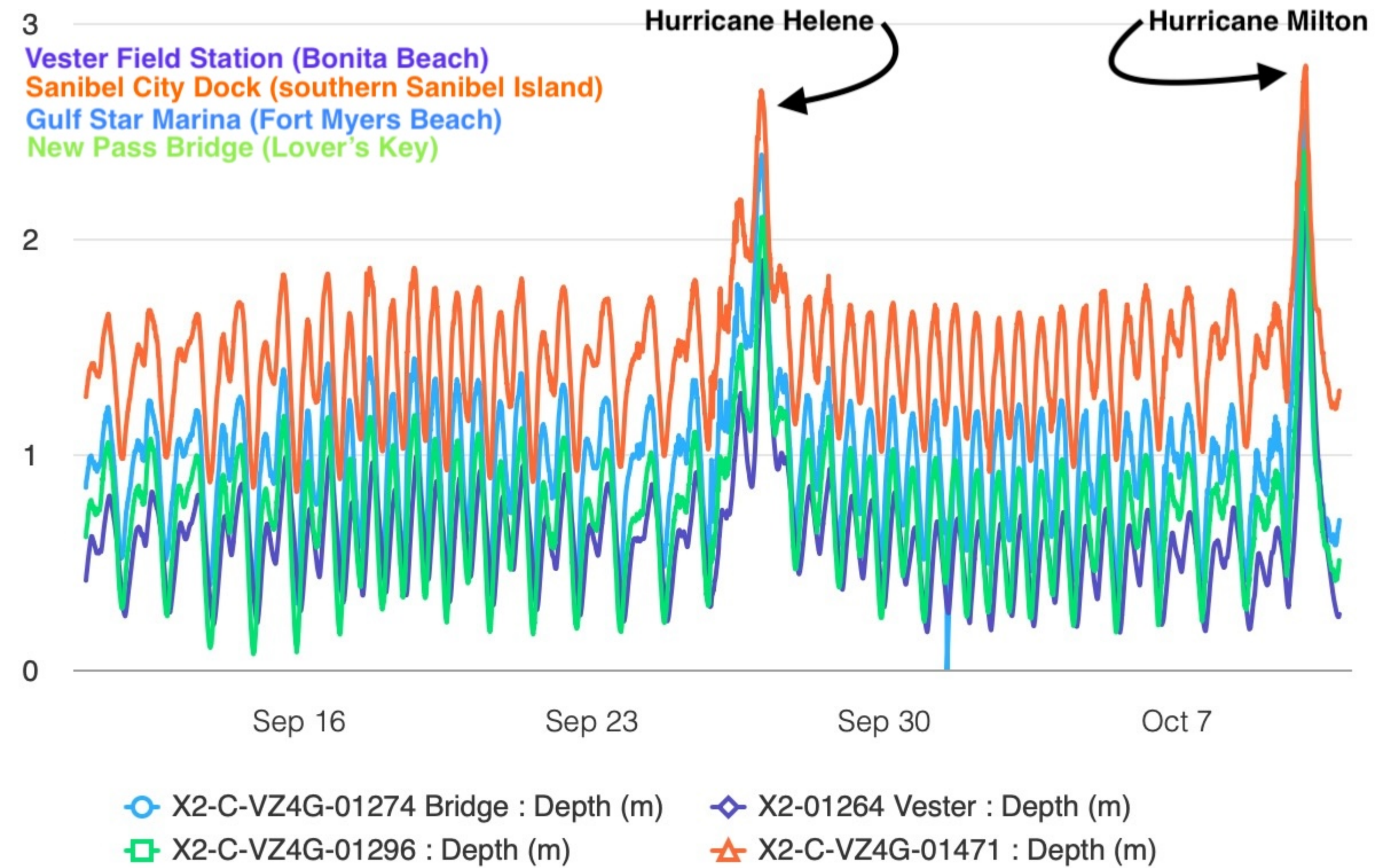
7 *Briefly describe any success stories that help convey the value of your project and the impact that it has made. Success stories should include how your project has benefited local/regional stakeholders. These stories may be used by SECOORA and the IOOS Office to respond to data calls, support presentations, or used as independent stories. Provide contact details (email addresses) for the PI and stakeholder(s) impacted.*

The depth data that was live streaming from these four stations were extremely useful and helpful for the local coastal community (i.e. homeowners, business owners, emergency personnel, etc.) to determine which areas were inundated with storm surge waters so safe passage and travel could be completed for rescue crews to access flooded areas. Also, the public portal that can be accessed by any user online to visualize water quality data for the four fixed stations was used live on a local news station (WINK News) during hurricane Milton to inform viewership if their homes or businesses were flooded.

LEVERAGED FUNDING

8 *Provide a summary on project leveraging (i.e., how you leveraged your SECOORA award to receive other funding). Also include the proposal/project title, funding agency, amount of funding received, project start date and duration of the project. Only report on leveraging activities within the six month reporting cycle.*

The funding and support from SECOORA gave our team the expertise and knowledge to be able to leverage internal Florida Gulf Coast University Water School funding to acquire four Sofar Spotter buoys that will be moored at multiple stations offshore of the southwest Florida region. Our team's goal is to continue to expand our expertise, regional footprint, and data acquisition throughout the southwest Florida region to obtain the best snapshot of long-term water quality and harmful algal bloom initiation.


Hurricane Helene
Hurricane Milton
Vester Field Station (Bonita Beach)
Sanibel City Dock (southern Sanibel Island)
Gulf Star Marina (Fort Myers Beach)
New Pass Bridge (Lover's Key)
3
2
1
0
Sep 16
Sep 23
Sep 30
Oct 7
X2-C-VZ4G-01274 Bridge : Depth (m)
X2-01264 Vester : Depth (m)
X2-C-VZ4G-01296 : Depth (m)
X2-C-VZ4G-01471 : Depth (m)

Appendix G

SECOORA PROGRESS REPORT: JULY 1 - DEC 31, 2024

Status: Submitted (01/07/2025 01:44:49 PM)

Project PI: Natalie Cohen, UGA

Project Title: Establishing a monitoring program and identifying environmental drivers of periodic harmful algal blooms in a model estuary of coastal GA

PROGRESS TOWARDS OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives and note if the objective is Complete, On-Track, or Delayed. If an objective is delayed, a justification for the delay (e.g., travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed to mitigate the delay.*

Objective is on track. Year 2 of summer monitoring was completed with another bloom captured and characterized in the Skidaway River Estuary, with cell concentrations reaching ~125 cells/mL. Water quality parameters, nutrients, and cell densities have continued to be collected to generate a seasonal view of HAB dynamics and potential drivers of the events. Bioinformatic analysis of molecular material collected during the 2023 bloom and sequenced in 2024 are underway to examine molecular clues that may explain their summer behavior. Sampling efforts expanded this past summer to include a temporal analysis of HABs over the day/night cycle, and spatial coverage of the blooms using rented skiff boats. We determined these dinoflagellates do not clearly engage in vertical daily migration, and blooms are restricted to the brackish estuarine environment, with lower cell densities downstream toward the sound and upstream in fresher river water. Correlative analyses are underway to determine which combinations of parameters may be predictive of their growth using data collected from two summer periods.

PUBLICATIONS & CONFERENCE PRESENTATIONS

2 *List any published scientific papers, conference papers, or notable presentations given within the reporting period related to this award. This may include presentations at non-traditional venues. Do not include publications outside of the six-month reporting period. For presentations, include the title, name(s) of the presenter(s), date the presentation was made, and the venue (e.g., CERF, AGU). Also note whether the materials presented (e.g., PowerPoint® slides) remain available to SECOORA and IOOS and, if so, how they may be accessed (i.e., list the website address or online file sharing link such as Google Drive).*

Presentations:

- Natalie Cohen. Microeukaryote physiology and molecular ecology across gradients of the North Atlantic Ocean. Old Dominion University, Richmond, VA. December 2024. Invited departmental seminar.
- Natalie Cohen. Microeukaryote physiology and molecular ecology across gradients of the North Atlantic Ocean. University of South Florida, St. Petersburg, FL. November 2024. Invited departmental seminar.
- Natalie Cohen. Introduction to Oceanography. Marine Extension & GA Sea Grant, Savannah GA.

November 2024. Invited lecture to fellows, staff and volunteers.

