



## 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:** 07/01/2023 – 12/31/2023

**Principal Investigator(s):** Debra Hernandez, SECOORA Executive Director

### I. PROJECT MILESTONES:

Milestone Table. Milestones from the SECOORA Year 3 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
<b>GOVERNANCE SUBSYSTEM</b>	
<b>Maintain the SECOORA governance and operational structure through implementation of SECOORA <a href="#">bylaws</a> and <a href="#">Strategic Plan</a>.</b>	
Accomplishments: <ul style="list-style-type: none"> <li>• SECOORA hosted a Board of Directors meeting, December 5-6, 2023 in Charleston, SC at the SC Sea Grant Consortium offices. The Board discussed updates to the next 5-year Strategic Plan, the Inflation Reduction Act topic 1 and topic 2 funding, and reviewed SECOORA committee membership.</li> <li>• SECOORA continues to partner with Savannah State University (an HBCU) to host a coastal ocean observing internship opportunity. Four interns have been part of this program. The mentor for the interns is Dr. Amanda Kaltenberg.               <ul style="list-style-type: none"> <li>○ Makiah Mooney (Marine Science major) - Project title: <i>Fluctuations in water properties due to the transition between tropical storm Matthew and Hurricane Matthew</i>. During the internship, Makiah was introduced to SECOORA data on hurricane effects on water temperature. During his internship, summer 2023, he was able to expand on his interest in the effects of hurricanes by collaborating with Dr. Eric Montie, University of South Carolina Beaufort, to obtain stationary passive acoustic data. He researched the impacts of Hurricane</li> </ul> </li> </ul>	On-track



<p>Matthew on soniferous fish call activity. Makiah made a poster presentation at the State of the Georgia Coast Symposium, Sept. 21-23, 2023, Tybee Island, GA. As a result of this opportunity, Makiah was able to further pursue his research interests for his Senior Research project, where he collected his own passive acoustic data from the local estuary during Tropical Storm Idalia. He found that the storm did impact fish call detections and he quantified the influence of masking of data from storm noise. Makiah graduated in Dec. 2023, and has applied to the MS Marine Science program at SSU, where he plans to continue researching the environmental and climate effects on soniferous fish activity.</p> <ul style="list-style-type: none"> <li>○ Brandon Williams (Sr. Biology major) - Project title: <i>Global greenhouse gas emissions and its effect on our planet's water systems</i>. During his summer 2023 internship, Brandon used data from SECOORA to investigate seasonal patterns of temperature and chlorophyll at Gray's Reef. He presented his research results with a poster presentation at the State of the Georgia Coast Symposium. Brandon graduated in December 2023 with a BS in Biology and has applied for the MS Marine Sciences program at SSU.</li> <li>○ Michon Shaw (Jr Marine Science major) was selected for an internship during the Fall 2023 semester. He is using SECOORA data to investigate fish catch data in marine protected areas. He plans to continue the project next semester for his Sr. Research project.</li> <li>○ Shavon Floyd (Jr. Marine Science major) was selected for an internship during the Fall 2023 semester. She is investigating sea level rise observed at tide stations (e.g., Fort Pulaski) coupled with published measurements of ocean heat content/temperature. She plans to continue working on the project during the Spring 2024 semester.</li> </ul>	
<p><b>Maintain SECOORA's Certification as a RICE</b></p>	
<p>The RCOS MOA between SECOORA and NOAA was executed on 8/22/22. All documents submitted for certification are found here: <a href="https://secoora.org/certification/">https://secoora.org/certification/</a>. The SECOORA By-Laws are available here: <a href="https://secoora.org/resources/by-laws/">https://secoora.org/resources/by-laws/</a></p> <p>SECOORA and Axiom Data Science reviewed the SECOORA Data Management Plan (<a href="https://secoora.org/wp-content/uploads/2022/05/00_SECOORA_DMPlan_2022-05-06.pdf">https://secoora.org/wp-content/uploads/2022/05/00_SECOORA_DMPlan_2022-05-06.pdf</a>) and made updates to reflect changes in personnel at Axiom (page 4) and add the new SECOORA logo. SECOORA and Axiom also work with funded data providers to review Data Sharing Plans annually as part of our RICE certification. The data sharing plans are located in Appendix F of the SECOORA DMAC plan and can be found here: <a href="http://secoora.org/wp-content/uploads/2022/05/0-APPENDIX_F_FundedDataStreamsInventory.pdf">http://secoora.org/wp-content/uploads/2022/05/0-APPENDIX_F_FundedDataStreamsInventory.pdf</a>. Updates were made to the following data sharing plans during this reporting period:</p> <ul style="list-style-type: none"> <li>● ASBPA/Hohonu water level stations</li> <li>● University of North Carolina Wilmington (UNCW) buoys and non real-time stations</li> <li>● UGA Grays Reef Buoy OA sensor</li> </ul>	<p>Complete</p>
<p><b>Update the SECOORA RCOOS Plan</b></p>	

There were no updates to the SECOORA RCOOS Plan this reporting period.	On-track
<b>OBSERVING SUBSYSTEM</b>	
<b>HF Radar Operations &amp; Maintenance</b>	
<p>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 <a href="#">HFR National Network</a>. 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:</p> <ul style="list-style-type: none"> <li>• The HFR report that details HFR operators, system status, and IT infrastructure needs by site is available here – review the worksheet titled “7 – 12 2023”: <a href="https://docs.google.com/spreadsheets/d/1L1w00TPG1K7xXyh_iXXw6T7JaGT8rLZwnZMWfrnIXOI/edit?usp=sharing">https://docs.google.com/spreadsheets/d/1L1w00TPG1K7xXyh_iXXw6T7JaGT8rLZwnZMWfrnIXOI/edit?usp=sharing</a></li> <li>• The HFR staffing report is found here – see worksheet titled “2023” - <a href="https://docs.google.com/spreadsheets/d/1dC4Tgh7x1BRLcFL62urO3sbWwp6FEUteO-c0J5OgwEw/edit?usp=sharing">https://docs.google.com/spreadsheets/d/1dC4Tgh7x1BRLcFL62urO3sbWwp6FEUteO-c0J5OgwEw/edit?usp=sharing</a></li> <li>• The HFR expenditures report is found here – see worksheet titled “2023” – <a href="https://docs.google.com/spreadsheets/d/1o72wuTtcAqYz0uVewoxmcwn14rqqBwzxUJHTpkzVYqY/edit?usp=sharing">https://docs.google.com/spreadsheets/d/1o72wuTtcAqYz0uVewoxmcwn14rqqBwzxUJHTpkzVYqY/edit?usp=sharing</a></li> </ul> <p>Issues: UGA Skidaway Institute of Oceanography (SkIO) has not been able to install the new WERA HFR at Kennedy Space Center (KSC). The SkIO team and Brain Zelenke, IOOS Surface Currents Program Manager, are working with KSC personnel to target an installation date in early 2024. Additionally, the CAT HFR has still not been replaced after being destroyed by a wildfire in 2022 and the JEK HFR went down in October 2023. At present, SkIO has only one working HFR system at Cape Canaveral. The SECOORA Executive Director plans to meet with SkIO personnel in January to discuss options for managing these systems.</p>	On-track
<b>SECOORA Glider Network</b>	
<p>The SECOORA glider team includes SkIO, the University of South Florida (USF), UNC-Chapel Hill (UNC-CH), and Georgia Tech. See table <b>IOOS, NOAA, Other Agency Funding</b> for details on Navy glider support.</p> <p>Accomplishments:</p> <ul style="list-style-type: none"> <li>• One SECOORA supported mission was completed during the reporting period (see table below). All data are submitted to the National Glider DAC and the glider data can be found on the SECOORA Data Portal.</li> <li>• The G1 glider Pelagia (on long term loan to SkIO from the University of North Carolina Wilmington (UNCW)) has been repaired and depth-tested after a faulty altimeter was</li> </ul>	On-track

found to be the source of the forward leak. Pelagia is now ready to be deployed for future missions after several years on the bench due to multiple hardware failures.

- USF glider Bass included a VMT acoustic receiver courtesy of OTN for one mission.

Team Lead	Glider Name	Deployment Date	Recovery Date	Days in Water
USF	<a href="#">Bass</a>	10/7/23	11/6/23	31

Issues:

- Batteries for SkIO glider Angus were found to have multiple faulty cells.
- SECOORA glider Franklin had minor issues with seating of its aft rechargeable battery; testing in the lab is ongoing to provide a more permanent resolution to what may be a design issue.
- SECOORA glider Franklin experienced a blown weight during a Hurricane glider mission after remora interference, despite wearing a full netting suit intended to prevent fouling. This was the first SkIO mission failure due to remoras since 2011, when the fabric suits were first designed. New procedures have been implemented to cover the smooth section of instruments on the science bay for all gliders, and SkIO is actively recruiting a new partner who can sew fabric suits, which prevent fouling without loss of glider speed.

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

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.

Accomplishments:

- Buoy turnaround cruises were completed as follows: 1) ILM2 buoy was replaced on 06/26/23; SUN2 buoy replaced on 07/26/23; LEJ3 buoy was replaced on 11/08/23.
- UNCW supports the FACT Network (ATN) by deploying acoustic receivers on 4 existing Onslow Bay, NC moorings (ILM2, ILM3, LEJ3, OB27M) to record tagged fish passage near the receivers. These receivers operate in non-real-time and receivers are recovered during buoy turnarounds and data uploaded to the FACT node.
- Provided a student internship/applied learning experience for 1 [Cape Fear Community College Marine Technology](#) student, Luke Edwards. Luke worked on buoy outfitting, instrument setup, and water level sensor deployments at UNCW.

UNCW up-time statistics for 7/1/23 – 12/31/23 for real-time moorings:

	ILM2	ILM3	LEJ3	SUN2	CAP2	FRP2	CHR60
Air Temperature	100%	100%	79%	100%	97%	100%	42%
Air Pressure	100%	100%	79%	100%	97%	100%	42%
Wind Speed, Gust, Direction	100%	100%	79%	100%	97%	100%	42%
Salinity	85%	94%	79%	100%	4%	99%	33%
Surface Water Temperature	100%	94%	79%	100%	4%	99%	33%
Waves	99%	N/A	91%	91%	78%	100%	80%
ILM2, LEJ3, SUN2, CAP2, & CHR60 have two buoys on site: a met buoy and a wave buoy							

On-track

Issues:

- CHR60 was struck by a large vessel in early September. The collision caused major damage to the buoy tower resulting in a power system failure. A maintenance trip on 09/06/23 found the buoy in an irreparable state. A new buoy is ready to be deployed but shiptime availability and weather conditions have impaired scheduling.
- CHR60WAVE and CAP2WAVE had power failures due to fouling of the solar panels. Replacement moorings are ready to be deployed. The RV Tomtate (UNCW small boat) has been out of service since early September due to deck and fuel tank work. The boat work is estimated to be completed by 12/20/23; therefore, buoy maintenance will be conducted as soon as weather is permitting during the next report period.
- LEJ3 experienced a power system failure in September, with the system losing power completely on 9/30/23. The buoy was replaced via the R/V Cape Fear on 11/7/23.
- CAP2 CTD lost communications on 7/31/23. A new CTD was not deployed until late December.

USF maintains 2 real-time buoys (C10 & C12) and 2 non-real-time moorings (C11 & C15) with SECOORA funding. USF also 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 the 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: One research mooring cruise was executed onboard the R/V Weatherbird II, 9/5/23 – 9/10/23 to service C13 and C22. Additionally, during the reporting period three service trips using small vessels were completed to successfully resolve data transmission issues and conduct ADCP deployments.

USF up-time statistics for 7/1/23-12/31/23 for real-time buoys:

USF	C10	C12	C13	C22
Wind	99%	80%	99%	98%
Air Pressure	99%	80%	99%	98%
Water Temperature	99%	80%	99%	73%
Salinity (Surface)	99%	80%	99%	73%
Air Temperature	99%	80%	99%	98%
Relative Humidity	99%	80%	99%	98%
Longwave Radiation	99%	N/A	N/A	N/A
Shortwave Radiation	99%	N/A	N/A	N/A
Currents (ADCP)	53%	57%	99%	87%

Four instrument issues resulted in below 85% up-time of some observed parameters. ADCP's failed at stations C10 and C12, a CTD failed at C22 and telemetry system failure at C12 resulted in the entire system being down for more than a month. All issues with maintaining up-time are due to a lack of sufficient spare equipment and ship time caused by Hurricane Ian. Hurricane Ian caused the loss of numerous sensors and telemetry

<p>equipment. In order to re-deploy any of the USF systems, all spares were used and USF has been unable to purchase replacement sensors as Hurricane Ian funds have not been made available at this time.</p>	
<p><b>Expand the SECOORA Real-time Observing Network</b></p>	
<p>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.</p> <p>Water level sensor locations can be viewed here: <a href="https://wl.secoora.org">https://wl.secoora.org</a>.</p> <p><b>SECOORA Accomplishments</b></p> <ul style="list-style-type: none"> <li>• In October 2023, SECOORA hired a full-time Water Level Project (WLP) Manager, Cotie Alsbrooks, to take on all water level network responsibilities.</li> <li>• SECOORA purchased a Trimble R12i RTK unit to support vertical elevation surveys for PI installed and SECOORA installed water level sensors. This is a great step in standardizing the SECOORA water level network’s surveying needs and practices.</li> <li>• The SECOORA WLP Manager conducted in person meetings with PIs for Hohonu/ASBPA, GA Tech, FIU, and CCU/FAU. These meetings included visiting water level stations to review sensor installations and PI operational capacity. The WLP Manager will assist with field work, especially future vertical elevation surveys for new or reinstalled stations, for each project team moving forward.</li> <li>• SECOORA hired McKim &amp; Creed to perform geodetic leveling at 16 Georgia Tech and 20 ASBPA/Hohonu water level stations. This allows for each surveyed station to have a reference land elevation and datum associated.</li> </ul> <p><b>Georgia Tech Accomplishments</b></p> <ul style="list-style-type: none"> <li>• Georgia Tech continues to align metadata, data, and monitoring procedures with SECOORA. All data is provided to the SECOORA data management team for integration into the SECOORA data portal and products that SECOORA is developing,</li> <li>• The project team is currently mapping the environmental and flooding dynamics in coastal Georgia and meeting with Chatham Emergency Management officials to review the progress.</li> </ul> <p><b>ASBPA/Hohonu Accomplishments</b></p> <ul style="list-style-type: none"> <li>• ASBPA/Hohonu focused on improving data quality via QARTOD and upgrading hardware. This was completed by Hohonu releasing updated QC procedures that organized their QC methodology better and added comparison of raw and clean data. This also allowed comparison between Hohonu and NOAA data.</li> <li>• The majority of the 2G water level sensors have been upgraded to LTE which has increased uptime percentage. The new hardware features 3+ days of onboard data logging to allow continuous data during network interruptions. The new LTE hardware also consumes less power.</li> <li>• To help standardize installation and sensor replacement, Hohonu has developed installation replacement SOPs via a short video for their customers.</li> </ul>	<p>On-track</p>

- Hohonu released a new Tidal Datum Calculation Procedure with NOAA CO-OPS in November 2023. This is to provide technical support for Hohonu data users. It gives an in-depth review into Hohonu’s tidal datum calculation methodology and comparison to NOAA protocols and Tidal Analysis and Datum (TAD) calculator. It also identifies future methodology upgrades that will better align with NOAA’s methods of optimizing calculation record length and MHHW calculation.
- Community representatives met with PI Elko and Dorton (SECOORA) during Fall 2023 NCBIWA meeting in Wilmington, NC for a discussion on needs and experience with the program. Communities reported that water level data was used to inform emergency management and public works decisions.

