Offshore Wind in North Carolina: Updates on the Kitty Hawk Wind and Carolina Long Bay Projects

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Kitty Hawk Wind

AVANGRID

DUKE ENERGY

TotalEnergies

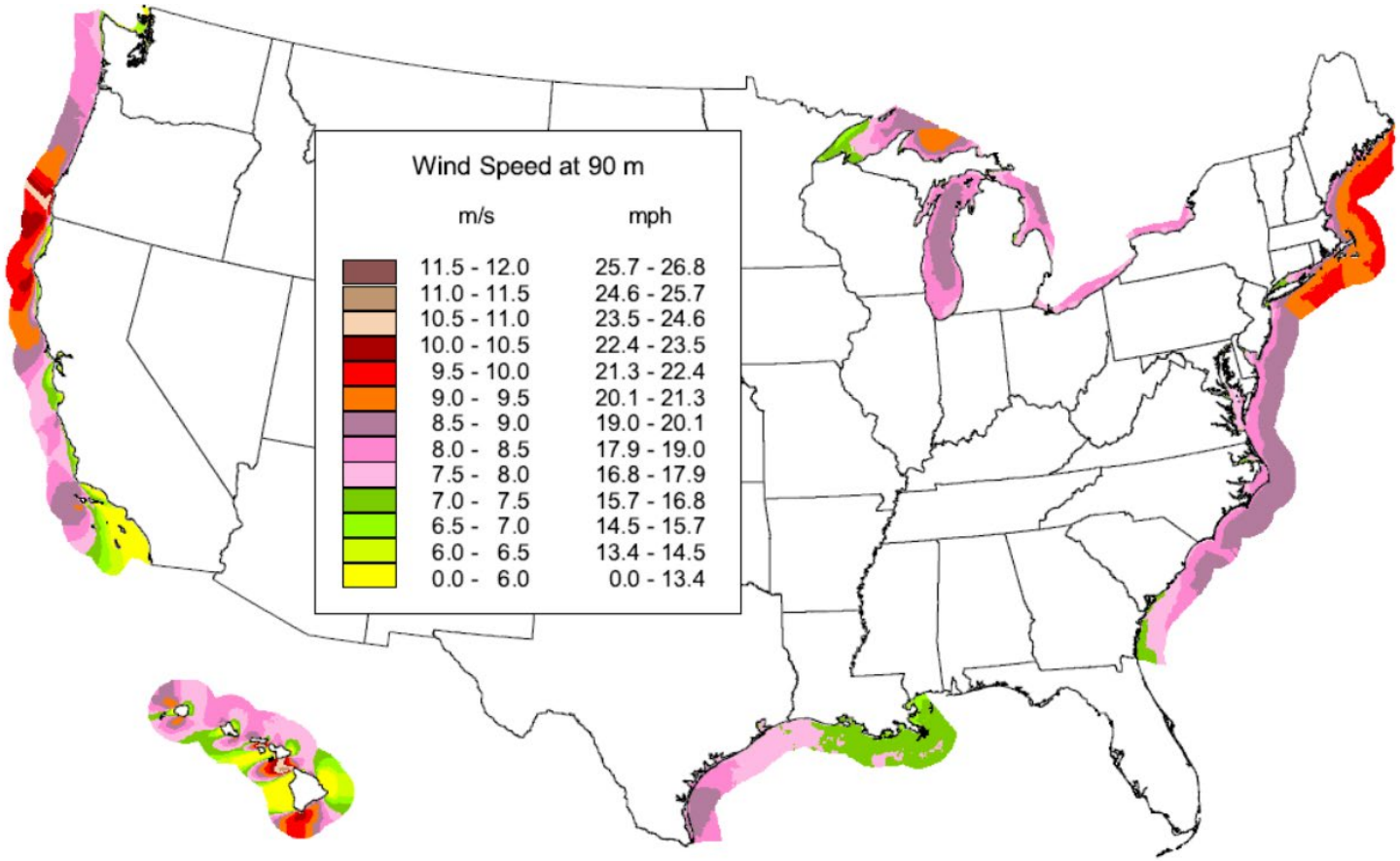
Presentation Overview

1) Brief Introduction to Offshore Wind
2) Overview of Kitty Hawk Wind
3) Overview of Carolina Long Bay
4) Regional Strategies
5) Time for Questions

Overview of Offshore Wind

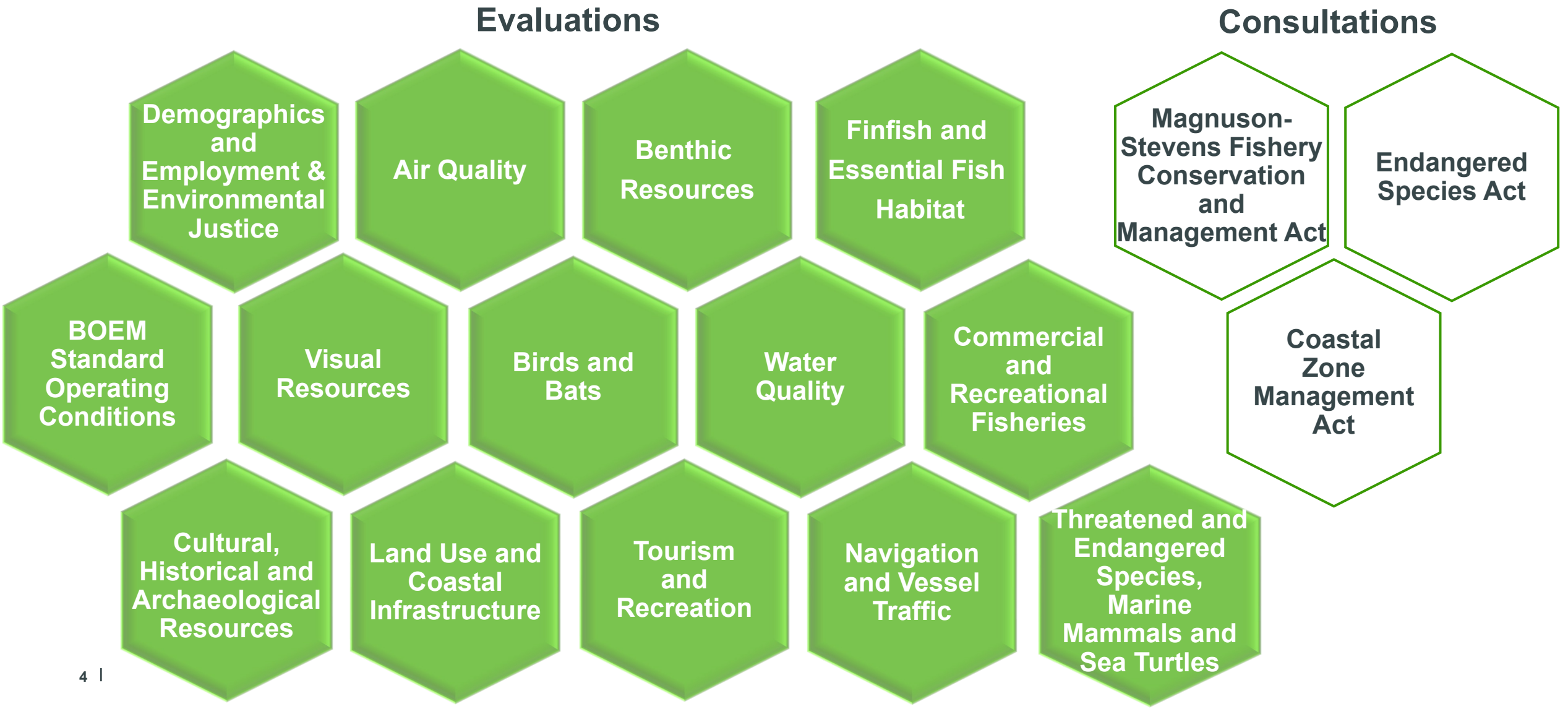
Annual Average Offshore Wind Speed at 90 m Above Sea Surface

