



Gray's Reef National Marine Sanctuary Update

Coastal Georgia Colloquium '24

October 15-16, 2024

Skidaway Institute of Oceanography, Savannah, Georgia

Designated in 1981



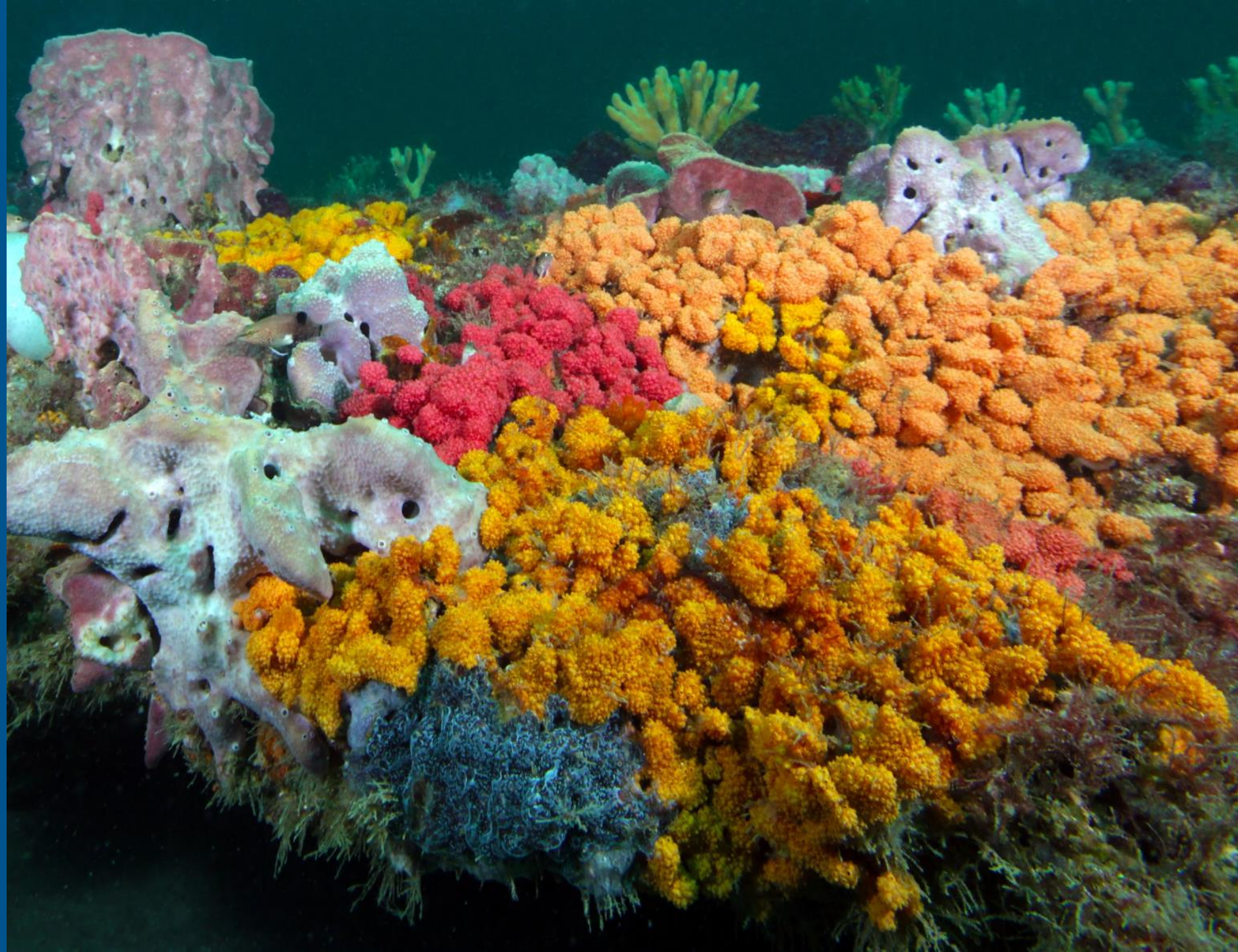
Under the Authority of Title III of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, (the Act), the waters and the submerged lands thereunder at Gray's Reef in the South Atlantic Bight off the coast of Georgia are hereby designated a National Marine Sanctuary for the purposes of:

- (1) Protecting the quality of this unique and fragile ecological community;
- (2) promoting scientific understanding of this live bottom ecosystem; and
- (3) enhancing public awareness and wise use of this significant regional resource.



Live-Bottom

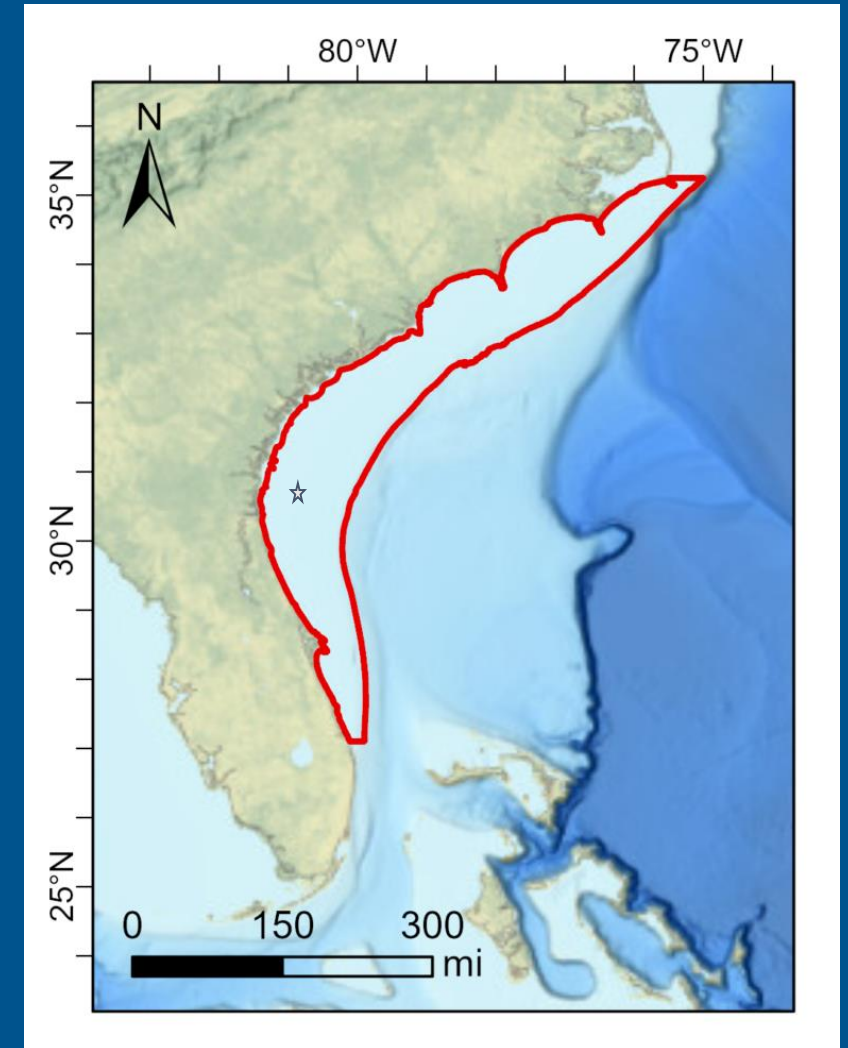
Unlike coral reefs that build on other corals, in live-bottom habitats sponges, tunicates, and corals attach to rocky outcrops to form a carpet of invertebrates



Extent of Live-Bottom

A recent study concluded that natural reefs constitute approximately 2.6 percent (just over 2,590 sq km (about the size of Rhode Island) of the South Atlantic Bight (103,220 sq km) between 10 and 200 m depth.

GRNMS is 57 sq km (22 sq mi) which equates to approximately 2.2 percent of estimated live bottom in the South Atlantic Bight.



Citation: D.N. Steward, A.B. Paxton, N.M. Bacheler, C.M. Schobernd, K. Mille, J. Renchen, Z. Harrison, J. Byrum, R. Martore, C. Brinton, K.L. Riley, J.C. Taylor, and G.T. Kellison. 2022. Quantifying spatial extents of artificial versus natural reefs in the seascape. *Frontiers in Marine Science* 9: 980384. DOI: 10.3389/fmars.2022.980384.

Map of the study region from Cape Hatteras, NC to St. Lucie, FL. Artificial versus natural reef extents were compared across the whole region and also by depth and by state. Basemap credit: GEBCO / NOAA NCEI. Adapted from Steward et al. 2022.

Extent of Live-Bottom

Locations of artificial reefs (A) and natural reefs (B–D) along the southeastern US continental shelf.

