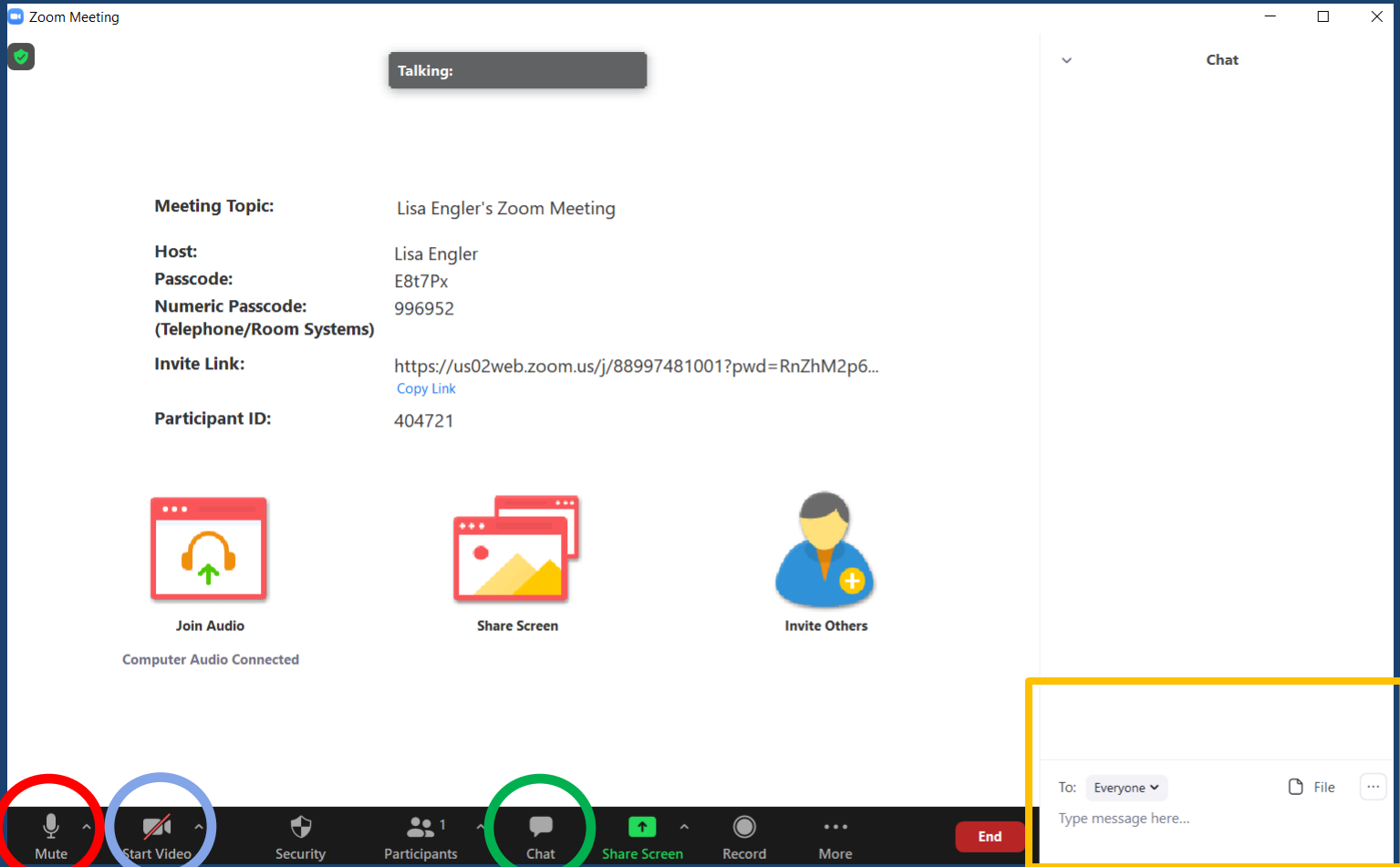
EEA Fisheries Working Group on Offshore Wind Energy

December 10, 2021, 10:00 am – 12:30 pm

Zoom Functions



Meeting Protocols

- Meeting will be recorded for note taking purposes
- Add your name and affiliation to the chat box
- Raise hand to speak
- Remain muted unless it is your turn to speak
- Use chat function to post questions for presenters
- Constructively receive and provide input on discussion topics
- Respectfully acknowledge and articulate differences of opinion or perspective

Agenda

10:00 Welcome and Introductions
10:10 Fisheries Compensatory Mitigation Framework update (Brian Hooker, BOEM)
10:40 Fishing Industry Updates
10:55 Offshore Wind Developer Updates:
- Vineyard Wind / Avangrid
- Equinor
- Mayflower
- Ørsted

11:35 Sunrise Wind - Offshore Convertor Station Cooling Water System (Mike Evans, Ørsted)
11:55 Pilot Regional Fisheries Studies: HMS Tagging Study (Brian Gervelis, INSPIRE Environmental)
12:25 Announcements & Adjourn

Fisheries Compensatory Mitigation Framework update

Brian Hooker, BOEM

Fishing Industry Updates

Developer Updates

Vineyard Wind / Avangrid

Equinor

Mayflower

Ørsted

Sunrise Wind – Offshore Convertible Station Cooling Water System

Mike Evans, Ørsted

Pilot Regional Fisheries Studies: HMS Tagging Project

Brian Gervelis, INSPIRE Environmental

Action Items and Next Meeting

Thank you

BOEM Bureau of Ocean Energy Management

Request for Information

Guidance for Mitigating Impacts to Commercial and Recreational Fisheries from Offshore Wind Energy Development

November 23, 2021 – January 7, 2022

Agenda

- Welcome and Opening Remarks
- Logistics and Agenda Review
- Overview of BOEM's Request for Information to inform its Guidance Document to Mitigation Potential Impacts to Fisheries
- Public Feedback Period
- How To Submit Written Public Feedback
- Next Steps, and Adjourn

Meeting Objectives

1. Describe the process for developing draft guidance to key stakeholders and answer questions.
2. Provide information on how to submit feedback during the Request for Information.
3. Receive feedback on key issue areas.

Purpose of this Engagement Effort

To provide information and perspective to the Bureau of Ocean Energy Management (BOEM) to inform BOEM's development of draft guidance on avoiding minimizing and, if needed, compensating for impacts from offshore wind energy projects to commercial and recreational fisheries.

What Is BOEM Asking of the Fishing Industry?

- Please provide us your comment and perspective on what BOEM should include and consider in the development of draft guidance expected in the spring of 2022.
- You may provide feedback through:
  - Comments today.
  - Written comments by January 7, 2022.
  - Through additional comments on the draft guidance once developed.

Why Have Fisheries Mitigation Guidance?

- BOEM considers the impacts to the commercial and recreational fishing industries resulting from the approval of Site Assessment Plans and Construction and Operations Plans.
- BOEM conducts NEPA reviews, which identify potential impacts that offshore renewable energy projects may have on the environment and ocean users, such as the commercial and recreational fishing.
- BOEM must consider these impacts per project and that analysis may support the need for mitigation measures.
- BOEM has not provided detailed guidance to the offshore wind industry regarding processes and methodologies for reducing impacts to fisheries. This has resulted in inconsistencies between projects in mitigating impacts.
- It is hoped that Federal guidance will provide greater consistency for equitable treatment of fishermen regardless of home or landing port.
- Nine eastern states have identified to BOEM the need for and benefits of regional natural resource impact assessment and mitigation frameworks.

What Potential Impacts Has BOEM Identified?

Potential fishery impacts could include, but are not limited, to:

- Displacement from fishing grounds during offshore wind development activities or loss of fishing areas occupied by project components.
- Potential gear damage or loss from increased survey activity or new or additional underwater hazards.
- Necessary gear or fishing modifications for fishing near turbines.
- Increased transit times.
- Increased gear conflict or operational competition within and outside of wind project areas if fishing effort is shifted due to offshore wind energy projects.
- Secondary economic impacts for support businesses such as seafood dealers, vendors to the fishing industry (e.g., bait and tackle, gear supply), processors, and distributors.

What is Mitigation?

- BOEM considers “mitigation” to encompass the full suite of activities to avoid, minimize, and compensate for adverse impacts.
- BOEM is taking a National level approach to mitigation for its offshore renewable energy program.
- This concept is reflected in the Council of Environmental Quality’s definition of mitigation.

What Topic Areas are BOEM Considering in the Guidance?

The mitigation hierarchy is at the core of BOEM's report on Fishing Best Management Practices (BMPs) published in July 2014. It identified five BMP areas:

- Fisheries communication and outreach (guidance already issued in 2015 and modified in 2020)
- Project siting, design, navigation, and access
- Safety
- Environmental monitoring
- Financial compensation

What Can BOEM's Guidance Do?

- **Recommend fisheries mitigation processes** (including processes for filing claims, timing of initial proposals).
- **Recommend methodology to determine the sufficiency of funds to compensate fishing communities** for negative economic impacts arising from offshore wind energy development activities approved by BOEM.
- **Propose measures** that could result in fair, equitable, and predictable methodologies used by developers **for mitigating impacts** of offshore wind energy on all offshore renewable energy projects.
- **Enforce compliance with contributions proposed by the lessee** that were part of the approved Construction and Operations Plan (COP) or other appropriate plan approval, regardless of said contributions being required by a state or not.

What Can't BOEM's Guidance Do?

- **Create a central fund**. BOEM lacks legal authority to create or oversee a central funding mechanism for compensatory mitigation. BOEM also lacks authority to require contributions to a particular compensation fund, absent a previous commitment or obligation for the lessee to do so (e.g., commitment/obligation under state contracts or the proponent's own proposed COP).
- **Administer funds.** BOEM lacks the legal authority to hold funds received or assess industry fees for mitigation.
- **Require regional mitigation**. BOEM cannot require a lessee to mitigate regional impacts as part of a COP approval, unless BOEM's environmental impact analysis demonstrates the regional impacts of the specific project. This environmental impact analysis must be supported by the record and the effects analysis cannot be based on speculation.

Feedback is Welcome on Topic Areas Identified in the BMPs:

- General approach
- Project siting, design, navigation, and access
- Safety measures
- Environmental monitoring plan
- Financial compensation

General Approach

- Should BOEM develop mitigation guidance for some or all of the BMP topic areas and how should they be prioritized?
- Are there specific strategies, process steps, and engagement components for minimizing impacts and obtaining information requested in the topic areas?
- Should the topics be addressed from a national or a regional perspective and why?

Project Siting, Design, Navigation, and Access

- What processes and engagement between fishermen and developers for a particular project site could help BOEM identify specific project layouts that avoid, minimize, or mitigate impacts to fishing, and to ensure that parties are satisfied with the engagement?
- Are there project design criteria for avoiding or minimizing impacts to fishing that the guidance should include (e.g., distance between turbines, clustering or spacing of turbines, orientation of turbines, setbacks or other means to address particular regulated fishing areas, such as Essential Fish Habitat (EFH), rotational fishing areas, closed fishing areas, or other similar regulatory spatial designations)?
- Are there evidence-based project criteria for avoiding or minimizing impacts to fishing from both export and inter-array electric cable layout, location, burial depth, and cable protection measures?
- Are there evidence-based criteria or guidance, such as scale and size of projects, number of affected vessels, distance between projects, and other factors, that would avoid or minimize impacts to navigation and fishing activities within a project area?

Safety Measures

- What specific safety measures or specifications should be included in the guidance?
- Is there specific training that is necessary to improve safety?
- Are there specific navigational or fishing products/equipment that could improve safety?
- Is there existing guidance issued by U.S. agencies, state agencies, or international bodies that should be incorporated by reference?

Environmental Monitoring Plan

- What data should be collected to understand fishery performance (e.g., changes in catch, transit, and/or fishing itself) in and around offshore wind facilities?
- What methods should be used to analyze such data?

Financial Compensation – part 1

- Data-related considerations:
  - What data sets should be used to calculate compensation for fishing losses?
  - How should data be handled for fisheries that currently lack more complete datasets (e.g., small fisheries, more distributed fishing, fixed gear fishing)?
- What is the expected extent of historical data that should be considered in calculating losses not otherwise mitigated?
- How should future conditions, such as changing fishery presence and abundance due to climate change, be handled in calculating financial compensation?
- What role should relevant states agencies have in ascertaining estimated economic impacts and the mitigation process more broadly?
- What types of guidance should be included regarding compensation (e.g., gear loss, fishing loss) before or during construction, losses post construction in the shorter term or longer term?

Financial Compensation – part 2

- What methodologies are appropriate for calculating economic impacts resulting from pre-construction, construction, and post-construction?
- How should the costs of gear modification, gear design, and changes in practices in order to fish within wind turbine arrays be addressed?
- What considerations for administration of funds should be included in the guidance, recognizing that BOEM cannot receive, distribute, or directly manage the funds?
- How can the guidance provide parameters for the inherent uncertainties posed by a new industry, dynamic environmental conditions, other ocean uses (e.g., shipping, telecommunications, sand and gravel), and climate change?
- Eligibility considerations:
  - How should the guidance identify those eligible for compensation (e.g., by valid federal fishing permit, valid vessel registration, vessel monitoring systems (VMS), automated identification systems (AIS) or fishing vessel trip reports/logbooks)?
  - How should the guidance address which sectors (e.g., commercial, recreational, shoreside) or members of a particular sector (e.g., captains, owner/operator, crew, dealers, processors) are eligible under a compensation framework?
- How often should the fisheries mitigation guidance be re-evaluated?

Feedback is Welcome on Topic Areas Identified in the BMPs:

- General approach
- Project siting, design, navigation, and access
- Safety measures
- Environmental monitoring plan
- Financial compensation

How to Submit Written Public Feedback

Written Public Feedback

You can provide feedback by January 7, 2022 at:

https://www.regulations.gov/docket/BOEM-2021-0083

More information can be found at:

https://www.boem.gov/renewable-energy/fishing-industry-communication-and-engagement