Source: NREL, 2010



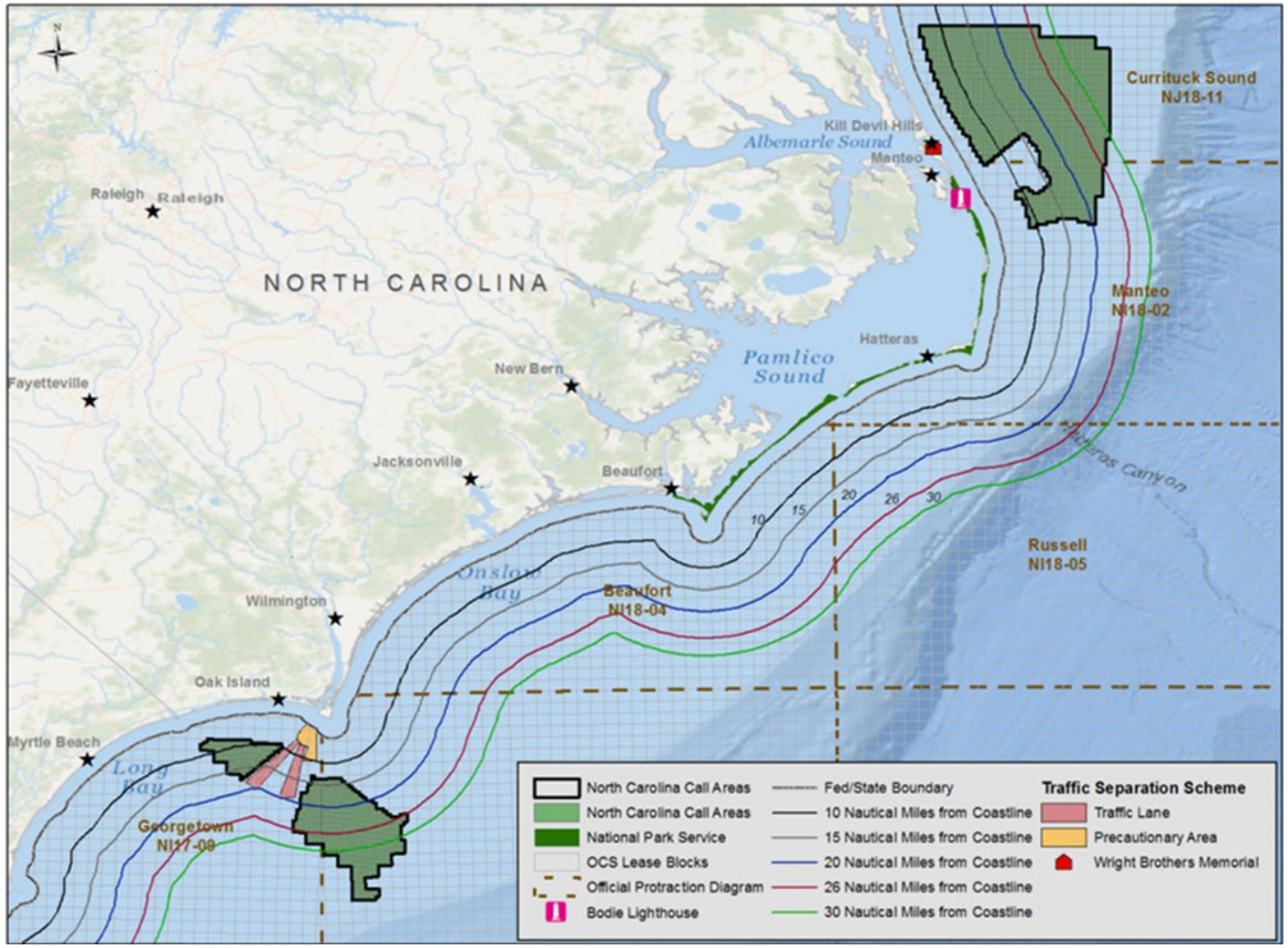
- Wind speeds are greater and more consistent offshore
- Offshore wind energy is an important part of meeting state and federal renewable and domestic energy goals
- Federal and state governments have worked together to determine locations for offshore wind energy areas

BOEM Environmental Assessments of Lease Areas

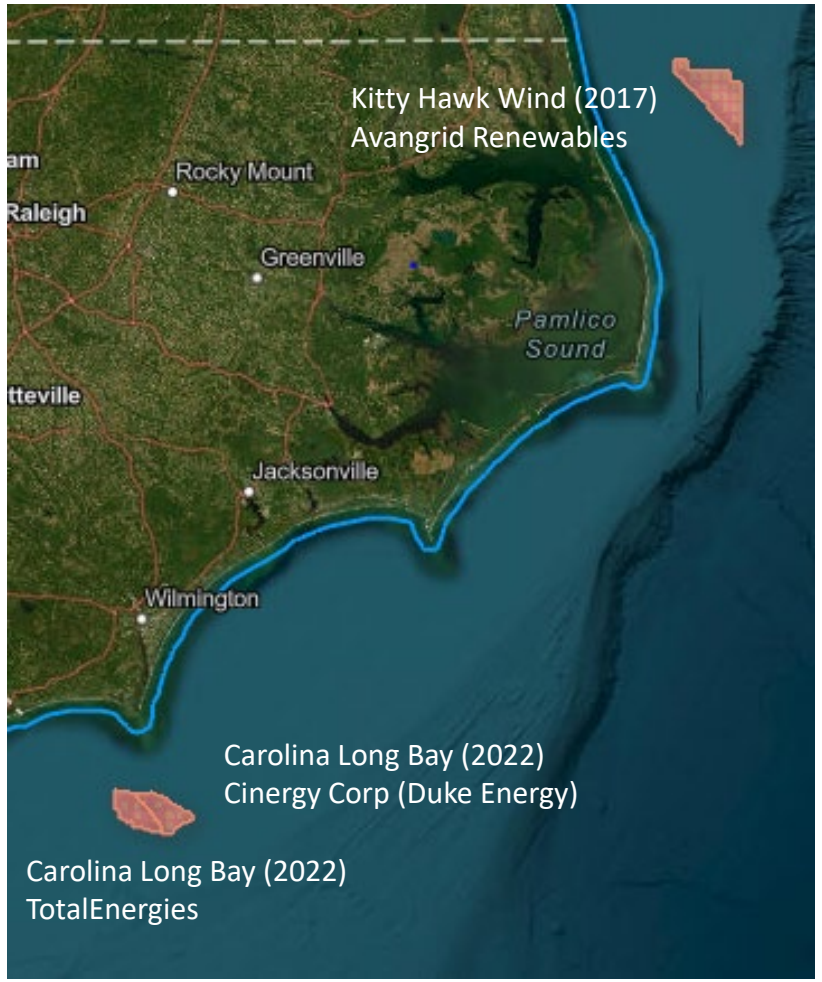


Evolution of NC Lease Areas

Wind Energy Call Areas



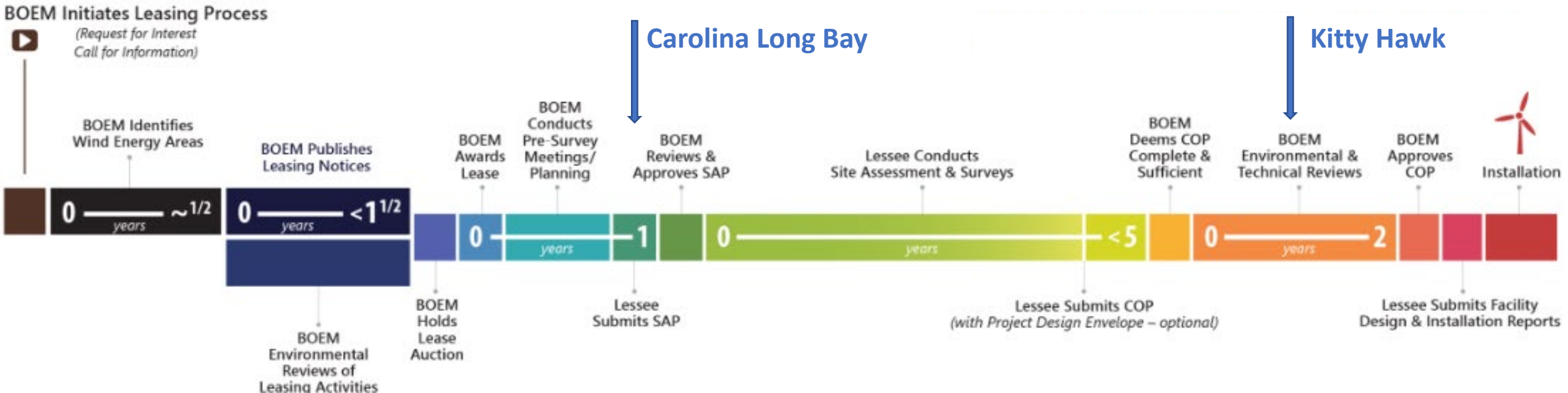
Wind Energy Call Areas



Overview of Offshore Wind

- Developers that win leases conduct surveys and studies to learn more about their lease areas
- Developers draw up project plans (construction and operations plan, COP) for offshore wind development and submit those plans to BOEM for approval
- BOEM conducts extensive environmental and technical reviews to determine possible impacts and how to mitigate them before approving, modifying, or disproving plans

BOEM Renewable Energy Leasing Process



Overview of Offshore Wind

- Developers are required by BOEM to work with independent researchers to conduct fisheries monitoring plans that will survey impacts to commercially and ecologically important species

- These important surveys are conducted before, during, and after construction occurs and use a variety of approaches that are appropriate for the region