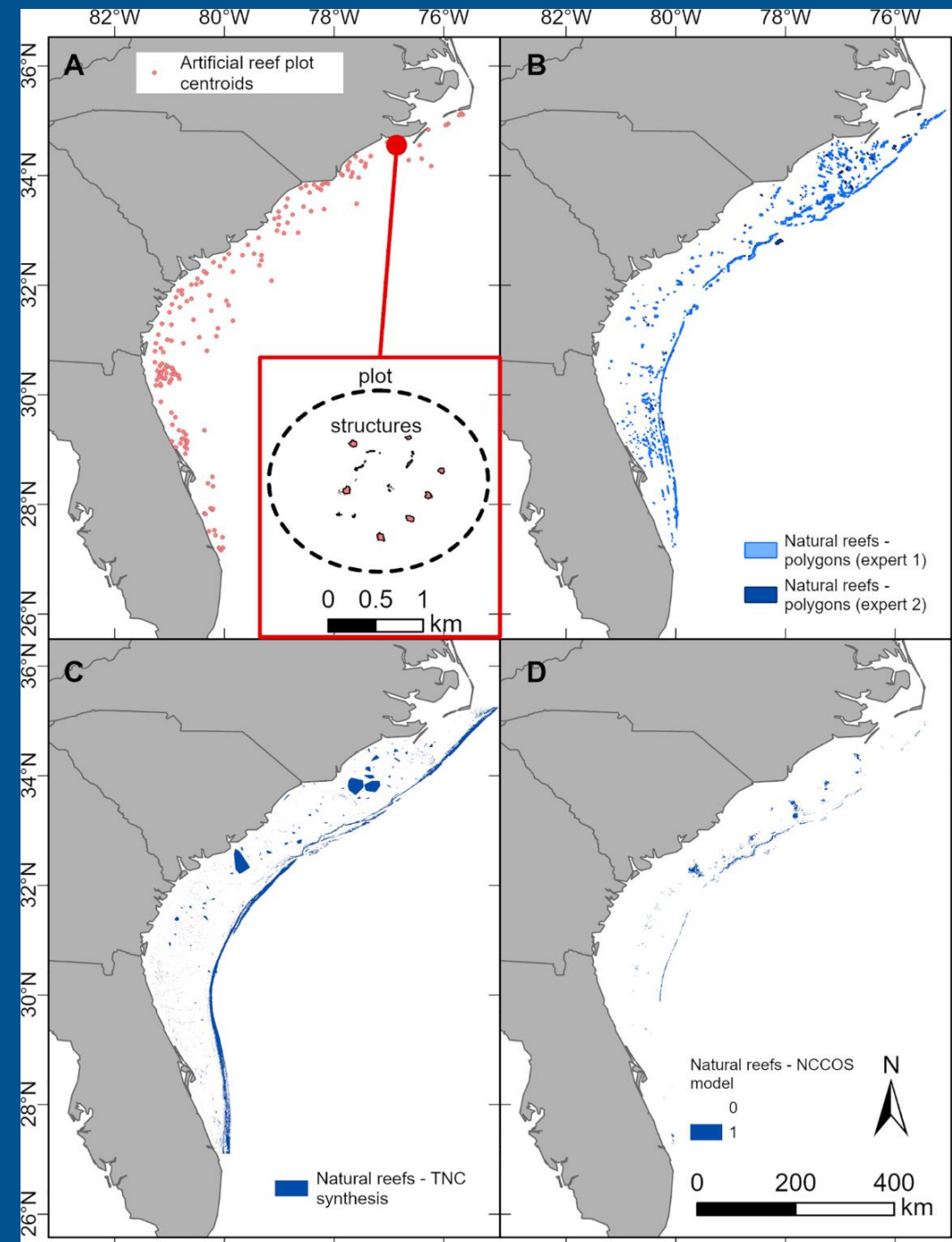
(A) Artificial reef locations correspond to centroids of permitted artificial reef plots, and the size of the artificial reef dots corresponding to each plot is not to scale. The inset in panel A depicts one NC artificial reef permitted plot (dashed line) and the artificial reef structures (red polygons) within.

(B) Natural reefs delineated by expert-drawn polygons.

(C) Natural reefs predicted by the TNC synthesis.

(D) Natural reefs predicted by the NCCOS model (likelihood >0.63).

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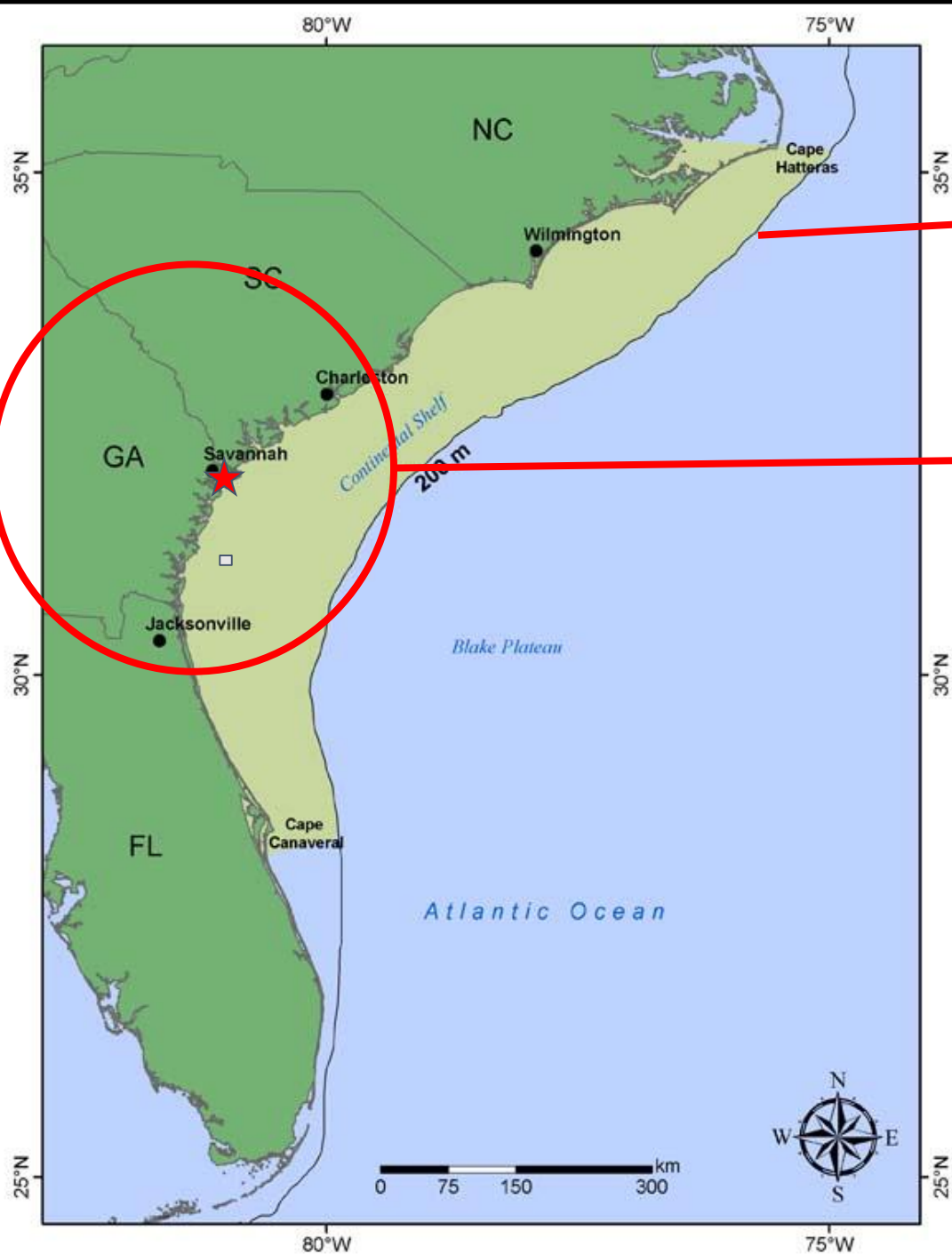
Where we work

South Atlantic Bight / Carolinian EcoRegion ($\leq 200\text{m}$ depth)

- Ecological Connectivity
 - Live-bottom habitats
 - Pelagic habitat
 - Salt marsh and estuaries

Core geographic area (Research and Monitoring, Education & Outreach)

- Charleston
- Columbia
- Atlanta
- Athens
- ★ Savannah (Headquarters)
- Brunswick, Darien
- Jacksonville / St Augustine



Scientific Research and Monitoring

GRNMS and Beyond

Vessel-based Research & Monitoring



NOAA Ship Nancy Foster

FY25 Expedition Planning Underway



Significant Yard Work in FY24 R/V Sam Gray



Decommissioning in FY25 R/V Joe Ferguson

R/V Gannet

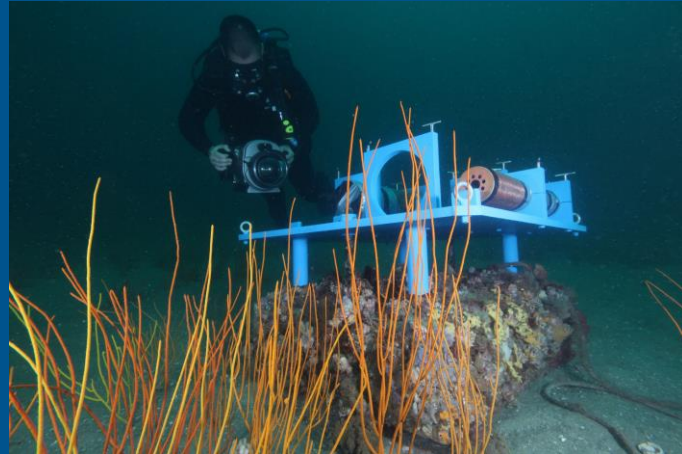
FY25 Sea Days Available



Technology in the Sanctuary



NOAA Data Buoy 41008



Seafloor Platform



Slocum Glider



Glider and
Saildrone
working together

Gray's Reef NMS is a sentinel site for Ocean Acidification

Ocean Acidification

Gray's Reef National Marine Sanctuary

The burning of fossil fuels continues to increase the amount of atmospheric carbon dioxide.

