

Update on Pilot Regional Fisheries Studies

MASS. FISHERIES WORKING GROUP
MARCH 31, 2023

NILS BOLGEN / JESS HILTZ



Pilot Regional Fisheries Studies

➤ Sponsors

- MassCEC
- BOEM
- RI DEM

➤ Priority Setting

- *Mgmt. Objectives and Research Priorities for Fisheries in the MA and RI-MA Offshore Wind Energy Area (MA DMF, et al, November 2018)*

➤ Supporters – members of the MA Fisheries Working Group

➤ Five projects selected

- January 2020



Credit: INSPIRE Environmental/New England Aquarium.

Summary

STUDY	STATUS
1. Passive Acoustic Telemetry for Highly Migratory Species INSPIRE Environmental and New England Aquarium	<ul style="list-style-type: none">• Complete; two years data• Initial presentation at 12/10/2021 FWG• Final report, September 2022
2. Net Survey for Larval Lobster and Fish Neuston UMass Dartmouth SMAST, with Mass. Lobstermen's Association	<ul style="list-style-type: none">• Complete; two years data (vs. one planned)• Initial presentation at 9/23/2021 FWG• Final report in review
3. Standard Approaches for Benthic Data Mapping INSPIRE Environmental, with Northeast Regional Council on Oceans	<ul style="list-style-type: none">• Integrated with RWSE Habitat and Ecosystem Subcommittee• Final report pending spring 2023
4. Study on Fishing Status of Vessels using the AIS University of Rhode Island	<ul style="list-style-type: none">• In process, but moving slowly• Initial presentation at 3/2/2022 FWG• Completion in late 2024
5. Comparative Analysis of European and Japanese Approaches to Regulation of Offshore Wind Farms New Bedford Port Authority	<ul style="list-style-type: none">• Not advancing

Contact

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Jess Hiltz, Program Administrator

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857-415-6088

Data Collection Studies

SCOPE	STATUS & REPORTING	TEAM / NOTES
1. Passive Acoustic Telemetry for Highly Migratory Species <i>Two-year acoustic tagging and tracking study of highly migratory species such as tuna and sharks at popular recreational fishing spots in the wind energy areas.</i>		INSPIRE Environmental and New England Aquarium
<ul style="list-style-type: none"> Year One (2020) – tagging July and August; retrieval in December Year Two (2021) – tagging June and July; retrieval in December 	<ul style="list-style-type: none"> Final Report, September 2022 (BOEM 2022-059) 	Available at: https://www.masscec.com/sites/default/files/documents/MassCEC_AcousticTelemetryFinalReport.pdf
2. Net Survey for Larval Lobster and Fish Neuston <i>Initially, one year of towed net surveys for larval lobster and fish neuston throughout the wind energy areas. A second year, including concurrent zooplankton surveys, was added by amendment.</i>		UMass Dartmouth SMAST , with Mass. Lobstermen’s Association
<ul style="list-style-type: none"> Year One (2020) – Larvae net surveys June to September Year Two (2021) – Larvae and zooplankton net surveys May and June 	<ul style="list-style-type: none"> Year One Report, July 2021 Final Report Net Surveys (both years) – DRAFT in review Final Report Zooplankton Surveys (year two) – DRAFT in review 	Year One Report available on request. Final reports are imminent.

Technical Studies

SCOPE	STATUS & REPORTING	TEAM / NOTES
3. Standard Approaches for Benthic Data Mapping <i>Develop standard approaches to synthesizing, visualizing and disseminating high resolution acoustic and imagery data for mapping of seabed habitat in the wind energy areas.</i>		INSPIRE Environmental , with Northeast Regional Ocean Council
Engage with the NROC Seafloor Habitat Data Work Group and (per March 2022 amendment) the RWSC Habitat and Ecosystem Subcommittee in order to <u>develop best practices for</u> : <ul style="list-style-type: none">Integrating geophysical data and ground-truth data to map benthic habitats;Making habitat data available to regulators and stakeholders in a vetted and established forum (the Northeast Ocean Data Portal); andStandardizing data delivery formats and metadata for ground-truth data.	<ul style="list-style-type: none">Kickoff meeting with NROC Work Group, January 2021Amended March 2022 to integrate with RWSCDRAFT Report, November 2022FINAL Report, spring 2023	More information at: https://neooceanplanning.org/data-issues/seafloor-habitat-data/

Technical Studies (continued)

SCOPE	STATUS & REPORTING	TEAM / NOTES
<p>4. Study on Fishing Status of Vessels using the AIS (Automatic Identification System)</p> <p><i>URI will merge electronic and other data on fishing vessel activity into a single data set and apply a “machine learning” approach to enable lower cost broadscale modeling of the probability of fishing activity (i.e., where and when vessels are actually fishing, compared to in-transit) and catch.</i></p>		<p>University of Rhode Island, with Rhode Island DEM</p>
<ul style="list-style-type: none"> • Data acquisition and preparation • Engagement with fishing community • Model development • Data analysis and mapping 	<ul style="list-style-type: none"> • Term extended due to federal restrictions on accessing vessel data, February 2022 • PI departed, August 2022 • New PI identified, January 2023 <p>Status:</p> <ul style="list-style-type: none"> • Model inputs identified (e.g. vessel speed, speed variability, water depth) • Coding in process for transforming raw data into machine learning model • Initial runs of model conducted • DRAFT Final Report, due Sept. 2024 	<p>Extension of term was necessary because access to confidential “landings data” is limited to NOAA grantees and state or Marine Fisheries Commission employees. The URI team includes a RI DEM employee so they have access, but availability for the study is limited.</p>



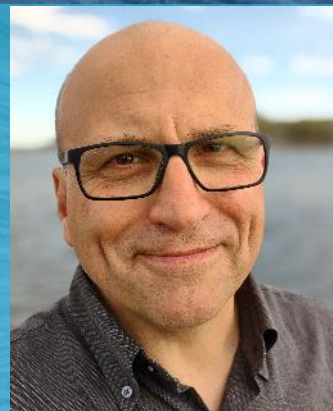
Update from Responsible Offshore Science Alliance

Massachusetts Fisheries Working
Group on Offshore Wind Energy

March 31st, 2023

Mike Pol, PhD
Research Director, ROSA

M/T: (508) 927-2817
Mike@rosascience.org
<https://www.rosascience.org/>



Recent ROSA Efforts

- Fish FRWRD database
 - OSW research gaps identified by comparing previously identified priorities to existing research projects
 - Goal is to fill gaps by administering RFPs and research programs in near future
 - Excel spreadsheet on website – soon to be web friendly
- Floating offshore wind project with DOE/NREL starting in May
 - Floating wind designs still under development
 - Opportunity to co-design technical details in Gulf of Maine (lobstermen, UMaine) and Mid-Atlantic (longliners and rec. fishermen, ROSA)
 - Starting in May
- Recommendations and Report on Fisheries Resource Data Production, Storage, and Accessibility – on our website



Other ROSA Efforts

- Website updated for easier navigation (+ new logo!)
- Executive Director search is underway and progressing
- No Q1 Advisory Council meeting – look for one in Q2
- Opening for Massachusetts comm. fisherman on AC
- Continue to work closely with commercial and recreational fishermen, Regional Wildlife Science Collaborative, NMFS, BOEM, NYSERDA, Maine Offshore Wind Research Consortium, and others
- Hosting science symposia – see website for past meetings and future meetings (seeking abstracts: 2023 American Fisheries Society; 2024 World Fisheries Congress)



Links

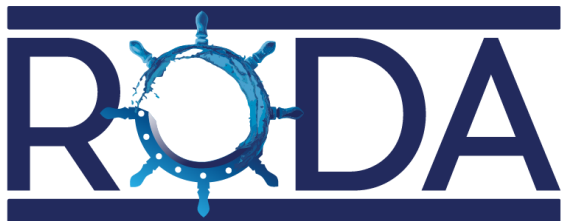


- [Fish FORWARD](#)
- [Recommendations and Report on Fisheries Resource Data Production, Storage, and Accessibility](#)
- [AFS 2023 Symposium on Offshore Wind, Fish, and Fisheries – Emerging Knowledge and Applications](#)
- [WFC 2024 Symposium on Pathways for a Sustainable Co-existence of Offshore Energy, Fisheries and Marine Conservation](#)



NOAA
FISHERIES

Northeast Fisheries
Science Center

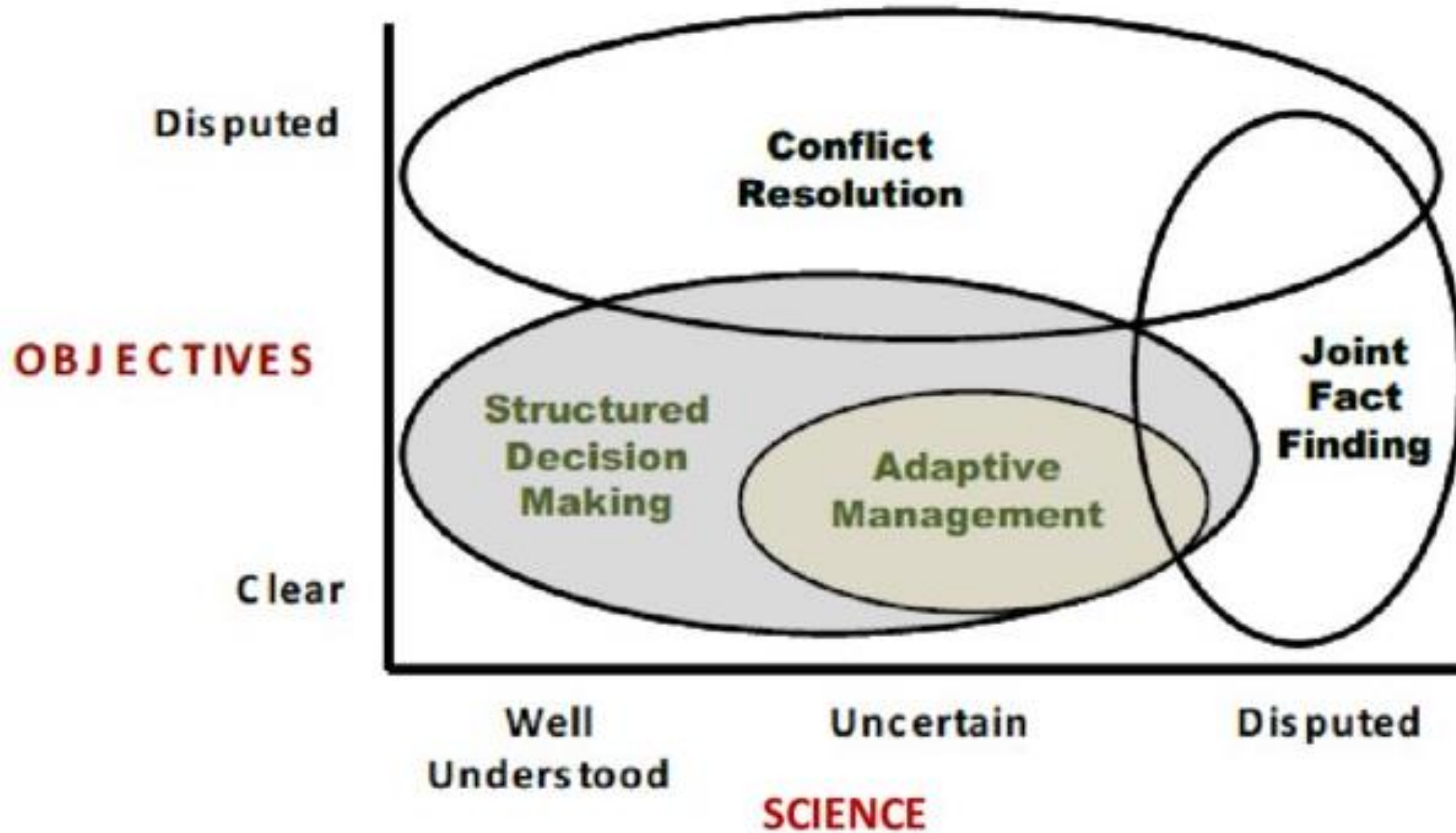


Integrated Ecosystem Assessments (IEA): Fisheries and Offshore Wind Development

Sean Lucey, Fiona Hogan,
Abigail Tyrell, Angela Silva

Massachusetts Fisheries Working Group – March 31, 2023

✉ Sean.Lucey@NOAA.gov
🐦 [@sluceyfish](https://twitter.com/sluceyfish)



