



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

Table 2 (Non-CORE Funding) Scope of Work - Year 3

TOPIC AREA 1: Implementation and Development of Regional Coastal Ocean Observing Systems

AWARD TYPE: Cooperative Agreement

PROJECT DURATION: July 1, 2021 – June 30, 2026

This revised grant proposal is submitted in response to the Funding Opportunity Title:
Implantation of the U.S. Integrated Ocean Observing System (IOOS)

Submitted: September 20, 2023

Year 3: July 1, 2023 – June 30, 2024

Table 2 Non CORE Funding Request: \$1,523,108

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Goals, Objectives, and Workplans

With the \$1,523,108 in non-CORE funding, SECOORA will enhance Goals 1 – 4. Objectives and tasks are described below and included in Table 1.

Goal 1: Continue successful operation of the SECOORA governance and management subsystem.

SECOORA will continue working on objectives 1.A – 1.C., as outlined in the SECOORA Core Proposal. With the growth in observing technology, number of Principal Investigators, and affiliated programs, SECOORA will hire a contractor to assist with pre- and post-award grant management. This will help assure that descope proposals, financial documents, progress reports, and ASAP draws are accurate and submitted in a timely manner. Additionally, funding will support the Office and Event Manager who assists with accounting and event planning functions.

Goal 2: Maintain and augment the SECOORA observing subsystem.

Objective 2.A: Maintain existing long-term coastal and ocean observing operations.

Additional Mooring Activities:

Gray's Reef OA mooring: SECOORA supports ocean acidification and water quality monitoring at the Gray's Reef National Marine Sanctuary (GRNMS) as part of NOAA's international effort to quantify the effects of ocean acidification. The University of Georgia (UGA, PI Scott Noakes) will maintain and oversee the operation of the mooring sensors at GRNMS and work with NOAA PMEL to ensure data integrity. These sensors include pCO₂, pH, DO, salinity, chlorophyll, turbidity and water temperature. Sensors are deck mounted on the mooring and mounted under the buoy which require diver support. The entire system including the MAPCO₂, equilibrator, battery pack, span gas and air block will be replaced once during the year, typically scheduled in early fall. As needed, additional trips (typically 2-3) will be made to the mooring to replace failed or fouled systems. Partners for the OA project include the UGA, NOAA PMEL, NOAA NDBC, and the USCG, which provides vessel support for mooring maintenance. NEPA analysis for the operation and maintenance of Gray's Reef sensors was completed in 2016 under award NA16NOS0120028 with record of environmental compliance issued 3/16/2016.

Additional Regional High Frequency Radar (HFR) Activities:

HFR funding for retuning: HFR operators in the southeast have identified priority funding needs (e.g., equipment, supplies, training) for the HFR operators. NEPA analysis for the operation and maintenance of the original SECOORA HFRs was completed in 2016 under award NA16NOS0120028, with record of environmental compliance issued 3/16/2016. Radar installed since the 2016 Environmental Compliance (EC) memo provided by NOAA IOOS have undergone NEPA analysis by the NOAA IOOS Environmental Compliance Coordinator, specifically: North Key Largo NEPA analysis conducted under award NA16NOS0120028, with record of EC issued 5/20/2019; Treasure Shores Park NEPA analysis conducted under award NA16NOS0120028, with record of EC issued 12/10/2020; Canaveral National Seashore NEPA analysis conducted under award NA16NOS0120028, with record of EC issued 12/10/2020; Kennedy Space Center NEPA analysis was completed by NASA with a CATEX issued on 5/18/2021 (contact Brian Zelenke, IOOS Surface Currents Manager for details); Myrtle Beach State Park NEPA analysis conducted under award NA16NOS0120028, with record of EC issued 8/30/2021; Hightower Beach Park FONSI issued on 9/14/2022 under award NA16NOS0120028.

HFR funds for Kennedy Space Center site installation: SECOORA will pay for the installation of the power meter at Kennedy Space Center (KSC) HFR location. The KSC power meter must be a separate box so

that HFR power usage can be accurately monitored. See above for NEPA compliance. Power meter installation is basic site maintenance and is required by NASA.

HFR funding for Florida Atlantic University (FAU): Funding will support procurement of HFR supplies needed to maintain two CODAR HFR operated by FAU (Haulover and Hillsboro). Typical maintenance issues include replacement of corroded air conditioning units due to high humidity and salt air, the need for back-up power supplies, and installation of a new liftgate on an FAU vehicle used to for servicing the HFR. Additionally, funding will support the PI to attend the CODAR SeaSonde Basic Training Course, Fall 2023. Funds for the original purchase and installation of the two HFR were provided through State of Florida funding (i.e., not federal funds).