Stations that did not meet the SECOORA up-time requirement of 85% during the 6-month reporting period.

Station Name	Owner	Uptime (%)
St Mary’s Waterfront Pavilion, GA	GT	50%
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	60%
Hunt Drive at Burnside Island, GA	GT	60%
Shipyards Road, Savannah, GA	GT	50%
Solomon Bridge, Savannah, GA	GT	80%
Hwy 80 at Chimney Creek, GA	GT	60%
Turner Creek Boat Ramp, GA	GT	60%
Walthour Road, Savannah, GA	GT	50%
Lazaretto Creek Fishing Pier, Savannah, GA	GT	50%
Catalina Drive, Savannah, GA	GT	30%
Hwy 17 at Salt Creek, Savannah, GA	GT	60%
UGA Marine Extension, GA	GT	50%
Holden Beach, Brunswick County, NC	Hohonu	82%
Surf City, NC	Hohonu	79%
The Citadel, Ashley River, SC	Hohonu	65%
Fripp Island, SC	Hohonu	61%
Marine Corp Recruit Depot Parris Island, SC	Hohonu	48%
North Topsail Beach, NC	Hohonu	47%
Emerald Isle, NC	Hohonu	39%
John's Pass, FL	Hohonu	33%
Fort Raleigh National Historic Site, NC	Hohonu	32%
Georgetown, SC	Hohonu	23%
Port Royal Sound Foundation SC	Hohonu	21%
Coastal Studies Institute, Wanchese, NC	Hohonu	17%
Washington Acres Boat Ramp, NC	Hohonu	9%
Snow's Cut Bridge, NC	Hohonu	0%
Kure Beach, NC	Hohonu	0%
Captiva Island, FL	Hohonu	0%
Sanibel, FL	Hohonu	0%

Mexico Beach, FL	Hohonu	0%	
Oyster Landing (N Inlet Estuary), SC	Hohonu	0%	
<p><b>Georgia Tech Issues:</b></p> <ul style="list-style-type: none"> <li>• There were two LoRaWAN gateway interruptions this period.</li> <li>• The primary service issue continues to be widely varying battery life for each sensor. Georgia Tech began installing solar panels to more of the SECOORA funded units to improve battery life.</li> <li>• There have been some failures in the MaxBotix sensors that have been in the field for an extended time. The metal surface of the sensor appears to be corroding over time in salt air. The symptom is decreased effectiveness for longer distances that can lead to lost data at lower tides.</li> </ul> <p><b>ASBPA/Hohonu Issues:</b></p> <ul style="list-style-type: none"> <li>• ASBPA/Hohonu is having lower up-time reporting due to older 2G models being phased out. Also, there are fewer hours of sun during fall/winter season causing poor battery performance for the 2G models. This will be resolved by continuing the transition to LTE models from the 2G models.</li> <li>• Captiva, FL and Sanibel, FL water level sensors have been down since Hurricane Ian. Supplemental funding will be used to reinstall these stations.</li> <li>• The Snow’s Cut Bridge (Wilmington, NC) site was vandalized over 6 months ago. The person responsible for the station has not re-installed the new sensor that was shipped in Nov 2023. It is uncertain when this station will be re-installed.</li> </ul>			
<b>SECOORA Biological Data Collection</b>			
<p>University of South Carolina Beaufort (USCB) operates and maintains the SC estuarine soundscape observatory (<a href="https://sound.secoora.org/">https://sound.secoora.org/</a>) using 9 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). 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.</p> <ul style="list-style-type: none"> <li>• Two May River stations lost data from 4/20/23 - 7/14/23 due to a recording issue with the DSG-Oceans. One Charleston Harbor station did not record accurate data from 4/12/23 - 7/24/23 due to an error with the sample rate set to 48 kHz (rather than 96 kHz). A second station in Charleston Harbor lost data from 8/5/23 - 11/8/23 due to water getting inside the recorder during the deployment. The Winyah Bay station line to the recorder was cut. The recorder was located, and SC Department of Natural Resources (SCDNR) will recover this recorder during the next reporting period.</li> <li>• All other recorders and sensors were successfully deployed and retrieved during this project period. Due to challenges with older DSG-Oceans sensors, USCB has decommissioned these instruments and now are deploying LS1s at all stations.</li> <li>• The team manually reviewed 45,196 sound (or wav) files for biological sounds and noise occurrences during this project period. For manual review, the team subsamples</li> </ul>			On-track



<p>and analyzes wav files every two hours, which equates to 12 wav files/day at each station.</p> <ul style="list-style-type: none"> <li>• USCP performed sound pressure level (SPL) analysis on 33,565 wav files. SPL analysis is completed on every wav file (i.e., every 20 min or 1 hour).</li> <li>• All soundscape observatory data have been uploaded to Research Workspace. This includes water temperature, water depth, sound pressure levels, and manually reviewed endpoints. Figures for each data endpoint for all stations were also provided.</li> </ul>	
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**DMAC AND MODELING & ANALYSIS SUBSYSTEMS**

**SECOORA DMAC subsystem**

<p>Axiom Data Science is the SECOORA data management team. Axiom provides the following support on an on-going, annual basis:</p> <ul style="list-style-type: none"> <li>• Maintain, operate, and develop SECOORA cyberinfrastructure to sustain long-term data stewardship for partners and stakeholders.</li> <li>• Maintain IOOS compliant services and applications for integration with national products. <ul style="list-style-type: none"> <li>○ THREDDS 4.6.15 - <a href="https://thredds.secoora.org">https://thredds.secoora.org</a></li> <li>○ ERDDAP 2.02 - <a href="https://erddap.secoora.org">https://erddap.secoora.org</a></li> <li>○ SECOORA ISO WAF - <a href="https://thredds.secoora.org/iso">https://thredds.secoora.org/iso</a></li> <li>○ NCEI Archive - <a href="https://ncei.axiomdatascience.com/secoora/">https://ncei.axiomdatascience.com/secoora/</a></li> </ul> </li> <li>• Maintain the Glider System for the management of SECOORA glider assets. The SECOORA glider data is available for visualization in the portal (<a href="#">here</a>), and data is submitted to the National Glider DAC (GDAC) during glider missions.</li> <li>• 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.</li> <li>• 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.</li> <li>• Promote data discovery and public access through the SECOORA data catalog and data portal. <ul style="list-style-type: none"> <li>○ Axiom is working with Biscayne Bay National Park Service (NPS) staff to access and archive non real-time water quality data for Biscayne Bay so that it can be shared via the SECOORA data portal and web services. The NPS moved offices during this reporting period so we anticipate regrouping on this activity in the next reporting period.</li> <li>○ NC State University and Fathom personnel worked with Axiom to share CNAPS model data. The data is accessible via an Axiom THREDDS server: <a href="https://thredds.secoora.org/thredds/catalog/catalog.html">https://thredds.secoora.org/thredds/catalog/catalog.html</a></li> <li>○ Axiom added the NOAA NCEI Continuously Updated Digital Elevation Model to the catalog (<a href="https://thredds.secoora.org/thredds/catalog/catalog.html">https://thredds.secoora.org/thredds/catalog/catalog.html</a>) and portal (<a href="https://portal.secoora.org/?ls=SKo9Pb7S#map">https://portal.secoora.org/?ls=SKo9Pb7S#map</a>)</li> </ul> </li> <li>• Strengthen data stewardship within SECOORA to improve data quality, access, attribution, exchange, delivery, and storage.</li> </ul>	<p>On-track</p>
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<ul style="list-style-type: none"> <li>○ Axiom continues working with NOAA NDBC to transfer real-time data from the SECOORA region to NDBC via ERDDAP services. Axiom set up a federated ERDDAP server in December 2022. This approach has alleviated much of the data latency and data drops; however, some issues do still arise with ERDDAP where data is delayed in reaching NDBC. Additionally, NDBC has issues maintaining their ERDDAP server, causing data drops from their side. Axiom often must determine where in the pipeline issues occur. When on NDBC’s side, the data providers must wait for NDBC to address the issues before data begins flowing again.</li> <li>● Implement real-time sensor QARTOD compliant quality control systems.</li> <li>● Annually archive physical oceanographic, biogeochemical, and meteorological data with NOAA’s NCEI.</li> <li>● See Appendix A for annual DMAC reporting requirements.</li> <li>● See Appendix B for the SECOORA Asset inventory (submitted as a separate document due to document format).</li> </ul>	
<b>CNAPS Model</b>	
<p>The <a href="#">CNAPS</a> model is operated and maintained by NC State University (NCSU) and Fathom Science. Specific accomplishments include:</p> <ul style="list-style-type: none"> <li>● The project team worked with the Axiom to establish a pathway for hosting CNAPS Nowcast/Forecast model output. The data is accessible via an Axiom THREDDS server: <a href="https://thredds.secoora.org/thredds/catalog/catalog.html">https://thredds.secoora.org/thredds/catalog/catalog.html</a></li> <li>● NCSU/Fathom successfully conducted a comprehensive 30-year ocean reanalysis (1993-2022) by employing the ensemble data assimilation (ENDA) method. This advanced technique enables the incorporation of historical data from various sources, including satellite observations (SST, SSH) and in situ measurements (temperature, salinity from ship surveys, gliders, floats, and moorings) into a dynamical model. The resulting ENDA ocean hindcast is characterized by its high precision and high resolution, featuring a 4-km spatial resolution and 50 vertical layers. This regional ocean analysis stands as one of the most accurate and up-to-date regional ocean assessments available. To ensure the widespread accessibility of this dataset, we have securely transferred the data to Axiom for both archiving and sharing purposes. The reanalysis is also available via the THREDDS service listed above.</li> <li>● The transition of CNAPS to Amazon AWS has been successfully made, and it is currently in operational status following the NCSU computing system failure. However, it is essential to note that the operational expenses associated with CNAPS on AWS are considerably higher than initially expected at approximately \$12,000/month, surpassing the budget constraints for this research project. For situations requiring swift and stable nowcast/forecast operations and data delivery, AWS remains a dependable option. As a result, the project team intends to keep AWS CNAPS in an on-demand operational mode to the extent that the budget allows and continue finding ways to optimize its cost and usage.</li> </ul>	On-Track
<b>WFS Model</b>	
The USF team continues to provide the West Florida Coastal Ocean Model (WFCOM) and	On-track

<p>the Tampa Bay Coastal Ocean Model (TBCOM) daily nowcast/forecast systems. These models produce simulated currents, water temperature, and sea surface height fields. The models enable researchers to better understand the role that the circulation plays in shelf ecology and other matters of societal concern. Real time data and model simulations (including daily automated nowcasts/forecasts for currents and particle trajectories, including short-term red tide tracking joint with the Florida Wildlife Research Institute) are publicly available online (<a href="http://ocgweb.marine.usf.edu">http://ocgweb.marine.usf.edu</a>), as well as being transmitted via THREDDS server to NOAA GOODS.</p>	
<p><b>AI Portal</b></p>	
<p>Florida Wildlife Research Institute (FWRI) and Axiom Data Science are building an artificial intelligence annotation data portal (AI portal). Accomplishments for the reporting period:</p> <ul style="list-style-type: none"> <li>• FWRI is working with Axiom to develop a beta-version of the interactive web portal based on requirements scoped during Years 1 and 2. The portal, which is now referred to as a gateway, will summarize AI standards, resources, and workflows and provide a place for end-users to share, host, and collaborate. Importantly, Axiom hired a web developer to support this effort and the team is meeting regularly to discuss draft gateway designs using a collaborative web design tool (i.e., Figma). Preparations for the development of the beta gateway have included the creation of a schematic of the “How does AI fit into my research?” decision tree user tool and documentation of AI use-case examples.</li> </ul>	<p>On-track</p>
<p><b>SEAMAP-SA Data and Analysis</b></p>	
<p>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:</p> <ul style="list-style-type: none"> <li>• As SCDNR and Axiom work through the DarwinCore conversion and incorporating the SEAMAP-SA data into the SECOORA data system, several issues were identified with data structure on the SEAMAP-SA that could result in erroneous data being downloaded from the site or erroneous summarizations. SEAMAP-SA staff have corrected these structure issues to make the data more compatible with the SECOORA system and DarwinCore.</li> <li>• Testing began on the back-end administrative portion of the data portal. The portal is user-friendly and no major issues were discovered during this testing phase. Ongoing testing will occur until project roll-out.</li> <li>• SEAMAP-SA staff worked with Axiom to develop an extraction tool for users to obtain abundance/ biomass data with zeroes for more than one species at a time (e.g., genus or family level or for selected species). SCDNR staff continue to work with Axiom to ensure these extractions will provide accurate outputs.</li> </ul>	<p>On-track</p>
<p><b>OUTREACH, ENGAGEMENT, PRODUCT DESIGN SUBSYSTEM</b></p>	
<p><b>Support Community Driven Networks</b></p>	
<p>See “NOAA, IOOS, Other Agency Funding” table, starting on page 13</p>	

