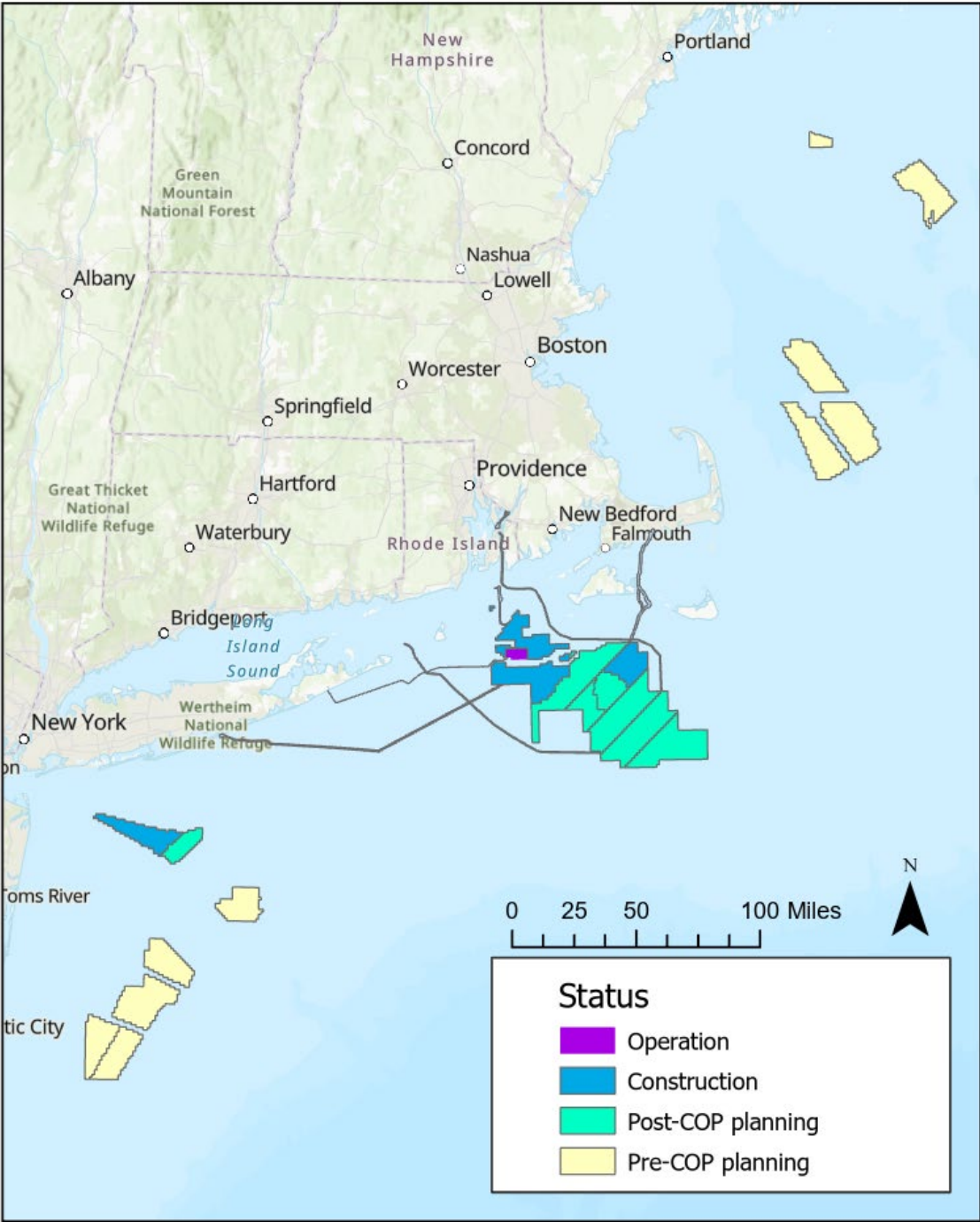


Fisheries Working Group – State Updates

June 27, 2025

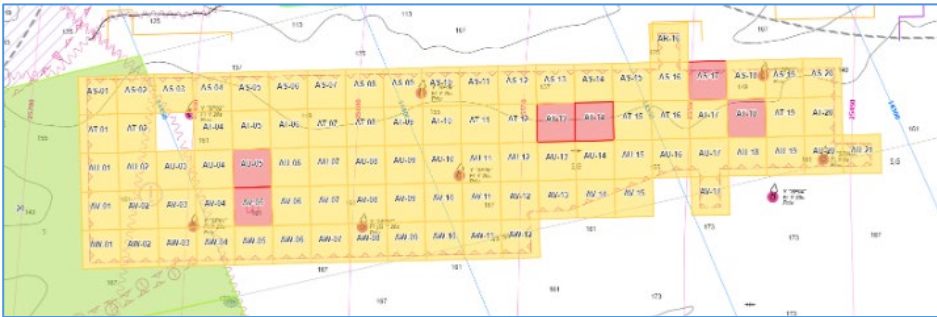
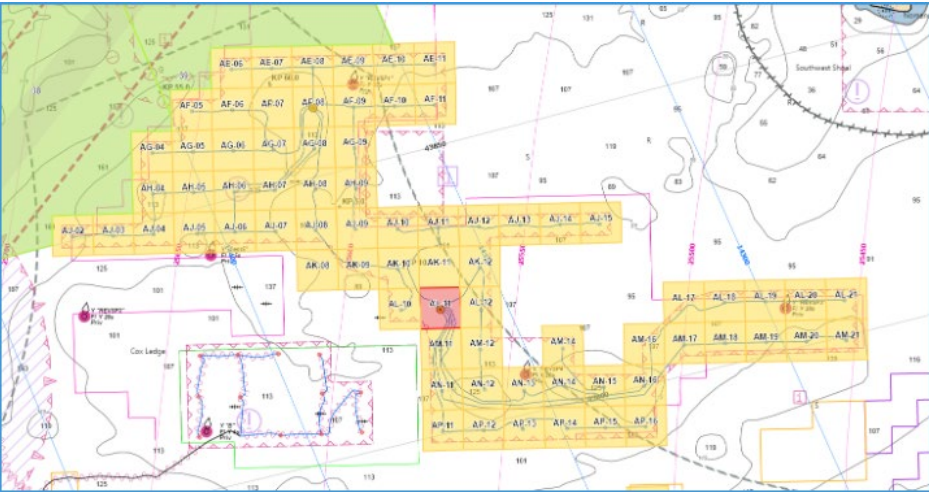
Offshore Wind Project Status

Status	Projects	Activities on the water (lease area and cable routes)
Complete and Operational	South Fork	May see occasional: <ul style="list-style-type: none">- post-construction surveys- maintenance operations
Under Construction	Vineyard 1 Revolution Sunrise Empire	Likely to see one or more of: <ul style="list-style-type: none">- seabed preparations (e.g., PLGR, boulder relocation)- pile-driving- installation of foundations, monopiles, WTGs- cable-laying
Planning and Permitting (COP is published)	New England 1 & 2 SouthCoast Beacon Starboard Vineyard Northeast Vineyard Mid-Atlantic	May see occasional: <ul style="list-style-type: none">- habitat/fisheries surveys- geophysical surveys- metocean buoys
Planning and permitting (pre-COP)	New York Bight (5) Gulf of Maine (5)	May see occasional: <ul style="list-style-type: none">- habitat/fisheries surveys- geophysical surveys- metocean buoys