Staudinger et al. 2015

**Single species or sector
EBM**



Or



**Multiple species or
sectors EBM**



Or

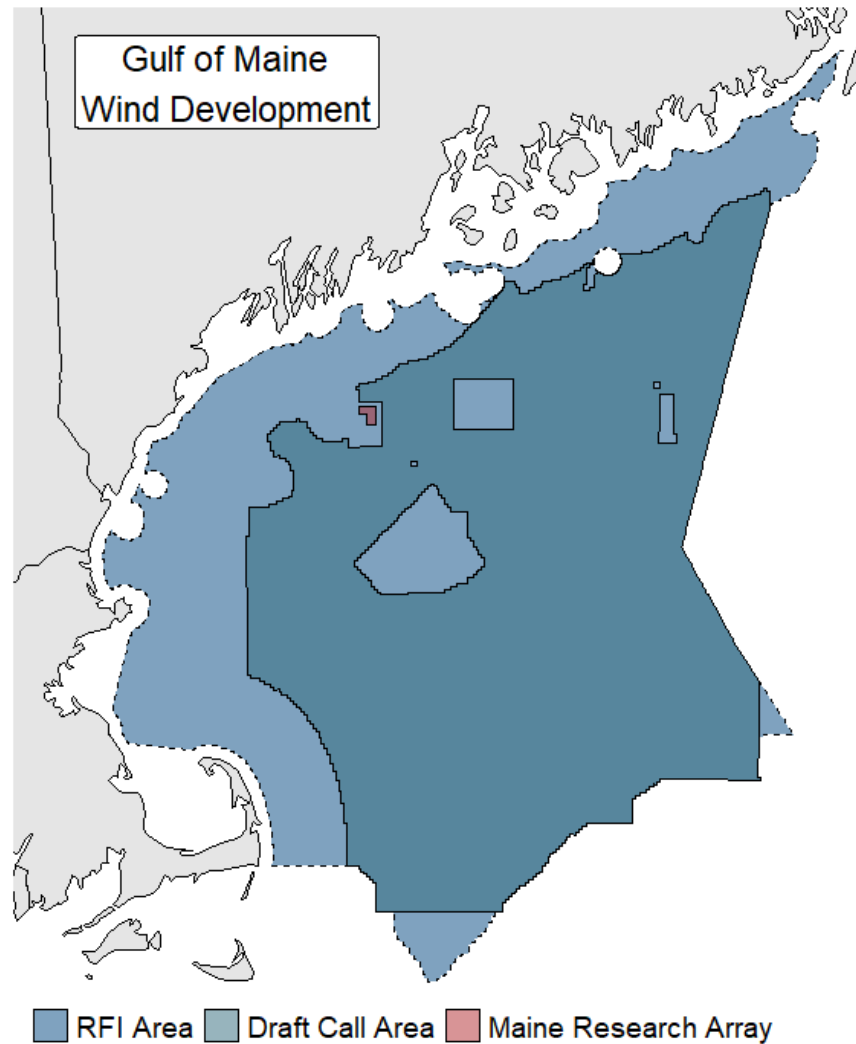


EBM of the entire system



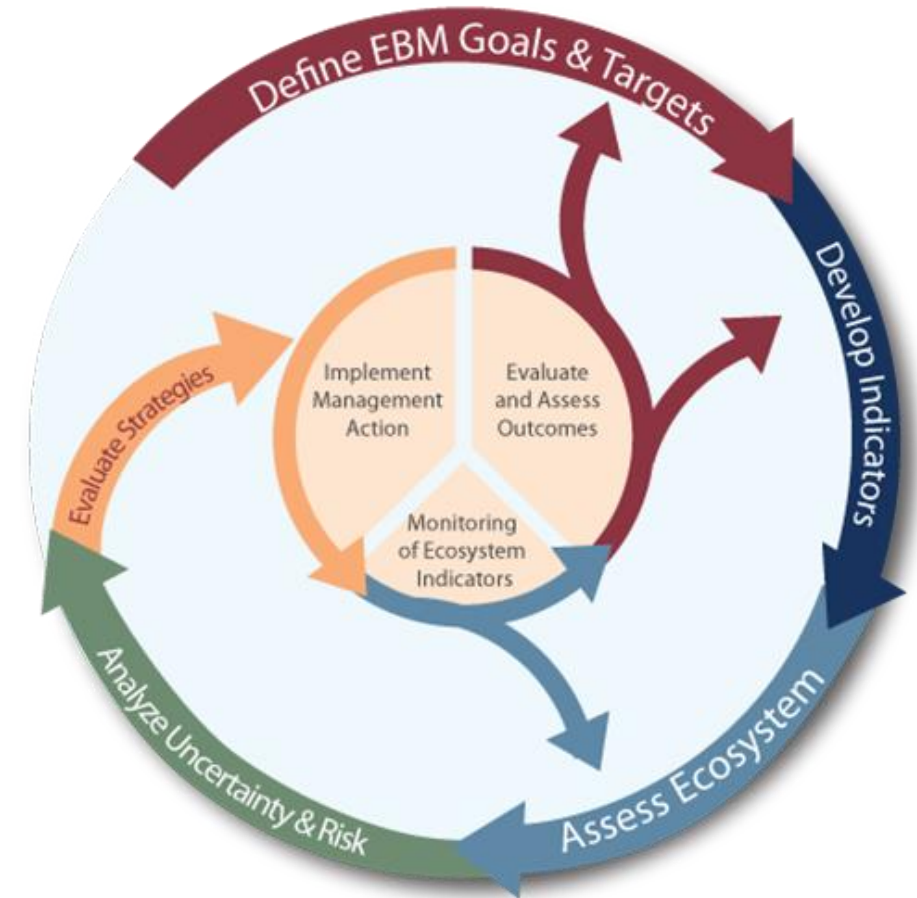
Adapted from UNEP, 2011

Wind Development in the Gulf of Maine



Integrated Ecosystem Assessments (IEA)

- Tool to achieve multiple ecosystem objectives
- Incremental and collaborative approach
- Provides decision-support information
- Complement single-species or single-sector approaches



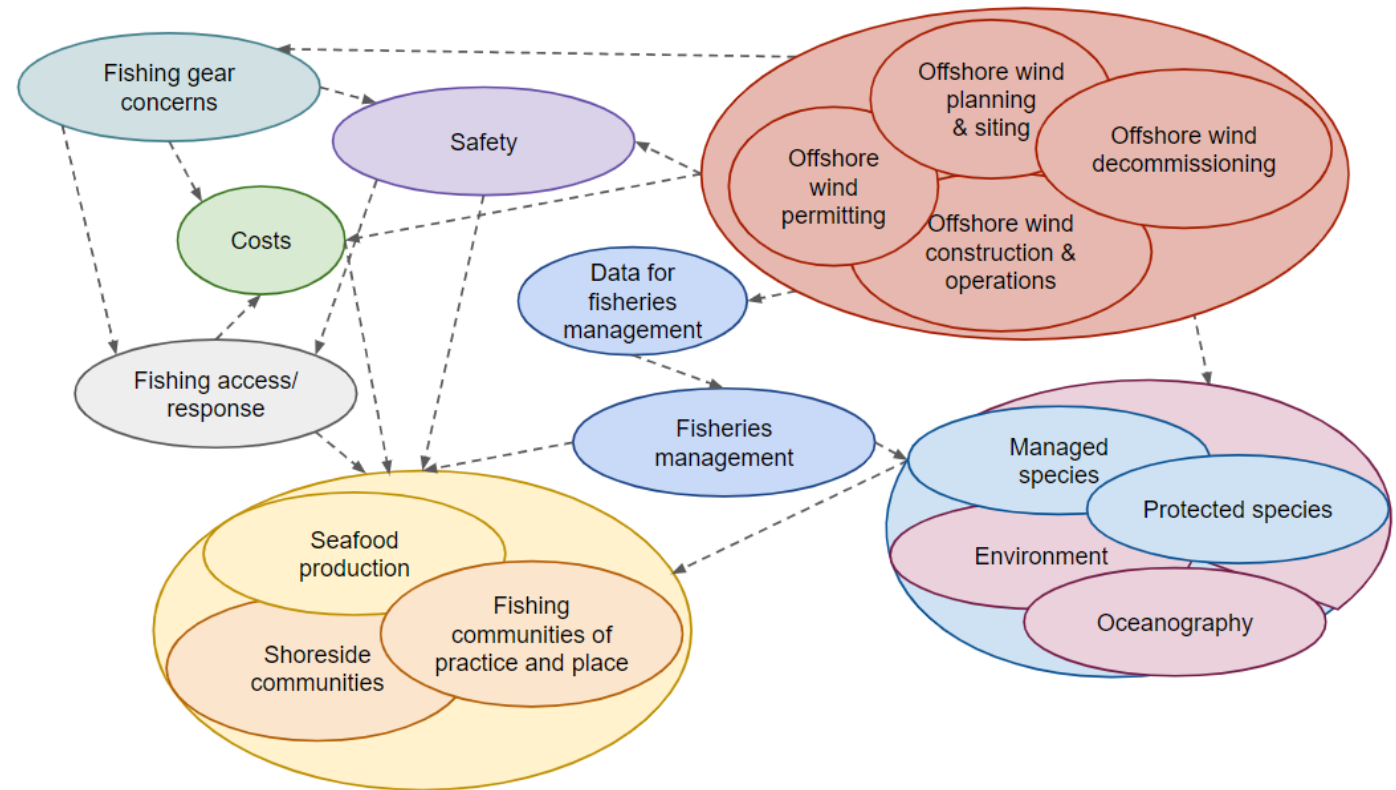
Getting Started: Defining EBM Goals & Targets

- Identify important connections between fishing, the environment, and offshore wind development/operations
- Discuss linkages with fishing industry
 - Current conditions
 - Future impacts



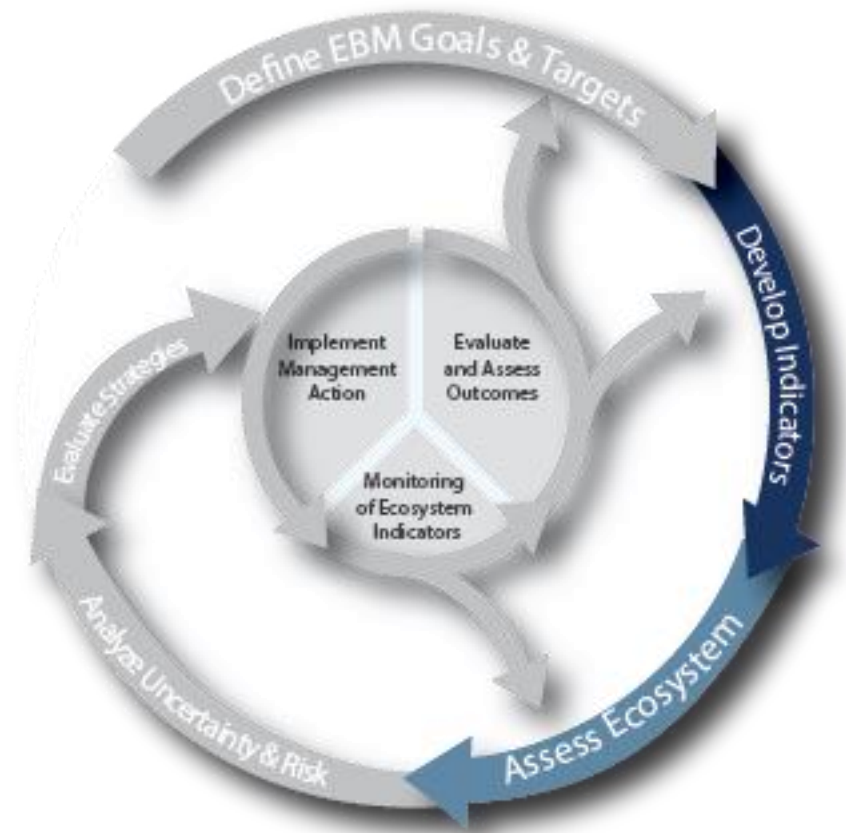
Development of a Conceptual Model

- Useful scoping tool
- Convey our understanding of the system
- Identify and visualize the diverse system