<b>SECOORA Outreach and Engagement</b>	
<ul style="list-style-type: none"> <li>SECOORA hosted the 2023 Data Challenge with proposals due 10/6/23. There were 6 proposals submitted. Kaylee Mooney, Florida Gulf Coast University submitted the winning proposal, <i>Implementing Vulnerability into Historic Hurricane Normalizations</i>. Learn more here: <a href="https://secoora.org/meet-the-winner-of-the-2023-secoora-data-challenge/">https://secoora.org/meet-the-winner-of-the-2023-secoora-data-challenge/</a></li> <li>The SECOORA section of the IOOS outreach <a href="#">document</a> was updated on 1/30/24.</li> <li>Details on media engagement and outreach for SECOORA staff and project PIs are found here (on the tab labeled 7/1/23-12/31/23): <a href="https://docs.google.com/spreadsheets/d/189a6FgoOajMvGxDxmYuf0QnEoHuPXgpNqiMWn5YFv94/edit?usp=sharing">https://docs.google.com/spreadsheets/d/189a6FgoOajMvGxDxmYuf0QnEoHuPXgpNqiMWn5YFv94/edit?usp=sharing</a></li> </ul>	On-track
<b>Product Development</b>	
<p>Water Level Network User Interface (SECOORA): SECOORA contracted Second Creek Consulting to develop a website and individual water level station pages. Second Creek is using two water level station pages as test pages for developing the individual water level station pages. The four Sea Grant extension teams (NC, SC, GA, and FL) are providing feedback on the development effort. After iterative feedback from the Sea Grant community, the new final website and station page updates will be implemented for the entire network. Second Creek has participated in Sea Grant calls in November and December to get initial page design recommendations and show a mock-up of the two stations pages. Further development will continue into the next reporting period.</p>	On-track
<p>SECOORA developed data products and websites:</p> <ul style="list-style-type: none"> <li>The new SECOORA website has launched: <a href="https://secoora.org/">https://secoora.org/</a>. SECOORA worked with PACT media to redesign the website and SECOORA logo.</li> <li>SECOORA Marine Life page highlights the importance of collecting biological data and SECOORA supported activities: <a href="https://secoora.org/marine-life/">https://secoora.org/marine-life/</a></li> <li>SECOORA's Text a Buoy system provides quick access to your favorite buoy. Click on the link to sign up: <a href="https://secoora.org/text-a-buoy/">https://secoora.org/text-a-buoy/</a></li> </ul>	On-Track
<p>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:</p> <ul style="list-style-type: none"> <li>Based on discussions between BCRS and the Navarre Beach Sea Turtle Conservation Center, two additional BCRS locations in the Florida Panhandle have been added.</li> <li>The BCRS team has gained national attention with conversations regarding development of BCRS products in Alabama, Texas, and California.</li> <li>A SC-specific landing page was made for ShellCast (<a href="https://shellcast-sc-dot-ncsu-shellcast.appspot.com/map">https://shellcast-sc-dot-ncsu-shellcast.appspot.com/map</a>). The team is now in the process of creating daily automated messages to be sent to SCDHEC regulators with ShellCast forecasts. This process will be consistent with the daily automated HTB nowcast messages that are provided to beach managers and other interested stakeholders.</li> <li>The ShellCast expansion to FL is nearly complete and it is expected to be published in</li> </ul>	On-track

<p>the next reporting period, barring unexpected problems. In FL, ShellCast will include all conditionally approved shellfish harvest areas.</p> <ul style="list-style-type: none"> <li>• The team supported researchers at the Institute for Water and Health at Georgia Southern University on the submission of a proposal to GA Sea Grant for the development of a HTB modeling decision support tool for the swimming waters of Tybee Island, GA.</li> </ul>	
<p>The UNCW developed Situational Awareness Tool (SAST) is a functional prototype product. Registered users can create an infinite number of custom alerts on cormp.org based on any combination of CORMP assets and user-defined parameter thresholds. NWS Staff continue to create alerts based off real-time data to forecast rip current and flooding events. Key users include Fripp Island Sea Rescue, Wilmington U.S. Power Squadron members, NWS offices in Wilmington, NC and Charleston, SC. Users continue to be added to the beta testing program. SAST sent out 3,392 alerts, based on user defined thresholds during this reporting period to numerous NWS/NOAA and other super-users.</p>	On-track

IOOS, NOAA, Other Agency Funding	
Funding Area/Recipient	Task and status update – See Appendix J for ASAP draws by funding line
<p>Regional Ocean Data Sharing Initiative, Lead PI Debra Hernandez, SECOORA</p>	<p>Status: On-track</p> <p>Accomplishments:</p> <ul style="list-style-type: none"> <li>• SECOORA issued a contract to McKim &amp; Creed to conduct water level vertical elevation surveys. The final surveys for Florida were conducted in July 2023.</li> <li>• SECOORA worked with NC Sea Grant, the town of Belhaven, NC and emergency management staff from Beaufort County, NC and the State of North Carolina to site two locations for water level sensor installation. SECOORA has contracted Green Stream Technologies to install both sensors in Feb 2024. Once installed, the sensors will be surveyed by NC Emergency Management so that the sensors can also be displayed in the <a href="#">NC FIMAN</a> network, a state-run flood mapping program. These two stations will be managed by the SECOORA WL Project manager and highlights a community partnership with NC Sea Grant, the town of Belhaven, Beaufort County, NC and NC Emergency Management. Both sensors fill critical gaps in water level data.</li> <li>• SECOORA and NC Sea Grant staff met with community planners with the City of Wilmington, NC to look at potential locations for water level sensors to meet the needs for urban underserved communities. As part of a collaborative effort, the City of Wilmington, UNCW, and SECOORA will partner on a Community Collaborative Research Grant (CCRG - <a href="https://wrri.ncsu.edu/funding/non-traditional-oppo/">https://wrri.ncsu.edu/funding/non-traditional-oppo/</a>) to install sensors in the Burnt Mill Creek watershed in order to provide water level data to residents and schools that are impacted by flooding.</li> <li>• Florida Sea Grant worked with FAU to identify the locations for 3 new sensors in Okaloosa and Walton Counties, in the FL panhandle region. In</li> </ul>

	<p>Dec 2023, FAU installed three stations: one in Niceville, FL, a second in the W.E. Combs neighborhood in Fort Walton Beach, FL and a third in the Sylvania Heights neighborhood in Fort Walton Beach, FL. The W.E. Combs neighborhood is an underserved community that has been plagued by flooding for decades.</p> <ul style="list-style-type: none"> <li>• Georgia Sea Grant participated in four community meetings to raise awareness, develop/strengthen relationships, and increase use of SECOORA and Southeast Water Level Network Resources. These community engagement efforts allow the GASG team to discuss water level data access and provide feedback for the SECOORA water level data webpage and individual station pages. GASG is also working with community partners to determine the best ways to visualize critical flood thresholds.</li> <li>• SC Sea Grant leads bi-monthly calls with all the South Atlantic Sea Grant Programs so that everyone remains coordinated and provides updates on how community engagement and sensor installations are progressing.</li> <li>• SCSG is using data from water level sensors in Marlboro County, the Town of McClellanville, and Marion County to help establish local critical flooding thresholds for these sensor locations. There has also been communication with the community leaders for each sensor to determine their needs for communication products.</li> <li>• SCSG has created a webpage as a guide to water level sensors - <a href="https://www.scseagrant.org/water-level-sensors/">https://www.scseagrant.org/water-level-sensors/</a></li> </ul>
SECOORA – Water level within region, Lead PI SECOORA	On-track, See pages 6-7 for specific SECOORA accomplishments
UNC-Chapel Hill, Lead PIs Brian Blanton & Rick Leuttich	See Appendix C
SECOORA – SECART support for SCDRP and Hernandez travel	<p>Accomplishments:</p> <ul style="list-style-type: none"> <li>• SCDRP support – on track <ul style="list-style-type: none"> <li>○ SCDRP has planned their 8<sup>th</sup> annual meeting, to be hosted Jan 23-24, 2024 in Savannah, GA. Registration for this event is full.</li> <li>○ SCDRP hosts monthly partnership meetings the 4<sup>th</sup> Thursday of each month.</li> <li>○ Tina Jackson and Ricardo Mercado Arroyo were contracted as the SCDRP Program Coordinator and the SCDRP Assistant Program Coordinator respectively.</li> </ul> </li> <li>• Travel support – complete <ul style="list-style-type: none"> <li>○ Hernandez participated in the SECART meeting hosted in St. Petersburg, FL in March 2023. Partial travel funds were provided by SECART after the meeting to offset the cost of the travel.</li> </ul> </li> </ul>
Filipe Fernandes	See Appendix C
SECOORA/FACT Data Wrangler & FACT Acoustic Telemetry	See Appendix C



Network DM improvements, Lead PI Joy Young, Fisheries Data Solutions	
Ocean Acidification, Grey's Reef, Lead PI Scott Noakes, UGA	See Appendix C
Ocean Acidification, SOCAN Network, Lead PIs Emily Hall (Mote Marine Lab) and Janet Reimer	See Appendix C
SECOORA/OMAO funding to support glider deployments & recoveries, PI Catherine Edwards, UGA SkIO	See Appendix C
One time System add on – Gliders to support Navy glider shipment, Lead PI Catherine Edwards, UGA SkIO	Status: Complete SECOORA provided funding to SkIO to cover the cost for the FY22 Navy glider shipment
One time System add on – OMAO-OAR RFP Sairdrone-Glider project funds to support UGA, Lead PI Catherine Edwards, UGA SkIO	See Appendix C
One time System add on - HFR Program Spin-up and O&M - Florida Atlantic University	Status: On Track SECOORA purchased two new A/C units for FAU and also issued a subaward to FAU for the remainder of the funds for "HFR Program Spin-up and O&M". See Baxley progress report in Appendix C.
One time System add on - KSC WERA HFR Site - Installation Costs	Status: On hold Still awaiting installation at KSC. Currently delayed until 2024.
SECOORA/HFR system wide support for retuning/testing/ additional work by SECOORA HFR operators	Status: On track Accomplishments: Funding was used by SECOORA to purchase infrastructure needed by multiple HFR operators. Remaining funds will be used during the next reporting period to purchase final supply items requested. <ul style="list-style-type: none"><li>• UNC- Chapel Hill and ECU Coastal Studies Institute (CSI) each sent 1 technician to CODAR training in Nov 2023.</li></ul>

	<ul style="list-style-type: none"> <li>• University of South Carolina (UofSC): purchased new Rx and Tx antenna coils and a CPCI computer from Helzel.</li> <li>• University of Miami (UM) ordered a new Power Amplifier from Helzel and purchased two new A/C units.</li> <li>• USF purchased CODAR cables.</li> <li>• Florida Institute of Technology (FIT) contracted an electrician to ground the Hightower Beach site and they have purchased supply items required for the instrument shed at Treasure Shores. New A/C units and other supplies will be purchased during the next reporting period.</li> <li>• SkIO has not provided a final list of required supply items. SECOORA will work with them to purchase supplies during the next reporting period.</li> </ul>
HABS – partial funding of pan regional Sargassum project, lead PI, Chuanmin Hu, USF	See Appendix C
Harmful Algal Blooms (HABs) – funding from Yrs 1-2: 1) Lead PI Michael Parsons, Florida Gulf Coast University (FGCU) 2) Natalie Cohen, UGA SkIO	See Appendix C
SECOORA/Vembu Scholarship	<p>Status: On-Track</p> <p>Accomplishments: SECOORA hosted the annual Vembu Ocean Scholars opportunity. Proposals were due 10/3/2023. There were 12 applicants and four awards provided, with two awards for international travel made with SECOORA Vembu scholar funds (non-federal funds) and two awards made for US travel for two scholars with the IOOS Year 3 supplemental funding. You can see a list of the funded proposals here: <a href="https://secoora.org/funding-opportunity-vembu-subramanian-ocean-scholars-award/">https://secoora.org/funding-opportunity-vembu-subramanian-ocean-scholars-award/</a></p>
Integration and evaluation of models to couple with NWM (PI Liu, University of South Florida)	See Appendix C
Marine Biodiversity Observations Network, Lead PI Neil Hammerschlag, UM – funding from Yrs 1&2	Status: Delayed (but ramping back up). Hammerschlag left UM and has started his own non-profit, Shark Research Foundation. SECOORA received the final UM invoice for this award and then a subaward for the remaining funds was established with Shark Research Foundation. See Appendix A for a progress report.



### III. PROJECT CHALLENGES/MODIFICATIONS:

- Equipment and supply costs are increasing due to inflation and continued supply chain shortages. Multiple vendors are quoting 10%-15% price increases over 2022 and 2023 pricing. SECOORA anticipates continued higher than normal costs for the upcoming year.
- Labor costs are also increasing given the ~10% cost of living increase. SECOORA anticipates continued higher costs for the remainder of the award.

### IV. PUBLICATIONS:

See Google Drive links for a list of Peer Reviewed Publications. There are two worksheets found in this file. The 2021-2022 worksheet lists Year 1 publications and the 2022-2023 worksheet lists publications for Years 2 and 3. The items highlighted in green on the 2022-2023 worksheet are publications from this most recent report period.

[https://docs.google.com/spreadsheets/d/1k1Z\\_u7oITH24HyqNxF17bpb73gYMubSpDJeD6J2XaPo/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1k1Z_u7oITH24HyqNxF17bpb73gYMubSpDJeD6J2XaPo/edit?usp=sharing)

### V. BUDGET SUMMARY:

- Were the oldest ASAP TAS BETC accounting lines invoiced first?
  - This is Year 3 of the award. SECOORA is spending Year 1 and Year 2 ASAP TAS BETC lines first. See **Appendix D**.
- 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 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.
  - SECOORA purchased a new RTK unit for the WLM to use when conducting vertical elevation surveys at water level stations. This equipment was highlighted in the budget and budget justification for the Year 3 – Table 2 descope proposal. The instrument was purchased from a U.S. company, Duncan-Parnell in December 2023 with delivery scheduled for January 2024. The total cost was \$34,642.
- Include changes in key scientific, technical or management personnel, not included in certification.
  - SECOORA added 3 new full-time employees during the reporting period.
    - Emily Noakes is the Outreach and Communication Specialist, which is a new position created after Abbey Wakely, Communication Director, resigned in August 2023.
    - Cotie Alsbrook is the Water Level manager, and Theo Jass is the WebCOOS manager. Both of these project management positions are new to SECOORA.
    - With separate grant funding (WebCOOS OTT grant) SECOORA also hired Theo Jass as the new WebCOOS manager. Theo is also assisting in SECOORA data portal and data catalog reviews.
- Include changes to the organizational structure such as: changes in status or partners organizations and points of contact.
  - No changes to organizational structure other than personnel changes identified above
- Provide an update about travel completed during the reporting period.