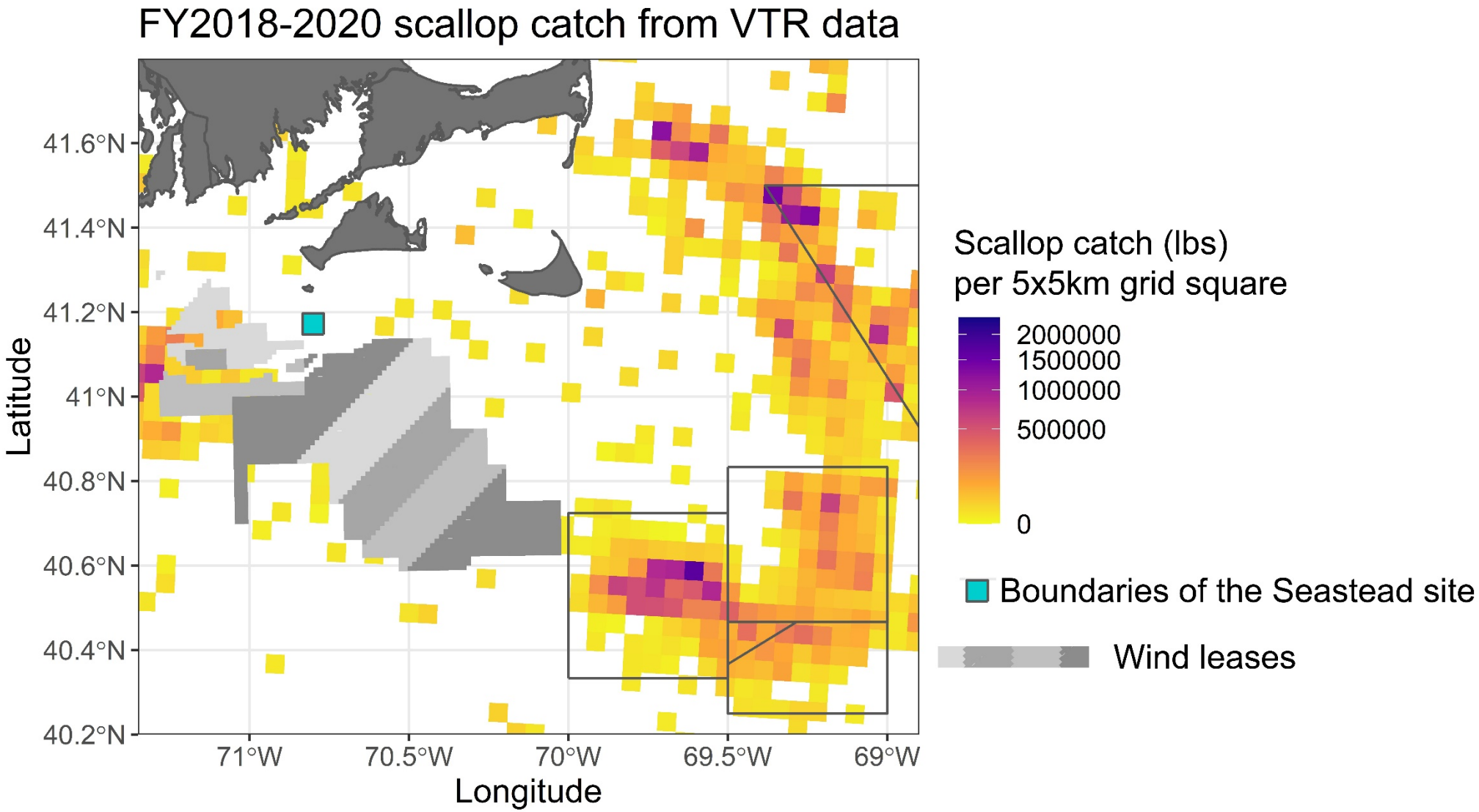
Timeline, Next Steps, and Adjourn

Timeline for Developing Guidance

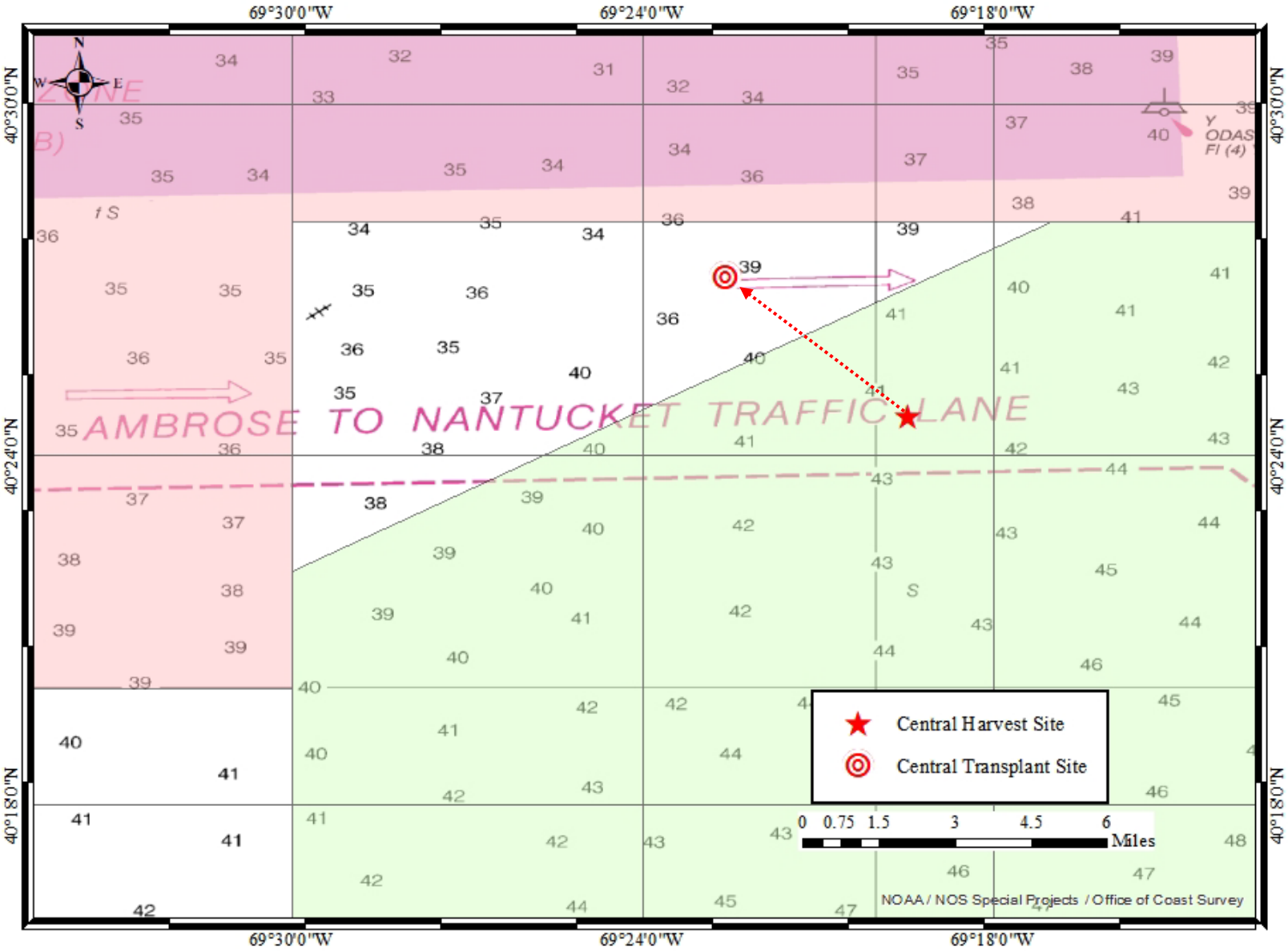
- Fall/Winter 2021:
  - Identify ideas and considerations from the fishing community, offshore wind energy developers, and others to inform the draft guidance.
- Early Winter 2022:
  - Develop draft guidance considering comments received.
  - Work in consultation with NOAA/NMFS, state fishery and coastal management agencies, and technical experts to develop the draft guidance.
- Early Spring 2022:
  - Publish draft guidance and discuss with constituents.
- Summer 2022: Issue final guidance.

BOEM Bureau of Ocean Energy Management

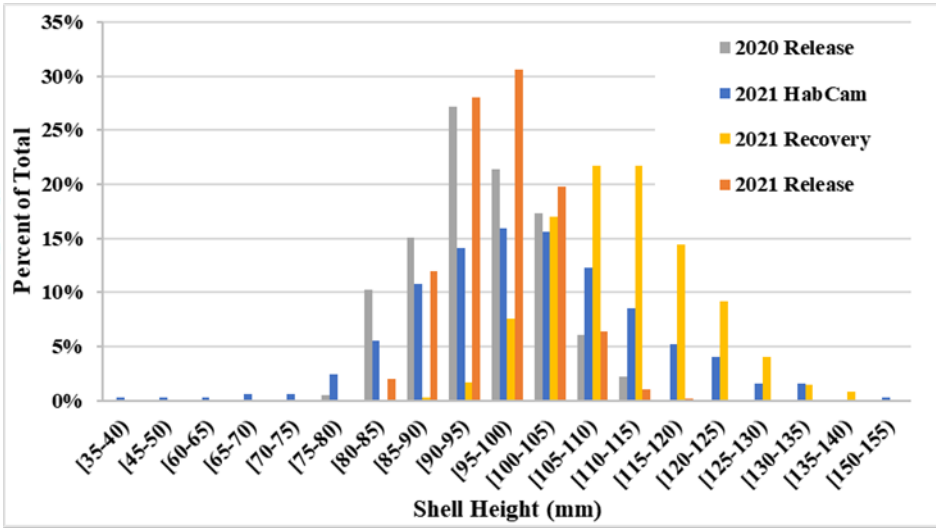
Thank you!


FY2018-2020 scallop catch from VTR data
41.6°N
41.4°N
41.2°N
41°N
40.8°N
40.6°N
40.4°N
40.2°N
Latitude
71°W
70.5°W
70°W
69.5°W
69°W
Longitude
Scallop catch (lbs)
per 5x5km grid square
2000000
1500000
1000000
500000
0
Boundaries of the Seastead site
Wind leases

Scallop Transplanting in the NLS



	Avg. Shell Height (mm)	Date	Days After Release	% change
2020 Release	94.12	6/9/2020	0	0
2021 HabCam	100.09	7/13/2021	400	6%
2021 Recovery	110.39	11/17/2021	515	10%



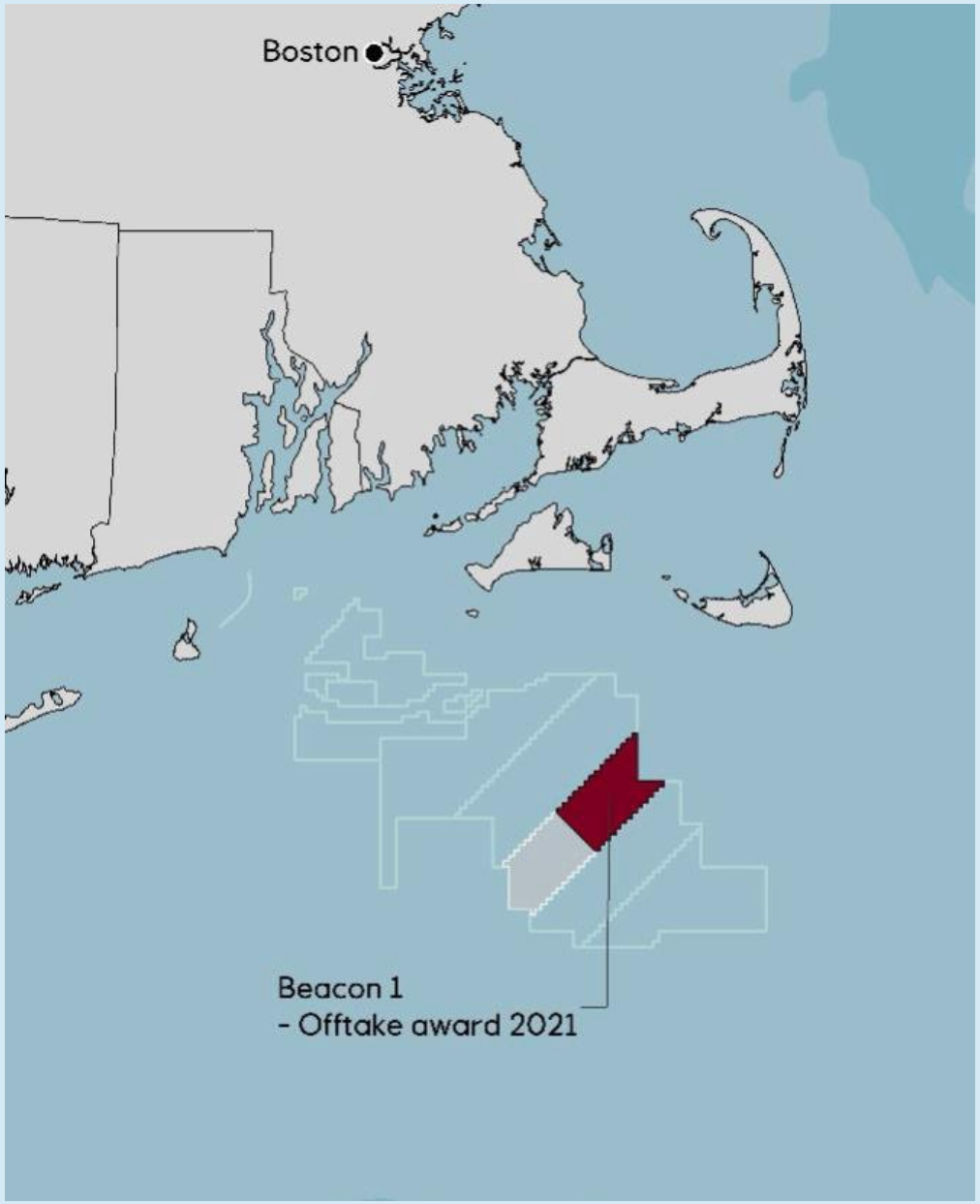
	Trip Date	Harvest Site	Transplant Site
Shell Height 2020	6/9/2020	94.12 mm	94.12 mm
Shell Height 2021	11/17/2021	95.96 mm	110.39 mm
	% change	2%	17%

Beacon Wind

EEA Fisheries Working Group
December 10, 2021

Beacon Wind | Agenda

- Beacon Wind Timeline
- Status update on Survey Program
- Metocean Buoy Deployment
- Questions?



Beacon Wind | Timeline

2019 – Lease Acquired

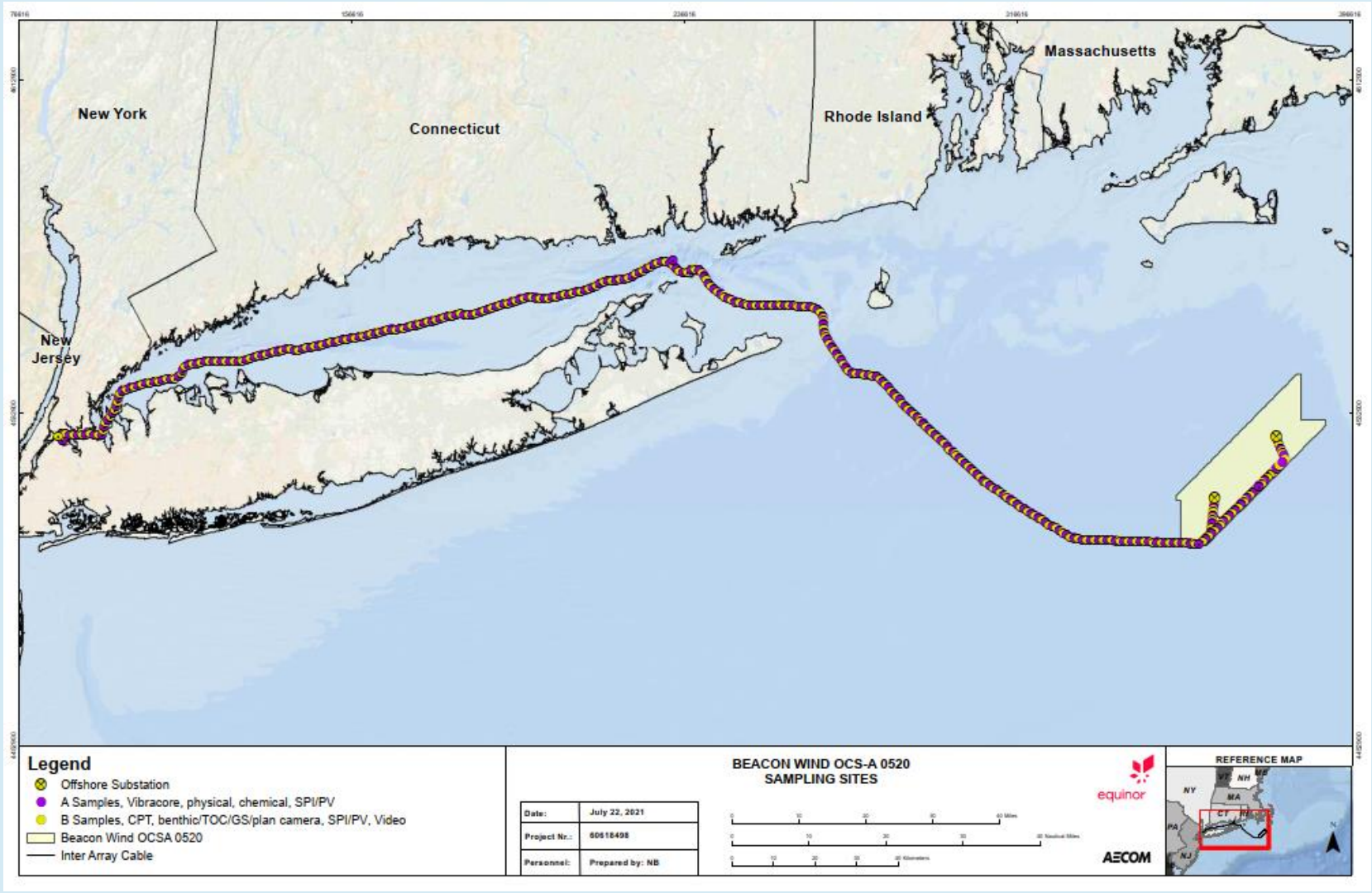
2020 – Aerial Wildlife and Marine Survey Commencement