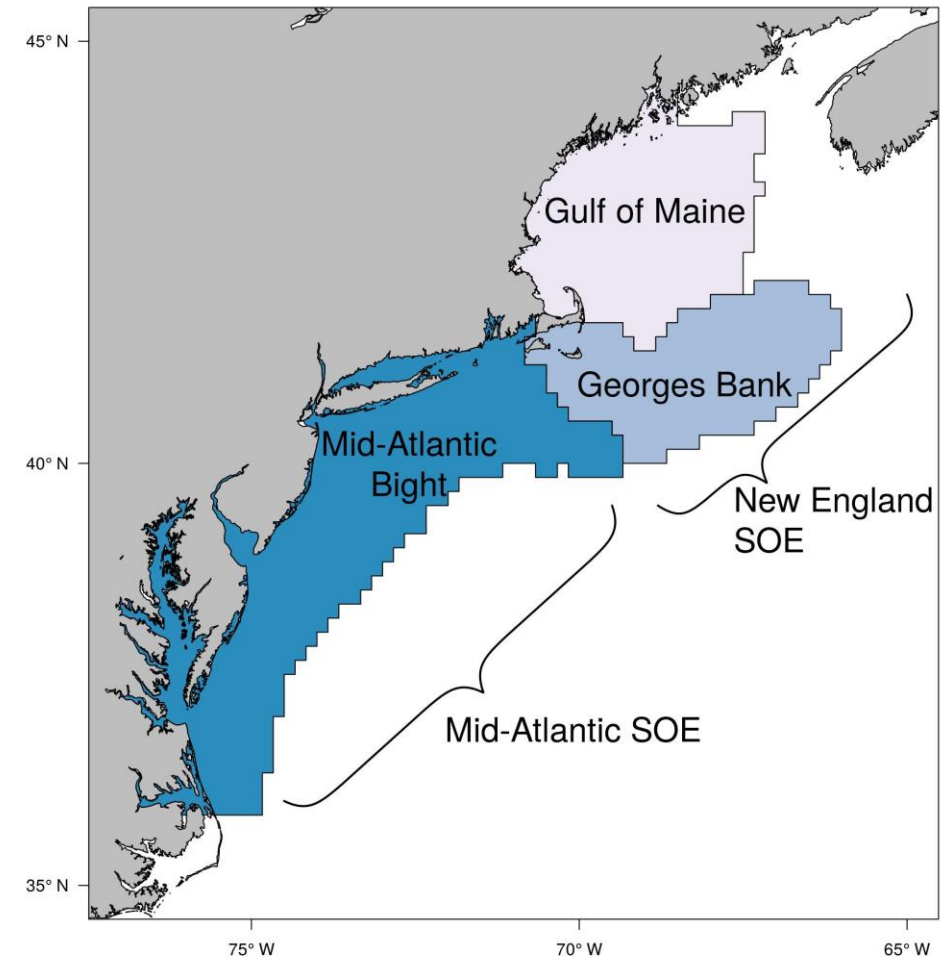
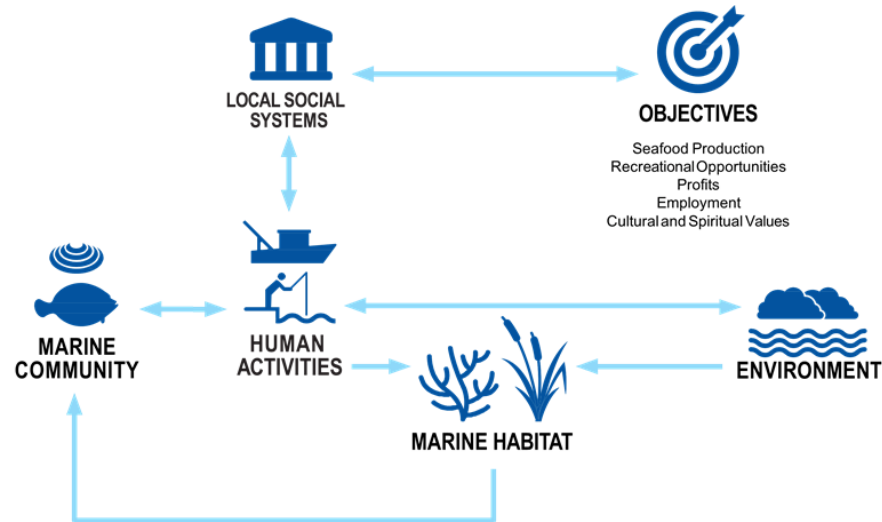
Next Steps: Indicator approach to assessing the system

- Catalog indicators that identify status and trend of key linkages in the system
- Collectively use indicators to reflect the entire socio-ecological system
- Develop indicators that are lacking
 - Local Ecological Knowledge
- Assess the ecosystem through an ecosystem status report (ESR)



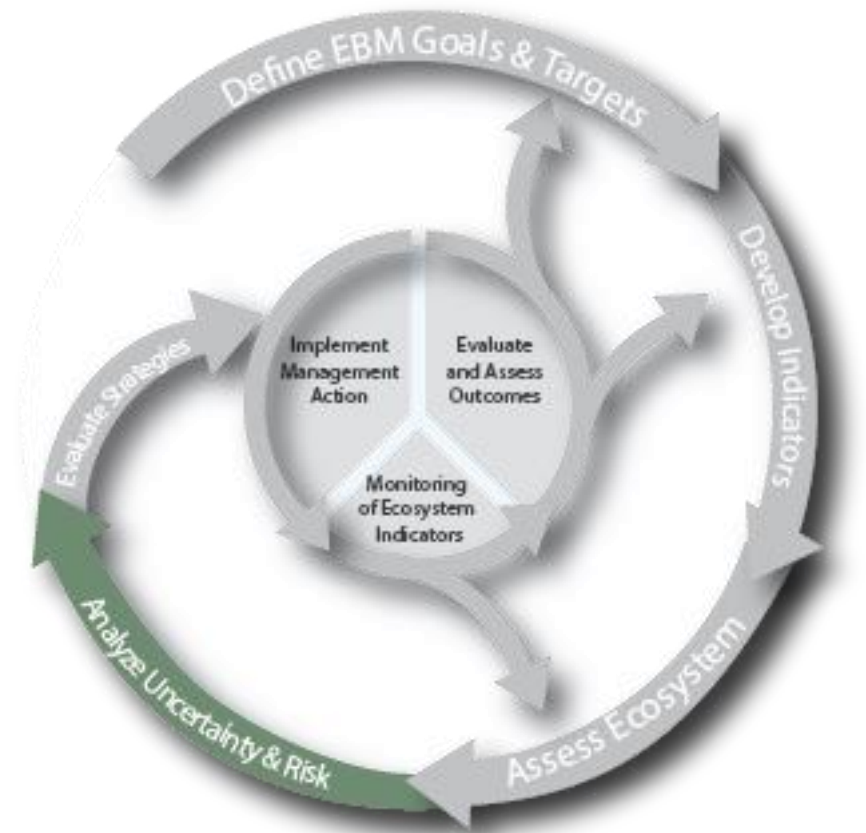
State of the Ecosystem Report

- Relatively short, non-technical document
- Focus on synthesis across indicators for big picture
- Clear linkages from ecosystem indicators to management objectives



Down the Road: Risk Assessment

- Risk = sensitivity/resilience to natural/human pressures and perturbations
- Determine the probability of undesirable events occurring
- Can be quantitative or qualitative
- Help prioritize management action

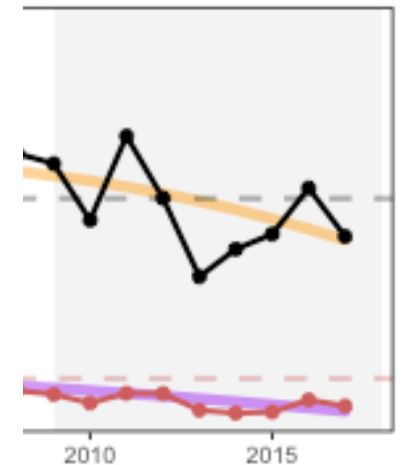


Develop r *Species and Sector level risk elements*

- Pre-defin

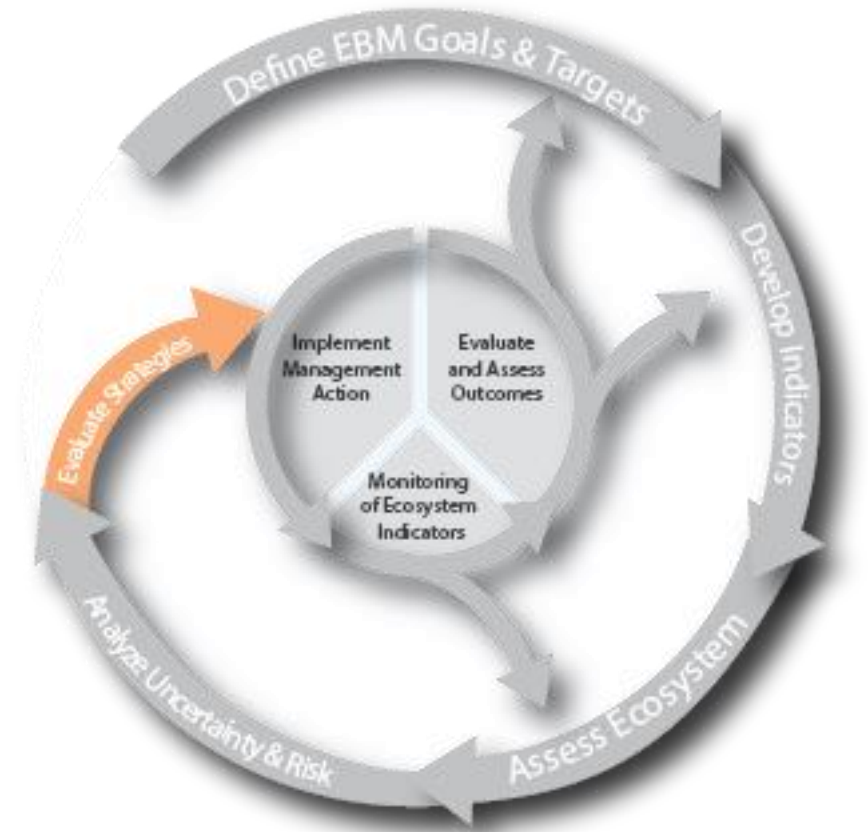
Risk Level	De
Low	No
Low-Moderate	In
Moderate-High	Sig
High	Sig

Species	MgtControl	TecInteract	OceanUse	RegComplex	Discards	Allocation
Ocean Quahog-C	lowest	lowest	lowmod	lowest	modhigh	lowest
Surfclam-C	lowest	lowest	lowmod	lowest	modhigh	lowest
Summer flounder-R	modhigh	lowest	lowmod	modhigh	highest	highest
Summer flounder-C	lowmod	modhigh	lowmod	modhigh	modhigh	highest
Scup-R	lowmod	lowest	lowmod	modhigh	modhigh	highest
Scup-C	lowest	lowmod	modhigh	modhigh	modhigh	highest
Black sea bass-R	highest	lowest	modhigh	highest	highest	highest
Black sea bass-C	highest	lowmod	highest	modhigh	highest	highest
Atl. mackerel-R	lowmod	lowest	lowest	lowest	lowest	lowmod
Atl. mackerel-C	lowest	lowmod	modhigh	highest	lowmod	highest
Butterfish-C	lowest	lowmod	modhigh	highest	modhigh	lowest
Longfin squid-C	lowest	modhigh	highest	highest	highest	lowmod
Shortfin squid-C	lowmod	lowmod	lowmod	lowmod	lowest	highest
Golden tilefish-R	na	lowest	lowest	lowest	lowest	lowest
Golden tilefish-C	lowest	lowest	lowest	lowest	lowest	lowest
Blueline tilefish-R	lowest	lowest	lowest	modhigh	lowest	highest
Blueline tilefish-C	lowest	lowest	lowest	modhigh	lowest	highest
Bluefish-R	lowmod	lowest	lowest	lowmod	modhigh	highest
Bluefish-C	lowest	lowest	lowmod	lowmod	lowmod	highest
Spiny dogfish-R	lowest	lowest	lowest	lowest	lowest	lowest
Spiny dogfish-C	lowest	modhigh	modhigh	modhigh	lowmod	modhigh
Chub mackerel-C	lowest	lowmod	lowmod	lowmod	lowest	lowest
Unmanaged forage	lowest	lowest	modhigh	lowest	lowest	lowest
Deepsea corals	na	na	modhigh	na	na	na



Payoff: Evaluate strategies

- Evaluate potential outcomes
- Identify trade-offs
- Applied to environmental impact statements



Timeline

- Scoping
 - Spring/Summer '23
 - Kickoff webinars
 - April 24
 - April 26
 - May 2
 - Series of workshops
- Indicator development
 - Summer '23 – Spring '24
 - Cataloging indicators
 - Developing new indicators
 - Local Ecological Knowledge
 - Indicator selection
- Risk Assessment/Evaluations
 - Starting Spring '24

Questions?

