Priority Issues in Coastal North Carolina: A Forum by The Coastal Society

Hosted by UNCW's Center for Marine Science in Partnership with North Carolina Sea Grant

November 6, 2023

Sea Grant NORTH CAROLINA

THE COASTAL SOCIETY

Center For Marine Science · UNCW ·

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ECU INTEGRATED COASTAL PROGRAMS

Coastal Studies Institute
A Multi-Institutional Research Partnership

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Duke University Marine Lab

N.C. DIVISION OF COASTAL MANAGEMENT

North Carolina Coastal Federation
Working Together for a Healthy Coast

Lynker

9:00am	**Coffee/Gather**
9:15am	**Welcome**
9:30am	**Keynote:** Dr. Braxton Davis - Director, NC Division of Coastal Management
9:40am	**Plenary #1: Natural & Community Resilience** • *The Collaboratory's Role in Research Partnerships and Coastal Marsh Protection* - Dr. Greer Arthur, Research Director - NC Policy Collaboratory (UNC-Chapel Hill) • *The North Carolina Resilient Communities Program* – Mackenzie Todd, Coastal Resiliency Coordinator, NCDCM • *Locality Beach Management Planning* - Ryan Davenport, Shore Protection Manager - Carteret County • *Living Shoreline Implementation: Policy, Strategies, & Lessons Learned* - Todd Miller, Executive Director - NC Coastal Federation • Q&A
10:35am	**5 min Break**

10:40am **Plenary #2: PFAS**

- *Overview of PFAS Testing Network at UNCW*- Rachylle Hart, Program Coordinator- UNCW Center for Marine Science
- *Tackling PFAS: Is Treating the Water Enough?* - Dr. Pingping Meng, Assistant Professor – ECU Dept. of Chemistry
- *PFAS Along the NC Coast & Community Concerns* - Riley Lewis, White Oak Waterkeeper with Coastal Carolina Riverwatch
- *Update on Legal Foundation to Address PFAS in the Cape Fear* - Dana Sargent, Executive Director - Cape Fear River Watch
- *What's Missing & Why That Matters*- Emily Donovan, Co-Founder - Clean Cape Fear
- Q&A

11:45am **10 min Break/Transition to Breakout Sessions**

11:55am **Breakout Sessions for Resilience & PFAS** (Attendees Pick 1)

12:30pm **Networking Boxed Lunch/Student Poster Session**

2:00pm	**Plenary #3: Marine Spatial Planning** • *Offshore Wind Development: Progress & Outlook* - Karly Lohan, NC Program & Outreach Manager - Southeastern Wind Coalition • *N.C. Division of Coastal Management's Role in Offshore Wind* - Daniel Govoni, Federal Consistency Coordinator - NCDCM • *Considerations for Offshore Sand Mining on the NC Coast* - Dr. Martin Posey, Professor of Biology & Marine Biology, UNCW • Q&A
2:55pm	**10 min Break**
3:05pm	**Breakout Session for Marine Spatial Planning**
3:40pm	**5 min Break**
3:45pm	**Announcement of Student Poster Competition Winners**
4:00pm	**Closing Remarks** (Dr. Paul Ticco, TCS President)
4:10pm	**Adjourn**
4:30pm	**Networking HH – Wilmington Brewing Company**

Keynote Speaker: Dr. Braxton Davis
Director, NC Division of Coastal Management

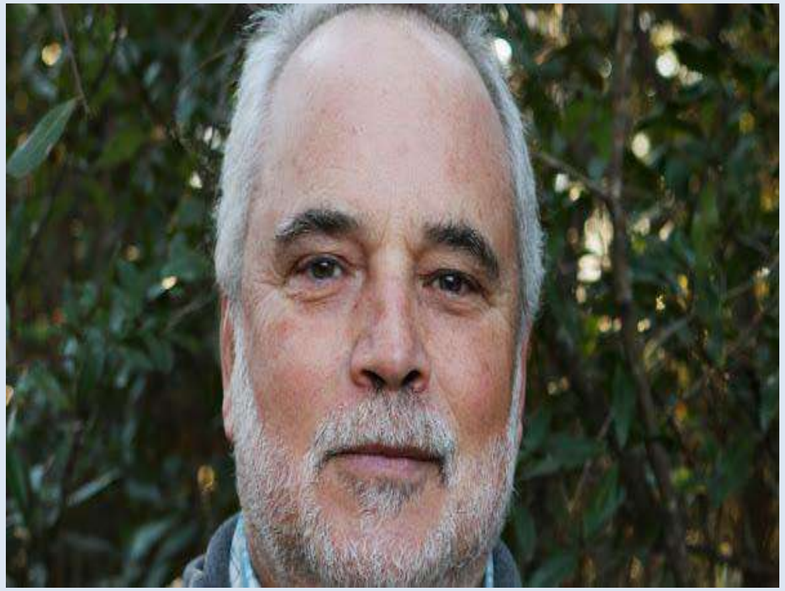
Plenary Panel #1: Natural & Community Resilience

The Collaboratory's Role in Research Partnerships and Coastal Marsh Protection
Dr. Greer Arthur
Research Director
North Carolina Collaboratory

The North Carolina Resilient Communities Program
Mackenzie Todd
Coastal Resiliency Coordinator
NC Division of Coastal Management

Locality Beach Management Planning
Ryan Davenport
Shore Protection Manager
Carteret County

Living Shoreline Implementation: Policy, Strategies, & Lessons Learned
Todd Miller
Executive Director
NC Coastal Federation



PARTNERING TO PROTECT COASTAL MARSHES

Greer Arthur, PhD
Research Director

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THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

ABOUT US

Established in 2016 by the North Carolina General Assembly, the Collaboratory supports cross-sector research partnerships that seek to transform academic research into evidence-based solutions for environmental, health and societal challenges faced by people in North Carolina.

Codified as Article 31A of NCGS 116-255

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APPROPRIATIONS

450+
Research Grants

20
Institutions of Higher Education

$67M
New Appropriations (2023-2025)

11
Business-Academia Partnerships

20
State Agency-Academia Partnerships

>$350M
Appropriations To-Date (2016-2025)

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Improving Water Quality and Safety

Preventing and Treating Disease

Enhancing Natural Disaster Resilience

Protecting the Environment and Natural Resources

RESEARCH MANDATES

We support research that directly addresses North Carolina's most pressing issues across a variety of discplines.

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We believe that cross-sector partnerships lead to real world research impact.

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Currituck Sound

A multi-year cross-sector partnership dedicated to applied conservation

THE PARTNERS

Working together to identify nature-based solutions to benefit birds
and their habitats and coastal communities

ECSU
ELIZABETH CITY STATE UNIVERSITY
FOUNDED 1891

Audubon

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Building Place-Based, Resilient Partnerships

THANK YOU

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NC DIVISION OF COASTAL MANAGEMENT

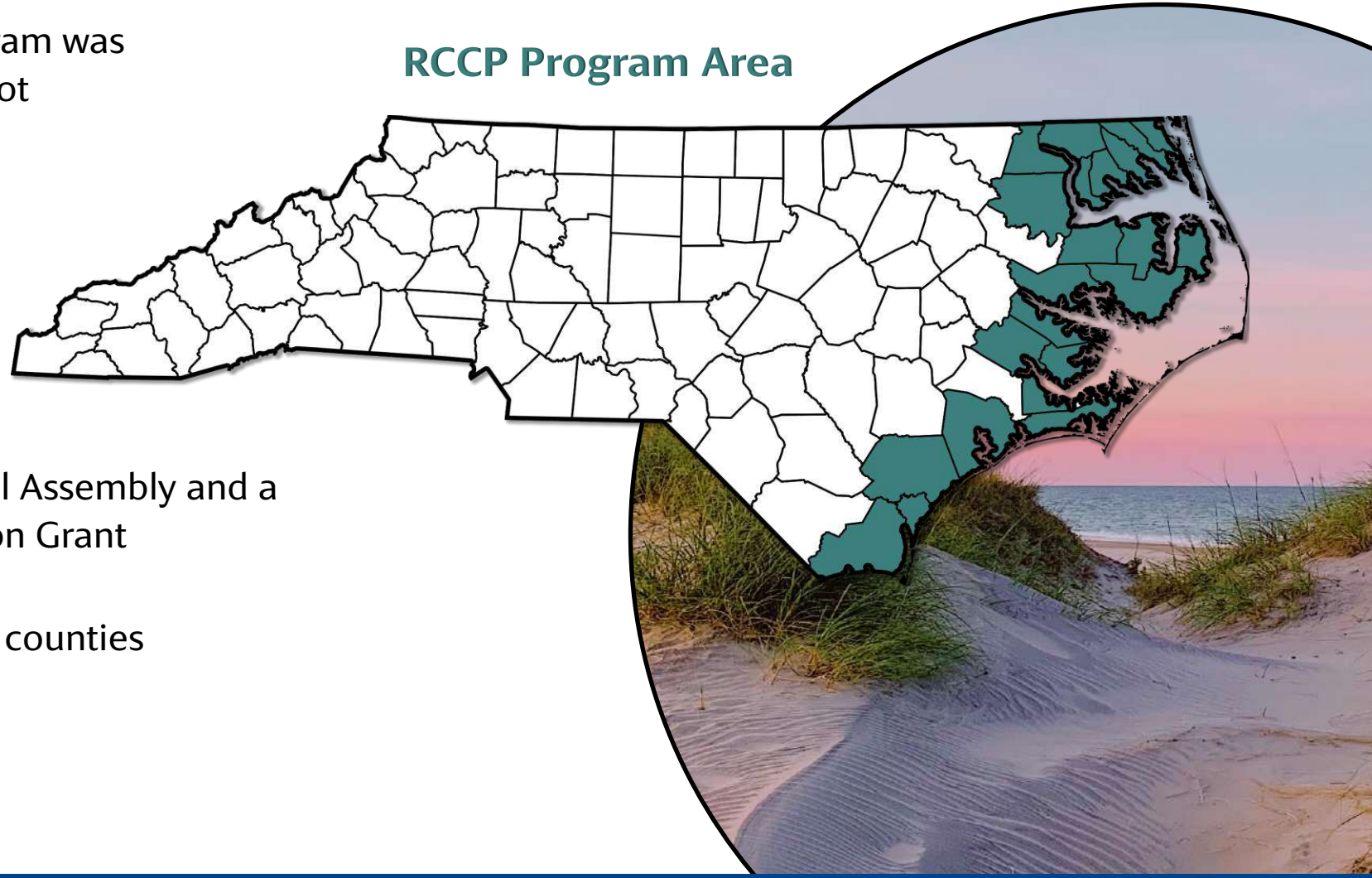
NC RESILIENT COASTAL COMMUNITIES PROGRAM

Mackenzie Todd, *Coastal Resiliency Coordinator*| mackenzie.todd@deq.nc.gov

Developing the Resilient Coastal Communities Program

Program Background

- The foundation of the RCCP program was laid in 2016 through the RENA pilot program
- Executive Order 80 created the NC Climate Risk & Resilience Plan, which eventually led to the RCCP
- RCCP Funded through the General Assembly and a National Fish & Wildlife Foundation Grant
- Program Scope: 20 coastal CAMA counties



N.C. Division of Coastal Management, 400 Commerce Ave., Morehead City, NC 28557 | Tel: (252) 515-5400 | Email: RCCP@deq.nc.gov

Program Partners & Funding

The Nature Conservancy

NCORR
NORTH CAROLINA OFFICE OF RECOVERY AND RESILIENCY

Sea Grant
North Carolina

NATIONAL FISH AND WILDLIFE FOUNDATION
NFWF

THE GREAT SEAL OF THE STATE OF NORTH CAROLINA
MAY 20, 1775
APRIL 12, 1776
ESSE QUAM VIDERI

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NOAA
U.S. DEPARTMENT OF COMMERCE

NC DIVISION OF COASTAL MANAGEMENT

Program Objectives

Address	Assist	Help	Advance	Link
Address barriers to coastal resilience at the local level	Assist communities with risk & vulnerability assessments	Help communities develop a portfolio of well-planned and prioritized projects	Advance priority projects to “shovel-ready” status	Link communities to funding streams for project implementation

Program Phases

Phase 1

COMMUNITY ENGAGEMENT & VULNERABILITY ASSESSMENT

Includes performing a risk and vulnerability assessment, developing a community action team, and engaging with the public.

Phase 2

PLANNING, PROJECT IDENTIFICATION, & PRIORITIZATION

Involves a community and data-driven process to identify priority actions that can be taken to adapt to short- and long-term hazards.

Phase 3

ENGINEERING & DESIGN

Grants are available for communities that successfully completed Phases 1 and 2 to develop projects that are shovel-ready.

Phase 4

PROJECT IMPLEMENTATION

Phase 4 grants are available for communities that successfully complete Phases 1, 2, and 3 for the implementation of shovel-ready projects.

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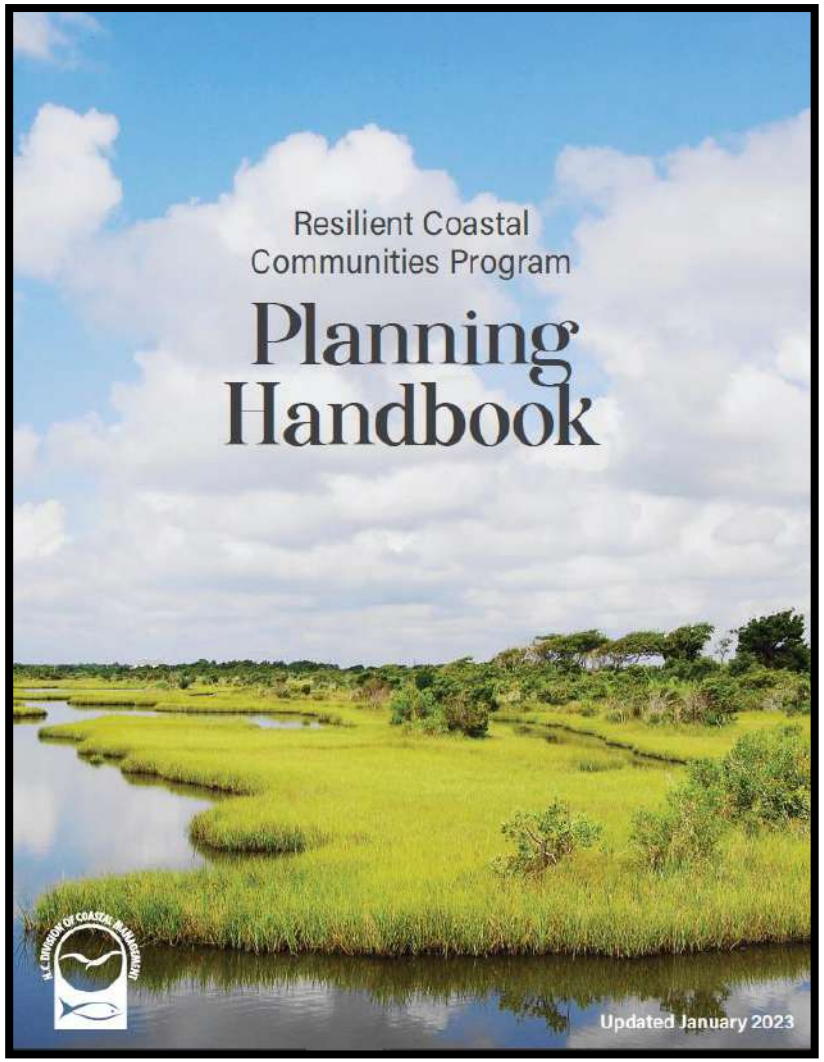
Program Planning Handbook & Technical Appendix