CO₂ production



CO₂ uptake

During winter months, Gray's Reef becomes a carbon dioxide sink, taking in excess carbon dioxide from the atmosphere. In the summer, the warm coastal waters release carbon dioxide into the atmosphere, making Gray's Reef a carbon dioxide source. Overall, the ocean takes up more carbon dioxide than it releases.

CO₂ winter

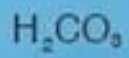
CO₂ summer

Every 24 hours the NOAA buoy transmits carbon dioxide levels in the air and water, and temperature which are used in monitoring ocean acidification.

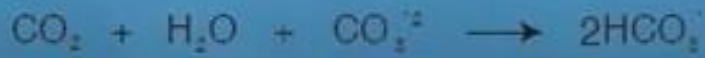


When taken up into the ocean, carbon dioxide reacts with water to form carbonic acid.

An increase in hydrogen ions causes the pH of ocean water to decrease, and the ocean becomes more acidic.



Carbonic acid then breaks down to form hydrogen ions and bicarbonate.



Excess carbon dioxide reacts with both water and pre-existing carbonate to form additional bicarbonate.

As the amount of carbon dioxide in the atmosphere rises, larger amounts will be taken up by the ocean. This causes more hydrogen ions to be produced which will acidify the ocean. The carbonate consumed when bicarbonate is produced decreases the amount of carbonate available to organisms that use carbonate to build their shells.

Calcium from the water combines with carbonate to form calcium carbonate, the main building block of shells and coral skeletons.

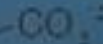
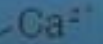


Illustration by © American Coastal Under the Sea and Sea Grant The University of Georgia, 2014

Understanding Fish Movement & Migration

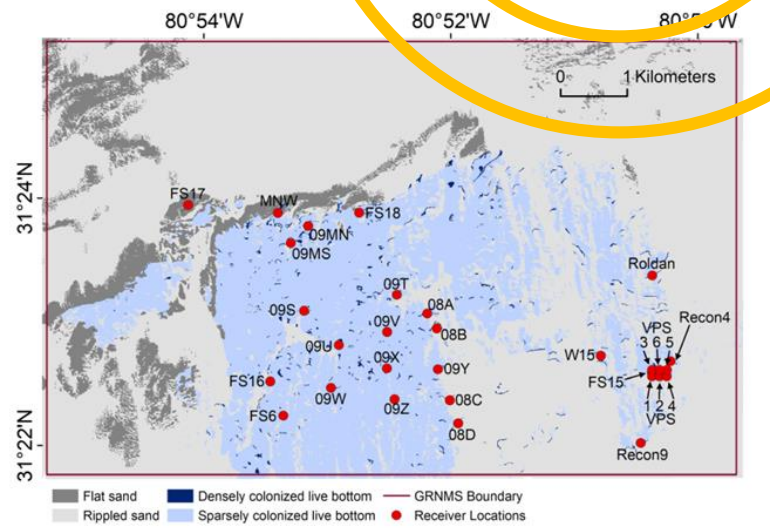
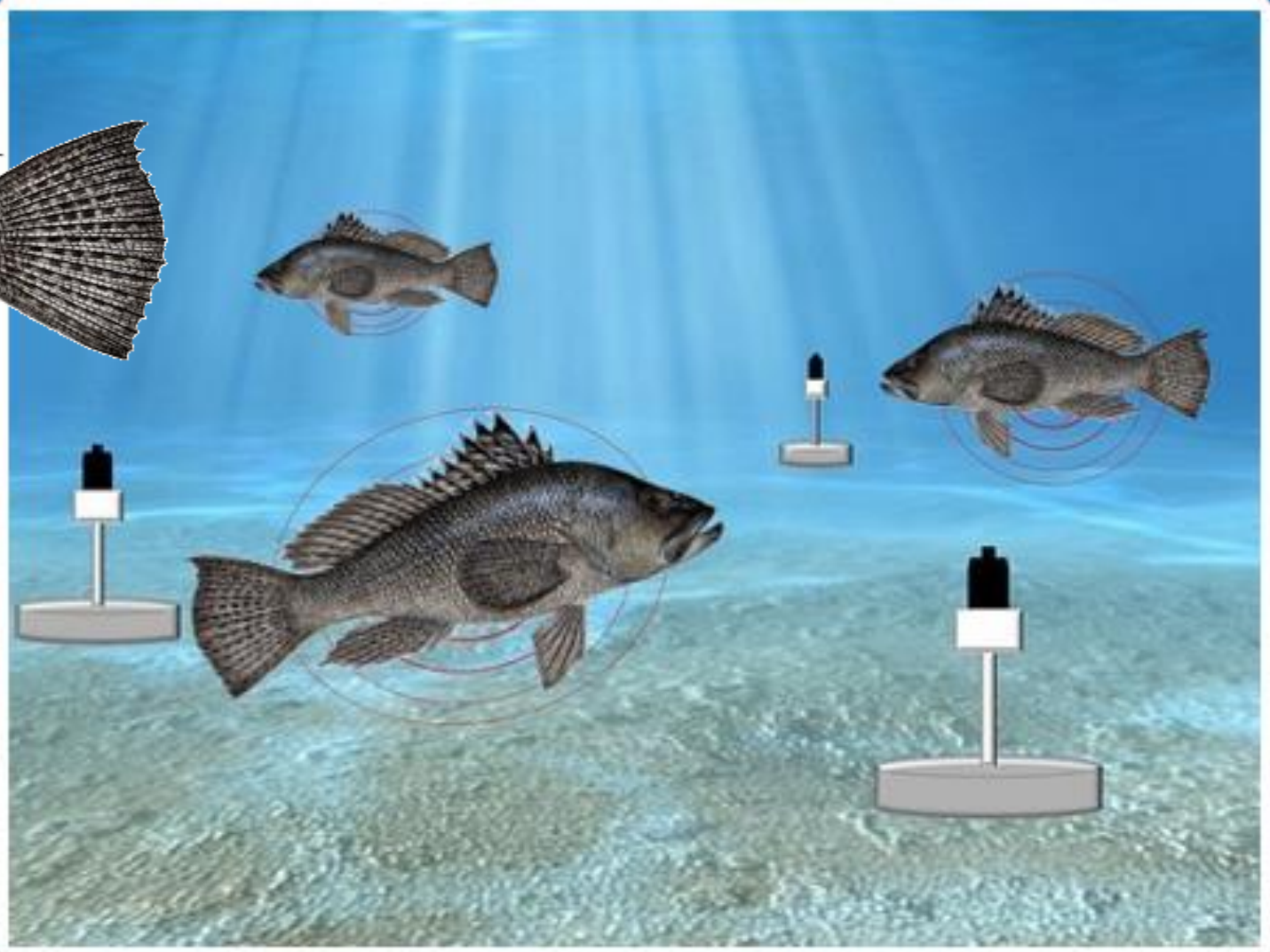
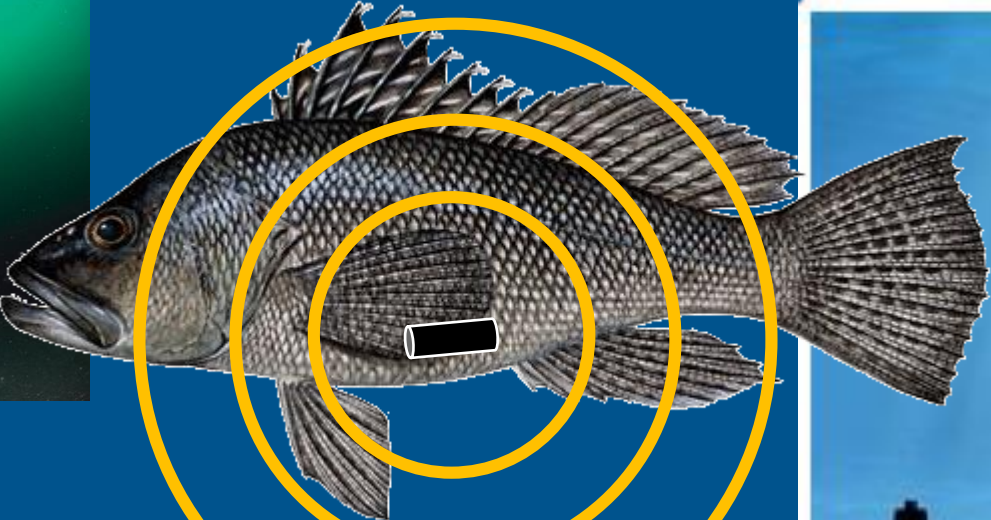
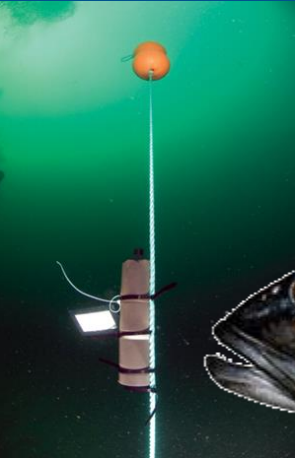
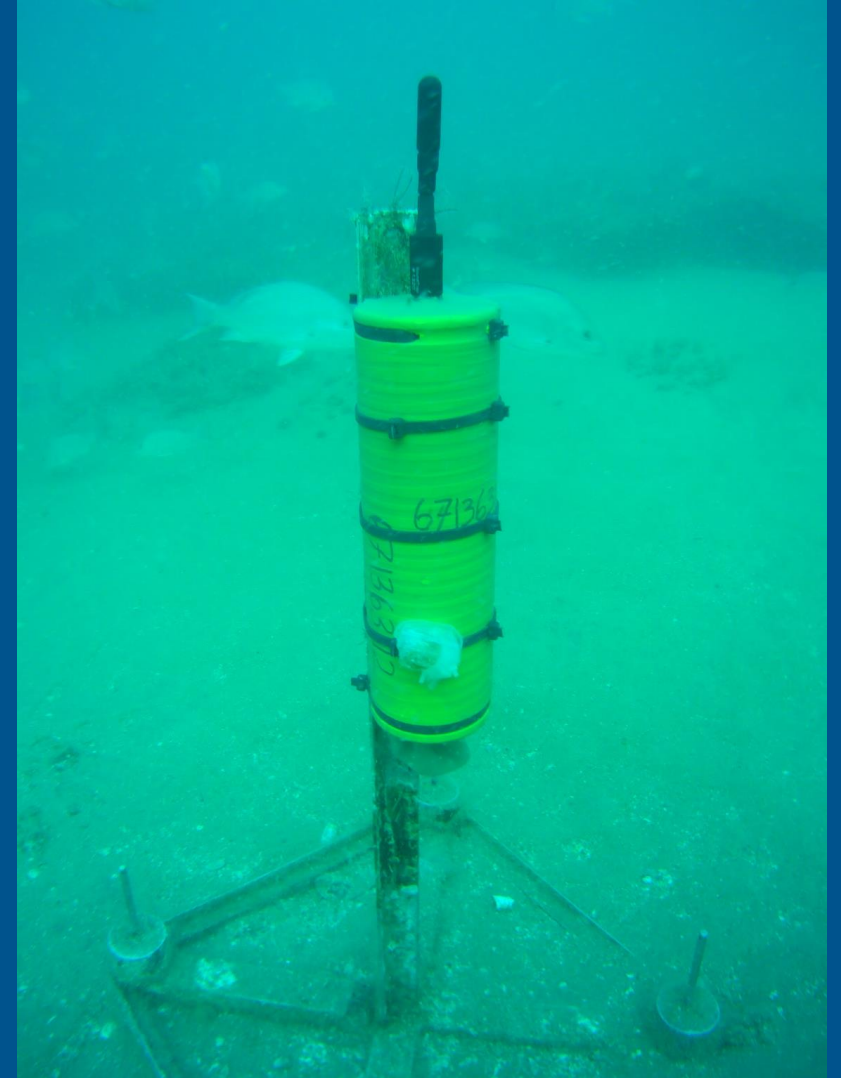
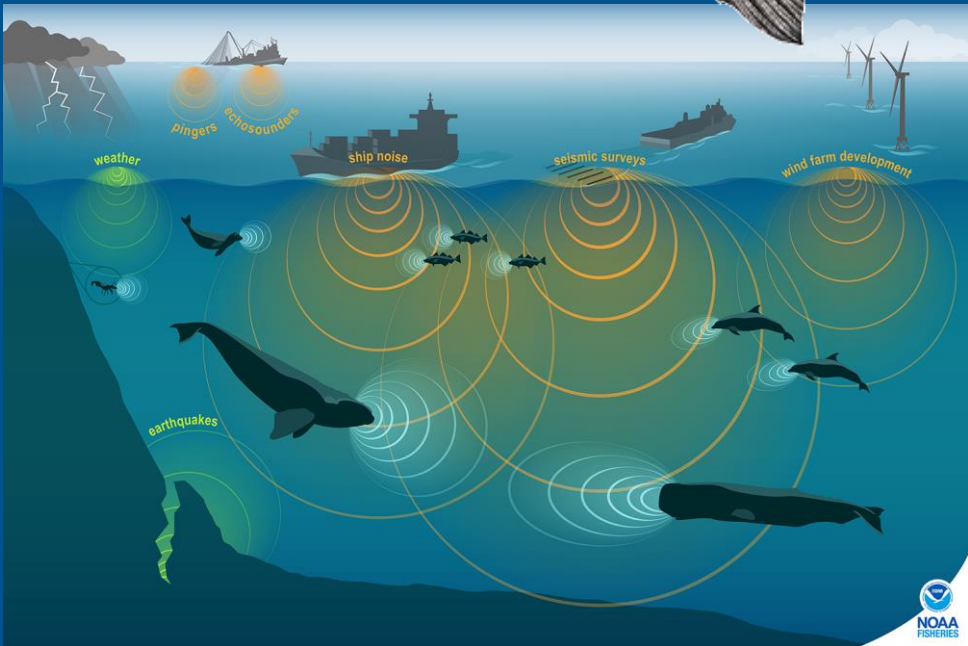