For projects currently Under Construction, activities include:

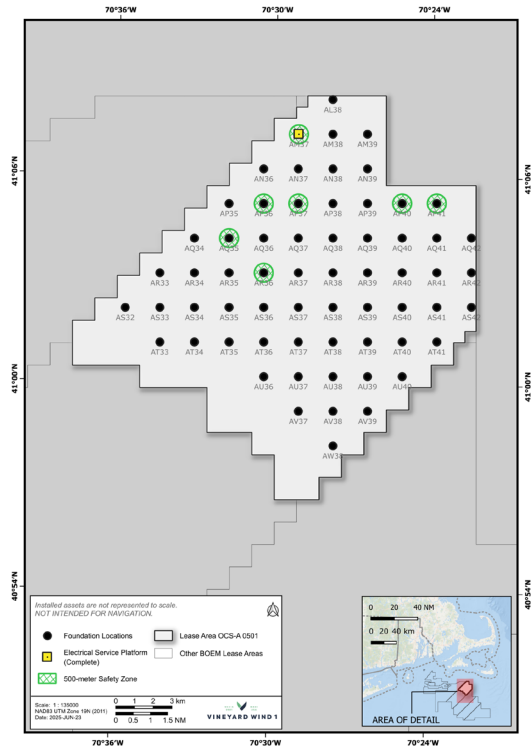
Project	Most recent update	Specific Activities on the water (lease area and cable routes)
Revolution	June 23, 2025	<ul style="list-style-type: none">• Installation of towers, nacelles and blades• Commissioning of completed WTGs
Sunrise	June 23, 2025	<ul style="list-style-type: none">• Installation of monopile WTG foundations• Deployment of bubble curtains, sound monitoring buoys, protected species observers• Installation of WTG transition piece



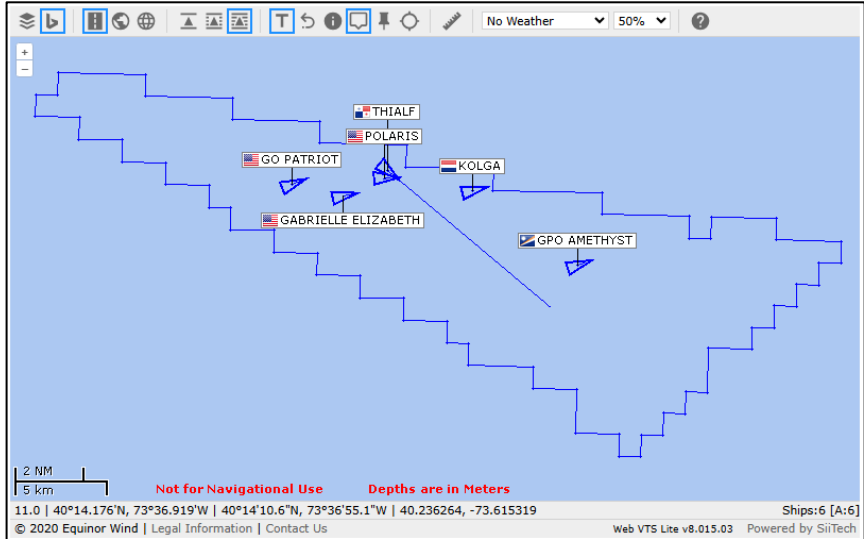
Source:
https://a2f3e3.emailsp.com/frontend/nl_preview_window.aspx?idNL=1035

For projects currently Under Construction, activities include:

Project	Most recent update	Specific Activities on the water (lease area and cable routes)
Vineyard 1	June 23, 2025	<ul style="list-style-type: none">• Installation of nacelle and blades• Surveys to assess export and inter-array cable burials
Empire	June 25, 2025	<ul style="list-style-type: none">• Subsea drilling and testing• Installation of subsea rock and scour protection• Deployment of sound monitoring buoys and bubble curtains• Deployment/maintenance of fish and oceanographic monitoring instruments• Installation of monopile WTG and jacket OSS foundations



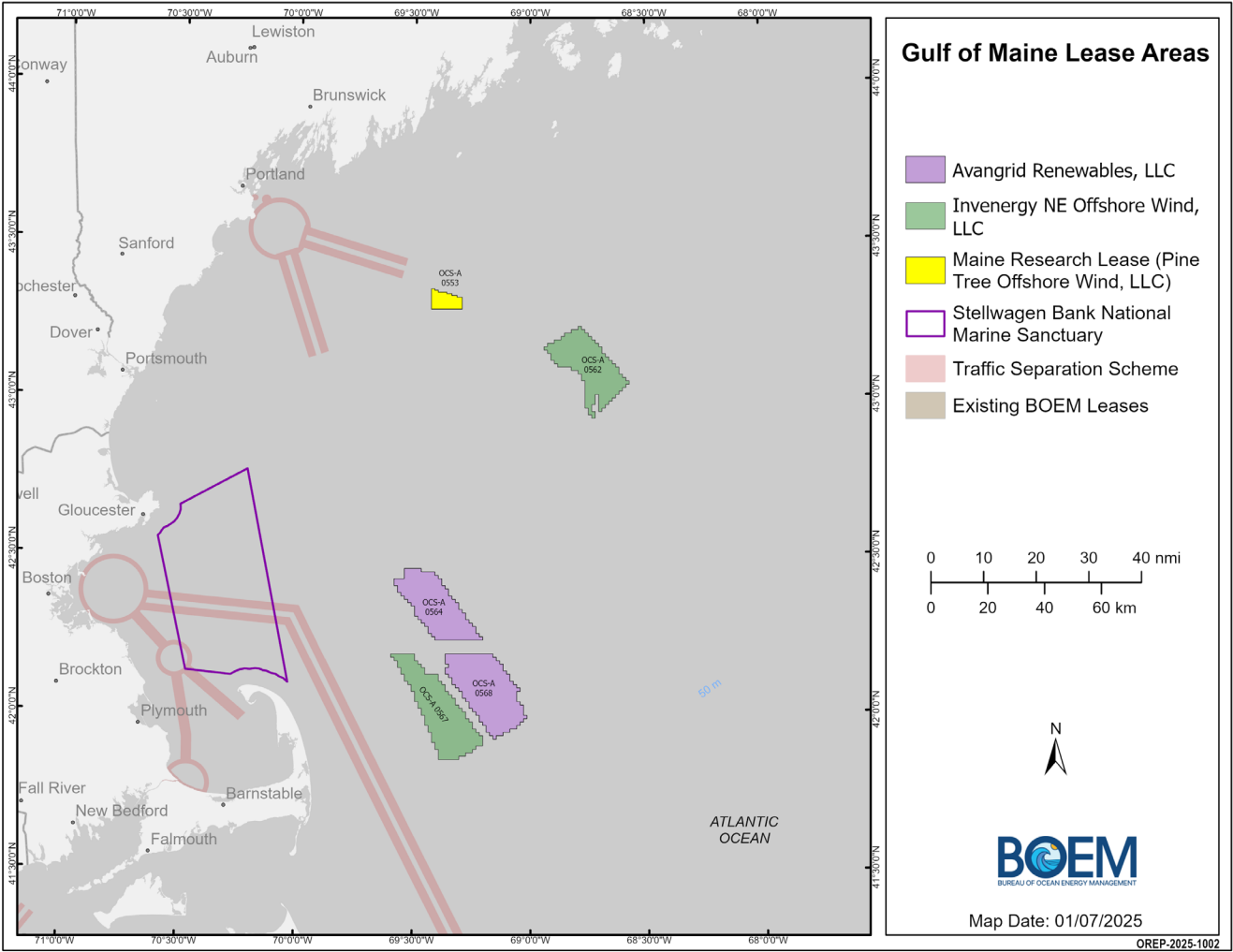
Source: <https://www.vineyardwind.com/offshore-wind-mariner-updates>