Additional Glider Activities:

Support for Glider deployments/recoveries: SECOORA partners at UGA Skidaway Institute of Oceanography (SkIO), UNC Chapel Hill (UNCCH), and University of South Florida (USF) will coordinate with the U.S IOOS, other RAs, and the U.S. Navy for glider deployments and recoveries as well as glider piloting support during the 2023 Hurricane season. SkIO (PI Catherine Edwards) will lead these efforts and be the main point of contact in the Southeast for both the U.S. IOOS and U.S. Navy glider operators. SECOORA glider operations NEPA analysis was conducted under award NA16NOS0120028, with record of environmental compliance issued by NOAA IOOS on 7/15/2016.

Navy Glider shipping: Funding will support the shipment of gliders back to U.S. Navy facilities for gliders recovered on the east coast. U.S. shipping companies such as FedEx or UPS are used for shipping.

Support of NOAA OMAO-OAR Sairdrone-Glider project: SkIO (PI Catherine Edwards) will support Sairdrone/glider coordination efforts by using past and future data from both platforms. Glider data from prior hurricane seasons will be post-processed to publication quality and shared with collaborators at AOML/PMEL. These data, together with data collected in recent Sairdrone missions, will be analyzed for trends related to successful co-location of the vehicles along the southeast and Caribbean region. PI Edwards will work with the NOAA AOML/PMEL Sairdrone team to coordinate deployments in hurricane season 2023, explore spatial and regional trends in co-located data, and leverage this insight to develop strategies for co-location and data assimilation in future hurricane seasons. See Appendix A for NEPA record of environmental compliance (SAC Release) related to this project.

Additional Water Level Network Improvements:

Water Level Network: SECOORA will hire a Water Level Manager (WLM) to oversee the four project teams which comprise the SECOORA Water Level Network. The WLM will assist teams in the implementation of the SECOORA Water Level Standard Operating Procedures, assist with water level gauge maintenance, work with PIs to establish routine vertical elevation surveys, track station performance including the review of daily quality control (QC) flags. The WLM will be a resource for SECOORA water level team members to improve their operational capabilities and will be available to provide guidance to other RAs as they stand up their water level programs. Appropriate field equipment and supplies will be purchased for site reconnaissance, station maintenance, and vertical elevation surveys. NEPA analysis for SECOORA water level sensor installations and maintenance was originally conducted under award NA16NOS0120028, with record of environmental compliance issued by NOAA IOOS on 4/19/2021.

Goal 3: Implement, integrate, and expand the Data Management Cyberinfrastructure, and Modeling and Analysis subsystems.

Additional Data Management Activities:

Curation of IOOS open-source repositories and software packages: This project supports the technical implementation of the IOOS DMAC system (PI Filipe Fernandes) including the following activities: monitoring and testing DMAC products and services, ongoing development of the IOOS data discovery and access tools, technical research and engagement with external groups (e.g., Pangeo), and maintenance of the IOOS GitHub software and tool ecosystem. Additionally, it funds the ongoing development and maintenance of several open-source software packages that are crucial to the IOOS DMAC enterprise.

Pan Regional Sargassum (HAB) Project: USF (PI Chuanmin Hu) will develop and operate a high-resolution, Web-based system to monitor and forecast pelagic Sargassum using satellite data. The ultimate purpose is to help local management agencies, citizens, and other stakeholders to better prepare for Sargassum inundation events. The Year 3 geographic scope has expanded from several coastal zones of the Florida Keys and South Atlantic Bight to also include the Gulf of Mexico and selected sites around Puerto Rico. The main project objectives are to 1) continue development and validation algorithms suitable for high-resolution satellite data to map and quantify Sargassum distribution and abundance; and 2) generate prototype high-resolution imagery products to map and quantify Sargassum distribution and abundance. The map-based products will be shared with stakeholders for review.

Additional Modeling Activities:

NCDIS Coastal Resilience: The goal of this project is to conduct a 43-year (1979-2021) reanalysis of coastal storm surge with the ADCIRC storm surge and tide model (UNC-CH, PI Brian Blanton). Using the ECMWF ERA5 atmospheric reanalysis, NOAA observed water levels, and a data assimilation system for ADCIRC (Asher et al. 2019), the results will provide detailed datasets of long-term coastal water levels for use in a variety of applications, including flood hazard assessments and as boundary conditions for smaller-scale, regional simulations. Year 3 activities will include:

- *Complete computation of V2 dataset.* Several issues were found in V1 of the reanalysis that required redress. In Y2 the project team completed the prior V2 simulation and developed an improved approach to handling the prior error analysis for data assimilation. In Year 3, the team will complete the posterior computation and make the data available to NOAA and collaborators. They will also continue with detailed analysis of the posterior error.
- *Incorporate tropical cyclones.* Using the IBTrACS database of Atlantic tropical cyclones and the ADCIRC GAHM vortex model, the project team will compute cyclone-specific wind/pressure fields for insertion into the ERA5 meteorology on a high-resolution (~ 5 km) nested and storm-following grid. The ADCIRC wind interface already handles nested grids of meteorology. The approach will blend the higher-resolution nest into the coarser ERA5 grids. This approach will be tested for the year 2018, leveraging the extensive Hurricane Florence hindcast dataset of both winds and water levels that have already been assembled.
- *Data access and post-processing.* The posterior results will be made available through the RENC THREDDS Data Server. The team will work with NOAA and affiliates that are hosting the large datasets on cloud resources for more general access. They will also develop specific post-processing for the large data files to facilitate easier access. This will be guided by use cases defined by specific end-users such as the Regional Frequency Analysis group.
- *Documentation.* Continue to develop and maintain project documentation suitable for end-users of the datasets. The documentation will contain comparisons of the prior and posterior datasets, with statistics that characterize both the posterior accuracy and the improvements over the prior solution.

Integration and evaluation of models to couple with NWM (USF): The Ocean Circulation Lab at USF (PI Yongang Liu) maintains a coordinated program of coastal ocean observations and models to describe and understand the circulation of the West Florida Continental Shelf and Tampa Bay, and the role that the circulation plays in shelf ecology and other matters of societal concern. The models include the West Florida Shelf Coastal Ocean Model (WFCOM) that downscales from the deep ocean, across the continental shelf and into the estuaries, and the Tampa Bay Coastal Ocean Model (TBCOM) that is nested in the WFCOM. Both WFCOM and TBCOM are applications of the unstructured grid Finite Volume Community Model (FVCOM). The USF Ocean Circulation Lab will participate in the cross-model software evaluation study to be coordinated by NOAA Unified Forecast System Coastal Application Team (NOAA UFS CAT).

A USF graduate student and postdoc will work as a tester to configure and test FVCOM models for New York Harbor/ Cook Inlet on NSF funded Texas Advanced Computing Center (TACC). The work will include conducting standard test runs for a given region and within specified computational time/resources to allow fair quantitative model inter-comparison of performances for a given sub-application. The models will be evaluated independently from other models and then evaluated coupled with either atmospheric or wave models that will be defined at a later stage. The outcome is providing skill assessment documentation and evaluating the model in the context of operations (stability, code management, ease of operation, etc.). The project PI, postdoc, and the graduate student will participate in the monthly project meetings, and present model evaluation results on a rotation basis.

Goal 4: Effectively implement the engagement subsystem to support product co-design and delivery.

SECOORA partners with other national and regional networks to leverage expertise, expand observing capacity, and provide education opportunities. SECOORA will engage with these groups during Year 3:

- [Regional Ocean Data Sharing](#) (RODS) efforts: SECOORA supports efforts aimed at meeting national ocean policy goals and coordinating discussion to address gaps in regional data. Sea level rise and resiliency are priority issues in the SECOORA four-state region. State coastal management leads support leveraging the SECOORA Water Level Network (funded through the Core proposal) with the RODS funds. The RODS funds will be used to support state agency and local municipality engagement, conduct vertical elevation surveys, implement iterative product design for enhanced access to water level data, and collaboration with the Sea Grant offices in each state. Sea Grant extension staff already work in coastal communities, allowing their staff to help SECOORA identify underserved communities in need of water level sensors and how best to deliver water level data. Finally, one additional water level sensor will be installed in an underserved community in Georgia. NEPA analysis for SECOORA water level sensor installations and maintenance was originally conducted under award NA16NOS0120028, with record of EC issued by NOAA IOOS on 4/19/2021. All sites are identified in the following spreadsheet and a record of additional review for site-specific location (e.g., review of historic locations) is documented: https://docs.google.com/spreadsheets/d/10KN3sdkzaUR-Kf_TbC-YI0d1mcCqWH6pyWowcQVbB8o/edit?usp=sharing
- The [FACT Network](#) is a grassroots collaboration of marine scientists from the Bahamas to the Carolinas using acoustic telemetry to better understand and conserve our region's important fish and sea turtle species. Year 3 funding specifically supports the FACT Data Wrangler (Lead PI Joy Young) who leads communications, data acquisition efforts, data quality control, and FACT data visualization tool development. The FACT team will continue development of procedures/protocols to facilitate data and metadata acquisition and ingestion in accordance with FACT data policies and standards. All acoustic telemetry data, after processing and quality control, are submitted to the

National ATN Data Assembly Center for archive. Note, funding is used to support the FACT data management node. Funds are not used to support field work related to animal tagging.