<https://www.integratedecosystemassessment.noaa.gov>

<https://rodafisheries.org/portfolio/iea/>



NOAA
FISHERIES



NOAA FISHERIES

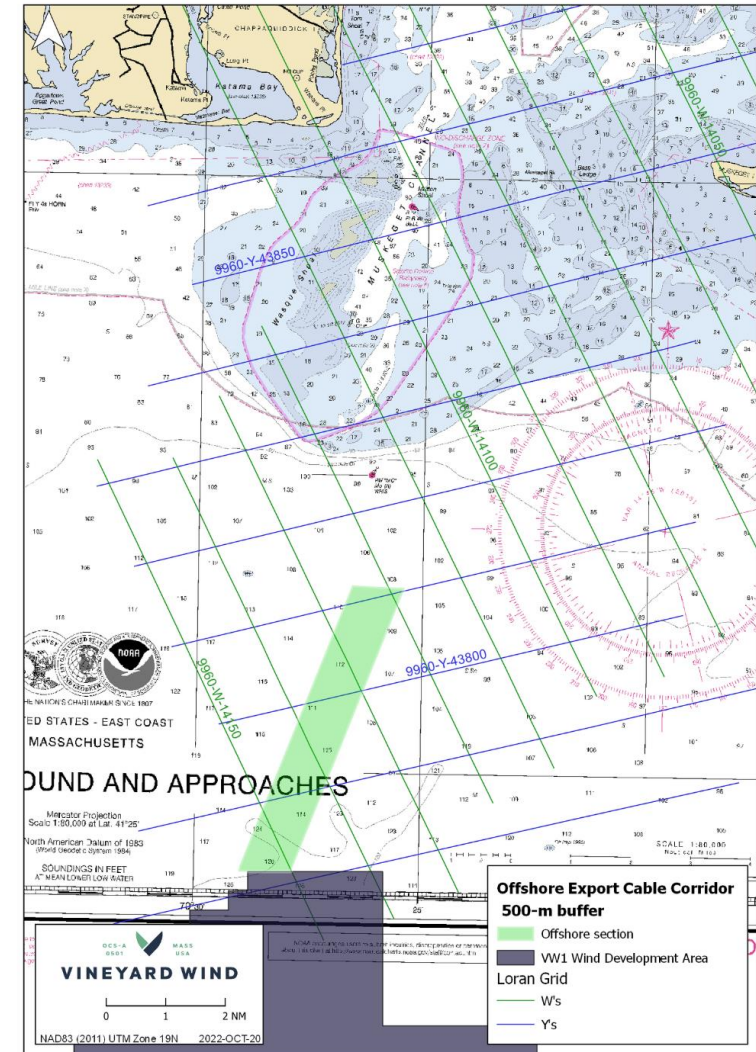
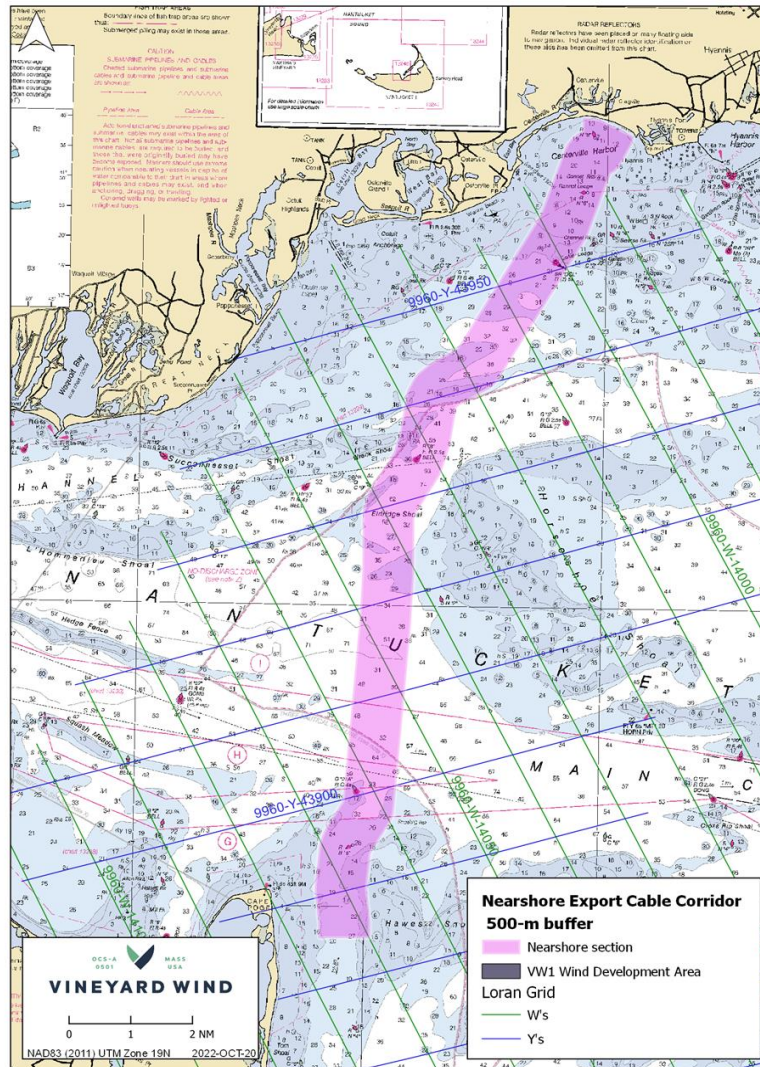


VINEYARD WIND

MA Fisheries Working Group Update

March 30, 2023

Nearshore Cable and Offshore Cable Sections Installed

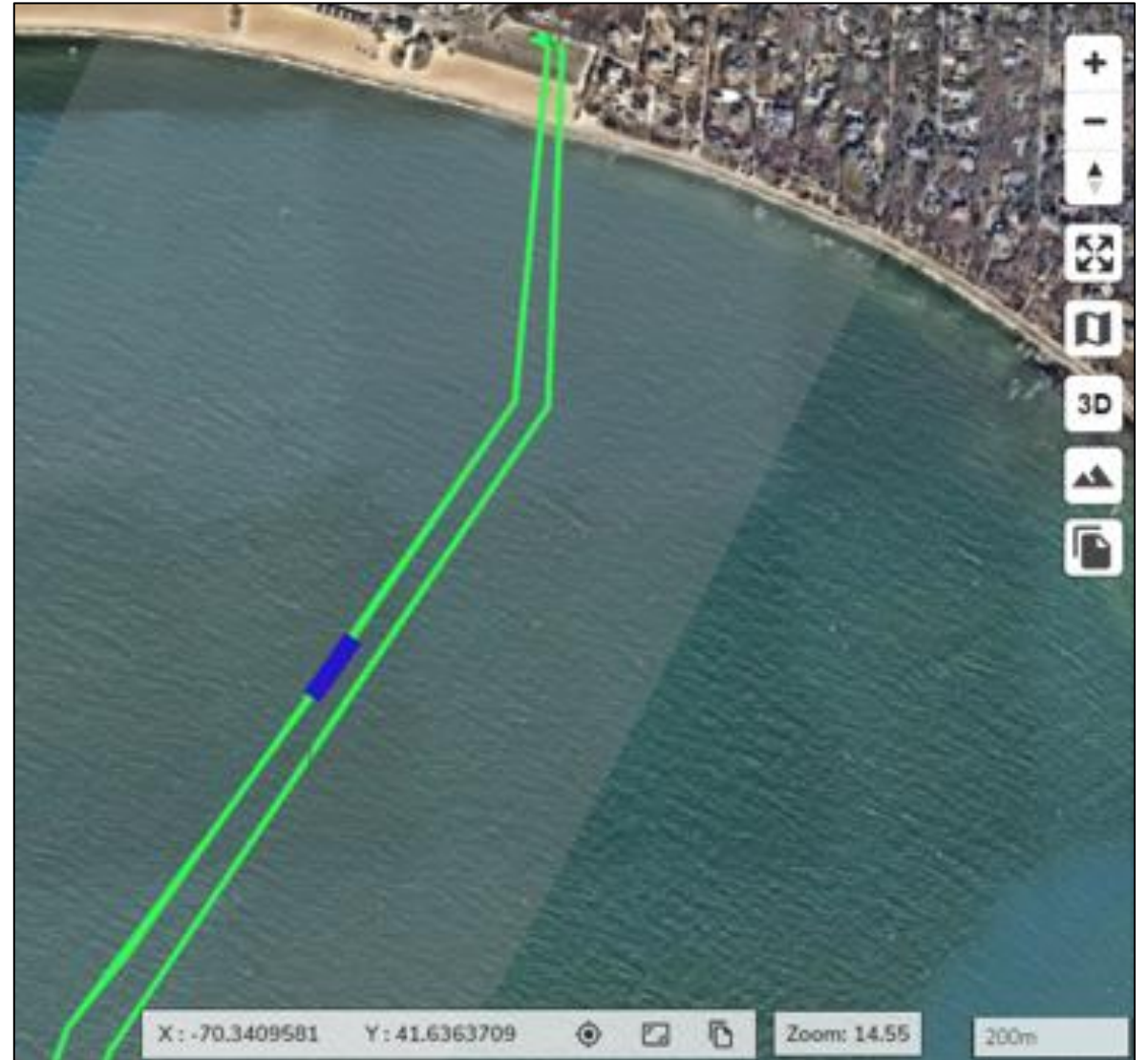


VINEYARD WIND 1

Nearshore Cable

Cable Burial Depth

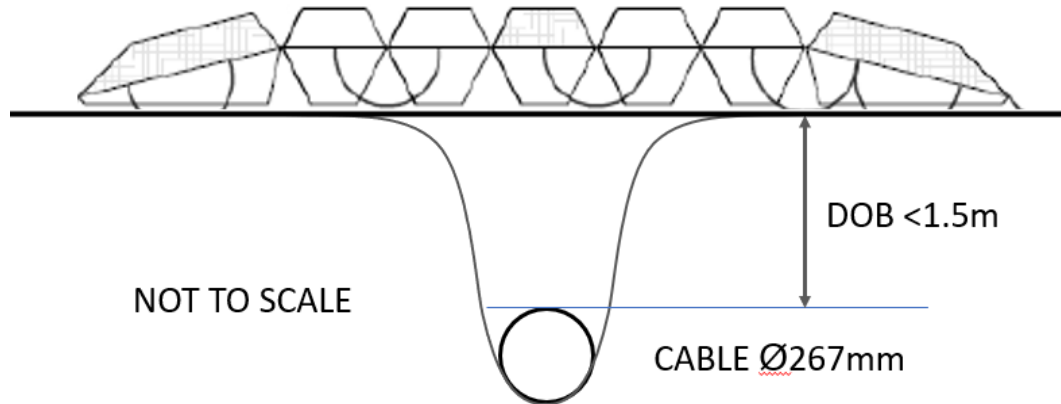
- Unable to penetrate hard bottom with jetting tool on Western cable near Spindle Rock
- Shallow water depths precluded use of other burial equipment
- Installation of adjacent Eastern cable achieved target burial depth throughout



Remedial Protection Measures

Nature-Based Design

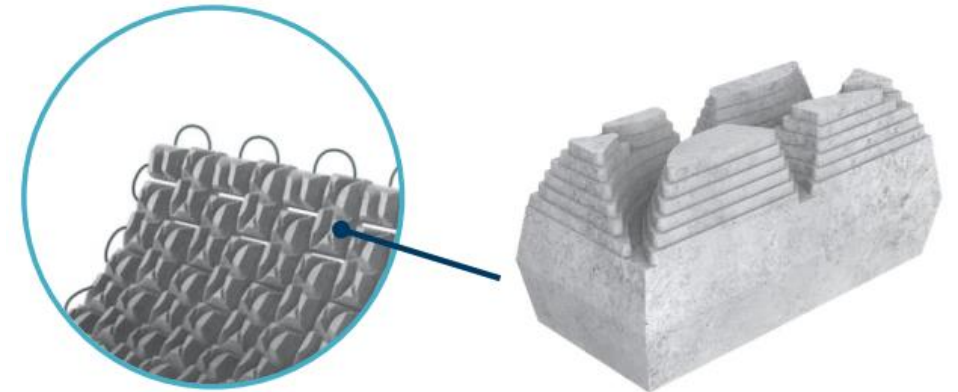
- EConcrete Mattresses
- Quantity: 20 mattresses to be placed longitudinally along 90 linear meters of underwater cable protection
- Specifications (per unit)
 - **Dimensions:** 6m x 3m x 0.34m (19.5 ft x 9.8 ft x 1ft)
 - **Weight:** 9.70 metric ton
 - **Material:** EConcrete® Admix bio-enhancing admixture and texture
 - Tapered edges (fishing gear friendly)



ECO[®]concrete

“The concrete mix design includes EConcrete Admix and is coupled with complex surface textures to encourage colonization and attachment by marine epifauna.”