- Examples of travel completed during the reporting period include:
  - SECOORA staff met in Charleston, SC, Dec 5-8 for the SECOORA Board meeting and Staff Retreat.
  - Hernandez and Dorton participated in IOOS Association Fall meeting held in San Diego, CA, Nov. 27 – Dec 1. SECOORA Board Chair Gary Mitchum also participated.
  - Dorton and Alsbrooks met partners in Beaufort County, NC on Dec. 8 and Wilmington, NC on Dec. 9 to scout water level sensor installation locations.
  - Alsbrooks has meet with water level PIs in SC and GA in November and December.
  - Dorton participated in the Northeast Water Level Workshop, hosted by NERACOOS at the University of New Hampshire, Sept 19-21.
  - Hernandez participated in the MARACOOS Annual meeting, hosted in Baltimore, MD, Sept 12-13.
  - Dorton participated in the joint NANOOS members meeting and IOOS Association meeting held Aug 9-11 in Astoria, OR.
  - SECOORA staff met in Charleston, SC July 17-19 for a staff retreat.
- What are the total travel expenditures to date on the award though the reporting period?
  - Total travel expenditures through the reporting period were \$76,113.89.
- Are there any plans to initiate a new partnership (contract or subaward) during the next reporting period?
  - No

## VII. SUCCESS STORIES

Success Story	Brief Description	Contact
GIS Day for 8 <sup>th</sup> grade students - Savannah. GA	Representatives from Georgia Tech participated in Savannah Chatham Public School's GIS day to present water level sensor and modeling work to >250 8th grade students from Jenkins High School, Savannah, GA, on 11/1/23.	Russ Clark - russ.clark@gatech.edu
SOCAN - coastal and ocean acidification workshop at the TOTE program for teachers	The <a href="#">Teachers on the Estuary</a> (TOTE) program provided teachers with experiences they can take back to the classroom. Over 15 teachers (from middle to high school) from SC participated. SOCAN and the team from CCU provided hands-on demonstrations that described how pH changes with salinity within the ACE Basin estuary. The team used real-world data to demonstrate how to estimate changes in acidification due to changing climate conditions using computer-based techniques. SOCAN also provided a demonstration on how to use chemical pH indicators to show how changes in CO2 can impact pH.	Emily Hall - emily8@mote.org
CORE Program with Florida Institute of Oceanography (FIO)	The Collaborative Oceanographic Research and Education (CORE) program, a partnership with USF and the Florida Institute of Oceanography,	Yongang Liu - yliu@usf.edu

	provides experiential, at-sea learning opportunities for graduate and undergraduate students. Student led cruises are adding data to a time series of interdisciplinary sampling stations along the newly established, across-shelf CORE transect on the west Florida Shelf.	
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End Report

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## APPENDIX A: 2023 SECOORA DMAC Annual Progress Report

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### ACTIVITIES DURING THE REPORTING PERIOD

*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.
  - operationalized an on-demand Kubernetes cluster infrastructure; deployed Kubernetes based on demand Dask cluster for data analysis support; and deployed ~130TB S3-compatible storage appliance.

##### **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 2.02 - <https://erddap.secoora.org>
  - SECOORA ISO WAF - <https://thredds.secoora.org/iso>
- Upgraded logging aggregation system to improve system visibility and decrease problem triage time.
- Improved storage cluster maintenance toolset.
- Enabled support for purely in-memory compute servers for special applications.
- Enhanced data center server access security
- Built, installed, and provisioned a new persistence server cluster.
- Decommissioned old generation compute servers in favor of more performant hardware.
- Developed deployment topology for compute nodes with high performance NVMe storage.
- Improved web server deployment configuration update procedure for increased stability
- Developed enhanced storage appliance monitoring dashboards.
- V1 to V2 sensor migration is functionally complete. QARTOD is now easily applicable to any real-time sensor.
- Leverage modern portal image format to optimize home page load times.

- Updated metadata and sensor database hardware and software, reducing initial metadata load time from ~7 seconds to ~1.8 seconds.
- Compiled and sent out data portal asset spreadsheet to survey RA priority layers.
- Applied basic QARTOD tests for [real-time and historical timeseries datasets](#) that are accessible through the SECOORA data portal. Quality flags are summarized on both the [station](#) and [sensor](#) pages within the data portal for visual exploration. In addition, the documentation of the test code and thresholds are displayed on sensor pages ([example](#)) with links available to the v 1.0 version [QARTOD GitHub library](#) accessible through the portal.
- Expanded SECOORA data portal holdings to include:
  - Water level [stations](#) for Southeast Water Level Network
  - Various updates and fixes to COMPS
  - NCEI's 3 arc-second U.S. [Coastal Relief Model](#) (CRM)
  - [Coupled Northwest Atlantic Prediction System \(CNAPS\)](#) via THREDDS
- 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.
- Maintained submission of 30 sensor feeds to NCEI for long-term preservation.

### **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**

- Worked with SECOORA contractor on website redesign. Fulfilled all requests of the contractor and assisted with data migration onto the new site.
- 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. The new operational deployment will help ensure that important data sets remain accessible to downstream consumers and are insulated from ERDDAP performance and stability issues.

## **Objective 5. External/Special Projects**

### **Task 1: SEAMAP, Continuous; Ongoing**

- In coordination with the SEAMAP team assisted in implementing Darwin Core standards across all data providers to better standardize incoming data
- Updated all existing libraries to modern versions
- Maintained a refreshed codebase to our staging server to continue build out of reporting tool
- Mapping of existing metadata fields to the new Darwin Core standard

### **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
- Began development of AI/ML 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
- Maintained all sensor feeds in the SECORA data portal and developed tagging for the [Southeast Water Level Network](#)
- Worked with water level team to develop standards for dealing with various datums and getting water level data into NAVD88

## **UPCOMING/PLANNED ACTIVITIES**

Upcoming SECOORA DMAC activities include:

- Planning for 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.
- Technical discussion, scoping, documentation, and build-out of model testbed approach, including assessing the performance of existing coastal and ocean models in the SECOORA region.

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## **SUCCESSSES OR CHALLENGES**

SECOORA continues to persist a robust system for continuous integration of real-time observation stations ([LINK](#)). Below are metrics for 2023:

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

For comparison - SECOORA data portal metrics (February 1, 2022 - January 1, 2023):

- Sensor Stations
  - Total number of sensor stations: 1,964
  - Number of sensor types: 92
  - Number of affiliates: 72
  - Total stations with data from the past year: 1,561
- Moving Platforms
  - Total number of moving platforms: 69
  - Number of affiliates: 3
  - Total platforms with data from the past year: 7
- Data Layers
  - Total number of data layers: 708
  - Number of affiliates: 23
  - Total datasets with data from the past year: 144

## Appendix B – Asset Inventory

See Excel file uploaded separately. This file was also emailed to Kathy Bailey with the IOOS Program Office.



## SECOORA PROGRESS REPORT: JULY 1 - DECEMBER 31, 2023

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**Status:** Submitted (01/16/2024 02:23:08 PM)

**Project:** IOOS.21(097)UNCCH.BB.MOD.1

**Project Title:** Multi-decadal reanalyses of coastal water level to support NOAA sea level and flood risk products

### 2021-2026 SECOORA PROGRESS REPORT

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#### 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. For each objective provide one of the following indicators: "Complete" and date of completion "On-Track" "Delayed" and anticipated date of completion If an objective is delayed, a justification for the delay (e.g., COVID travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed or to be 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.

Overall in this performance period (1 Jul - 31 Dec 2023), we completed rerunning of the posterior simulations, resulting in an updated version of the complete dataset. [Note that RENCI calls this "version 2", but the NOAA working group under which this project sits decided to call this "version 1", from their perspective. This is largely because the first reanalysis dataset will not be published nor made available by NOAA.] Initial statistical analysis on the updated results indicates that the posterior is demonstrably improved over the prior, particularly in the relatively longer period >1day errors. Issues noted in the first version of the reanalysis, namely the low-frequency oscillations in the Gulf of Mexico and wetting / drying "hot spots", have been addressed. 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.

Post-doc T Asher continues to engage with government agencies (FEMA, USACE, and NOAA) and with the broader research community through conferences, presentations, meetings, and one-on-one interactions. He is also very involved in a more frequently held "technical team" meeting that discusses various scenarios and use cases for the datasets, access to the datasets, and related topics. We also note that a manuscript on preliminary applications of the reanalysis has been written by University of Hawaii. It will likely be submitted in late winter 2024.

Task Progress:

1. Incorporate tropical cyclones. Blend ADCIRC GAHM vortex winds and pressures into the ERA5 reanalysis. 10% complete. Delayed. This task has previously been delayed in order to address key issues in the first version of the dataset. In this reporting period, we have outlined a general approach for inserting the higher resolution tropical cyclone winds into ERA5, and begun some initial tests of blending Hurricane Florence (2018) with ERA5, using ADCIRC's NWS 13 functionality.
2. Recompute the prior, error, and posterior. Rerun the multi-decadal simulation. 100% complete. The reanalysis posterior solution was recomputed for 1979-2022, resulting in a revised, version 2 of the dataset noted above. This task involved computing the errors between the V2 prior and the observations, computing the error surfaces for each of the 3 partitions, and then computing the V2 posterior. The key difference in the error handling from version 1 is that the errors were split into sea level rise (SLR), monthly-to-daily, and sub-monthly components. Data gaps in the sub-monthly part were filled using a "boosted tree" machine learning approach, as implemented in the XGBoost method. This allowed the capture of relatively larger scale and

longer period features (intra- and inter-annual variability and trends) at stations with long data gaps, such as in the Gulf of Mexico in the early decades of the reanalysis period. [The details of the XGBoost application and results are currently being put into a manuscript for submission to a relevant "data science" journal.] The SLR component to the error was handled as follows: Prior to the analysis of errors, the long-term (i.e. linear) trend was removed from the observations. The NOAA-published values of annual SLR rates were then used as an additional component to the error surface calculation in the computation of the posterior by evaluating the SL amount for each simulation day. This component thus varies slowly (and linearly) over the 44 yr reanalysis. Gaps in the monthly-to-daily band were set to 0. Each error component has a separate error surface that were added together for the final error surface.

3. Data access and post-processing. This is an ongoing and on-track task. In this period, we placed the new reanalysis dataset to RENCi THREDDS Data Server that host the datasets for both direct end-user access and for upload by the RPS team. The url to the TDS is: <https://tdsres.apps.renci.org/thredds/catalog/ReanalysisV2/ADCIRC/ERA5/hsofs.V2/catalog.html>

4. Documentation: Develop and maintain project documentation for end-users of the datasets. Ongoing and on-track.

5. Eastern Pacific Scoping. 50% complete. During the reporting period, RENCi participated in several discussions on carrying out a coastal reanalysis for the western US coast (east Pacific Ocean). A. Luscher-Aissaoui (NOAA/NOS) convened a "working group" to scope out the resources needed, ADCIRC grid requirements, and time frame. PIs Blanton and Luettich and PD Asher have been significantly involved in those discussions. Details of a Pacific reanalysis are not yet complete.

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## **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).

None in this period.

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## **MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH**

- 3 Please 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.

None in this period.

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

None in this period.

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

---

## **PRODUCT DEVELOPMENT & DELIVERY**

- 6 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) 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 primary product/deliverable of this project is the 44-year posterior simulation of water levels and waves for the US east coast and Gulf of Mexico. The ADCIRC model output files, in native netCDF and reorganized netCDF files for more efficient time series extraction, are posted on the primary RENCi research THREDDS Data Server. This is primarily to support "early access" for end-users developing analyses and to provide a dataset for RPS to develop more customized access methods and approaches for longer-term access. The Jupyter/Python notebook (previously described) continues to be used for time-series extraction from

the large data files. The data that the notebook accesses has been replaced with version 2. The python code is hosted in a GitHub repository at <https://github.com/RENCI/EDSReanalysis.git> and in an interactive Binder notebook at <https://tinyurl.com/RenciReanalysis>.

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### **SUCCESS STORIES**

- 7 Briefly describe any success stories that help convey either the value of your project and/or 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.

None in this period.

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### **LEVERAGED FUNDING**

- 8 Provide a brief 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.

None in this period.

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## Filipe Fernandes - Python Data Analysis Tools for Oceanographers

### Progress and Accomplishments during the reporting period (June 1<sup>st</sup>, 2023 -Dec 31<sup>th</sup>, 2023)

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

We improved the notebook experience by adding *nbclassic* to the environment ([ioos/ioos\\_code\\_lab #147](#)), adding a special cell to make them run on Google's colab ([ioos/ioos\\_code\\_lab #152](#) and [ioos/ioos\\_code\\_lab #175](#)), fixed a few notebooks that were no longer running ([ioos/ioos\\_code\\_lab #154](#) and [ioos/ioos\\_code\\_lab #156](#)), removed archived notebooks from the published book ([ioos/ioos\\_code\\_lab #151](#)) and updated the IOOS environment installation instructions ([ioos/ioos\\_code\\_lab #153](#)).

We also update the minimum Python version to 3.12 ([ioos/ioos\\_code\\_lab #167](#)) and started building the final book with link checker to avoid link rot ([ioos/ioos\\_code\\_lab #155](#), [#162](#), and [#163](#)). And we are experimenting with a notebook gallery in the draft PR [ioos/ioos\\_code\\_lab #174](#).

IOOS participated in the 2023 Oceanhackweek and these were our contributions to this OHW edition:

- Machine learning packages [oceanhackweek/jupyter-image #75](#)

- Conda environment tutorial [oceanhackweek/ohw-tutorials #106](#)
- Classic Machine Learning tutorial [oceanhackweek/ohw-tutorials #107](#) and [oceanhackweek/ohw-tutorials #116](#)

We started tracking the ERDDAP servers version deployed for a curated list of important servers in the ERDDAP\_VER\_CHECK repository. The repository was upgraded to use a rendered version of the lockfile and save the URLs for each server that changed ERDDAP version ([ocefpaf/ERDDAP\\_VER\\_CHECK #1](#) and [ocefpaf/ERDDAP\\_VER\\_CHECK #2](#)).

We improved the overall IOOS documentation experience with some automated checks, *dependabot* inspection, and easier environments to build the documentation ([ocefpaf/qartod\\_manuals #9](#), [ioos/governance #2](#), [ioos/ioos-documentation-jekyll-skeleton #14](#), [ioos/ioos-python-package-skeleton #26](#), [ioos/ioos\\_metrics #40](#), [ioos/ioos\\_metrics #41](#), [ioos/ioos\\_metrics #42](#), [ioos/documentation-theme-jekyll #14](#), [ioos/erddap-gold-standard #57](#), [ioos/erddap-gold-standard #59](#), and [ioos/erddap-gold-standard #60](#)).

This term we unified the *ioosngdac* and *glider-dac* repositories. The migration was completed by a number of small steps to avoid service disruption:

- Fixed IOOS ngdac links [ioos/ioos.github.io #8](#)
- Added a 404 page [ioos/ioosngdac #203](#)
- Archival notice [ioos/ioosngdac #204](#)
- Added a README with the new page information [ioos/glider-dac #210](#)
- Added pre-commits [ioos/glider-dac #212](#)
- Fixed site names in the config [ioos/glider-dac #216](#)
- Run codespell [ioos/glider-dac #258](#)
- Remove stale pages [ioos/glider-dac #261](#)
- Updated README with *ioosngdac* information [ioos/glider-dac #262](#)
- Shorten the title to fit the navigation bar [ioos/glider-dac #265](#)
- Avoid jekyll copying over the files [ioos/glider-dac #280](#)
- Fixed relative links [ioos/glider-dac #281](#)
- Fixed shellcheck lints [ioos/glider-dac #292](#)

- Added two more linter checks [ioos/glider-dac #293](#)
- update site for the glider dac [ioos/documentation-theme-jekyll #13](#)

## 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) All the *compliance-checker* plugins required some updates to be installable alongside latest cc:

- Modernize packaging [ioos/cc-plugin-glider #42](#)
- Added pre-commit and modernize code [ioos/cc-plugin-glider #43](#)
- Added PyPI autopublish [ioos/cc-plugin-glider #44](#)
- Added *pyproject.toml* [ioos/cc-plugin-ugrid #19](#)
- Implemented pre-commit checks fixes [ioos/cc-plugin-ugrid #20](#)

Removed deprecated distutils from [ioos/ciso #27](#).