- [Southeast Ocean and Coastal Acidification Network \(SOCAN\)](#) is dedicated to supporting and encouraging discussions on ocean and coastal acidification. As part of the annual SOCAN workplan, the PIs (Hall and Reimer) will organize and host at minimum two virtual Town Hall style webinars to engage the acidification stakeholder community across the Southeast, recruit and engage stakeholders to participate in SOCAN virtual forums, participate in the Ocean Acidification Program federal vulnerability report and monitoring prioritization plan until its completion, write one to two research proposals, and participate in at least one professional conference. Reports for the SOCAN virtual meetings will be written and distributed to SOCAN membership, as well as being made available on the [SOCAN website](#). SOCAN will continue its social media presence on Twitter, Facebook, Instagram, the Ocean Acidification Information Exchange, and email updates to members.
- [Vembu Scholar](#): SECOORA submits Hollings Scholar opportunities to NOAA annually. The goal is for the scholars to work with a SECOORA member and learn all facets of an ocean observing program. Scholarship funds are provided to the institution that hosts the Hollings scholar. These funds support the scholar above and beyond the Hollings funding to assure that the scholar has a well-rounded experience. If a Hollings Scholar does not choose a SECOORA institution for their experience, then the funds will be used to support a travel award for the annual SECOORA [Vembu Subramanian Ocean Scholars Award](#). The goal of this award is to provide students and early career professionals with the opportunity present their ocean science research at a regional or national meeting. Funds are provided as a subaward to the awardees home institution.

Cost Table:

Funding Area	Amount	PI & Institution	Task
Goal 1: Continue successful operation of the SECOORA governance and management subsystem			
SECOORA	\$50,000	Hernandez, SECOORA	FY23 one-time funds to assist with core needs of the Regional Association, specifically salary & fringe for the SECOORA Office and Events Manager and to hire a pre- and post-Award contractor.
Goal 2: Maintain and augment the SECOORA observing subsystem			
Ocean Acidification	\$42,466	Noakes, UGA	OAP allotment of FY22 project resources in support of the NOAA Ocean Acidification Observing Network
One Time System Add Ons	\$53,100	Edwards, UGA SkIO	HFR system wide support for retuning/testing/staff training by SECOORA's HFR Operators to comply with FCC Regulations.
One Time System Add Ons	\$1,500	Hernandez, SECOORA	KCS HFR power meter installation
One Time System Add Ons	\$40,000	Baxley, FAU	Funding to support the maintenance and operation of the existing Hillsboro & Haulover CODAR HFR
One Time System Add Ons	\$40,000	Edwards, UGA SkIO	Glider (system wide support) funding from the OMAO to support glider deployments and recoveries
One Time System Add Ons	\$1,500	Edwards, UGA SkIO	Gliders: to support Navy glider recoveries & shipment back to Navy
One Time System Add Ons	\$51,882	Edwards, UGA SkIO	OMAO-OAR RFP Glider-Saildrone funds to support UGA work
SECOORA	\$250,000	Hernandez, SECOORA	Funding for a water level manager, equipment, supplies, and other costs associated with operating a water level network.
Goal 3: Implement, integrate, and expand the DMAC and Modeling and Analysis subsystems			
Filipe Fernandes	\$95,000	Fernandes, Independent Contractor	Curation of IOOS open-source repositories and software packages through ongoing development of the IOOS data discovery, access tools, and demonstrations as part of the IOOS.us, and ioos.github.io web pages
Harmful Algal Blooms (HABs)	\$100,000	Hu, USF	Pan-regional Sargassum project

University of North Carolina - Chapel Hill	\$327,900	Blanton, UNC-CH and RENCi	NCDIS Coastal Resilience: support for coastal inundation work (modeling reanalysis)
SECOORA	\$100,000	Liu, USF	Funds to support the integration and evaluation of models to couple with NWM
Goal 4: Effectively implement the engagement subsystem to support product co-design and delivery			
Regional Ocean Data Sharing	\$249,760	Hernandez, SECOORA	Regional Ocean Data Sharing Initiative
SECOORA	\$90,000	Young, FACT Network	Data Wrangler position for the FACT Acoustic Telemetry Network
Ocean Acidification	\$25,000	Hall, Mote Marine Laboratory & Reimer, Independent Contractor	OAP allotment of FY22 project resources in support of SOCAN
SECOORA	\$5,000	Hernandez, SECOORA	Vembu Award/Hollings
Total Non-CORE Funding	\$1,523,108		

Appendix A: NEPA documentation for Glider/Saildrone project