Source: <https://www.empirewind.com/environment-and-sustainability/mariners-and-fisheries/>

For GOM projects currently planning and permitting, activities include:

Project	Specific Activities
Avangrid OCS-A 0564 OCS-A 0568	<u>Communications Plans</u> <ul style="list-style-type: none">AgencyNative American TribalFisheries <u>Project Websites</u> <ul style="list-style-type: none">www.ocs-a0564.comwww.ocs-a0568.com
Invenergy OCS-A 0562 OCS-A 0567	<u>Communications Plans</u> <ul style="list-style-type: none">Granted extension, being drafted, due to be released by 11/30/2025
Maine Research Array OCS-A 0553	Awaiting update from Erin W.



Massachusetts Fisheries Innovation Fund Update

- Fisheries Innovation Fund (FIF): **\$1.75m mitigation fund** created by Vineyard Wind to “support programs and projects that ensure safe and profitable fishing continues” as current and future offshore wind projects are developed
- Other developers will add mitigation funds to FIF, possibly \$2.3-4.8m in future

Progress Update

May: Finished FIF Request for Proposals draft for funding Solicitation1

FIF Advisory Panel met to approve RFP priorities, scale, eligibility and evaluation criteria

June: Finalize RFP – Solicitation1 with EEA, post to CommBuys and on DMF site

Fisheries Innovation Fund – Solicitation 1

Project Priorities

Fishing Innovation

Community

Safety

Scale of Funding

- Up to \$750,000 funding, with projects ranging from \$25,000-\$300,000 total
- Projects up to 3 years in duration

Eligible Entities

Commercial fishing businesses, non-profit fishing or research organizations, shoreside infrastructure businesses, academic institutions or public sector entities

Evaluation Criteria

Support for co-existence of marine fisheries and offshore wind development, direct engagement (or collaboration) with commercial or for-hire fishing, etc.

Timeline

Publish RFP: End of June

Proposals Due: August 15

Projects Start: January1

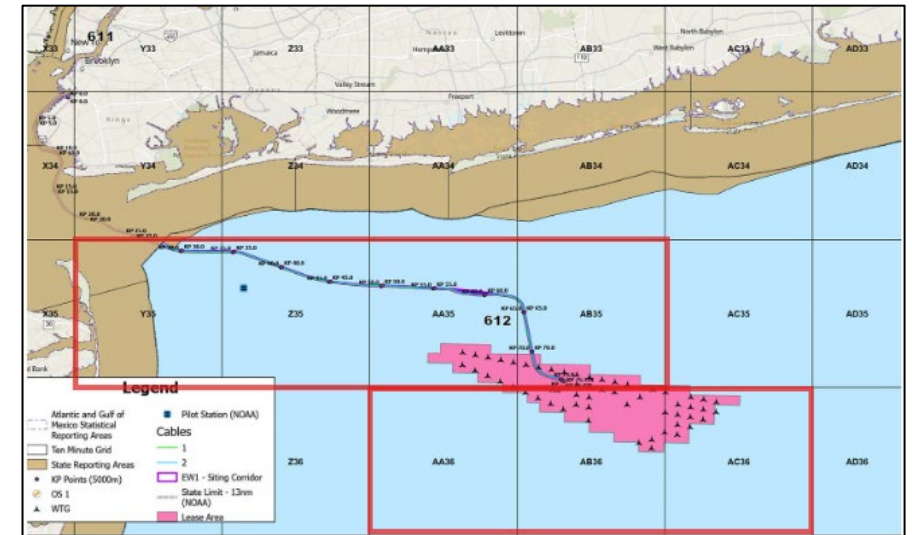


Fisheries Compensation period NOW OPEN through October 13, 2025

<https://ew1fisheriescompensation.com/>

Basic Criteria

- Commercial/Charter for-hire:
Fished in area in 3 years from 2020-2024
- Shoreside: 10miles from New Bedford, Cape May or Point Pleasant, or having >20% business from project area
- Data for claim: GARFO VTR and permit data, VMS (OLE), NEFOP, Logbooks



Contact Administrator (de Maximus) with questions

Email: offshorewind@demaximis.com

Phone: 865-691-5052

DMF/ CZM Boulder Relocation Partnership

April – RI Workshop

Boulder Relocation and Offshore Wind – Finding Solutions to Minimize Impacts

1. Regional Fishermen Working Groups for OSW planning
2. Document methodology for assessing fishing impact from boulder relocation
3. Pursuing research funding for specific research priorities