2021 – Deployment of Metocean Buoys

2022 – Federal & State Permit Submission

2024 – Permits Approved

2025 – Construction and Fabrication



Beacon Wind | Survey Program Update

Stril Explorer
Beacon ECR geotechnical survey
FLO Clint Baker
Projected Completion – Mid December 2021

Danielle Miller
Beacon ECR
FLO David Monohan
Projected Completion December 2021

Saentis
Beacon Wind Lease Area
Projected Completion – April 2022

Dina Polaris
Beacon Wind Lease Area
FLO Tom Donovan
Projected Completion April 2022

Deep Helder
Beacon ECR
FLO Maxwell Hall
Projected Completion – January 2022

F/V Karoline Marie
Captain Thomas Hill
Scout support as needed

Beacon Wind | Metocean Buoy Deployment

2 Meteorological and Oceangraphic Monitoring Buoys

2 Current Moorings

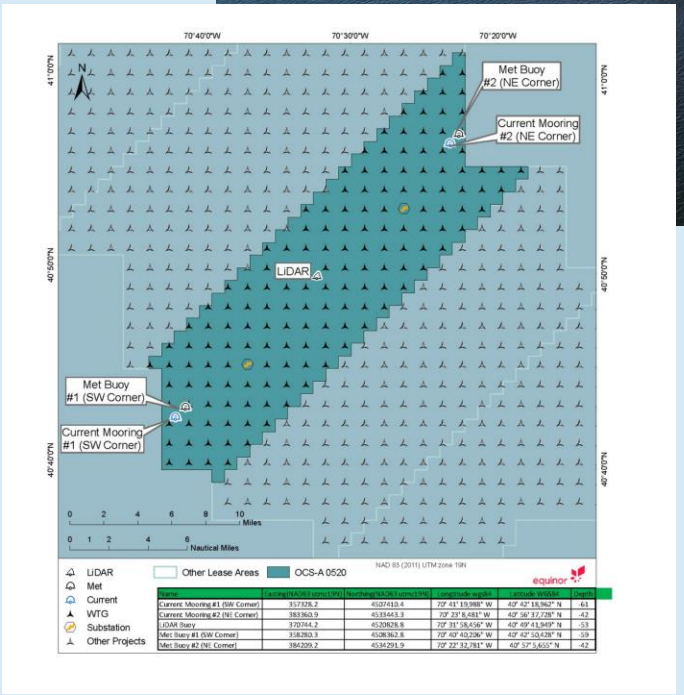
1 LiDAR Buoy

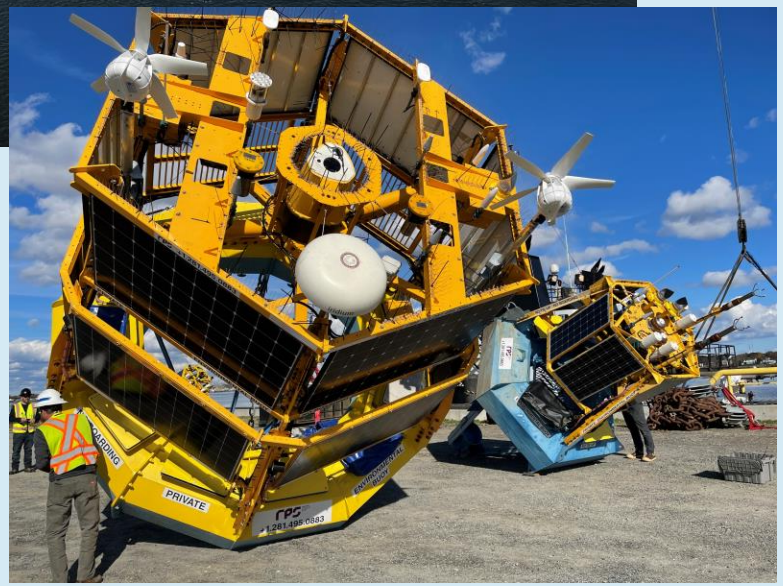
Deployed November 2021

2-year deployment

Position Coordinates will be updated to the LNM following future 6-month maintenance visits as necessary

PATON approved through USCG





SHAPING THE FUTURE OF ENERGY

Thank you for your attention. Questions?

Elizabeth Marchetti
EMARC@equinor.com

MAYFLOWER WIND

Project Update

Presented to

MA EEA Fisheries Working Group on Offshore Wind Energy

Presented by

Joel Southall, Fisheries Liaison Officer, Mayflower Wind

December 10, 2021

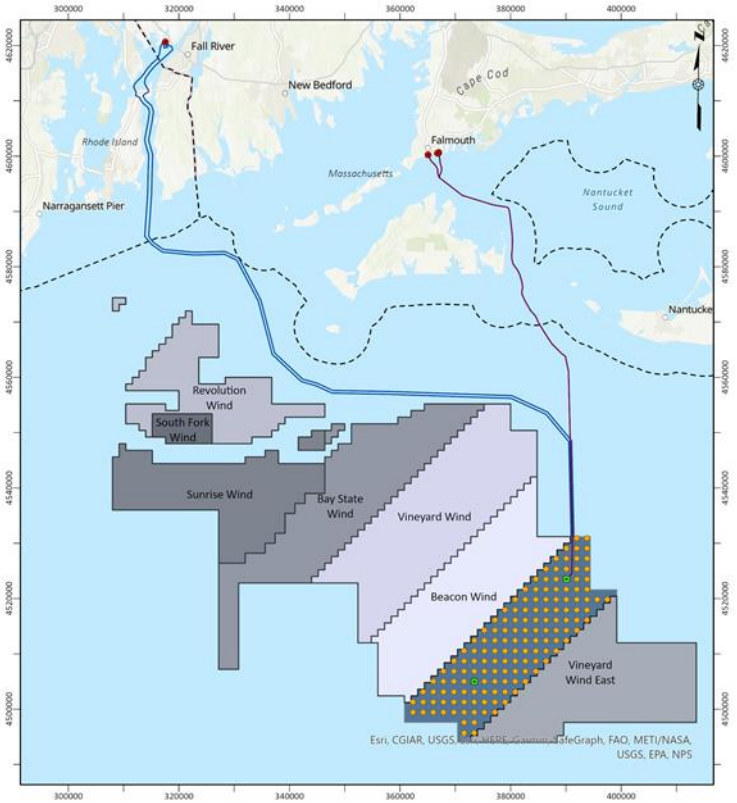
Mayflower Wind Project Overview

Points of Interconnection

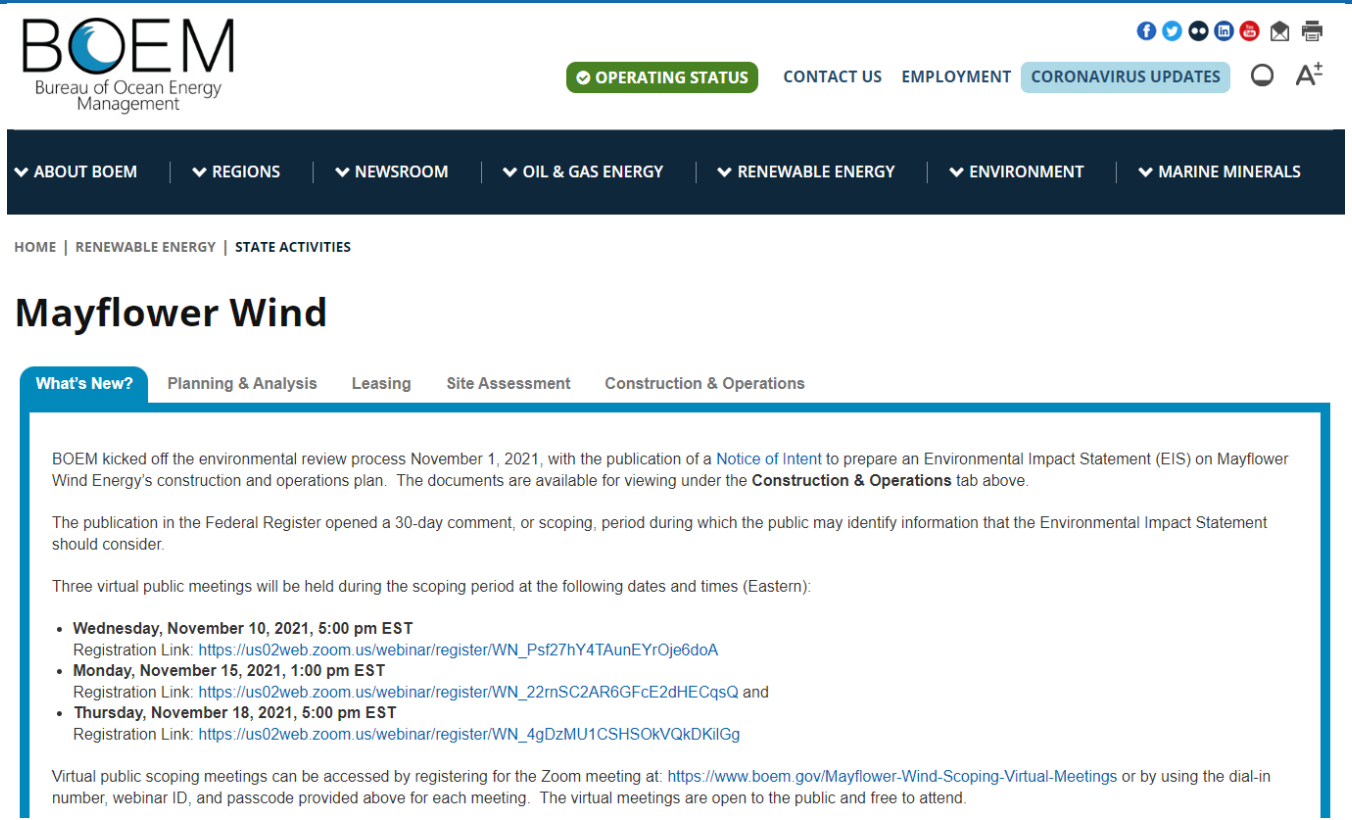
- Falmouth, MA
- Brayton Point, Somerset MA

Lease OCS-A 0521

- 127,388 acres
- Up to 149 positions with up to 147 wind turbine generators (WTG)/ and 5 offshore substation platform (OSP) positions within the lease area
- 1nm x 1nm spacing



Project Progress



BOEM
Bureau of Ocean Energy Management

OPERATING STATUS | CONTACT US | EMPLOYMENT | CORONAVIRUS UPDATES

ABOUT BOEM | REGIONS | NEWSROOM | OIL & GAS ENERGY | RENEWABLE ENERGY | ENVIRONMENT | MARINE MINERALS

HOME | RENEWABLE ENERGY | STATE ACTIVITIES

Mayflower Wind

What's New? | Planning & Analysis | Leasing | Site Assessment | Construction & Operations

BOEM kicked off the environmental review process November 1, 2021, with the publication of a Notice of Intent to prepare an Environmental Impact Statement (EIS) on Mayflower Wind Energy's construction and operations plan. The documents are available for viewing under the **Construction & Operations** tab above.

The publication in the Federal Register opened a 30-day comment, or scoping, period during which the public may identify information that the Environmental Impact Statement should consider.

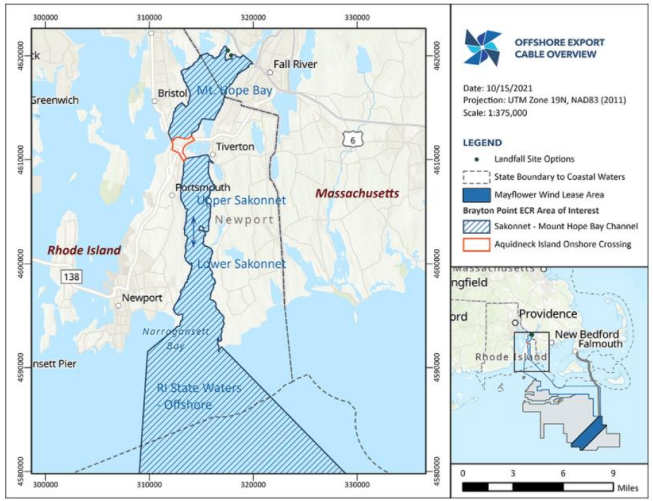
Three virtual public meetings will be held during the scoping period at the following dates and times (Eastern):

- **Wednesday, November 10, 2021, 5:00 pm EST**
  Registration Link: https://us02web.zoom.us/webinar/register/WN_Psf27hY4TAunEYrOje6doA
- **Monday, November 15, 2021, 1:00 pm EST**
  Registration Link: https://us02web.zoom.us/webinar/register/WN_22rnSC2AR6GFcE2dHECqsQ and
- **Thursday, November 18, 2021, 5:00 pm EST**
  Registration Link: https://us02web.zoom.us/webinar/register/WN_4gDzMU1CSHSOkVQkDKilGg

Virtual public scoping meetings can be accessed by registering for the Zoom meeting at: https://www.boem.gov/Mayflower-Wind-Scoping-Virtual-Meetings or by using the dial-in number, webinar ID, and passcode provided above for each meeting. The virtual meetings are open to the public and free to attend.

mayflowerwind.com > Our Commitment > Mariners

Mayflower Wind G&G Surveys – Offshore, Sakonnet River and Mt. Hope Bay



Mayflower Wind G&G Surveys – Vessel Operating Schedule

December	December	November-December	
12-18	5-11	28-4	
N/A	*N/A*	*N/A*	**Mt. Hope Bay**
N/A	*N/A*	*N/A*	**Upper Sakonnet**
N/A	*N/A*	*N/A*	**Lower Sakonnet**
N/A	*N/A*	*N/A*	**Offshore - RI State Waters**
Fugro Brasilis/Go Pursuit	*Fugro Brasilis/Go Pursuit*	*Fugro Brasilis/Go Pursuit*	**Offshore - Federal Waters**
Fugro Explorer	*Fugro Explorer*	*N/A*	**Mayflower Wind Lease Area**

Mariner Documents

2021 Boating Safety Flyer – Greater Fall River (PDF)

2021 Geophysical Surveys – Falmouth (PDF)

2021 Geophysical Surveys – Greater Fall River (PDF)

Mariners Archive

Deep Water I Vessel: GO Pursuit

Water Depths > ~12m
LOA: 150'
Call Sign: WDH6498
Phone: 337-205-740

Deep Water I Vessel: Fugro Explorer

Water Depths > ~12m
LOA: 261'
Call Sign: 3FEV9
Phone: 713-489-3204

Thank You

Questions and Comments?

joel.southall@mayflowerwind.com
(617) 817-4682

Ørsted Offshore North America

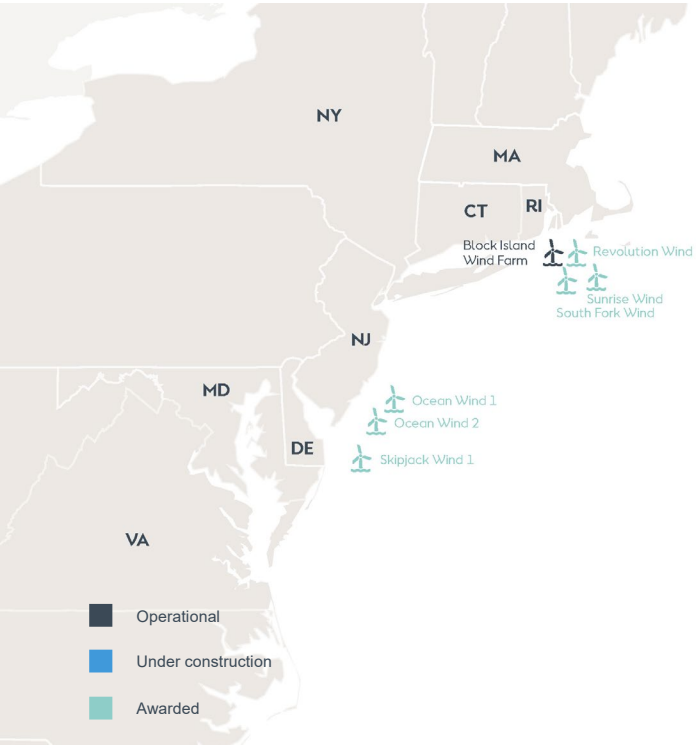
Northeast Program Update

Ørsted

MA Fisheries Working Group Meeting on Offshore Wind
December 2021

Ørsted Offshore North America portfolio

Awarded over 4,000 MW of offshore capacity on the East coast



In Operation

Block Island Wind Farm: 30MW

Awarded

Revolution Wind: 50/50 JV w/ Eversource, 704MW (400MW to RI, 304MW to CT)
South Fork Wind: 50/50 JV w/ Eversource, 132MW
Sunrise Wind: 50/50 JV w/ Eversource, approximately 924MW
Ocean Wind 1: 75/25 JV with PSEG, 1,100MW
Ocean Wind 2: 1,148MW
Skipjack Wind 1: 120MW

Orsted Northeast Program
50/50 JV with Eversource

South Fork

- Lease Area OCS-A 0517
- Deliver power to the East Hampton, NY
- NY Article VII approved March 2021
- FEIS issued August 2021
- Record of Decision received November 2021

  (Record of Decision (boem.gov)
- COP decision January 2022

Revolution

- Lease Area OCS-A 0486
- Interconnect to the existing Davisville Substation, RI
- NOI issued April 2021, scoping ended June 2021, DEIS expected in July 2022

Sunrise

- Lease Area OCS-A 0487
- Proposed interconnection at Holbrook Substation, NY
- NOI issued August 2021, NEPA scoping ended October 2021, DEIS expected October 2022

Northeast Site Investigation activities

Sunrise

- 2021 survey activities complete. No further planned activities until 2022

Revolution

- No planned survey activities until 2022

South Fork

- No planned survey activities until 2022

.