- The Program Planning Handbook: Updated 2023
  - Walks communities and contractors through the steps and requirements of Phases 1 and 2 of the RCCP

- Major Changes to the Planning Handbook
  - Identifying a champion in the CAT
  - Steps 2 & 3 have switched
  - Minimum list of critical assets
  - Technical Appendix

- The technical appendix provides links to additional information, such as helpful templates, maps, and formatting suggestions for deliverables, as well as examples from previous rounds of the RCCP



Phase 1: Community Engagement & Risk Assessment

Step 1: Develop a Community Action Team

Step 2: Set Vision and Goals

Step 3: Review Existing Local Plans & Efforts

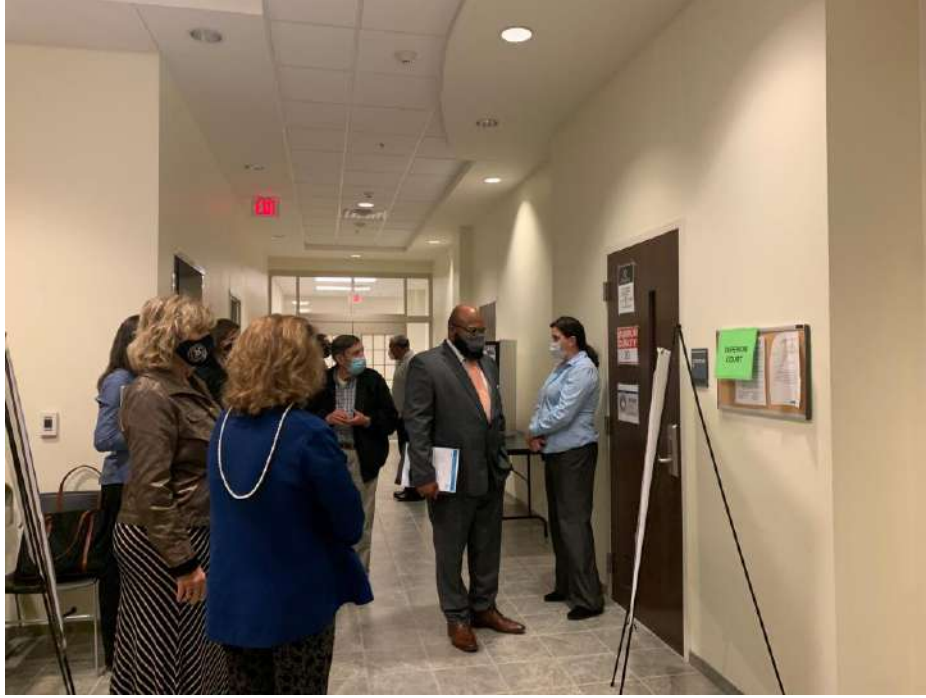
Step 4: Develop a Community Engagement Strategy

Step 5: Map Critical Assets and Natural Infrastructure

Step 6: Conduct a Risk and Vulnerability Assessment

Phase 2: Project Identification & Prioritization

- Develop a Project Portfolio
- Steps:
  1. Identify a Suite of Potential Solutions
  2. Consolidate and Prioritize Projects



Deliverables

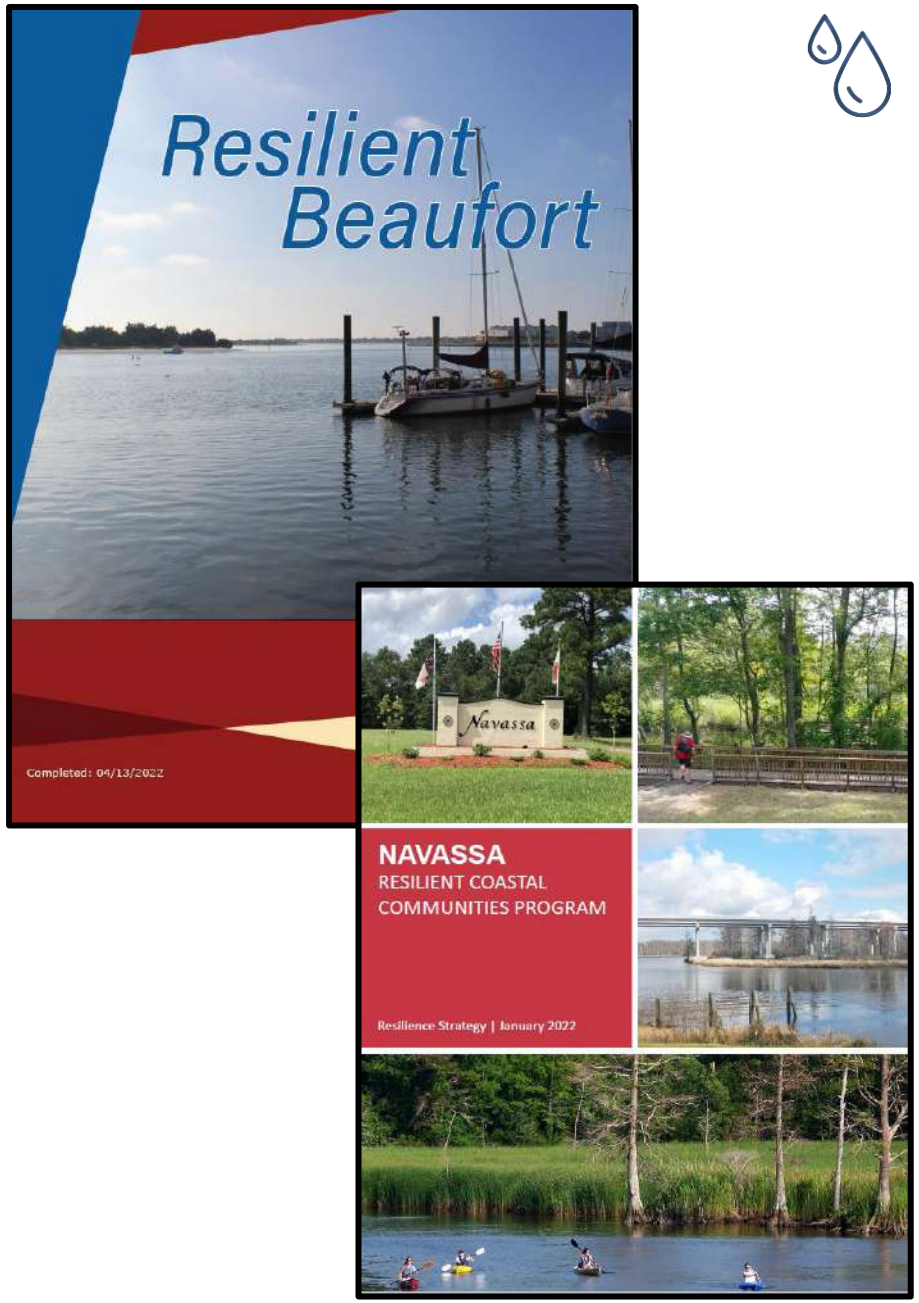
The main deliverable will include a Resilience Strategy based on guidance provided in the handbook. The two components include:

1. **Vulnerability Assessment Report:**

    - Details the quantitative and qualitative elements of assessment(s) performed

2. **Project Portfolio:**

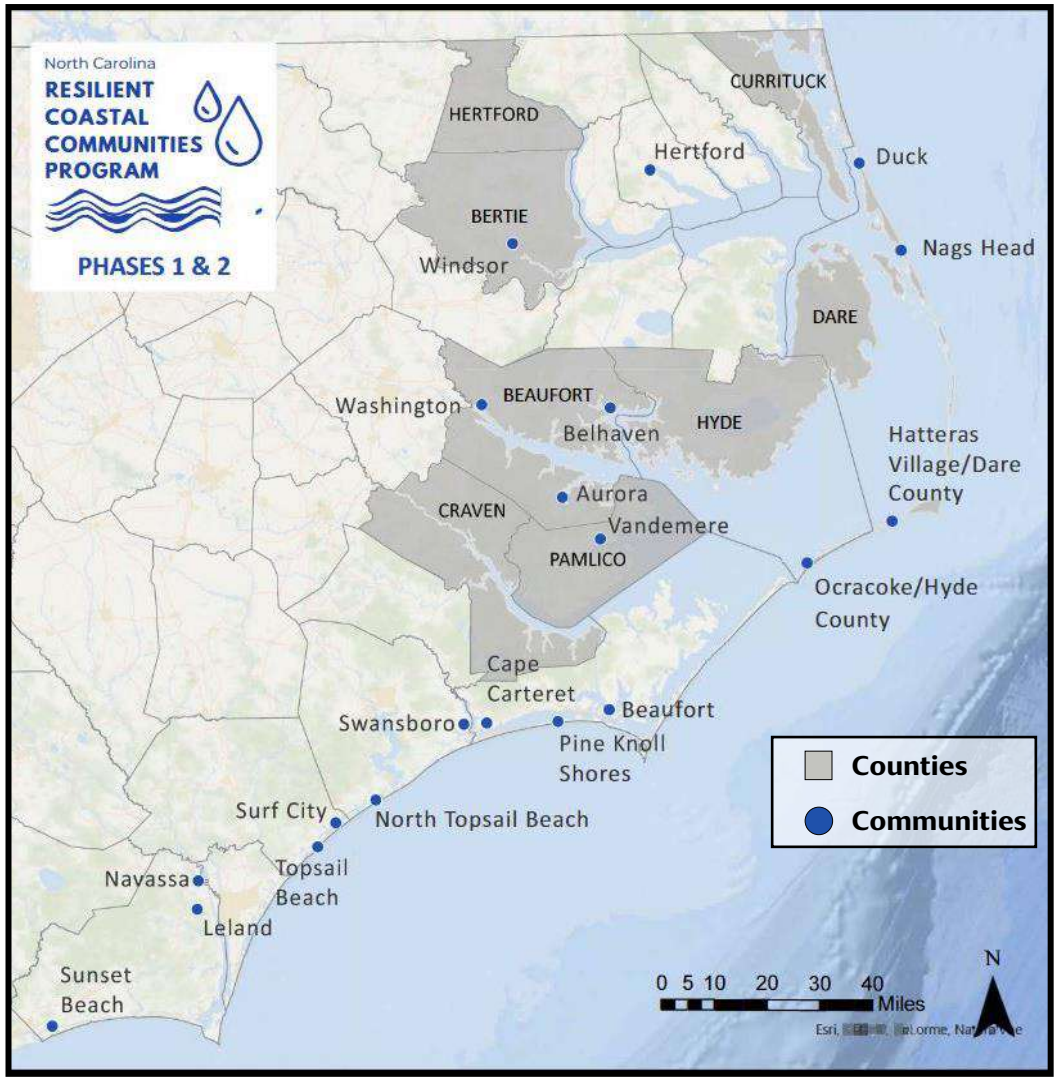
    - Outlines a series of options to address coastal hazards with local, community-specific information.



First Round (2020 – 2022)

- Project Period: 2020-2022
- 26 communities (8 counties and 18 municipalities)
- 10 contractors
- Total Funding Amount: $775,000
- Previous Resilience Strategies on the RCCP Website

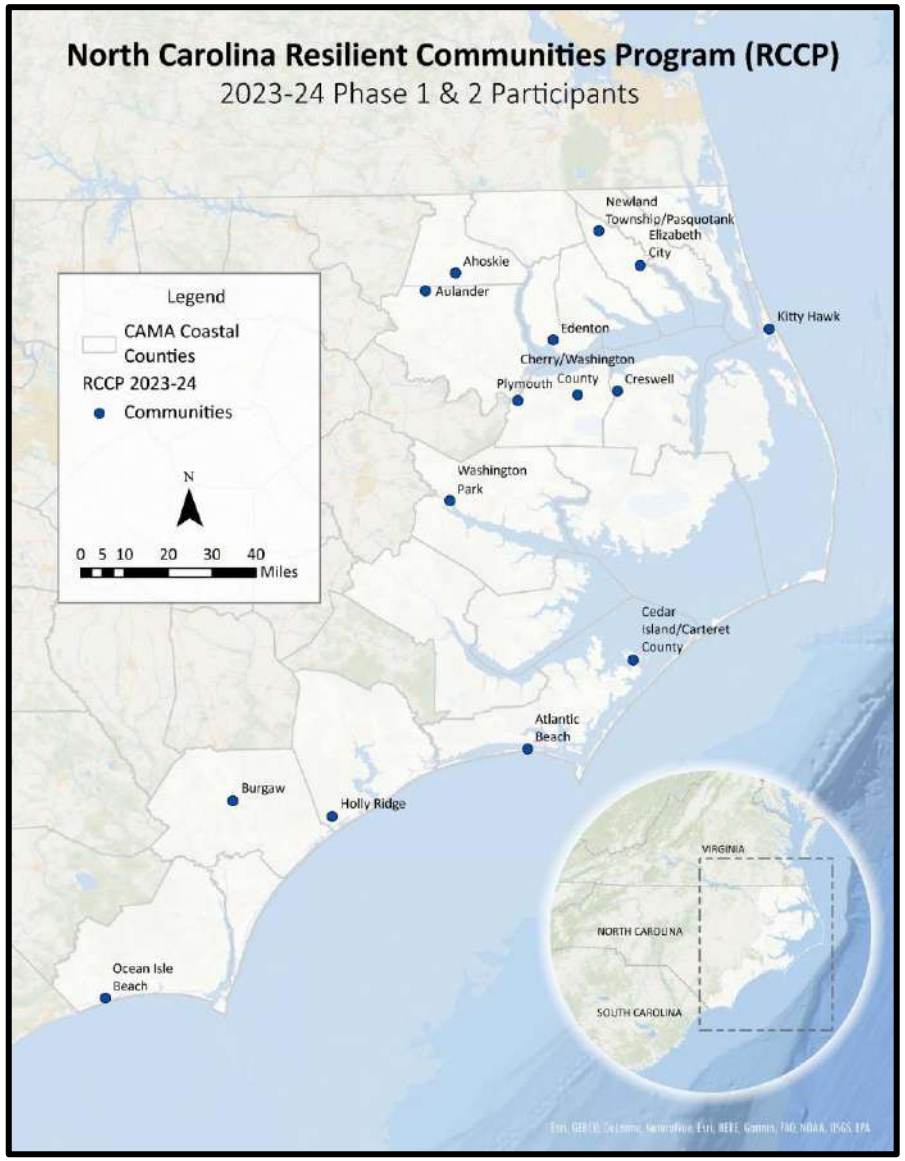
- **RK&K and Mideast Commission:** Aurora, Beaufort County, Belhaven, and City of Washington
- **SWCA:** Hertford County, Windsor, and Bertie County
- **Withers Ravenel:** Dare County (Hatteras Village), and Currituck County
- **Kimley Horn:** Vandemere, Pamlico County, and Hyde County (Ocracoke)
- **Dewberry:** Craven County, Pine Knoll Shores, Swansboro, and Cape Carteret
- **Moffatt & Nichol:** Navassa, Leland, and Sunset Beach
- **Kleinfelder:** Surf City, Topsail Beach, and North Topsail Beach
- **Stewart:** Town of Beaufort



Second Round (2023-2024)

- Project Period: 2023-2024
- 15 communities (3 counties and 12 municipalities)
- 9 contractors
- Total Funding Amount: $1.19 M

- **Dewberry:** Carteret County and Atlantic Beach
- **Kleinfelder:** Burgaw and Holly Ridge
- **Moffatt & Nichol:** Ocean Isle Beach
- **RK&K/Mid-East Commission:** Ahoskie Township, Aulander, Plymouth, and Washington Park
- **Stewart:** Kitty Hawk
- **SWCA:** Creswell and Washington County
- **WSE:** Elizabeth City and Pasquotank County
- **WSP:** Edenton



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2022-2023 Phase 3 Awards: Engineering & Design

Community	Project Name	Award($)
Aurora	Wetland Restoration at Wastewater Treatment Plant (WWTP)	$74,885
Beaufort County	Low Impact Development Site-Beaufort County Community College	$64,130
Belhaven	Wynne's Gut Tidal Gates and Flood Attenuation	$84,800
Bertie County	Cashie River Drainage System	$45,000
Cape Carteret	Cape Carteret Flood Mitigation Planning Project	$85,000
Craven County	Craven County Living Shoreline Prioritization and Engineering Design	$45,000
Currituck County	Baxter Lane and Old Tulls Road Drainage	$35,000
Dare County	Hatteras Village Stormwater Improvements	$45,000
Town of Duck	Duck Neighborhood Floodwater Management Plan	$45,000
Town of Hertford	Jennies Gut Drainage Improvement Feasibility Study	$45,000
Hyde County	Ocracoke Stormwater Management Plan	$45,000
Town of Leland	Mallory Creek Drive Drainage Improvements	$20,000
Nags Head	Town of Nags Head Drainage Infrastructure Improvements	$45,000
New Bern	Duffyfield Community Resilience Improvement-Basin Restoration and Enhancement	$45,000
Pine Knoll Shores	Town-Wide Nature-Based Stormwater Solutions	$45,000
Sunset Beach	Green Infrastructure-40th Street Erosion	$49,865
Swansboro	Water Street Rehabilitation	$45,000
Topsail Island (Surf City, N. Topsail Beach, and Topsail Beach)	Topsail Island Roadside Stormwater Project	$135,000
Vandemere	Improving Stormwater Culverts and Drainage	$45,000
City of Washington	Jack's Creek Floodplain and Greenway Improvements	$61,480

Total Funding Amount: $1.12 million

Phase 4 (Construction & Implementation)

- Communities must have completed Phases 1, 2, and 3 or equivalent
- Projects **MUST** include a natural or nature-based component
- Total award amount: $1.16M
- Belhaven, New Bern, Pine Knoll Shores, Vandemere, and City of Washington

Thank you!

