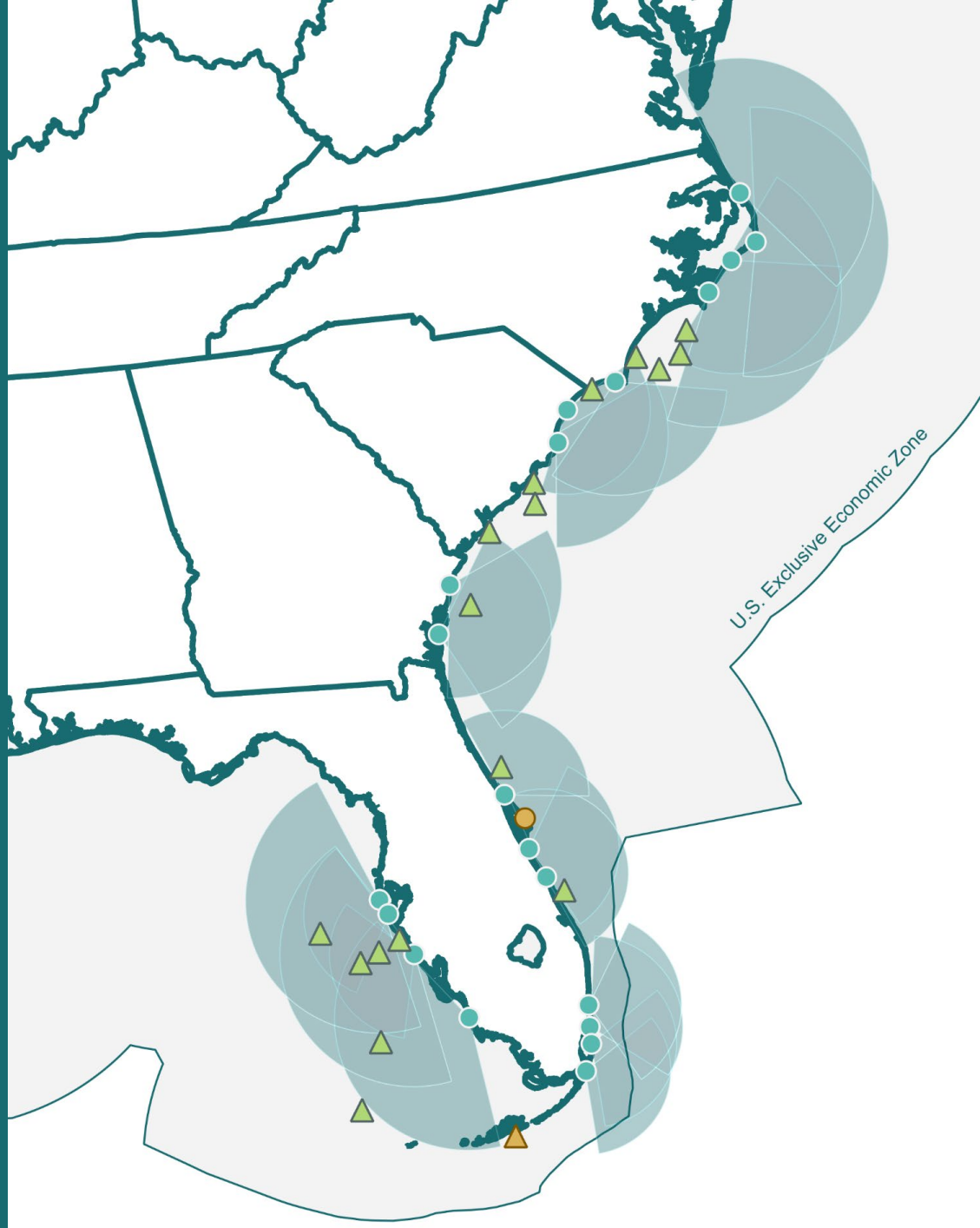
2024 Annual Meeting
HFR Lightning Talk