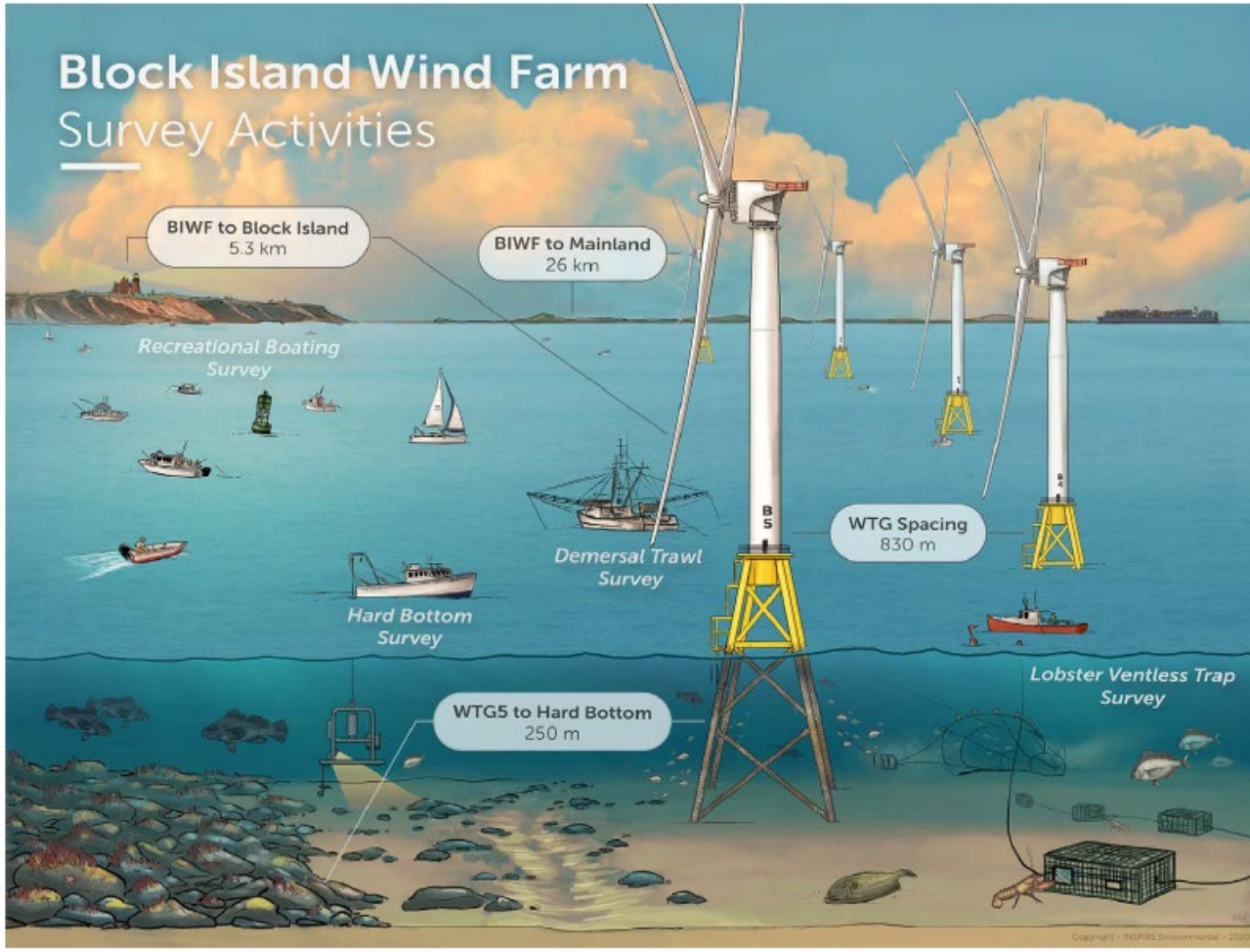


FIGURE 1. The first offshore wind farm in the United States, Block Island Wind Farm (BIWF) is unique in scale with five turbines 830 m apart. It is locate near an island adjacent to natural reefs, an area where there is heavy recreational fishing use. Four studies related to fish and fisheries resource yielded important lessons on scale and duration for future monitoring efforts. WTG = wind turbine generator.

Kitty Hawk Wind

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Kitty Hawk Wind Lease Area

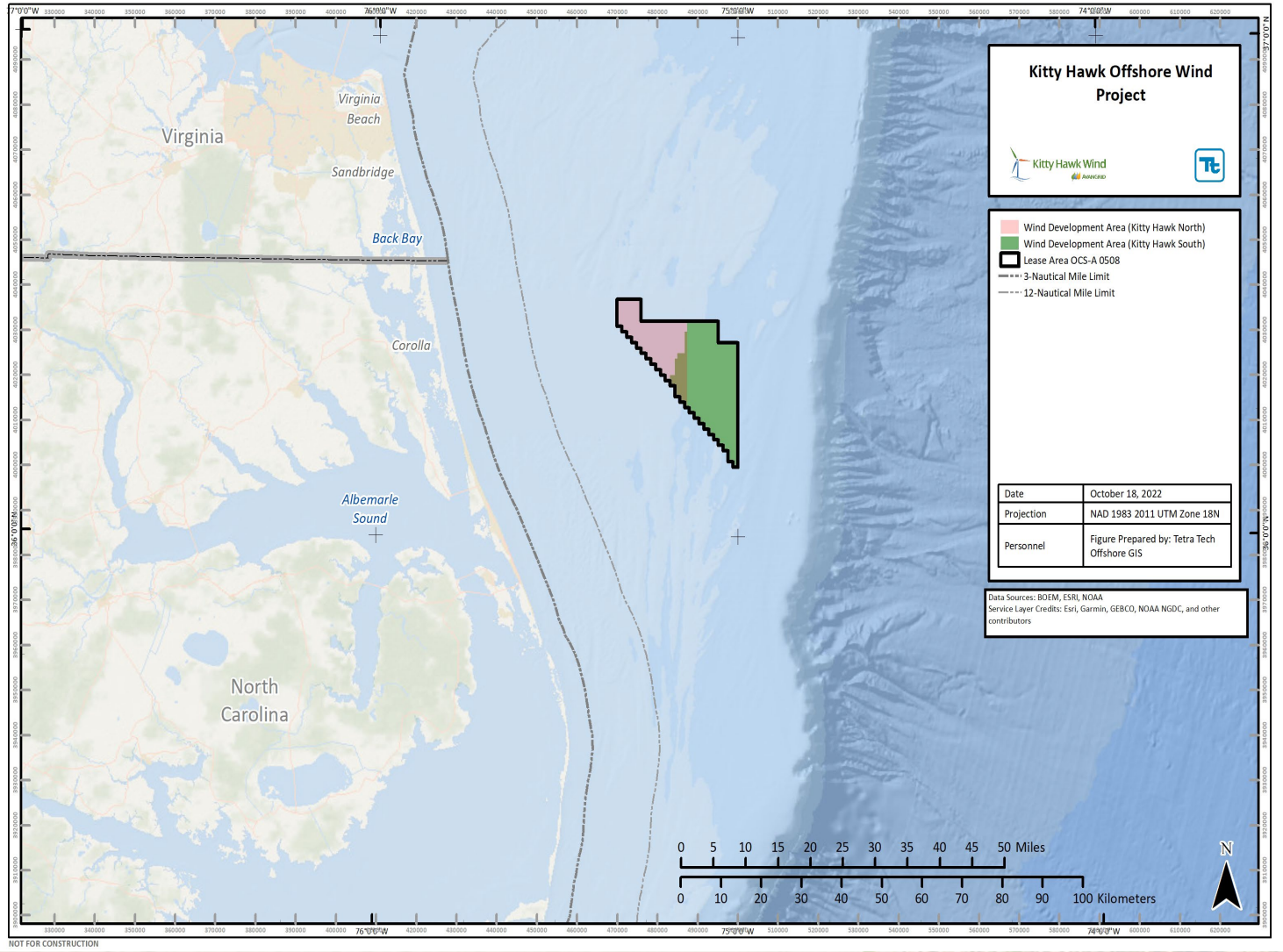
Location: 27 miles offshore of Corolla, NC

Lease Area: 122,405 acres

Capacity: ~3500 megawatts (MW)

Site Characteristics:
Wind speed: 8-9 m/s
Water depth: 30 to 50 meters

Projects w/in Lease:
Kitty Hawk North- ~ 40% of the lease
Kitty Hawk South- ~ 60% of the lease



Kitty Hawk North Overview

Overview

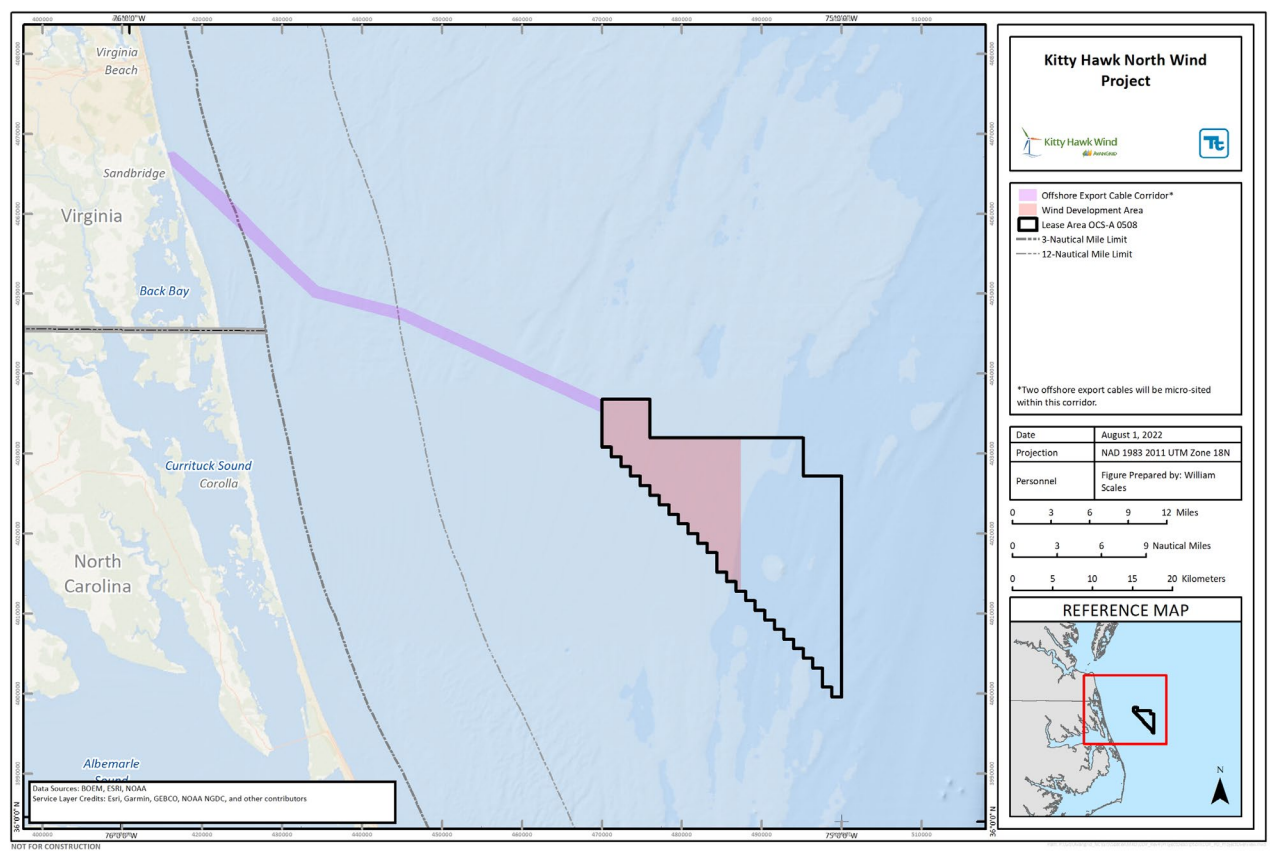
- Approximately 40% of the Kitty Hawk Lease Area
- 69 wind turbine positions and 1 electrical service platform