Mackenzie Todd

Coastal Resilience Coordinator

NC Division of Coastal Management

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Major Programs of the North Carolina Coastal Federation

Todd Miller, Executive Director
North Carolina Coastal Federation
www.nccoast.org
October 17, 2023

North Carolina Coastal Federation
working together for a healthy coast

Celebrating 41 years of coastal protection and restoration

Work with people from all walks of life for a healthy coast

Cover 20 coastal counties of NC with offices in Carteret County, Wrightsville Beach and Wanchese

40 YEARS North Carolina Coastal Federation *Working Together for a Healthy Coast*

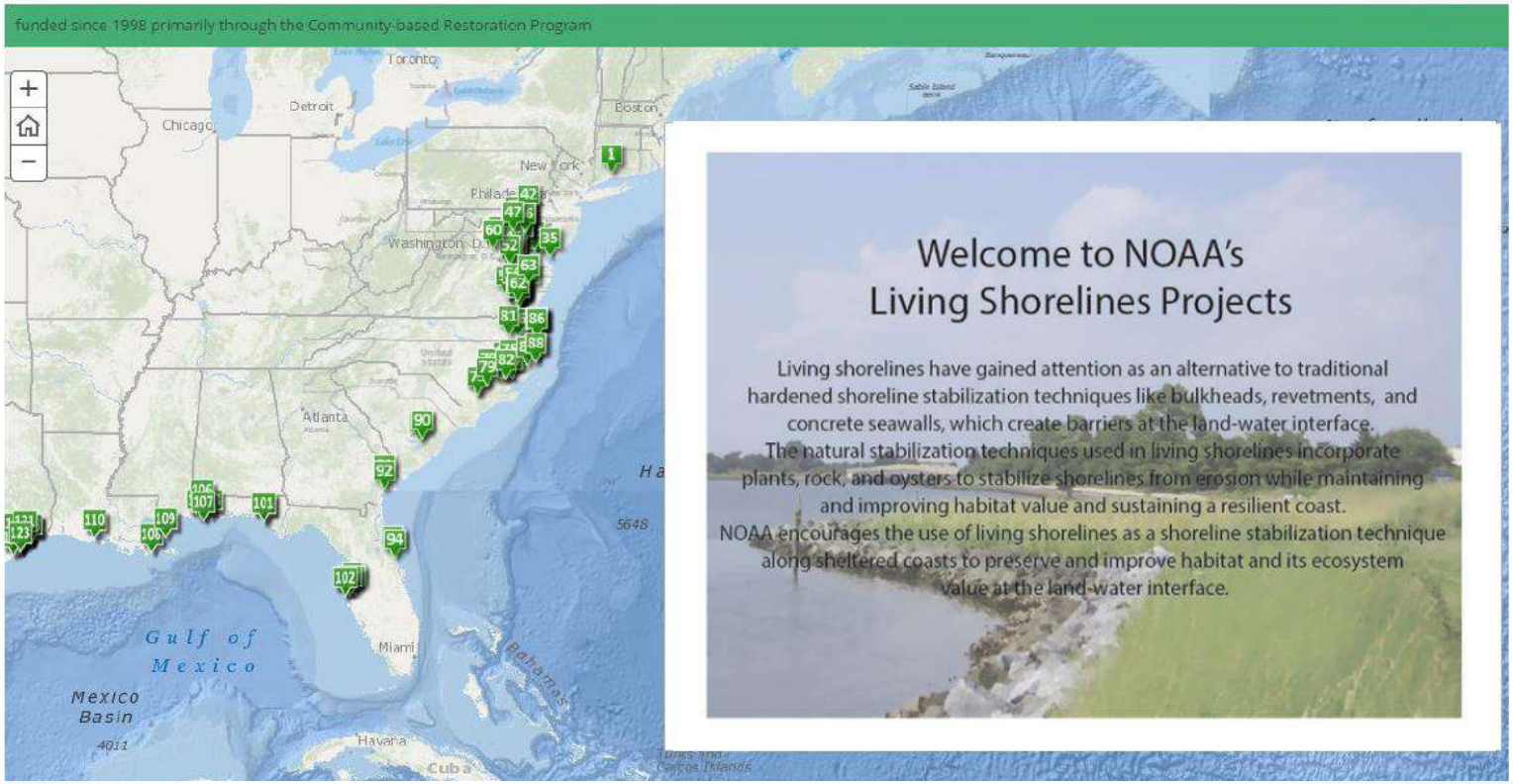
North Carolina Coastal Federation
What We Work For – *Our Key Goals*

- **Clean Coastal Waters and Reduced Coastal Flooding** for a healthy more resilient coast
- **Living Shorelines** that reduce soundside erosion and create coastal habitat
- **Abundant Oysters** to support coastal fisheries, habitat, clean water and the coastal economy
- A coast that is **Free of Marine Debris**

Living Shorelines (and Salt Marshes)

Examples of Landscape Scale Projects

Salt marsh conservation and restoration



"NOAA encourages the use of living shorelines as a shoreline stabilization technique along sheltered coasts to preserve and improve habitat and its ecosystem value at the land-water interface."

Examples of Community Resilience Projects

900 + feet of granite sills
900 feet of oyster structures
0.25 acres of salt marsh creation
70 – year service life

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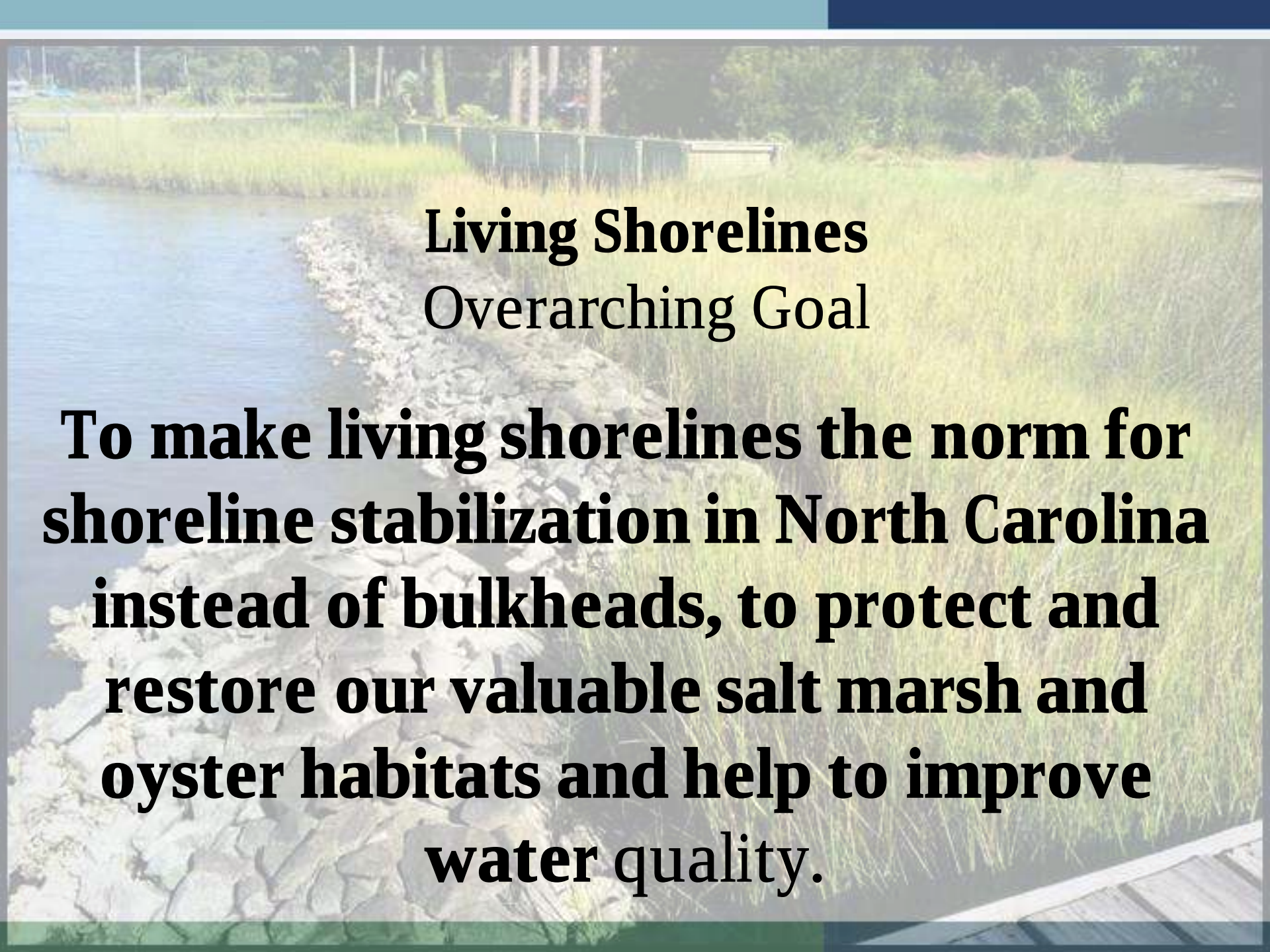
Living Shorelines By The Numbers

Year	Feet	Approx. Miles	# of Sites	# of Marsh Grass Plugs Planted
2019	2,379	0.5	16	21,987
2020	6,384	1.2	22	18,000
2021	5,091	1	30	137,692
2022	7,129	1.4	35	21,804
2023	10,965	2.1	58	29,632
TOTAL	**35,046**	**6.6**	**>161**	**245,425**
Proposed	>40,000	> 7.6		



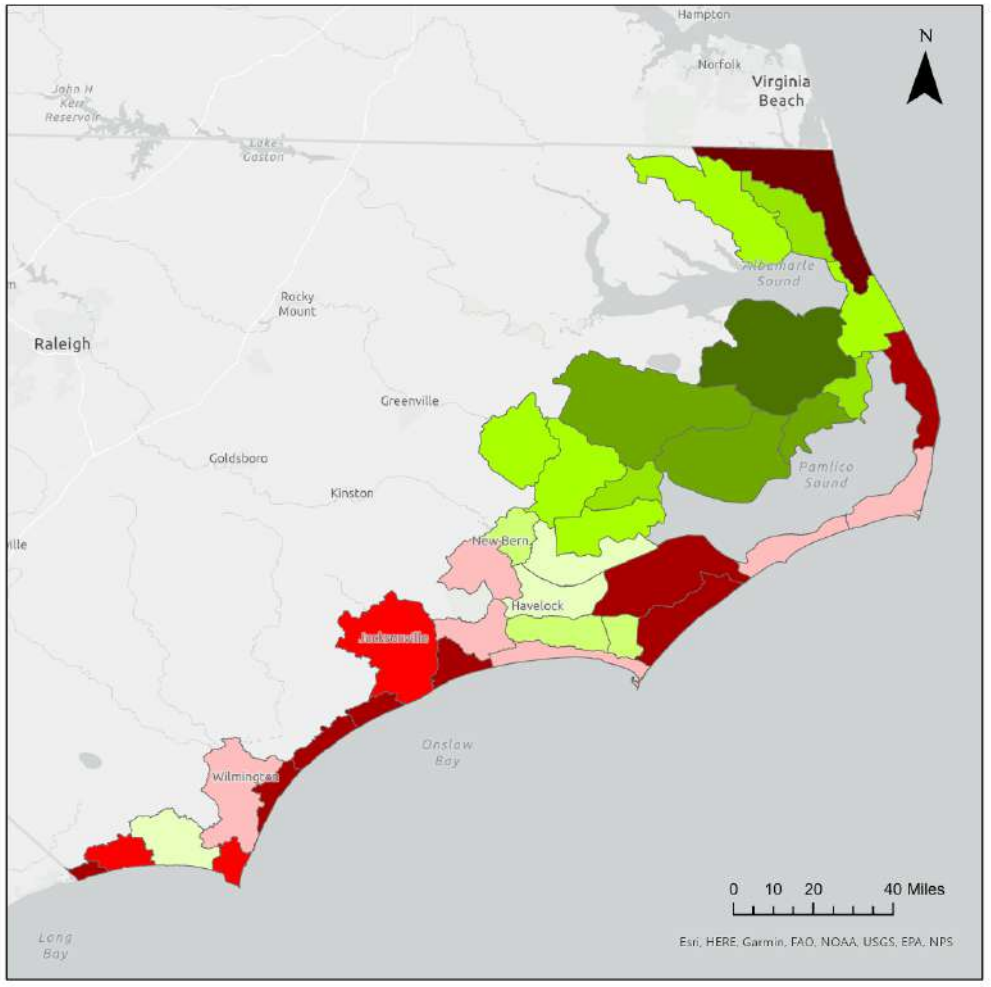
Living Shorelines
Overarching Goal

To make living shorelines the norm for shoreline stabilization in North Carolina instead of bulkheads, to protect and restore our valuable salt marsh and oyster habitats and help to improve water quality.

