

# Southeast Coastal Ocean Observing Regional Association (SECOORA): Supporting Resilient Ecosystems, Communities and Economies

## Program Performance Report

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## 1) Progress and Accomplishments

**Goal 1: Continue SECOORA’s region-wide governance and communication structure to engage users and stakeholders in coastal observing science**

**Milestone A: Maintain governance and management for the RA and RCOOS: *On-Track***

Activities	Status
Effectively manage grants and contracts	The SECOORA Year 5 Descope proposal was submitted to the IOOS office 09/08/20.
Ensure SECOORA’s operational & governance structure enables us to achieve our vision	SECOORA held a virtual winter Board Meeting, December 1-2, 2020. The main focus was to approve the SECOORA 2021-2026 IOOS Proposal and review and refine language in the SECOORA Strategic Plan.
Maintain effective communication with US IOOS and the IOOS Association	Highlights this period include IOOS Association Annual virtual meeting Oct. 9, including work on the IOOS Association Strategic Plan; and monthly IOOS Program Office, IOOS Association Executive Committee and RA Director calls.
Expand and diversify funding.	SECOORA is a co-PI on the proposal, <i>Rapid floodwater extent and depth measurements using Optical UAV and SAR</i> , submitted by Dr. Leila Hashemi-Beni, North Carolina Agricultural and Technical State University. <a href="#">NCAT</a> is the largest HBCU’s in the country. If funded, SECOORA will provide data management support and assist with outreach to NOAA partners from the NWS, NWC, and SERFC. Additionally, SECOORA received it’s first OTT funding for WebCOOS, see <a href="#">story here</a> .

Activities	Status
Update and maintain SECOORA's RCOOS Plan	SECOORA has revised its Regional Coastal Ocean Observing System Strategic Operational Plan ( <a href="#">RCOOS plan</a> ). The new plan covers the period 2020 – 2025 and was used to guide the SECOORA proposal writing process for the <a href="#">2021 – 2026 IOOS proposal</a> . The RCOOS plan will undergo and annual review by the SECOORA Science Committee in Feb. 2021.

**Milestone B: Engage users and other stakeholders to prioritize investments: *On-Track***

Activities	Status
Improve web-based information system and web presence	SECOORA continues to track website usage with Google Analytics. There was a 28% increase in website sessions on secoora.org (from 35,382 to 45,456) this period. Data portal sessions (portal.secoora.org) have decreased 21% in the reporting period (from 5,340 to 4,228). Two hurricane pages were developed during this time period: <a href="#">Eyes on Eta: Data Resources</a> and <a href="#">Eyes on Isaias: Data Resources</a> .
Identify and promote opportunities for non-members to engage in SECOORA activities and initiatives	SECOORA hosted 3 webinars as part of the <i>Coastal Ocean Observing in Your Community</i> series and over 245 participants tuned in. Click here for <a href="#">recorded webinars</a> . <ul style="list-style-type: none"> <li>• Dr. Steven Murawski, Chad Lembke, Sarah Grasty, and Alex Ilich, all from University of South Florida College of Marine Science, presented “Establishing Baselines for Benthic Habitat and Fish Populations on the West Florida Shelf via the Power of Combined Visual and Acoustic Technologies.” 111 attendees.</li> <li>• Dr. Eric Montie, University of South Carolina Beaufort, presented the webinar “What’s all that racket! Estuarine soundscapes in South Carolina.” 61 attendees.</li> <li>• Dr. Robert Weisberg, University of South Florida College of Marine Science, presented “Observations at the West Florida Shelf Pressure Point: How the Pressure Point Affects both the Shelf and the Gulf of Mexico Loop Current.” 74 attendees.</li> </ul>
Implement an effective outreach strategy	SECOORA’s outreach strategy is based on Strategic Plan goals and the Fundraising Strategy. Primary marketing and outreach mechanisms are e-newsletters, e-mails, social-media, and the website. During this period subscription to the newsletter increased by 12% (from 1,136 to 1,284) and three newsletter were distributed ( <a href="#">June</a> , <a href="#">July</a> , <a href="#">October</a> ); Facebook “likes” have grown 6% (from 485 to 513); and, Twitter “followers” have grown 11% (from 741 to 820). SECOORA shared approximately 76 Facebook posts and 206 Twitter “tweets”, referring a combined 1,052 sessions to the SECOORA website (increasing 31% from 802 to 1,052) and 25 stories were published on the website ( <a href="#">www.secoora.org/news</a> ).
Support citizen science opportunities	No updates on citizen science during this reporting period.
Engage students in problem solving using ocean observing data	In October, two USF undergraduate classes participated in outside (COVID safe) field trips to the Clam Bayou station. The students learned why the data are important for environmental monitoring ( <a href="#">see story</a> ). The Clam Bayou station is a partnership between YSI Xylem, SECOORA, and USF COMPS. Over 325 students have been taught through this partnership since it began in 2014.  Mote Marine Laboratory & Aquarium created a new interactive, educational exhibit about the sounds of the ocean. This exhibit builds on the work of Mote’s Dr. James Locascio, who’s research focuses on identification of biological, geophysical, and anthropogenic sounds ( <a href="#">see story</a> ).  In June 2020, the winners of three SECOORA Student awards were announced. See stories below.

Activities	Status
	<ul style="list-style-type: none"> <li>• <a href="#">Student funded to research the effects of temperature, habitat, and prey resources on fish movement in South Florida</a></li> <li>• <a href="#">Announcing the Vembu Subramanian Ocean Scholarship Winner – Julie Vecchio, PhD</a></li> <li>• <a href="#">Meet the 2020 Data Challenge Winner- Douglas Cahl from the University of South Carolina</a></li> </ul> <p>The winner of SECOORA’s <a href="#">curriculum RFP</a> is Katy Smith from the University of Georgia Marine Extension and Georgia Sea Grant. The project, <i>Water Shapes Our Planet and Our Lives</i>, will construct a comprehensive fourth grade, virtual-learning science unit on the water cycle, weather, climate and natural processes that shape the Earth’s coasts and communities (<a href="#">see story</a>).</p> <p><b>See page 12 for NOAA Hollings Scholars updates.</b></p>

**Milestone C: Provide DMAC infrastructure to enable collaboration and decision-making (SECOORA and Axiom Data Science, LLC): *On-track***