May – Workshop follow up meeting

Further develop priorities and specific research ideas

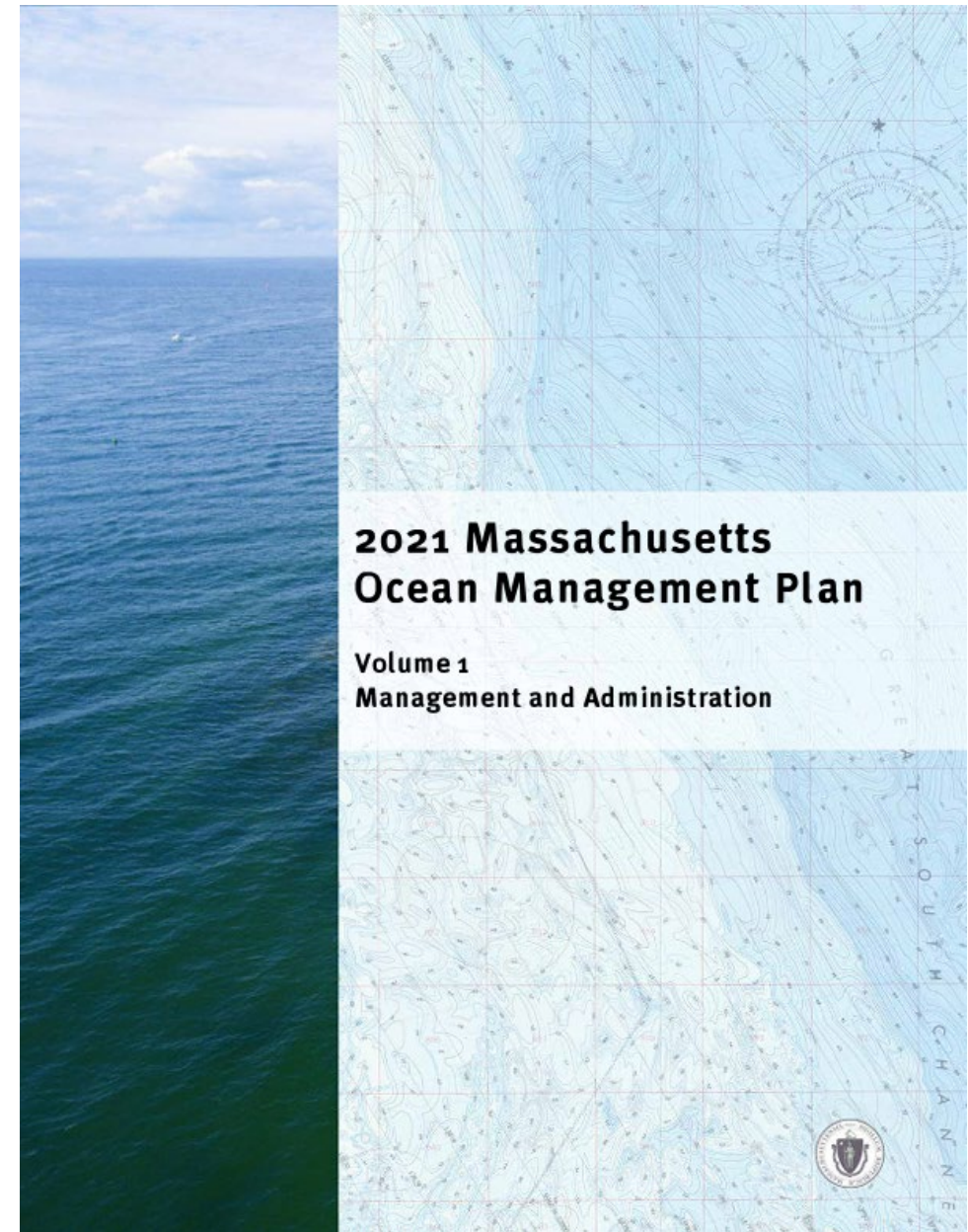
June – Working meeting

Review priority actions, assign tasks and plan for implementation



Ocean Management Plan

- Framework for development in state ocean waters
 - Renewable energy
 - Linear infrastructure (cables, pipelines)
 - Sand for beach nourishment
- Sets siting and performance standards to protect:
 - **Special Sensitive and Unique** resources (e.g., including habitats)
 - areas of concentrated **Water Dependent Uses** (e.g., traffic, fishing)
- Data-oriented, science-based
 - Baseline assessment – ongoing trends
 - Science and Data Priorities
- Intentionally adaptive document reviewed every 5 years



Ocean Management Plan Review

- Two-step process: formal review in 2025, possible update in 2026
- Key finding: Does the 2021 Plan need to be updated?
 - New information in past 5 years: science, policy
 - Updated data in past 5 years
- Plan Development and Review advised by 2 groups:
 - Ocean Advisory Commission
 - Ocean Science Advisory Council
- Review undertaken by 6 topical EEA agency-led stakeholder working groups:
 - Fisheries, Habitat, Sediment & Geology, Energy & Infrastructure, Transport & Navigation, Cultural & Recreational
- Public comment period ~ Q4 2025
- <https://www.mass.gov/info-details/massachusetts-ocean-management-plan>

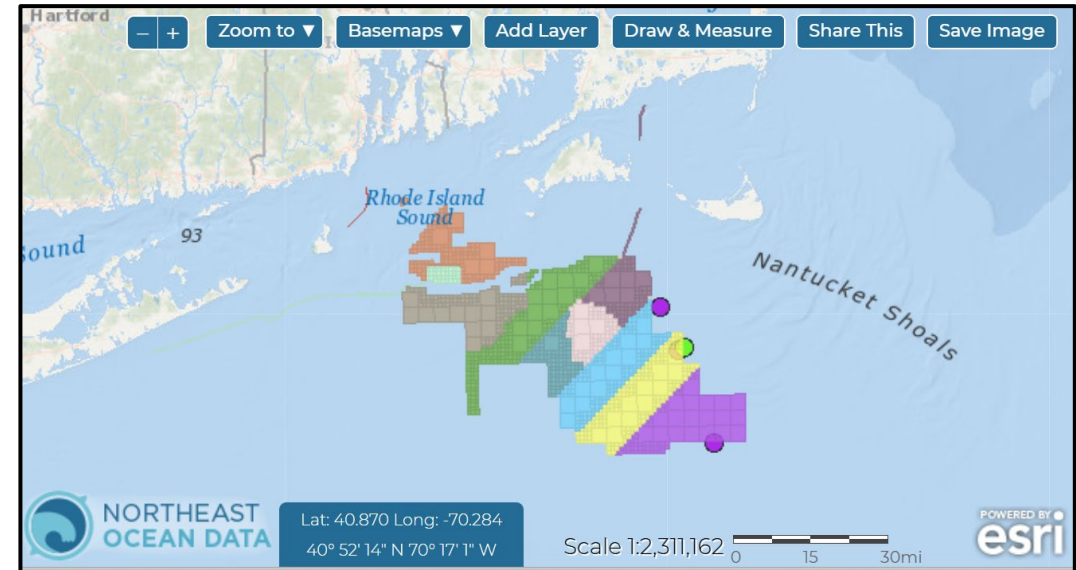
New England Shelf Hydrogeology Project - Expedition 501



Week 2 Drilling and Scientific Report for
IODP-NSF Expedition 501
New England Shelf Hydrogeology, 2025



- European Consortium for Ocean Research Drilling (ECORD)
- Began on May 19th via Lift Boat *Robert*
- Currently at MV03 (green dot – in SouthCoast)
- Have drilled to 393 m below seafloor
- Many cores removed
- Water chemistry, sedimentology, microbiology, micropaleontology
- Have had some challenges with glauconite
- 2-month study



South Fork Wind Benthic Story Map

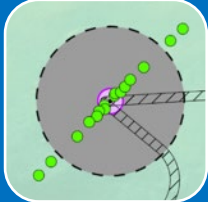
Annie Murphy and Lianne Allen-Jacobson

INSPIRE Environmental

annie@inspireenvironmental.com

lianne@inspireenvironmental.com

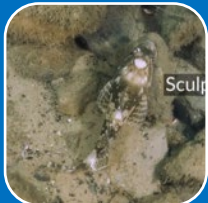
Key Takeaways



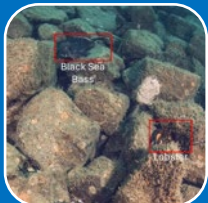
South Fork Wind (SFW) has invested in a comprehensive benthic (seafloor) monitoring program that includes targeted studies that span pre-construction, construction, and post-construction time periods.