Permitting

- COP submitted to BOEM in December 2020; updated COP submitted in September 2022
- Construction to begin no earlier than 2026

Transmission/Interconnection

- High Voltage Alternating Current (HVAC) technology



Kitty Hawk South Overview

Overview

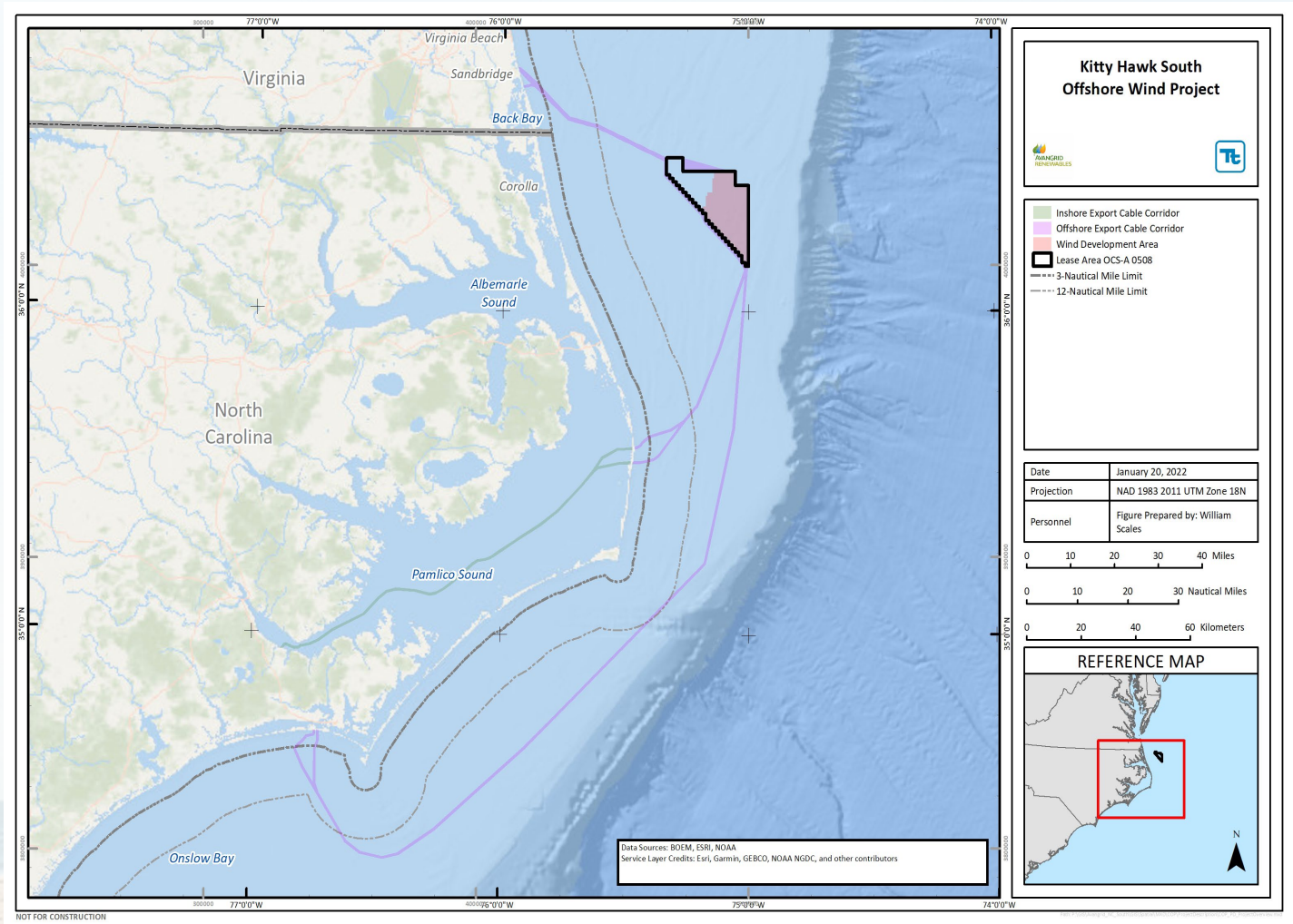
- 60% of the Kitty Hawk Lease Area
- 121 wind turbine positions and 2 electrical service platforms

Permitting

- COP submitted to BOEM on April 14, 2022
- State permitting process not yet initiated
- Construction to begin no earlier than 2028

Transmission/Interconnection

- Route planning and constraints analysis ongoing for offshore and onshore transmission routes to North Carolina
- High Voltage Direct Current (HVDC) technology

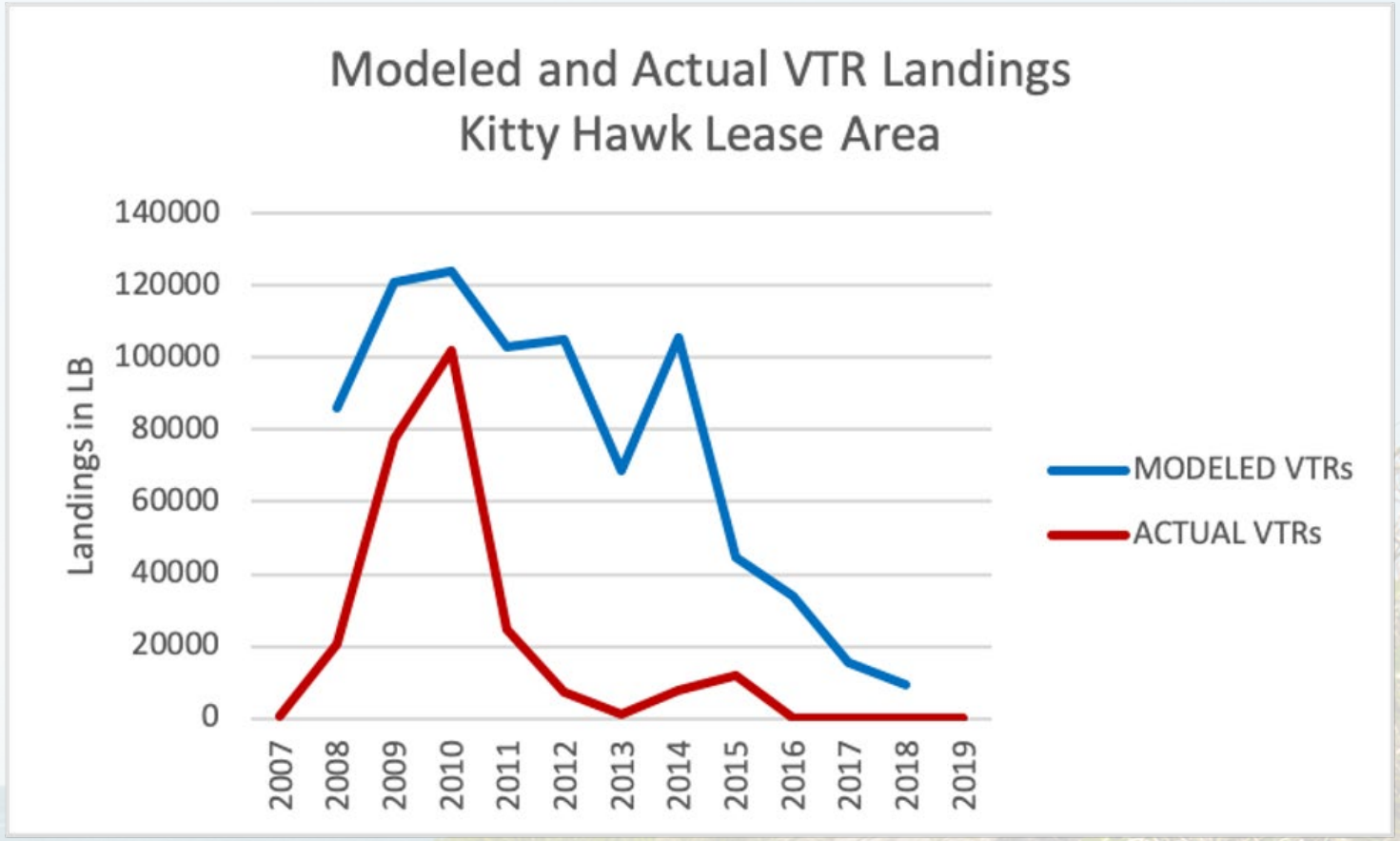


Fisheries Considerations

Utilizing Historical Fisheries Knowledge and Experience

- Previous Avangrid fisheries liaison, Rick Robbins, conducted extensive interviews with local Captains to determine use of lease area