Figure 1.2. Map of substrates and acoustic receiver locations at Gray's Reef. Substrates originally mapped by Kendall et al., 2005.

Ocean Soundscape (Passive Acoustic Monitoring)



Long-term Monitoring Strategy

R/V Gannet

- Smaller-scale mapping and habitat (<200m)
- Sessile Community/Invertebrate Monitoring
- Fish Monitoring
- Fish Telemetry Studies
- Passive Acoustic Monitoring (Soundscape)
- Ocean Acidification Sentinel Site
- Water Quality
- Pollutants
- Micro-Plastics
- Marine Debris
- GRNMS seafloor platforms
- Glider Deployments



NOAA White Ships

- Benthic Mapping >30m - Blake Plateau
- Habitat Characterization across SAB
- Specific Research Expeditions
- ROV deployments (>30m)
- Multi-sanctuary missions



FY25 Federal Funding Opportunity!

NOAA-NOS-NCCOS-2025-28604

2025 Regional Ecosystem Research (RER) Program:
Understanding Species' Habitat Usage and Connectivity in and around Marine Protected Areas



<https://grants.gov/search-results-detail/356666>

Regional Ecosystem Research Program Announces FY25 Federal Funding Opportunity

📅 Published on: 10/09/2024

Research Area(s): Marine Spatial Ecology / Regional Ecosystem Science; Other Topics / Funding, Sponsored Research

Primary Contact(s): kimberly.puglise@noaa.gov

The NCCOS Competitive Research Program, in cooperation with NOAA's Office of National Marine Sanctuaries and National Marine Protected Areas Center, is pleased to announce its Fiscal Year 2025 Notice of Funding Opportunity (NOFO) for the [Regional Ecosystem Research \(RER\) Program](#).

Marine protected areas (MPAs) have been used as one of the main tools to protect significant natural and cultural resources within the marine environment for the benefit of present and future generations. While the use of MPAs and MPA networks as resource management tools has grown significantly in recent decades, there is still substantial scientific investigation needed to improve MPA stewardship and effectiveness.

For an MPA or MPA network to meet its intended purpose, it is imperative that it encompass the habitat requirements for key species, taking into account the species' home range, site fidelity, and ontogenetic patterns of habitat use. The RER Program is soliciting proposals to understand species' habitat usage and connectivity in and around MPAs. This information will be used to improve the ability of resource managers to address habitat connectivity, species' habitat affinities, and spatial and temporal usage of habitats in management plans for MPAs. Selected projects will help support national and global commitments to effectively conserve 30% of marine and coastal areas, especially areas of particular importance for biodiversity and ecosystem functions and services, by 2030.