These SFW benthic surveys have not detected demonstrable changes in the biological communities or benthic functions associated with a) soft sediments surrounding offshore wind structures, b) soft sediments along the export cable, or c) boulders relocated during seafloor preparation.

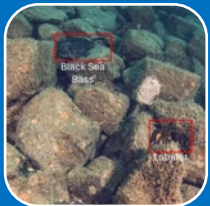
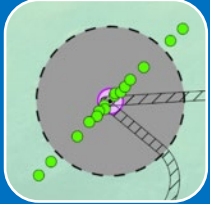


Wind farms add new structure to the marine environment, which can act as artificial reefs and provide habitat for valuable marine resources. These SFW benthic surveys document the marine life living on and near this infrastructure, which conforms to expectations based on other studies on new structures (e.g., offshore energy projects, artificial reefs).



Comprehensive monitoring requirements aim to protect the valuable marine resources found in offshore habitats. Preliminary results provide promising support for the hypothesis that these projects will have minimal environmental impact, based on the first surveys at SFW

South Fork Wind Storymap

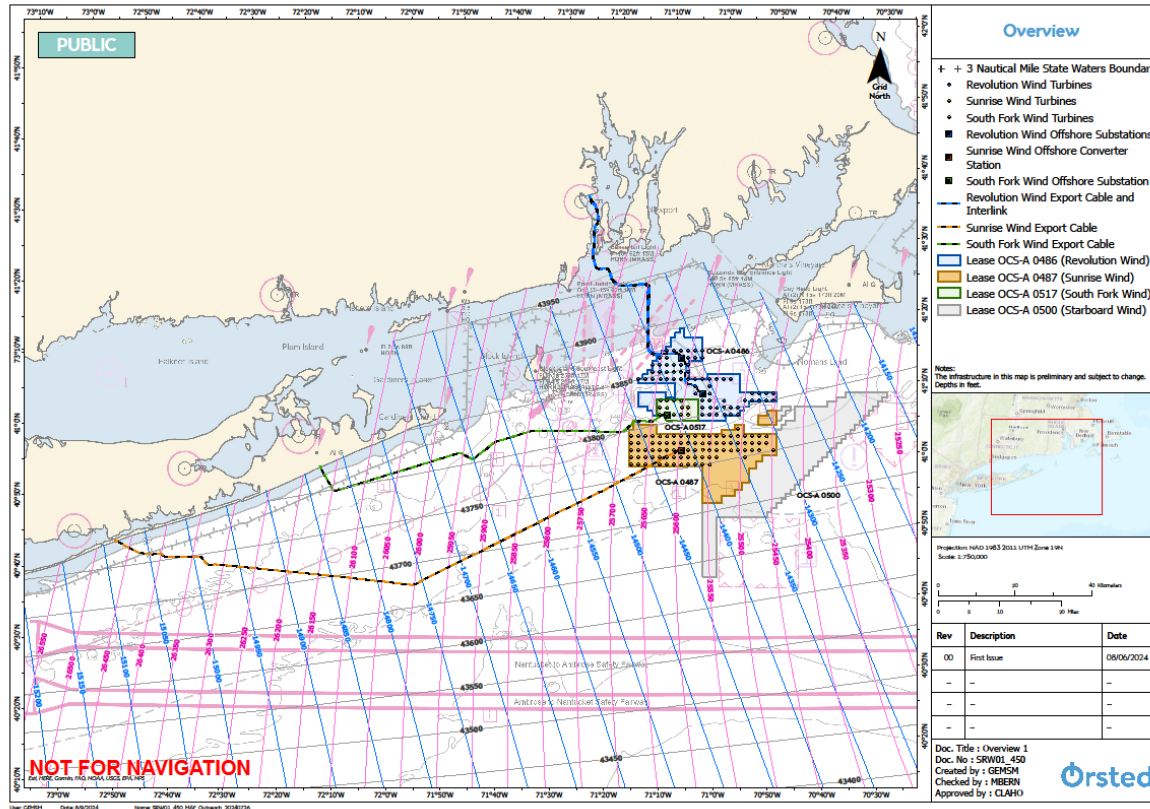


<https://arcg.is/198zub1>

Ørsted Northeast Program Update

MA Fisheries Working Group

Northeast Program On-Water Activity Update



Wind Turbine Generator (WTG)

- SCYLLA and supporting vessels installing WTGs
- Components transported to field from New London, CT



Foundation Installation

- BOKALIFT 2 and supporting vessels installing foundations
- BOKALIFT 1 installing secondary steel
- Boulder clearance complete, locations at us.orsted.com/mariners



Inter-Array Cable Installation

- Installation resumes early fall
- YELLOWSTONE conducting cable protection installation
- Route clearance late summer



Offshore Substations/Converter Station

- OSS 2 installation and commissioning complete
- OSS 1 installation early fall
- OCS installation early fall

Mariner Communication

Information for Mariners Webpage

→ us.orsted.com/mariners



Project-specific resources



Locations of boulders and cable protection



Programs for fishermen



Mariners Briefing

Revolution Wind

Ørsted's Revolution Wind offshore wind farm is being built midway between Block Island, Rhode Island and Martha's Vineyard, Massachusetts. You can read more about the project [here](#), and find information on navigation and scientific monitoring in Rhode Island waters below.

Navigational resources

- [Revolution Wind Chart](#)
- [Revolution Wind Preliminary Export Cable Route Coordinates](#)
- [Revolution Wind Preliminary Turbine Coordinates](#)
- [Revolution Wind Preliminary Inter-Array Cable Coordinates](#)
- [Revolution Wind Preliminary Plotter Files](#)
- [Revolution Wind Relocated Boulder Coordinates: Inter-array Cables and Foundations](#)
- [Revolution Wind Relocated Boulder Coordinates Export Cable](#)

Mariners Briefing



Subscribe at us.orsted.com/mariners



Update on on-the-water activities



Zone Charts

Orsted

Mariners Briefing

No. 26 | June 27, 2024

Project vessels designate a working channel over VHF channel 16 daily at 0600 and 1900 to communicate work plans for the next 12 hours. Mariners should contact the Fisheries Liaison Officer (FLO), Max Hall, on the BOKALIFT 2 or the Safety Vessels on scene (VHF 16/13) for questions regarding fishing gear deployment.

New On-Water Activity

Revolution Wind: BOKALIFT 2 is installing foundations at A255 and A256. BOKALIFT 1 is installing secondary steel at installed foundation locations. The associated vessel spread is in the Revolution Wind Lease Area.

Lease 585: NORTHSTAR ATLANTIC SURVEYOR is conducting a benthic survey in Zones 37, 40, 43, 44, 48, 51, 52, 57, 58.

FUGRO BRASSUS will be conducting a survey in Zones 37.

Sunline Wind: An ALV will be in Zones 20, 45, 46, and 50. WARREN JR is in the field. NORTHERN FRANKLIN is conducting a survey in Zones 40 and 47.

South Fork Wind: ECO EDISON is stationed at the South Fork Wind substation.

Project Activities

The below section details project-specific on-water operations. Our zone charts indicate the level of activity and where it is taking place. All zones are open to navigation and fishing, except when a USCG Safety Zone is in place. Enforcement periods and the exact locations of the Safety Zone will be announced in the weekly [USCG Notice to Mariners](#) (NTM), published each Tuesday. Please view our zone chart legend.