“EConcrete units have been shown to enhance growth of ecosystem engineering species such as oysters, serpulid worms, bryozoans, and coralline algae... These species deposit their CaCO₃ skeletons onto hard surfaces, thus creating valuable habitat for other benthic organisms as well as generating an active carbon sink over the lifespan of the structure”

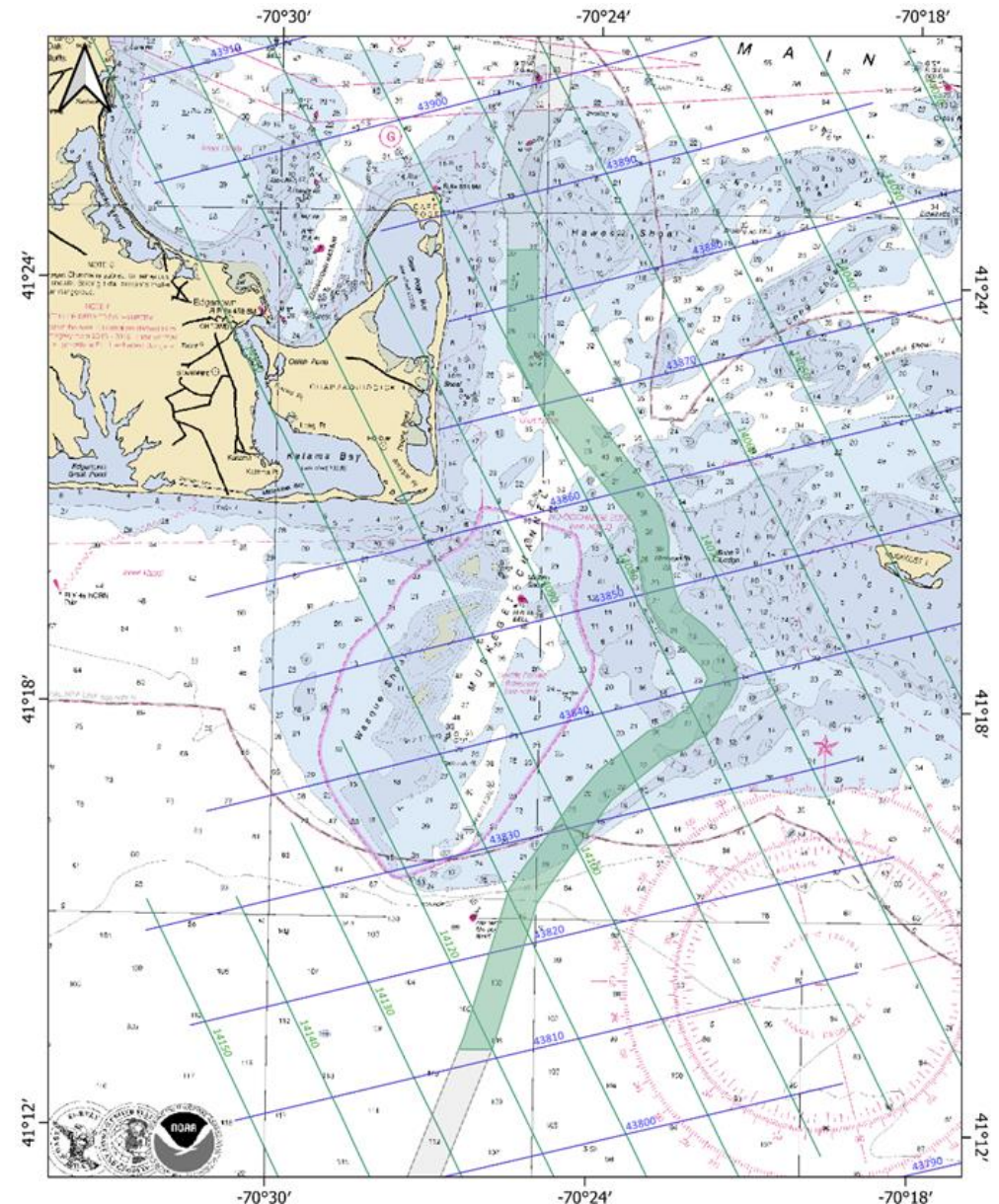


VINEYARD WIND 1

Mid-Section Cable Installation

In Progress

- Pre-lay Jetting complete
- Cable being loaded on Ulisse
- Installation starting next week
- FV Helen H on site as safety vessel



VINEYARD WIND 1

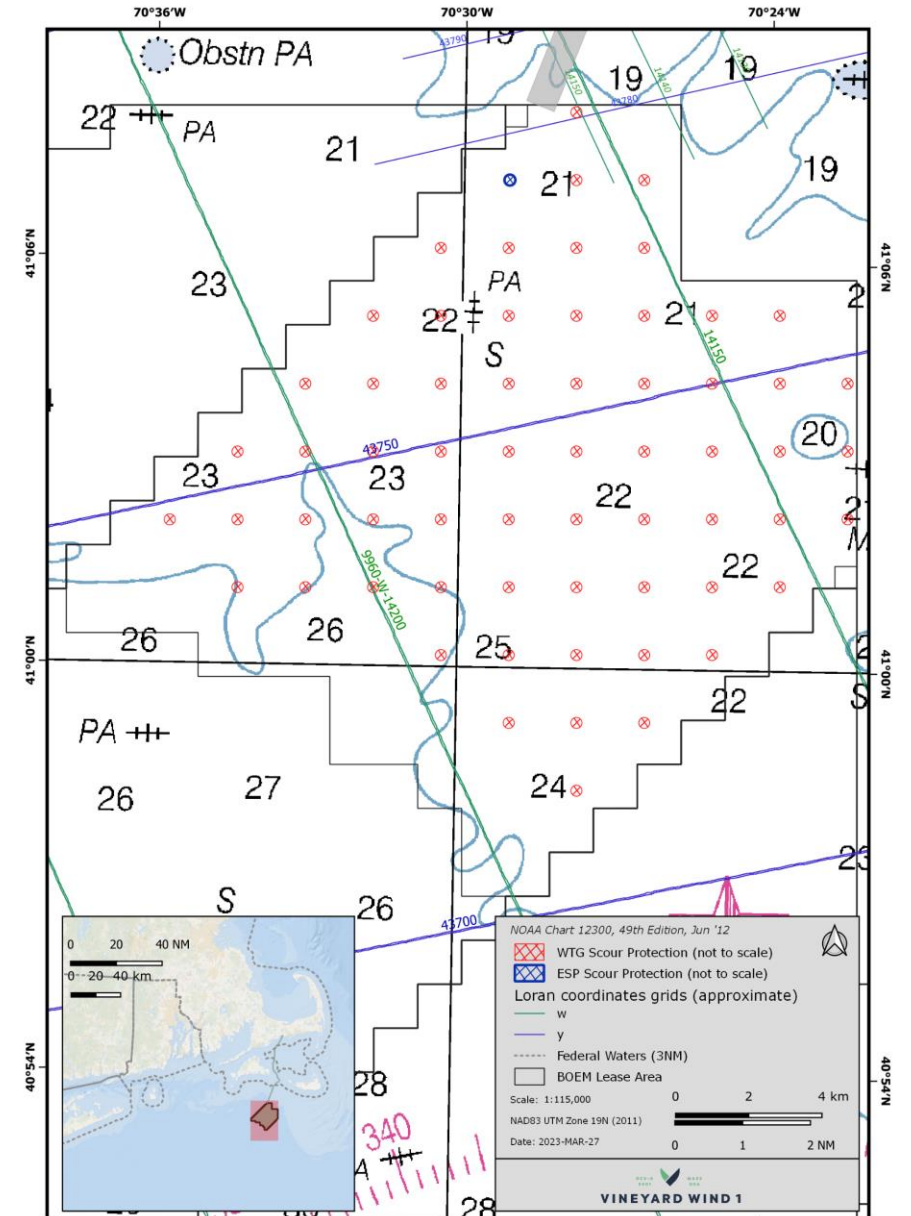
Offshore Construction

Scour protection in progress

- Started at 17 locations in the North
- Continuing through May 22
- FV Torbay on site as safety vessel



Monopile installation estimated to start mid May



Enhanced Mariner Information

Available from website / emails / text

- For enhanced mariner information including map viewer and downloadable plotter files you may scan or click the QR code, or follow the below link.

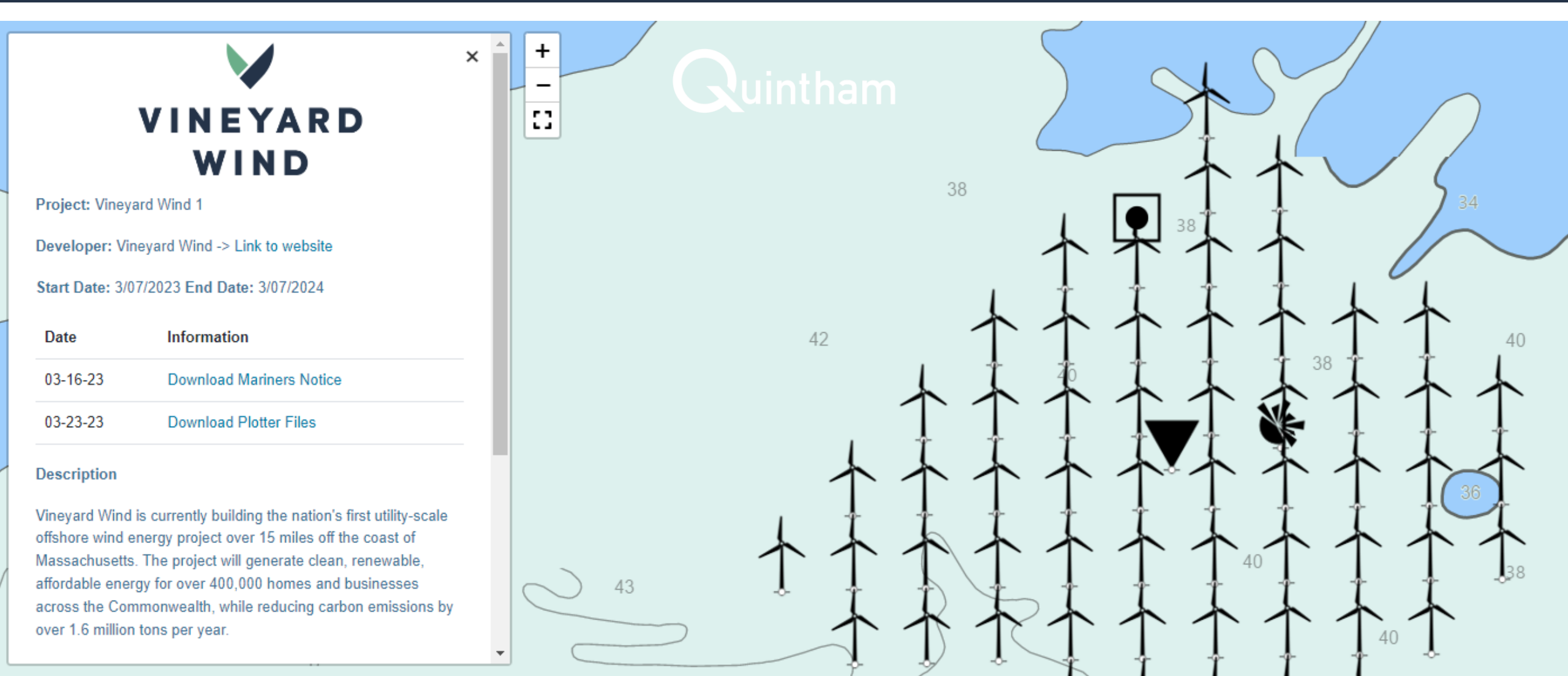
[Online map viewer and Plotter downloads](#)

- Plotter files are available for most commercial and recreational navigation systems including, Windplots, Timezero, Google Earth, Olex, Furuno, Lowrance, Garmin and many others.
- Help is available from the team at **Quinham**.