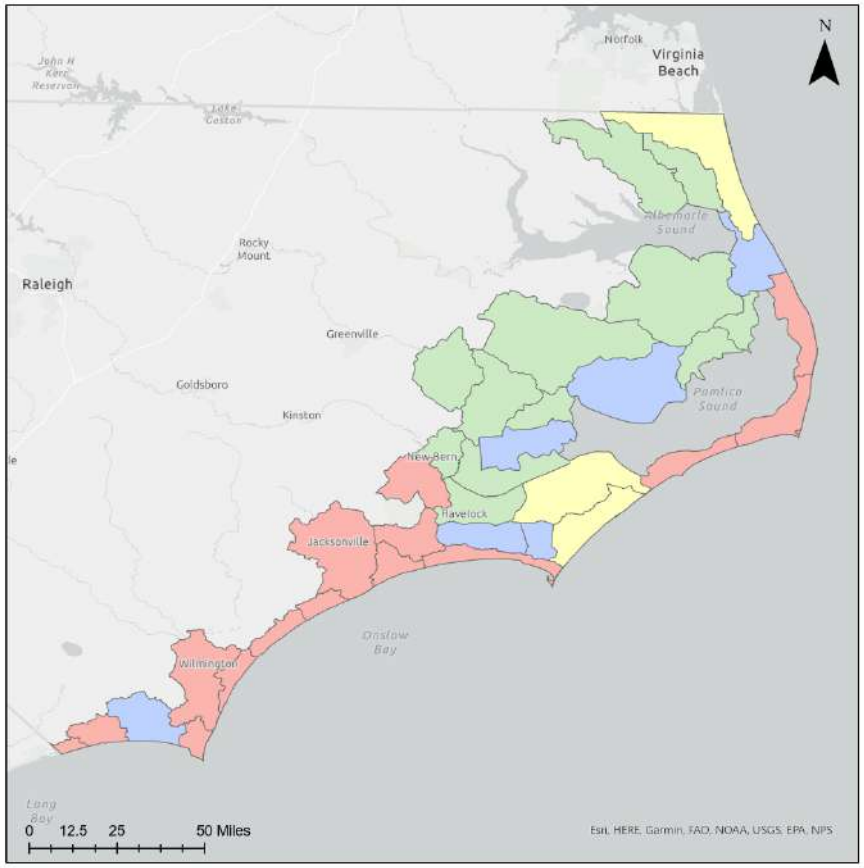
Facilitating the migration of salt marshes as sea level rises

Salt Marsh Gain or Loss by 2050 (acres)

- (-15,000) - (-5000)
- (-5000) - (-1000)
- (-1000) - (500)
- (-500) - 0
- 0 - 500
- 500 - 1000
- 1000 - 5000
- 5000 - 15,000
- 15,000 - 35,000
- 35,000 - 100,000



Examples of Landscape Scale Projects



Addressing Salt Marsh Loss and Migration

		Suggested Priority Action for Salt Marsh Protection	
Cluster	*Net Gain or Loss	Restoration	Conservation
Red	Loss	X	
Yellow	Loss	X	X
Blue	Gain	X	X
Green	Gain		X

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Source: NC Salt Marsh Conservation Action Plan
Data Credit: **Warnell, Olander, & Currin** (2022)
Map Development: **Mike Wissner & Jessie Mandirola** (Pew GIS Team),
Claire Rapp (NCCF, Salt Marsh Campaign Lead)

STORIES FROM THE COAST

EPISODE 25: SAVING DREDGE SPOIL ISLANDS

Questions?

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www.nccoast.org

3609 N.C. 24, Newport, NC 28570

252-393-8185

5-Min Break – Please Return by 10:40am for Plenary #2: PFAS

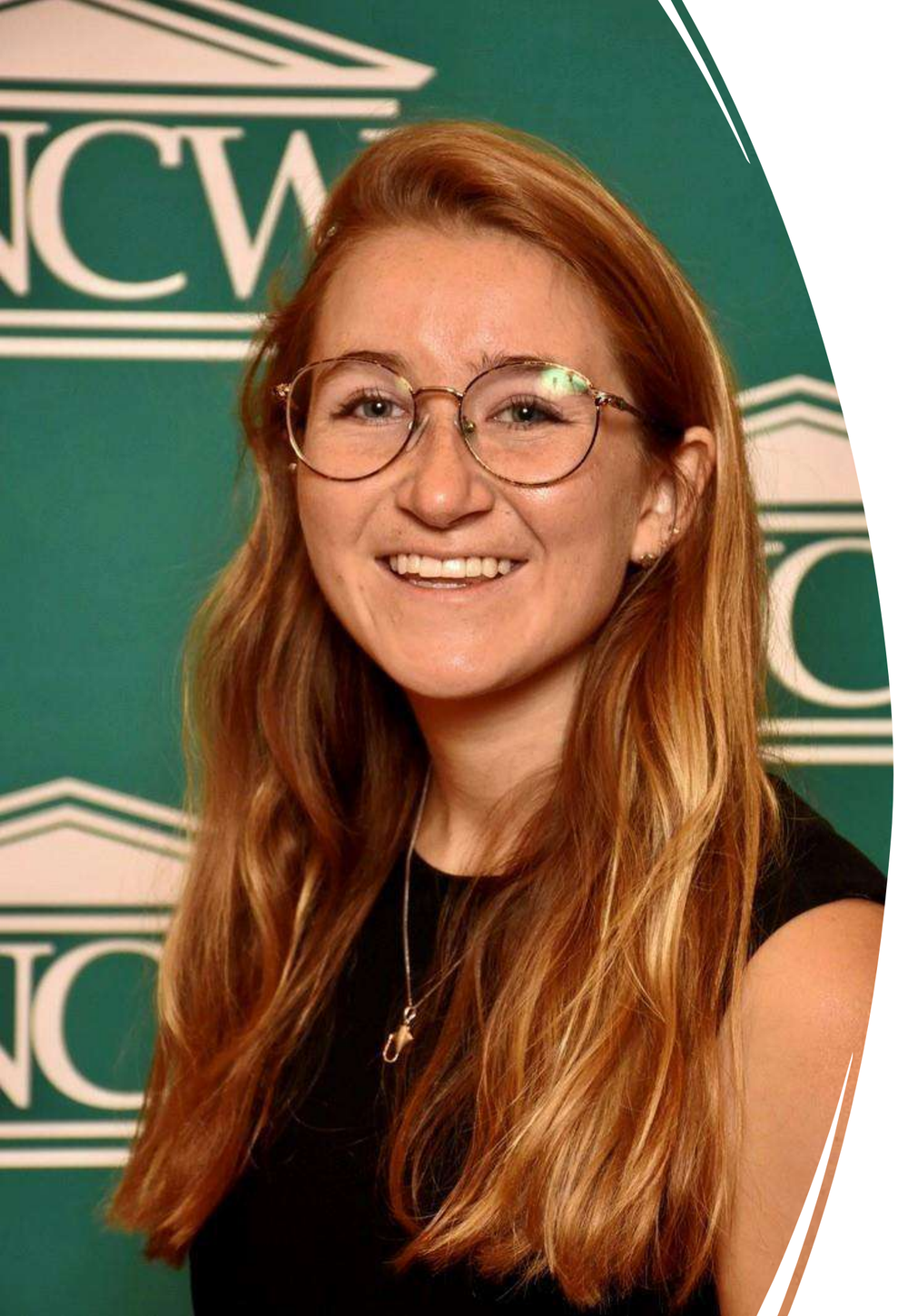
Science & Advocacy of PFAS Exposure

The Coastal Society Forum

UNCW Center for Marine Science

November 6th, 2023

Cape Fear River, aerial photo courtesy of Alan Cradick, Cape Fear River Watch



Rachylle Hart, Program Coordinator PFAS Testing Network

Rachylle is enthusiastic about her role maintaining communication and operations for the PFAS Testing Network. Prior to joining the Network last June, she worked at a contract research organization doing organic synthesis. She received her Bachelors of Sciences in Chemistry and Environmental Science from UNCW in 2021.

Pingping Meng, Assistant Professor
East Carolina University

Pingping obtained her Ph.D. in Environmental Engineering from Tsinghua University in 2019, with one year visiting research experience at Stockholm University supervised by Dr. Ian Cousins. Following her PhD, Pingping finished a four-year postdoctoral research training at North Carolina State University, working with Dr. Detlef Knappe. Her research experience focuses on the occurrence, transport, human exposure, and remediation of per- and polyfluoroalkyl substances (PFAS) in the environment.

Riley Lewis, White Oak Water Keeper
Coastal Carolina River Watch

Riley Lewis spends her time researching and advocating for local water quality. She received her BS in Marine Science from the University of South Carolina and her MS in Coastal and Ocean Policy from UNCW. During her time at UNCW she re-established the TCS student chapter and today she continues to connect students with coastal professionals.

Dana Sargent, Executive Director
Cape Fear River Watch

Dana earned a Bachelor of Arts in Journalism from San Diego State University, and a Master of Science in Environmental Sciences & Policy from The Johns Hopkins University. She worked in communications for a large nonprofit out of D.C. for 13 years and moved to Wilmington in 2013 with the intention of transforming her career to align with her passion for the environment. She volunteered and worked freelance at CFRW and other local groups for 5 years while working remotely for the DC nonprofit and is honored to have been hired in January 2019 to serve as the executive director of this small but mighty organization. She loves music and her two magnificent daughters.

Emily Donovan, Co-founder Clean Cape Fear

Clean Cape Fear is a grassroots community group that formed in 2017 after learning DuPont/Chemours contaminated North Carolina's drinking water supply for over 40 years with toxic PFAS. Emily testified before Congress twice and helped secure reverse osmosis filling stations at 49 public schools impacted by PFAS contamination in Brunswick and New Hanover counties. Recently, her group filed a complaint with the United Nations seeking redress for human rights violations due to excessive PFAS exposures from Chemours. Emily sits on the planning team for the National PFAS Conference series and is a leadership team member for the National PFAS Contamination Coalition. She frequents Washington, DC, and Raleigh, NC pressuring lawmakers and regulators for quicker responses to our growing PFAS public health crisis.

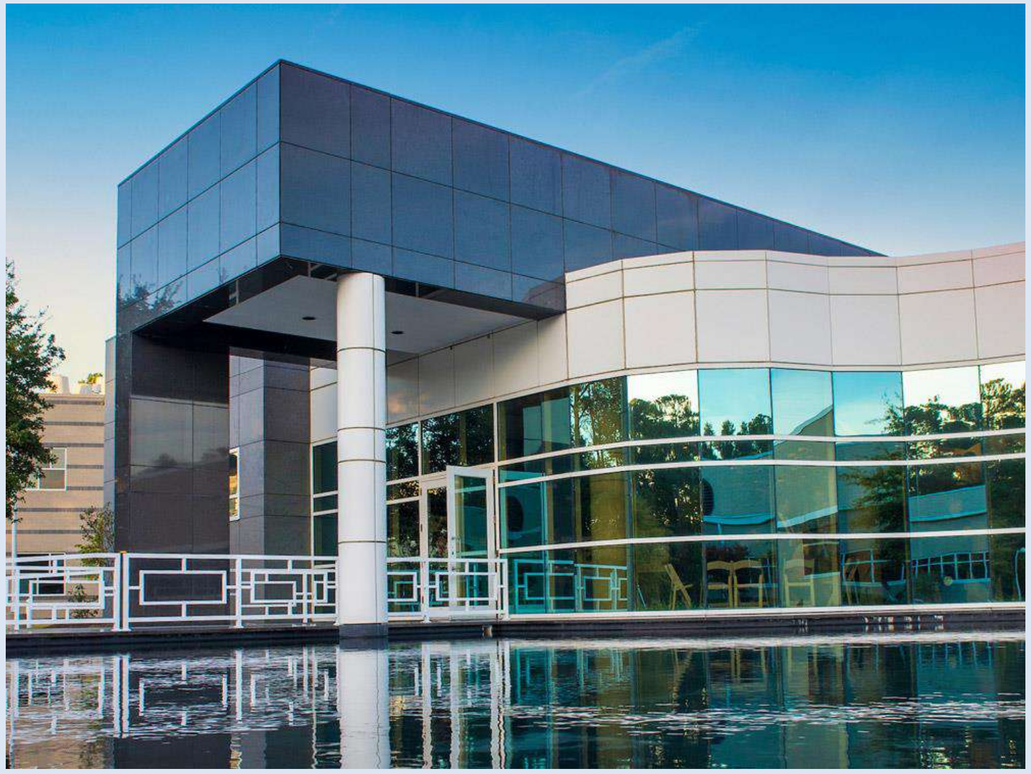
10-min Break - Please Proceed to Breakout Rooms by 11:55am

Breakout Sessions: Resilience & PFAS (11:55am-12:30pm)

Breakout Session Locations (Plenary Panels #1 & #2)				
Topic	**Location**	**Seating Capacity**	**Speaker(s)**	**Event Staff**
PFAS	CMS 1107 (this building)	12	Rachylle Hart, Dr. Pingping Meng	Genevieve Guerry
PFAS	CMS 1109 (this building)	20	Dana Sargent	Dr. Jenny Biddle
PFAS	MARBIONIC 1001A	16	Riley Lewis, Emily Donovan	Kathryn Lienhard
Natural & Community Resilience	MARBIONIC 1001B	20	Dr. Greer Arthur, Mackenzie Todd	Jeff Flood
Natural & Community Resilience	MARBIONIC 1001C	20	Ryan Davenport, Todd Miller	Jeff Benoit

Lunch/Networking Break (12:30pm-2:00pm)

Please return to the MARBIONIC lobby to pick up your complimentary lunch, network, & stop by the student posters!



Plenary Panel #3: Marine Spatial Planning

Offshore Wind Development: Progress & Outlook
Karly Lohan
NC Program & Outreach Coordinator
Southeast Wind Coalition

NC Division of Coastal Management's Role in Offshore Wind
Daniel Govoni
Federal Consistency Coordinator
NC Division of Coastal Management

Considerations for Offshore Sand Mining
Dr. Martin Posey
Professor of Biology & Marine Biology
UNCW

NC Division of Coastal Management

NC Dept. of Environmental Quality

Division of Coastal Management

Offshore Wind

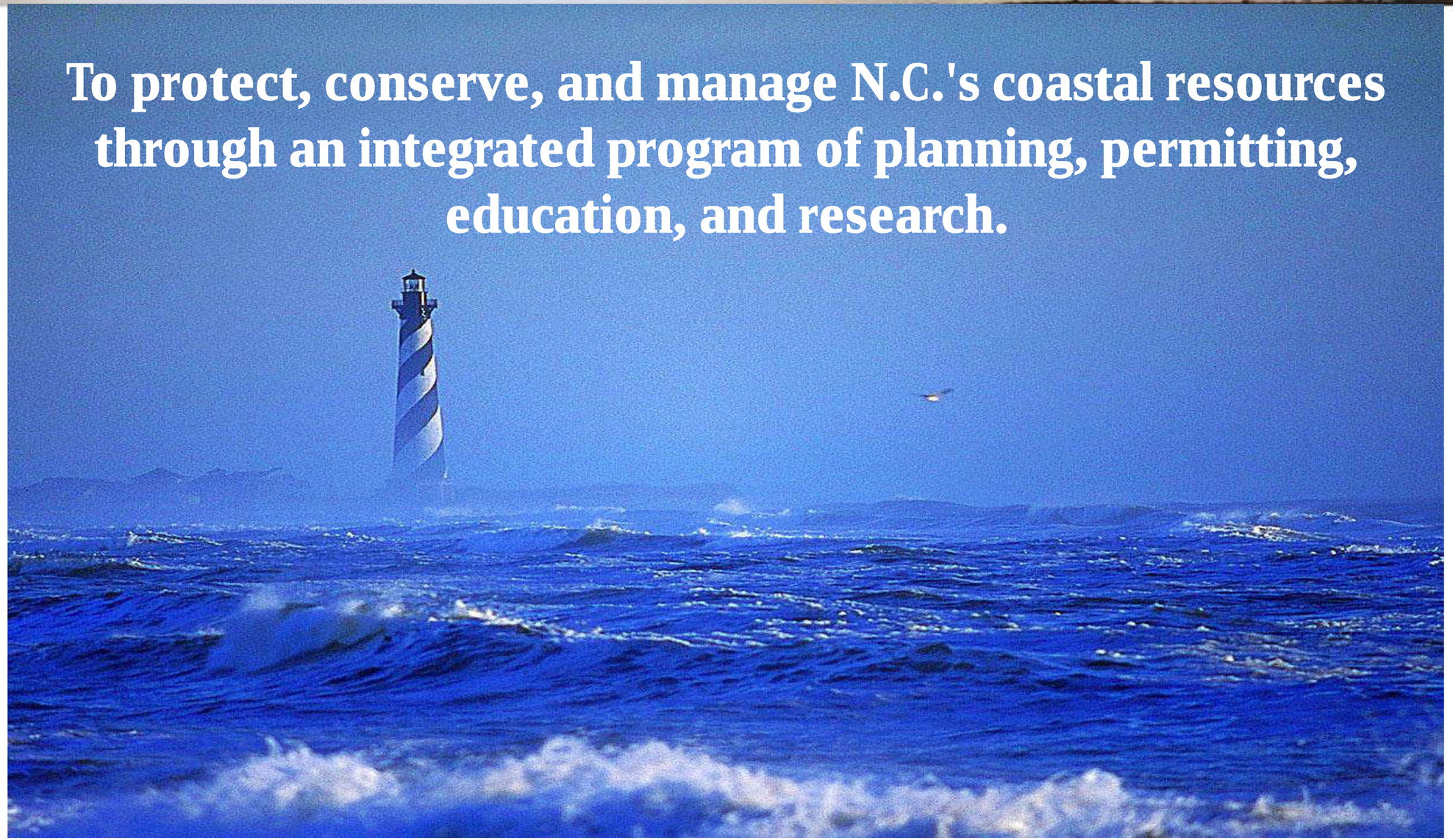
&

N.C. Division of Coastal Management's Role

Daniel Govoni

NC DIVISION OF COASTAL MANAGEMENT

NC Coastal Area Management Act (1974)



What is “Development”?