NCCOS expects to fund two projects for up to four years in duration, with an approximate annual budget for each project up to \$500,000, not to exceed \$2,000,000 per project. The deadline for full applications is January 23, 2025 at 11:59 p.m. Eastern Time. [View the full NOFO here.](#)



A Gopher rockfish (*Sebastes carnatus*) in the foreground near a white-spotted anemone (*Urticina lofotensis*) with vertical relief at the Outer Pinnacles. Credit: Chad King / NOAA MBNMS

Resource Protection & Management

South Atlantic Bight

Plan, Do, Check, Act

Condition Reports: Assess current conditions



Management Plans: set management strategies



Climate Vulnerability Assessments:
Assess climate vulnerabilities

Assessing the Condition of Resources



- Peer Review Completed
- Anticipated Publish: Late Winter 24/25

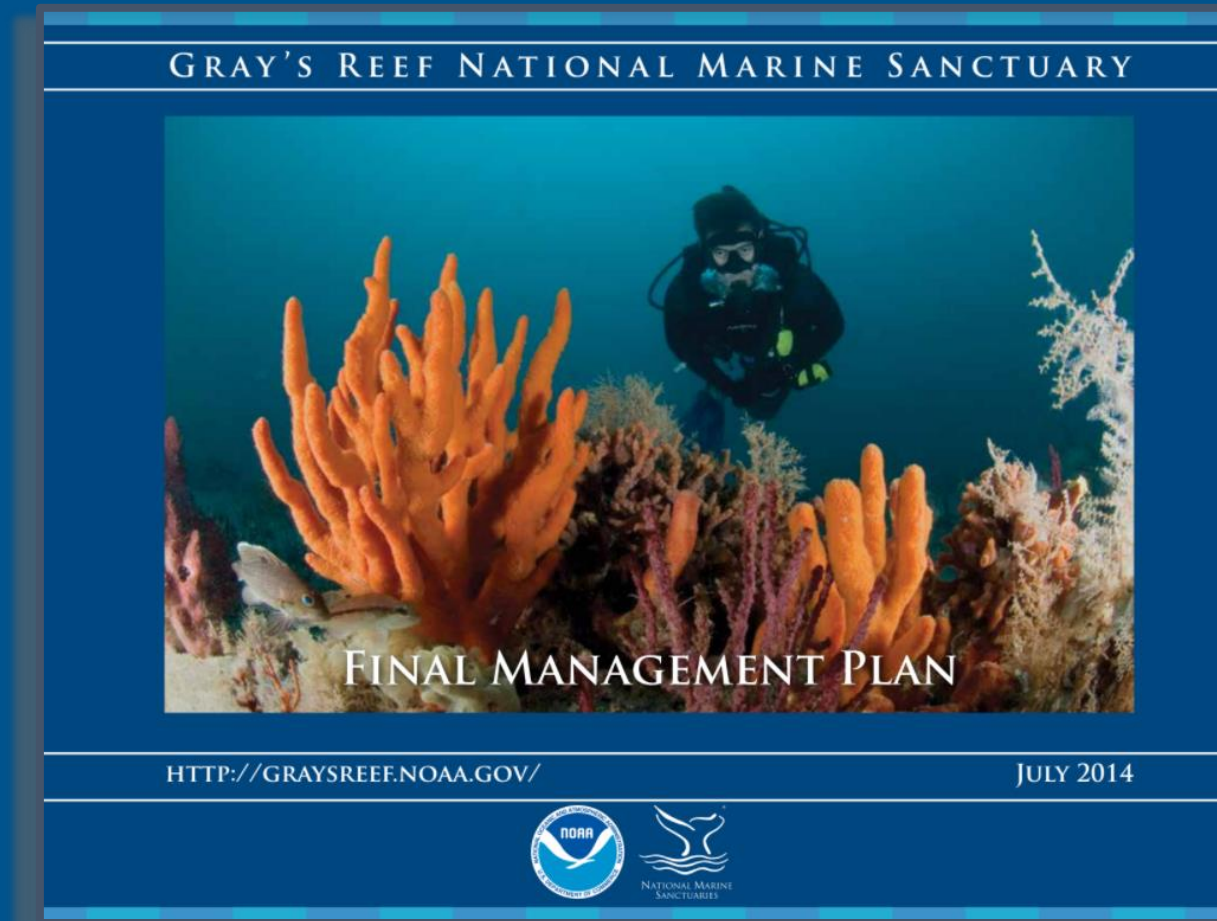
Condition Reports provide a summary of resources in each sanctuary, pressures on those resources, the current condition and trends, and management responses to the pressures that threaten the integrity of the marine environment.

Specifically, the reports include information on the status and trends of water quality, habitat, living resources and maritime archaeological resources and the human activities that affect them.

GRNMS Management Plan Review & Update

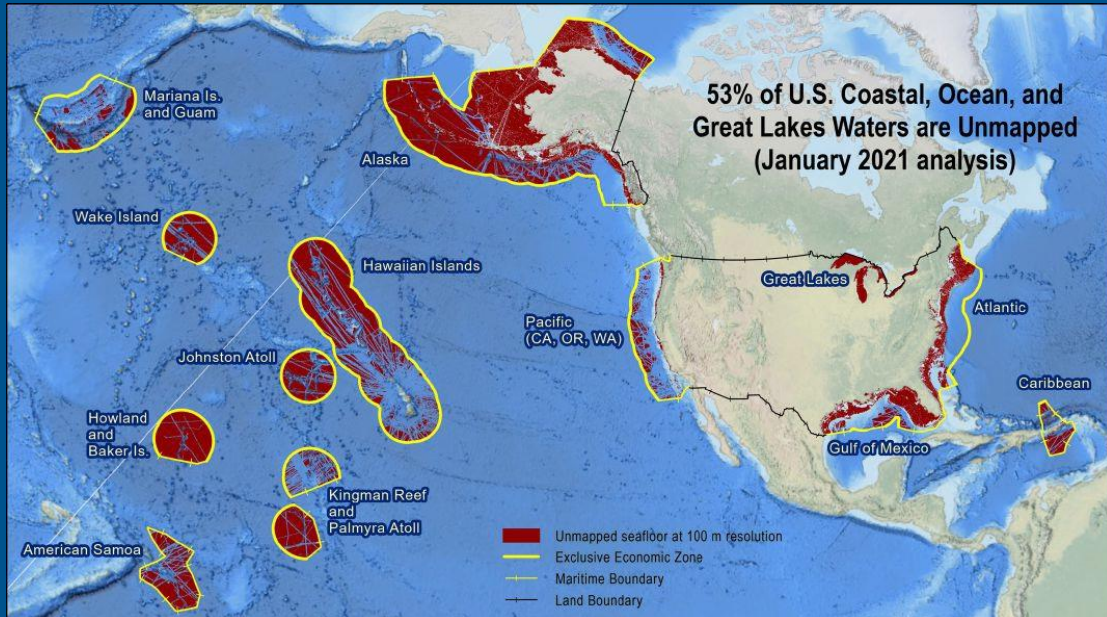
- GRNMS will initiate scoping for the review and update of the 2014 Management Plan in FY25.
- 30X30 a major consideration

- Scientific Research
- Resource Protection
- Education & Outreach

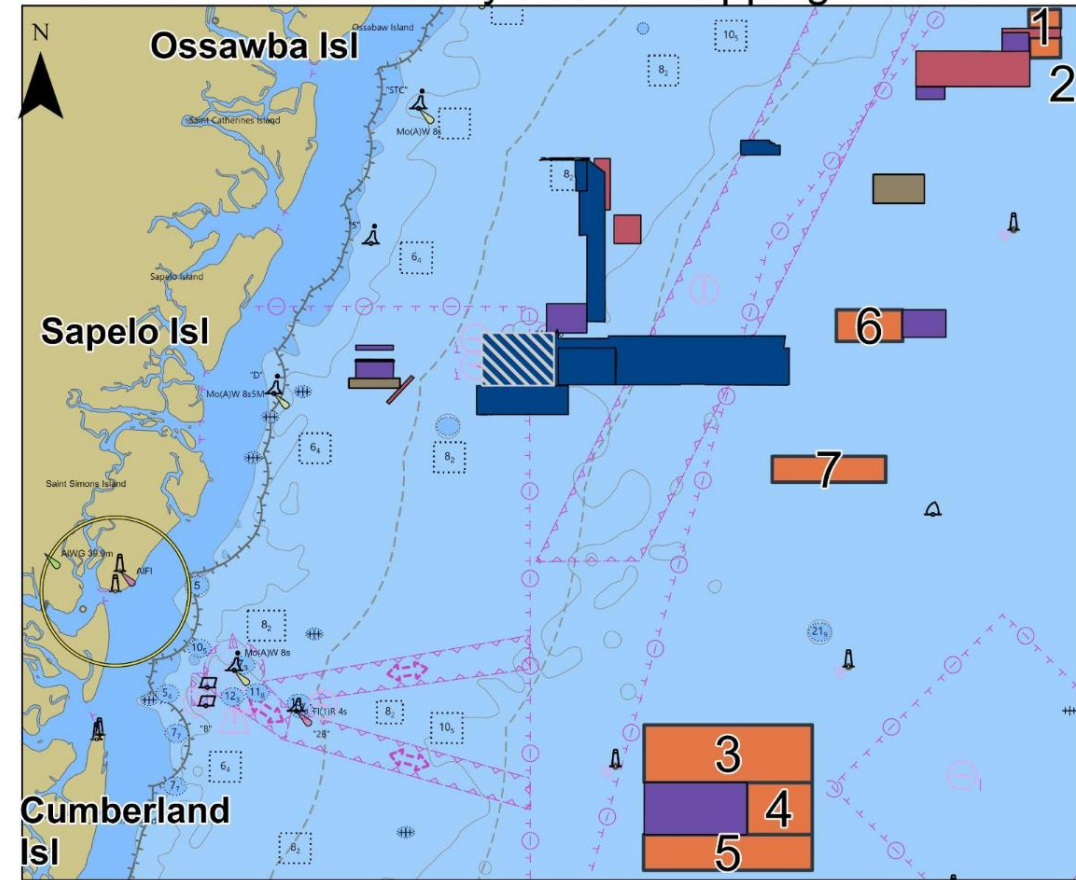


Mapping and Characterizing Habitats

Gray's Reef NMS is mapping the seafloor along the South Atlantic Bight and Characterizing Benthic Habitats