Activities	Status
<p>IOOS DMAC standards compliance and implementation of Data Management, Products, and Services. (Axiom Data Science, LLC, Showalter and Wilcox)</p>	<p>SECOORA follows the IOOS recommended standards-based services and requirements to ingest, manage, and provide access to all our funded data streams (in-situ, remotely sensed and numerical models). See <a href="http://portal.secoora.org">portal.secoora.org</a>. Progress during this period:</p> <ul style="list-style-type: none"> <li>• Maintain IOOS compliant services and applications for integration with national products. Updated THREDDS (4.6.14 -&gt; 4.6.15) and ERDDAP (1.82 -&gt; 2.02). <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>• Expanded SECOORA data portal holdings to include: <ul style="list-style-type: none"> <li>○ Ingested <a href="#">CORMP (MSBN-S) Masonboro Island, NC</a></li> <li>○ Ingestion of historic data from USF CMS COMPS C14, C16, C17 (funded by SEACOOS), C18 and C19</li> <li>○ <a href="#">University of North Carolina Wilmington Center for Marine Science (UNCW-CMS) (BOTTOMS-UP)</a> uploaded to Research Workspace</li> <li>○ <a href="#">Coastal Data Information Program (CDIP)</a> stations pulled directly from CDIP into the portal</li> <li>○ Ingested data from <a href="#">Indian River Lagoon (FAU HBOI)</a></li> </ul> </li> <li>• Submission of 30 sensor feeds to NCEI for long-term preservation. Submitted 9 new glider missions to the IOOS Glider DAC (<a href="#">angus-20201115T0000</a>, <a href="#">franklin-20201104T0000</a>, <a href="#">sam-20201008T0000</a>, <a href="#">stella-20201014T0000</a>, <a href="#">franklin-20200918T0000</a>, <a href="#">sam-20200821T0000</a>, <a href="#">pelagia-20200826T0000</a>, <a href="#">franklin-20200729T0000</a>, <a href="#">sam-20200716T0000</a>)</li> <li>• Maintained the Glider System for the management SECOORA glider assets. The SECOORA glider data was updated for visualization in the portal (<a href="#">here</a>), as well as submitted to the DAC. Progress was made in collaboration with SECOORA, IOOS, and Rutgers towards resolving issues with submitting the corrected, delayed mode data with the DAC and providing the DAC with raw science/flight files in the future.</li> <li>• Developed a Station Observatory data product that allows end users to access SECOORA funded station data in a more user-friendly way. This included</li> </ul>

Activities	Status
	<p>development of <a href="#">station landing pages</a> to access and display end products, including a visual summary of data availability in the region.</p> <ul style="list-style-type: none"> <li>• Supported the WebCAT application (<a href="http://secoora.org/webcat">http://secoora.org/webcat</a>). Kicked off WebCOOS project and worked with team to develop user/camera requirements and outreach materials for camera providers.</li> <li>• The SECOORA PIs annually review and update their individual DMAC Plans. The most recent version of the DM plans are part of the overall SECOORA <a href="#">Certification</a> documents and can be found here: <a href="https://secoora.org/wp-content/uploads/2020/12/F-APPENDIX_F_FundedDataStreamsInventory.pdf">https://secoora.org/wp-content/uploads/2020/12/F-APPENDIX_F_FundedDataStreamsInventory.pdf</a></li> <li>• FACT Network: <ul style="list-style-type: none"> <li>○ Supported the OTN FACT Node at SECOORA, which includes progress towards making the FACT data discoverable through the IOOS Animal Telemetry Network data portal.</li> <li>○ Environmental datasets from 5 different tagging projects were uploaded into the RW for ingestion into the SECOORA data system and into the <a href="#">FACT map</a>.</li> </ul> </li> </ul>
Maintenance of DMAC infrastructure (hardware and software)	<p>The Axiom data system is the backbone 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. Axiom maintained ongoing continuous performance of the SECOORA data system following IOOS DMAC guidelines. Additionally, Axiom completed a data center expansion, which included four new racks, 10 Gb internet connection, 10 Gb ethernet network, Ansible 2.9 upgrade, and additional new generation hardware (compute blades and storage cluster). Technical scoping and experimentation were done with new storage technologies (Ceph, using S3 compt APIs more) for system optimization. Server building/bootstrapping processes were improved, and Docker image store was compressed using multi-stage builds.</p>
Establishment and release of new SECOORA Portal	<p>Frontend and backend work occurred to develop features for the v2.13 data portal release, scheduled for mid-December. Changes include custom map drawing and print tools, display of instrument narratives on station pages, improved dataset download, and brush time selection for timeseries charts. Additionally, work was completed to add time zone support to the portal backend, including formatting, time zone switching, and state saving implementations. Effort is underway to develop frontend capability for migrating time zone selector into the unit management system.</p>
QARTOD Implementation	<p>During this performance period, basic QARTOD tests were applied for 115 <a href="#">real-time and historical timeseries datasets</a> that are accessible through the SECOORA data portal. Quality flags are summarized on both the <a href="#">station</a> and <a href="#">sensor</a> pages within the portal for visual exploration. In addition, the documentation of the test code and thresholds are displayed on sensor pages (<a href="#">example</a>) with links available to the 1.0 version <a href="#">QARTOD GitHub library</a>. The qc codebase for the <a href="#">Argo Quality Control Manual for CTD and Trajectory Data</a> tests, including location test, range test, spike test, and speed tests were created and merged into the <a href="#">ioos qc library</a> for integration into the SECOORA data system. The metadata attributes were updated to include quality flags for the test types.</p>
Address 10 requirements per NOAA IOOS Contribute Data Page	See Appendix A