- Natalie Cohen. HAB Monitoring updates in the Skidaway River Estuary. Marine Extension & GA Sea Grant, Savannah GA. September 2024. Invited lecture to citizen scientist volunteers and NOAA staff during annual NOAA Plankton Monitoring Network training event.
- Mintz, ML; Harvey, E; Higgins, K; and Cohen, N (2024). "Akashiwo sanguinea Blooms in Coastal Georgia: Insights from high-resolution monitoring efforts." University of Georgia Marine Science Student Research Symposium in Athens, GA. May 16-18.
- Mintz, ML; Harvey, E; Higgins, K; and Cohen, N (2024). "Akashiwo sanguinea Blooms in Coastal Georgia: Insights from high-resolution monitoring efforts" SECOORA Annual Principal Investigator Meeting in Charleston, SC. May 7-8.
- Mintz, ML; Quirk, L; Harvey, E; Higgins, K; and Cohen, N (2024)."Akashiwo sanguinea Blooms in Coastal Georgia: Insights from high-resolution monitoring efforts." Southern Association of Marine Labs Annual Meeting in Georgetown, SC. April 29-30.
- Mintz, ML; Quirk, L; Higgins, K; and Cohen, N (2024). "Akashiwo Sanguinea Blooms in Coastal Georgia: Insights from high-resolution monitoring efforts" Oral presentation at Ocean Sciences Meeting, New Orleans, LA. February 19-23

MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH

3 *List any media coverage related to this award and include links to news stories and media coverage. Only include media coverage conducted within this six-month reporting period.*

This article highlighted our SECOORA work from March 2024, but wasn't included in the last progress report:
https://www.fluidimaging.com/blog/notes-from-the-field-the-2024-ocean-sciences-meeting

4 *Describe education or outreach materials related to this award that have been developed within this six month reporting period.*
N/A

5 *Upload outreach and education materials developed during the reporting period. Please combine multiple outreach/education materials into one document.*
N/A

PRODUCT DEVELOPMENT & DELIVERY

6 *Provide a brief description of the status of all products or tools currently available or under development as part of this award. Include weblinks where available. Use this section to report instances in which IOOS-funded science related to this project has been transitioned to support products developed by your organization or even beyond your organization. For example, this might include models, apps, mapping tools, etc. that are being used by state or federal agencies to assist with decision support. Also describe who is using the products and the number of users. Only report on work conducted within the six-month reporting cycle.*

We have a page on the SECOORA site with information about this project, including an estimate of Akashiwo cell concentrations in our estuary: https://secoora.org/georgia-harmful-algal-blooms/

Cell densities are updated 3+ times a week in the summer months, and targeted weekly during non-summer

months when blooms are less likely to occur

SUCCESS STORIES

7 *Briefly describe any success stories that help convey the value of your project and the impact that it has made. Success stories should include how your project has benefited local/regional stakeholders. These stories may be used by SECOORA and the IOOS Office to respond to data calls, support presentations, or used as independent stories. Provide contact details (email addresses) for the PI and stakeholder(s) impacted.*

N/A

LEVERAGED FUNDING

8 *Provide a summary on project leveraging (i.e., how you leveraged your SECOORA award to receive other funding). Also include the proposal/project title, funding agency, amount of funding received, project start date and duration of the project. Only report on leveraging activities within the six-month reporting cycle*.

A new FlowCam fluid imaging instrument was purchased by the UGA Skidaway Institute of Oceanography in summer 2024 to support field sampling projects including this one, and will be leveraged to continue HAB cell quantification in this ecosystem with higher efficiency.

Graduate student Mallory Mintz was recently awarded the SECOORA Vembu Ocean Scholars Award to present participate in an Aquaculture conference this February, which will allow us to communicate our findings to an audience of stakeholders. We aim to better understand the connections between Akashiwo and oyster mortality in the coming year. Her dissemination of our findings at this conference, exposure to current aquaculture ecology work, and networking with specialists will aid in this effort.

Appendix H

SECOORA PROGRESS REPORT: JULY 1 - DEC 31, 2024

Status: Submitted (01/16/2025 10:38:52 AM)
Project PI: Brian Blanton, UNC-Chapel Hill
Project Title: Multi-decadal reanalyses of coastal water level to support NOAA sea level and flood risk products

PROGRESS TOWARDS OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives and note if the objective is Complete, On-Track, or Delayed. If an objective is delayed, a justification for the delay (e.g., travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed to mitigate the delay.*

This SECOORA/IOOS/NOAA project is computing a long-term reanalysis of coastal water levels for the US eastern and Gulf of Mexico coasts, using a data assimilation (DA) scheme for the ADCIRC model (Asher et al, 2019). This DA approach corrects model predictions based on errors between a prior solution and observations of water levels. Using NOAA/NOS gauge observations, time-series of prior errors (prediction - observations) are determined and used to compute a sequence of dynamic water level correction surfaces on the ADCIRC grid. The long-term simulation is then rerun by incorporating the error surfaces into a new (posterior) prediction of coastal water levels. The atmospheric forcing is from the ECMWF's ERA5 reanalysis (Hersbach et al, 2022). The reanalysis simulation period is 1979-2022, and the simulations include the wind-wave model SWAN.

In this performance period (1 Jul - 31 Dec 2024), the main goal was to recompute the entire reanalysis (V1.0) due to some issues discovered related to the handling of the mean sea level component of the error model. This was noted in the previous progress report as, “However, it has also been noted that the SLR amounts, over the period 1979-2022 in the CORA-GEC, may not reflect recent (from about 1995 forward) increases in the rates.” Essentially, the SLR model was linear, over the 44-period of record, and thus did not adequately capture the apparent acceleration of SL observed in the last two decades. This caused a lower than observed mean sea level in the first part of the reanalysis. After much discussion with NOS and other sea level experts, it was decided that the posterior prediction needed to be recomputed. To correct this problem, the error model was reworked as follows.

The error was split (“decomposed”) into two “bands”, a monthly mean part and a “weather” part.
1) The monthly mean sea level (mMSL) data from NOAA was used to construct mMSL time series at each assimilation location, using nearby stations to fill gaps. This is the same basic approach used by NOAA for their SLR analyses. Any remaining gaps, typically a few months over the 44 years, were filled with means of that specific month based on the other monthly for that location. The result is a complete 44-yr record of monthly means for all assimilation locations, meaning that the mean sea level changes are completely defined and captured in the posterior prediction.

2) This monthly mean series was then subtracted from the hourly data, which was subsequently 36-hr

lowpass filtered. Gaps in this series were NOT filled. The consequence of this is that errors in this "band" (36-hr lp with monthly means removed) are only defined when the hourly data are available. Where gaps exist, the prior and posterior are the same in this band.

After modifying the error model, a sequence of coarse ADCIRC model simulations was conducted to ensure that the new error model correctly captured the long term MSL changes (which it did). The posterior on the high-resolution ADCIRC grid (hsofs) was then recomputed, starting about 1 October and finishing at the end of November. Asher and Blanton scrutinized the posterior prediction and error reduction carefully. This updated posterior is labeled V1.1 for the CORA-GEC.

Post-doc T Asher continued to engage with government agencies (FEMA, USACE, and NOAA) and with the broader research community through conferences, presentations, meetings, and one-on-one interactions.

Progress has also been made on the incorporation of high-resolution hurricane winds into the ERA5 synoptic meteorology. Typically, the representation of a tropical cyclone in a model such as ERA5 is relatively poor due to the spatial resolution of the model (~25km in this case). To embed a higher resolution vortex field in ERA5, we first need to remove the hurricane representation in ERA5. We have developed a method to remove a hurricane vortex from a large-scale synoptic field, based on the approach outlined in Kurihara et al (1995) [Improvements in the GFDL Hurricane Prediction System, Monthly Weather Review] and related work.

The UNC research group has continued to engage with the NOAA NCDIS team through frequent virtual meetings where progress and status toward the overall objectives of the reanalysis project are described and discussed. Additional, more detailed technical discussions have been held to determine dataset readiness and access.

Also during this reporting period, RENCI has started to work out the details of the eastern Pacific simulations, using a coarse ADCIRC grid. Asher completed a draft version of a higher-resolution eastern Pacific grid, and many test simulations were conducted to develop an understanding of the grid's performance.

We note that NOAA planned to announce the CORA-GEC dataset at the 2025 annual meeting of the American Meteorological Society. This event occurred outside of the progress report's window but is an important milestone in the overall project.

PRODUCT DEVELOPMENT & DELIVERY

2 *Provide a brief description of the status of all products or tools currently available or under development as part of this award. Include weblinks where available. Use this section to report instances in which IOOS-funded science related to this project has been transitioned to support products developed by your organization or even beyond your organization. Also describe who is using the products and the number of users. Only report on work conducted within the six-month reporting cycle.*

The V1.1 dataset was used by NOAA and RPS/Tetra Tech to generate the 500-m resolution coastal product hosted on NOAA's Open Data Dissemination (NODD) system and https://tidesandcurrents.noaa.gov/cora.html

Appendix I

SECOORA PROGRESS REPORT: JULY 1 - DEC 31, 2024

Status: Submitted (01/17/2025 04:10:24 AM)
Project PI: Andres Tejada
Project Title: Evaluation of Coastal Models in NOAA Operational Environments

PROGRESS TOWARDS OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives and note if the objective is Complete, On-Track, or Delayed. If an objective is delayed, a justification for the delay (e.g., travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed to mitigate the delay.*

During the first six months, the project focused on model setup, configuration, and mesh generation, in line with the Statement of Work.