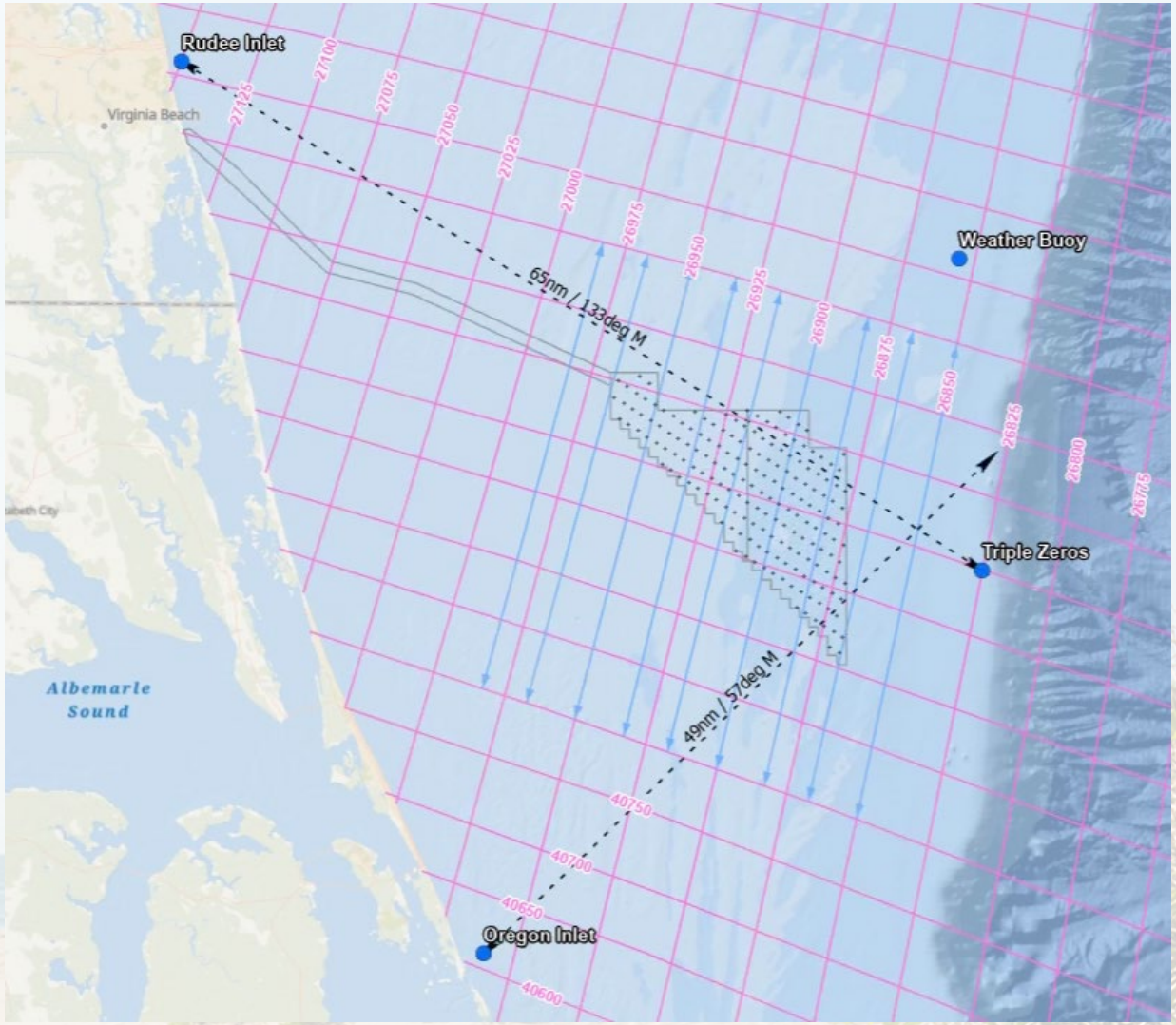
- Thorough analysis of landings data, vessel trip reports, and transits through lease areas revealed low levels of commercial and recreational fishing in the lease area



Fisheries Considerations

Utilizing Historical Fisheries Knowledge and Experience

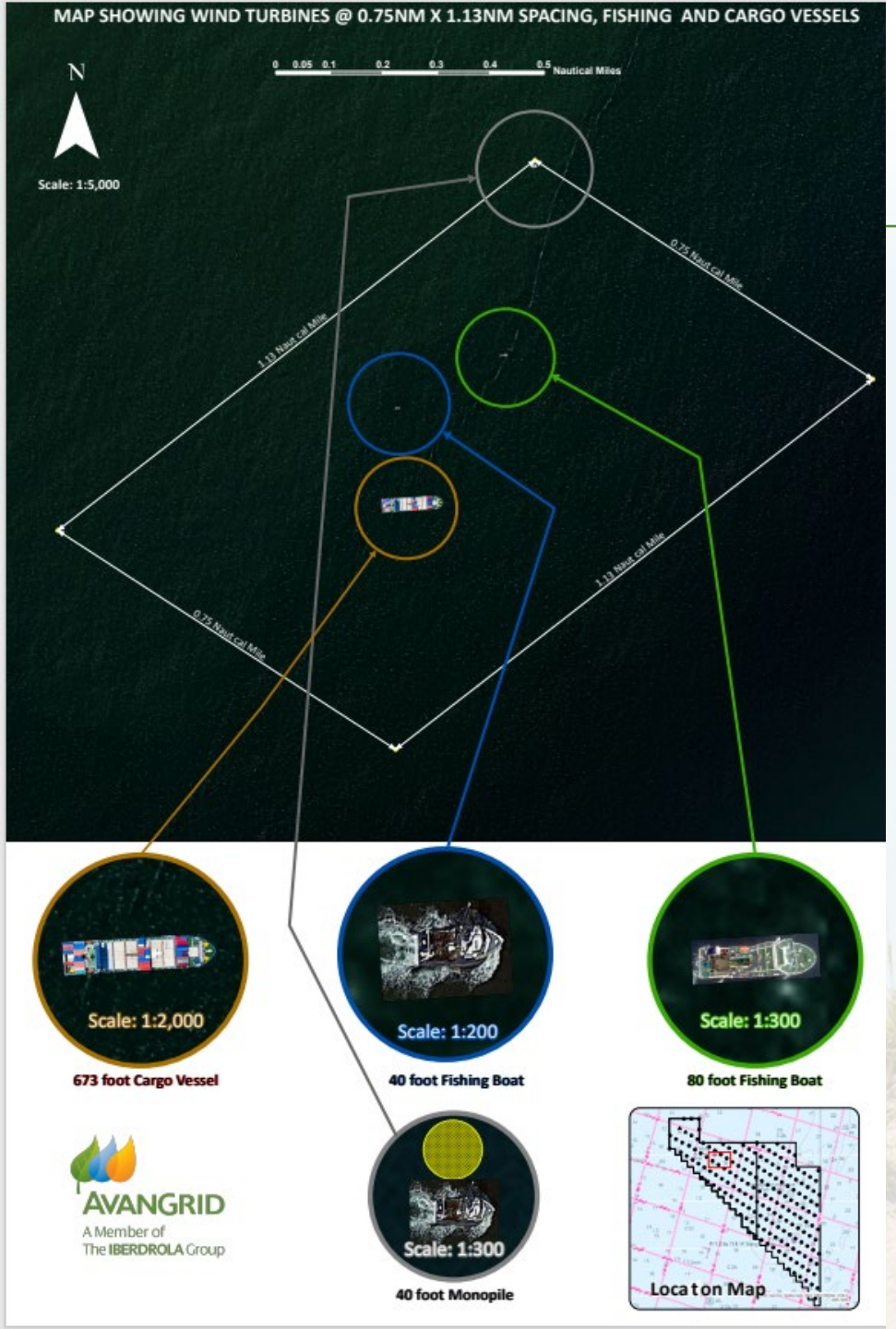
- Orientations of turbines will be consistent with trawl tow directionality
- Relatively direct transit to ledge
- Marking, lighting, and AIS to comply with USCG Guidance



Fisheries Considerations

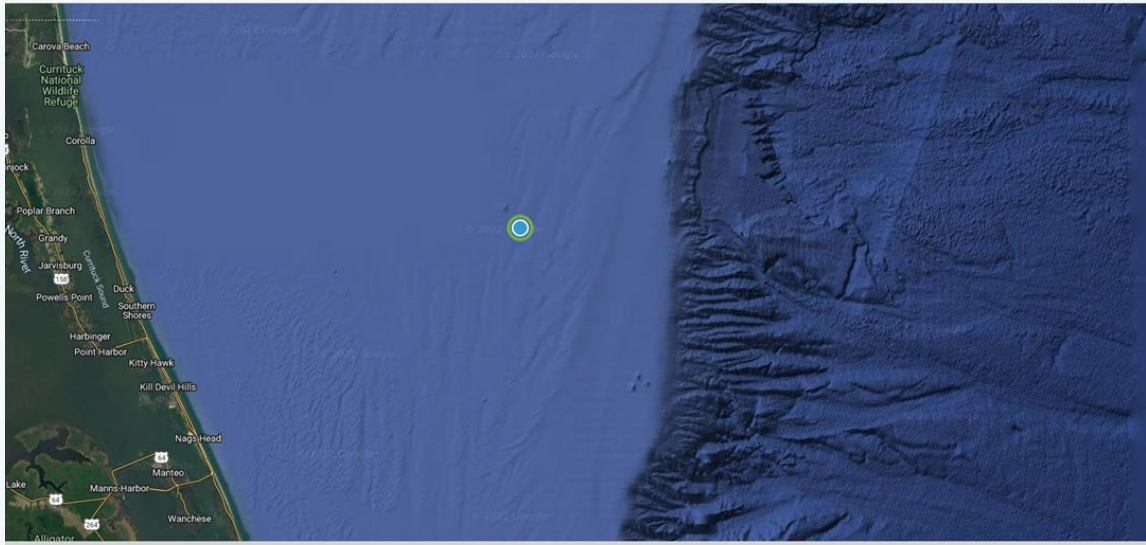
Utilizing Historical Fisheries Knowledge and Experience

- Spacing to accommodate vessels (0.75 x 1.13 nm spacing of turbines)
- Cables buried 5-8ft in the stable sea floor
- Commercial and recreational fishing will not be restricted within the lease area except for construction/maintenance
- Turbines will act as artificial reefs



Meteorological F310 Buoys

- Between 2020 and 2022 Avangrid launched two buoys to collect real time meteorological and ocean data
- Buoys measured:
  - Surface wind speed and direction
  - Relative humidity
  - Directional waves
  - Ocean currents
  - Tide
  - Salinity
  - Water/air temperature
  - Atmospheric pressure
- Data collected was made public in real time



Kitty Hawk Offshore Dashboard

2022-10-25 19:30 UTC

Significant Wave Height (HSig)	Significant Wave Period (TSig)	Mean Wave Direction	Mean Wave Spread
3.61 feet	5 s	82 °	37 °
Surface Current Speed	**Surface Current Direction**	**Sea Surface Temperature**	**Air Temperature**
0.00 knots	13 °	65.1 ° F	62.2 ° F
Surface Wind Speed	**Surface Wind Direction**	**Barometric Pressure**	**Humidity**
11.04 knots	12 °	1016.4	94.9