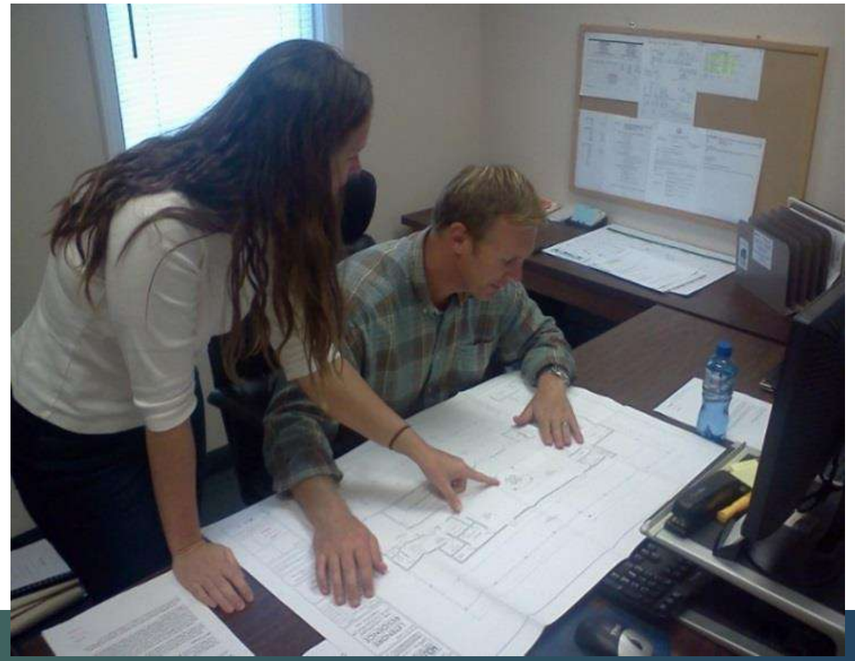
§ 113A-102. Legislative findings and goals.

(5)a. "Development" means any activity in a duly designated area of environmental concern (except as provided in paragraph b of this subdivision) involving, requiring, or consisting of the construction or enlargement of a structure; excavation; dredging; filling; dumping; removal of clay, silt, sand, gravel or minerals; bulkheading, driving of pilings; clearing or alteration of land as an adjunct of construction; alteration or removal of sand dunes; alteration of the shore, bank, or bottom of the Atlantic Ocean or any sound, bay, river, creek, stream, lake, or canal; or placement of a floating structure in an area of environmental concern identified in G.S. 113A-113(b)(2) or (b)(5).

www.wilmington-nc.com

CAMA Permits & Authorizations

- **Minor permits** issued mostly by local governments consistent w/CRC-established standards
  ~ Decks, beach houses, walkovers, other SFR structures
- **General permits** issued by DCM staff and streamlined for routine projects
  ~ Docks, bulkheads, boat ramps, small-scale dredging, etc.
- **Major permits** reviewed by 9 state & 4 federal agencies
  ~ Beach/inlet projects, marinas…
- **Federal Consistency** reviews



Federal Consistency

Federal actions must be found consistent with the **enforceable policies** of a state's federally approved coastal program

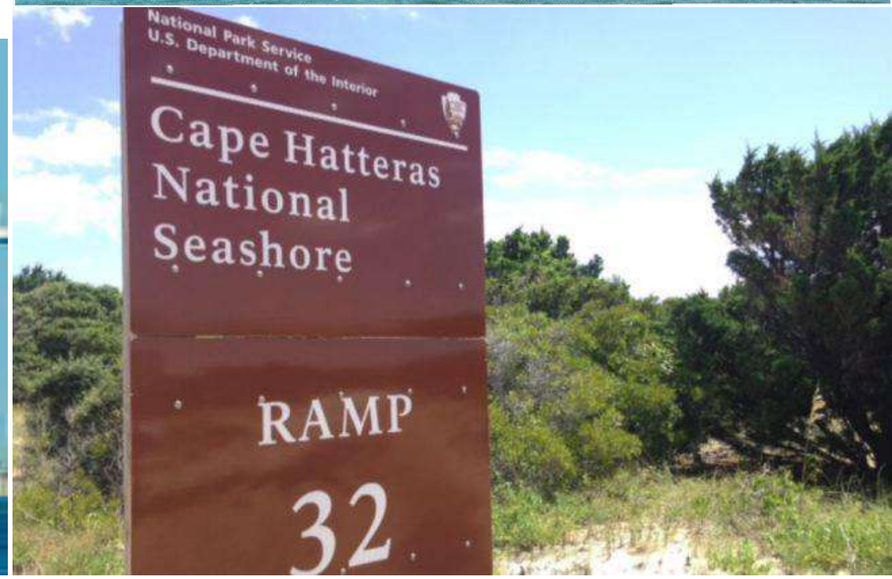
Applies to federal actions that:

- could have reasonably foreseeable **coastal effects**
- are within or **outside** the state's coastal zone (20 coastal counties to 3NM)

Federal consistency provisions of CZMA provide states a strong voice in federal agency actions in the coastal zone

Federal Actions

- Federal Agency Activities
- Federal License or Permits
- Outer Continental Shelf Plans
- Federal Assistance



Federal Consistency Determinations

- Circulate to appropriate state agencies for comment
- Public Notice
- Review proposed activity for conformance with enforceable policies
- Found consistent, consistent with conditions, or objection
- In the event of objection, ongoing coordination or begin mediation/appeal process through NOAA

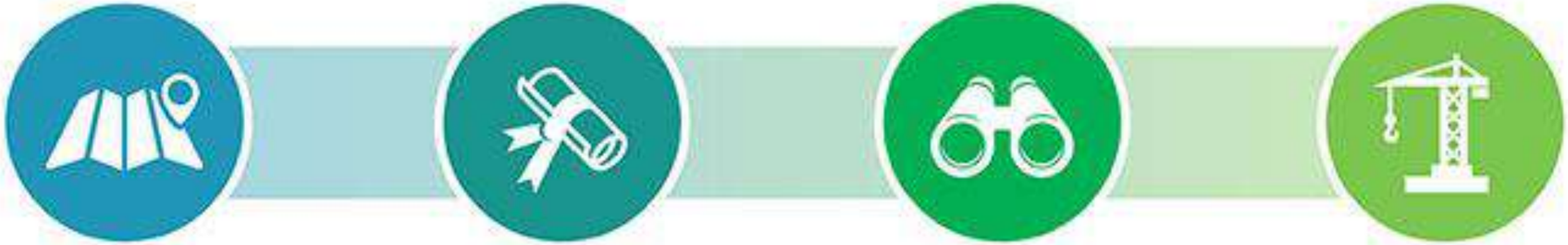
Enforceable Policies

- 15A NCAC 07H .0208 USE STANDARDS (b)(13)(A)
  - Evaluation requirements

- 15A NCAC 07H .0208 USE STANDARDS (b)(13)(B)
  - Development Standards

- 15A NCAC 07M .0401-.0403
  - Coastal Energy Policies

Regulatory Roadmap



Planning & Analysis	Leasing	Site Assessment	Construction & Operations
~ 2 YEARS	~ 1-2 YEARS	UP TO 5 YEARS	~ 2 YEARS (+25)
• Intergovernmental Task Force • Request for Information or Call for Information and Nominations • Area Identification • Environmental Reviews	• Publish Leasing Notices • Conduct Auction or Negotiate Lease Terms • Issue Lease(s)	• Site Characterization • Site Assessment Plan	• Construction and Operations Plan • Facility Design Report and Fabrication and Installation Report • Decommissioning • Environmental and Technical Reviews

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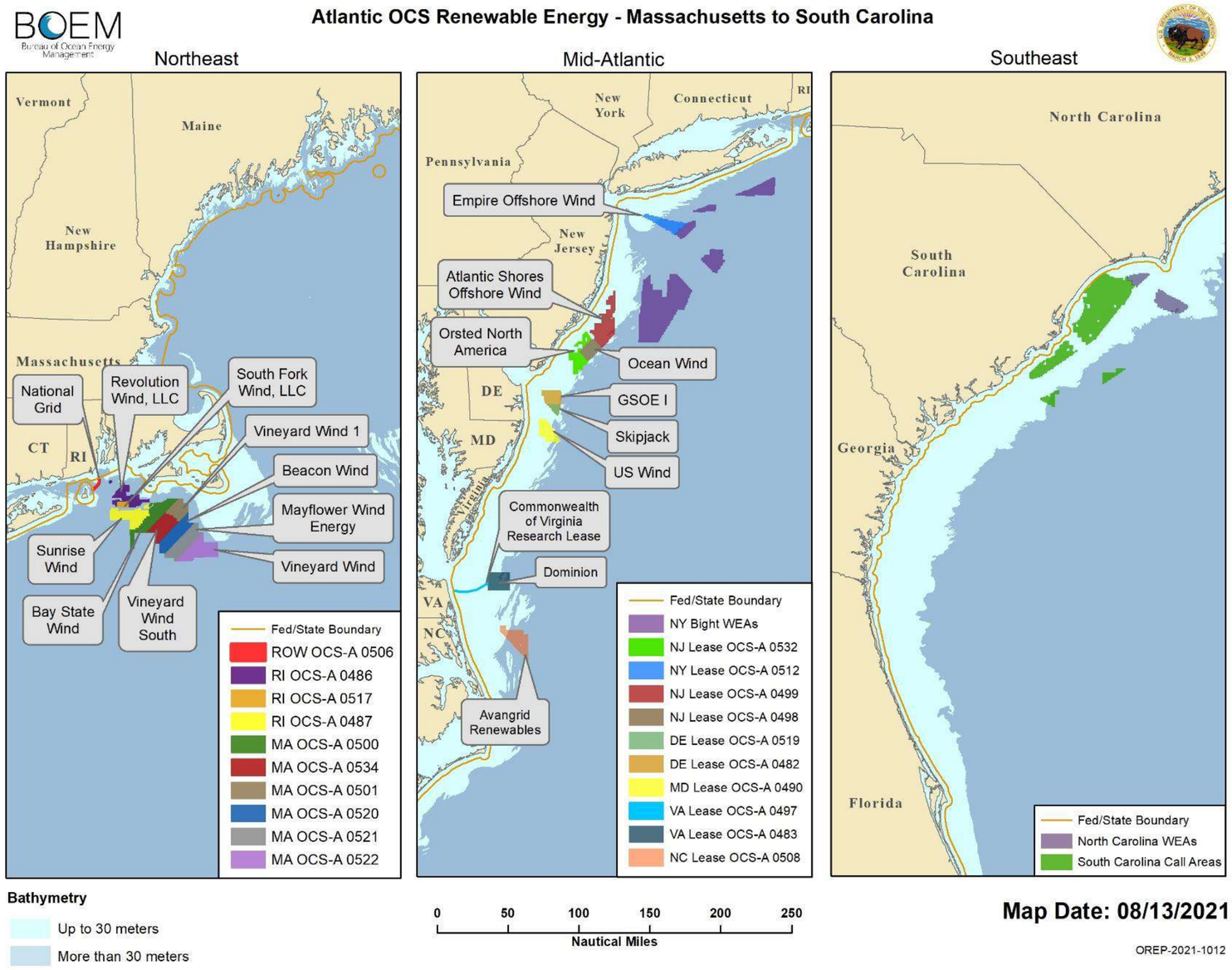
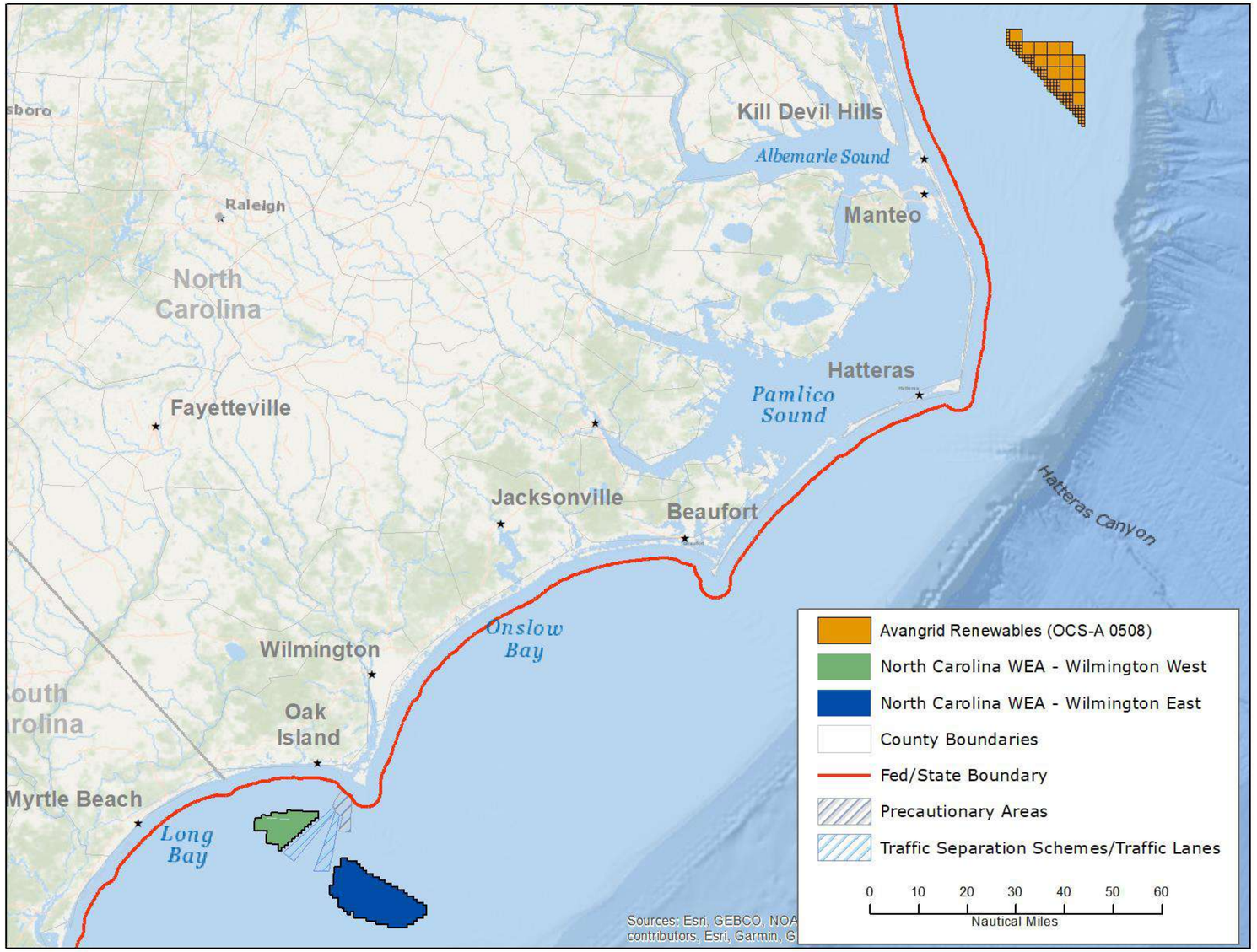
Atlantic Offshore Wind Projects



North Carolina Offshore Wind Projects



Kitty Hawk Offshore Wind Project

- 8/11/16, BOEM submitted a Federal Consistency Certification for possible lease issuance and site assessment plan
  - 10/10/16, DCM found proposal consistent contingent on meeting with DCM, WRC, and DMF to avoid conflicts with marine resources.