Model Setup and Configuration: On-Track. Access to TACC computing platforms (Frontera, Stampede3) was obtained. The SCHISM model was configured for New York Harbor using OCSMesh, generating a mesh with 101,000 elements (200–8000 m resolution). A refined mesh was subsequently developed with SMS, yielding 225,132 elements (20–4000 m resolution) for improved representation of coastal dynamics.

Mesh Generation and Validation: Complete. Meshes were successfully generated and validated using bathymetric and geographic data provided by NOAA. The refined SMS mesh enhances the model's ability to resolve fine-scale features, ensuring readiness for subsequent simulation phases.

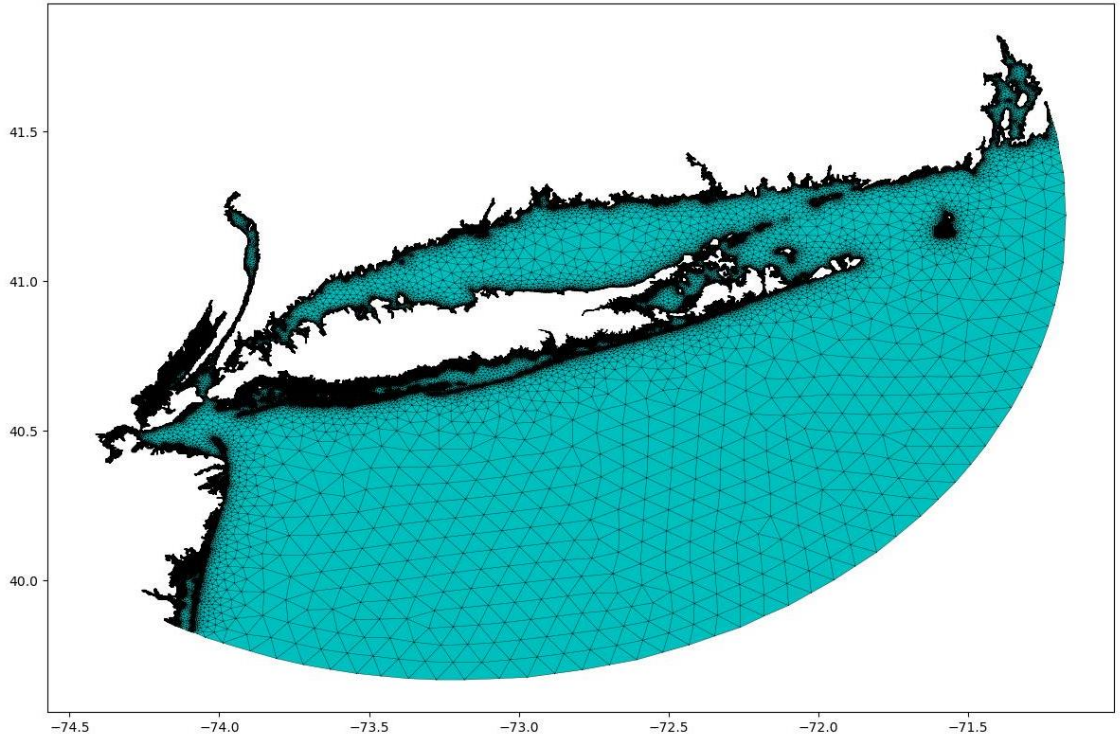
Note: Please see attached slide deck with mesh figures and a sample result from the first SCHISM run.

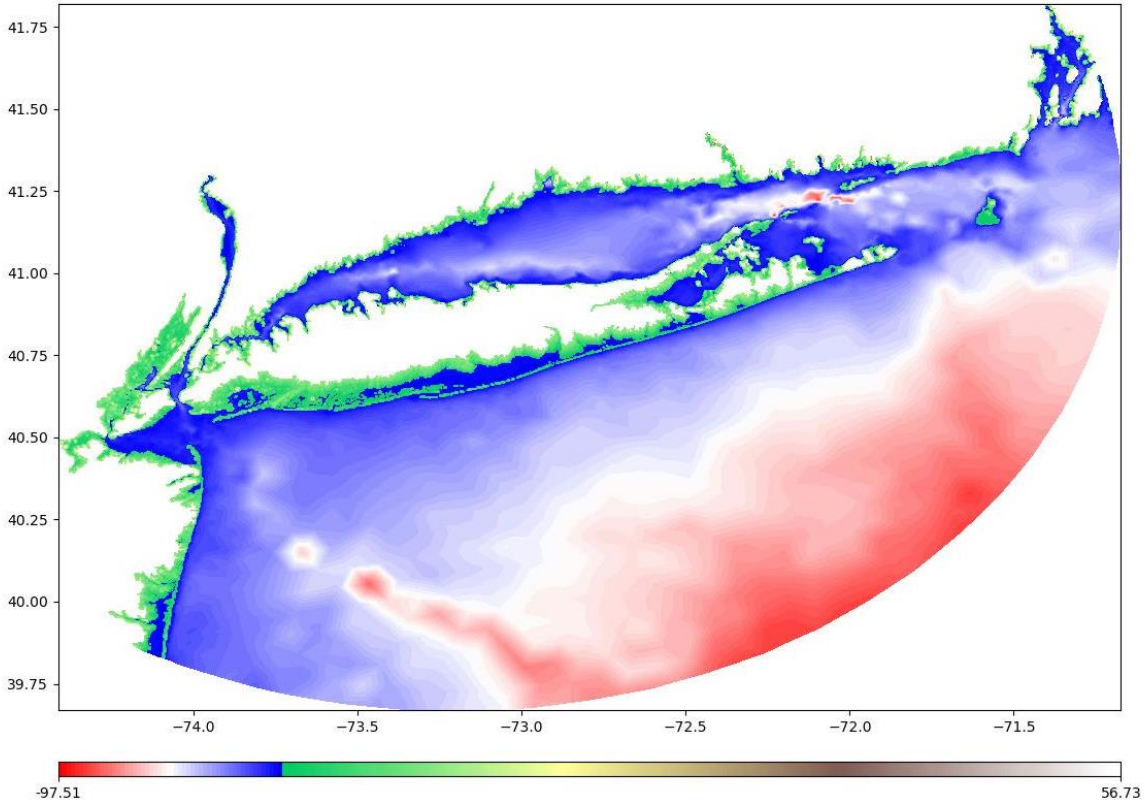
2 *Describe education or outreach materials related to this award that have been developed within this six month reporting period.*

Please see attached slide deck with mesh figures and a sample result from the first SCHISM run referenced in Section 1 above.

Meshing - OCSMesh

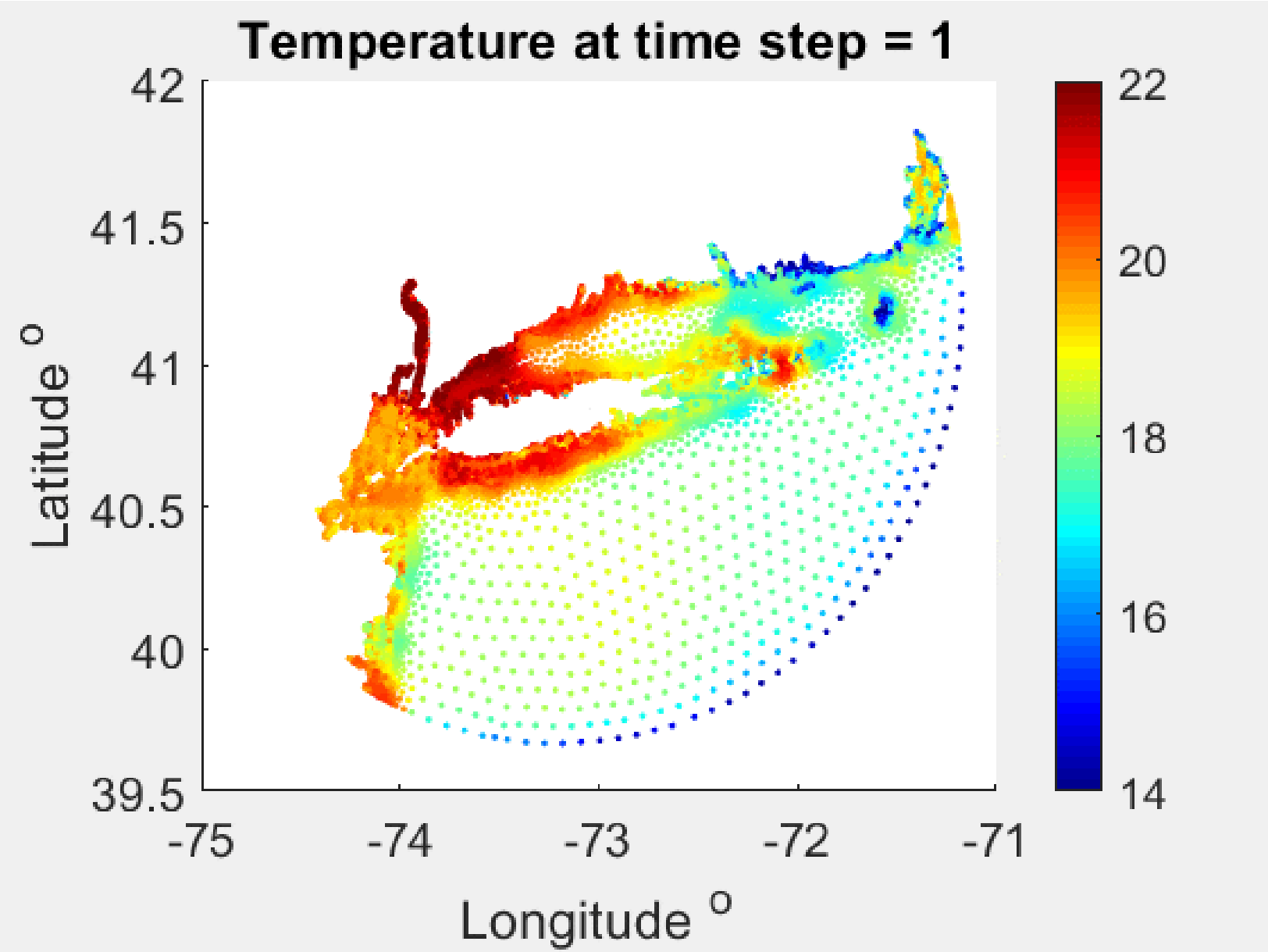
- Used OCSMesh following Soroosh Mani's tutorial for NY Harbor.