Northeast Survey Activity
Mariners Briefing

Date of notice: December 6th, 2021 Notice no. 219

Overview

These briefings are intended to update mariners on marine operations for Ørsted survey activities. Survey operations are planned for locations throughout the lease areas (see chart) and are expected to last several months. These operations involve only the survey phase of the projects.

Mariners briefings are submitted on Mondays and Thursdays to the U.S. Coast Guard and distributed to the fishing community and interested mariners on our website at: us.orsted.com/mariners or via email upon request through Chris Sarro (CHSAR@orsted.com).

Vessels will designate a working channel on VHF 16 daily at 0600 and 1800 to communicate work plan for the next 12 hours

About the Wind Farms

Sunrise Wind is a 50-50 joint ventures between Ørsted and Eversource.

Sunrise Wind is a planned offshore wind farm located 30 miles east of Montauk Point.

- Projected End: December 2021

* The Fugro Explorer was originally scheduled to begin survey work in Sunrise Wind at the beginning of September for a ~ 2-month campaign. However, survey operations have been delayed due to an external operational commitment. The Fugro Explorer will now start geotechnical work in early November and conclude in December. In addition to the Fugro Explorer, the US flagged PSV Regulus will also operate in Sunrise from late October into December in order to meet project deadlines and complete the work before winter. The scope of work is unchanged however it will be split between two vessels.

Northeast fisheries monitoring activities

Sunrise

- Fisheries and benthic monitoring plans currently under agency review
- Trawl survey expected to begin winter/spring 2022
- Acoustic telemetry around the cable landing to begin in spring/summer
- Benthic surveys at the foundations and cable route

Revolution

- Trawl study expected to begin in winter 2022
- Ventless lobster pot survey expected to begin in May/June 2022

South Fork

- Monthly beam trawl survey: ongoing
- Bi-monthly gillnet survey: one trip left in December 2021, resumes April 2022
- Bi-monthly ventless lobster pot survey: resumes May 2022
- Monthly fish pot survey: resumes June 2022

Cross-project studies

- HMS acoustic telemetry study: ongoing

Ørsted

Mid-Atlantic Update

Simulator demonstration at Marine Institute of Technology and Graduate Studies (MITAGS)

- Demonstration of Ocean Wind 1 off of New Jersey
- Attended by 6 members of the New Jersey commercial fishing community
- Contact Kara Gross (KARGR@orsted.com) if you fish in and/or transit through our New Jersey lease areas and are interested in attending MITAGS

Questions?

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Greg DeCelles
Senior Environmental & Permitting Specialist
GREDE@orsted.com
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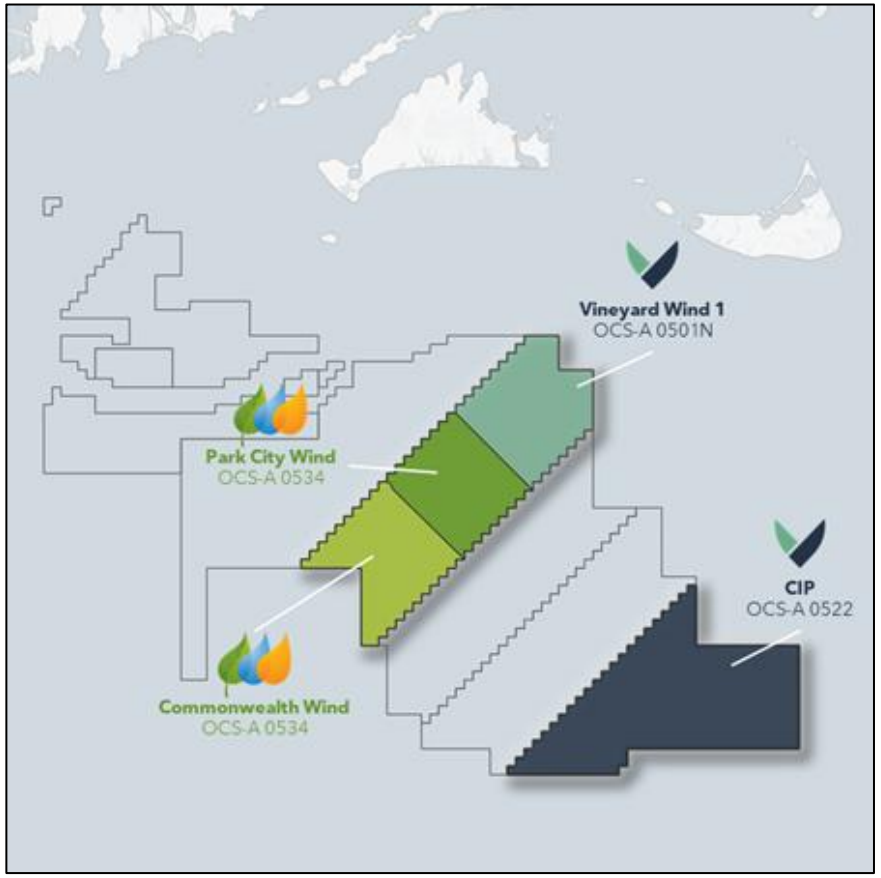
Ørsted

Massachusetts Fisheries Working Group
December 10, 2021

Vineyard Wind Ownership Transition

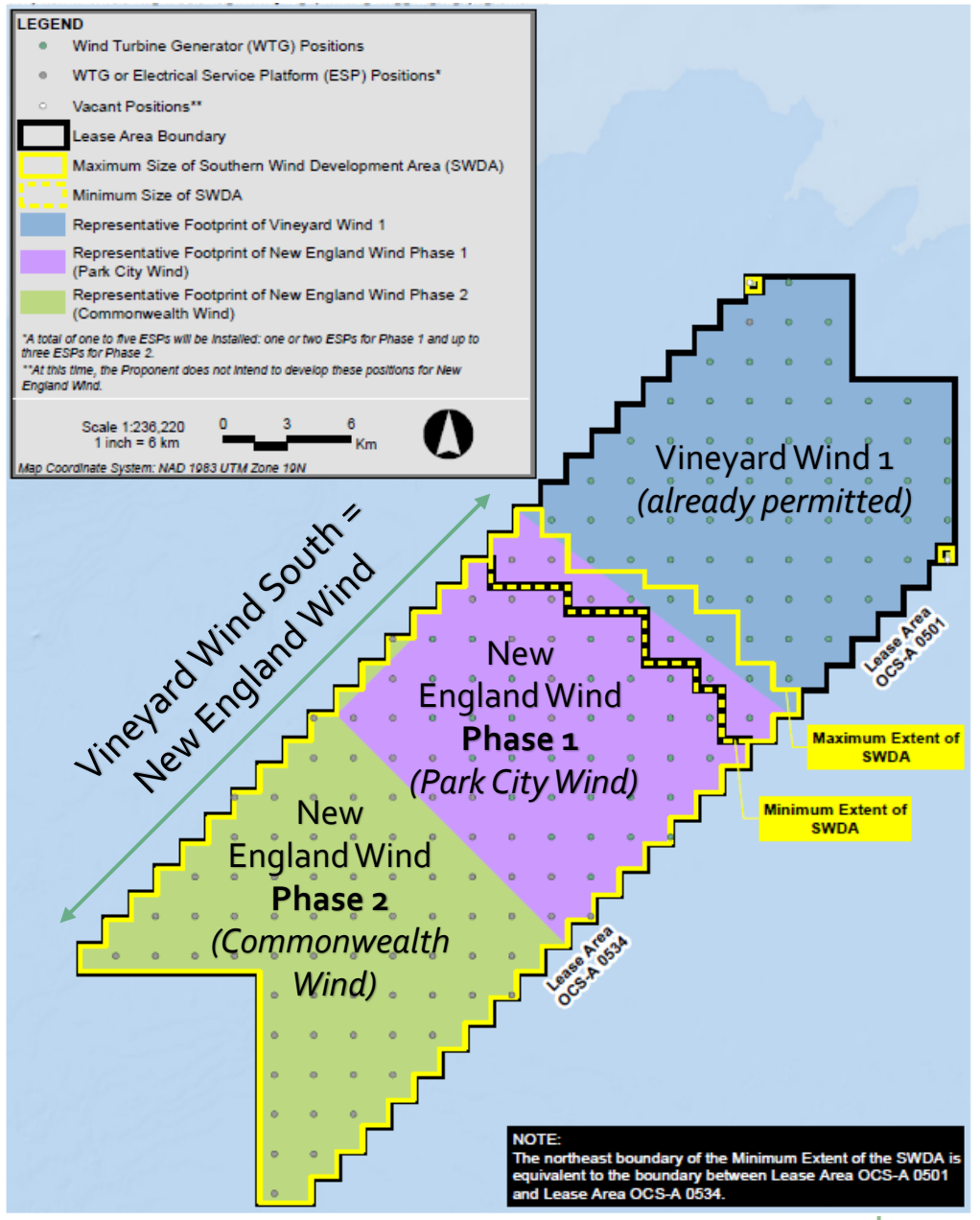


Overview

- Avangrid Renewables and Copenhagen Infrastructure Partners are restructuring their 50/50 Vineyard Wind joint venture
- Vineyard Wind 1 will remain a 50/50 joint venture between the two companies
- Lease Area OCS-A 534, containing Park City Wind and Commonwealth Wind, will be owned by Avangrid Renewables
- Lease Area OCS-A 522 will be owned by Copenhagen Infrastructure Partners

Updated Name

- Vineyard Wind South (Lease Area OCS-A 501S)
- Changed names in October 2021 and is now
- **New England Wind Lease Area OCS-A 534**
  - Phase 1—Park City Wind
  - Phase 2—Commonwealth Wind



Proposed Development - Phases

- New England Wind includes two Phases
- Each Phase has its own Project Design Envelope

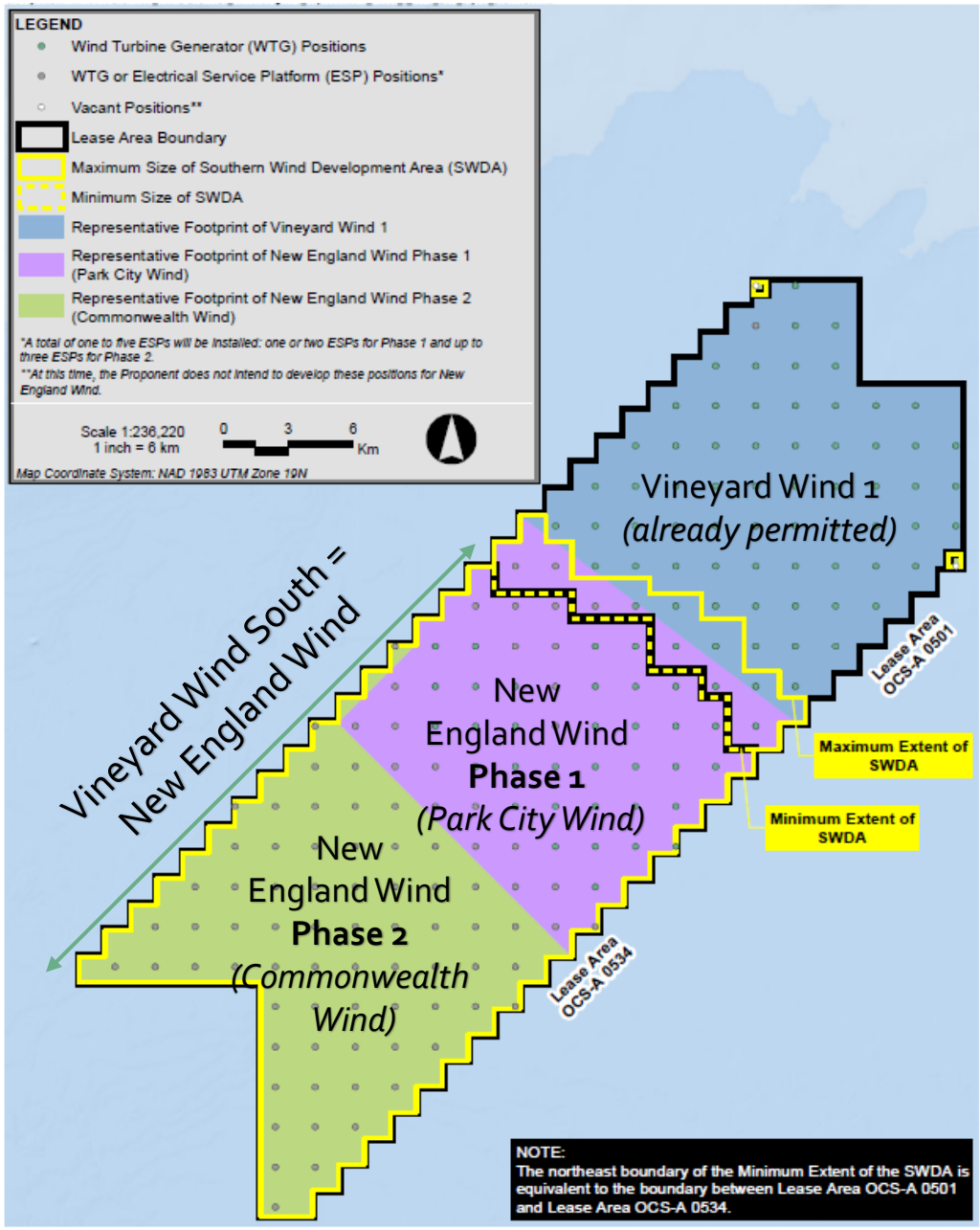
Phase 1 (Park City Wind)

- 804 MW - Connecticut
- 13 to 16 MW turbine size range
- 50–62 turbines
- 1-2 electrical service platforms

Phase 2 (Commonwealth Wind)

- 1,200–1,500 MW (no power purchase agreement yet)
- 13 to 19 MW turbine size range
- 64 to 79 turbines
- Up to 3 Electrical service platforms