2024 GRNMS Nancy Foster Mapping Priorities

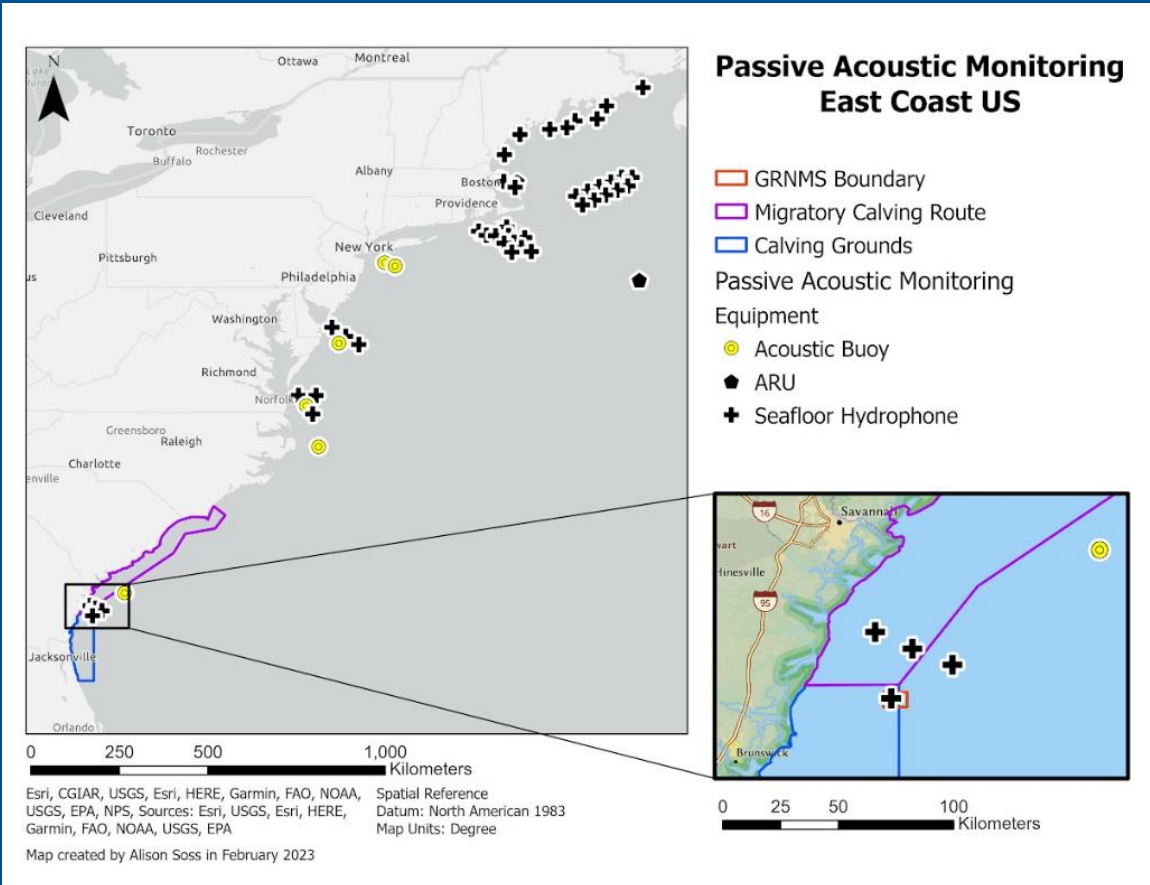
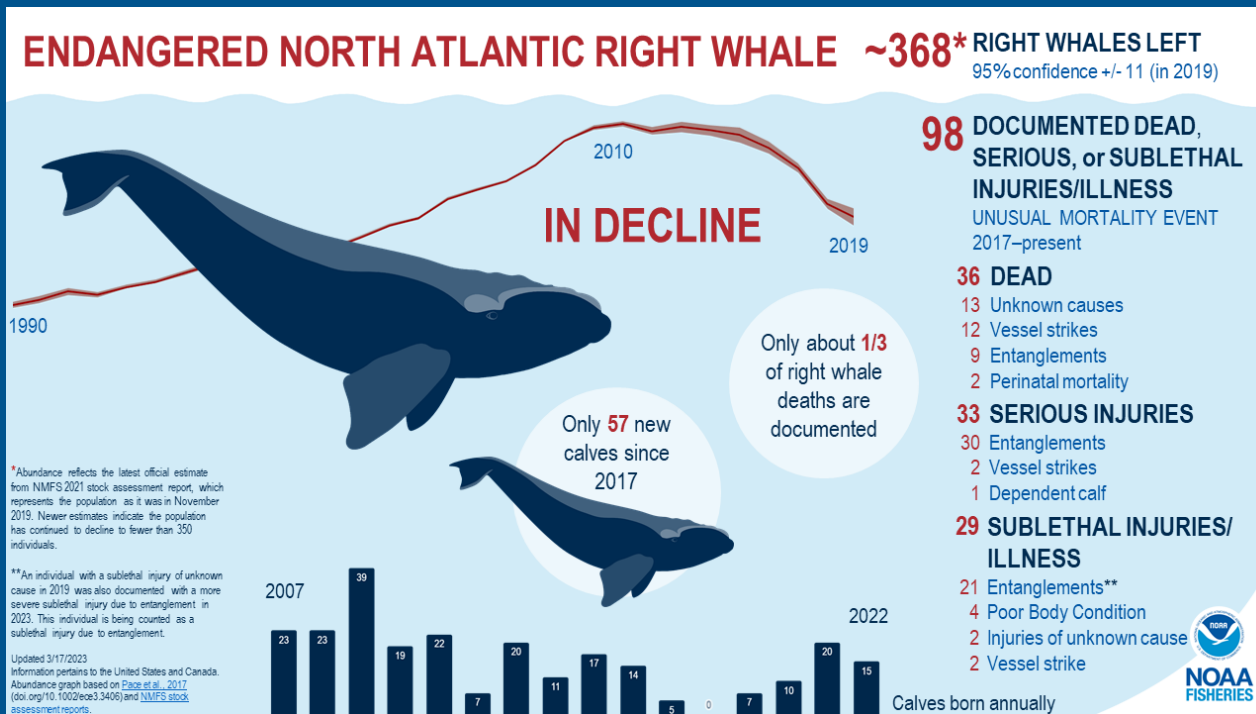


Area Name	Min Depth (meters)	Max Depth (meters)	Areas (km ²)	Latitude DDM	Longitude DDM
1	22	27	8.83	31 45.403113538N	80 12.707553710W
2	29	29	9.43	31 44.753560379N	80 12.669527445W
3	22	27	145.92	30 55.353143236N	80 42.781912790W
4	31	33	51.46	30 55.331555688N	80 34.870609338W
5	25	33	90.65	30 51.885750075N	80 42.850685974W
6	21	33	31.73	31 44.51516N	80 46.632389W
7	23	35	44.5	31 28.36520N	80 5468178W

Recovery of North Atlantic Right Whales



Gray's Reef NMS lies within the Southeast U.S. Calving Grounds



Detection of North Atlantic Right Whales

GRNMS in partnership with the National Marine Sanctuary Foundation is planning to potentially expand ongoing work between Woods Hole Oceanographic Institution (WHOI) and the CMA CGM Group to increase right whale detection efforts along the U.S. East Coast. Funding through NMSF will hopefully deploy additional near real-time passive acoustic monitoring buoys off the Southeast Coast.

Locations off the coast of Norfolk and Savannah were chosen for the new systems because the ports are among the busiest in the United States, which often puts ships directly in the path of migrating whales. The new buoys will fill a critical gap in monitoring along the East Coast.