VINEYARD WIND 1

Enhanced Mariner Information



Compensatory Mitigation Information Available on VW Website



Vineyard Wind 1 Fisheries Compensatory Mitigation Program

Vineyard Wind 1 LLC is constructing an 800 MW offshore wind project located in federal Lease Area OCS-A-0501 approximately 15 miles south of Martha's Vineyard and Nantucket. The lease area is approximately 63,000 acres where 62 wind energy turbines and one electrical platform will be installed in a grid pattern spaced one nautical mile apart in a north/south/east/west direction.

Offshore construction activities for the project commenced in 2022 with installation of the offshore export cable. Construction of the wind energy turbine array within the lease area (referred to as the wind development area, WDA) is scheduled to begin in mid-2023.

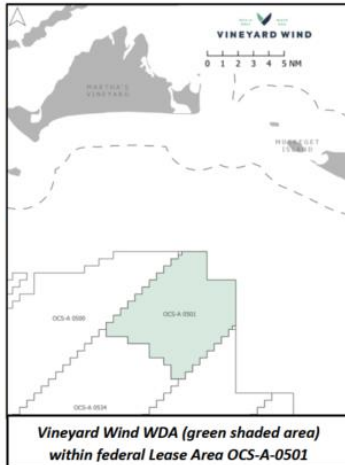
Vineyard Wind has created the WDA Compensation Program with a primary objective to provide fair, equitable compensation to fishermen and fishing businesses (i.e., shoreside businesses) for economic losses attributable to Vineyard Wind's construction, operations, and decommissioning activities.

Three escrow funds have been established to compensate affected fishermen in Massachusetts, Rhode Island, and Other States (Connecticut, New Jersey, and New York). Compensation is also available to fishing businesses with demonstrated losses due to the project activities.

The WDA Compensation Program will be overseen by an independent Third-Party Administrator who will manage the claims review and payments processes in collaboration with expert Fishery Advisors representing fixed and mobile gear fisheries. We are currently in the process of selecting the Third-Party Administrator, whom we expect to have in place in summer 2023.

For commercial fishermen, the WDA Compensation Program will employ a phased approach that requires vessel owners to first qualify for payment based on defined eligibility criteria, and then receive payment based on historic revenue dependence on the WDA. General information about the eligibility phase of the program is provided below. The eligibility package will be available once the Third-Party Administrator is in place, along with further details regarding the claims process for fishing businesses.

Information will be available on the Third-Party Administrator's website, which will be provided on Vineyard Wind's website (www.vineyardwind.com). You can also sign up for information alerts at <https://www.vineyardwind.com/contact>.



Eligibility Criteria for Fishermen

- Commercial fishing vessel owners/operators homeported in Massachusetts, Rhode Island, Connecticut, New Jersey, or New York
- A copy of a valid 2023 commercial fishing permit from NOAA Fisheries
- A copy of a current government-issued vessel registration showing ownership, or a vessel lease agreement
- Documented fishing activities within the WDA in at least three of the last seven years of the Baseline Period (2016-2022), including but not limited to:
 - Vessel Trip Reports
 - Vessel Monitoring System information
 - AIS information
 - Fishery observer or At-Sea Monitor information
 - NOAA Cooperative Research Study Fleet information
 - Chart plotter data/images
 - Logbooks
 - Other trip level reporting information that establishes fishing activity in the WDA
- Documented annual revenue from fishing activities in the corresponding three years, including but not limited to:
 - IRS form 1099 with reported income
 - Sales receipts
 - Dealer slips
 - Dealer compilation reports
 - Other income information that establishes income from fishing activities

Fishermen will have 60 days to submit their eligibility information once the Third Party Administrator has been established.



VINEYARD WIND 1

Offshore Construction Updates



Sign up for updates on our website:

https://www.vineyardwind.com/fisheries/#sign_up

Or text vwfisheries to 844-621-2170 to sign up for text message updates

Crista Bank

cbank@vineyardwind.com

508-525-0421

Travis Lowery

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508-728-4529



VINEYARD WIND 1



Massachusetts Fisheries Working Group

Lease Area OCS-A 0534 New England Wind Update

March 31, 2023

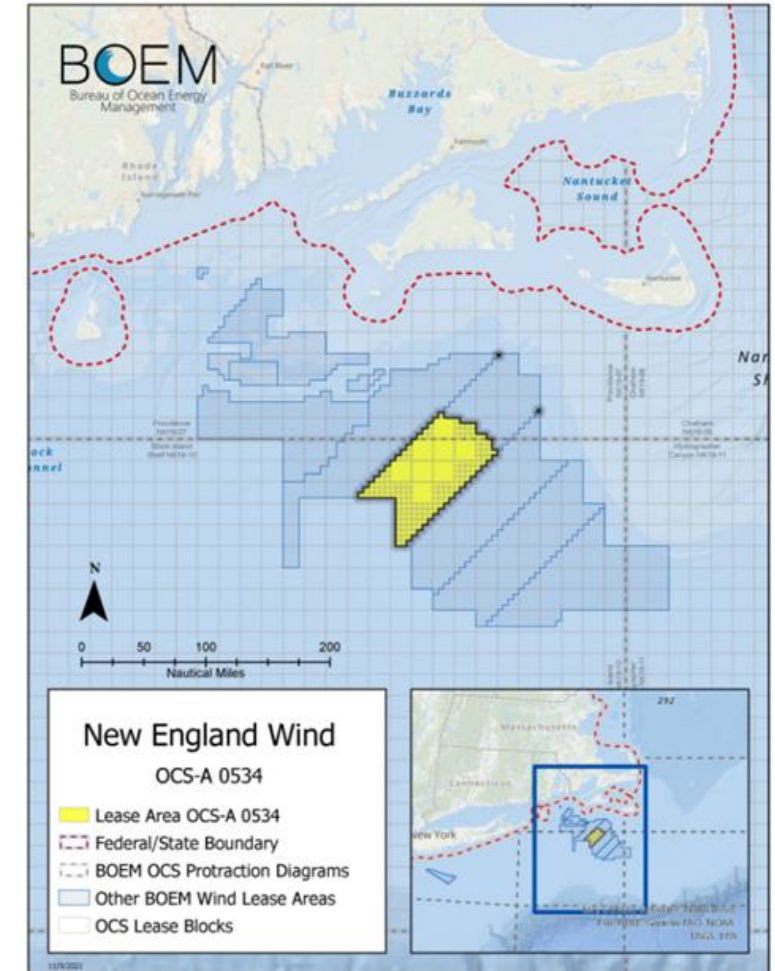
Permitting Update

Federal Permitting

- Lead Federal Agency: BOEM (Bureau of Ocean Energy Management)
 - New England Wind Construction and Operations Plan (COP) submitted July 2, 2020 for OCS-A 0534 lease area (includes Park City Wind and Commonwealth Wind projects)
 - [Draft Environmental Impact Statement](#) released Dec.19, 2022
 - Public Meetings held Jan. 27, Feb. 1, and Feb. 6, 2023
 - 60 day comment period closed Feb. 21, 2023

State Permitting

- New England Wind 1 Connector: Encompasses the portions of Park City Wind's offshore export cable located in state waters and onshore infrastructure in Massachusetts
 - MEPA Review Complete
 - EFSB Review underway
 - State and local permitting underway
- New England Wind 2 Connector: Encompasses the portions of Commonwealth Wind's offshore export cable located in state waters and onshore infrastructure in Massachusetts
 - MEPA ENF Certificate Received December 9, 2022
 - EFSB Petition filed November 2022
 - State and local permitting underway

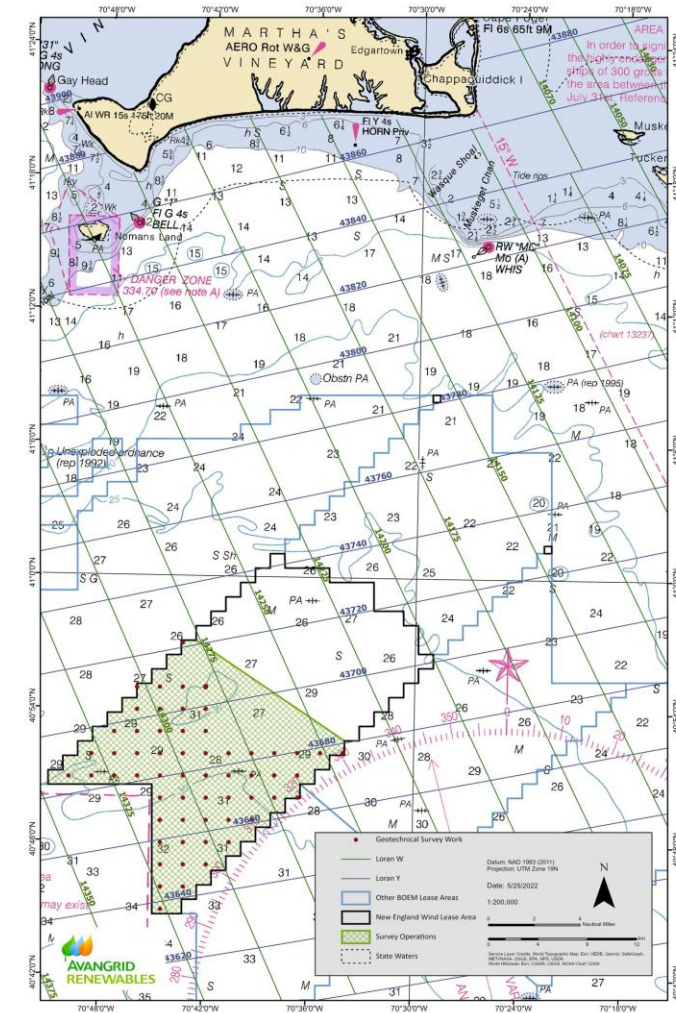


Survey Activity

Ongoing

- Deep Geotechnical survey
 - Commonwealth Wind
 - Fugro Explorer
 - Expected completion date: April 2023

Survey Plans for the remainder of 2023 are under consideration



Fisheries Monitoring Plan

Status: In development- Addressing comments from multiple agencies

To include:

- Drop camera
- Bottom Trawl
- Lobster Ventless Trap, Black Sea Bass and Plankton

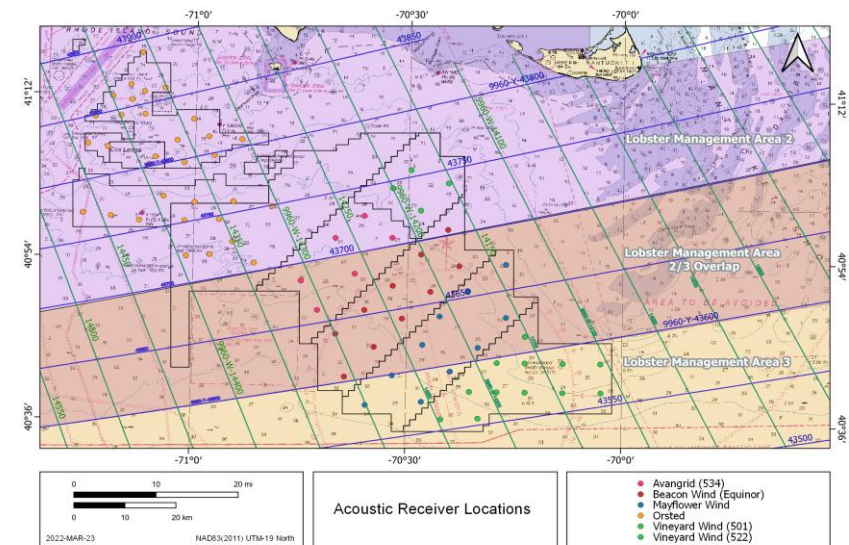


Additional Fisheries Studies

- Conch/ Channeled Whelk
- Highly Migratory Study
- False Albacore Tagging



**New England
Aquarium**



Fisheries Engagement

- Recreational Fishing Tournament Sponsorships
 - Various upcoming 2023 season
- Recreational / industry fishing shows
 - Rhode Island Saltwater Fishing Show
 - Connecticut Fishing & Outdoor Show
 - Massachusetts Lobstermen's Association Annual Weekend & Trade Show
- Joint Developer Port Hours
- New England Fisheries Management Council Meeting
 - Joint developer information session 4/18/23



Offshore Wind Information Event

Fisheries Liaisons from multiple wind developers from the MA/RI and NY Bight wind development areas will be present during the New England Fishery Management Council Meeting for conversation and information sharing.