The Construction and Operations Plan analyzes the maximum impacts for each Phase



Proposed Development – Updates

Phase 2 Offshore Export Cable Corridor Variants

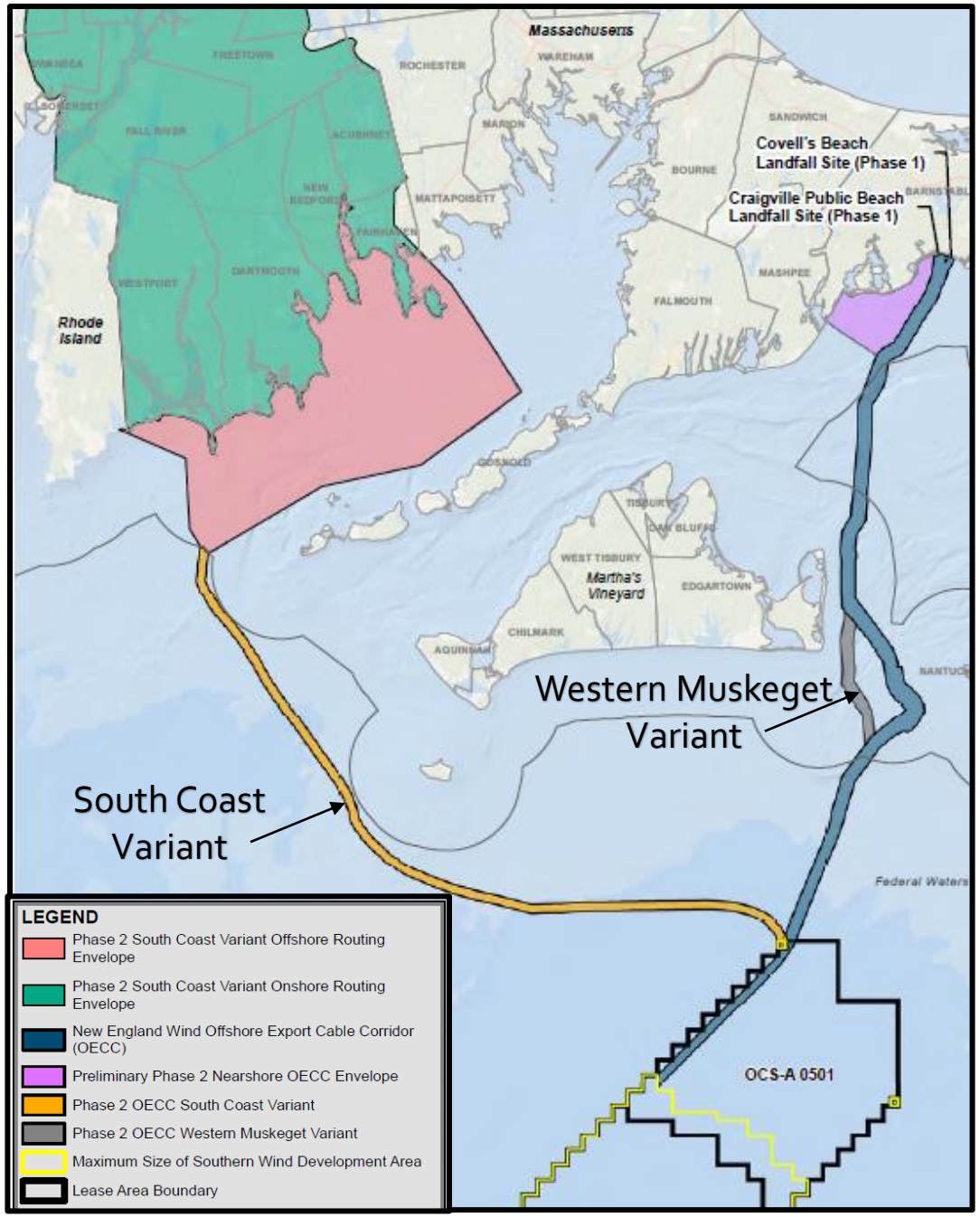
Two new Phase 2 Offshore Export Cable Corridor variants identified in the event that technical, logistical, grid connection, or other unforeseen issues arise

Phase 2 OECC Western Muskeget Variant (December 2021 COP update)

- 1 or 2 offshore export cables may be installed in the western Muskeget variant
- Included as part of Vineyard Wind 1 Offshore Export Cable Corridor

Phase 2 OECC South Coast Variant (February COP Addendum)

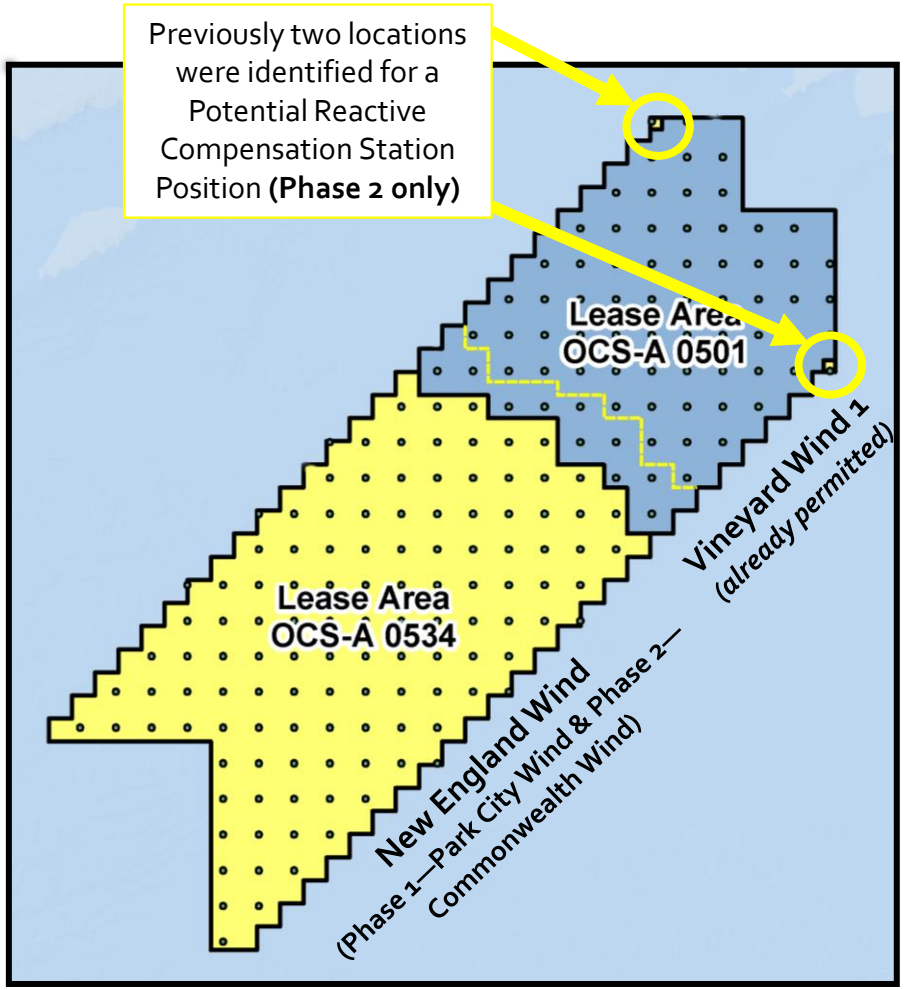
- Routed from Lease Area OCS-A 0501 to the state waters boundary near Buzzards Bay
- 2 or 3 offshore export cables may be installed in the variant if:
  a) engineering issues through Muskeget
  b) landfall issues in Barnstable
  c) grid interconnection issues at the West Barnstable Substation arise



Proposed Development – Updates

Minor updates to Project Design Envelope for New England Wind:

1. The option in Phase 2 for a reactive compensation station (booster station) will be removed.
2. Removed the option to use gravity pad bottom-frame foundations for Phase 2 wind turbine generators



Foundation options:

Monopile
Phase 1 & 2

Jacket
Phase 1 & 2

Bottom Frame
Phase 2

(piles or suction buckets)

BOEM Public Comment Period

Additional Cable Variant Open Comment Period

- Federal Register Notice Published– November 22nd, 2021
- 30-day public comment period ends December 22nd, 2021

Written comments can be submitted:

- Delivered by mail or delivery service, enclosed in an envelope labeled, “NEW ENGLAND WIND COP EIS” and addressed to Program Manager, Office of Renewable Energy, Bureau of Ocean Energy Management, 45600 Woodland Road, Sterling, Virginia 20166; or

- Through the regulations.gov web portal: Navigate to http://www.regulations.gov and search for Docket No. BOEM-2021-0047. Click on the “Comment” button below the document link. Enter your information and comment, then click “Submit Comment.”

New England Wind Virtual Meeting Room:

New England Wind Virtual Meeting Room | Bureau of Ocean Energy Management (boem.gov)

Questions?

- **Vineyard Wind 1 – OCS-A-501**
  - Crista Bank
    cbank@vineyardwind.com
    508-525-0421
- **New England Wind – OCS-A- 534**
  - Caela Howard
    caelahoward@avangrid.com
    860-575-3501

Sunrise Wind

A Joint Venture of Ørsted and Eversource

12.10.2021
MA FWG Meeting

Sunrise Wind | Powered by Ørsted & Eversource

SUNRISE WIND

Offshore Convertor Station Cooling System

Offshore Convertor Station (OCS-DC)

- AC to DC Conversion of renewable generation
  - Provides more efficient electrical design that reduces losses
  - Reduces project infrastructure (one export cable, one OCS-DC)
  - No booster station required
- Process requires cooling water
  - Maximum of 8.1 million gallons daily (MGD)
  - Average of 4.0 MGD
  - Discharge of heated effluent (90° F)
- Once through Cooling System
  - Insufficient freshwater volume (make-up) available
  - Spatial limitations
  - MetOcean conditions
  - Unmanned platform

Water Consumption

Increased water volume and flow rate are correlated with biological effects

Integrate protective elements into cooling water intake design (CWIS) design to minimize flow and volume

Cooling Water Intake System (CWIS) – Protective Design and Operational Elements

→ Intake Pipes

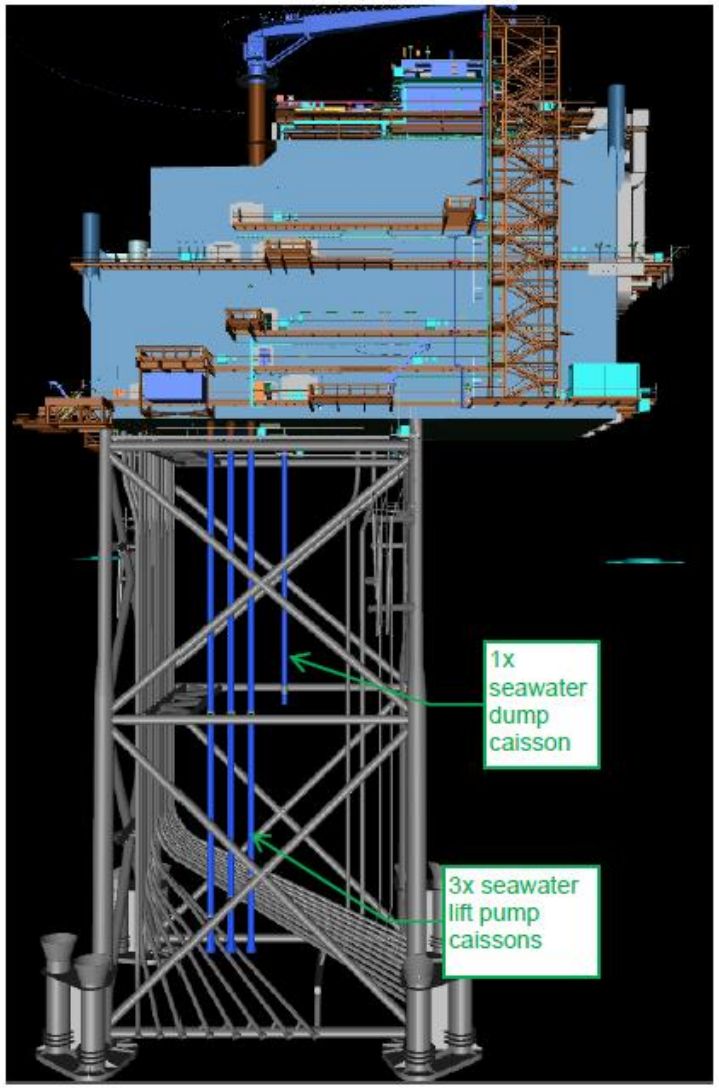
- Sited in water column (10 m from sea floor)
- Hydraulic modelling to define zone of influence
- **Avoid benthic resources**

→ Dump Caisson

- Single vertical outlet at 40 ft (12m) below sea surface
- Thermal plume modelling to define mixing zone
- **Minimize mixing zone**

→ Seawater Lift Pumps

- Ability to control flow rate
- **Minimize zone of entrainment for eggs and larvae**
- Maintain intake velocities less than 0.5 ft/s
- **Eliminate impingement of juvenile/adult fish**



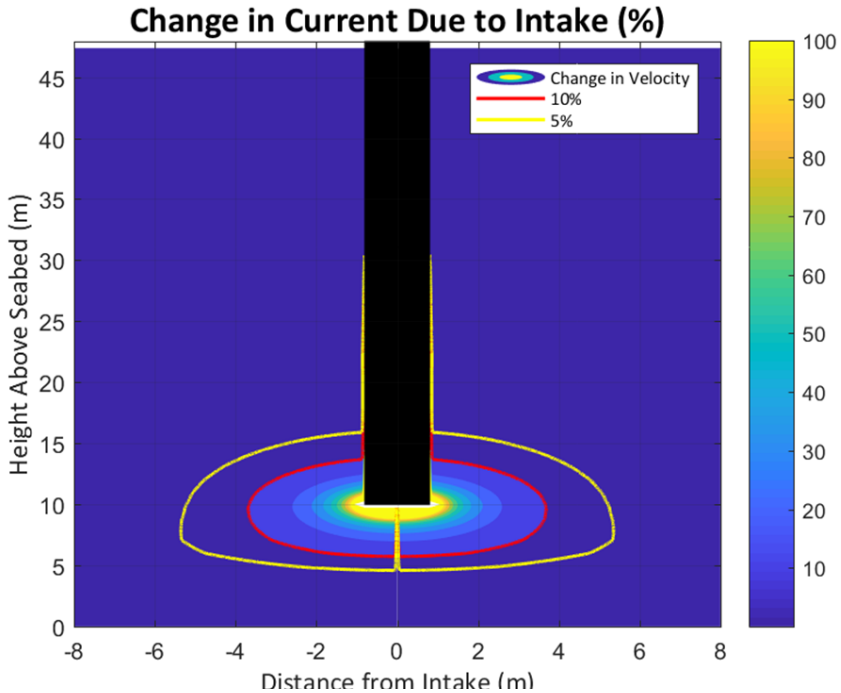
Hydraulic Modelling

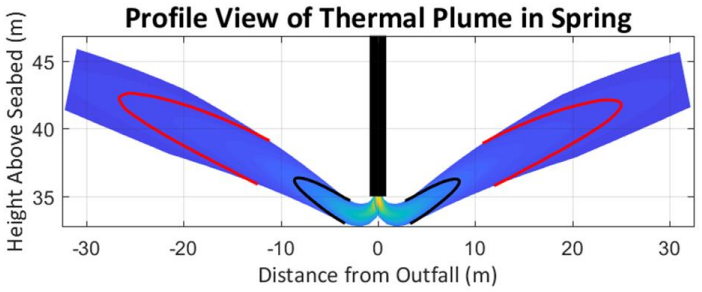
→ Intake

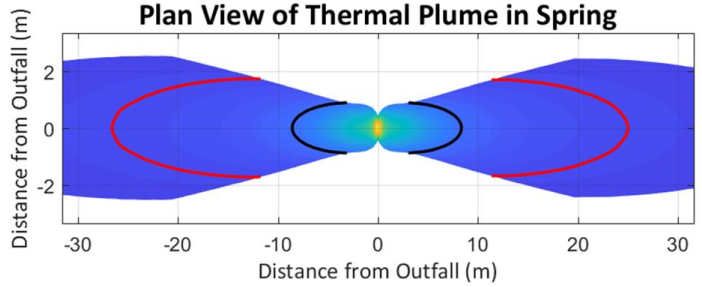
- < 0.5 ft/s through screen velocity (TSV) under 8 MGD
  - No impingement of juvenile and adults
  - Defined at §125.84(c)
- Sited 30 ft (10m) above seafloor
  - Zone of Influence of 463 ft3 (43m^3)
  - No interaction with benthos, highly localized