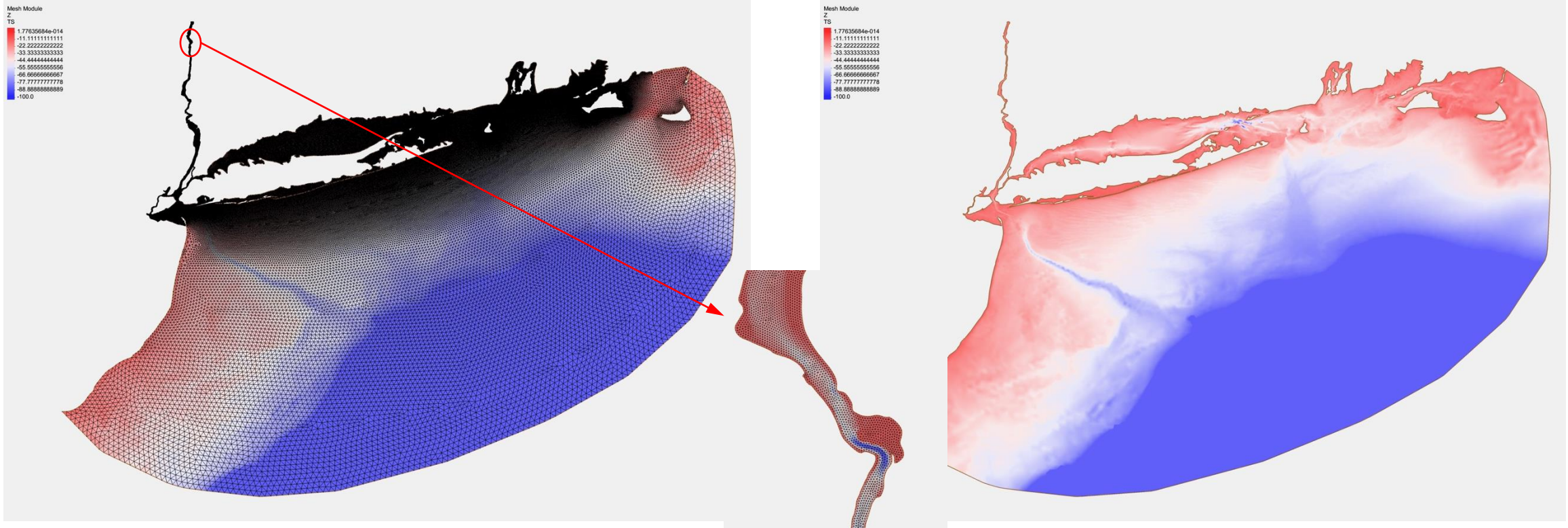


101K number of elements from 200 m to 8000 m

3D Computation Setup – *Results*



New Mesh – SMS



225,132 number of elements from 20 m to 4000 m

Appendix J

SECOORA PROGRESS REPORT: JULY 1 - DEC 31, 2024

Status: Submitted (01/15/2025 11:24:17 AM)
Project PI: Yonggang Liu, USF
Project Title: New York Harbor - Cook Inlet Model Testing

PROGRESS TOWARDS OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives and note if the objective is Complete, On-Track, or Delayed. If an objective is delayed, a justification for the delay (e.g., travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed to mitigate the delay.*

The National Water Initiative is funding a coastal model evaluation in response to a series of white papers that were written by the NOAA Unified Forecast System Coastal Application Team (UFS CAT) focused on total water level, navigation, and risk reduction. The USF Ocean Circulation Lab works as a tester to configure and test Finite Volume Community Model (FVCOM) on NSF funded Texas Advanced Computing Center (TACC). They have successfully completed the required work in Rounds 1 and 2.

Round 3: Testers will evaluate the model's skill using the 3-D configuration coupled with wave processes. Testers will build upon their work from Round 2 and incorporate wave processes by coupling to a wave model or feeding wave data into the hydrodynamic model. The skill assessment metrics will remain the same as in Round 2, with only minor adjustments. Testers will utilize UFS-Coastal in their Round 3 configurations in one way or another. There are various approaches for integrating wave processes and utilizing UFS-Coastal, and testers are encouraged to explore and select the approach that suits them best.

Here is a list of activities performed by USF Ocean Circulation Lab during this reporting period:

- The entire USF team attended monthly UFS CAT Water Quantity model evaluation online meetings and participated in discussions for FVCOM application in New York Harbor and Cook-Inlet region.
- Dr. Yonggang Liu participated in the monthly PI meetings online.
- Updated 3D model simulation of the New York Harbor – Cook Inlet region for the three-month periods in both 2021 and 2022. Completed model evaluations against the available observations using both required and suggested metrics.
- Documented the challenges in ocean wave modeling using FVCOM.
- Performed the UFS-Coastal regression test for coupling using the provided model grid mesh near the Scituate Harbor.
- Started the UFS-Coastal configuration FVCOM for the New York Harbor region.
- Submitted Round 3 progress report to NOAA UFS CAT on 11/30/2024. The report documents all the detailed information about the model configuration, performance, and

model/data comparison results using the required metrics.
- Dr. Yonggang Liu participated in revising the Round 2 summary report (draft), which is organized by NOAA.
- Provided another update of the Round 3 work of USF team in June monthly meetings: 9/24/2024.

This project is on-track towards meeting the objectives.

PUBLICATIONS & CONFERENCE PRESENTATIONS

2 *List any published scientific papers, conference papers, or notable presentations given within the reporting period related to this award. This may include presentations at non-traditional venues. Do not include publications outside of the six-month reporting period. For presentations, include the title, name(s) of the presenter(s), date the presentation was made, and the venue (e.g., CERF, AGU). Also note whether the materials presented (e.g., PowerPoint® slides) remain available to SECOORA and IOOS and, if so, how they may be accessed (i.e., list the website address or online file sharing link such as Google Drive).*

Seroka, G., A. Fujisaki-Manome, J. Kelley, S. Pe'eri, J. Sienkiewicz, J. Feyen, O. Doty, K. Ide, B. Gramp, F. Ogden, T. Fanara, E. Myers, S. Moghimi, T. Cockerill, W. Wu, E. Anderson, K. Huelse, C. Forbes, Y. Liu, S. John, E. Di Lorenzo, P. Park, S. Wipperfurth, N. Sannikova, V. Titov, Y. Wei, C. Akan, S. Mani, and C. Lindley (2024), UFS Coastal Applications Team Report: Round 1 Summary of a Unified Forecast System Model Evaluation for Marine Navigation. NOAA Office of Coast Survey, 27 pages, Silver Spring, Maryland, May 2024. NOAA Technical Memorandum NOS, 36, https://repository.library.noaa.gov/view/noaa/60886

Conference presentations:

Liu, Y., R.H. Weisberg, L. Zheng, K.A. Hubbard, E.G. Muhlbach, M.J. Garrett, C. Hu, J.P. Cannizzaro, Y. Xie, J. Chen, S. John, and L.Y. Liu (2024), Automated short-term forecast of Karenia brevis trajectory on the West Florida Shelf. The Ocean Prediction Symposium 2024 (OP'24), IOC-UNESCO, Paris, France, 11/18-11/22/2024 (oral)