## Goal 2: Maintain existing core observation investments in the region

### Milestone A: Maintain High Frequency Radars (HFR) distributed throughout the region

Institution/Contractor	Status
University of South Florida (USF) (Weisberg, Merz) <b>All HFR sites On-Track</b>	USF continues to operate and maintain 3 CODAR HFR sites (Naples, Venice and Redington Shores) and 2 WERA HFR sites (Venice and Ft. DeSoto Park) which overlook the USF mooring array. Data are sent to SECOORA, NOAA NDBC, and the IOOS HFR CORDC network for integration, display, and dissemination. Plots of the data are also posted on the USF COMPS Ocean Circulation Group website ( <a href="http://ocgweb.marine.usf.edu">http://ocgweb.marine.usf.edu</a> ). All radars performed well this reporting period with the exception of the Redington Shores CODAR (up-time 37%) due to low offshore energy conditions.
University of Georgia (UGA), Skidaway Institute of Oceanography (SkIO) (Edwards/Savidge): <b>CAT: Repairs On-Track</b> <b>JEK: Repairs On-Track</b>	Access to St. Catherine’s island via ferry (unavailable since the onset of the COVID pandemic) has been restored. The hardware for the frequency conversion to 5.25MHz has been installed. A series of hardware failures in the rack have been discovered during initial testing which has led to a significant delay in getting the station up and operational. As of Nov. 30, the team has finished all necessary repairs and has begun testing again. The station awaits some minor exterior antenna hardware reconfiguration along with the new FCC permit to operate on the new frequency.  Hardware installation has been mostly completed at Jekyll. While the team has been able to install all antennas, they have not been able to route the cables to the rack as the path passes through a construction staging area associated with Villas by the Sea, (a local beach community). We expect this to be resolved in January. Additionally, the field team has run into significant tuning problems which began in July. SkIO staff have been working through the problems with the Helzel team. The timeline for correcting the tuning issue is early January 2021.
University of Miami (Shay) <b>STF On-Track</b> <b>VIR Delayed</b> <b>CDN Delayed</b> <b>NKL On-Track</b>	UM has only been able to repair 1 of 3 WERA which were severely damaged in 2017 due to Hurricane Irma. Hurricane supplemental funding was provided in May 2019 and two new HFR were received by UM in late May 2020. Due to COVID-19, field work to install the new HFR is delayed.  North Key Largo (NKL): All permits have been received and the installation is progressing. There was some damage to the site during Hurricane Eta in November. As per guidance from Helzel, we have configured the site for both beam forming and direction finding from WERA. The site should be operational in December 2020; however, UM is relying on Helzel to develop the software to combine direction finding and beam forming radials.
University of NC - Chapel Hill (UNC-CH) (Seim) and ECU Coastal Studies Institute (CSI) (Muglia) <b>CORE – On-Track</b> <b>HATY – On-Track</b> <b>DUCK – On-Track</b> <b>OCR – Delayed</b>	UNC-CH has turned over the management of Coastal Studies Institute (CSI) to East Carolina University; therefore, SECOORA issued two sub-awards in year 5, one to UNC-CH and one to CSI, to continue operation of the four NC HFR systems. UNC-CH provides operation and maintenance for CORE and overall data management support for all four stations. CSI provides operation and maintenance for HATY, DUCK, and OCR. DUCK and HATY systems performed well during the reporting period. Repairs to the HATY were completed with Hurricane Supplemental Repairs funding.  CORE site (CODAR, up-time 94%): In early June 2020 remote controllable thermostats were installed to control the building temperature and to analyze air conditioning run-time. The system is running smoothly, although heat build-up and the associated power demands may become problematic during the hottest part of the summer.

Institution/Contractor	Status
	<p>Through Fill-the-Gaps funding, SECOORA purchased a previously owned WERA deployed in Ocracoke, NC (OCR). The station was completely destroyed during Hurricane Dorian (2019). Since there was not sufficient funding to purchase a new WERA, SECOORA worked with CSI to repair a CODAR that was on hand. Installation of the CODAR began and the system should be tuned ready for testing on December 10.</p> <p><b>Data analysis and tool development:</b> PIs have been developing a tool that provides daily estimates of Gulf Stream variability in position, width of the cyclonic shear zone, and orientation. The tool was developed using radial velocities from the HATY and CORE sites but could be applied to any region where there is high surface current shear occurring within an HFR radial footprint. Algorithm development focused on one-month of quality controlled HFR radials in November 2014. The PIs are now applying it to two years of radial velocity measurements in 2017 and 2018. A manuscript describing this method is nearly complete with a planned submission date for review January 2021.</p>
<p>University of South Carolina (Voulgaris)  <b>GTN – On Track</b>  <b>CSW – On Track</b></p>	<p>University of South Carolina is responsible for the operation and maintenance the WERA HFRs located at Georgetown, SC (GTN) and Fort Caswell, NC (CSW). The operation of the two systems continued although more downtime and greater latencies were experienced this period due to aging equipment and hurricane activity which impacted GTN. In addition, the network provider (Verizon Wireless) used at our stations occasionally experiences overloaded bandwidth that leads to higher than usual latency in data delivery. Due to coastal erosion, the GTN RX antennas were relocated again and all guy wires were elevated to accommodate sea turtle nesting for the summer of 2020. Routine and emergency maintenance activities were undertaken at both sites. New computers, including updated operating systems and processing software, were installed in both locations in November. The existing routers / LTE adapters were replaced with the newer models (Cradlepoint CBA850) in October which resulted in significant improvement in connectivity.</p> <p>USC is preparing to change from the current 8.3 MHz to the FCC’s Universal Licensing System (ULS) to operate in the International Telecommunications Union (ITU) HF radar allocated frequency bands. USC has shift to the frequency range 5.250 – 5.275 MHz. New hardware for this frequency conversion has been received from the manufacturer.</p> <p>USC and SECOORA are working with personnel from Myrtle Beach State Park to site the 3<sup>rd</sup> USC WERA HFR. The Environmental Compliance paperwork for this site was submitted to NOAA the first week of December.</p>

**Milestone B: Maintain in-situ stations along the Carolina and West Florida Shelf (WFS) coasts**

Institution/ Contractor	Status
<p>USF (Weisberg) - Coastal Ocean Monitoring and Prediction System (COMPS) moorings  <b>On Track (but some delays with ship-time)</b></p>	<p><b>Operations:</b> Three real-time surface moorings (C10, C12, C13) were maintained, along with two non-real-time subsurface moorings (C11 and C15). All data from C11 and C15 continue to be uploaded to RW for data archival and sharing with SECOORA and NCEI.</p> <p>Along with the SECOORA-funded buoys, USF maintains two additional real time stations. One is the RESTORE Act-funded C21 station, offshore of St Pete Beach, FL. The second is a “pressure point mooring” (C22) located at the southwest corner of the WFS to the northeast of the Dry Tortugas. This mooring was deployed on 6/27/19 through funding from the NASEM Gulf Research Program.</p> <p>The following table indicates up-time percentages for USF real-time moored stations.</p>