→ Discharge

- Sited 40 ft (12m) below water surface
  - No thermal interaction with benthos of surface, highly localized
  - Maximum mixing zone within 87 ft (27m) of discharge
  - Mixing zone is contained within 100 m from discharge point (defined at §125.121(c))







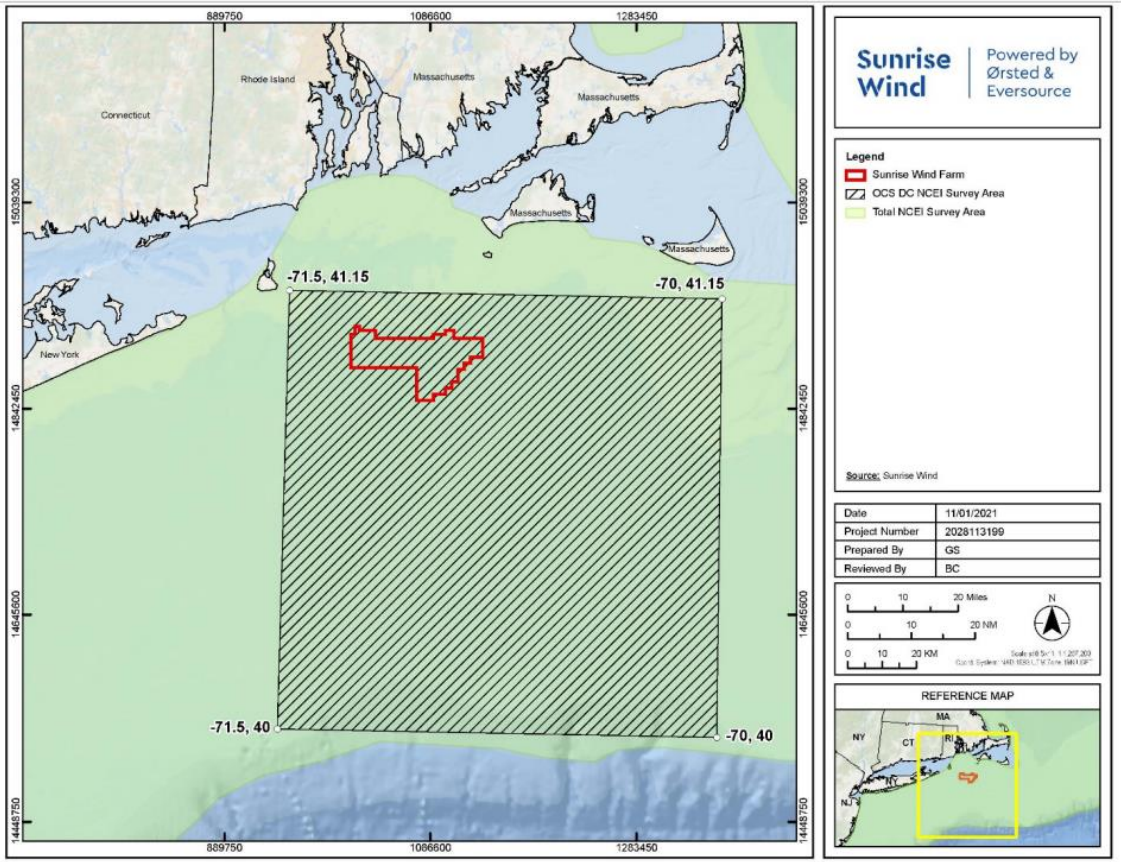
Biological Effects – Entrainment of Eggs and Larvae

Methods

- MARMAP (1977-1987) and EcoMon (1995-2017) ichthyoplankton density
- Sorted by geographical area and species with designated EFH
- Average densities (#/100m^3) applied to withdrawal volumes by month

Results

- 16 species assessed
- Forage species most susceptible (Atlantic herring, Atlantic mackerel, silver and red hake)
- Benthic species less susceptible (yellowtail and summer flounder, cod)
- Entrainment rates highest May through December
  - Number of ichthyoplankton are minimal relative to species fecundity and total amounts of eggs/larvae present



THANK YOU

Contact Us

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Passive Acoustic Telemetry as a Tool to Monitor the Baseline Presence and Persistence of Highly Migratory Species (HMS) in Popular Recreational Fishing Grounds within Southern New England Wind Energy Areas (WEA)

Brian Gervelis

INSPIRE ENVIRONMENTAL

Dr. Jeff Kneebone

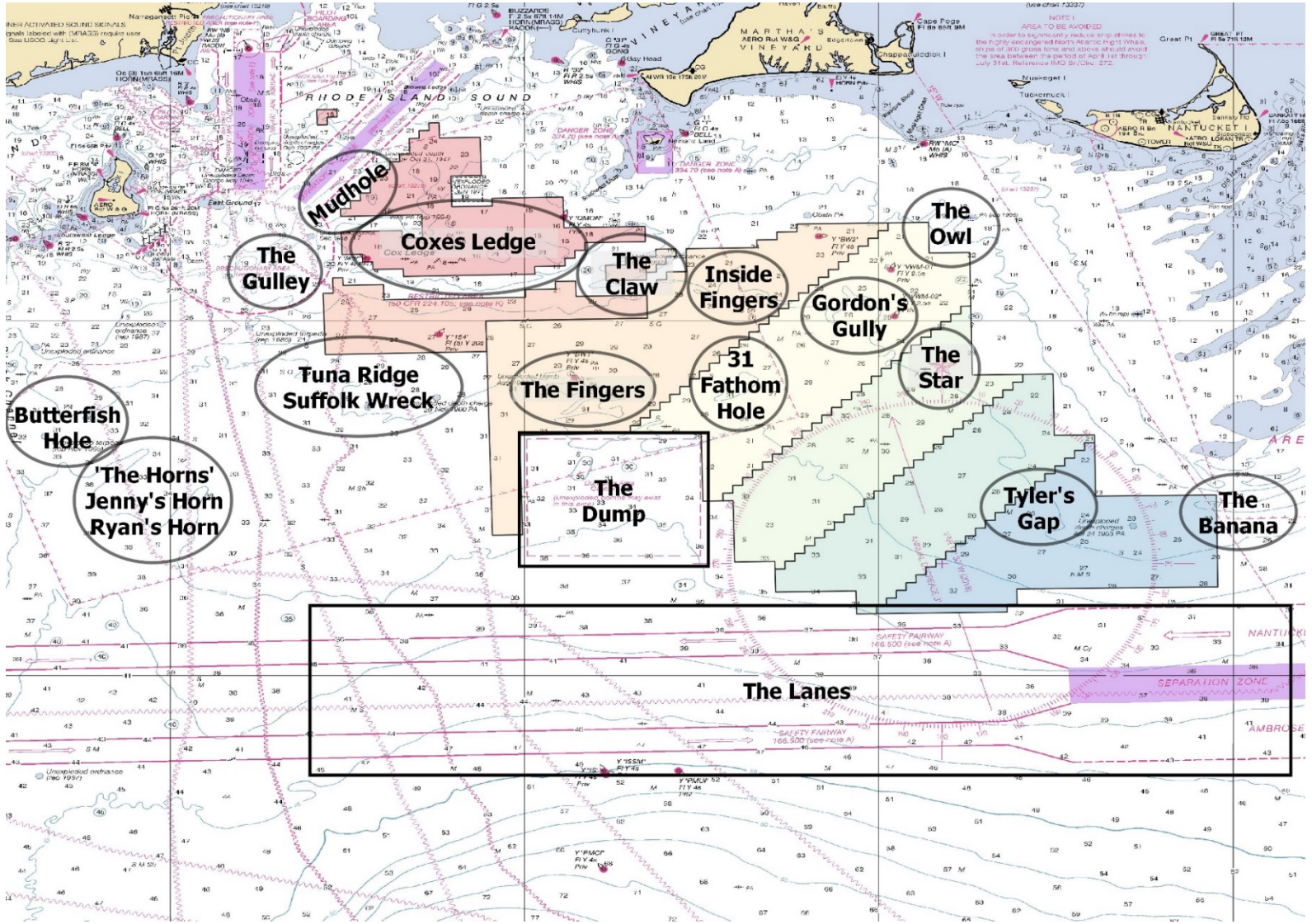
Anderson Cabot Center for Ocean Life at the New England Aquarium

MASSACHUSETTS CLEAN ENERGY CENTER

BOEM Bureau of Ocean Energy Management

DEM RHODE ISLAND

Coming Soon to Southern New England…Offshore Wind



Kneebone & Capizzano 2020

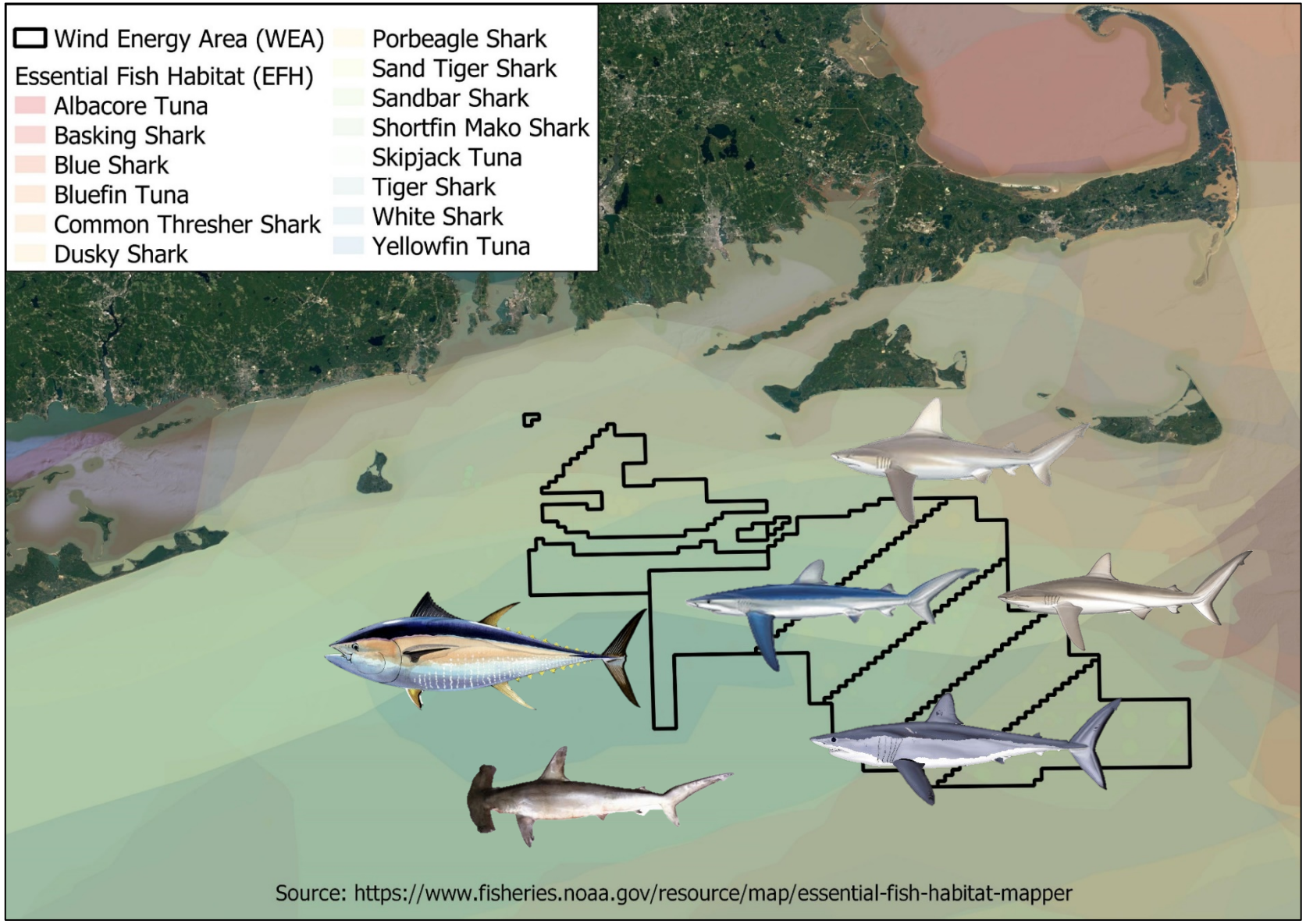
HMS in southern New England (SNE) and the WEA

SNE contains…

- Essential Fish Habitat (EFH) for 14 species
  - Migratory corridors
  - Foraging areas
  - Mating/pupping areas?

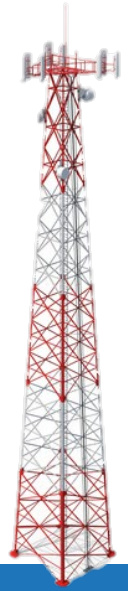
SNE supports…

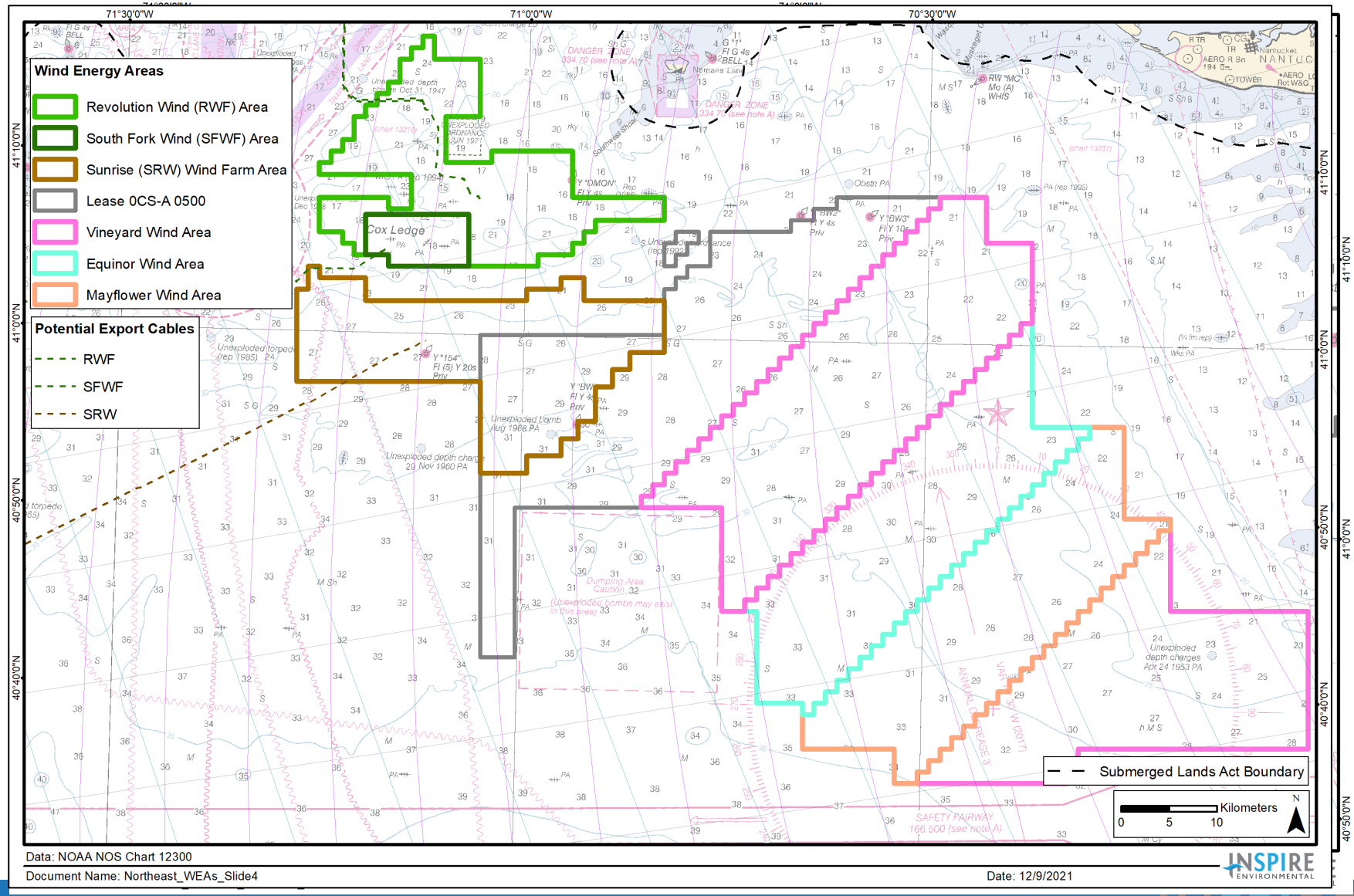
- Large recreational fishery for HMS
- >7,000 permitted vessels in 2020*