Fisheries Engagement

Offshore Wind Simulator- Maritime Academy

- In partnership with the Maritime Academy Institute in Norfolk, VA, Avangrid developed an offshore vessel simulation as a tool for navigating/ acclimating to transiting around the wind turbine areas
- Fishers and other ocean users can gain real-time visual experience
- Cooperative work includes enhancing the simulator capabilities by partnering with fishers and other maritime professionals

Fisheries Engagement

Fisheries Outreach

- Sponsored 5 fishing tournaments in 2023:
  - Big Rock, VB Tuna, Alice Kelley, Pirates Cove, VB Billfish

Fisheries Representatives

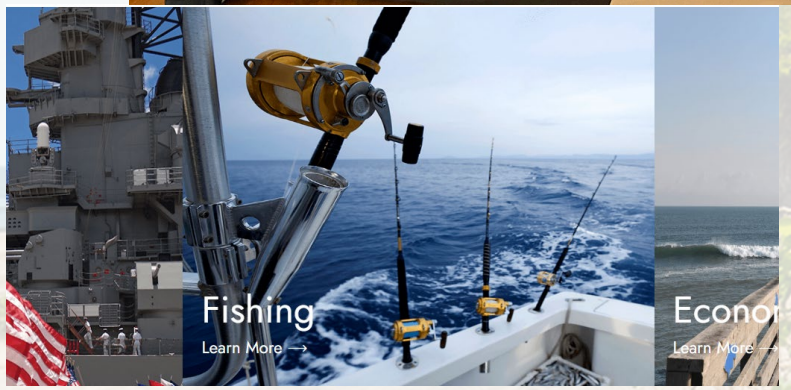
- 2 NC: Dewey Hemilright (Commercial) and Hank Beasley (Rec Charter/Commercial)
- VA: Daniel LeGrande (Rec Charter)

Future collaboration

- Scout and contractors- survey & safety
- Community outreach events
- Joint developer initiatives

Kitty Hawk Website

- Notice to mariners, fisheries notices, FAQs



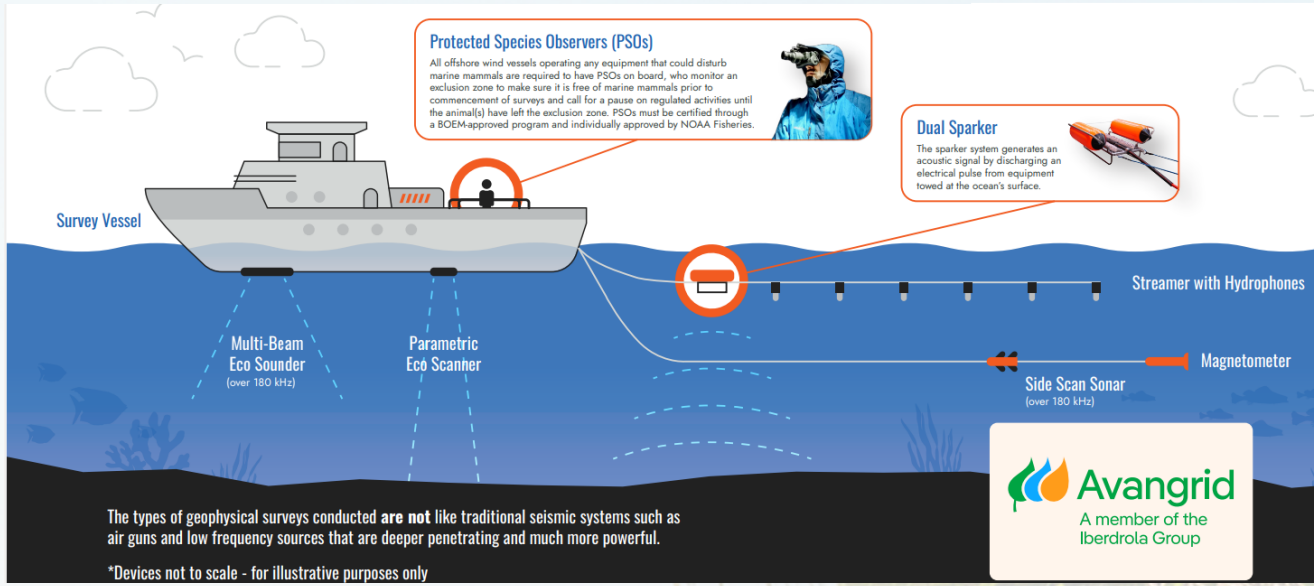
Completed and Upcoming Research

Completed Research

- Wind, current, and wave data gathered from meteorological buoys
- Geophysical surveys (sonar to map sea floor)
- Geotechnical surveys (sediment cores)

Upcoming Research

- Currently planning fisheries monitoring plan in collaboration with academic researchers at local research institutes, local fishermen, and management agencies
- Fisheries monitoring research will be 6-8-year research commitments



Carolina Long Bay 2023 Offshore Wind Activities

Lease Area OCS-A 0545
TotalEnergies Renewables USA, LLC

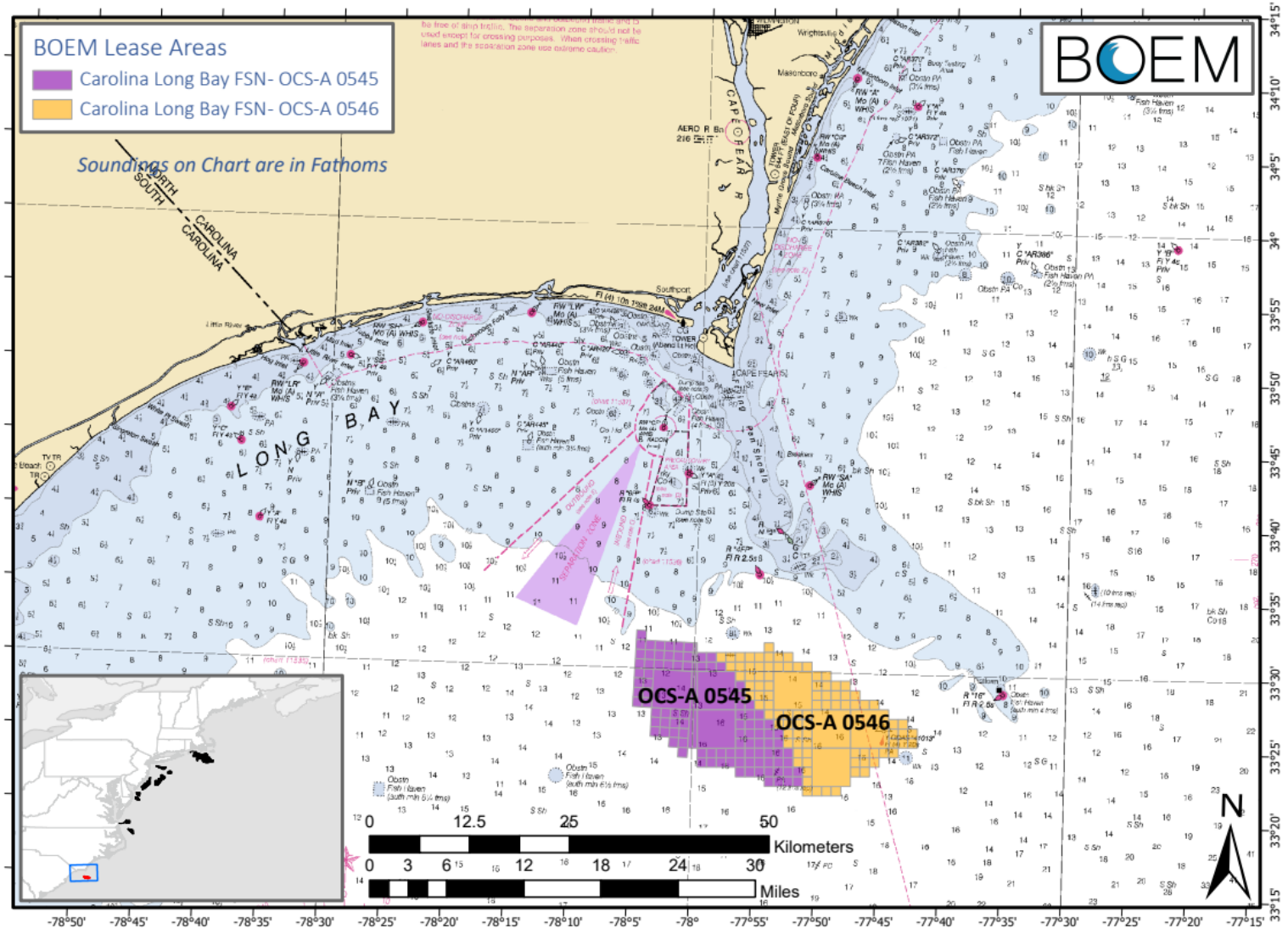
Lease Area OCS-A 0546
Cinergy Corp., a direct non-regulated subsidiary of Duke Energy

South Atlantic Fisheries Management Council

Snapper Grouper AP

October 12, 2023

Carolina Long Bay Offshore Wind Lease Auction – May 2022



Auction Winners

OCS-A 0545: TotalEnergies Renewables USA, LLC

- 54,937 acres

OCS-A 0546: Cinergy Corp.