Institution/ Contractor	Status																																																					
		C10	C12	C13	C21	C22																																																
	Wind	99%	87%	98%	21%	61%																																																
	Air Pressure	99%	87%	99%	21%	61%																																																
	Water Temperature	99%	87%	99%	N/A	61%																																																
	Salinity (Surface)	99%	87%	99%	N/A	61%																																																
	Air Temperature	95%	87%	99%	21%	61%																																																
	Relative Humidity	95%	87%	99%	21%	61%																																																
	Longwave Radiation	99%	N/A	N/A	N/A	N/A																																																
	Shortwave Radiation	99%	N/A	N/A	N/A	N/A																																																
	ADCP	94%	83%	97%	10%	50%																																																
	Waves	N/A	N/A	N/A	10%	N/A																																																
	<p><i>Discussion of low stats:</i> The three SECOORA funded moorings (C10, C12, and C13) met the SECOORA 85% up-time requirements. The two-non SECOORA moorings have experienced technical issues and repairs to the systems were hampered due to USF's COVID-19 restrictions to travel and ship use. C21 has experienced several failures of the underwater armored cable which provides power to and data transmission from the underwear waves sensor. The cause of the problem has not been isolated but technicians suspect that there is a grounding issue in the underwater termination.</p> <p><b>Data Management:</b> USF has implemented QARTOD recommended QC test for all near real time data.</p>																																																					
USF (Luther) - Coastal tidal & meteorological stations <b>CLB, FHP, SHP On-Track</b> <b>APK – Delayed</b>	<p><b>Operations:</b> Sites collecting water level and surface meteorological parameters are Big Carlos Pass, Clam Bayou, Fred Howard Park, Aripeka, and Shell Point. A full suite of water quality sensors is operated on the Clam Bayou site in partnership with YSI/Xylem. Unfortunately, site visits have not been possible since mid-March due to COVID-19 travel restrictions; however, emergency repair visits are allowed with approval from the dean.</p> <table border="1" data-bbox="516 1268 1349 1598"> <thead> <tr> <th></th> <th>APK</th> <th>CLB</th> <th>FHP</th> <th>SHP</th> <th>BCP</th> </tr> </thead> <tbody> <tr> <td>Water Level</td> <td>85%</td> <td>94%</td> <td>97%</td> <td>3%</td> <td>99%</td> </tr> <tr> <td>Air Temperature</td> <td>85%</td> <td>99%</td> <td>100%</td> <td>100%</td> <td>100%</td> </tr> <tr> <td>Air Pressure</td> <td>65%</td> <td>99%</td> <td>100%</td> <td>100%</td> <td>100%</td> </tr> <tr> <td>Relative Humidity</td> <td>85%</td> <td>99%</td> <td>100%</td> <td>0%</td> <td>100%</td> </tr> <tr> <td>Wind (Gust, Speed, Dir)</td> <td>85%</td> <td>99%</td> <td>100%</td> <td>100%</td> <td>100%</td> </tr> <tr> <td>Surface Water Temperature</td> <td>85%</td> <td>78%</td> <td>N/A</td> <td>100%</td> <td>100%</td> </tr> <tr> <td>Precipitation</td> <td>82%</td> <td>99%</td> <td>100%</td> <td>100%</td> <td>100%</td> </tr> </tbody> </table> <p>The CLB station includes a YSI that collects: DO, fluorescent DO, Blue-Green Algae, pH, Chlorophyll concentration, and Turbidity. The water quality data up-time for the reporting period was 78%. The water quality sonde installation was destroyed in Tropical Storm Eta on 11/11-12/2020. The piling to which the sonde protective well was attached broke off below the water line. USF personnel, with assistance from YSI/Xylem retrieved the sondes and well on 11/20/2020. The sondes were returned to YSI refurbishment. It is unknown when the sondes will be returned and re-deployed. The pilings supporting</p>							APK	CLB	FHP	SHP	BCP	Water Level	85%	94%	97%	3%	99%	Air Temperature	85%	99%	100%	100%	100%	Air Pressure	65%	99%	100%	100%	100%	Relative Humidity	85%	99%	100%	0%	100%	Wind (Gust, Speed, Dir)	85%	99%	100%	100%	100%	Surface Water Temperature	85%	78%	N/A	100%	100%	Precipitation	82%	99%	100%	100%	100%
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Institution/ Contractor	Status																																																	
	<p>the dock where the system is located appear to be damaged as well. We will approach the City of St. Petersburg, which owns and maintains the dock, to request repairs.</p> <p><i>Reporting Statistics:</i> Overall the stations have reported well. The Shell Point water level sensor is scheduled for repair in mid-December. The non-functioning relative humidity sensor will be swapped on the same site visit. Other stations will be visited in early 2021 for general maintenance and sensor swaps.</p> <p><i>Station Leveling:</i> Complete</p>																																																	
<p>University of North Carolina - Wilmington (UNCW) (Leonard) - Coastal Ocean Research and Monitoring Program (CORMP) mooring network <b>All stations On-Track</b></p>	<p><b>Operations:</b> UNCW operates 9 moorings in NC and SC coastal waters. Buoy statistics for the reporting period are below. Note that ILM2, LEJ3, and SUN2 have co-located wave buoys (i.e., 2 moorings on station) that provide spectral wave data and water temperature. All moorings met the SECOORA 85% up-time requirements with the exception of the SUN2Wave mooring.</p> <table border="1" data-bbox="457 758 1398 995"> <thead> <tr> <th></th> <th>ILM2</th> <th>ILM3</th> <th>LEJ3</th> <th>SUN2</th> <th>CAP2</th> <th>FRP2</th> </tr> </thead> <tbody> <tr> <td>Air Temperature</td> <td>100%</td> <td>94%</td> <td>95%</td> <td>100%</td> <td>93%</td> <td>100%</td> </tr> <tr> <td>Air Pressure</td> <td>100%</td> <td>94%</td> <td>95%</td> <td>100%</td> <td>93%</td> <td>100%</td> </tr> <tr> <td>Wind Speed, Gust, Direction</td> <td>100%</td> <td>94%</td> <td>95%</td> <td>100%</td> <td>93%</td> <td>100%</td> </tr> <tr> <td>Salinity</td> <td>99%</td> <td>94%</td> <td>41%</td> <td>100%</td> <td>92%</td> <td>94%</td> </tr> <tr> <td>Surface Water Temperature</td> <td>98%</td> <td>94%</td> <td>41%</td> <td>100%</td> <td>92%</td> <td>94%</td> </tr> <tr> <td>Waves (co-located buoys)</td> <td>100%</td> <td>N/A</td> <td>99%</td> <td>10%</td> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• During Hurricane Isaias all nearshore buoys (CAP2, FRP2, SUN2, and ILM2) were switched to 15-minute reporting based on a request from NWS Charleston for higher frequency data. The storm tracked over the SUN2 buoy 8/3-8/4/20. CORMP technicians inspected the SUN2 buoy on 8/7/20 and found no damage to the buoy or any of its components.</li> <li>• The CDIP Databell buoy at SUN2WAVE was recovered on 8/21/20, and the CORMP NEXSENS buoy was redeployed. A failure of the cellular modem caused telemetry to cease 09/04/20 and the NEXSENS buoy was recovered on 9/14/20. The NEXSENS buoy was deployed again on 10/27/20; and had another telemetry failure on 11/02/20. CORMP plans to replace the NEXSENS buoy with a SOFAR Spotter wave buoy in early January.</li> <li>• The non real-time ADCP and CTD located on OB27 were serviced on 8/10/20 and 11/04/20. All of the data have been uploaded to the CORMP data archive and Research Workspace.</li> </ul> <p><b>Data Management:</b> All real-time data are extensively QA/QC's based on QARTOD requirements. Flags are archived with the data on UNCW servers and passed to Axiom. CORMP continues to use the cloud-based data collection platform during internet disruptions on the UNCW campus. The cloud-based software is updated to match the CORMP telemetry software, allowing for simple transitions during unexpected outages.</p> <p><b>Partner activities:</b> CORMP continues to work with FACT to maintain the VEMCO acoustic receivers on the three Onslow Bay real-time buoys and OB27. The VEMCO acoustic receivers were swapped at LEJ3 and ILM2 on 10/28/20; at ILM3 on 11/04/20; and OB27 on 8/10/20. All acoustic telemetry data has been uploaded and provided to FACT.</p>		ILM2	ILM3	LEJ3	SUN2	CAP2	FRP2	Air Temperature	100%	94%	95%	100%	93%	100%	Air Pressure	100%	94%	95%	100%	93%	100%	Wind Speed, Gust, Direction	100%	94%	95%	100%	93%	100%	Salinity	99%	94%	41%	100%	92%	94%	Surface Water Temperature	98%	94%	41%	100%	92%	94%	Waves (co-located buoys)	100%	N/A	99%	10%	N/A	N/A
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### Milestone C: Maintain the sensors on NOAA GRNMS buoy (NDBC 41008)