Liu, Y., R.H. Weisberg, J. Law, J. Chen, L. Zheng (2024), Coastal ocean response to Hurricanes Ian and Idalia revealed through coordinated observations and models. The Ocean Prediction Symposium 2024 (OP'24), IOC-UNESCO, Paris, France, 11/18-11/22/2024 (poster)

Liu, Y., R.H. Weisberg, L. Zheng, Y. Sun, J. Chen, J. Law, C. Hu, J.P. Cannizzaro, T.K. Frazer (2024), A tracer model nowcast/forecast study of the Tampa Bay, Piney Point effluent plume: Rapid response to an environmental hazard. The Ocean Prediction Symposium 2024 (OP'24), IOC-UNESCO, Paris, France, 11/18-11/22/2024 (poster)

Liu, Y., R.H. Weisberg, L. Zheng, K.A. Hubbard, E.G. Muhlbach, M.J. Garrett, C. Hu, J.P. Cannizzaro, Y. Xie, J. Chen, S. John, and L.Y. Liu (2024), Short-term forecast of Karenia brevis trajectory on the West Florida Shelf. Unifying Innovations in Forecasting Capabilities Workshop (UIFCW) 2024, Jackson State University, Jackson, 7/22-26/2024 (oral)

Appendix J

MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH

3 *List any media coverage related to this award and include links to news stories and media coverage. Only include media coverage conducted within this six-month reporting period.*

- Helene just flooded Tampa Bay. Here's how much worse Milton's surge could be. (Tampa Bay Times, 10/7/2024) https://www.tampabay.com/hurricane/2024/10/07/helene-just-flooded-tampa-bay-heres-how-much-worse-miltons-surge-could-be/
- Storm surge from a distant Helene creates major problems around the Tampa Bay area (WUSF, 9/27/2024) https://www.wusf.org/weather/2024-09-27/storm-surge-distant-helene-creates-major-problems-tampa-bay-area
- What to expect as Hurricane Helene swipes Tampa Bay? (AXIOS Tampa Bay, 9/25/2024) https://www.axios.com/local/tampa-bay/2024/09/26/hurricane-helene-tampa-bay-impacts

4 *Describe education or outreach materials related to this award that have been developed within this six-month reporting period.*

As an experienced coastal ocean modeling group, the Ocean Circulation Lab at University of South Florida provided valuable guidance and help to the other groups working on this FVCOM evaluation project.

5 *Upload outreach and education materials developed during the reporting period. Please combine multiple outreach/education materials into one document.*

PRODUCT DEVELOPMENT & DELIVERY

6 *Provide a brief description of the status of all products or tools currently available or under development as part of this award. Include weblinks where available. Use this section to report instances in which IOOS-funded science related to this project has been transitioned to support products developed by your organization or even beyond your organization. For example, this might include models, apps, mapping tools, etc. that are being used by state or federal agencies to assist with decision support. Also describe who is using the products and the number of users. Only report on work conducted within the six month reporting cycle.*

The model code, model configuration, forcing/input and output data files of the FVCOM application in New York Harbor region have been made available to NOAA on the TACC computer. This has been properly documented in the Round 3 progress report submitted to NOAA.

SUCCESS STORIES

7 *Briefly describe any success stories that help convey the value of your project and the impact that it has made. Success stories should include how your project has benefited local/regional stakeholders. These stories may be used by SECOORA and the IOOS Office to respond to data calls, support presentations, or used as independent stories. Provide contact details (email addresses) for the PI and stakeholder(s) impacted.*

One of the purposes of this project is to train more coastal ocean modelers, as there are not many qualified modelers available in the U.S. Two more postdocs from USF Ocean Circulation Lab joined this project (Dr. Haibo Xu and Dr. Sieu-Cuong San), bringing the USF team to five: PI, Dr. Yonggang Liu; Postdocs: Drs. Sebin John, Haibo Xu, Sieu-Cuong San; Graduate student: Orion Witmer.

Dr. Yonggang Liu was invited to serve as the Chair of Session 2.1 Coastal sea level, waves, and nearshore currents prediction at the 2024 Ocean Prediction Symposium, organized by IOC-UNESCO in Paris, France, 11/20/2024.

LEVERAGED FUNDING

8 Provide a summary on project leveraging (i.e., how you leveraged your SECOORA award to receive other funding). Also include the proposal/project title, funding agency, amount of funding received, project start date and duration of the project. Only report on leveraging activities within the six month reporting cycle.

SECOORA funded modeling was leveraged to receive NSF funding for Tampa Bay numerical model application “DISES-EX: Spatial Dynamics of Emerging Chemical Threats Along Social and Ecological Gradients in a Large Urban-to-Rural Estuarine System”, $749,908 (USF Ocean Circulation Lab portion $52,746), 1/1/2025 – 12/31/2027.

Python Data Analysis Tools for Oceanographers
Filipe P. A. Fernandes
Progress and Accomplishments during the reporting period (7/1/24 – 12/31/24)

The tasks were divided into:

1. Assist in the development of the IOOS.us Documentation and Demonstration sub-pages
2. Support current and continue developing important software packages to the IOOS enterprise
3. Ensure software deployment via conda-forge packages and updates

1) Assist in the development of the IOOS.us Documentation and Demonstration sub pages
The ioos code lab requires constant updates and fixes to keep the notebooks running to avoid both URL and data rot. We fixed links and broken notebooks (#210, #212, #213, #233, #237), update the environment (#222, #245, #247, and #248,). The highlights are a more streamlined environment, quicker build times, and everything is working on the latest Python 3.13. We also update the general IOOS issue template (#12), and brought the package skeleton up to the latest packaging standards (#32).

In addition to that we update the glider metrics fetching and notebook runner (#87, #94, #90, and #95). The metrics now report all glider names, including those that use special characters in them. We also fixed the runner in the ERDDAP version checker tool (#5). We can track the community's ERDDAP updates via weekly reports with it.

2) Support current and continue developing important software packages to the IOOS enterprise
This activity can be divided into two three-sections: (a) packages from the IOOS GitHub organization, (b) packages from third party organizations that are important for IOOS, and (c) pangeo/cloud support.

a) *compliance-checker*: Updated the CF version in the README (#1098), fixed the failing Windows tests and VCRs (#1104 and #1115) and added Python 3.13 to the test matrix, bumped the min to 3.9 and min supported to 3.10 (#1114, #1117, and #1122). Cleanup the code and tests (#1119, #1120, #1121, #1123, #1125, and #1126);
   ioos_qc: Fixed for numpy 2.0 and added Pyhton 3.13 support (#137 and #136);
   erddapy: Fixed a URL builder bug by always quote params in queries (#358, #360, #361, #361, and #381). Fixed the context loader (#373), and updated the test matrix to the latest Python 3.13 (#374 and #382);
   Update many packages to work with Python 3.13 and test matrix updates (ioos/cc-plugin-glider #65, #68, ioos/cc-plugin-ncei #57, ioos/cc-plugin-sgrid #4, ioos/cc-plugin-ugrid #27, ioos/odvc #73, ioos/ciso #52, and ioos/gliderpy #130).
b) Update the Python gs*w* testing framework (#184, #187, #188, and #189);
   Fix test and add Python 3.13 in *netcdf4-python* (#1352, #1359, #1372, and #1377);
   Remove the *cgi* module in ecmwf/multiurl #15;
   Multiple fixes to the *cmocean* CI matplotlib/cmocean #111;
   Modernize pyoceans/nbrr #12, pyoceans/python-ctd #212, and python-windrose/windrose #276, #280 CIs;
   Fix context loader in pyoceans/python-ctd #218;
   Fix for numpy 2.0 compatibility pyoceans/python-oceans #101;
   Added Python 3.13 support in *folium* (#2012 and #2013);
   Fixed docs, numpy 2.0 support, and added Python 3.13 support in wesleybowman/UTide #130, #133;
c) Added a min *xarray* pin on run and *numpy* version to the linters xarray-contrib/cf-xarray #536.