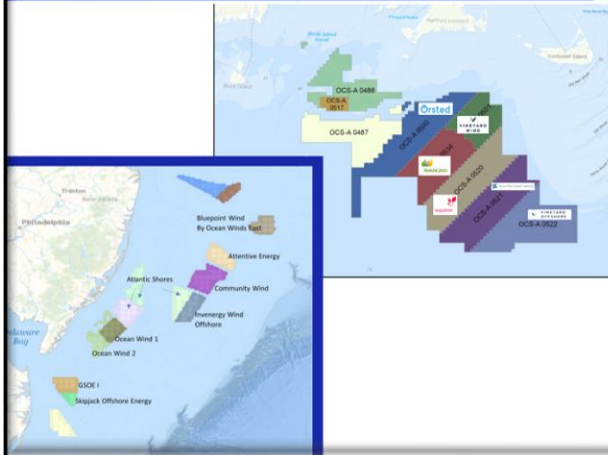
APRIL 18, 2023

Food and refreshments will be available.

Date: Tuesday April 18, 2023

Time: 9:00 a.m. - 5:00 p.m.

**Location: "Clipper Room" at the Hilton Mystic
20 Coogan Blvd Mystic, CT 06355**



Caela Howard
860.575.3501

John Harker
857.216.8611



Elizabeth Marchetti
401.954.2902

EJ Marohn
781.579.9978



Joel Southall
617.817.4682



Rodney Avila
857.332.4479

Julia Prince
857.348.326



Travis Lowery
508.728.4529



Crista Bank
508.525.0421

Thank You

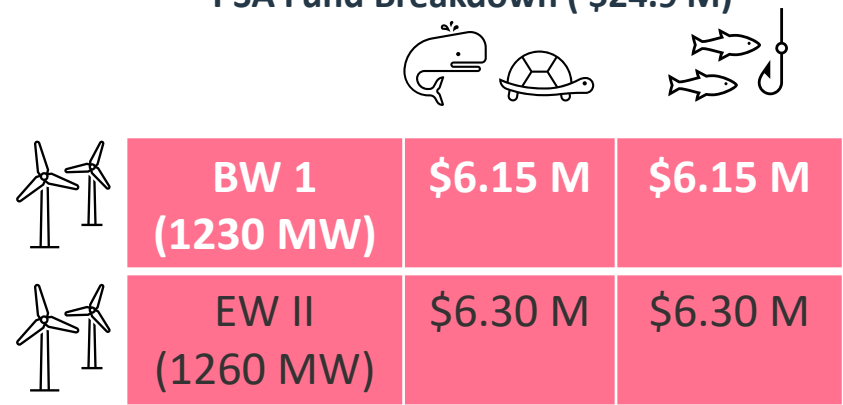
Questions?



NYSERDA EW2 and BW1 PSA Monitoring Plan Update

Timeline	Action
14 Jan 2022	EW2 and BW1 Purchase And Sale Agreement Signed - \$10,000 / MW
14 Jan 2023	Equinor Submitted Monitoring Plan to NYSERDA for approval
6 Mar 2023	NYSERDA Approved
Q2 2023	Equinor contracting with ROSA and RWSC
2023	Develop RFPs and selection process
2023/2024	Issue RFPs
2024-2028	ROSA and RWSC Administer Funds, Manage Projects, Collect and Share Data, Communicate Project Progress

PSA Fund Breakdown (\$24.9 M)



SouthCoast Wind - Overview

- **Lease Area**

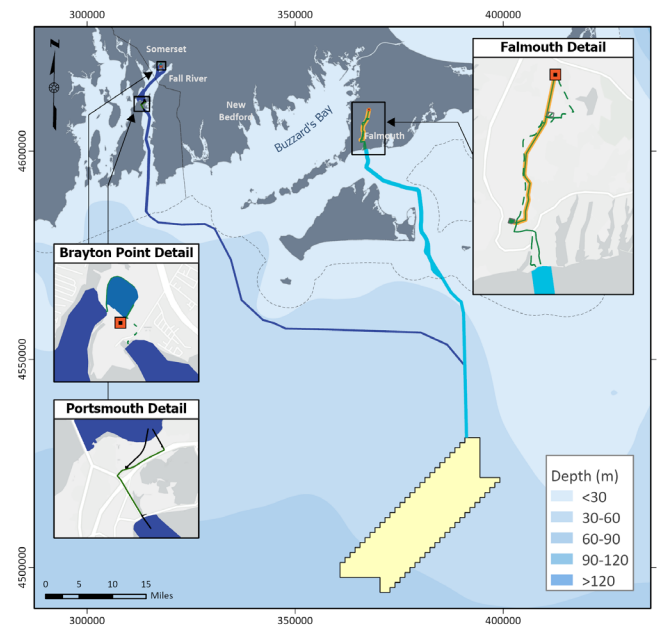
- 127,388 acres
- Up to 149 wind turbine/offshore substation platform positions
- 51 nautical miles from the RI coastline
- 1 x 1 nautical mile grid layout

- **Generation Potential**

- Estimated 2,400 MW+ total generating capacity

- **Two points of interconnection**

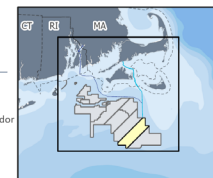
- Brayton Point, Somerset, MA
- Falmouth, MA



Date: 2/9/2023 Projection: UTM Zone 19N, NAD83 (2011)

LEGEND

- Point of interconnection to grid
- HVDC converter station area
- Preferred onshore cable route
- Alternate onshore cable route
- Eversource transmission route
- Horizontal direction drilling trajectories
- Brayton Point offshore export cable corridor
- Falmouth offshore export cable corridor
- State boundary to coastal waters
- SouthCoast Wind lease area



Ørsted

Ørsted Offshore North America

Northeast Program Update

MA Fisheries Working Group
Meeting on Offshore Wind
March 2023

Our U.S. portfolio

Awarded ~5,000 MW of offshore capacity



In Operation

Block Island Wind Farm: 30MW

Under construction

South Fork Wind: 50/50 JV w/ Eversource, 130MW

Awarded

Revolution Wind: 50/50 JV w/ Eversource, 704MW

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

Skipjack Wind 2: 846MW

Orsted Northeast Program 50/50 JV with Eversource

South Fork Wind

- Deliver power to the East Hampton, NY
- NY Article VII approved March 2021
- COP Approval January 2022
- **Onshore: Construction Commenced**
- **Offshore: Pre-construction Fall 2022, Construction Spring 2023**

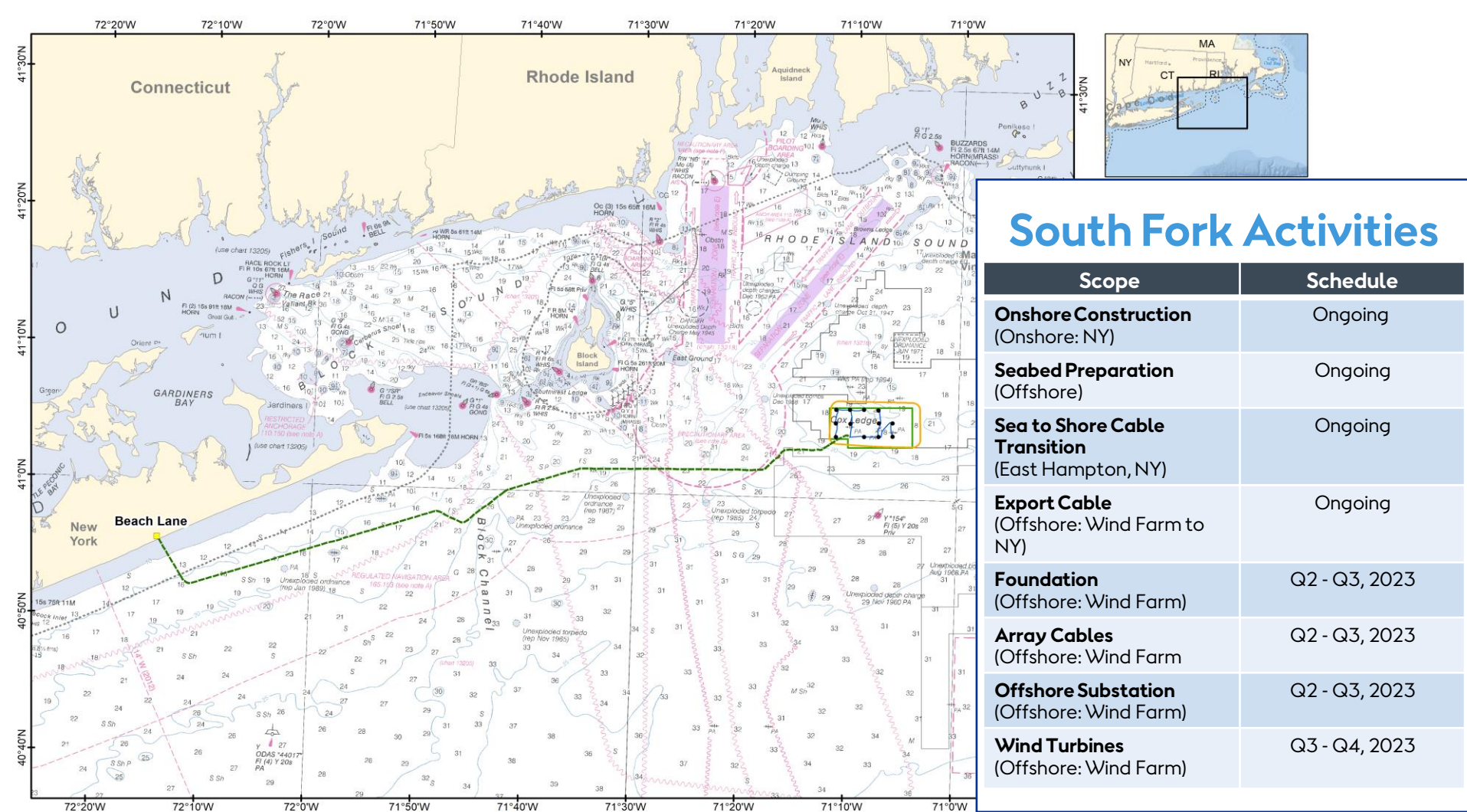
Revolution Wind

- Interconnect to the existing Davisville Substation, RI
- RI EFSB Order Issued July 2022
- RI CRMC/RIDEM permitting underway
- **DEIS September 2022, FEIS June 2023**