Institution/Contractor	Status
UGA (Noakes) – Support to NOAA’s Ocean Acidification Program, NDBC Gray’s Reef National Marine Sanctuary (GRNMS) NDBC ID #41008 buoy <b>On-Track</b>	<p><b>Operations:</b> The GRNMS buoy has been reporting ocean acidification data nearly continuously since 2006 when the MAPCO2 system was installed. During this reporting period, the MAPCO2 has reported at 85% of the time with the reduction in reporting due to a system failure on July 12. A replacement MAPCO2 was requested from PMEL and delivered to UGA on July 24. On August 10, the replacement MAPCO2 system was installed on the GRNMS buoy. Since the sanctuary vessels were not allowed to operate due to COVID, the Latitude 31 charter vessel based out of Richmond Hill, GA was hired for the operation. In addition to the MAPCO2 system installation, a new Seabird and SAMI-pH were also mounted under the buoy.</p> <p><b>Mooring Redesign:</b> NOAA OAP requested that UGA investigate design concepts to streamline instrument deployment on the NDBC 3-meter buoy; specifically, to find ways to eliminate the need for divers to manually install/remove instruments from under the buoy. NDBC was presented with the conceptual design for modifying the buoy to allow for the Seabird and SAMI-pH sensors to be deployed from topside instead of diver mounted under the buoy. The report is currently being circulated through the NDBC staff and undergoing discussion prior to approval. At this time, the GRNMS buoy is slated to be replaced sometime during 2022 to 2023 leaving ample time to gain approval and for the modification to be completed.</p>

### Goal 3: Begin to address geographic gaps in observations

#### Milestone A: Establish a regional glider observatory in the South Atlantic Bight (SAB)

Institution/Contractor	Status
UGA SkIO (Edwards) North Carolina State University (NCSU, He) UNC-CH (Seim) USF (Lembke) Georgia Institute of Technology (GIT, Zhang) <b>Glider operations On-Track</b>	<p><b>Operations:</b> During the reporting period, the SECOORA glider team conducted 10 missions, totaling 190 days at sea (Appendix B – Glider days at sea). USF glider Sam was deployed off Cape Canaveral, FL three times, with recovery locations off SC, GA, and NC. Franklin was deployed off Cape Canaveral two times, with recovery destinations off NC, and was deployed and recovered off GA once. SkIO/UNCW glider Pelagia was deployed off Georgia and recovered after 2 days due to forward pump issues. The two Franklin missions were part of the 2020 Hurricane glider deployments (see page 12).</p> <p><b>Maintenance:</b> The SkIO team conducted regular maintenance on all gliders. Additional maintenance for the SECOORA glider Franklin included forward service and replacement of the “bellafram”, conducting thorough glider checklists, updating mission software in shore-side and glider archives, simulated missions, and documentation of the glider status and procedures used. The SkIO glider Angus spent most of the reporting period at Teledyne Webb Research for service following an electrical malfunction in the forward section during a deployment in late May. Pelagia had a broken connector so it did not form a solid electrical connection for the forward pump to receive power. This is being repaired at SkIO and Pelagia is scheduled to be deployed in the first quarter of 2021. See Appendix B for total glider days at sea.</p> <p><b>Navy-SURTASS glider mission:</b> As part of an externally funded Navy/NOAA SURTASS project on soundscapes in marine protected areas, PI Edwards and her team conducted one 9-day glider deployment in Gray’s Reef National Marine Sanctuary (GRNMS), working with collaborators at Woods Hole and GRNMS to develop best practices and evaluate metrics for soundscape data collection. Angus collected acoustic data via integrated Vemco units and a SoundTrap (passive acoustics) mounted along its forward section.</p>

**Milestone B: Install a new coastal water quality and meteorological station in Charleston Harbor, SC:**

Institution/Contractor	Status																
South Carolina Department of Natural Resources (Sanger) <b>Charleston Harbor – On Track</b>	<p>The Charleston Harbor station was installed at the new site, the SCDNR Marine Resources Division’s piling at the end of the Fort Johnson (FJ) boat slip, in July 2020. The relocated site consists of a PVC tube with a YSI EXO2 and all of the supporting telemetry equipment. The site officially began collecting data on July 22, 2020. The FJ site (ACEFJWQ) is designated as a secondary site for the ACE Basin National Estuarine Research Reserves’ (NERR) and data can be found on the CDMO website (<a href="https://cdmo.baruch.sc.edu/">https://cdmo.baruch.sc.edu/</a>) and the SECOORA Data Portal.</p> <p>Statistics for real time data collected since period July 22, 2020 – November 30, 2020.</p> <table border="1" data-bbox="581 617 1200 888"> <thead> <tr> <th></th> <th>FJ</th> </tr> </thead> <tbody> <tr> <td>Water Temperature</td> <td>100%</td> </tr> <tr> <td>Salinity/Specific Conductivity</td> <td>100%</td> </tr> <tr> <td>Dissolved Oxygen</td> <td>100%</td> </tr> <tr> <td>pH</td> <td>100%</td> </tr> <tr> <td>Turbidity</td> <td>100%</td> </tr> <tr> <td>Chlorophyll Fluorescence</td> <td>100%</td> </tr> <tr> <td>Depth</td> <td>100%</td> </tr> </tbody> </table>		FJ	Water Temperature	100%	Salinity/Specific Conductivity	100%	Dissolved Oxygen	100%	pH	100%	Turbidity	100%	Chlorophyll Fluorescence	100%	Depth	100%
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**Goal 4: Continue delivery of operational model forecasts and products to serve priority users**