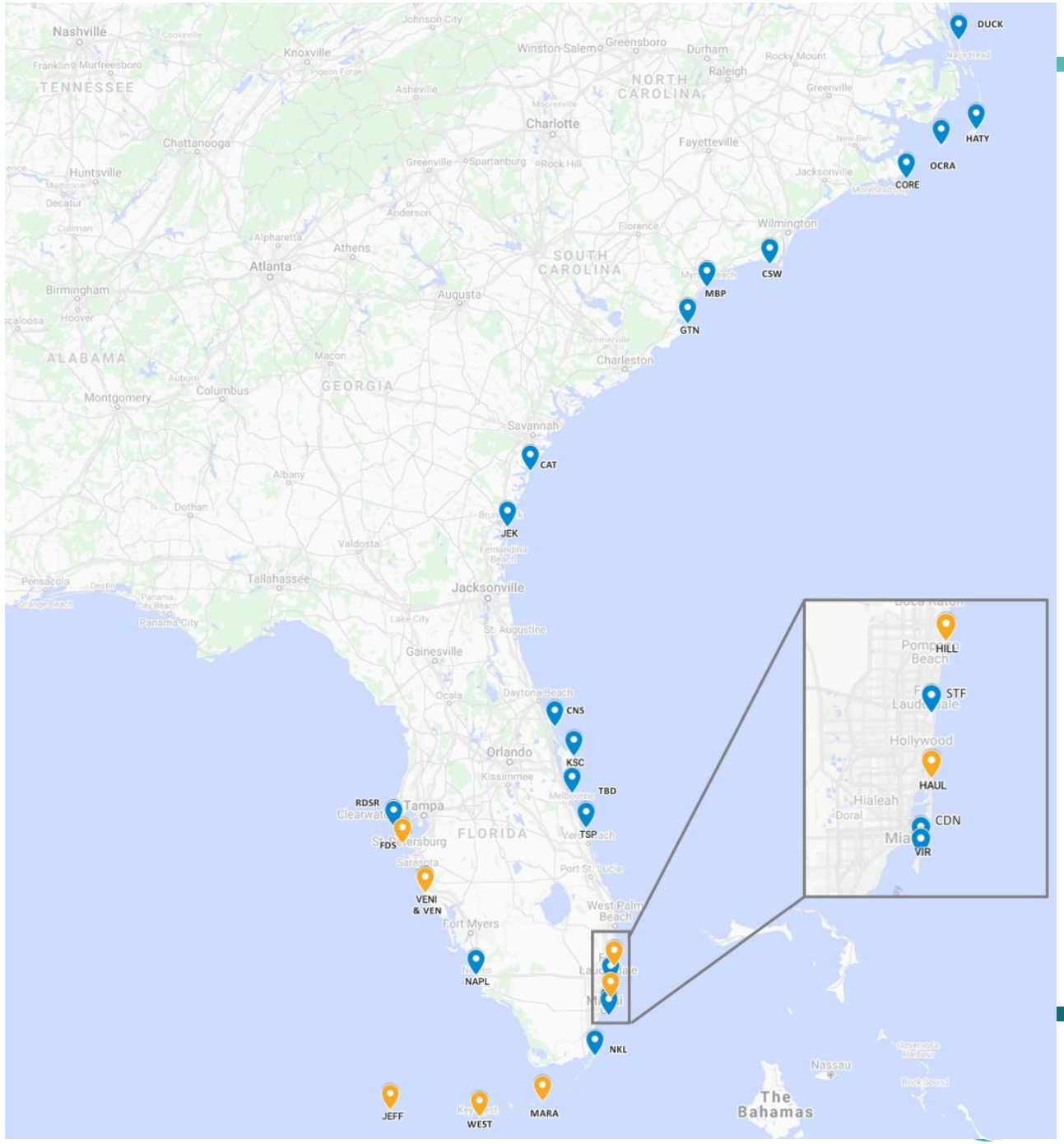
PI - Clifford R. Merz, PhD, presenting on behalf of the SECOORA HFR network