- Avangrid Renewables won lease for $9,066,650

- Avangrid Renewables submitted a Federal Consistency Certification on 8/5/21 for Construction and Operation
  - DCM requested a “Stay” to conclude review until draft EIS is published

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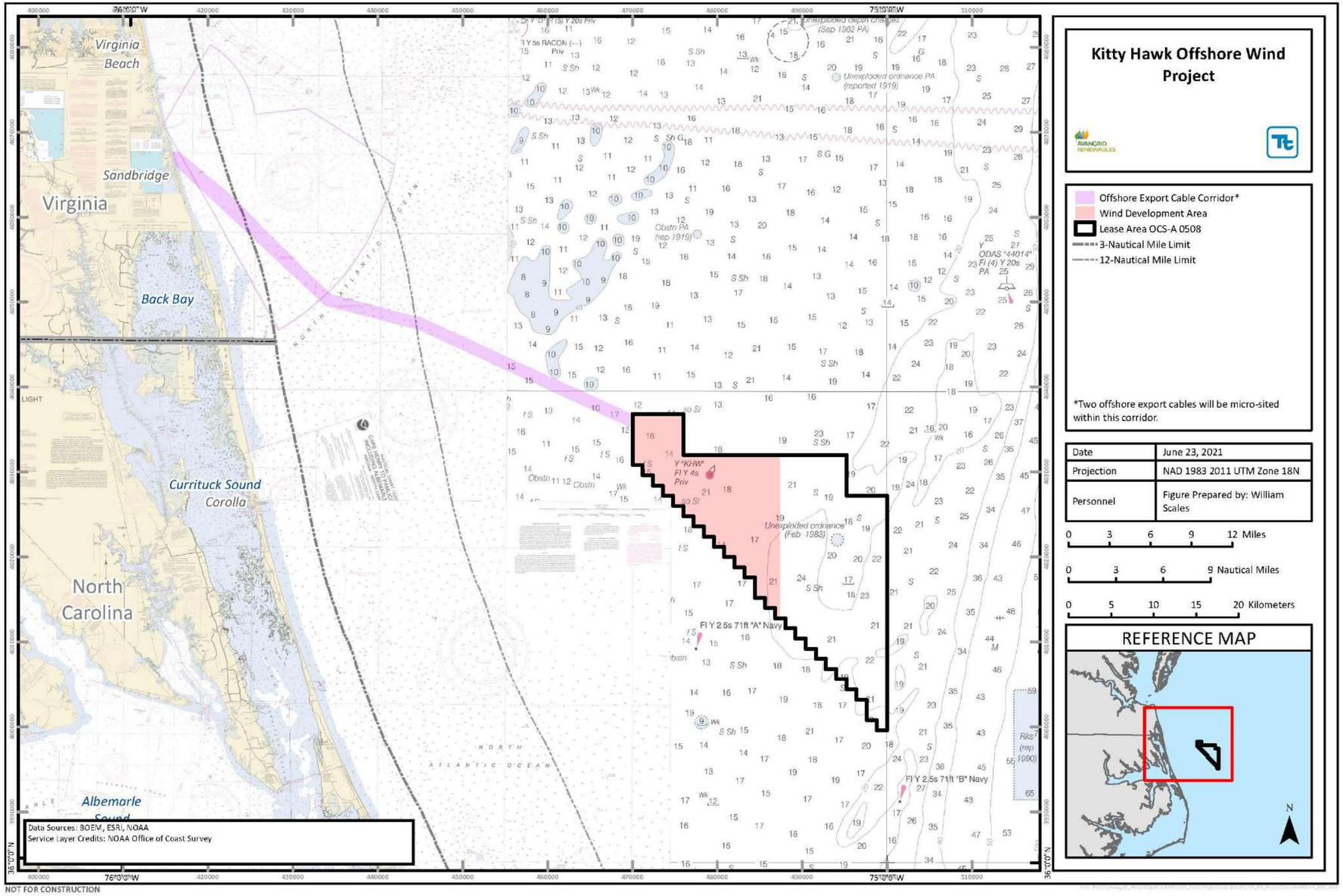
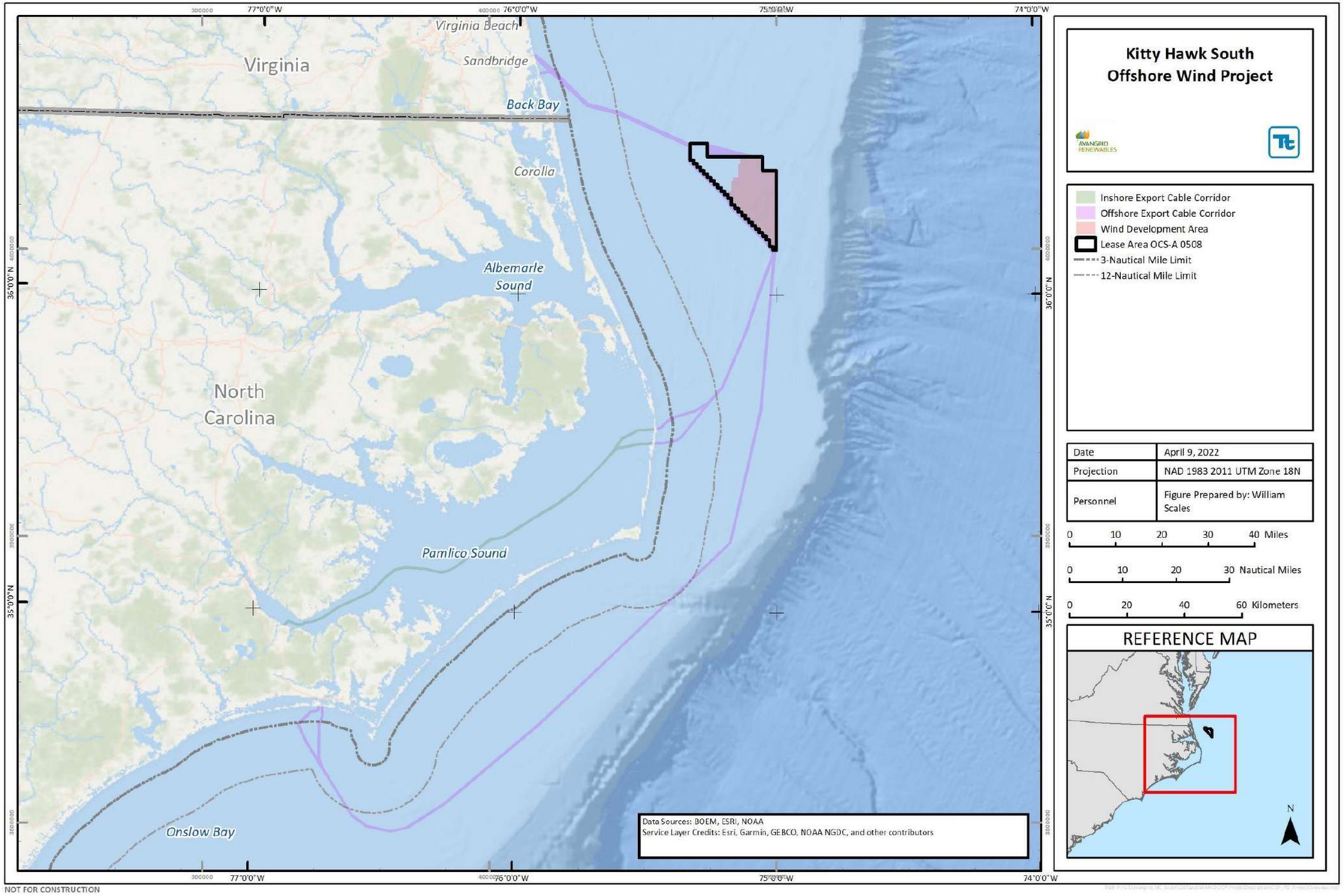
AVANGRID RENEWABLES

Kitty Hawk North Offshore Wind Project



AVANGRID RENEWABLES

Kitty Hawk South Offshore Wind Project

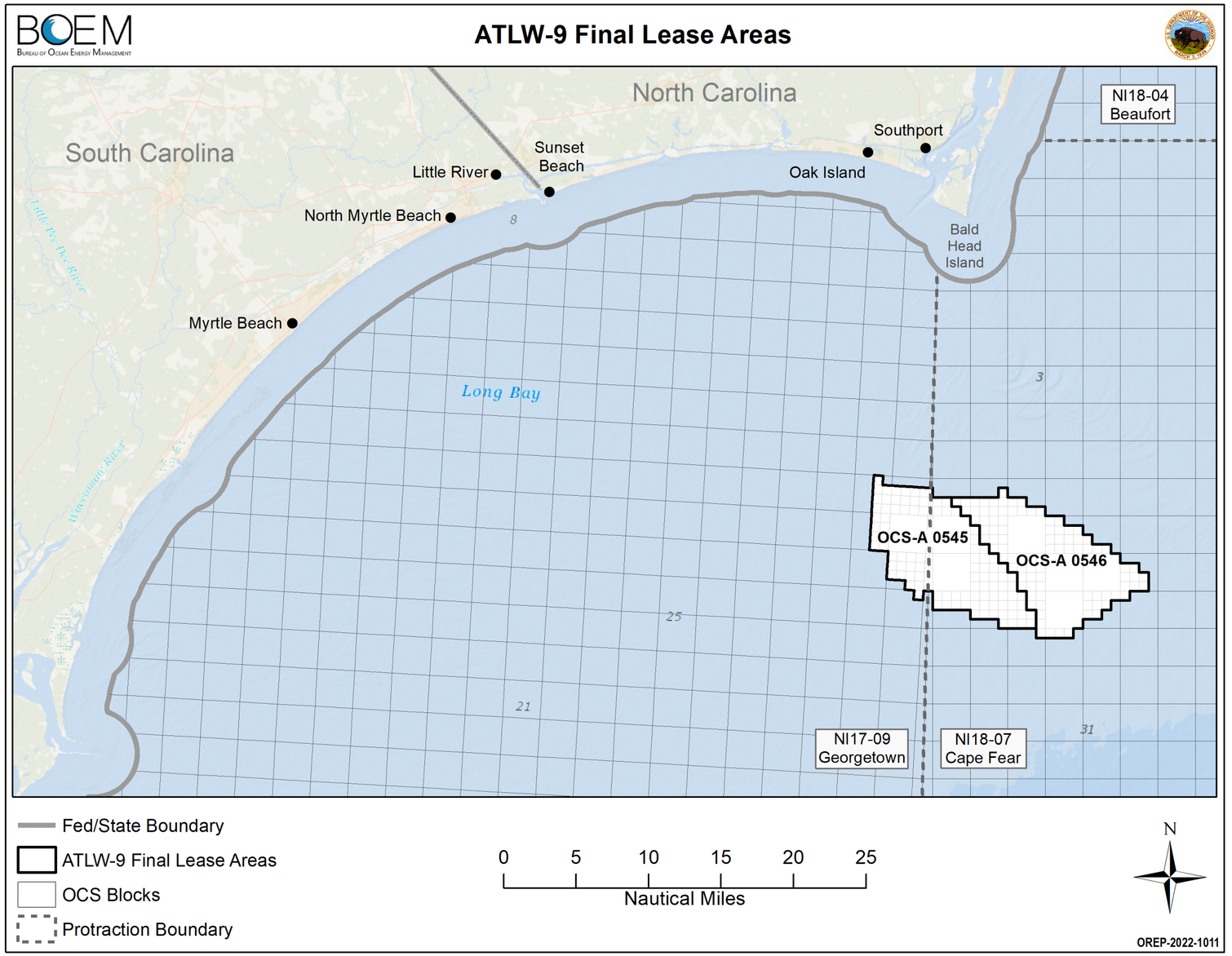


AVANGRID RENEWABLES

Kitty Hawk South Offshore Wind Project

NOT FOR CONSTRUCTION

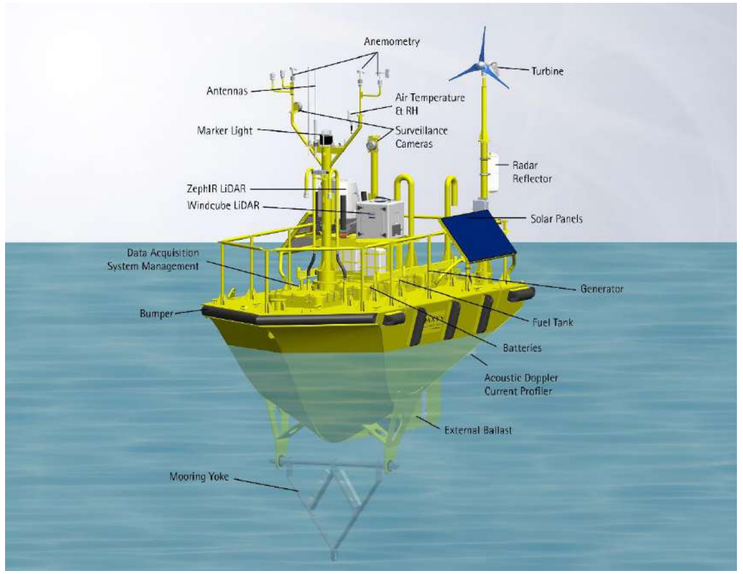
Wilmington Wind Energy Area



Wilmington Wind Energy Area

- 1/12/22, BOEM submitted a Federal Consistency Certification for possible lease issuance and site assessment plan
  - 3/17/22, DCM found proposal conditionally consistent on meeting with DCM, WRC, and DMF to avoid conflicts with marine resources

- 5/11/22 lease auction will be held for two areas within the Wilmington Wind Energy Area



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Wilmington Wind Energy Area

- 547 Energy LLC
- Arevia Power LLC
- Avangrid Renewables, LLC
- BP US Offshore Wind Energy LLC
- Invenergy Long Bay Offshore LLC
- Carolina Offshore Wind LLC
- **Duke Energy Renewables Wind, LLC**
- EDF Renewables Development, Inc.
- JERA Renewables NA, LLC
- Masdar Offshore Wind Americas LLC
- MRP Offshore Wind Farm LLC
- Orsted North America Inc.
- OW North America Ventures LLC
- RWE Offshore Wind Holdings, LLC
- Shell New Energies US LLC
- **Total Energies Renewables USA, LLC**