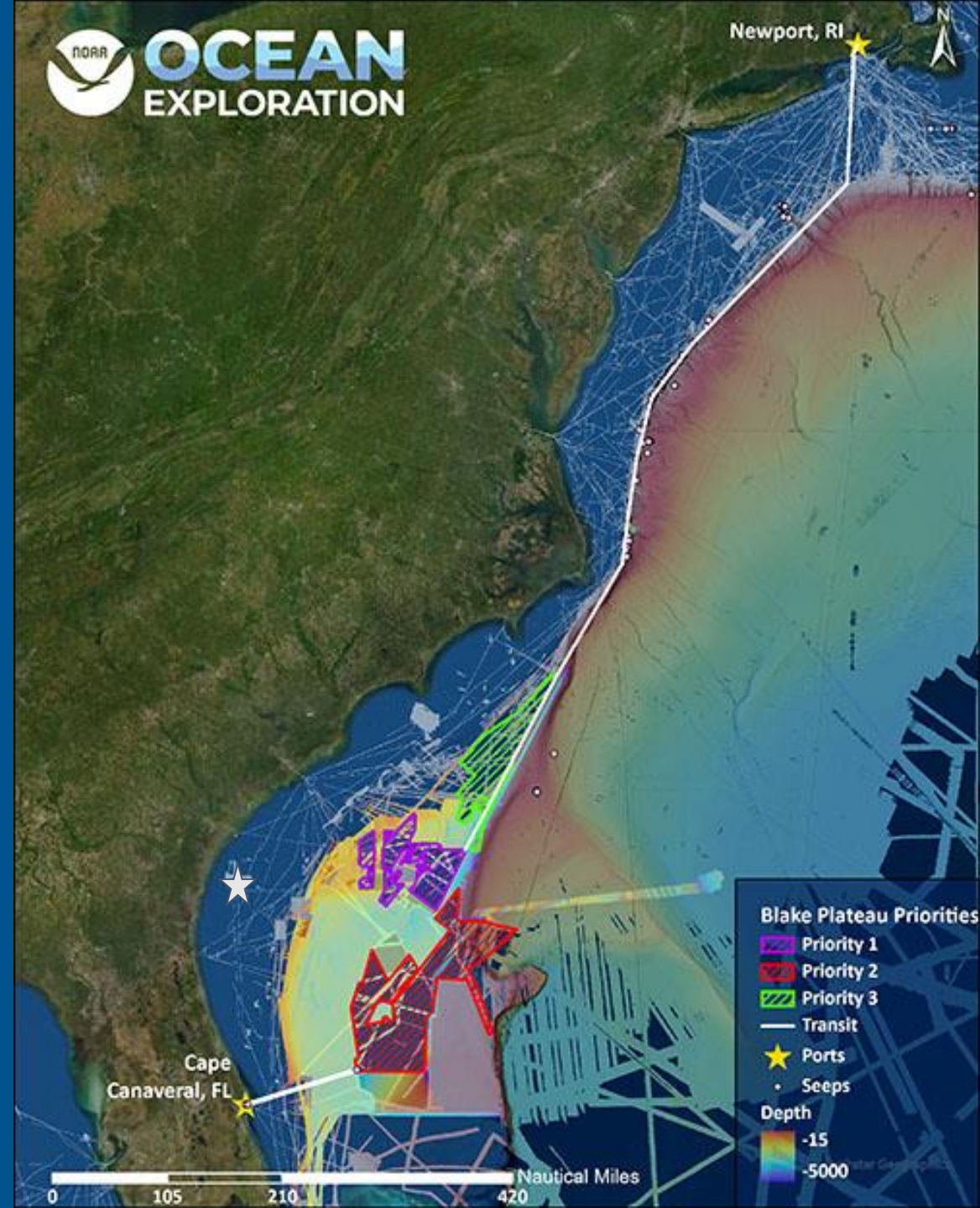
CMA CGM Group



Photo Provided by:
CMA CGM Group

The Blake Plateau

- NOAA Ocean Exploration and partners have conducted focused expeditions on the Blake Plateau region off the southeastern U.S. coast for the past several years.
- These efforts have documented the most extensive continuous cold-water coral mound reef ecosystem yet discovered in the world and have provided high-resolution imagery of the seafloor as well acoustic backscatter information about the seabed and water column.
- With these upcoming expeditions, NOAA Ocean Exploration and partners from the U.S. Geological Survey and the Bureau of Ocean Energy Management hope to complete mapping of the deepwater (greater than 200

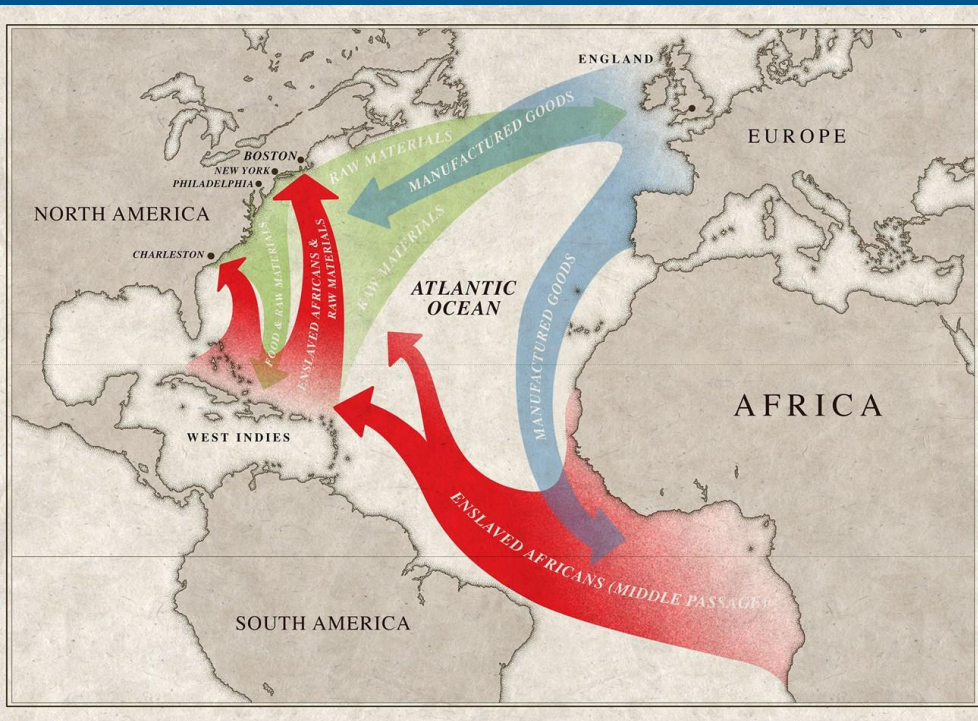


Dense thickets of the reef-building coral *Desmophyllum pertusum* (previously called *Lophelia pertusa*) make up most of the deep-sea coral reef habitat found on the Blake Plateau in the Atlantic Ocean. The white coloring is healthy – deep-sea corals don't rely on symbiotic algae, so they can't bleach. Images of these corals were taken during a 2019 expedition dive off the coast of Florida. Image courtesy of NOAA Ocean Exploration, Windows to the Deep 2019.