Fixed some compliance-checker lints, packaging issues and typos:

- Update pre-commit [ioos/compliance-checker #1037](#)
- Implemented the pre-commits fixes [ioos/compliance-checker #1038](#)
- Removed *pkg\_resources* [ioos/compliance-checker #1039](#)
- Skip some URLs in the linkchecker [ioos/compliance-checker #1042](#)
- Fixed some typos [ioos/compliance-checker #1045](#)
- Fixed wrong GitHub Actions version [ioos/compliance-checker #1046](#)

Prepared new versions of both *erddapy* and *gliderpy* with better *httpx* error handling and single server searching ([ioos/erddapy #319](#), [#320](#), [#321](#), [ioos/gliderpy #66](#), [#67](#), [#72](#), and [#75](#)).

b) There were many third party packages pull request and the important ones to list are:

- Avoid distutils in [TEOS-10/GSW-Python #143](#)
- Removed Python 3.7 (EOL) [Unidata/cftime #310](#)
- Build source distribution [Unidata/cftime #313](#)
- Added pyproject fmt [Unidata/netcdf4-python #1267](#)
- Added cibuildwheel GHA [Unidata/netcdf4-python #1283](#)
- Windows wheels for Python 3.12 [ocefpaf/netcdf4-win-wheels #10](#)
- Added pre-commits [jobis/pyobis #139](#)
- Fixed pre-commits failures [jobis/pyobis #140](#)
- Fixed failing tests [pyoceans/pocean-core #81](#)
- Fixed pre-commits [pyoceans/python-ctd #193](#)
- Use https in [pyoceans/python-oceans #96](#)
- Removed pre-commit GitHub Action [python-visualization/folium #1781](#)
- Updated and fixed pre-commits [python-visualization/folium #1797](#)
- Removed Stamen tiles from [python-visualization/folium #1811](#)
- Removed distutils in [xarray-contrib/cf-xarray #463](#)

c) Remove old and unsupported sphinx GitHub Action in [pangeo-data/pangeo #913](#).

### 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) Mark libnetcdf 4.9.2 builds 108 and 109 in win as broken [conda-forge/admin-requests #761](#)

- ii) Mark win-64/libnetcdf-4.9.2-nompi\_hefebadb\_110 as broken [conda-forge/admin-requests #799](#)
  - iii) Mark latest conda-smithy as broken [conda-forge/admin-requests #807](#)
  - iv) Archive pytest-runner [conda-forge/admin-requests #889](#)
  - v) Sort and remove duplicates entries [conda-forge/conda-forge-pinning-feedstock #4819](#)
  - vi) aAdd some missing packages to aarch and osx-arm rebuild [conda-forge/conda-forge-pinning-feedstock #4897](#)
  - vii) Add *libmo\_unpack* to aarch and osx\_arm64 [conda-forge/conda-forge-pinning-feedstock #5065](#)
  - viii) Patch altair for latest jsonschema [conda-forge/conda-forge-repodata-patches-feedstock #480](#)
  - ix) Patch *xpublish* for *pydantic*<2 [conda-forge/conda-forge-repodata-patches-feedstock #485](#)
  - x) Patch *prometheus\_client* 0.18.0 for the correct min python [conda-forge/conda-forge-repodata-patches-feedstock #591](#)
- b) New packages to conda-forge: [aws stuff](#), [fix linting message](#), [doodleverse-utils](#), [pypinfo](#), [erddaputil](#), [pycoare](#), [bathyreq](#), [veros](#), [mlo-co2](#), [rbeast](#), [pncpy](#), [veros-extra-setups](#), and [pydm](#).
- c) See the list of updated feedstocks in the appendix.



## Pull Requests links

- [conda-forge/altair-feedstock #48](#)
- [conda-forge/argopy-feedstock #16](#)
- [conda-forge/aws-parallelcluster-feedstock #84](#)
- [conda-forge/branca-feedstock #16](#)
- [conda-forge/capturer-feedstock #18](#)
- [conda-forge/cf\\_units-feedstock #57](#)
- [conda-forge/coastseg-feedstock #2](#)
- [conda-forge/django-grappelli-feedstock #37](#)
- [conda-forge/gemgis-feedstock #16](#)
- [conda-forge/gliderpy-feedstock #6](#)
- [conda-forge/humanfriendly-feedstock #56](#)
- [conda-forge/lorem-feedstock #12](#)
- [conda-forge/pandas\\_flavor-feedstock #11](#)
- [conda-forge/prometheus\\_client-feedstock #38](#)
- [conda-forge/pymultinest-feedstock #24](#)
- [conda-forge/python-jsii-feedstock #35](#)
- [conda-forge/rechunker-feedstock #10](#)
- [conda-forge/rio-cogeo-feedstock #42](#)
- [conda-forge/xpublish-feedstock #7](#)

## SECOORA PROGRESS REPORT: JULY 1 - DECEMBER 31, 2023

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**Status:** Submitted (01/15/2024 01:10:12 PM)

**Project:** IOOS.21(097)FDS.JY.ATN.1

**Project Title:** FACT Data Wrangler

## 2021-2026 SECOORA PROGRESS REPORT

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### 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. For each objective provide one of the following indicators: "Complete" and date of completion "On-Track" "Delayed" and anticipated date of completion If an objective is delayed, a justification for the delay (e.g., COVID travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.

Data Wrangler

Priority 1:

- Completed 30 June 2023: Conduct two major (i.e. inter-network matching) telemetry data processing events. One major data matching event was completed in October 2023.

Fast FACTS for the October data push:

Fact Issues October push: 106

Total Detections: 316,173,606

New and Update Detections October Push: 58,817,385 (18% increase)

Total tags: Active Tags: 3,375 Total Tags: 10,264

New and updated Tags October Push: 670

Project count: 191

Contributor count: 302

Institution count: 61

Species count: 132

- Completed 30 November 2023: Collect and upload environmental data from array owners in conjunction with data processing. Collection and processing of temperature data was conducted in November 2023. Worked with Axiom staff to refine detection extracts to only include ambient temperature and clarify metadata definitions.

Priority 2:

- Completed 30 October 2023: Work with PIs to resolve incomplete telemetry datasets (based on process under priority 1). During the two data push events, approximately 30% of issues were classified as data fixes. An issue is a specific task for a project, for example loading tag metadata for project ABCD.

- Delayed. Produce one manuscript using data derived from the FACT/SECOORA node. Two manuscripts are in progress. The first is being written but lead by a graduate student who was delayed writing his dissertation. The second manuscript was submitted but is currently in revision stage. Expected February 2024.

- Completed 12 June 2023: Present results of the collaborative manuscript at a national scientific conference. Results on a collaborative paper on cobia movements was presented at the International Conference of Fish Telemetry. See conference presentations for details.

DaViT Mini-proposal

Priority 1: Augment researchers' detection extracts with species level QC flags

- Completed: Identify machine readable sources for home range and maximum swim velocity for species within the FACT Network. A student was engaged to evaluate and integrate external authorities on species home range, and analyzed the species coverage of OBIS/GBIF, IUCN, and AquaMaps' predictive mapping tool. OBIS's coverage of FACT species was found to be the most robust and a workflow in R to produce concave polygons from OBIS occurrence data was delivered.

- Completed: Identify appropriate QC filters from the remora toolkit. Remora's QC process was refactored to allow each of the tests to run independently and aggregate only selected QC tests toward a cumulative QC score. This is important to do since some of the QC testing done by Remora's default configuration was redundant to OTN and FACT data QC processes and was inflating the final aggregate scores.

- On-track: Include coding for the QC flags as a step-in processing detection extracts.

The tailored QC tests and the OBIS-derived homerange dataset allow a 5-point QC test to be run against each individual detection recorded across the FACT network and the resulting QC columns to be included in detection extract files, creating a reliable subset of the data to feed the visualization tool. Still to come - deploying this workflow into the detection extract process in order to create QC flag columns on Research Workspace that can be read by the DaViT visualization process for filtering purposes, and amending DaViT's data ingestion step to act on these QC flags when creating species polygons for the DaViT tool.

Priority 2: Improve the accuracy of visuals on the DaViT tool.

- Completed: Adapt the DaViT to ingest detections based on QC flags to reduce false detections used to calculate range and distribution.

- On-track\*: Change the algorithm used to calculate range and distribution to stay within the confines of the acoustic networks.

Priority 3: Improve the effectiveness of the DaViT in communicating animal movement information to the public.

- On-track: Incorporate suggestions from the 2022 annual SECOORA meeting including (but not limited to): updated explanations of range and distribution to illustrate metrics are calculated within the network, include a depiction of the network, allow selection of multiple months, make disclaimers more pronounced, change numbers to worlds for months, and include pictures for all species.

- On-track: One new project page was created and is being reviewed by PIs before publishing. Publication expected in February 2024.

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## **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).

Facilitated the publication of several manuscripts by providing detection data or were mentioned as a network.

Jacoby, D.M.P., Piper, A.T. (2023). What acoustic telemetry can and cannot tell us about fish biology. *Journal of Fish Biology*. <https://doi.org/10.1111/jfb.15588>

Lennox, R. J., et al. (2023). Globally coordinated acoustic aquatic animal tracking reveals unexpected, ecologically important movements across oceans, lakes and rivers. *Ecography*, e06801.

Ellis, R. D., Koenig, C. C., Locascio, J. V., Malinowski, C. R., & Coleman, F. C. (2023). Spawning Migrations of the Atlantic Goliath Grouper along the Florida Atlantic Coast. *Fishes*, 8(8), 398.

Larkin, M. F., et al. (2023). Bonefish do not respect international borders: the Florida–Bahamas connection. *Marine biology*, 170(11), 149.

Griffin, L. P., Brownscombe, J. W., Adams, A. J., Wilson, J. K., Casselberry, G. A., Holder, P. E., ... & Danylchuk, A. J. (2023). Individual variation and repeatability of Atlantic tarpon *Megalops atlanticus* migrations in the southern US: implications for conservation and management. *Marine Biology*, 170(12), 168.

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### **MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH**

- 3 Please 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.  
None at this time.

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- 4 Describe education or outreach materials related to this award that have been developed within this six month reporting period.  
None at the time.

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

### **PRODUCT DEVELOPMENT & DELIVERY**

- 6 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) 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.

Data Wrangler

Data processed:

The detection data processing event was completed in October 2023 resulting in 710 new or updated detection extracts for 129 different telemetry projects. The temperature data processing event was completed in Dec 2023. All detection were re-processed resulting in 8,182,593 temperature data points from 29 projects. Project staff worked with Axiom to revive the pipeline for ingestion into the SECOORA data portal. Temperature and Detection extracts were provided to projects conducted by state and federal governments, universities, not-for profit organizations, and private companies. However, while the pipeline is now functional and updated temperature extracts were provided, they were not updated on the SECOORA data portal by Axiom staff. Expected to update in February 2024.

Processing tools:

Refined three new Jupyter notebooks to 1) pull and format temperature data from receivers 2) pull and format temperature data from external sensors (e.g. Onset hobo loggers), and 3) combine temperature files from receivers and external hobs and save as individual projects by year (for project PIs) and save all FACT derived temperature by year (for the SECOORA portal). Notebooks may be used by any data manager working with node-derived data.

Website development:

The FACT website (hosted by SECOORA) was updated with the agenda for the January 2024 meeting, was migrated over to the new system, and biosketches of the new Steering Committee member and student coordinator was added..

DaViT mini-proposal

The QAQC flags have performed well using some test datasets. It has successfully flagged known false detections. Next step is to 1) update the DaViT with new and existing projects and 2) update the DaViT with a dataset with the QAQC flags.

### **SUCCESS STORIES**

- 7 Briefly describe any success stories that help convey either the value of your project and/or 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.

Data Wrangler

One project published data in OBIS, an open source platform, making their data available to the public. The FACT Steering Committee began discussion on offering guidance how best to publish telemetry data with the goal of encouraging more

members to do so. At the January 2024 meeting, a representative from OBIS will present on the process and goals of open publishing.

Project FSUGG. PI: Robert Ellis, Robert.Ellis@myfwc.com

DaViT Mini Proposal

The DaViT tool has grown to display data on 68 species of fish and marine reptiles reflecting 52 tag projects. We anticipate this to increase after Axiom staff update the DaViT tool with new data.

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## **LEVERAGED FUNDING**

8

Provide a brief 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.

None at this time.

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## SECOORA MOORINGS AND WATER LEVEL PROGRESS REPORT: JULY 1 - DEC 31, 2023

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**Status:** Submitted (12/20/2023 11:10:27 AM)

**Project:** IOOS.21(097)UGA.SN.OA.1

**Project Title:** Grey's Reef OA mooring

## 2021-2026 MOORINGS AND WATER LEVEL STATIONS PROGRESS REPORT

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### ACCOMPLISHMENTS 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" and date of completion "On-Track" "Delayed" and anticipated date of completion If the milestone is delayed, a justification for the delay (e.g., COVID travel delays, manufacture turnaround times for repairs, NEPA compliance taking longer than anticipated) must be provided along with a new completion date and description of activities employed to mitigate the delay.

In the previous progress report, it was discussed that the MAPCO2 system was replaced in late June. However, the SAMI-pH could not be deployed for two reasons: dead battery even though the SAMI had just been serviced; and NDBC had deployed a temperature data recorder where the SAMI was normally installed. With the first data report transmitted from the buoy, it was noticed that the Seabird water quality sonde was not reporting. No Seabirds were available so alternative methods for waking up the Seabird were explored. After numerous discussions, it was determined that the Seabird could be remotely rebooted. On August 11, 2023 the Seabird was successfully rebooted and operational. It could not be determined why the Seabird needed rebooting to wake it up, but at least that operation was successful.

The SAMI-pH battery was replaced at UGA and tested. By the next morning, the SAMI battery was once again below operational voltage so the sensor was returned to Sunburst Sensors for repair. They replaced the battery, but could not find any reason why the SAMI's battery had been drained. Once the SAMI was returned to UGA, it was tested and appeared to be in good operational condition. On August 19, arrangements were made to go offshore to install the SAMI-pH but could not go. One crew member got sick at the last minute and the trip had to be cancelled. On August 27, we finally were able to go offshore to deploy the SAMI-pH. PMEL had sent an extended cable so the SAMI could be deployed on the furthest buoy bridle leg away from the thru port in the deck. The installation was successful and 6 water samples were collected and sent on September 5 to the University of Delaware for analyses. Unfortunately, the SAMI was running, but for some reason was not reporting pH (only time and temperature). The SAMI potentially had an air lock, but the only way to try that theory was to travel back offshore. Given that the expense would be considerable and there was no guarantee of success, it was decided to wait for another SAMI to become available.

A replacement SAMI-pH was finally received days before Thanksgiving. The process was started to find a calm day that the boat was available. On December 8, we once again headed offshore to change out the SAMI-pH. The new SAMI was installed and 3 water samples were collected (1000 ml/sample). These samples will be sent to Mote Marine Laboratory in Sarasota, Florida for analyses (DIC, TA, and pH). All data from the Gray's Reef mooring is now reporting properly.