**Milestone A: Enhance and operate a Coupled Marine Environmental Assessment and Prediction System for the SE**

Institution/Contractor	Status
NCSU (He) - Support and enhance SABGOM model <b>On-Track</b>	<p>The project team is on-track with modeling efforts. The team maintains the SABGOM and CNAPS ocean prediction systems, providing time- and space-continuous regional marine environment predictions on a user-interactive <a href="#">web portal</a>. The team continues to make progress in advanced data assimilation schemes. In addition to successfully completing data assimilative (DA) hindcast experiments for 2017-2019 based on the 4-dimensional variational data assimilation (4DVAR) method, the team is also working on the ensemble data assimilation (ENDA) method. Both DA approaches, by assimilating satellite sea surface height, sea surface temperature, in situ temperature, and salinity profiles from ship surveys, Argo floats, and gliders, can successfully reduce model errors in hindcasting regional ocean conditions. Also, the team has been implementing and testing the DA scheme in the nowcast/forecast system. The 4DVAR DA system, by requiring an iterative integration between the forward and adjoint models, is very computing-intensive and time-consuming for routine operation in university computing infrastructure. The team is exploring the possibility of using ENDA in conjunction with Amazon Web Service (AWS) cloud computing to perform DA nowcast/forecast.</p>

### Milestone B: Operate the WFS FVCOM ocean model

Institution/Contractor	Status
USF (Weisberg) <b>On-Track</b>	<p>USF works with Florida Fish and Wildlife Research Institute (FWRI) on HABs tracking and modeling. USF provides short-term predictions consisting of a 1 day hindcast and 3.5 days forecast of the red tide trajectories for both near surface and near bottom water columns. See FWRI update for HABS tracking and forecasting activities.</p> <p>Real time data and model simulations are publicly available on the internet (<a href="http://ocgweb.marine.usf.edu">http://ocgweb.marine.usf.edu</a> and the SECOORA web site) and are transmitted via THREDDS server to NOAA GOODS. Output from the West Florida Shelf Coastal Ocean Model (WFCOM) and high-resolution Tampa Bay Coastal Ocean Model (TBCOM) are also available via <a href="#">THREDDS server</a>.</p>

### Milestone C: Provide an early warning system for swimming beach and shellfish harvesting waters

Institution/Contractor	Status
USC (Porter) <b>On-Track</b>	<p>The project team continues to maintain the platform <a href="http://howsthebeach.org">howsthebeach.org</a> and provide public access to daily estimates of swimming beach bacteria levels for Myrtle Beach, SC, Charleston, SC, Folly Beach, SC, Sarasota, FL, and Kill Devil Hills, NC. During this reporting period the team worked with town officials in Surfside Beach, SC resulting in the establishment of nowcasting conditions for their swimming beaches (<a href="http://howsthebeach.org/surfside/map">http://howsthebeach.org/surfside/map</a>). The team also continues to operate <a href="http://howmyscriver.org">http://howmyscriver.org</a> for the Saluda River Monitoring Coalition.</p> <p>Artificial Intelligence (AI) and Machine Learning (ML) running on GPU-based hardware is being used to perform feature extraction on a collection of WebCOOS camera feeds. Feature extraction or object detection includes people and objects associated with beach use (e.g., beachgoers, swimmers, chairs, umbrellas and other objects). These automated processes can continually, and in near real-time, provide timestamped counts and movement tracking within the processed camera feed images. Work on feature extraction is on-going using the cameras in FL (Bradenton and St. Augustine) and SC (Folly Beach Pier).</p>

### Milestone D: Optimize and enhance the SECOORA Marine Weather Portal (MWP)

Institution/Contractor	Status
SECOORA (Dorton), Second Creek Consulting (Galvarino) <b>Complete</b>	The MWP is hosted on the SECOORA website: <a href="http://mwp.secoora.org/">http://mwp.secoora.org/</a> . The site was updated to include the SECOORA <a href="#">Text-a-Buoy</a> product.

### Milestone E: Python Data Analysis Tools for Oceanographic Services

Institution/Contractor	Status
Independent Contractor, Filipe Pires Alvarenga Fernandes, Oceanographer, Brazil <b>On-Track</b>	Activities conducted fall into three areas of work. 1. Assist in development of IOOS.us Documentation and Demonstration sub-pages; 2. Support current and continue developing software packages to IOOS; and, 3. Ensure software deployment via conda-forge packages and updates. All work is reviewed by the IOOS program office. Full details, listing accomplishments this period, are found in Appendix C.

## Milestone F: Special Projects

Institution/Contractor	Status
Unmanned Aircraft System (UAS) workshop <b>Complete</b>	Due to COVID-19 the UAS workshop was conducted as a virtual workshop. SECOORA, in conjunction with NOAA SECART and CariCOOS, hosted the six-session virtual webinar series for <a href="#">Drones in the Coastal Zone</a> . Approximately 750 participants attended the sessions. Participants were from the southeast and US Caribbean and represented federal and state agencies, academic institutions, and private industry. A workshop report is in development.
Hollings Scholarship <b>On-track</b>	<p>The 2020 Hollings Scholar, Natalie Murphy, is now a SECOORA intern. She is developing “meet the users” stories, which highlight how individuals are using SECOORA funded data. Two stories have been developed and two more stories will be published during the next reporting period:</p> <ul style="list-style-type: none"> <li>• <a href="#">SECOORA Partners Work Together for Improved Fishing Forecasts</a></li> <li>• <a href="#">Commercial Fisherman Develops Models with High Frequency Radar Data to Find Fish</a></li> </ul> <p>SECOORA and Mote Marine Laboratory (Michael Crosby) submitted a 2021 Hollings Scholar opportunity to the IOOS Program Office. The opportunity is titled “Public Outreach and Education through the Expansion of Mote Marine Laboratory’s Beach Conditions Reporting System (BCRS)”.</p>
ROWG Meeting Support (CSI, Muglia) <b>On-Track</b>	CSI led the virtual ROWG Meeting Planning team and hosted the meeting November 17-18. Over 100 people participated in the event. CSI personnel are now coordinating a follow-up ROWG in-person meeting for 2021; however, this is dependent on COVID-19 travel restrictions.
2020 Hurricane Glider Deployments (UGA’s SkIO, Edwards) <b>On-track</b>	The two Franklin missions discussed on page 9 were deployed in the SAB for the 2020 Hurricane Glider effort. The first mission lasted 26 days (7/29 – 8/23) and the second lasted 33 days (9/18 – 10/20). These missions are included in Appendix B – Glider Days at Sea.
Navy glider deployments and recoveries (SECOORA Glider team) <b>On-track</b>	The SECOORA glider team deployed two Navy gliders and monitored them daily and interacted with the NAVO glider operations center at Stennis on a weekly basis. The team recovered one glider off of Georgia. The glider suffered significant tail damage several weeks into the mission. After recovery it was evaluated and shipped back to Stennis. The second Navy glider suffered a malfunction and is presumed lost at sea.
IOOS/NOPP Soundscape Observatory (USC Beaufort, Montie) <b>On-track</b>	The project team maintains a non real-time estuarine soundscape observatory in coastal SC. The team’s passive acoustic array is deployed in estuaries where in-situ data is collected by NERRS, USGS, and USC Beaufort. Nine mooring platforms, with acoustic receivers and water temperature loggers, make up the soundscape observatory: 3 in the May River, 1 in Chechessee Creek, 1 in Colleton River, 3 in Charleston Harbor and 1 in North Inlet-Winyah Bay (NI-WB). The South Carolina Department of Natural Resources (SCDNR) assists with servicing Charleston Harbor and NI-WB platforms. All 9 stations were serviced twice (instruments swapped and moorings cleaned) during the reporting period. Using collected data, the team manually reviewed 18,332 wav files for biological sounds and noise occurrences. Data from the May River and Charleston Harbor will be used to compare anthropogenic noise levels as well as identify fish species. Finally, the project team is working with SECOORA to create a soundscapes webpage for K-12 educators and public audiences.