- 55,154 acres

OCS-A 0546 Lease Reassignment:

- July 12, 2023: Assignment of the lease from Duke Energy Renewables Wind LLC to Cinergy Corp. was approved.
- Cinergy Corp. is a direct non-regulated subsidiary of Duke Energy ("Duke Energy"). [1]

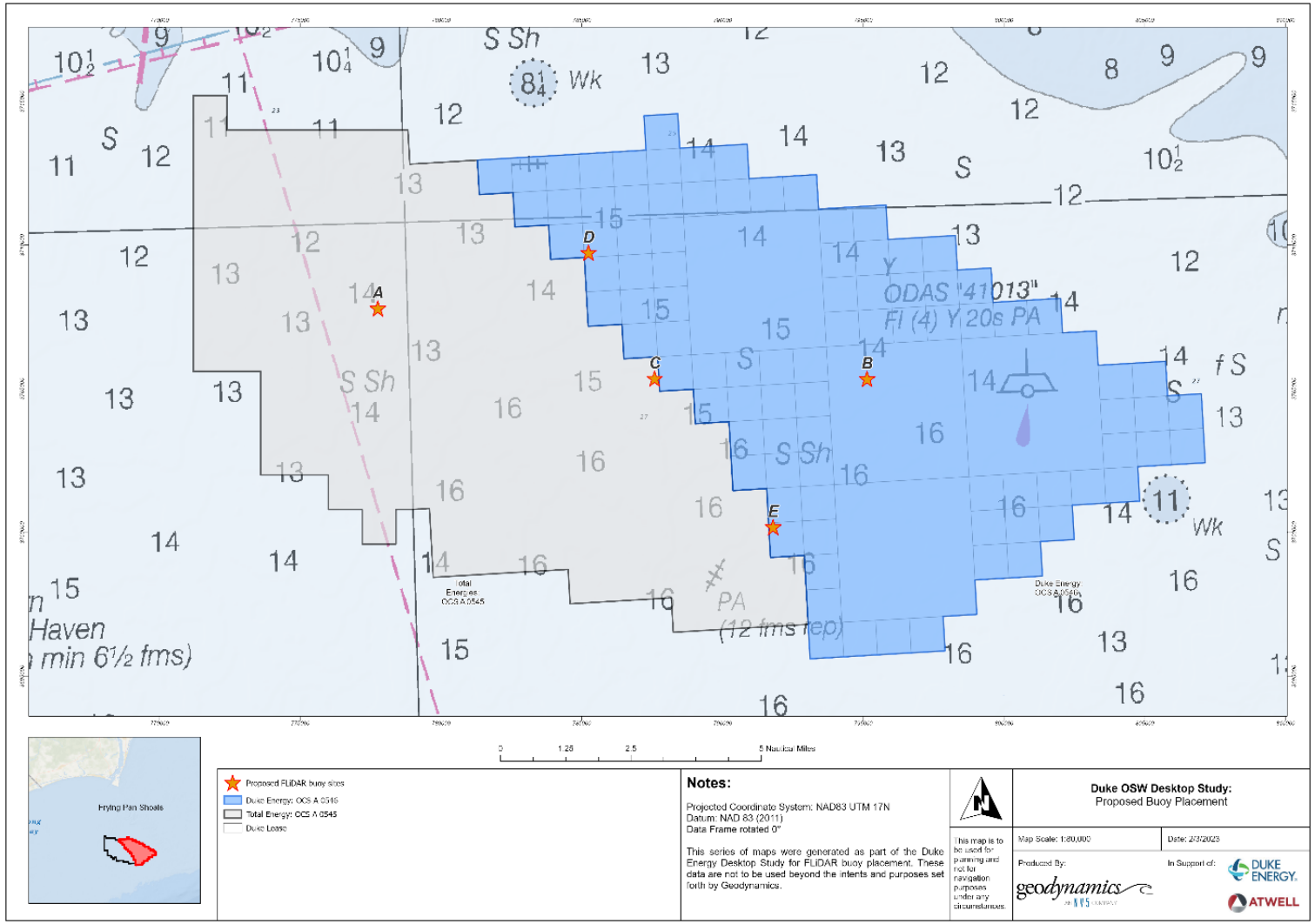
1) Cinergy Corp is not regulated by the North Carolina Utilities Commission (Commission) or in any way sanctioned by the Commission.

Communication Activities

Fisheries Communications Plan (FCP)	Communications strategy for fisheries stakeholders prior to and during activities
	Drafts submitted October 2022 - each Lessee submitted individual plans
	Final plans to be posted on Project websites within 30 days of issuance of BOEM's final guidance
Fisheries Engagement	Commercial & recreational fishermen
	Seafood markets & seafood buyers
	Fishing associations
	Universities, agencies & researchers

Survey Locations

(locations being considered for deployment of buoys)



Plan for Buoys

Meteorological Buoys: Two buoys (one within each lease area) equipped with floating light detection and ranging (LiDaR) and other sensors

Environmental Buoy: Wildlife monitoring; triangulation for locating whale and other marine mammal activity

*No more than 3 buoys are planned

Survey Locations

Survey Location	Latitude	Longitude
Location A	33.477819N	78.0119996W
Location B	33.447271N	77.830528W
Location C	33.442476N	77.913567W

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SAP survey to assess buoy locations:
August 15, 2023 – August 24, 2023

Survey Contractor:
Geodynamics, an NV5 Company

Protected Species Observer Contractor:
RPS

Offshore Fisheries Liaison Contractor:
RPS

Vessel: R/V Shackleford

Survey Stats

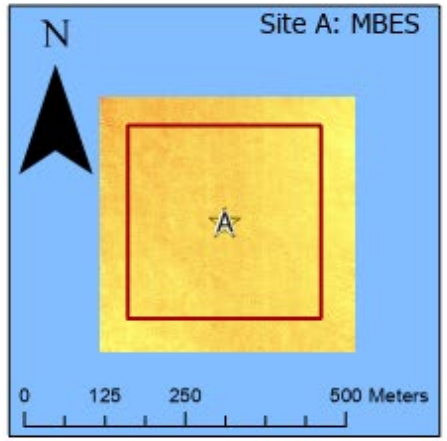
Equipment

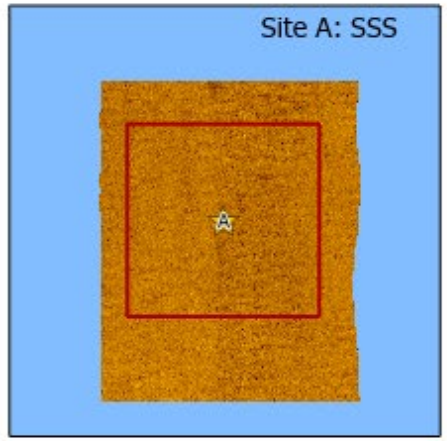
- Sidescan Sonar (SSS)
- Multibeam Echosounder (MBES)
- Magnetometer in Transverse Gradiometer configuration (TVG)
- Sub-bottom Profiler (SBP)
- Young-Modified Van Veen Grab (0.04m2)
- Video transects

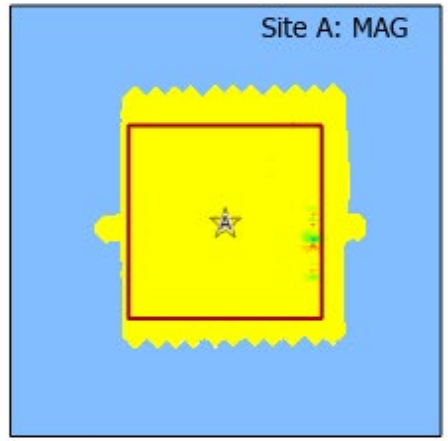
Agency/SAFMC Feedback

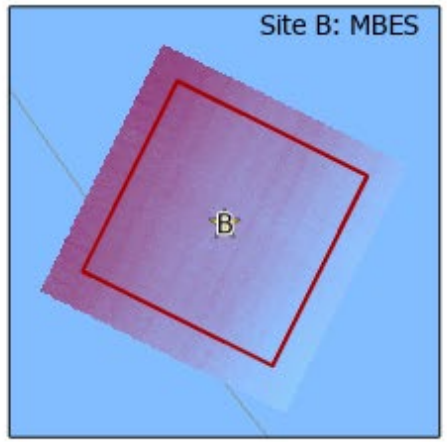
- Positive feedback on combined permitting
- HRG review ahead of benthic grabs
- Real-time review of video transects to ensure visibility
- Use of Modified Van Veen for grab samples

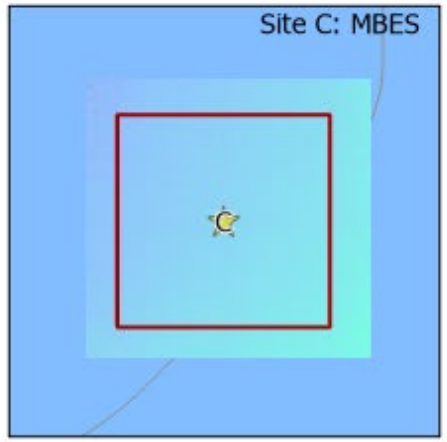
Still-shot from Site A video transect:

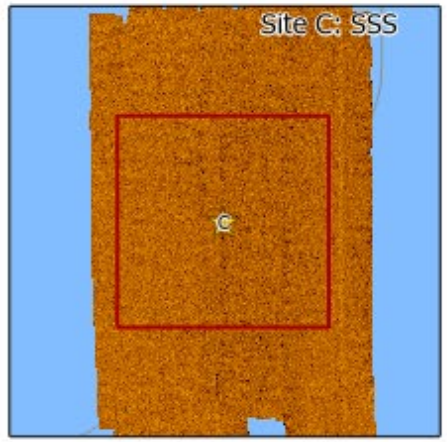


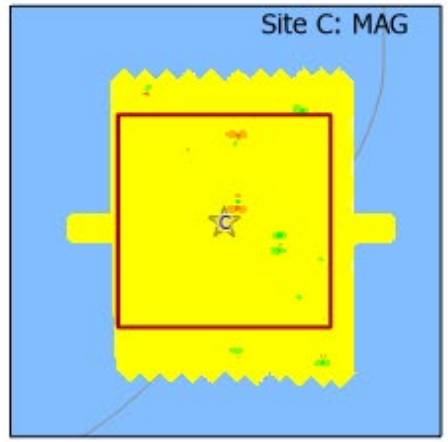












Legend

GDX Proposed Locations

300m Survey Box

Bathymetry

Elevation (m, MLLW)