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.

In addition to the usual weather and sensor related delays, funding (or lack of) was an issue during this reporting period. With the closure of the egrants portal in October, funding for the project was delayed. UGA had provided financial support to keep the project going, but the deadline for the funding advance was rapidly approaching. According to the terms of the UGA advance,

the funds would have to be repaid to UGA by November 30 if the new funds were not received by that date. As a result, the department requested that spending be slowed to only allow absolutely necessary expenses. The funding did arrive before the advancement date so all is back on schedule.

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### **PUBLICATIONS & CONFERENCE PRESENTATIONS**

- 4 Please 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).

no papers

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### **MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH**

- 5 Please list any media coverage related to this award conducted within this six month reporting period. Include links to news stories and media coverage.

I gave a presentation on the Gray's Reef data to the Gray's Reef Science Symposium on October 19, 2023. This presentation covered the overall picture of the Gray's Reef ocean acidification monitoring that has occurred at the sanctuary since 2006. In addition, I participated in the National Marine Sanctuary Moorings meeting held on November 8. During this meeting, I discussed the benefits of utilizing a mooring for maintaining a monitoring site offshore.

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- 6 Describe educational or outreach materials related to this award that have been developed within this six month reporting period.

none

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- 7 Upload outreach and education materials developed during the reporting period. Please combine multiple outreach/education materials into one document.
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### **PRODUCT DEVELOPMENT & DELIVERY**

- 8 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) currently available or under development as part of your award. Only report on work conducted within the six month reporting cycle. 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 product(s) and the number of users. Only report on work conducted within the six month reporting cycle.

none

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### **SUCCESS STORIES**

- 9 Briefly note any success stories that help convey either the value of your project and/or the impact that it has made. An example could be how you work with stakeholders during emergency events to provide them with data or products for decision support. These stories may be used by SECOORA and the IOOS Office to respond to data calls, support presentations, or independent stories. Provide contact details (email addresses) for the PI and stakeholder(s) impacted.

NDBC has been concerned about the overall status of the Gray's Reef mooring. Due to budget cuts, NDBC no longer recovers the buoy chain and mooring block every 3 years as in the past. Now, the chain and mooring block is utilized for at least six years or longer. Since we have a dive team at the buoy doing sensor replacement, we have added a video survey of the mooring so NDBC can review the overall condition. This takes the guess work/risk out of the equation. If an issue (corrosion) arises, we will be able to document it before the integrity is compromised.

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**LEVERAGED FUNDING**

10

Provide a brief 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.

none

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## SECOORA PROGRESS REPORT: JULY 1 - DECEMBER 31, 2023

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**Status:** Submitted (01/11/2024 03:33:40 PM)

**Project:** IOOS.21(097)MOTE.EH.OA.1

**Project Title:** Southeast Ocean and Coastal Acidification Network

## 2021-2026 SECOORA PROGRESS REPORT

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### 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. For each objective provide one of the following indicators: "Complete" and date of completion "On-Track" "Delayed" and anticipated date of completion If an objective is delayed, a justification for the delay (e.g., COVID travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.

The SOCAN team participated and led a session at a Teachers on the Estuary (TOTE) workshop in South Carolina on coastal ocean acidification. Complete

A member of the SOCAN team participated as a reviewer on OA Proposals for Georgia Seagrant. Complete

The SOCAN team participated in multiple webinars about developing technology on cost-friendly pH sensor. Complete

The SOCAN team were invited speakers at the annual MACAN meeting. Complete

The SOCAN executive team continues to meet every month. Complete

The SOCAN working groups continue to meet every other month (alternating each other). Emily Hall continues to lead the science working group, focusing on proposal development, information sharing, and gathering information on monitoring priorities in the Southeast. Janet Reimer continues to lead the stakeholder working group, developing the OA webinar series, and determining stakeholder needs in the southeast. Complete

A decision has been made to restructure the working groups in order to gain more participation. Plans have started to develop a Steering Committee and evolve from there. On Track

SOCAN continues to update and revise the website with new material and references lists: [www.socan.secoora.org](http://www.socan.secoora.org). On Track

SOCAN continues to work with researchers from Coastal Carolina University on the project entitled "Coastal and Estuarine Acidification in Long Bay, South Carolina" funded by South Carolina Sea Grant. On Track

SOCAN and GCAN submitted a final report of the GCAN/SOCAN Stakeholder Survey Project to CHNEP for review. On Track

An abstract was submitted and accepted to the Gulf of Mexico Conference (GOMCON) hosted by the Gulf of Mexico Alliance (GOMA) Meeting that will be held in February 2024. On Track

### 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).

2023 Hall, ER, Reimer, JJ, and Vreeland, J. Coastal acidification network stakeholder feedback project. Oral presentation at the 2023 MACAN meeting, September 2023.

2023 Reimer, JJ, Olsen, M, Hannides, A, Viso, D, Hall, ER, Libes, S, Green, V, Orion Glass Electrode pH Validation in Estuarine Waters and Citizen Science Success, Oral presentation at the 2023 MACAN meeting, September 2023.

All presentations are available in the GOOGLE Drive SOCAN Folder: [https://drive.google.com/drive/folders/0BzNfLjaO8w6IUmtFVnA5M00yN1E?resourcekey=0-mrNzQWBx0nKrCYPH1Rf3sw&usp=drive\\_link](https://drive.google.com/drive/folders/0BzNfLjaO8w6IUmtFVnA5M00yN1E?resourcekey=0-mrNzQWBx0nKrCYPH1Rf3sw&usp=drive_link)

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### **MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH**

- 3 Please 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.  
N/A
- 4 Describe education or outreach materials related to this award that have been developed within this six month reporting period.  
A presentation on coastal OA in the US Southeast was created for the TOTE Workshop and is available on the SOCAN google drive
- 5 Upload outreach and education materials developed during the reporting period. Please combine multiple outreach/education materials into one document.

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### **PRODUCT DEVELOPMENT & DELIVERY**

- 6 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) 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.  
N/A

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### **SUCCESS STORIES**

- 7 Briefly describe any success stories that help convey either the value of your project and/or 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 workshop at the TOTE program on coastal acidification was a huge success. We reached over 15 teachers (from middle to high schools) within the South Carolina region, showing them hands on techniques for measuring acidification in the classroom and in the field. It has also helped us establish a great partnership with Coastal Carolina University (CCU) who plans to continue with this education source. SOCAN and the team from CCU provided hands-on demonstrations in the field, on a boat trip, on how pH changes with salinity within the ACE Basin estuary. Then back in a classroom setting, used real-world data to demonstrate how to estimate changes in acidification due to changing climate conditions using computer-based techniques. SOCAN also provided demonstration on how to use chemical pH indicators to show how changes in CO2 can impact pH. The full day TOTE program provided teachers with experiences they can take back to the classroom.

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### **LEVERAGED FUNDING**

- 8 Provide a brief 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.  
N/A
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## SECOORA GLIDER AND OTHER UNCREWED SYSTEMS PROGRESS REPORT: JULY 1 - DEC. 31, 2023

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**Status:** Submitted (01/17/2024 04:31:06 PM)

**Project:** IOOS.21(097)UGA.CE.NAVY GLD.1

**Project Title:** Navy Glider

## 2021 - 2026 GLIDER AND OTHER UNCREWED SYSTEMS PROGRESS REPORT

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### 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" "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 ng291/ng296). The track design and all deployment/logistics details for ng291/ng296 were led by SKIO to coordinate deep glider data sampling with nearby Sairdrones 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 X. Giomi deployed ng291/ng296 175 miles from shore, and PI Edwards coordinated harried but successful recoveries by charter partner R. Meredith (Kahuna) after 151 and 154 days at sea, respectively.

\* 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.

\* Co-PI Lembke gave a regional briefing in the internal hotwash meeting in December 2023.

2 Describe any specific accomplishments/successes achieved during the six-month period.

Excellent communication with the Navy and with charter operators during the holiday season permitted the gliders' recovery in a pretty high stakes recovery effort (see below for problems/delays).

3 Describe any major problems/delays that are outside of your control that prevented project objectives from being accomplished (e.g., COVID travel delays, manufacture turnaround times for repairs).

Weather along the US East Coast became a significant issue for recovering Navy gliders. Unfavorable offshore currents delayed the gliders' progress to the Gulf Stream edge, and recovery was delayed further by almost 4 weeks due to bad weather along the East Coast. The combination of these two delays with a minor battery issue on one of the two gliders led it to become a drifter late in December. The second glider, while still with sufficient battery to fly, was overcome by remoras and ejected its emergency weight.

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**PUBLICATIONS AND CONFERENCE PRESENTATIONS**

- 4 Please list published scientific papers, conference papers, or notable presentations given within this six month reporting period related to this award. This may include presentations at non-traditional venues. Do not include publications or presentations outside of the six month reporting period. For presentations, include the title, name(s) of the presenter, 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).
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**MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH MATERIALS**

- 5 Please list any media coverage related to this award and provide links to the stories (e.g., newspaper articles, TV interviews). Only provide updates on media coverage that occurred within six month reporting period.
- 
- 6 Describe educational or outreach materials related to this award that have been developed within this six month reporting period. (200 words or less)
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- 7 Attach education and outreach materials developed during this six month reporting period.
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**PRODUCT DEVELOPMENT & DELIVERY**

- 8 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) currently available or under development as part of this glider 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 (e.g. Georgia Tech’s glider path planning tool) or even beyond your organization. For example, this might include apps, mapping tools, etc. Also describe the user for the developed products and the number of users. Only report on work conducted within the six month reporting cycle.
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**LEVERAGED FUNDING**

- 9 Provide a brief 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.
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## SECOORA GLIDER AND OTHER UNCREWED SYSTEMS PROGRESS REPORT: JULY 1 - DEC. 31, 2023

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**Status:** Submitted (01/17/2024 04:43:50 PM)

**Project:** IOOS.21(097)UGA.CE.SAILDRONE.3

**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

### 2021 - 2026 GLIDER AND OTHER UNCREWED SYSTEMS PROGRESS REPORT

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#### 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" "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.

Funding for this award has not yet been processed by UGA.

1. Develop a coordinated and effective observing strategy for gliders and saildrones (CONOPS) during the Atlantic hurricane season. On Track. Technician A. Vincent has been processing data and making initial comparisons of glider and Saildrone data from 2021 season. Vincent and PI Edwards are exploring the development and use of a Gulf Stream coordinate to potentially improve effectiveness of coordination of the vehicles in the South Atlantic Bight. Edwards has participated in weekly Saildrone missions with the piloting and planning team, providing guidance for operations particularly in the South East Atlantic and Gulf of Mexico, with more frequent meetings when in "storm mode", when an active hurricane approached glider and/or saildrone platforms. On Track.

- 2 Describe any specific accomplishments/successes achieved during the six-month period.

- 3 Describe any major problems/delays that are outside of your control that prevented project objectives from being accomplished (e.g., COVID travel delays, manufacture turnaround times for repairs).

Funding for this award has not yet been processed by UGA.

#### PUBLICATIONS AND CONFERENCE PRESENTATIONS

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

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**MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH MATERIALS**

- 5 Please list any media coverage related to this award and provide links to the stories (e.g., newspaper articles, TV interviews). Only provide updates on media coverage that occurred within six month reporting period.  

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- 6 Describe educational or outreach materials related to this award that have been developed within this six month reporting period. (200 words or less)  

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- 7 Attach education and outreach materials developed during this six month reporting period.  

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**PRODUCT DEVELOPMENT & DELIVERY**

- 8 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) currently available or under development as part of this glider 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 (e.g. Georgia Tech’s glider path planning tool) or even beyond your organization. For example, this might include apps, mapping tools, etc. Also describe the user for the developed products and the number of users. Only report on work conducted within the six month reporting cycle.  

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**LEVERAGED FUNDING**

- 9 Provide a brief 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.  

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## SECOORA PROGRESS REPORT: JULY 1 - DECEMBER 31, 2023

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**Status:** Submitted (01/17/2024 12:45:02 PM)

**Project:** IOOS.21(097)FAU.WB.3

**Project Title:** 2023 SECOORA HFR Support

### 2021-2026 SECOORA PROGRESS REPORT

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#### 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. For each objective provide one of the following indicators: "Complete" and date of completion "On-Track" "Delayed" and anticipated date of completion If an objective is delayed, a justification for the delay (e.g., COVID travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.

During the period from July 1 to December 31, 2023 the contract with Florida Atlantic University was awarded, and funds were made available from our financial department in mid November 2023. We received materials purchased for us by SECOORA in the form of two air conditioning units for our CODAR stations in South Florida. We were not able to attend the CODAR training in early December, but we plan to attend the next training section most likely in Spring/Summer 2024. We plan to purchase most of the items in support of our HF Radar systems in early 2024 now that the financial aspects are complete.

#### 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).

No publications or conference presentations occurred during the period of July 1 to December 31, 2023.

#### MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH

- 3 Please 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.

No media coverage occurred during the period of July 1 to December 31, 2023.

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

No education or outreach occurred during the period of July 1 to December 31, 2023.

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

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## **PRODUCT DEVELOPMENT & DELIVERY**

- 6 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) 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 the period of July 1 to December 31, 2023 we received two AC units as backup units for our two CODAR stations in South Florida. We have not installed them since they are spares in case of equipment failure.

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## **SUCCESS STORIES**

- 7 Briefly describe any success stories that help convey either the value of your project and/or 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.

No activities have occurred during the period of July 1 to December 31, 2023 since funding was only finalized in mid November 2023

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## **LEVERAGED FUNDING**

- 8 Provide a brief 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.

No leverage funding has occurred during the period of July 1 to December 31, 2023.

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## SECOORA PROGRESS REPORT: JULY 1 - DECEMBER 31, 2023

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**Status:** Submitted (12/11/2023 09:27:31 PM)

**Project:** IOOS.21(097)USF.CH.MOD.1

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

## 2021-2026 SECOORA PROGRESS REPORT

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### 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. For each objective provide one of the following indicators: “Complete” and date of completion “On-Track” “Delayed” and anticipated date of completion If an objective is delayed, a justification for the delay (e.g., COVID travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.

Year 3 geographic scope continued to be: Florida Keys and beaches along the east coast of Florida, and meanwhile included the Florid Panhandle area.

Year 3 objectives continued from Year 2, including:

1) to develop and validate algorithms suitable for high-resolution satellite data to map and quantify Sargassum distribution and abundance

Status: delayed but in progress, with new results generated from deep-learning modeling of Sentinel-2 data.

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

Status: delayed but in progress, with quicklook SuperDove images generated in near real-time for a selected area near Key West.

Despite the late start of the project and late arrival of Year 3 funding, 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. Results showed advantage over the MODIS-based detection because these new maps cover coastal waters up to the shoreline. A master’s thesis is being prepared from this work. Once fully validated, the algorithm will be implemented to automatic production.