DUKE ENERGY®

TotalEnergies

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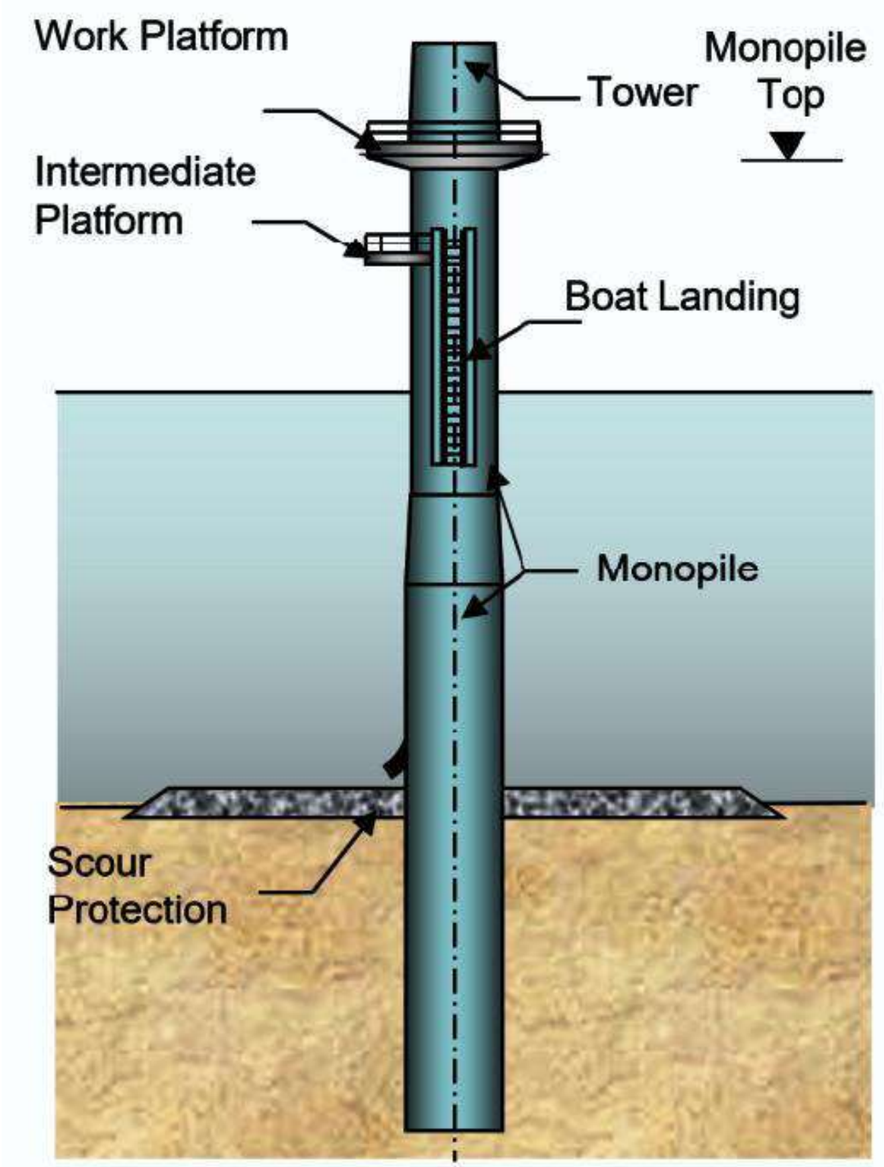
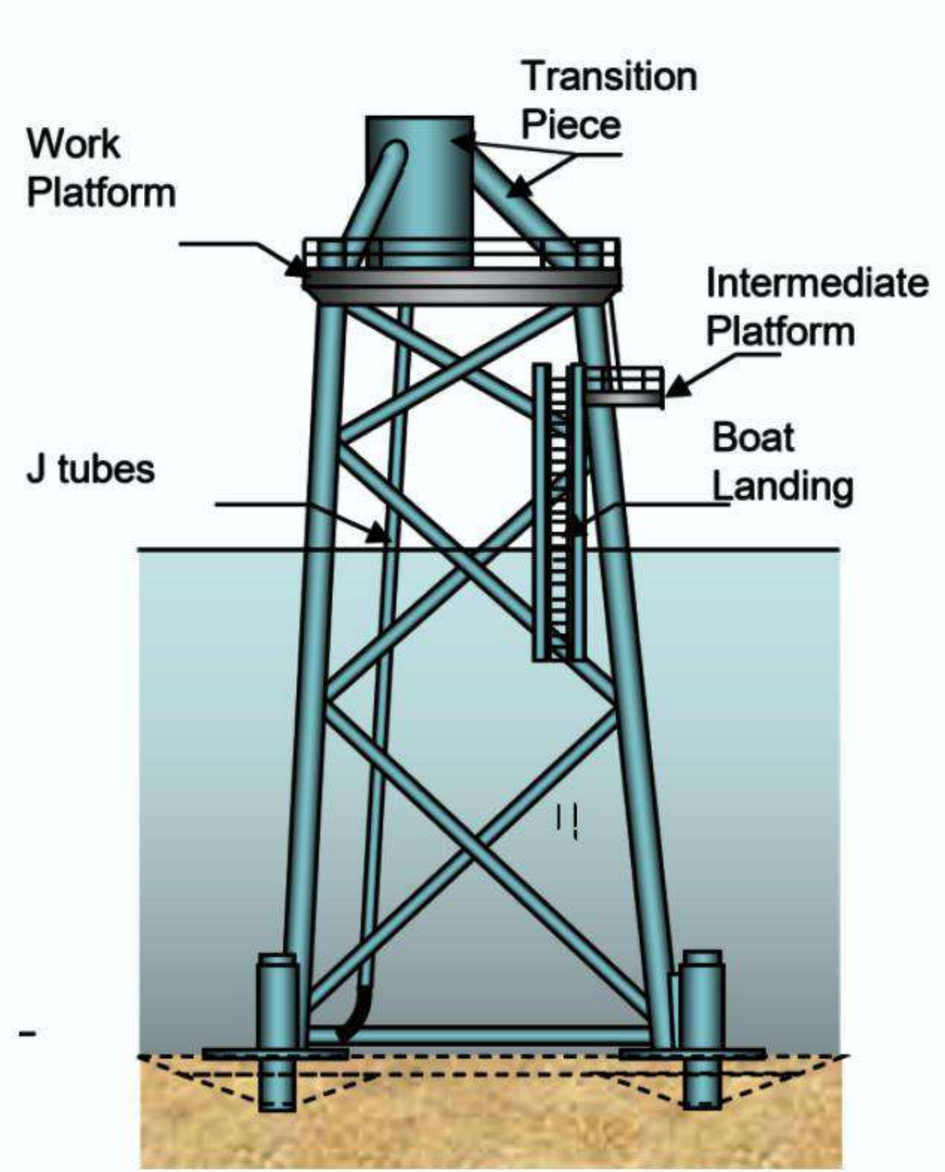
Bureau of Ocean Energy Management