*Source: NOAA Fisheries 2020 HMS SAFE report

Acoustic Telemetry Monitoring in the SNE WEA





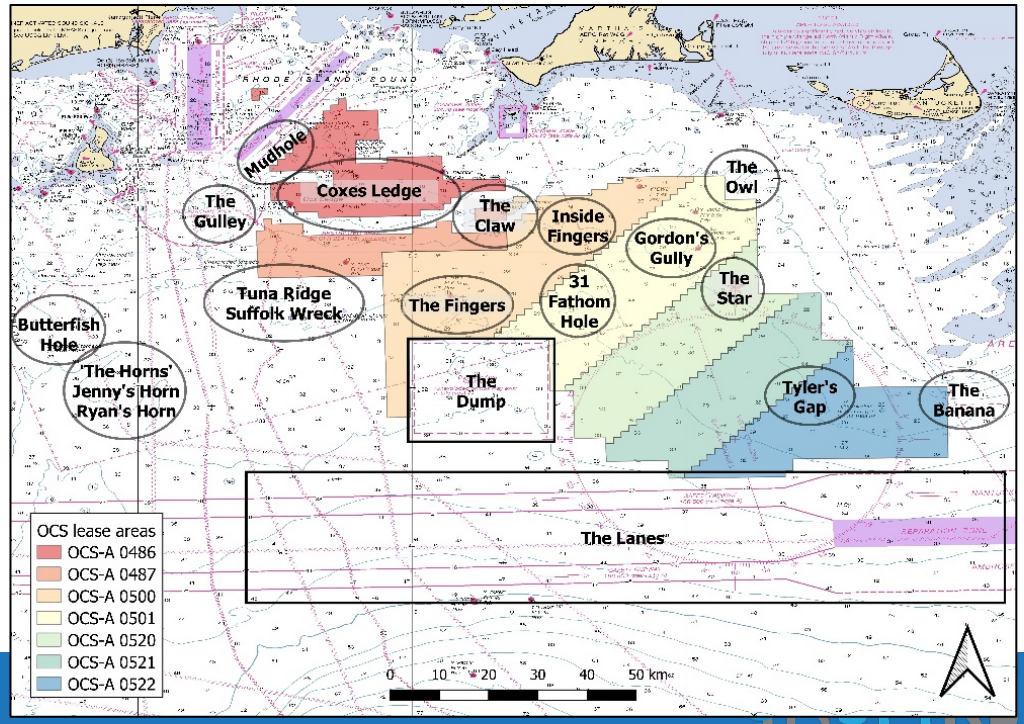
Highly Migratory Species Monitoring: Acoustic Telemetry

Long-term goals

- Monitor the presence, persistence, and movements of highly migratory pelagic species (HMS) through various stages of offshore wind development (baseline, construction, operations)
- Assess impacts of offshore wind activities on HMS by directly comparing metrics/data across various stages of development

Short-term goal

- Collect baseline (pre-construction) information about HMS use of the lease areas and broader southern New England
- Illustrate utility of acoustic telemetry for monitoring HMS responses to offshore wind over various spatial and temporal scales
- Illustrate utility of acoustic telemetry as a multi-species monitoring technology

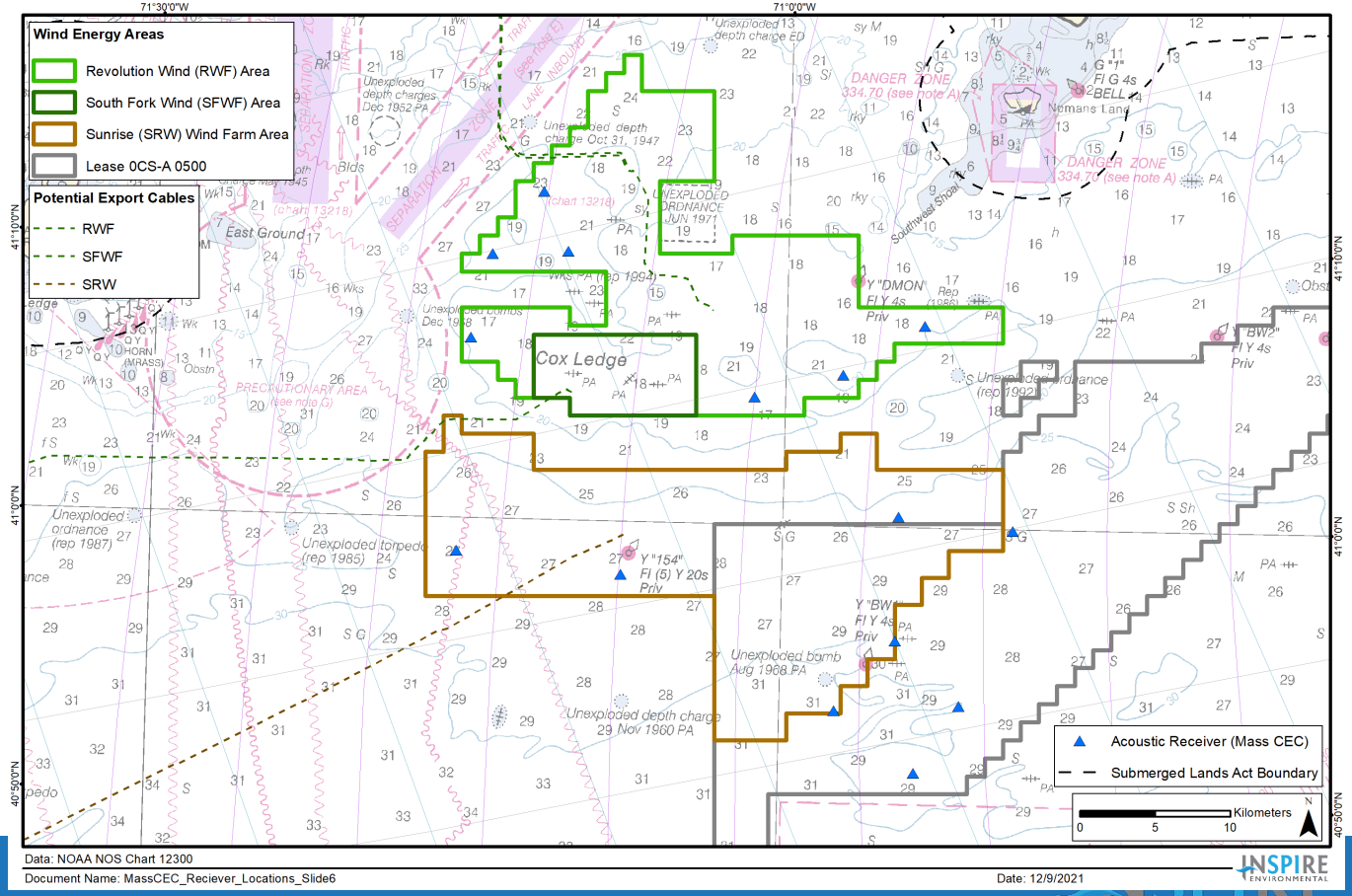


MassCEC Pilot Study: 2020 and 2021

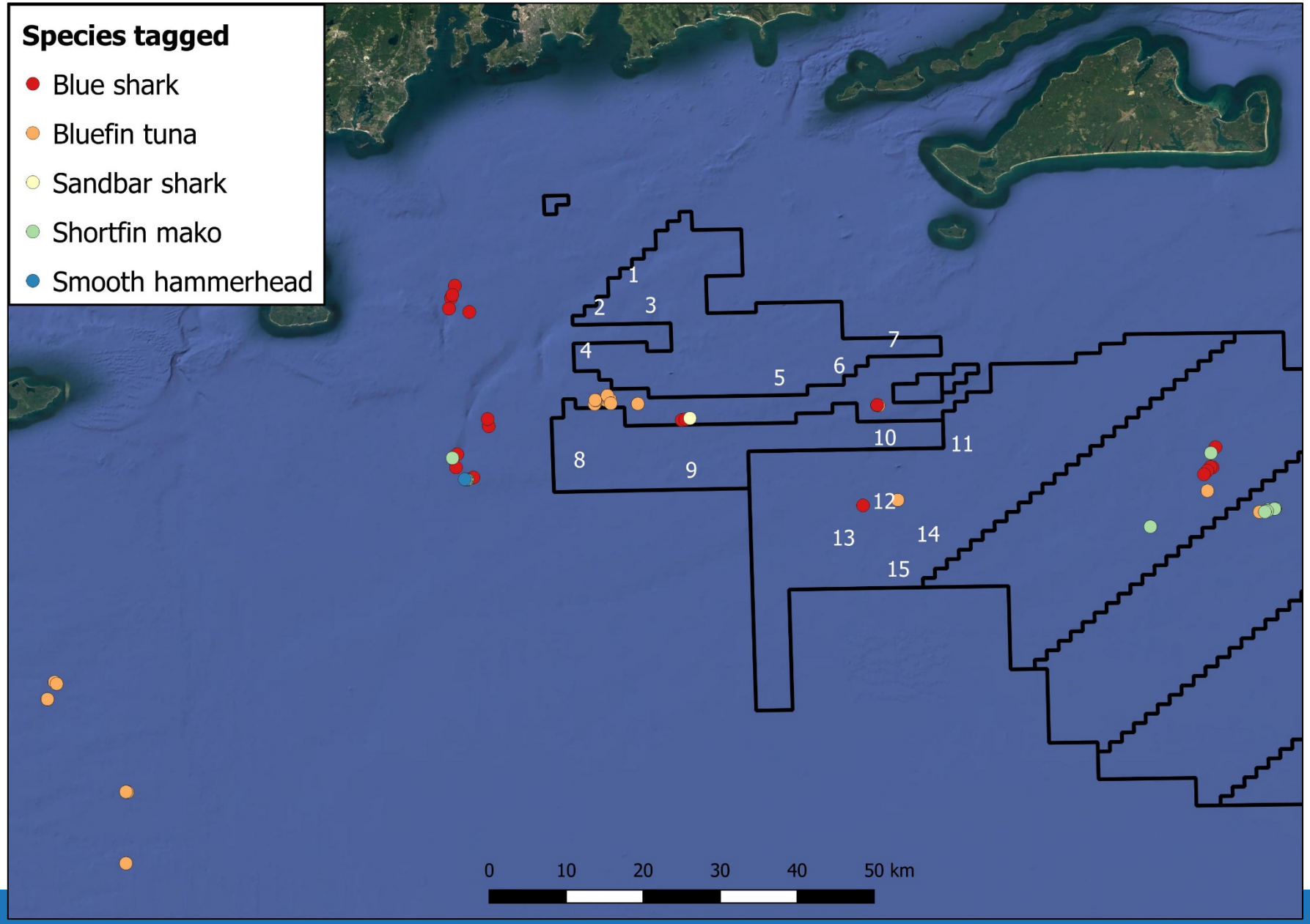
- Monitor at the most popular recreational fishing spots for HMS in southern New England WEA
- Monitor species of greatest importance to the recreational HMS fishery: bluefin tuna, blue shark, shortfin mako
- Deploy tags both within and outside the WEA
- Monitor for animal presence and persistence (residency)
- Monitor inter-annual use of WEA
- Establish baseline metrics

X15 July to December (2020)
June to December (2021)

X 60



Receiver Station and Tagging Locations



2020 and 2021 detection summaries

Species	2020		2021		Total		
	# tagged	# detected	# tagged	# detected	# tagged	# detected	% detected
Blue shark	13	9	8	6(2)	21	15	71%
Shortfin mako	8	4	4	3(3)	12	7	58%
Bluefin tuna	8	4	17	9(3)	25	13	52%
Sandbar shark	0	0	1	0	1	0	0%
Smooth hammerhead	0	0	1	0	1	0	0%
Total	**29**	**17**	**31**	**18**	**60**	**35**	58%

( ): Detected fish that were tagged in 2020

	Blue shark				Shortfin mako				Bluefin tuna			
	2020		2021		2020		2021		2020		2021	
	# dtx	# tags	# dtx	# tags	# dtx	# tags	# dtx	# tags	# dtx	# tags	# dtx	# tags
Station 1	117	5	14	2			24	3			26	3
Station 2	66	4	31	2			17	2			32	3
Station 3	36	4					17	2			22	4
Station 4	9	1					12	3	3	1	13	4
Station 5	7	1	14	2			26	4	4	1	6	3
Station 6	10	2					13	2	2	1	2	1
Station 7			2	1			54	4			8	2
Station 8	42	3					19	2	4	1	54	8
Station 9	24	2	24	2	50	2	7	2			15	4
Station 10	34	4	39	2							26	5
Station 11	21	2	58	3	9	1					28	4
Station 12	2	1	17	1	8	1					8	2
Station 13	50	5	X	X	4	2	X	X	6	1	X	X
Station 14	43	3	37	1					10	2	21	3
Station 15	30	3	X	X	15	1	X	X	4	1	X	X
Total	491	9	236	8(2)	86	4	189	6(3)	33	4	261	12(3)

X: receiver was missing

"Bonus" detection data

	MACEC HMS Tags				NEAq HMS Tags		Other Researcher's Tags				All detected tags			
	2020		2021		2021		2020		2021		2020		2021	
	# dtx	# tags	# dtx	# tags	# dtx	# tags	# dtx	# tags	# dtx	# tags	# dtx	# tags	# dtx	# tags
Station 1	117	5	64	8	36	2	187	11	226	22	304	16	326	32
Station 2	66	4	80	7	88	3	145	11	114	12	211	15	282	22
Station 3	36	4	39	6	8	1	139	11	218	17	175	15	265	24
Station 4	12	2	25	7	37	2	66	8	29	10	78	10	91	19
Station 5	11	2	46	9	5	2	72	8	268	22	83	10	319	33
Station 6	12	3	15	3	3	1	65	9	436	27	77	12	454	31
Station 7			64	7	1	1	66	5	334	20	66	5	399	28
Station 8	46	4	73	10	59	6	56	9	124	18	102	13	256	34
Station 9	74	4	46	8	148	7	84	10	141	15	158	14	335	30
Station 10	34	4	65	7	122	9	56	9	254	20	90	13	441	36
Station 11	30	3	86	7	255	7	33	5	213	20	63	8	554	34
Station 12	10	2	25	3	138	9	90	9	51	14	100	11	214	26
Station 13	60	8	X	X	X	X	46	8	X	X	106	16	X	X
Station 14	53	5	58	4	394	16	20	5	67	10	73	10	519	30
Station 15	49	5	X	X	X	X	37	6	X	X	86	11	X	X
Total	610	17	686	26	1294	23	1162	67	2475	139	1772	84	4455	188