On Objective #2 – We continued the data downloading and processing flow in near real-time in an automatic fashion for both Sentinel-2 and SuperDove, for two selected regions near Barbados and Key West, respectively. Quicklook images have been generated continuously. Computer codes have been debugged to assure smooth operations. This framework is now ready to implement any new algorithm for automatic production.

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### 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).

Hu, C. (2023). Ocean optics illuminates aquatic algae. *Physics Today*, 76 (7), 26–32; <https://doi.org/10.1063/PT.3.5269>

Schaeffer, B. A., P. Whitman, R. Vandermeulen, C. Hu, A. Mannino, J. Salisbury, B. Efremova, R. Conmy, M. Coffey, W. Salls, H. Ferriby, and N. Reynolds (2023). Assessing potential of the Geostationary Littoral Imaging and Monitoring Radiometer (GLIMR) for water quality monitoring across the coastal United States. *Marine Pollution Bulletin*. 196, 115558, <https://doi.org/10.1016/j.marpolbul.2023.115558>

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### **MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH**

- 3 Please 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, C. Hu has continuously been interviewed by numerous public media channels (television, newspaper, radio, online) on Sargassum inundation. An incomplete list is compiled and provided below.

<https://www.wptv.com/weather/weather-news/sargassum-season-likely-is-over-usf-researchers-say>

<https://phys.org/news/2023-07-sargassum-season-florida-mysterious-seaweed.html>

[https://www.islandernews.com/news/keybiscayne/with-lady-luck-on-its-side-key-biscayne-dodges-the-expected-sargassum-blob/article\\_a778dad6-4e9a-11ee-b65a-a3c4937beba0.html](https://www.islandernews.com/news/keybiscayne/with-lady-luck-on-its-side-key-biscayne-dodges-the-expected-sargassum-blob/article_a778dad6-4e9a-11ee-b65a-a3c4937beba0.html)

<https://stpetecatalyst.com/seaweed-mass-disappears-stumping-local-researchers/>

<https://www.accuweather.com/en/climate/the-huge-blob-of-seaweed-headed-for-florida-has-shrunk-by-75/1556153>

- 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.html>. A sample bulletin is provided below.

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

Sargassum\_outlook\_2023\_bulletin11\_USF.pdf

### **PRODUCT DEVELOPMENT & DELIVERY**

- 6 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) 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 new data products from MODIS, based on the machine learning algorithm, have been generated and made available online on a daily basis. These have been downloaded by many stakeholders.

The workflow to download, process, and make available high-resolution data from Sentinel-2 sensors has been implemented and tested. We have been working to make sure the workflow works smoothly, using a remote region (Barbados) as a test case in order to avoid mis-interpretation by Floridians or other residents around the Gulf of Mexico. During this period we also continued running computer codes to download PlanetScope/SuperDove data automatically, and to generate quicklook images.

### **SUCCESS STORIES**

- 7 Briefly describe any success stories that help convey either the value of your project and/or 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.

During this reporting period, Sargassum inundation in Florida has finished, yet C. Hu was still called by reporters and others to explain the current Sargassum situation, with interviews published in online stories or TV channels. See weblinks provided above under #3.

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### **LEVERAGED FUNDING**

8

Provide a brief 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 will leverage on.

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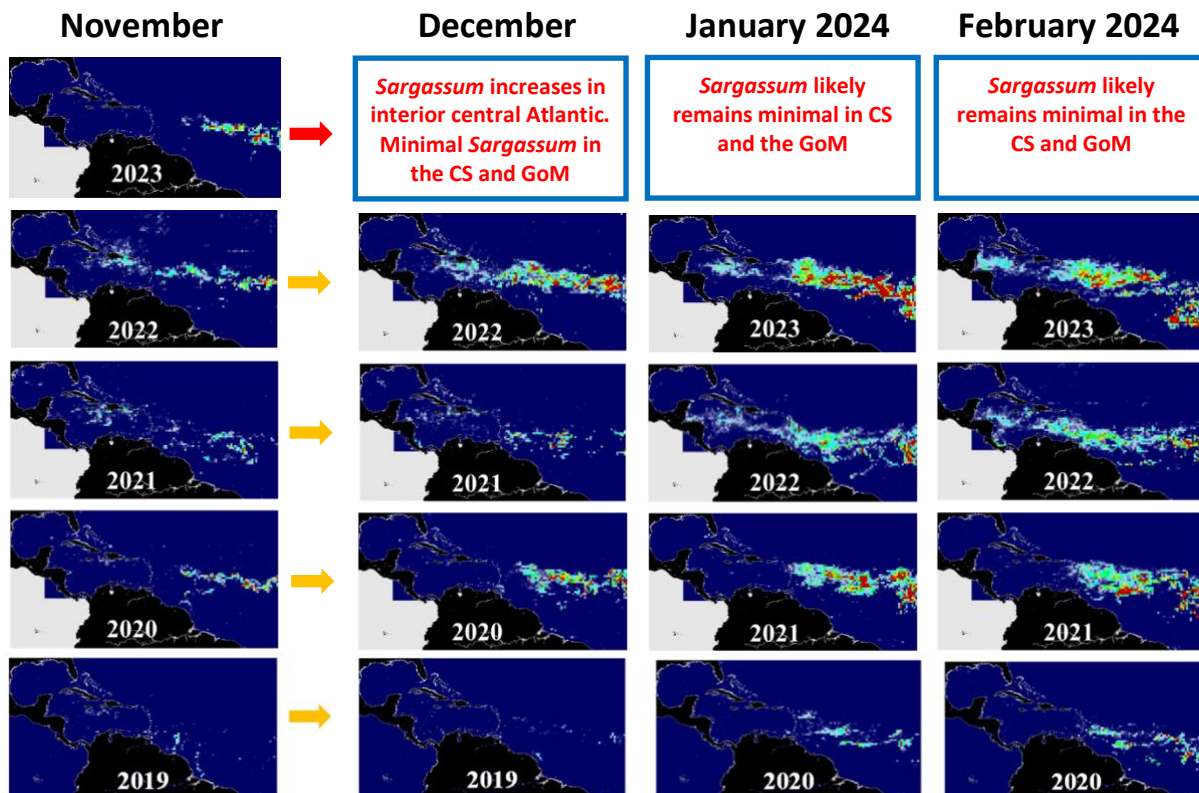


Outlook of 2023 *Sargassum* blooms in the Caribbean Sea and Gulf of Mexico\*  
December 5, 2023, by University of South Florida Optical Oceanography Lab  
([bbarnes4@usf.edu](mailto:bbarnes4@usf.edu), [yuyuan@usf.edu](mailto:yuyuan@usf.edu), [huc@usf.edu](mailto:huc@usf.edu))

The maps below show *Sargassum* abundance, with warm colors representing higher values. Overall, as predicted last month, the *Sargassum* quantity in the central Atlantic was essentially stable from October to November 2023, with the wet weight of *Sargassum* detected during November being just over 1 million metric tons. Almost the entirety of this biomass was located in the interior central Atlantic (geographically between 1000 km east of the Caribbean Sea and 700 km west of the western Africa coastline).

Minimal *Sargassum* was observed in the Caribbean Sea [CS] or Gulf of Mexico [GoM], with approximate biomass densities of 15 thousand tons and 1 thousand tons, respectively. While we expect very little *Sargassum* presence during this time of year, these values are among the lowest recorded in November during the modern Great Atlantic *Sargassum* Belt era (since 2011).

**Looking ahead:** In December, the *Sargassum* abundance within the central Atlantic will likely begin to increase. This increased biomass will remain far offshore, largely keeping within the current geographic distribution (interior central Atlantic). We will certainly see increases in *Sargassum* abundance and distribution into the first few months of 2024, but the longer-term extent of the 2024 bloom is unclear. However, the closest historical analogs to the November 2023 condition were observed in 2017 and 2020, both of which preceded major blooms. As such, we will closely monitor and track *Sargassum* throughout the central Atlantic, and will provide more summary updates in early 2024. Meanwhile, daily updates through near real-time imagery can be found under the *Sargassum* Watch System (SaWS, <https://optics.marine.usf.edu/projects/saws.html>).



Disclaimer: The information bulletin is meant to provide a general outlook of current bloom condition and future bloom probability for the Caribbean Sea. By no means should it be used for commercial purpose, or used for predicting bloom conditions for a specific location or beach. The authors of this bulletin, as well as USF and NASA, take no responsibility for improper use or interpretation of the bulletin.

## SECOORA PROGRESS REPORT: JULY 1 - DECEMBER 31, 2023

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**Status:** Submitted (01/17/2024 11:57:37 AM)

**Project:** IOOS.21(097)FGCU.MP.HABS.2

**Project Title:** Expansion of the Estero Bay HAB Water Quality Monitoring Network

## 2021-2026 SECOORA PROGRESS REPORT

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### 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. For each objective provide one of the following indicators: “Complete” and date of completion “On-Track” “Delayed” and anticipated date of completion If an objective is delayed, a justification for the delay (e.g., COVID travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.
  - 1) 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 with Vester Field Station operating as of February 28th, 2022, Gulf Star Marina as of April 13th, 2023, New Pass Bridge as of October 31st, 2023, and Sanibel Island’s city dock as of December 23rd, 2023. During the last 6 month time period, July 2023 to December 2023, there have not been any significant HAB events or deleterious water quality impacts to the study area of Estero Bay and the greater southwest Florida region. Although there may not be significant instances of water quality impacts and situations to report in the region, having continuous baseline data allows for the collection of data that will be useful for proper long term management to local, state, and federal resource managers.
  - 2) The second objective to use other tools to determine HABs, such as an Imaging FlowCytoBot (IFCB), is currently on-track. We have run six of 13 samples collected during “elevated” chlorophyll conditions ( $>20 \mu\text{g L}^{-1}$ ) on the IFCB to determine baseline and “bloom-specific” phytoplankton community assemblages. There is currently no database or library of the phytoplankton community in the southwest Florida region alongside continuous environmental multiparameter sonde data signifying the importance and knowledge gap that the currently funded project is fulfilling. Along with the analysis of IFCB samples and increased sonde deployments, this group has been deploying YSI ProSample P autosamplers at Vester Field Station and Gulf Star Marina on a routinely basis collecting water samples every hour for 24 hours at each site. A total of 5 deployments have been completed since December 2023 and will continue through the remainder of the project. All twenty-four sample bottles of water are analyzed and recorded using a Turner Trilogy fluorometer for color dissolved organic matter (ppb), turbidity (NTU), and chlorophyll a in vivo ( $\mu\text{g L}^{-1}$ ). Samples that have the highest and lowest chlorophyll a concentrations will be preserved for IFCB analysis, total dissolved nitrogen, total dissolved phosphorous, inorganic nutrients ( $\text{NH}_3$ ,  $\text{NO}_2$ ,  $\text{NO}_3$ ,  $\text{PO}_4$ , and  $\text{SiO}_2$ ), and extracted chlorophyll a (EPA Method 445.0).

### 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).  
None to report to date.

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### **MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH**

3 Please 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.

None to report to date.

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

None to report to date.

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

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### **PRODUCT DEVELOPMENT & DELIVERY**

6 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) 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 (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).

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### **SUCCESS STORIES**

7 Briefly describe any success stories that help convey either the value of your project and/or 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 expertise that has been created for the funded team at Florida Gulf Coast University, Dr. Michael Parsons (PI), Adam Catusus (Co-PI), and Kayla Hughes (graduate student) has supported interest from local city and town resource managers that have great concern regarding their local water quality. For example, the city of Fort Myers Beach, Florida, which was significantly damaged by hurricane Ian decided to invest and support creating a fixed live streaming data logging station similar to what our team is using (YSI EXOII and X2 live data logger). This future station will be linked to the public portal along with the currently operating stations (total of 5 live streaming stations), which will also be posted to the Fort Myers Beach city website for public use in the future when the station is fully operational. For any questions or comments please reach out to our Fort Myers Beach contact Mr. Adam Knight adam.knight@fmbgov.com.

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### **LEVERAGED FUNDING**

8 Provide a brief 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.

No new projects have been funded in this 6 month reporting period that leverage this SECOORA award.

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## SECOORA PROGRESS REPORT: JULY 1 - DECEMBER 31, 2023

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**Status:** Submitted (12/12/2023 09:54:09 AM)

**Project:** IOOS.21(097)UGA.NC.HABS.2

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

## 2021-2026 SECOORA PROGRESS REPORT

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### 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. For each objective provide one of the following indicators: “Complete” and date of completion “On-Track” “Delayed” and anticipated date of completion If an objective is delayed, a justification for the delay (e.g., COVID travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.

The overarching goals of this project are to 1) initiate a monitoring program in coastal GA to track periodic HAB events, 2) determine the physicochemical and ecological drivers conducive to their formation, and 3) identify the seasonal windows during which they are most likely to occur.

1. We have begun sampling the Skidaway River Estuary (SRE) weekly in January 2023, and increased sampling resolution to daily in the late Spring through early Fall. We now have a dataset reflecting seasonal transitions in water physicochemistry and algal community composition. Sampling will continue through the next year. Monthly data uploads to SECOORA are ongoing. This goal is on track.

2. The HAB species *A. sanguinea* went from undetected in June to highest cell densities of 157 cells/mL in late July 2023, coinciding with high estuary temperatures, high chlorophyll *a* levels, and low ammonium concentrations. This is below the max concentration on record which occurred in summer 2017 (252 cells/mL), but exceeds a 100 cells/mL threshold that has been used to characterize bloom conditions. Over the weekend this peak density occurred, 2-day old oyster larvae suffered 100% mortality, similar to the event in 2017 (Justin Manley, UGA Marine Extension & GA Sea Grant Hatchery Manager, personal communication). Water quality parameters, cell densities, and biomass for metatranscriptomic sequencing was collected throughout the summer period.

Transcriptomic sequencing is currently being performed at UGA, and will enable us to examine molecular underpinnings of these events, which may elucidate drivers of HAB growth. In particular, we will examine strategies used by *A. sanguinea* to thrive when ammonium concentrations are low. We will additionally screen microbial community members to determine how bacteria community shifted during high HAB cell densities, and determine whether this could have contributed to oyster mortality.

This monitoring program is the first step in establishing a regional notification network in which HAB occurrences are communicated to local residents and regional aquaculture organizations. We broadcasted our recorded HAB occurrences on the SECOORA website through our summer sampling period to inform stakeholders of estuarine conditions in near real-time: <https://secoora.org/hab-test/>

We have made significant progress and this goal is on track.

3. With two years of monitoring data, we can begin to identify trends in when these HABs appear in our estuary. Along with physicochemistry and cell densities, we are collecting ammonium concentrations, and keeping track of publicly available parameters including wind speed, wind direction, solar energy, and freshwater discharge. This environmental data is being analyzed to determine if combinations of variables are predictive of HAB species abundance. This goal is on track.