3) Ensure software deployment via conda-forge packages and updates
This effort can be separated into (a) infrastructure maintenance, (b) new packages, and (c) packages updates.

a)
   i) Fix recipe building and security in staged-recipes (#27802, #28137, #28190, #28285, #28287, #28288, and #28468);
   ii) Patch *numexpr* for latest numpy compatibility (conda-forge-repodata-patches-feedstock #882);
   iii) add *r-jqr*, *r-leafpop*, and *r-satellite* (conda-forge/conda-forge-pinning-feedstock #6251, #6405, and #6829) to osx-arm64 migration;
   iv) archive *pathlib*, *pysimplegui*, *r-bold*, *r-rgdal*, *xarray-topo*, and *xlayers* conda-forge/admin-requests #1113, #1086, #1108, #1035, #1203, and #1092); Mark as broken *erddapy* 2.2.1 and *flox* 9.11 (conda-forge/admin-requests #1088 and #1083); Request new outputs for *cf-xarray*, *ioos-qc*, and *ioos-tools* feedstocks in conda-forge/admin-requests #1228; Reset token for *sqlite*, *python-wget*, and reset_token_fast-barnes-py (conda-forge/admin-requests #1212, #1232, and #1211);

b) New packages to conda-forge: *r-volumodel, r-rangebuilder, r-modev, xarray-tensorstore, dinosaur-dycore, neuralgcm, aiohappyeyeballs, docopt-ng, durationpy, mocket, yarl, pyeddytracker, r-nanoparquet*, and *zizmor*.

c) See the list of updated feedstocks in the appendix.

Pull Requests links

- conda-forge/cf_xarray-feedstock #41
- conda-forge/cf_xarray-feedstock #44
- conda-forge/docutils-feedstock #64
- conda-forge/erddapy-feedstock #44
- conda-forge/gdal-feedstock #994
- conda-forge/geopandas-feedstock #121
- conda-forge/google-pasta-feedstock #3
- conda-forge/heapdict-feedstock #9
- conda-forge/ioos_metrics-feedstock #5
- conda-forge/ioos_qc-feedstock #10
- conda-forge/ioos_tools-feedstock #18
- conda-forge/jenkspy-feedstock #30
- conda-forge/jenkspy-feedstock #31
- conda-forge/numexpr-feedstock #69
- conda-forge/optype-feedstock #5
- conda-forge/pyresample-feedstock #99
- conda-forge/pyspharm-feedstock #30
- conda-forge/r-satellite-feedstock #13
- conda-forge/regex-feedstock #154
- conda-forge/seapy-feedstock #35
- conda-forge/sip-feedstock #83
- conda-forge/sortednp-feedstock #17
- conda-forge/tornado-feedstock #65
- conda-forge/ua-parser-feedstock #14

Appendix L

SECOORA NAVY GLIDER SUPPORT PROGRESS REPORT: JULY 1 - DEC. 31, 2024

Status: Submitted (01/16/2025 01:21:46 PM)
Project PI: Catherine Edwards, UGA Skidaway Institute of Oceanography (SkIO)
Project Title: Navy Glider

PROGRESS TOWARDS MEETING OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives. For each objective provide one of the following indicators: "Complete" and date of completion. "On-Track" or "Delayed" and anticipated date of completion. If an objective is delayed, a justification for the delay must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.*

Objective: SkIO will support IOOS Hurricane Glider efforts by assisting with Navy glider operations during Hurricane Season. SkIO will coordinate deployment, recovery, and logistical activities with IOOS and the Navy for 1-2 gliders. On-Track.

- SkIO coordinated the deployment, piloting, and logistics of 2 Navy gliders (deep gliders ng289/ng778).
    - The track design and all deployment/logistics details for both gliders were led by SkIO to coordinate deep glider data sampling with nearby Saildrones operating in the Sargasso Sea and at the Gulf Stream edge, and to maximize cross-calibration opportunities with NDBC buoys.
    - SkIO/UGA student F. McQuarrie and SkIO intern A. Gray deployed ng289 and ng778 160 miles from shore. The gliders had shorter than expected endurance due to heavy use of the thrusters on the outbound leg of the mission. The gliders were unable to be piloted back to shore and were recovered by NAVO survey vessel Pathfinder.
- PI Edwards designed and executed pre-season briefings with GOC personnel re piloting strategy in the Gulf Stream.
- PI Edwards and SECOORA observatory co-PI Lembke participated in weekly meetings with Hurricane Glider efforts and maintained effective communications with NAVO/GOC pilots and managers.
- PI Edwards gave a regional briefing in the internal hotwash meeting in December 2024.

Appendix M

SECOORA GLIDER AND OTHER UNCREWED SYSTEMS PROGRESS REPORT: JULY 1 - DEC. 31, 2024

Status: Submitted (01/16/2025 01:16:05 PM)

Project PI: Catherine Edwards

Project Title: A coordinated observing strategy for saildrones and gliders during the Atlantic hurricane season and advancement of data assimilation for the coupled hurricane forecast system

PROGRESS TOWARDS MEETING OBJECTIVES

1 Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives. For each objective provide one of the following indicators: “Complete” and date of completion, “On-Track” or “Delayed” and anticipated date of compeletion. If an objective is delayed, a justification for the delay must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.

1. SkIO will support Saildrone/glider coordination efforts by using past and future data from both platforms. On-Track. Edwards coordinated with project leads, mission pilots, and the larger team through hurricane season 2024, helping to lead operations for the two Saildrones assigned to the South Atlantic Bight. Planning is underway for the 2025 hurricane season.
2. Glider data from prior hurricane seasons will be post-processed to publication quality and shared with collaborators. These data, together with data collected in recent Saildrone missions, will be analyzed for trends related to successful colocation of the vehicles given the regional context. On Track. Former SkIO technician A. Vincent trained 2024 summer intern A. Gray (Washington and Lee University) on the methods he developed to process and compare co-located glider and Saildrone data. A. Gray has visualized and processed data from 2021, and are working on standardizing methods for later years.
3. PI Edwards will work with the NOAA AOML/PMEL Saildrone team to coordinate deployments in hurricane season 2024, explore spatial and regional trends in colocated data, and leverage this insight for to develop strategies for colocation and data assimilation in future hurricane seasons. On Track. Former SkIO technician Vincent and summer intern A. Gray have conducted preliminary statistical analyses of co- located saildrone missions, and has used 2021 as a case study to consider along- vs cross-track error, testing the hypothesis that alongshore position differences between the two instruments is less significant driver of cross-platform error than cross-shore differences in position.

Appendix N

SECOORA HURRICANE GLIDER MISSIONS PROGRESS REPORT: JULY 1 - DEC. 31, 2024

Status: Submitted (01/16/2025 01:32:49 PM)

Project PI: Catherine Edwards, UGA Skidaway Institute of Oceanography (SkIO)

Project Title: Southeast Coastal Ocean Observing Regional Association (SECOORA) Regional Glider Observatory - Hurricane Glider Support

PROGRESS TOWARDS MEETING OBJECTIVES

1 Provide a summary of progress towards meeting your project objectives for the six month reporting period. Pay special attention to the six month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives. For each objective provide one of the following indicators: “Complete” and date of completion, “On-Track” or “Delayed” and anticipated date of completion. If an objective is delayed, a justification for the delay must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.

1. Prepare, deploy, and operate at least two dedicated missions during hurricane season to benefit the Hurricane Gliders effort. Each mission, typically 20-28 days' duration, will occur in the SE Atlantic coastal ocean, West Florida Shelf, and/or Florida Straits. Complete

   The UNCW glider Pelagia was deployed for a mission off Georgia (August 20-September 8) for a 20-day mission, and the SECOORA glider Franklin was deployed October 25-November 18, conducting cross-shore transects off the Georgia coast until a suspected science error ended data collection.

2. Maintain institutional gliders: On Track.

   SkIO glider Angus suffered a board failure in December 2024 and is in prep for service at the manufacturer. NCSU glider Salacia has been repaired at USF and will rejoin the hurricane glider fleet in 2025. The G1 Pelagia is ready to be deployed for future missions.

3. Maintain SECOORA gliders: On Track.

   SkIO conducted lab testing and maintenance of SECOORA gliders Franklin and Unit_1091, as well as gliders Angus (SkIO), Pelagia (UNCW), and Salacia (NCSU) during the reporting period. SkIO staff conducted significant troubleshooting of a new server for glider communications, piloting, and control. Pump service and science bay calibrations are in progress for SECOORA gliders Franklin and Unit 1091 in order for them to be available for hurricane season 2025.

4. Data management: Ensure that glider data sets are made available in standardized formats via SECOORA/Axiom. Complete.
   Data were made available to Axiom for submission to the SECOORA portal and NGDAC.

Pelagia mission (Aug – Sept) found here
Franklin mission (Oct – Nov) found here

5. Delayed mode data submission: Complete.

   Full data sets of both missions were submitted to Research Workspace within 30 days of glider recovery.

Appendix O

SECOORA PROGRESS REPORT: JULY 1 - DEC 31, 2024

Status: Submitted (01/15/2025 09:58:11 PM)

Project PI: Chuanmin Hu, USF

Project Title: Monitoring and forecasting pelagic Sargassum in the South Atlantic Bight

PROGRESS TOWARDS OBJECTIVES

1 *Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives and note if the objective is Complete, On-Track, or Delayed. If an objective is delayed, a justification for the delay (e.g., travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed to mitigate the delay.*

Year 4 geographic scope continued to be: Florida Keys and beaches along the east coast of Florida, and the Florid Panhandle area. During this reporting period, there was no major Sargassum inundation within SECOORA domain or GCOOS domain. This agrees with our earlier predictions back in spring 2024.