Sunrise Wind

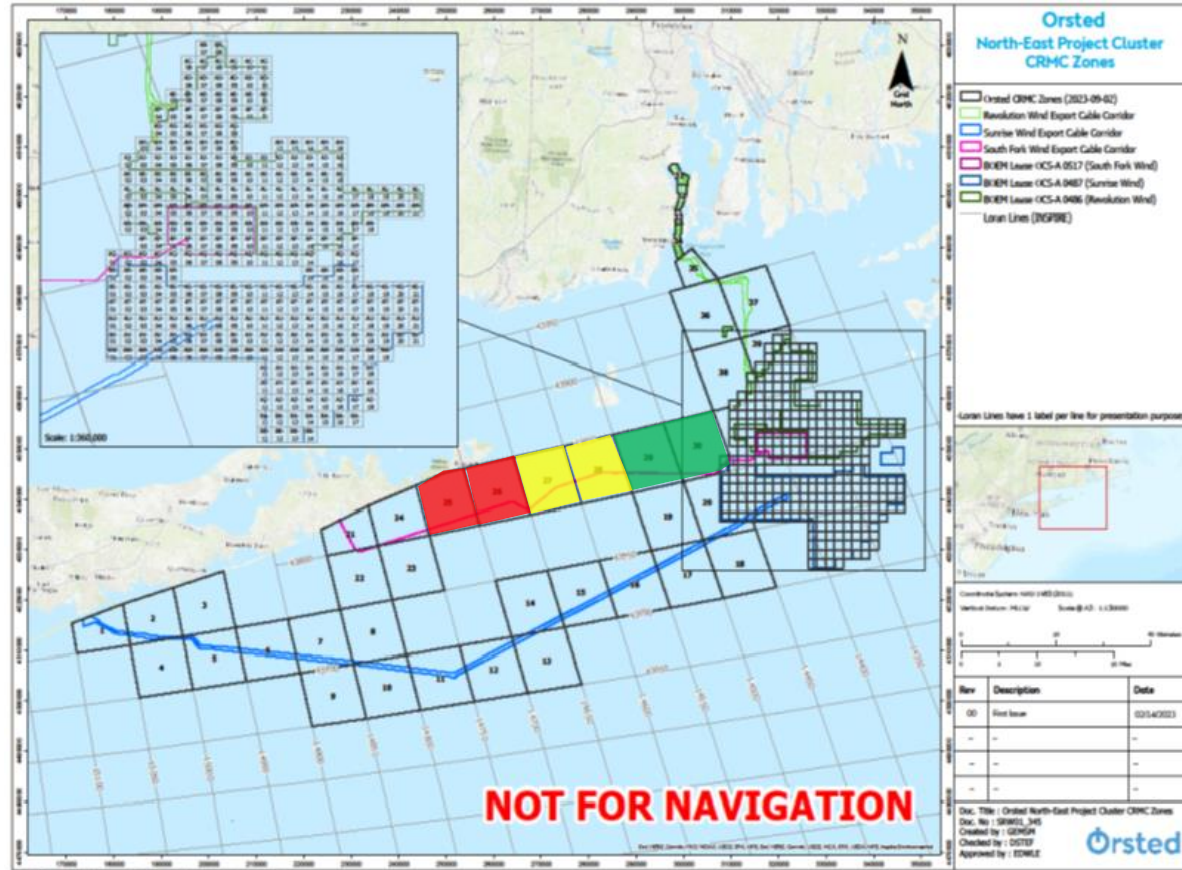
- Proposed interconnection at Holbrook Substation, NY
- NY Article VII Settlement meetings close to completed
- **DEIS December 2022, FEIS July 2023**





Updated survey zones

- Twice weekly email updates
- 3- and 7-days outlooks
- Predictive Traffic Light model
 - Heavy traffic or exposed cable
 - Light vessel activity or near-term future work
 - Possible low impact vessel work

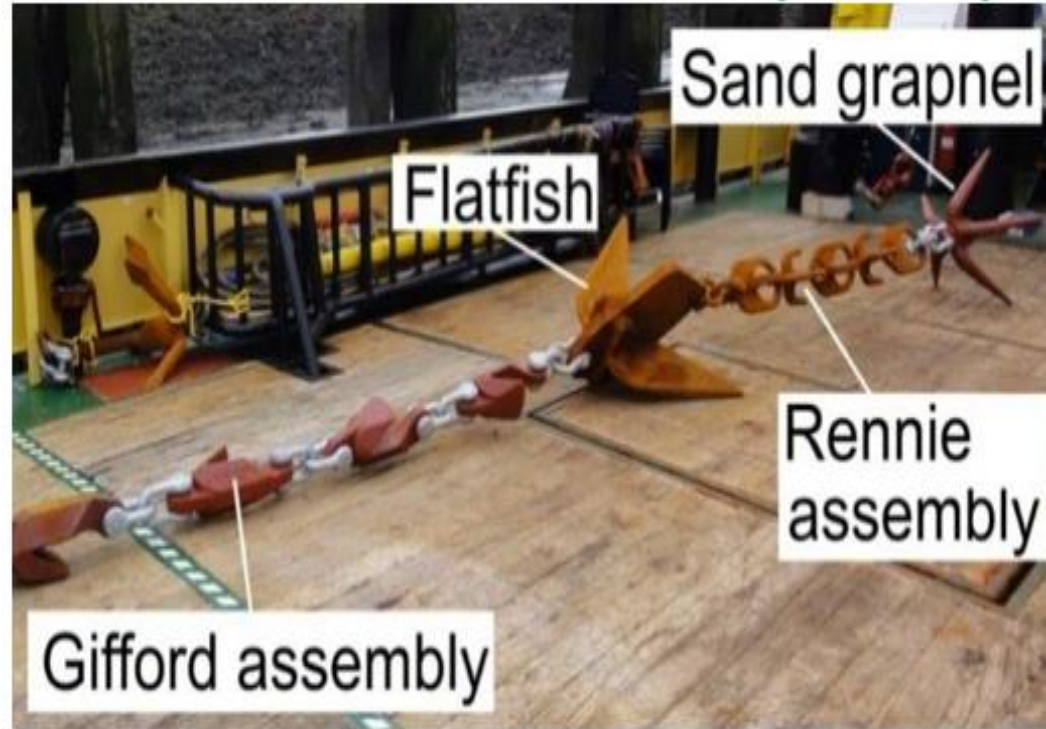


Lease area example

AK-02	AK-03	AK-04	AK-05	AK-06	AK-07	AK-08	AK-09	AK-10	AK-11	AK-12	A
AL-02	AL-03	AL-04	AL-05	AL-06	AL-07	AL-08	AL-09	AL-10	AL-11	AL-12	A
AM-02	AM-03	AM-04	AM-05	AM-06	AM-07	AM-08	AM-09	AM-10	AM-11	AM-12	A
AN-02	AN-03	AN-04	AN-05	AN-06	AN-07	AN-08	AN-09	AN-10	AN-11	AN-12	A
	AP-03	AP-04	AP-05	AP-06	AP-07	AP-08	AP-09	AP-10	AP-11	AP-12	A
AQ-02	AQ-03	AQ-04	AQ-05	AQ-06	AQ-07	AQ-08	AQ-09	AQ-10	AQ-11	AQ-12	A
AR-02	AR-03	AR-04	AR-05								
AS-02	AS-03	AS-04	AS-05	AS-06	AS-07	AS-08	AS-09	AS-10	AS-11	AS-12	A

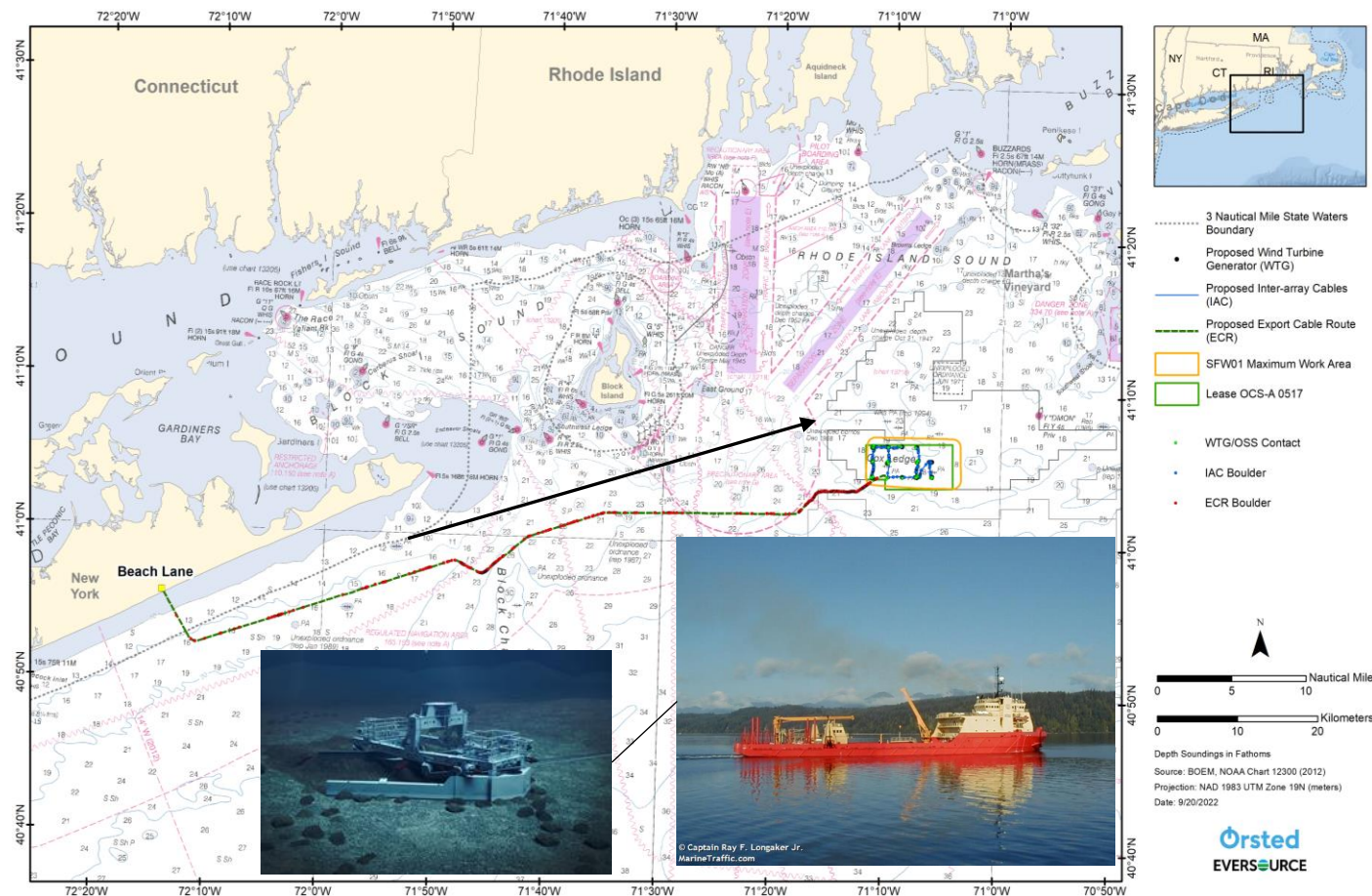
Pre-lay Grapnel Run Campaign

- Campaign conducted on the Northstar Commander
- The objective of the campaign is to remove small debris and ghost gear from along the cable route
- ECR started on 2/27 and was completed on 3/20
- ACR planned for May; vessel to be confirmed
- We had no interactions with fishing gear during the ECR campaign



Displacing Boulders from Designed Routes

- Boulder Plough campaign started on 3/16
- Vessel is at the end of the ECR
- The vessel is scheduled to start work in the lease area mid-April
- Small boulder grab campaign at one turbine location. Expect to start soon and end mid-April



Offshore cable installation

- Cable installation conducted on the Living Stone
- Cable pulled into the HDD pit on 3/22
- Campaign conducted in two sections
 - **Section 1:** HDD pit to 27 nm offshore
 - ~ 5 days to lay the cable
 - Cable burial starts immediately after cable laying and takes ~ 2 weeks
 - Cable lay ended 3/28 and burial expected to be complete mid-April
 - **Section 2:** 27 nm to the lease area
 - Vessel will return to Charleston for the 2nd section of cable
 - Join the two cable sections together and the remainder of the cable will be laid and buried
 - Cable expected to be laid and buried by the end of May



Next steps

- Offshore installation of the foundations and OSS (expected to start in June)
- Cable pull-in at the OSS (expected to start in June)
- Array cable installation (expected to occur in June/July)
- Install the turbines (expected to start in late summer/early fall)



Questions?

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