Legend:

- Priority offshore cable or other special route
- Level of on-water construction or current activity
- Level of activity (current activity)
- No elevation
- Indicates an enclosed bottom
- Recreation as of the date of this notice


Programs for fishermen

→ us.orsted.com/mariners

 Fisheries Direct Compensation

RI REV fishermen → revwindfisheriescomp.com

All other fishermen → fisheriescompensationprogram.com

 Claims process for lost or damaged fishing gear / Fishing gear bank

 Navigation Enhancement and Training Program

Programs for fishermen

Our Marine Affairs team works closely with fishermen, ensuring the ocean remains a place where both offshore wind and fishing can thrive. In addition to regular communications, Ørsted provides fishing-specific programs designed to avoid or mitigate impacts on individuals who rely on local fisheries.



Lost or Damaged Fishing Gear Claim

Our teams are constantly working to mitigate impacts to commercial fishing operations. In the case of gear loss related to Ørsted's activities, fishermen can [follow our procedure to claim lost or damaged fishing gear](#).



Navigation Enhancement and Training Program

Ørsted's [Navigation Enhancement and Training Program](#) offers vouchers for professional training, new pulse compression radar systems, and Automatic Identification System transceivers for eligible commercial and for-hire fishermen. Eligible fishing license holders can also access experiential learning opportunities with Ørsted's offshore wind simulation.



Compensation for fishing claims

[Fisheries Direct Compensation Programs](#) are available to compensate eligible commercial and for-hire fishermen for economic losses incurred during the construction, operation, and decommissioning of Ørsted wind farms.

Orsted Northeast Program Update – Fisheries Monitoring

South Fork Wind

- Lease Area (ongoing): Beam trawl (1x/month), Ventless lobster trap survey (2x/month from May – Nov), Jigging study (2x/month from Apr – Jun, Oct – Dec), Fish pot survey (1x/month from Jun-Dec) and Fine-scale acoustic telemetry study (year-round, receivers deployed in Sep/Oct '24)
- Export cable (ongoing): Acoustic telemetry study (year-round) and Bottom trawl survey (quarterly)

Revolution Wind

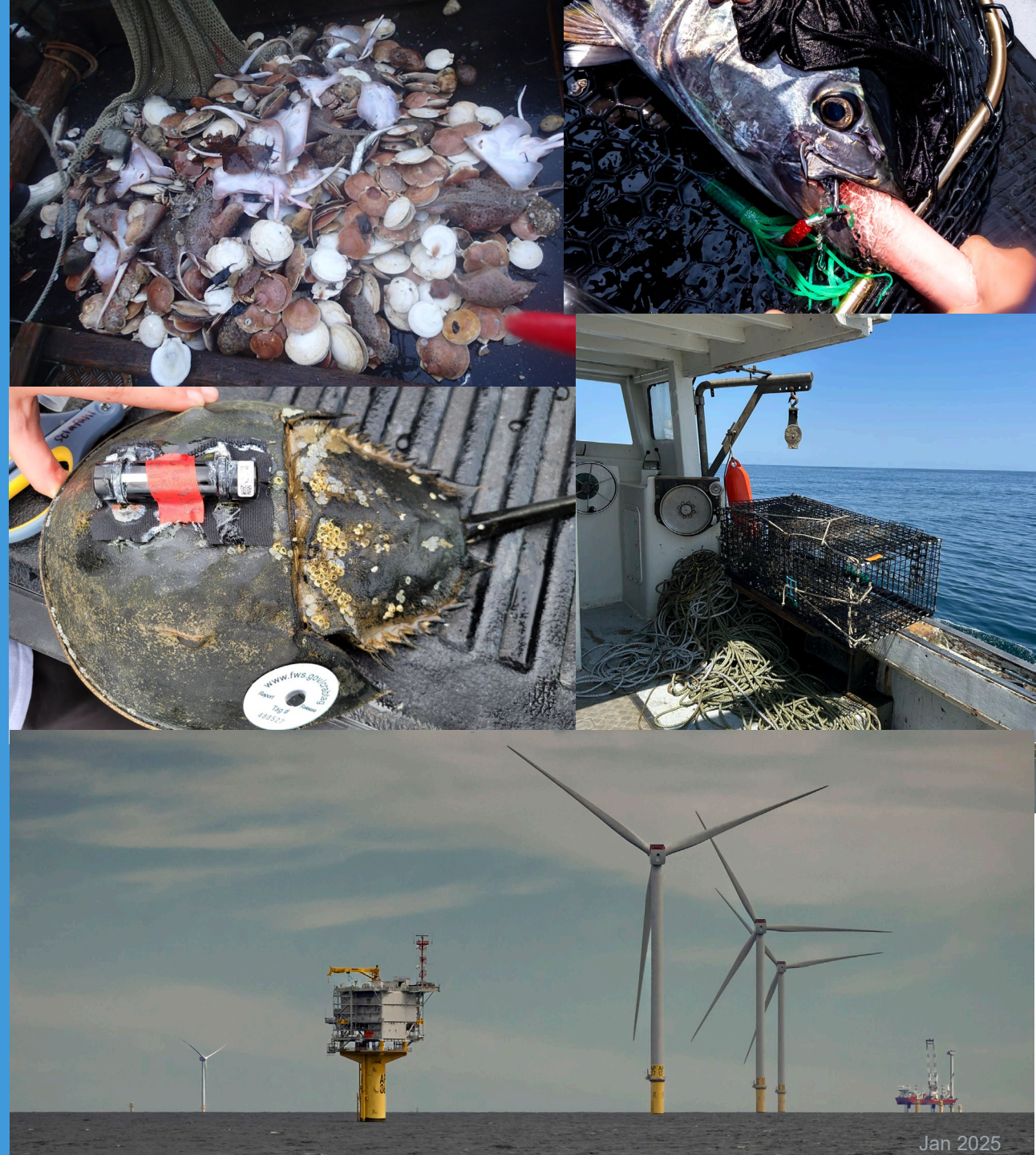
- Lease area (ongoing): Bottom trawl survey (quarterly concurrently with SRW) and Ventless lobster trap survey (2x/month from May – Nov)
- Export cable (ongoing): Ventless lobster trap survey in RI state waters (2x/month, year-round)

Sunrise Wind

- Lease area (ongoing): Bottom trawl survey (quarterly concurrently with REV), Ichthyoplankton sampling (quarterly) and HabCam survey (1x/year conducted in May 2025)
- Export cable (ongoing): Acoustic telemetry study (elasmobranchs, horseshoe crab and lobster; year-round)

Cross-project

- Highly Migratory Species acoustic telemetry study (year-round)
- Cod spawning monitoring (REV and SRW; Nov 1st – Mar 31st)



Orsted Northeast Program Update – Benthic Monitoring

South Fork Wind

- Operational
- Y1 Post-construction monitoring of soft-bottom habitat, novel surfaces, and boulders complete in 2024
- Y2 monitoring planned for Summer 2025
- [Benthic StoryMap](#) Released in May with Y1 benthic monitoring results