University of South Florida
May 7, 2024
Charleston, SC



SECOORA HFR Operators

Operator	HFR System	Number in operation
Coastal Studies Institute & UNC Chapel Hill	CODAR	4 in NC
University of South Carolina	WERA	1 in NC; 2 in SC
Skidaway Institute of Oceanography	WERA	2 in GA; 2 in FL
Florida Institute of Technology	WERA	2 in FL
University of Miami	WERA	4 in FL
University of South Florida	CODAR & WERA	2 WERA & 6 CODAR in FL
Total:		20 SECOORA supported; 5 USF unsupported = **25 HFR**



HFR installations

- Blue dots represent SECOORA funded HFR
- Yellow dots are non-SECOORA funded HFR
- There are still major gaps in coverage in all 4 states

Accomplishments

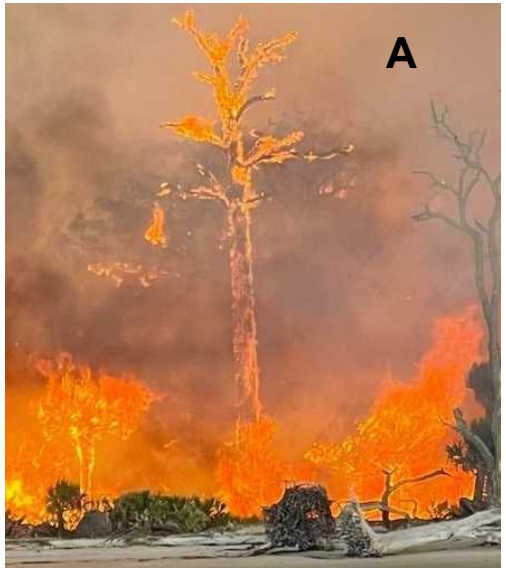
During 2021-2026 period, the HFR team has installed 9 HFR:

- **UofSC** installed the Myrtle Beach State Park WERA (2021)
- **UM** installed the North Key Largo WERA (2021)
- **SkIO** installed the Canaveral National Seashore WERA (2022) and currently installing the Kennedy Space Center WERA
- **FIT** installed WERA at Treasure Shores Park WERA (2022) and Hightower Park (2024)
- **CSI/UNC** moved the DUCK CODAR to Jennette's Pier in Nags Head, NC to improve coverage (2023)
- **USF** has installed CODAR to cover the Florida Straits: Marathon (2019); Key West (2022); Fort Jefferson, Dry Tortugas(2024) – installation funding provided by NASEM

Accomplishments

- **USF** (Ft. Jefferson): Installation of a new, custom, low power Seasonde CODAR with Starlink satellite communications and a CODAR single Transmit/Receive antenna. Same T/R used at Key West & Naples.
- **CSI/UNC**: NSF award to reprocess ~20 years of surface current data off the NC Outer Banks for algorithm development which will be incorporated into a Gulf Stream nowcast product.
- **UM**: Working with Miami Navy facility, integrating an X-Band radar measurement with WERA measurements for currents and waves.
- **FIT/SkIO**: New staff and students gain experience with HFR installation and O&M; participating in upcoming ROWG meeting to connect with other operators
- **UofSC**: Machine learning has been tested as a method for finding and correcting for the effect of Stokes drift on HFR derived surface velocities

Challenges



A. Wildfire that destroyed the CAT HFR on St. Catherines Island, GA; B. Corrosion issues have impacted several HFR installations in FL; C. Coyote trapping on top of HFR cables in Georgetown, SC; D. Hurricane Ian coastal beach erosion

Looking Ahead

- BIL funding is supporting HFR recapitalization. Years 1 & 2 focused on CODAR recap for USF and CSI/UNC.
- On-going funding challenges:
  - HFR have expanded in the SE; however, funding has not increased to support the existing network
  - 7 unfunded sites – 2 FAU operated; 5 USF operated– each site fills a gap location in the SECOORA HFR Plan
- Operational challenges: maintaining real-time uptime with the ongoing issues of severe weather-related damage, troubleshooting, and repairing aging HFR systems (some dating back to 2003).
- Continued testing Stokes drift effect on HF radar measurements using in-situ near surface velocities using an Autonomous Surface Vehicle.
- Evaluating twin TX antennas at HATY and JENN to see if range is boosted.