Turbine Foundation-Monopile



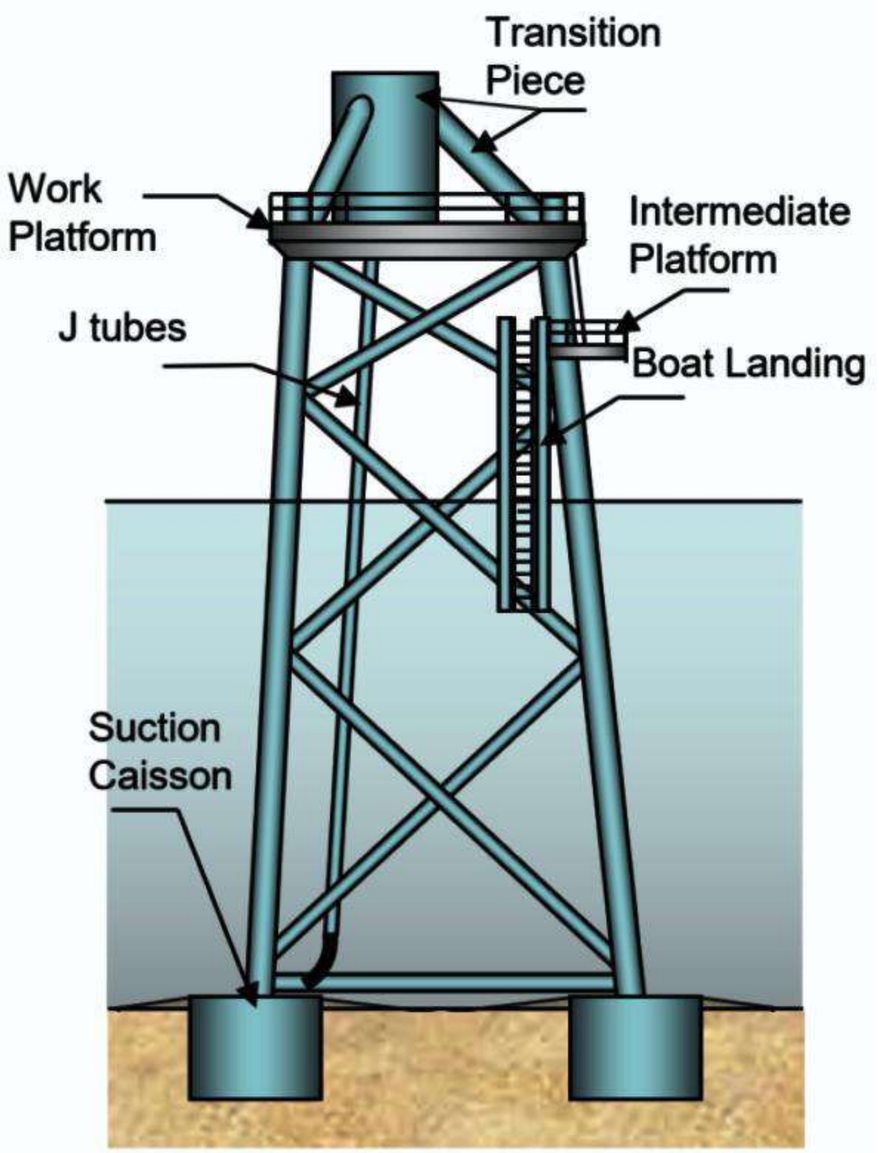
AVANGRID RENEWABLES

Turbine Foundation-Piled Jacket



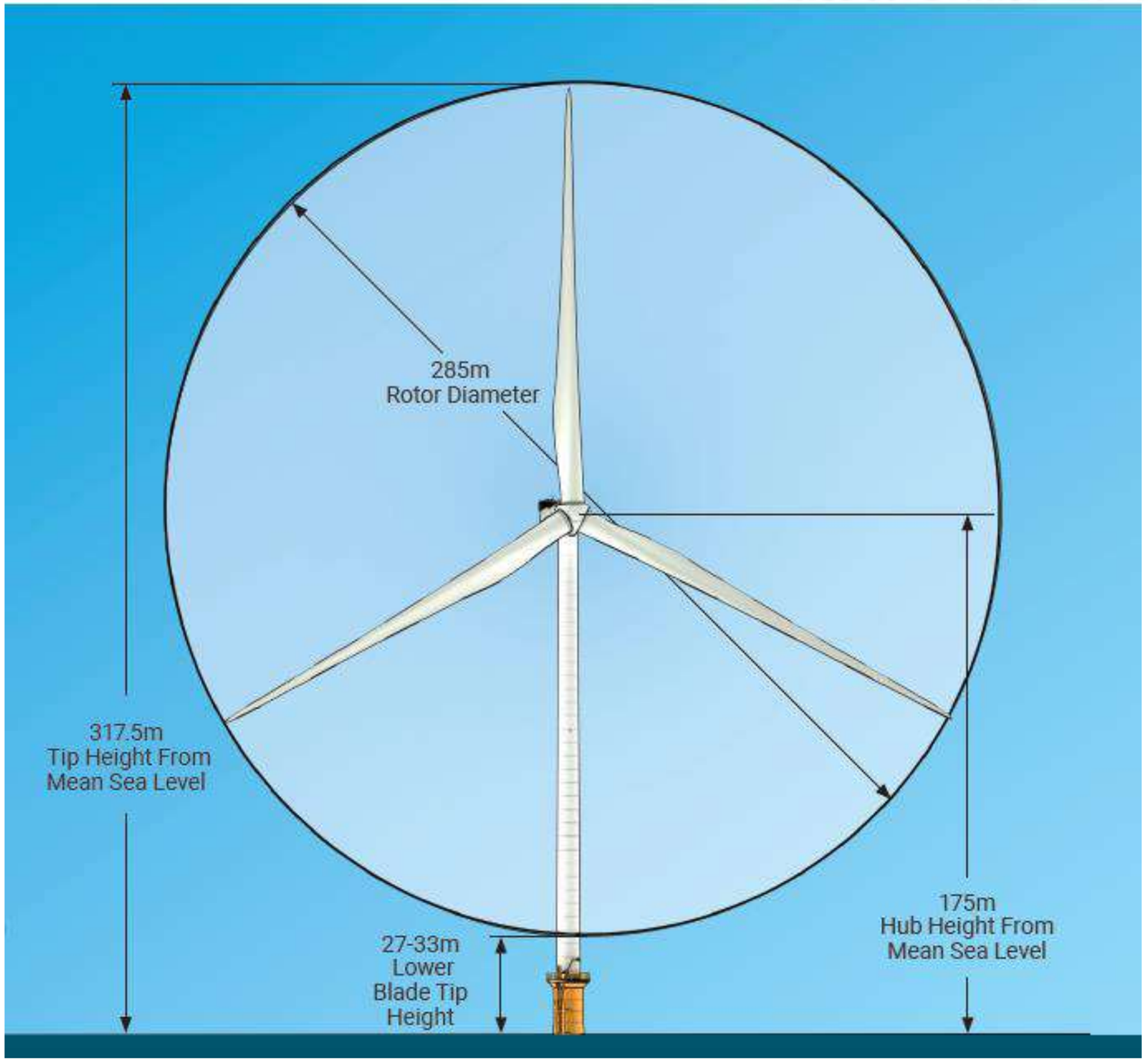
AVANGRID RENEWABLES

Turbine Foundation-Suction Caisson Jacket



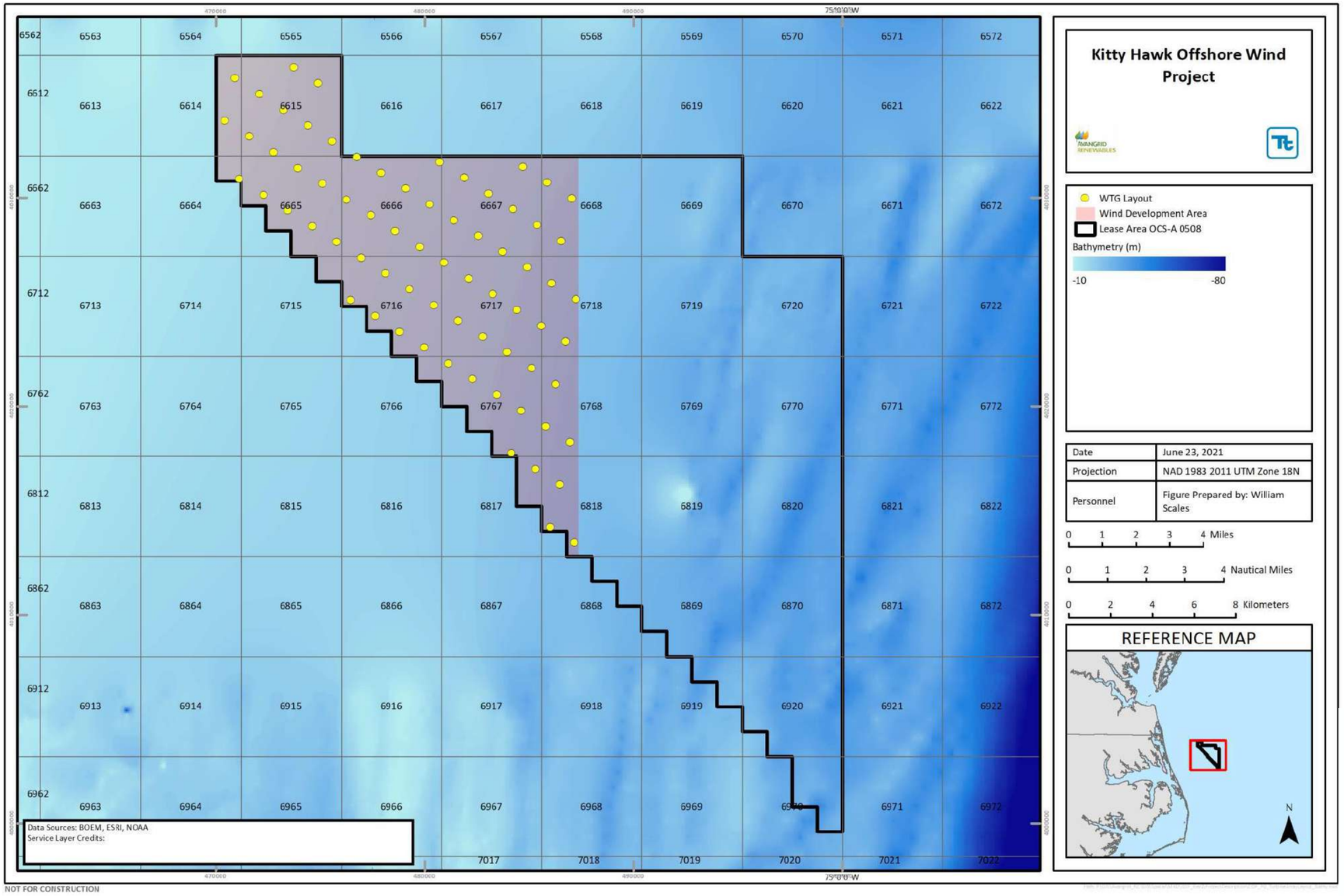
AVANGRID RENEWABLES

Wind Turbine Generator-Maximum Dimensions



AVANGRID RENEWABLES

Wind Turbine Layout



NC Joins Fisheries Compensation Initiative

Special Initiative on Offshore Wind

- Avoid impacts to fisheries
- Minimize impacts
- Mitigation with compensation

Special Initiative on
Offshore Wind

Questions

BOEM
Bureau of Ocean Energy Management

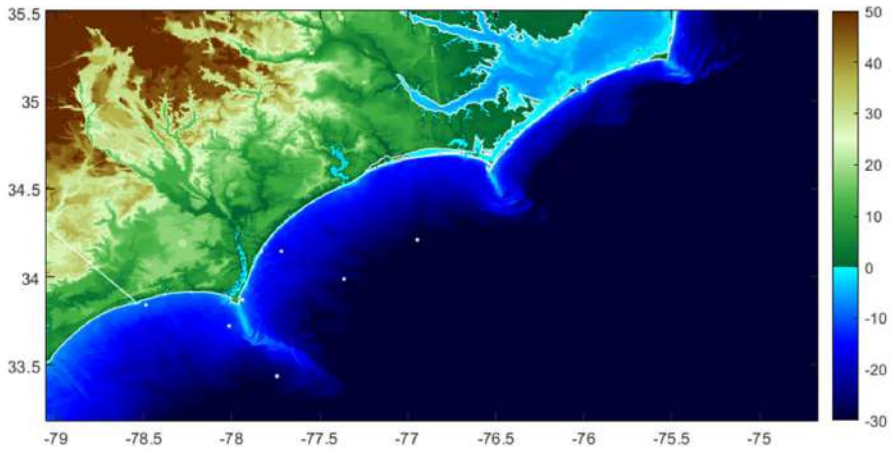
Ecosystem Analysis of Frying Pan Shoals

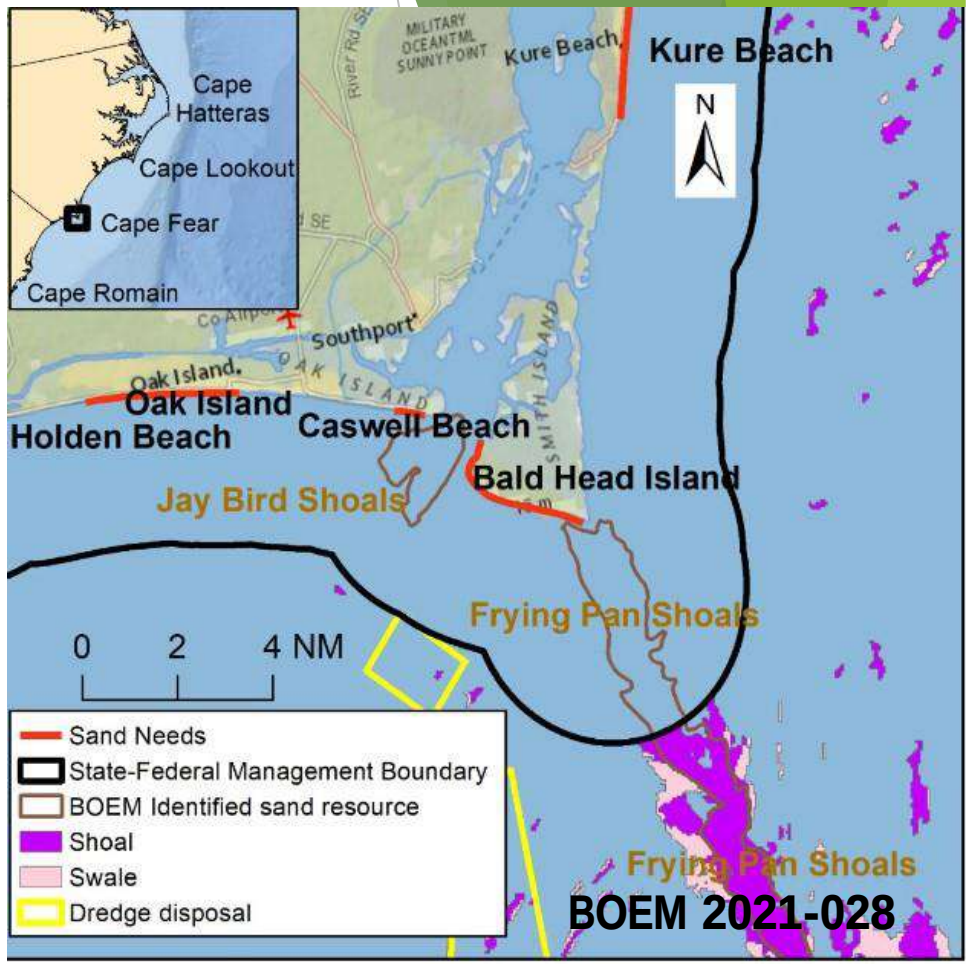
Researchers:

- Co-lead Dr. Joseph Long, associate professor, Physics and Physical Oceanography; director, Coastal Engineering Program
- **Co-Lead Dr. Frederick Scharf, professor, Biology and Marine Biology**
- **Dr. Christian Briseño-Avena, assistant professor, Biology and Marine Biology**
- Dr. Derek Grimes, assistant professor, Physics and Physical Oceanography
- Dr. Andrea Hawkes, professor, Earth and Ocean Sciences
- Dr. Shannon Klotsko, assistant professor, Earth and Ocean Sciences
- **Dr. Martin Posey, professor, Biology and Marine Biology**
- Dr. Sutara Suanda, assistant professor, Physics and Physical Oceanography
- Dr. Lynn Leonard, associate director for research and innovation, CMS; director, Coastal Ocean Research and Monitoring Program; professor, Earth and Ocean Sciences

Cape Fear / Frying Pan Shoals

- Part of larger Carolina Cape and Bay system
- Characteristics:
  - 28 miles long; Frying Pan Slough ~15 miles offshore
  - 35-50 ft depth at the Frying Pan Tower
  - 3-5ft depth at some crest areas
  - Known for large number of shipwrecks
  - Protects entrance to Cape Fear River – ecological and historical importance
  - Onslow Bay contains several hard-bottom areas





Connection to Cape Fear River System

- Cape Fear River
  - Longest river wholly within NC
  - Area >9300 square miles
  - Largest commercial port in terms of tonnage in state; Military Terminal at Sunny Point
- FPS redirects connection between Onslow Bay and Cape Fear estuary
  - Barrier for species moving along coast between Long Bay and Onslow Bay
- Extended estuary patterns for some species
  - E.g. blue crabs


NC Costal Federation

Biotic Resources and Uses of the FPS Region

- Fisheries
  - Commercial
  - Recreational
- Shipping
- Protected species
- Migratory fish, birds, whales
- Possible unique habitats

Need for Sand

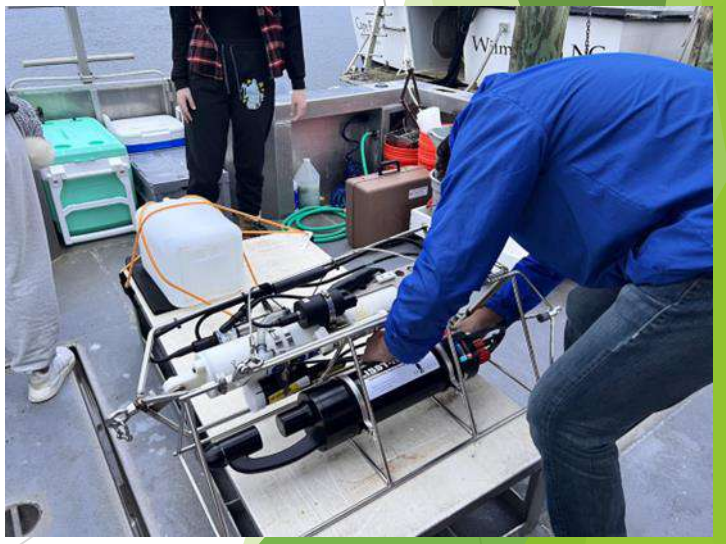
- Several regional beaches undergo at least periodic beach nourishment
  - Wrightsville Beach
  - Bald Head Island
  - Carolina Beach
  - Kure Beach
  - Ocean Isle
  - Caswell Beach
  - Others …
- Demand may increase with rising sea level
- Regional sand sources of correct sediment type depleted
  - Based on an analysis of historic placement volumes, New Hanover and Brunswick Counties predicted to have a net sediment deficit over next 50 years.

Information to be Obtained From FPS Sampling

- Characterize the sedimentary environment of FPS
- Characterize the oceanographic conditions of FPS
- Examine aspects of sediment transport pathways to FPS
- Determine the baseline seasonal variability of benthic community species composition and distribution at FPS
- Determine if zooplankton are advected to or produced and maintained within the FPS complex
- Understand the utilization and importance of FPS to coastal fishes

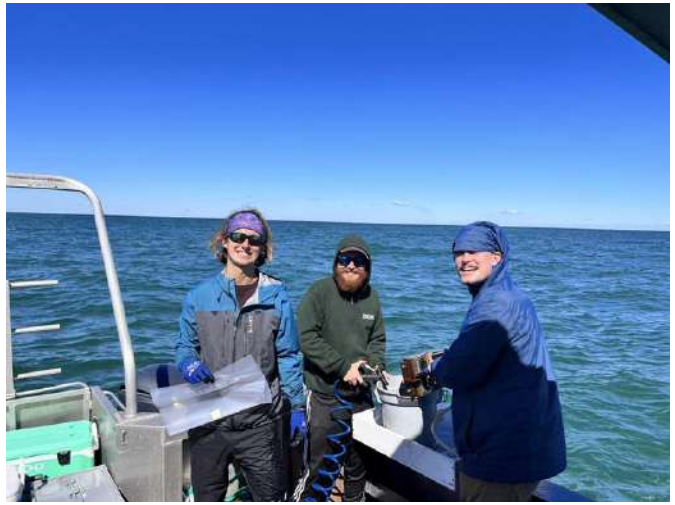
Proposed Biotic Sampling Design – Scale and Frequency

- 12 sites
  - Shallow and deeper areas along both sides of the shoal
- Sampled seasonally over 2 years
  - Feb, May, Jul/Aug, Oct
- Plankton (Dr. Briseno-Avena)
  - CTD casts with DO; flourometer, PAR, Transmissometer
  - Plankton net tows
  - Niskin bottle
  - Holographic imaging



Proposed Biotic Sampling Design – Scale and Frequency

- Benthos (Dr. Posey / Troy Alphin)
  - Grab samples for fauna and sediment characteristics
  - Functional guild analyses
  - Crabs and shrimp from trawls
- Fisheries (Dr. Fred Scharf)
  - 4cm stretched mesh trawl; 15 cm stretched mesh
  - Longline
  - Acoustic tagging of select species (with fixed acoustic receivers)



Other Sampling – Physical Variables

- Geologic processes
  - Sidescan sonar; sub-bottom profiler
  - Coring; surface grabs
- Physical processes
  - Moored arrays: profilers, current meters, temperature/conductivity/depth profiler, pressure sensors, optical sensors, wave buoys
  - Shipboard water sampling: florescence profile, CTD
  - ADCP's
  - Langragian study with drifters
  - Modeling

Understanding We Hope to Gain from Biotic Sampling

- Plankton Sampling
  - Planktonic food sources
  - Distribution of plankton around shoals
  - Ichthyoplankton
- Benthos
  - Composition provides insights into food webs and disturbance regimes
  - Benthic prey
  - Connections to fisheries species
- Fisheries
  - Composition and movement around shoals
  - Timing of occurrence
  - Use of shoals by commercial and recreational species

Funding support from BOEM Agreement # M22AC00013

10-Min Break – Please Proceed to MSP Breakout Rooms by 3:05pm

10-Min Break – Please Proceed to MSP Breakout Rooms by 3:05pm

Breakout Session Locations (Plenary Panel #3)				
Topic	**Location**	**Seating Capacity**	**Speaker(s)**	**Event Staff**
Sand Mining	CMS 1107 (this building)	12	Dr. Martin Posey	Dr. Larry Cahoon
Sand Mining	CMS 1109 (this building)	20	Ryan Davenport	Dr. Mariko Polk
Offshore Wind	MARBIONIC 1001A	16	TBD	Kyra Hagge
Offshore Wind	MARBIONIC 1001B	20	Daniel Govoni	Scott Baker
Offshore Wind	MARBIONIC 1001C	20	Karly Lohan	Jeff Flood

5-Min Break – Please Return to CMS Auditorium by 3:45pm

Student Poster Competition Winners!

Closing Remarks: Dr. Paul Ticco
President, The Coastal Society

THE COASTAL SOCIETY

Many thanks to our generous sponsors!

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Duke University Marine Lab

N.C. DIVISION OF COASTAL MANAGEMENT

North Carolina Coastal Federation
Working Together for a Healthy Coast

Lynker

If you'd like to continue your networking offline or suggest what coastal issues should be on tap next, then pour it on!

Post-Forum happy hour generously hosted by Wilmington Brewing Company
4:30pm -6:00pm
Free snacks provided by TCS

800 South Kerr Avenue, Wilmington, NC 28403