Revolution Wind

- All pre-construction monitoring complete
- Post-construction monitoring will begin in Summer 2025

Sunrise Wind

- All pre-construction monitoring complete
- Post-construction monitoring will begin in 2026, pending construction schedule

Starboard Wind

- Pre-development benthic characterizations surveys completed in June 2024 in support of Construction and Operations Plan development





ROSA

Responsible Offshore
Science Alliance

Regional RFP Update

June 27, 2025

Tricia Perez, Research Program Manager

Growing collaboration at the intersection of ocean development & fisheries

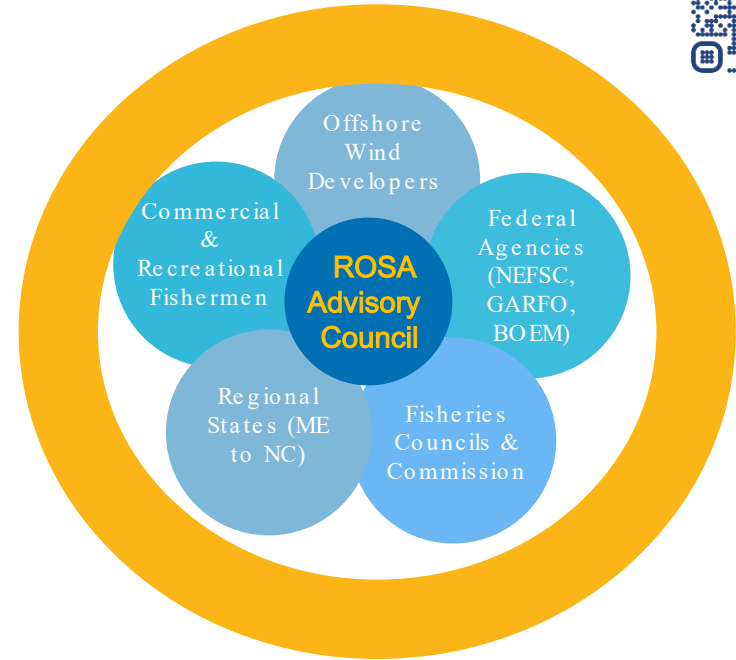
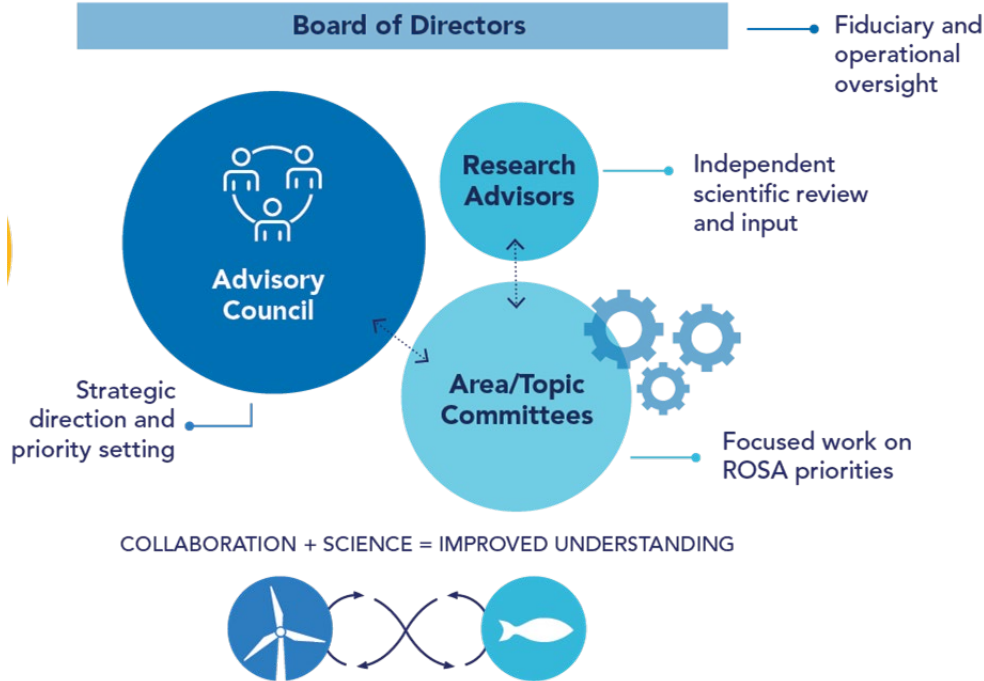


Inception:

Formed in early 2019 as a 501(c)(3) through partnership between RODA and OSW developers

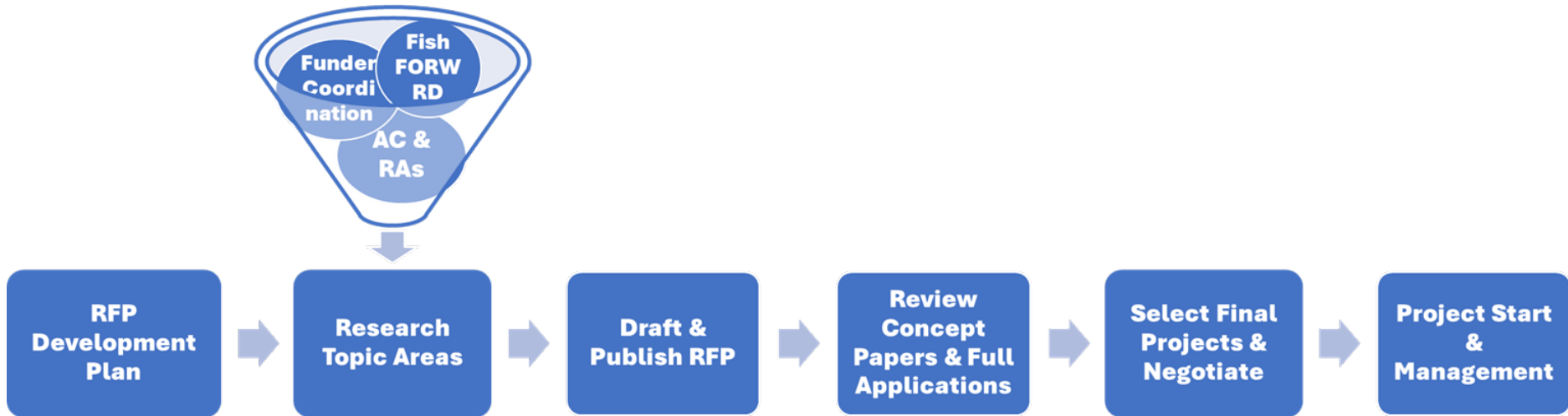
We serve as an objective resource for all sectors and facilitate the coordination of regional scientific research to collaboratively and efficiently deepen understanding.