-25

-29

SSS

Reflectance

High

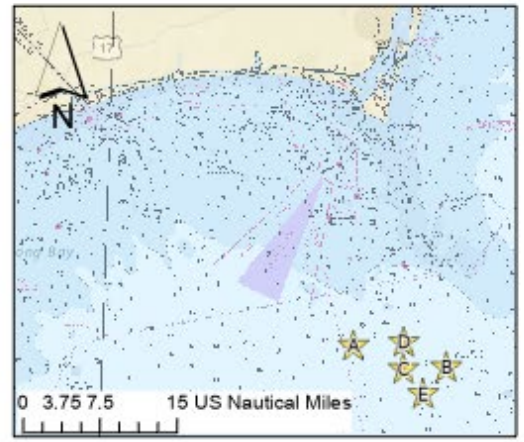
Low

Residual Field

nT

5

-5



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Protected Species Observers (PSOs)

Vessel Strike Avoidance Procedures

- One PSO on watch from the time that the vessel leaves the dock until when the vessel returns to the dock
- Speed Restrictions
  - 10 knots or less inside SMAs and DMAs.
  - 4 knots or less through areas of visible jellyfish aggregations or floating vegetation
  - 4 knots or less in areas with less than 4 ft of clearance between vessel and bottom

Mitigation Distances:

Species / Species Group	Separation Distance (m)
North Atlantic right whale (NARW)	500
ESA-listed or Unidentified whales	500
Other whales	200
Dolphins, porpoises, seals	N/A
Sea turtles	Forward path (any distance)**
Giant manta rays	Forward path (any distance)**

TotalEnergies and Duke Energy voluntarily committed to a 10-knot speed restriction during surveys

The efforts by The Companies to protect right whales while advancing these initial surveys shows that we do not need to choose between clean energy development and wildlife protection.

- National Resources Defense Council blog
(https://www.nrdc.org/bio/francine-kershaw/nc-offshore-wind-surveys-advance-protections-right-whales)

Protected Species Observers (PSOs)

PSOs Monitored for Vessel Strike Avoidance

Total visual monitoring effort: 58:51 hours

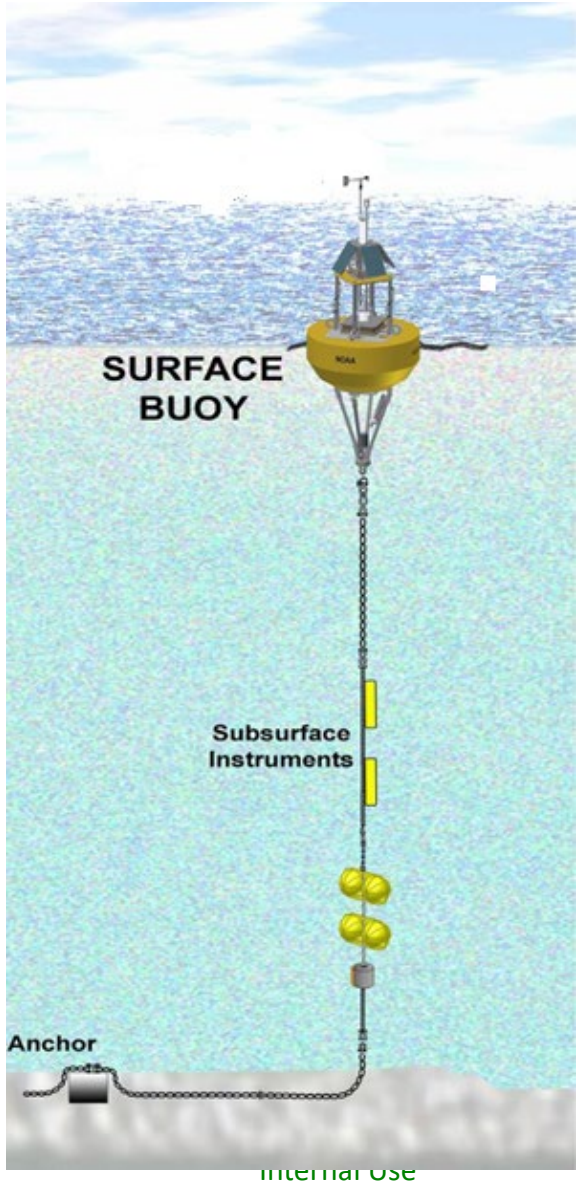
Avoidance Actions	Project Total
Maintain course	11
Maintain speed	10
Total # of avoidance maneuvers	21

Description of Detections	Detection Events	Number of Animals
Sea turtle visual sightings	0	0
Delphinid visual sightings	14	48
Whale visual sightings	0	0
Pinniped visual sightings	0	0
All protected species detections	14	48

8/20/23: Common bottlenose dolphin

Preliminary Plan – Meteorological Buoys (Floating LiDaR)

Objective	Collect data on the wind resource and other parameters to inform the design of the facility
	Collect data on the presence of wildlife
	Collect data on water quality parameters
Configuration	Two buoys (one within each lease area)



Preliminary list of Data Collection Equipment (subject to change)

Floating LiDaR

- Meteorological data (wind speed & direction, relative humidity, air temperature, atmospheric pressure, precipitation)
- Wave sensor / buoy
- Current sensor
- Tide / Water Levels

MOTUS Station

Passive Acoustic Monitoring (PAM) System

- Monitoring of North Atlantic Right Whale
- C-POD Click Detector (toothed whales, dolphins and porpoises)

Fish Tag Acoustic Receivers (passive)

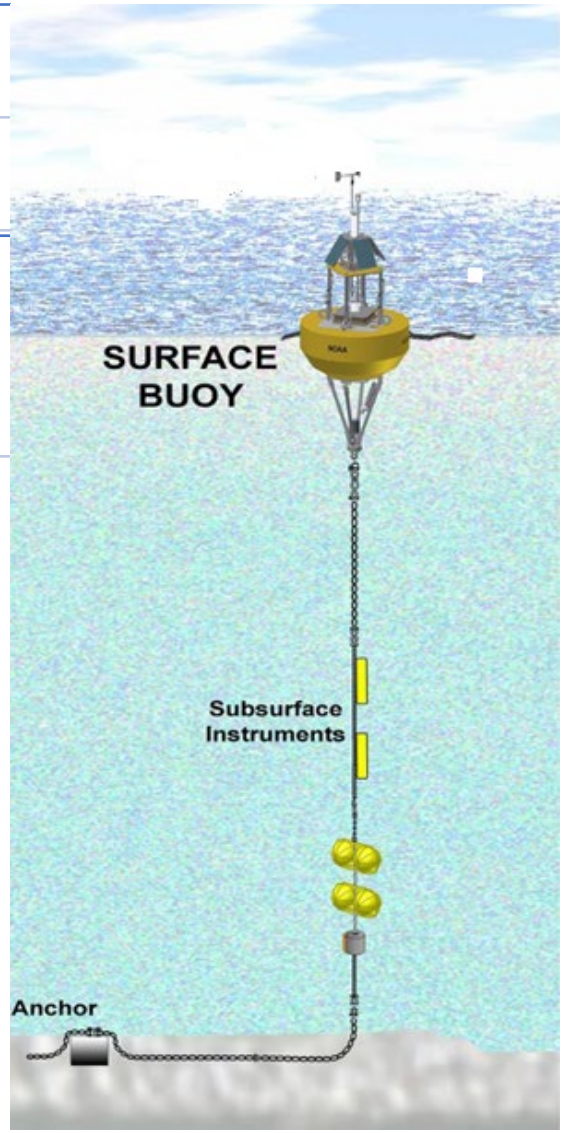
- InnovaSea – Underwater Receiver

Water Quality Sensors

- Dissolved oxygen, water temperature and pressure, conductivity, salinity, pH, turbidity, and chlorophyll-a

Preliminary Plan – Environmental Buoy

Objective	Collect data on presence of wildlife
	Support the detection (presence and spacio-temporal distribution) of marine mammals
Configuration	One buoy centrally located within the lease areas



Preliminary list of Data Collection Equipment (subject to change)

Bird Acoustic Sensor

- Record diurnal and nocturnal bird calls for species identification

Bat Ultrasonic Sensor

- Record migrating bat calls for species identification

Passive Acoustic Monitoring (PAM) System

- Monitoring of North Atlantic Right Whale
- C-POD Click Detector (toothed whales, dolphins and porpoises)

Fish Tag Acoustic Receivers (passive)

- InnovaSea – Underwater Receiver

Wave Sensor, if warranted

Upcoming Activities

Submit Joint Site Assessment Plan (SAP)	Submittal anticipated October/November 2023
	BOEM coordinates review with U.S. Fish & Wildlife (USFWS) and National Marine Fisheries Service (NMFS)
Buoy Call for Tenders	Underway; reviewing proposals received
	Buoy installation TBD - 2024
Fisheries Outreach	Reviewing NOAA Fisheries data to better understand fishing within leases
	Continued fisheries outreach to expand understanding of day-to-day use of leases
Mooring Design Review	U.S. Coast Guard to review mooring design
	Leaseholders will coordinate with selected buoy firm
MOTUS Coordination	Install Motus stations on meteorological or environmental buoys in coordination with USFWS's Offshore Motus network
	Leaseholders will coordinate with selected buoy firm and USFWS

Regional Strategies

- Representatives from the four developers (Dominion, Avangrid, Duke, and TotalEnergies) meet biweekly to discuss:
  - Regional fisheries issues
  - Pertinent information about upcoming survey work
  - Joint communication to the councils

- Each project is run independently, but our goals are to communicate and address regional challenges as a team when possible

- Upcoming SAFMC Presentations
  - November 8: Mackerel Cobia AP
  - December 4-7: South Atlantic Fisheries Management Council Meeting

Thank you!

Questions?

Carolina Long Bay

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Kitty Hawk Wind

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Dominion CVOW

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