Year 4 objectives continued from Year 3, including:

Objective 1) to improve and finalize algorithms suitable for high-resolution satellite data to map and quantify Sargassum distribution and abundance

Status: On track. Significant progress has been made on Objective #1 during this period. Specifically, we implemented and tested a Deep Learning algorithm to apply to Sentinel-2 MSI data (10 m) resolution to detect and quantify Sargassum in the Florida Keys. We also started a new data stream from the Google Earth Engine where Sentinel-2 MSI images are already mosaiced. This greatly improved the data processing efficiency. We are testing a new deep-learning (DL model) on this data flow.

Objective 2) to generate prototype high-resolution imagery products to map and quantify Sargassum distribution and abundance

Status: On track. We continued the data downloading and processing flow in near real-time in an automatic fashion for both Sentinel-2 and SuperDove, for selected regions in the Florida Keys and along the SE coast of Florida. Quicklook images have been generated continuously. Computer codes have been debugged to assure smooth operations.

Objective 3) to integrate high-resolution data with high-resolution numerical model to predict Sargassum trajectory

Status: On track. The remote sensing group (led by C. Hu) and ocean circulation group (led by Y. Liu) have worked together to test data format, data transfer, and data integration. We started integration of high-resolution satellite data and high-resolution numerical circulation model to predict the Sargassum trajectory in near-shore waters. Some preliminary results have been generated, while the integration is still being tested.

PUBLICATIONS & CONFERENCE PRESENTATIONS

2 *Please list any published scientific papers, conference papers, or notable presentations given within the reporting period related to this award. This may include presentations at non-traditional venues. Do not include publications outside of the six-month reporting period. For presentations, include the title, name(s) of the presenter(s), date the presentation was made, and the venue (e.g., CERF, AGU). Also note whether the materials presented (e.g., PowerPoint® slides) remain available to SECOORA and IOOS and, if so, how they may be accessed (i.e., list the website address or online file sharing link such as Google Drive).*

N/A

MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH

3 *List any media coverage related to this award and include links to news stories and media coverage. Only include media coverage conducted within this six-month reporting period.*

During this reporting period, the Optical Oceanography Lab received the 2024 William T. Pecora Award sponsored by the Department of Interior (DOI) and the National Aeronautics and Space Administration (NASA). See listed news stories:

- https://www.usgs.gov/news/featured-story/usgs-nasa-award-honors-excellence-earth-observation-0
- https://www.usf.edu/marine-science/news/2024/the-optical-oceanography-lab-wins-2024-william-t-pecora-award.aspx

During this reporting period, C. Hu has continuously been interviewed by news media channels (television, newspaper, radio, online) on Sargassum inundation. Here is an example: https://www.foxweather.com/earth-space/sargassum-seaweed-florida-atlantic-caribbean-gulf

4 *Describe education or outreach materials related to this award that have been developed within this six month reporting period.*
C. Hu's group has been generating and distributing monthly Sargassum bulletins to many groups, where all historical bulletins can be found at the SaWS page: https://optics.marine.usf.edu/projects/saws.htlm. During this reporting period we continued to use the revised layout of the bulletin to include historical statistics, so the current Sargassum situation can be put in historical perspective. The most recent bulletin (for December 2024) at the end of this document.

5 *Upload outreach and education materials developed during the reporting period. Please combine multiple outreach/education materials into one document.*
Sargassum_outlook_2024_bulletin12_USF.pdf

PRODUCT DEVELOPMENT & DELIVERY

6 *Provide a brief description of the status of all products or tools currently available or under development as part of this award. Include weblinks where available. Use this section to report instances in which IOOS-funded science related to this project has been transitioned to support products developed by your organization or even beyond your organization. For example, this might include models, apps, mapping tools, etc. that are being used by state or federal agencies to assist with decision support. Also describe who is using the products and the number of users. Only report on work conducted within the six-month reporting cycle.*

During this reporting period, we continued to work on the newest PACE satellite data, revised and improved the online imagery for the Gulf of Mexico and Caribbean Sea based on the alternative floating algae index (AFAI). We also developed and tested a Deep-learning model to extract Sargassum features from PACE imagery. We are comparing the results with those obtained from the heritage sensors such as MODIS and VIIRS. Once consistency is verified, we will implement the codes to produce floating algae density (FAD) images online in near real-time.

For high-resolution data products, we continued generating Sentinel-2 MSI images for several selected sites in the Florida Keys and SE Florida coast. We also continued to generate quicklook images from the PlanetScope sensors for a selected site in the Florida Keys.

During this reporting period, NASA has revised the contract with Planet Labs, and it is unclear how PlanetScope data can be accessed. We are exploring options.

A new effort was initiated during this reporting period to download Sentinel-2 MSI images from Google Earth Engine and run the DL model over these images. The advantage is that the images are already mosaiced by GEE, which greatly improves data processing efficiency.

SUCCESS STORIES

7 *Briefly describe any success stories that help convey the value of your project and the impact that it has made. Success stories should include how your project has benefited local/regional stakeholders. These stories may be used by SECOORA and the IOOS Office to respond to data calls, support presentations, or used as independent stories. Provide contact details (email addresses) for the PI and stakeholder(s) impacted.*
N/A

LEVERAGED FUNDING

8 *Provide a summary on project leveraging (i.e., how you leveraged your SECOORA award to receive other funding). Also include the proposal/project title, funding agency, amount of funding received, project start date and duration of the project. Only report on leveraging activities within the six month reporting cycle.*

The NOAA MERHAB proposal has been funded, with funds being distributed to co-PI institutions during this reporting this period. C. Hu served as a non-funded co-PI but will supervise postdocs and students. The MERHAB project will combine high-resolution satellite data and high-resolution

numerical models for several regions to improve Sargassum monitoring and forecasting. This is the project that we leveraged on and will continue to leverage on.

In addition, C. Hu received a new NASA award, “Global mapping of floating matters in the PACE and AI era”, which will use PACE data and computer AI to map floating matters at the global scale. Part of the work is to map Sargassum in the Atlantic Ocean. This new NASA award will also be leveraged upon for our SECOORA-funded work.

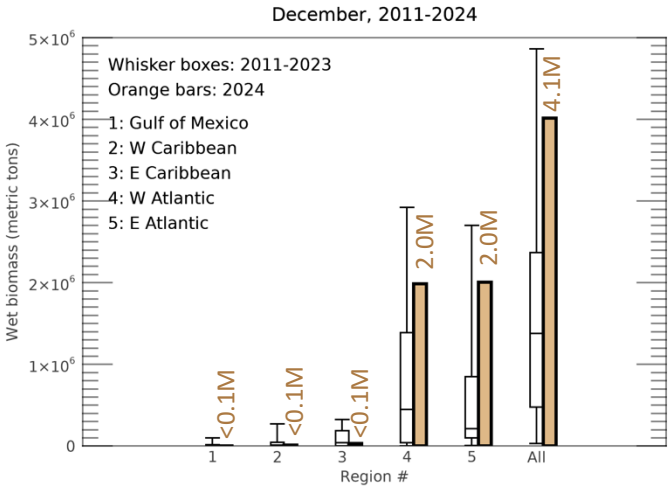
Outlook of 2024 *Sargassum* blooms

A perspective for the Caribbean Sea and Gulf of Mexico*

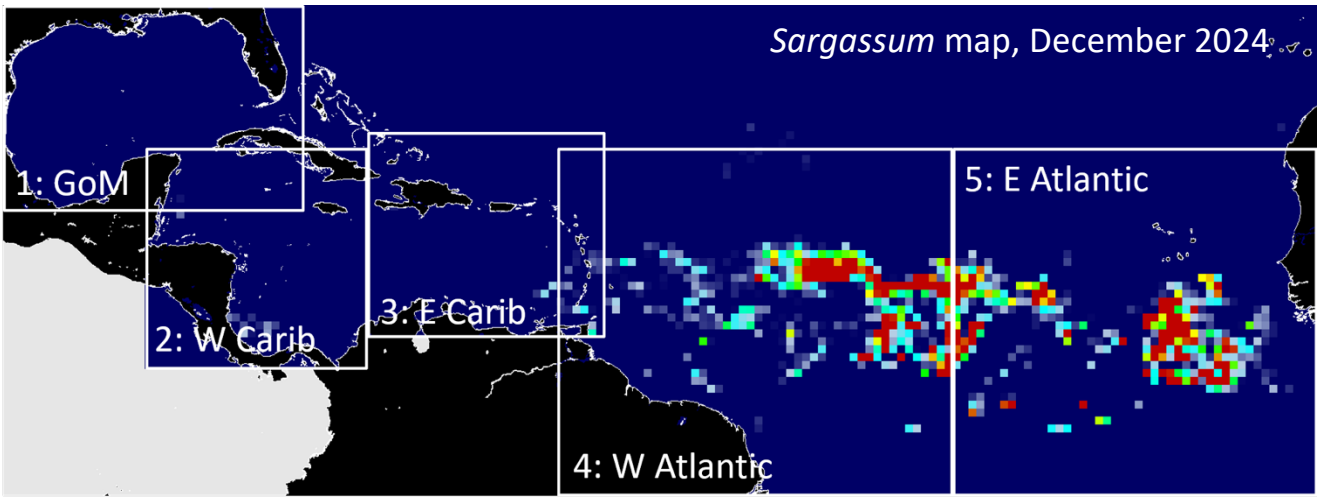
January 6, 2025, by University of South Florida Optical Oceanography Lab
(bbarnes4@usf.edu, yuyuan@usf.edu, huc@usf.edu)

The map below shows average *Sargassum* abundance for the month of December 2024, with warm colors representing higher abundance. The *Sargassum* abundance for each region is compared with historical values in the same month of 2011 – 2023 in the whisker box plot below, where horizontal bars in each vertical box indicate minimum, 25%, 50%, 75%, and maximal historical values, respectively.