**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).  
Cohen, Natalie. University of Georgia Skidaway Institute of Oceanography. Evening @ Skidaway Seminar Series (August 2023): Monitoring for harmful algal blooms on Skidaway Island:  
<https://www.youtube.com/watch?v=EmBVWIPno4k> (Publicly available)

**MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH**

- 3 Please 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.  
News coverage:  
<https://www.savannahnow.com/story/news/environment/2023/07/25/university-of-georgia-researcher-monitors-savannah-waterways-for-harmful-algal-blooms/70456678007/>  
<https://thecurrentga.org/2023/07/18/tracking-algal-blooms-on-the-georgia-coast/>  
<https://www.gpb.org/news/2023/07/19/tracking-algal-blooms-on-the-georgia-coast>  
<https://gacoast.uga.edu/georgia-researchers-and-residents-work-together-to-monitor-harmful-algal-blooms/>  
<https://gacoast.uga.edu/student-researchers-address-coastal-issues/>

- 4 Describe education or outreach materials related to this award that have been developed within this six month reporting period.
- 5 Upload outreach and education materials developed during the reporting period. Please combine multiple outreach/education materials into one document.

**PRODUCT DEVELOPMENT & DELIVERY**

- 6 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) 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.

**SUCCESS STORIES**

- 7 Briefly describe any success stories that help convey either the value of your project and/or 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.

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## **LEVERAGED FUNDING**

8

Provide a brief 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 funds support UGA Master's student Mallory Mintz only part-time, with extra funds needed to support her annual salary. Mallory applied for and received a 1 year Marine Extension & GA Sea Grant traineeship to support her salary, which enables her to carry out this SECOORA-funded research project.

<https://gacoast.uga.edu/education/college-students/research-trainee-program/>

<https://gacoast.uga.edu/student-researchers-address-coastal-issues/>

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## SECOORA PROGRESS REPORT: JULY 1 - DECEMBER 31, 2023

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**Status:** Submitted (01/08/2024 10:58:41 AM)

**Project:** IOOS.21(097)USF.YL.MOD.SUPP.2

**Project Title:** New York Harbor - Cook Inlet Model Testing

## 2021-2026 SECOORA PROGRESS REPORT

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### 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. For each objective provide one of the following indicators: “Complete” and date of completion “On-Track” “Delayed” and anticipated date of completion If an objective is delayed, a justification for the delay (e.g., COVID travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed or to be 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 will work as a tester to configure and test Finite Volume Community Model (FVCOM) on NSF funded Texas Advanced Computing Center (TACC).

Object in Year 1: USF will configure an FVCOM application for the New York Harbor/ Cook Inlet region for tidal simulation (dominant tidal constituents), and evaluation against available water level observations. The outcome is providing skill assessment documentation and evaluating the model in the context of operations (stability, code management, ease of operation, etc.)

Object in Year 2: USF will configure an FVCOM application for the New York Harbor/ Cook Inlet region for 3D wind-driven circulation simulation, and evaluation against available observations. The outcome is providing skill assessment documentation and evaluating the model in the context of operations (stability, code management, ease of operation, etc.)

Here is a list of activities performed by USF team during this reporting period:

- The entire USF team (PI, postdoc and graduate student) 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.
- PI Yonggang Liu participated in the monthly online PI meetings.
- Provided an update of the Phase I work of USF team in the July monthly meeting (7/24/2023).
- Dr. Yonggang Liu participated in the 2023 Annual FVCOM-NOAA Workshop and gave a presentation on FVCOM application in Tampa Bay waste water plume tracking (8/9/2023).
- Started 3D model simulation of the New York Harbor – Cook Inlet region for the three-month period in 2021.
- Provided an update of the Phase II work (3D simulation) of USF team in the December monthly meeting (12/5/2023). USF team was the first team in updating the Phase II work.

This project is on-track towards meeting the objectives.

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### 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).

Phase I project summary report to NOAA:

Seroka, G., Fujisaki-Manome, A., Kelley, J., Pe'eri, S., Sienkiewicz, J., Feyen, J., Olivia Doty, O., Ide, K., Gramp, B., Ogden, F., Fanara, T., Myers, E., Moghimi, S., Cockerill, T., Wu, W., Anderson, E., Huelse, K., Forbes, C., Liu, Y., John, S., Di Lorenzo, E., Park, P., Wipperfurth, S., Sannikova, N., Titov, V., Wei, Y., Akan, C., Mani, S., Lindley, C. (2023), The Unified Forecast System (UFS) Coastal Applications Team Report – Round 1 Summary of a Unified Forecast System Model Evaluation for Marine Navigation. NOAA Office of Coast Survey, 18 pages, September 2023.

Conference presentation:

Liu, Y., R.H. Weisberg, L. Zheng, Y. Sun, J. Chen (2023), Nowcast/Forecast of the Plume of the Piney Point Effluent in Tampa Bay: A Rapid Response. The 2023 Annual FVCOM-NOAA Workshop (Virtual), August 9, 2023 (talk).

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### **MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH**

3 Please 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.

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, University of South Florida Ocean Circulation Lab 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.

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### **PRODUCT DEVELOPMENT & DELIVERY**

6 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) 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.

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### **SUCCESS STORIES**

7 Briefly describe any success stories that help convey either the value of your project and/or 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. Both a postdoc and a graduate student from University of South Florida Ocean Circulation Lab actively participate in this project.

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### **LEVERAGED FUNDING**

8 Provide a brief 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 PROGRESS REPORT: JULY 1 - DECEMBER 31, 2023

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**Status:** Submitted (01/16/2024 07:47:33 PM)

**Project:** IOOS.21(097)UM.NH.MBON.1

**Project Title:** MBON/ATN joint BioTrack project

## 2021-2026 SECOORA PROGRESS REPORT

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### 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. For each objective provide one of the following indicators: “Complete” and date of completion “On-Track” “Delayed” and anticipated date of completion If an objective is delayed, a justification for the delay (e.g., COVID travel restrictions, late receipt of contract) must be provided along with a new completion date and description of activities employed or to be employed to mitigate the delay.

Year 1 and 2 Objectives:

Objective 1 (Complete 08/08/2022): Reach out to the marine acoustic tracking research community to solicit data sharing contributions to this joint MBON-ATN project.

After a series of meetings with MBON-ATN and network leaders (including FACT, ACT, iTAG, OTN), we identified the existent network directories and data pipelines as the primary target for this objective. By June 16th, members of all these networks were first contacted by email with an open invitation for data contributions. New invitations and reminders of the open call were sent via email and social media platforms (Twitter, Facebook and Instagram) until the deadline of July 30th, which was later extended to August 8th. In the end, 44 principal investigators from 38 institutions (~50 acoustic telemetry projects) committed to the project, and their data is now available for the BioTrack team for data processing and analysis.

Objective 2 (Complete 05/17/2022): Develop a data management plan with the ATN.

Together with ATN leaders we developed a data management plan that was formalized in a data sharing & use agreement sent to all potential collaborators. This document describes the project objectives, expected products, data sharing steps, and data archiving options.

Objective 3 (On-Track): Work to integrate these data in the BioTrack project of the ATN Data Assembly Center (DAC).

Considering that the project involves multiple and diverse collaborators, ATN and BioTrack leaders agreed to offer varied options of data archiving within ATN-DAC. Nearly 40% of the principal investigators agreed to have their data archived with ATN during the execution of this project, and an additional 47% said they may be open to that in the future. Individual contributors that want their data to be archived in ATN-DAC will receive a specific data archiving agreement from the ATN data manager. It is now up to the ATN data manager to integrate the data into their Data Assembly Center.

Year 3

Objective 1: (On-Track) Integrate acoustic telemetry data with OBIS data, that incorporates environmental covariates and probability of detections, to create a function spatial occupancy model for the Southeast region that identify shared multi-species hotspots within the continental shelf for the species tagged. After concluding the data acquisition process that includes more than 39 million detections of 71 species from 3,509 unique receiver locations, the full dataset was combined and went through a systematic process of standardization and quality control. Potential false detections – inherent from acoustic telemetry sampling – were flagged and removed from the final analysis. A set of Integrated spatial occupancy models were fit for all species and the whole study area combining acoustic telemetry data and the open-access database from Ocean Biodiversity Information System (OBIS). Our predictions, based on a set of spatial and environmental variables, produced distribution maps with 10-km resolution (hexagonal grid cells). We are now overlapping latent occurrence parameters from outputs generated for all the species. This will allow us to generate a wide range of spatially explicit biodiversity indicators to highlight biodiversity hotspots within the study area (e.g. species richness, weighted-area species number, endangered species overlapping areas, classes of species composition).

Objective 2 (On-Track): Expand the occupancy model resulting from Objective 1, to expand the modeling area spatially to

include the Northeast region, northern Caribbean Sea, and western Gulf of Mexico.

Objective 3 (On-Track): Archive data and code used to generate integrated occupancy models and associated products created in Objectives 1 and 2, such that project can be replicated.

Objective 4 (On-Track): Overlay aggregated hotspots with place-based management zones, conservation areas, and areas of interest (e.g. wind lease areas) to highlight and map areas protected from and vulnerable to human activity.

Objective 5 (On-Track): Submission of a peer-reviewed scientific publication.

Objective 6 (On-Track): Present data products via a webinar hosted by X-MBON Working Group

Objective 7 (On-Track): Create a digital visualization of the data product for online viewing.

• Objective 5 (Delayed): Generate data visualizations of the resulting biodiversity maps linked among MBON, ATN and SECOORA.

After concluding the analysis, the final biodiversity maps are being produced based on different ecological indicators (richness, weighted-area richness, composition). Not all of them were fully concluded. They will be shared with the data contributors during the FACT annual meeting in January 2024 and then finalized after incorporating collaborators' feedback. This objective should be fully completed by the spring of 2024. Visualizations of biodiversity hotspots will be then made available to MBON, ATN and SECOORA as maps and shapefiles.

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## **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).
- Thiago B. A. Couto. Generating broad-scale biodiversity indicators from acoustic telemetry data. BES Aquatic Ecology Group Meeting: Sept 19th, 2023 (Lancaster, UK). Slides: <https://docs.google.com/presentation/d/12xFtMmJj-OudCljTNvu4xKq8tSkL1KzD/edit?usp=sharing&oid=114797030080097639942&rtpof=true&sd=true>
  - Thiago B. A. Couto and Neil Hammerschlag. Generating broad-scale biodiversity indicators from acoustic telemetry data. MBON Virtual Meeting with Marine Sanctuary Staff - July 27, 2023

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## **MEDIA ENGAGEMENT, EDUCATION, AND OUTREACH**

- 3 Please 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.
- Thiago received the BES Aquatic Ecology Group Early Career Award (British Ecological Society (BES) / Global Change Biology Journal). He gave a keynote presentation at the 2023 BES Aquatic Ecology Group Meeting at Lancaster (United Kingdom), where he presented the results from the A-BioTrack Project.
- 4 Describe education or outreach materials related to this award that have been developed within this six month reporting period.
- 5 Upload outreach and education materials developed during the reporting period. Please combine multiple outreach/education materials into one document.

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**PRODUCT DEVELOPMENT & DELIVERY**

- 6 Please provide a brief description of the status of all products or tools (or major upgrades to existing products) 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.
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**SUCCESS STORIES**

- 7 Briefly describe any success stories that help convey either the value of your project and/or 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.
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**LEVERAGED FUNDING**

- 8 Provide a brief 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.
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### Account Detail Profile Inquiry

Date: 01/09/2024  
Time: 1:27 PM

<b>ALC/Region:</b> 13140001	<b>Agency Short Name:</b> NOAA	<b>Account ID:</b> FNA21NOS0120097
<b>Recipient ID:</b> 4530798	<b>Recipient Short Name:</b> SECOORA	

**Inquiry Results:**

<b>Account Type:</b> Control Account	<b>Account ID:</b> FNA21NOS0120097	<b>Description:</b> NOACOOPNOS
<b>Available Balance:</b> \$6,010,965.06	<b>Total Cumulative Draw Limit:</b> \$13,745,738.00	

Account Detail ID	Account Status	Cumulative Draw Limit	Draws/RP/BE To Date
FY 23 OAP-T-004-008	OPEN	\$67,466.00	- \$0.00
FY21CETACEAN2021-X-000-005	CLOSED	\$350,000.00	- \$350,000.00
FY21NATDMAC021-T-000-002	CLOSED	\$90,000.00	- \$90,000.00
FY21NCDIS021-T-000-009	CLOSED	\$190,000.00	- \$190,000.00
FY21NOSHQ021-X-000-001	CLOSED	\$10,000.00	- \$10,000.00
FY21OAP021-T-000-007	OPEN	\$71,365.00	- \$70,984.36
FY21OCM021-T-000-006	OPEN	\$244,444.00	- \$204,574.03
FY21OMAO021-T-000-008	CLOSED	\$10,000.00	- \$10,000.00
FY21REG021-T-000-003	OPEN	\$3,576,136.00	- \$3,375,984.05
FY21SECART021-T-000-004	OPEN	\$10,500.00	- \$10,382.39
FY22 COOPS NCDIS022-T-002-001	OPEN	\$357,500.00	- \$338,493.26
FY22 OAP 022-T-002-003	OPEN	\$76,915.00	- \$27,313.28
FY22 OCM WATER 022-T-002-005	OPEN	\$197,144.00	- \$161,862.69
FY22 OCMROP022-T-002-006	OPEN	\$244,400.00	- \$89,652.10
FY22 OMAOBATTERY022-T-002-007	OPEN	\$30,000.00	- \$19,668.62
FY22 SECART022-T-002-002	CLOSED	\$4,800.00	- \$4,800.00
FY22F4DISCRETION022-T-002-009	CLOSED	\$150,000.00	- \$150,000.00
FY22NATDMAC022-T-002-004	OPEN	\$159,153.00	- \$110,950.00
FY22REG022-T-001-001	OPEN	\$3,061,136.00	- \$2,165,799.27
FY22REG022-T-002-008	OPEN	\$324,201.00	- \$78,071.43
FY23 NATL DMAC023-T-004-005	OPEN	\$165,000.00	- \$25,437.50
FY23 REGIONAL023-T-003-002	OPEN	\$3,061,136.00	- \$196,014.78
FY23 REGIONAL023-T-004-001	OPEN	\$521,100.00	- \$41,016.78
FY23 SEACART023-T-003-001	OPEN	\$3,800.00	- \$0.00
FY23NCDIS OCM023-T-004-009	OPEN	\$195,400.00	- \$0.00
FY23NCDIS023-T-004-003	OPEN	\$132,500.00	- \$0.00
FY23OCM023-T-004-004	OPEN	\$100,000.00	- \$0.00
FY23OMAO023-T-004-006	OPEN	\$40,000.00	- \$0.00
FY23ROP023-T-004-007	OPEN	\$249,760.00	- \$13,768.40
FY23UGA023-T-004-002	OPEN	\$51,882.00	- \$0.00