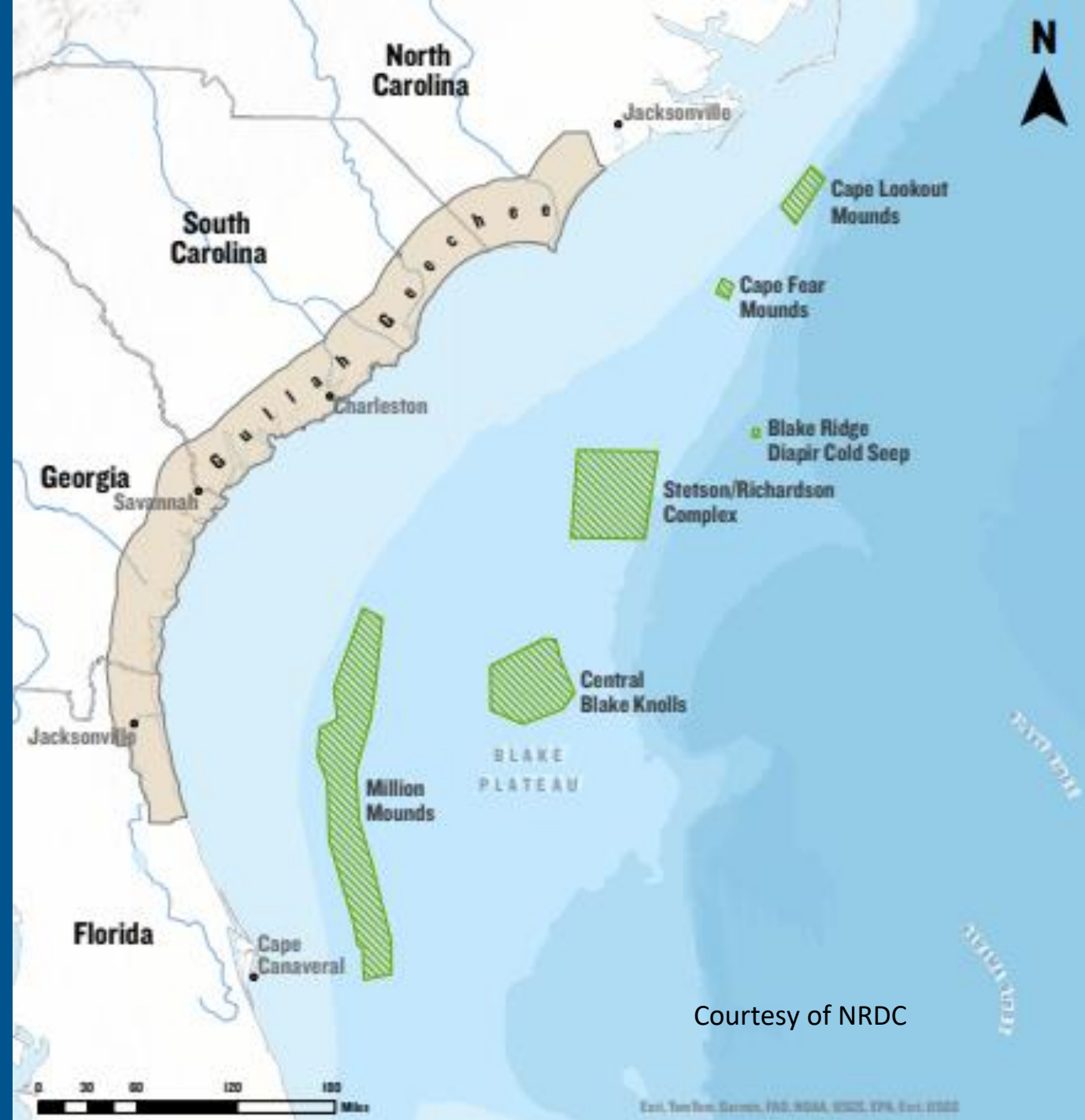


The Blake Plateau

The map indicates key areas of ecological interest along the Blake Plateau for conservation and protection also showing the Gullah-Geechee Heritage Corridor.

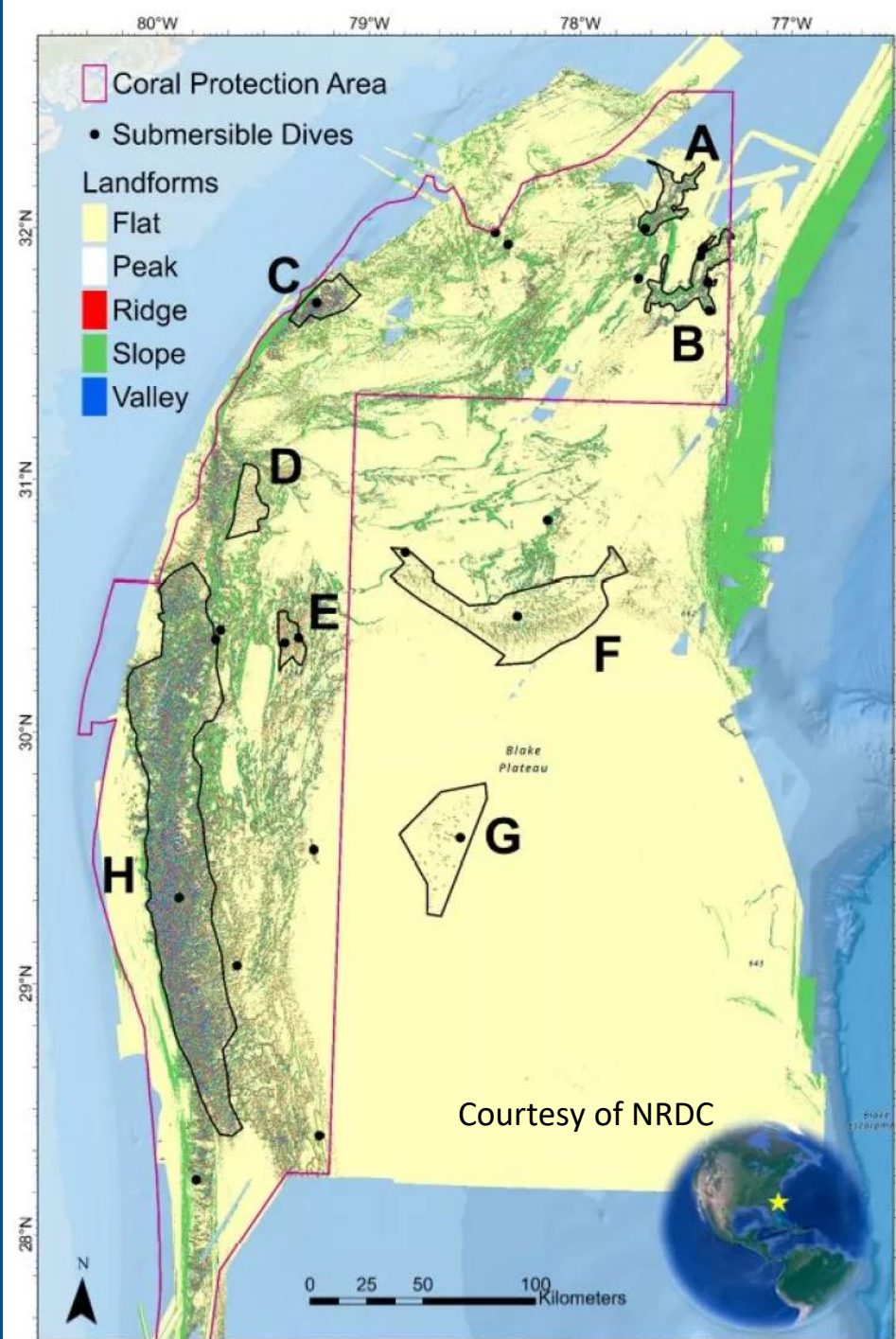


Map showing the primary movement of Enslaved Africans, raw materials, and manufactured goods. Courtesy of NPS.



The Blake Plateau

Geomorphic landform overview map with subregions labeled A–H: Jellyfish Mounds (A); Richardson Mounds (B); Streamlined Mounds (C); Ripple Mounds (D); Mini Mounds (E); Pinnacle Mounds (F); Sparse Mounds (G); and Million Mounds (H). All subregions contain CWC mound features. Black circles show the location of submersible dives with video footage of the seafloor used to ground-truth substrates. The yellow star on the inset map represents the location of the Blake Plateau adjacent to the southeast U.S. coastline. | Geomatics 2024



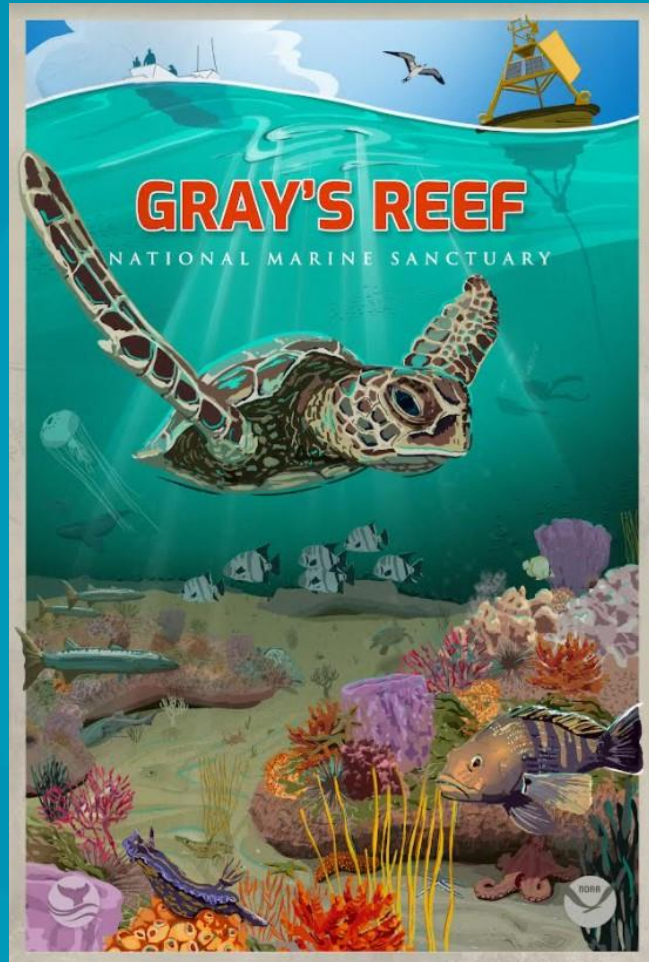
Education & Outreach

New Exhibits: Winter 2025



October 15, 2022 Ribbon-cutting in Historic Downtown Savannah, GA





**Sanctuaries
50th Anniversary
Poster Series**

Stan Rogers, Superintendent

Gray's Reef National Marine Sanctuary

10 Ocean Science Circle

Savannah, GA 31411

Phone: 912-598-2428

Email: Stan.Rogers@noaa.gov



**GRAY'S REEF
NATIONAL MARINE
SANCTUARY**