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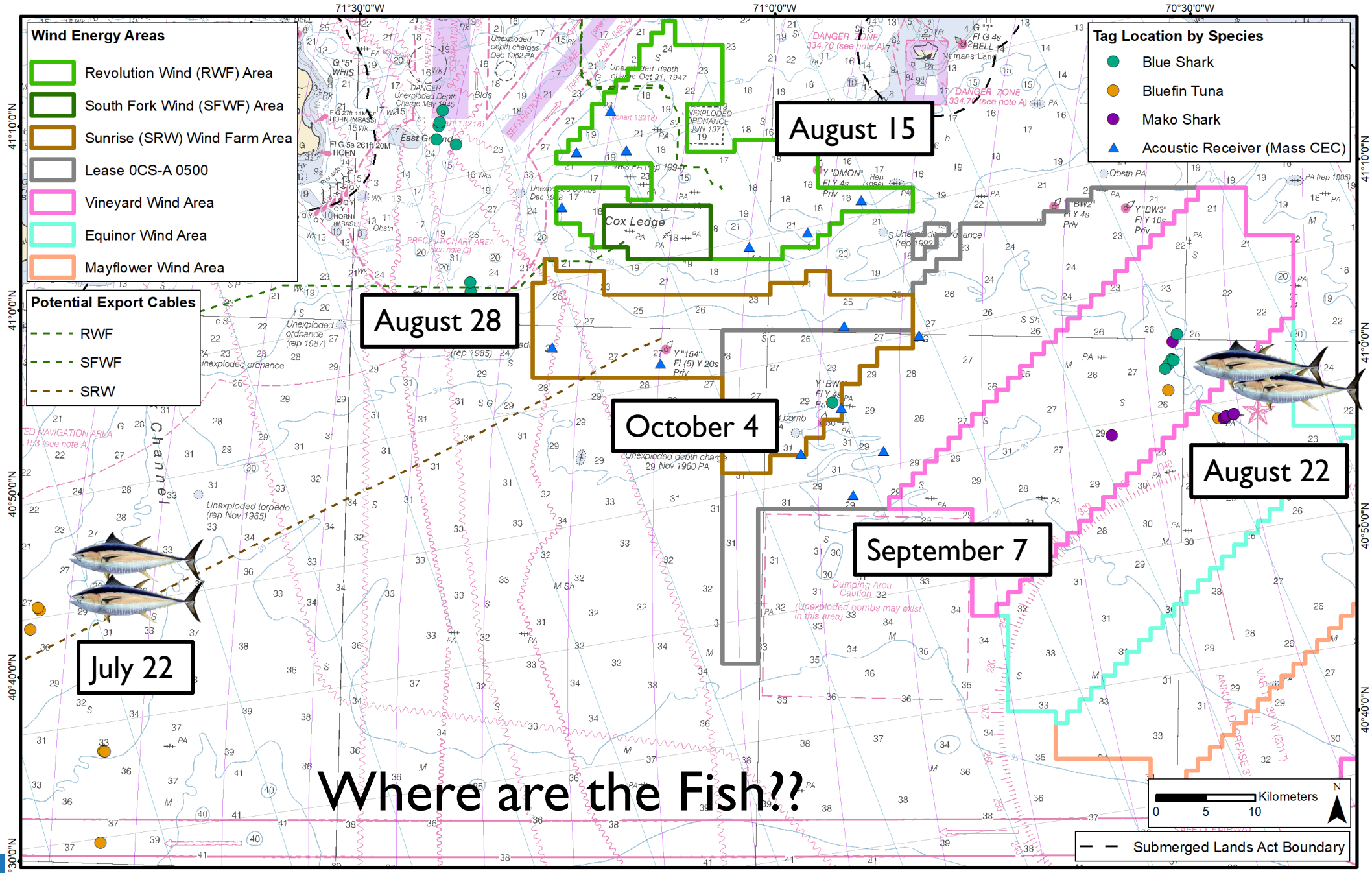

Data: NOAA NOS Chart 12300

Document Name: SFW_MACEC_Receivers_SpeciesTagLocations_Slide8

Date: 12/9/2021

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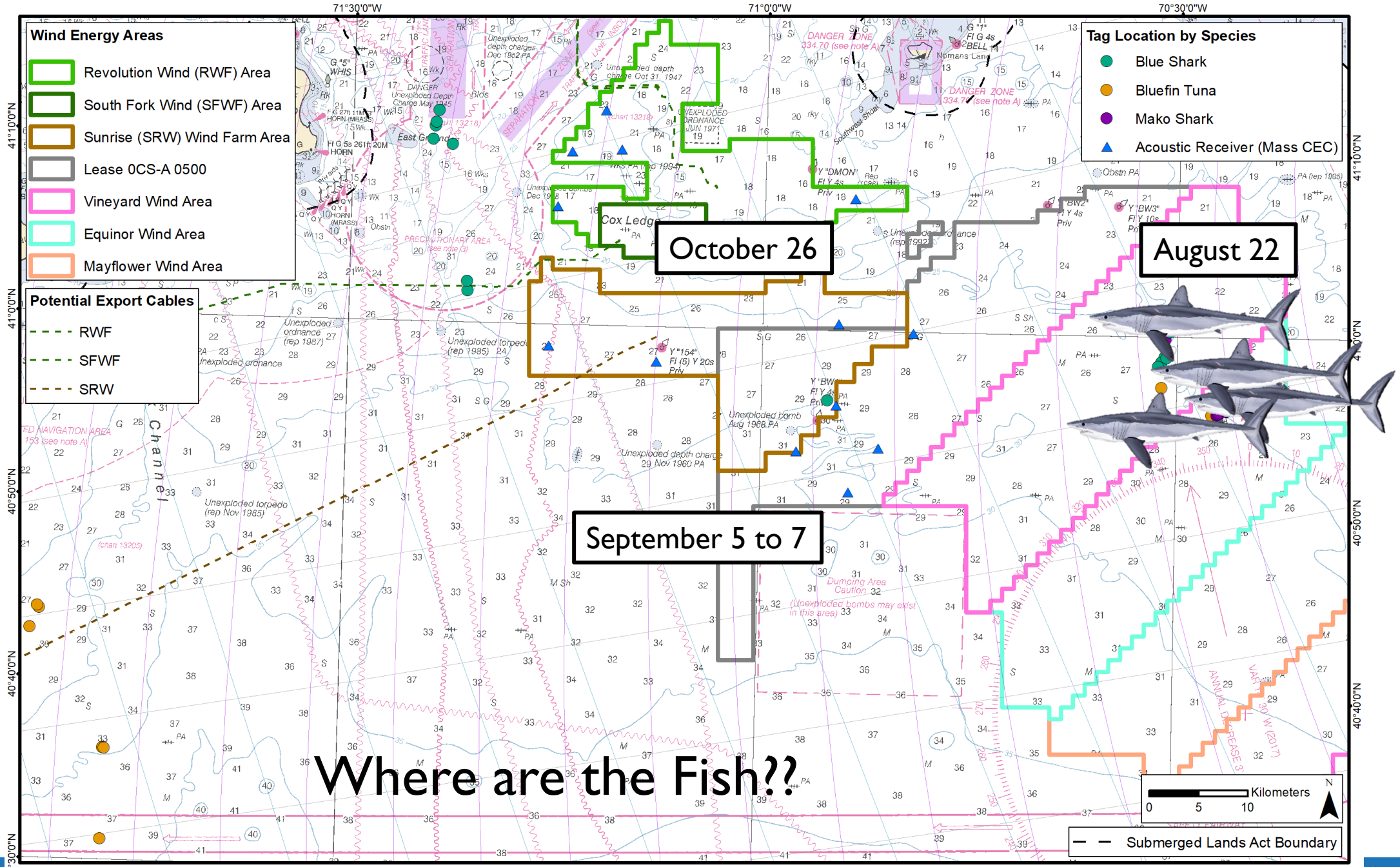

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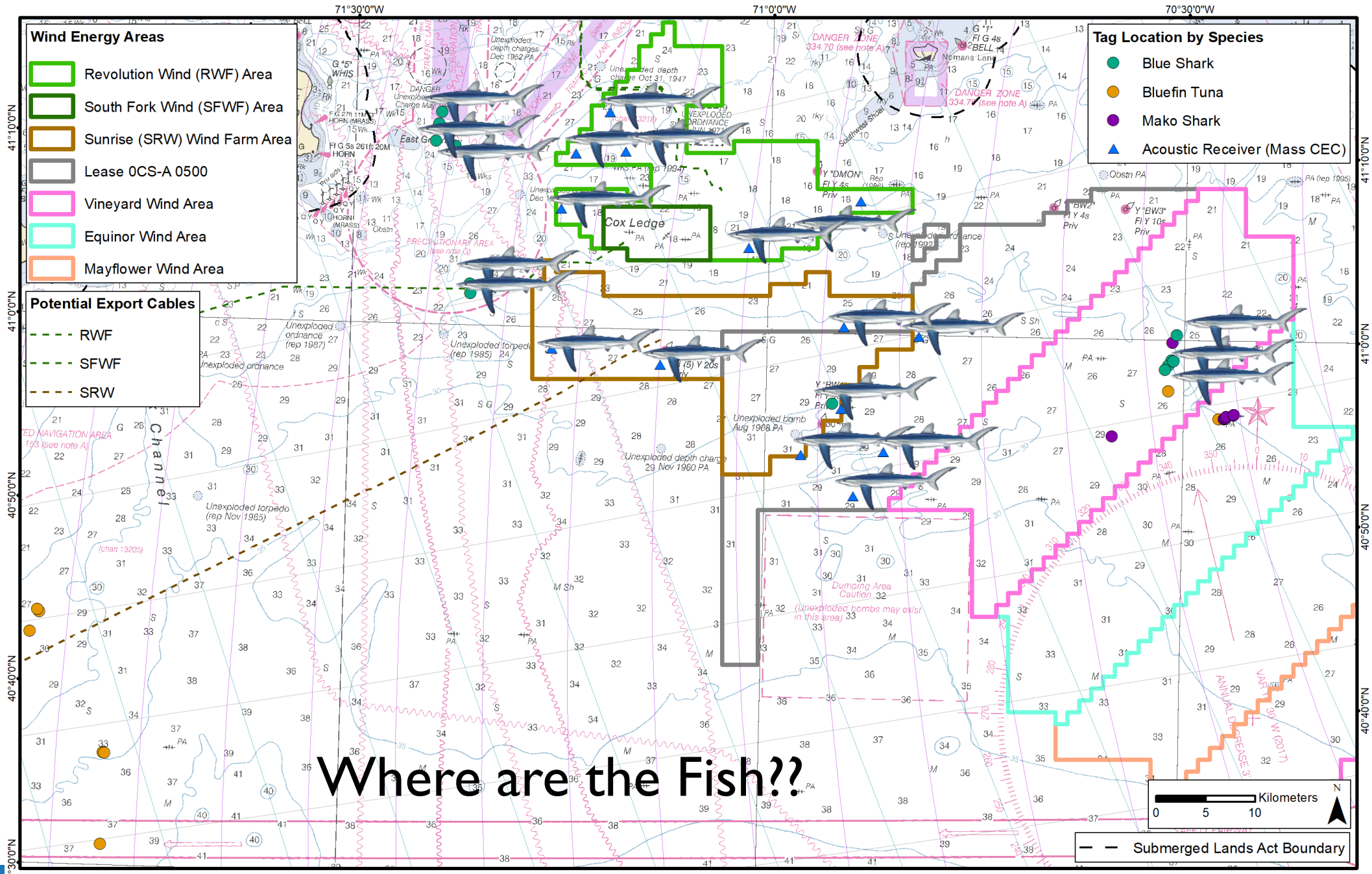

Where are the Fish??

Data: NOAA NOS Chart 12300

Document Name: SFW_MACEC_Receivers_SpeciesTagLocations_Slide8

Date: 12/9/2021

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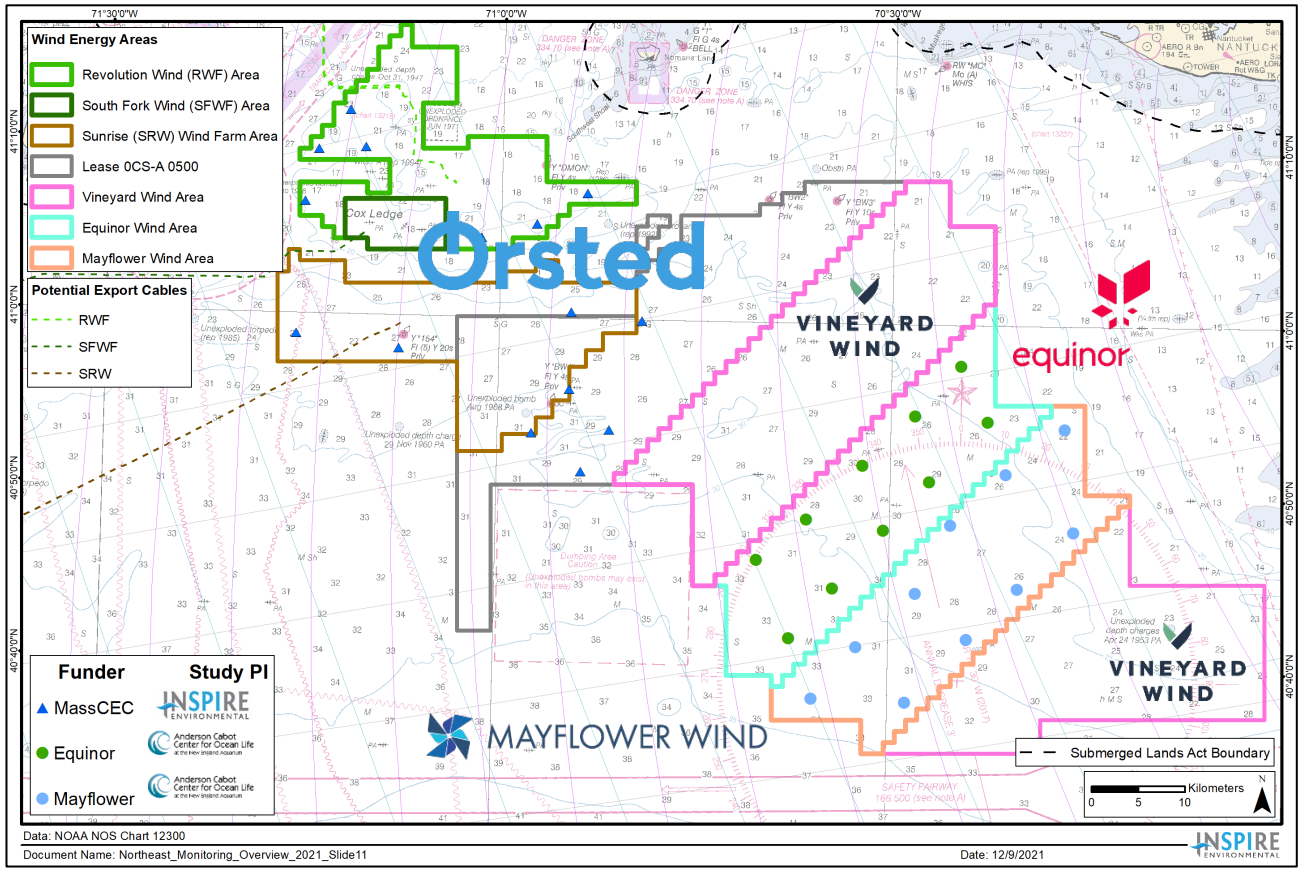
Future Work

Part 1: Monitor recreational fishing effort for HMS in SNE WEA

- Continue to build time series of baseline data
- Explore new methods for data collection (more real time monitoring)

Part 2: Monitoring HMS presence with telemetry

- Expansion of acoustic receiver array
  - 10 receivers each added to Beacon Wind and Mayflower in 2021
  - 30 receivers in Ørsted lease areas in 2022
  - 22 receivers in Vineyard Wind lease areas in 2022
- Continued tagging in 2022 - 2025
  - White marlin
  - Common thresher shark
- Aim to continue monitoring through 2026
- Achieve regional monitoring
- Establish data sharing policies



Acknowledgements

- Greg Mataronas, *F/V Cailyn & Maren*
- Rob Taylor, Newport Sportfishing Charters, *F/V Reel EZ*
- Willy Hatch, Machaca Charters, *F/V Machaca*
- Dr. Diego Bernal, UMASS-Dartmouth, *F/V Toro*
- Mid-Atlantic Acoustic Telemetry Observation System (MATOS) and cooperating researchers