Total *Sargassum* amount in the Gulf of Mexico, western Caribbean Sea, and eastern Caribbean Sea continued to remain negligible in December, but increased substantially in the western Atlantic and eastern Atlantic, with the increases way over our "slight increase" prediction. In particular, a 6-fold increase was found in the western Atlantic, a result of east-west transport and local growth. Compared to most previous years since 2011, *Sargassum* amount in the western Atlantic and eastern Atlantic as well as in the combined region all exceeded each region's 75 percentile. During the last week of December, small amounts of *Sargassum* already reached the Lesser Antilles.



Looking ahead: As in most previous years, January is expected to see increased *Sargassum* from December. Likewise, more *Sargassum* is expected to be around the Lesser Antilles and in the eastern Caribbean Sea. *Sargassum* in the western Caribbean Sea and the Gulf of Mexico will likely remain very low. However, because of the relatively high amounts of *Sargassum* in the tropical Atlantic, 2025 is likely another major *Sargassum* year. We will closely monitor and track *Sargassum* throughout the central Atlantic. Meanwhile, all previous monthly bulletins as well as daily updates through near real-time imagery can be found under the *Sargassum* Watch System (SaWS, https://optics.marine.usf.edu/projects/saws.html).



Appendix P

SECOORA PROGRESS REPORT: JULY 1 - DEC 31, 2024

Status: Submitted (01/15/2025 01:34:44 PM)

Project PI: Neil Hammerschlag

Project Title: MBON/ATN joint BioTrack project

PROGRESS TOWARDS OBJECTIVES

1 Provide a summary of progress towards meeting your project objectives for the six-month reporting period. Pay special attention to the six-month reporting period accomplishments and the broader impacts related to those findings. Indicate if you anticipate any substantive changes to the project Scope of Work (SOW) as you complete the information below. List each objective and text that describes progress towards meeting the objectives and note if the objective is Complete, On-Track, or Delayed. If an objective is delayed, a justification for the delay (e.g., travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed to mitigate the delay.

Objective 1: Complete

Objective 2: Complete

Objective 3: Complete; however, ATN is not prioritizing accepting the acoustic data anymore, thus data are archived within the contributing PI's node, such as OTN, FACT, ACT, iTag.

Objective 4: Delayed. This objective is not yet completed due to delay caused by the high computational demands of the final model parametrization (i.e. expanded study area, seasonality, and spatial autocorrelation). The partnership with colleagues from University of Florida was positive and outputs from the more complex models were released at the end of December 2024. Code adjustments are necessary to make the code suitable to run the analysis in the high-end computing system of University of Florida, which took longer than initially anticipated. In the meantime, we received feedback from data contributors on the maps produced for each species. Their feedback is being used to improve the final maps through a final round of data quality control, mostly for the OBIS dataset (e.g. removing unlikely species records and making sure all known occurrences are being included in the final analysis). This process should be completed by the end of January and a final run of the models should be completed by March 2025.

Objective 5: Delayed as this objective is based on outputs from Objective 4. Visualizations of biodiversity hotspots will be then made available to MBON, ATN and SECOORA as maps shortly after March 2025 if all goes as planned.

ASAP.gov
Automated Standard Application for Payments
BUREAU OF THE FISCAL SERVICE

Account Detail Profile Inquiry

Date: 01/21/2025
Time: 11:31 AM

ALC/Region:
13140001

Agency Short Name:
NOAA

Account ID:
FNA21NOS0120097

Recipient ID:
4530798

Recipient Short Name:
SECOORA

Inquiry Results:

Account Type:
Control Account

Account ID:
FNA21NOS0120097

Description:
NOAACOOPNOS

Available Balance:
$6,658,067.73

Total Cumulative Draw Limit:
$18,492,126.00

Account Detail ID	Account Status	Cumulative Draw Limit	Draws/RP/BE To Date
FY 23 OAP-T-004-008	OPEN	$67,466.00	- $46,817.15
FY 24 NATDMAC 024-008-004	OPEN	$165,000.00	- $25,437.50
FY 24 REG024-008-002	OPEN	$3,509,694.00	- $156,221.27
FY21CETACEAN2021-X-000-005	OPEN	$350,000.00	- $350,000.00
FY21NATDMAC021-T-000-002	OPEN	$90,000.00	- $90,000.00
FY21NCDIS021-T-000-009	OPEN	$190,000.00	- $190,000.00
FY21NOSHQ021-X-000-001	OPEN	$10,000.00	- $10,000.00
FY21OAP021-T-000-007	OPEN	$71,365.00	- $71,078.97
FY21OCM021-T-000-006	OPEN	$244,444.00	- $204,574.03
FY21OMAO021-T-000-008	OPEN	$10,000.00	- $10,000.00
FY21REG021-T-000-003	OPEN	$3,576,136.00	- $3,534,884.89
FY21SECART021-T-000-004	OPEN	$10,500.00	- $10,382.39
FY22 COOPS NCDIS022-T-002-001	OPEN	$357,500.00	- $357,500.00
FY22 OAP 022-T-002-003	OPEN	$76,915.00	- $75,589.96
FY22 OCM WATER 022-T-002-005	OPEN	$197,144.00	- $192,399.28
FY22 OCMROP022-T-002-006	OPEN	$244,400.00	- $191,435.48
FY22 OMAOBATTERY022-T-002-007	OPEN	$30,000.00	- $30,000.00
FY22 SECART022-T-002-002	OPEN	$4,800.00	- $4,800.00
FY22F4DISCRETION022-T-002-009	OPEN	$150,000.00	- $150,000.00
FY22NATDMAC022-T-002-004	OPEN	$159,153.00	- $147,440.00
FY22REG022-T-001-001	OPEN	$3,061,136.00	- $2,954,138.17
FY22REG022-T-002-008	OPEN	$324,201.00	- $147,668.74
FY23 NATL DMAC023-T-004-005	OPEN	$165,000.00	- $113,425.59
FY23 REGIONAL023-008-001	OPEN	$40,000.00	- $0.00
FY23 REGIONAL023-T-003-002	OPEN	$3,061,136.00	- $1,870,963.94
FY23 REGIONAL023-T-004-001	OPEN	$521,100.00	- $380,170.08
FY23 SEACART023-T-003-001	OPEN	$3,800.00	- $0.00
FY23NCDIS OCM023-T-004-009	OPEN	$195,400.00	- $195,400.00
FY23NCDIS023-T-004-003	OPEN	$132,500.00	- $132,500.00
FY23OCM023-T-004-004	OPEN	$100,000.00	- $0.00
FY23OMAO023-T-004-006	OPEN	$40,000.00	- $31,430.54
FY23ROP023-T-004-007	OPEN	$249,760.00	- $97,323.45

ASAP.gov
Automated Standard Application for Payments
BUREAU OF THE FISCAL SERVICE

Account Detail Profile Inquiry

Date: 01/21/2025
Time: 11:31 AM

Account Detail ID	Account Status	Cumulative Draw Limit	Draws/RP/BE To Date
FY23UGA023-T-004-002	OPEN	$51,882.00	- $672.98
FY24 AOML DC 024-008-007	OPEN	$54,844.00	- $0.00
FY24 CORA 024-008-003	OPEN	$325,000.00	- $51,991.23
FY24 OAP 024-008-008	OPEN	$183,090.00	- $201.38
FY24 OCM WATER 024-008-005	OPEN	$150,000.00	- $0.00
FY24 OMAO OPS 024-008-006	OPEN	$66,000.00	- $0.00
FY24 SECART 024-008-010	OPEN	$3,000.00	- $0.00
FY24- OCM ROP 024-008-009	OPEN	$249,760.00	- $9,611.25