Institution/Contractor	Status
OTN/ATN <b>On-Track</b>	SECOORA contracts with Joy Young, Fisheries Data Solutions and Chris Kalinowsky, Georgia Department of Natural Resources, in support of ATN. Progress reports from Young and Kalinowsky have been submitted to the IOOS ATN manager. These reports are included in Appendix D.
Regional Ocean Data <b>On-track</b>	<p>The following work associated with Regional Ocean Partnership funds was completed:</p> <ul style="list-style-type: none"> <li>○ Steering Committee meetings were held in June, July, August, and November.</li> <li>○ The committee developed a comprehensive list of stakeholders interested in sand resources including beach advocate groups, state agencies, federal agencies, academics, and engineering firms. The TNC conducted 10 interviews with stakeholder representatives to better understand the use of existing sand resources and gaps/opportunities for enhancements.</li> <li>○ The information gained from the interviews has been organized into an outline and will be developed into a sand resource white paper and translated into a Story Map that can be shared with interested parties. The Story Map will visually describe why sand is an important resource across the region and provide links to existing work.</li> </ul> <ul style="list-style-type: none"> <li>● Data products developed as a result of these activities includes: <ul style="list-style-type: none"> <li>○ Outline of the final white paper, <i>Sand Data and Management in the Southeast</i>, has been completed.</li> </ul> </li> <li>● A plan for future continuation of the work: <ul style="list-style-type: none"> <li>○ The <a href="#">SECOORA 2020 RFP to Enhance Regional Ocean Data Sharing</a> was released in September with proposals due October 31. Twelve proposals were submitted to the opportunity. SECOORA will fund 3 proposals. The award recipients are Joy Young (FACT Network), Natalie Nelson (NCSU), and Mary Conley (TNC).</li> <li>○ Final white paper based on the outline</li> <li>○ Story map translation of the white paper</li> <li>○ SECOORA webinar on the project – Feb. 23, 2021</li> </ul> </li> <li>● New relationships that were established <ul style="list-style-type: none"> <li>○ The individual steering team members are stakeholders of SECOORA, but the steering committee is a new group, focused on collaboration among state and federal agencies.</li> </ul> </li> </ul>
Compilation of Environmental, Threats, and Animal Data for Cetacean Population Health Analyses (CETACEAN), SECOORA and Axiom Data Science <b>On-track</b>	The CETACEAN team is comprised of an Executive Committee, a Steering Committee, and an Implementation Team. The goal is to develop a data platform that provides user-friendly access to datasets that can be used to assess the health of whales and dolphins and identify stressors that threaten them. Axiom representatives are on the Implementation team which meets weekly and participates in Steering Committee meetings. Axiom submitted a pre-proposal to the National Fish and Wildlife Foundation to update Gulfmap and move it to the cloud. Gulfmap is a prototype marine mammal health and monitoring analysis platform with data stored in an Access database. The CETACEAN team would like for the Gulfmap data to be incorporated into its platform, but first it needs to be in a more usable format and location. NFWF asked Axiom to submit a full proposal as it will align well with the CETACEAN goals.
Coordination of SOCAN activities (TremI) <b>On-track</b>	The SOCAN Executive Team, which includes Dr. Janet Reimer, Dr. Emily Hall, and Megan TremI, met on the following dates: 7/23, 8/6, 9/8, 9/22, 10/1, 10/29, 11/17. The team planned and hosted a <a href="#">Town Hall</a> through the OAIE website on September 10, 2020 with over 70 attendees. The team provided an introduction to SOCAN and an overview of OA and the general Southeast state of knowledge and research efforts. The Town Hall also

Institution/Contractor	Status
	<p>included a series of lightning talks on OA impacts on estuaries, coastal hazards, harmful algal blooms, corals, and aquaculture.</p> <p>SOCAN has finalized membership in the science and stakeholder working groups. Emily Hall will lead the science working group, which will focus on proposal development, information sharing, and developing a list of OA data sources in the SE. Janet Reimer will lead the stakeholder working group that will develop a new OA webinar series.</p>
<p>Southeast and Caribbean Disaster Resilience Partnership (SCDRP) <b>On-Track</b></p>	<p>The SCDRP is developing a strategic plan for the organization. Working with the Advisory Board, this plan outlines the main goals and associated key strategies and forms the basis of the workplan for the coming year. This plan is in a final drafting stage.</p> <p>As part of the strategic plan, the Advisory Board has also developed a membership structure for the SCDRP in order to formalize the membership and assure investment in the organization by partners and members. As part of this effort, the Advisory Board stood up a development committee charged with identifying and building strategies for long-term support for the SCDRP</p> <p>The SCDRP began planning the winter meeting to be held January 26-28, 2021. This will be a virtual event. The 13-member Meeting Planning Committee began meeting in August. The agenda and meeting information are available here: <a href="https://www.sdrp.secoora.org/2021meeting">https://www.sdrp.secoora.org/2021meeting</a>.</p>
<p>Additional Observations: OTT Biology pilot project. (SCDNR, Axiom) <b>On-track</b></p>	<p>Beginning in 2018, SECOORA, Axiom, SC DNR, and SAFMC have worked together to migrate a subset of the SEAMAP-SA surveys from the <a href="http://seamap.org">seamap.org</a> portal to the SECOORA data portal. The goal of this project is to increase user interoperability and responsive system management over the current seamap.org system. During this performance period the following activities are underway:</p> <ul style="list-style-type: none"> <li>● Support the final integration of long-term living marine resource survey data types from SEAMAP-SA into the SECOORA data portal. This includes: <ul style="list-style-type: none"> <li>○ Expand the data tables and code tables to add a Tagging table (which houses tagging and recapture information for a variety of fish and elasmobranchs encountered in SEAMAP-SA surveys) and a Turtle table (which houses life history and tagging information for sea turtles encountered by the Coastal Trawl Survey; Goal #1 final integration). These ancillary tables provide essential information on movements, longevity, and demographics for species of management interest.</li> <li>○ Inclusion of data and related code tables that are consistent with the current database structure, Darwin Core standards, and primary keys. User access to these tables is being designed in a manner consistent with access to other survey data to capitalize on existing programming. SCDNR data management staff are working with Axiom to develop Darwin Core headers and convert these tables to the new Darwin Core standards</li> </ul> </li> <li>● Support expansion of long-term living marine resource survey data availability in the SECOORA data portal. <ul style="list-style-type: none"> <li>○ SCDNR biologists are preparing and formatting new data for the existing tables already included in the SECOORA system and provide updates to Axiom. These updates include new sampling data, biological weights and lengths, hydrographic data, and updated ages and maturity.</li> </ul> </li> </ul>

Institution/Contractor	Status
Additional Observations Initiative <b>On-Track</b>	SECOORA hosted competitive mini-proposal opportunities in Year 5. <ul style="list-style-type: none"> <li>As mentioned on page 13, the <a href="#">SECOORA 2020 RFP to Enhance Regional Ocean Data Sharing</a> was released in September with proposals due October 31. Twelve proposals were submitted to the opportunity. SECOORA will fund 3 proposals. The award recipients are Joy Young (FACT Network), Natalie Nelson (NCSU), and Mary Conley (TNC).</li> <li>The <a href="#">SECOORA 2020 Request for Proposals to Fill Regional Product and Observational Gaps</a> was released in October with proposals due November 30. These proposals are being reviewed in December and award recipients announced in early January.</li> </ul>

**Goal 5: Initiate new operational products to meet additional user needs**

**Milestone A: Implement a HAB forecasting system for the WFS.**

Institution/Contractor	Status
Florida Fish and Wildlife Research Institute (FWRI) (Hubbard) <b>On-track but sampling cruises are working at reduced capacity</b>	<p>The bimonthly NOAA/AOML cruises that sample from Miami through the Florida Straits and along the WFS were temporarily paused through July due to Covid-19. Cruises were conducted in August and October but with a small science crew and reduced activities to allow for extra safety precautions. The red tide alga, <i>Karenia brevis</i>, was not prevalent during either survey. Remote sensing data was provided by USF prior to and during the cruises to allow for adaptive sampling and helped determine the final cruise plan. Short-term predictive forecasts provided by USF provided further informed cruise sampling and the understanding of the ocean circulation.</p> <p>An upswing in the number of locations reporting <i>K. brevis</i> cells and an increased concentration of cells occurred in southwest FL following the passage of Eta in early November. The December AOML survey and a modified plan to permit trace metal sampling will be conducted. It is anticipated that bloom levels (&gt;100,000 cells/L) will be observed during the December survey.</p>

**Goal 6: Continue building critical elements of the observing system by adding biogeochemical and marine sound sensors, and HFRs**

**Milestone A: Implement a regional ocean sound observing initiative to characterize and measure sources of sound production and establish acoustic baseline levels.**

Institution/Contractor	Status
Mote Marine Laboratory (Locasio) <b>On-Track</b>	<p>Continued review and classification of acoustic signals for black and red grouper to build training libraries for machine learning algorithm development. The majority of over 2,500 files were reviewed and classified/labeled by interns/volunteers. Approximately 30% of these were then reviewed by Dr. Locascio for quality assurance. Of these approximately 40% had partial or complete labeling errors. This varied somewhat based on call types. The high error rate reflects the learning curve associated with properly labeling fish vocalizations to level of accuracy required for ML/AI purposes. Dr. Locascio has been correcting and adding to this library and expects to be at the original goal of 2,000 qc'd calls by early 2021.</p> <p><b>Student engagement:</b> The graduate student engaged on the project has proposed the use of a transfer learning algorithm to use on the first batch of labeled files. The transfer learning algorithm will be used to detect calls and to an extent automate the library building process. She has communicated with Jesse Lopez, Axiom Data Science, who will assist with the planned AI work.</p>

**Milestone B: Install and operate new HFRs**

Institution/Contractor	Status
Florida Institute of Technology (FIT)/Lazarus <b>On-Track</b>	<p>FIT had to withdraw the request to deploy the HFR at Patrick Air Force Base as the Base would not allow FIT to position the antenna on or east of the dunes. Dr. Lazarus is working with Indian River County Parks personnel to establish an HFR location at Treasure Shores Park. A land use agreement between FIT and the Park has been signed. Final approval from the County is required before installation can begin. Environmental Compliance consultations have been completed. A second location at Hightower Park looks promising. The PI has been in touch with the park staff and is planning a site visit in mid-December.</p>
SkIO/Savidge <b>CNS – On-Track</b> <b>KSC – Delayed</b>	<p>Through the Fill the Gaps campaign, SkIO purchased two used WERA. SkIO will deploy the WERA at Kennedy Space Center (KSC) and Canaveral National Seashore (CNS) in FL. The required research permit for Canaveral National Seashore has been approved and the associated Environmental Compliance consultations have been completed. Site installation will begin in February 2021. KSC requires a land-use agreement between NOAA – NASA before an HFR can be deployed at this site. Oriana Villar, IOOS Regional Coordinator and John Hueckel, NASA KSC, are drafting the land-use agreement. The Environmental Compliance questionnaire for this site has been submitted to the IOOS office. At this time, the KSC site is delayed due to COVID-19. KSC is only allowing essential personnel so the land use agreement will not be signed until KSC allows access to the facilities.</p>
FAU HFR Support (Baxley) <b>Complete</b>	<p>All CODAR supply items requested by Dr. Baxley were purchased and shipped to FAU.</p>

**2) Scope of Work**

Scope of work is as described in the [Year 5 Statement of Work](#).

### 3) Personnel and Organizational Structure

Current lists of SECOORA Members and Board are available on our [website](#). Additionally, SECOORA personnel job descriptions and employee CVs are available on: <http://secoora.org/certification>.

### 4) Budget Analysis

SECOORA's October 31, 2020 financial report for Year 1 and 2 combined funds shows a budget balance remaining of approximately \$12,000. The October 31, 2020 financial report for Year 3 funds shows a budget balance remaining of approximately \$493K. The October 31, 2020 financial report for Year 4 funds shows a budget balance remaining of approximately \$2.4M. The October 31, 2020 financial report for Year 5 funds shows a budget balance remaining of approximately \$4M. We are within budget, although somewhat delayed with spending. SECOORA will be submitting a NCE in early January. SECOORA continues to receive invoices regularly from our sub-awardees and we process them during bi-monthly administration meetings. All invoices are paid within forty-five days. SECOORA continues to draw from ASAP monthly. As a reminder SECOORA pays out its monthly operational costs (i.e. payroll, etc.) and then conducts the ASAP draws in the middle of the following month for both the preceding month's operational expenses and the sub-awardee invoices.