ROSA's Organizational Structure

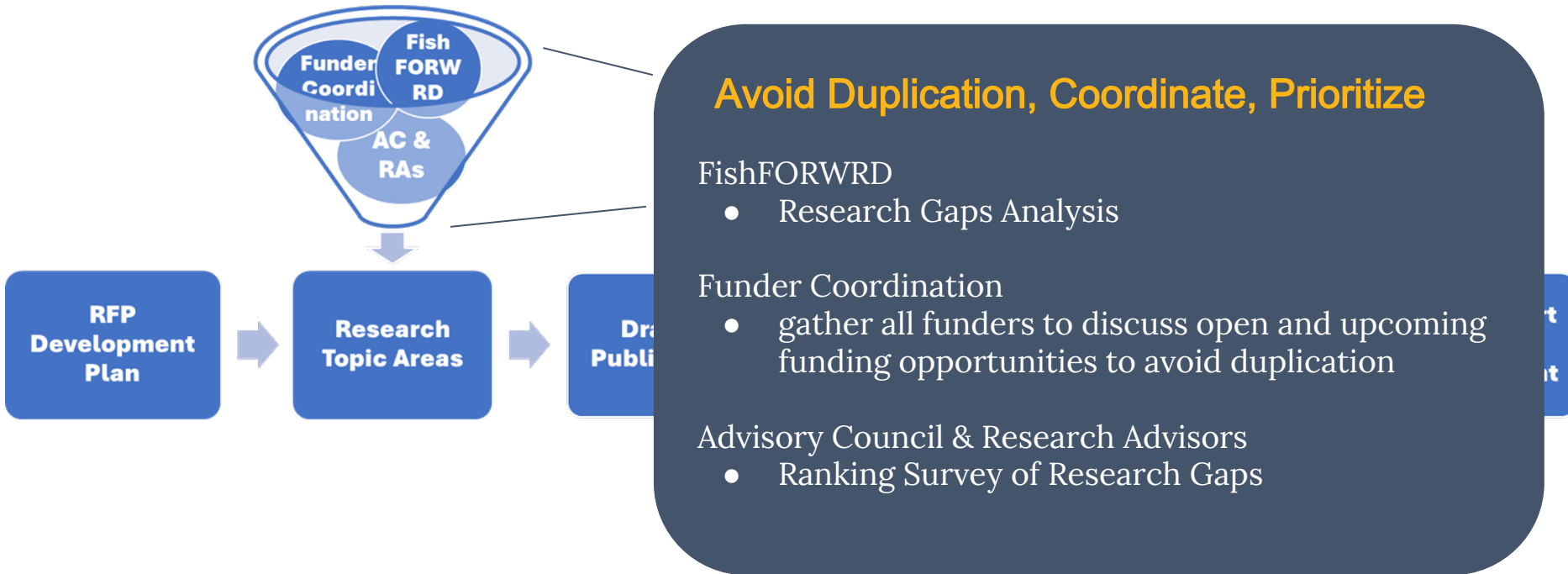


*Tribal Nation representation TBD

ROSA RFP Development Process



ROSA RFP Development Process Continued



Objective

- increase awareness of ongoing work
- avoid duplication of efforts
- create a common understanding of research needs

Contents

Research Projects

- Research projects funded by federal agencies, state agencies, non-profits, etc.
- Implemented Developer Fisheries Monitoring Plans

Research Needs

- Individual research needs from 17 different published documents by federal agencies, states agencies, and public-private partnerships

Research Gaps Analysis (in development)

Research Categories



Habitat Fragmentation/Modification



Socioeconomic Impact



Cumulative Impacts



Sound/Vibration Impacts



Species Distribution/Composition



EMF



Fisheries Access & Gear Modification



Fisheries Engagement & Capacity Building



Survey Adaptation



Data Management



Resource Monitoring

323
Research
Needs



Consolidate
duplicative or
species-specific
Research Needs

101
Summarized
Research
Needs (SRN)

Complete list
of RN still
available in
Database
Center



Research Gaps Analysis

Habitat
Modification/Fragmentation

- SRN-1
- SRN-2
- SRN-3
- ...

Fisheries Access & Gear
Modification

- SRN-1
- SRN-2
- SRN-3
- ...

Socioeconomic Impacts

- SRN-1
- SRN-2
- SRN-3
- ...

...

11 Research
Categories

173
Research
Projects

Explored
Research
Needs

Research
Gaps

September 2024 Ranking Survey

2024 Gaps Analysis ROSA Regional RFP Topic Area Feedback

Provide rankings and opinions on high priority regional research needs

OPPORTUNITY TO PROVIDE FEEDBACK AT TWO LEVELS

1. Section 1 - High Level Ranking of all Research Categories
2. Section 2 - Ranking within Research Category - you do not have to provide feedback on each category

Start now

More information
can be found on
our website

[rosascience.org/
resources/fishforwrd/](https://rosascience.org/resources/fishforwrd/)

ROSA Regional RFP 01 Funding Source



- NYSERDA included specific language in their solicitations for Offshore Wind Renewable Energy Certificates (ORECs) with offshore wind lease holders to allocate **\$5000/MW to regional fisheries and offshore wind research**
- February 2024 - Empire Wind 1 selected in New York 4 OSW Solicitation
- Equinor contracted with ROSA to execute and manage these fisheries and offshore wind research funds through a competitive request for proposals process



NYSERDA



Advancing Regional Solutions for Fisheries and Offshore Wind

Topic Area	# Projects Selected
Supporting Fisheries Access	3 PROJECTS
Understanding Potential Offshore Wind Impacts to Larval Fish	1 PROJECT
Fisheries Monitoring: Data Integration, Evaluation, & Analysis	6 PROJECTS



48 Concept Papers
Received

24 Full Applications
Invited

23 Full Applications
Received

10 projects selected

Please note that the projects are not considered formally awarded until a contract has been fully executed by ROSA and the selected research entities, therefore the project awards and obligation of funds is not final.



TA 1: Supporting Fisheries Access

Objective: enhance our understanding of the ability of existing fisheries to operate within or near offshore wind farms and to foster the development of industry -supported innovations in gear technology, fisheries and stock enhancement, and other non -compensatory mitigation strategies.

Co-Locating a Fixed Gear Fishery with a Demonstration Scale Floating OSW Turbine University of Maine	Gear Monitoring Technologies for Safe Fishing in OFW UMass Dartmouth SMAST	Supporting Fisheries Access in the Gulf of Maine Gulf of Maine Research Institute
Assess the compatibility of fixed gear fisheries with floating offshore wind infrastructure in the Gulf of Maine using the VoltturnUS+, a 1:4 scale floating offshore wind turbine, as a test site to quantify fishing gear interactions with mooring systems and develop safe operating procedures for fishermen.	Test commercially available technology , including chartplotting software and gear monitoring systems, that will enhance the situational awareness of mobile fishers operating within wind farms , thereby minimizing risks .	Identify and address key operational challenges by simulating various floating offshore wind mooring designs and diverse fishing gear types at the United States Maritime Resource Center (USMRC) maritime simulation center with fishing industry participants .

TA 2: Understanding Potential Impacts to Larval Fish

Objective: advance the current state of knowledge on the potential of offshore wind development to impact the survival, transport, settlement, and distribution of commercially important fish and invertebrate larvae.

Black Sea Bass Connectivity UMass Dartmouth SMAST

Address **dispersal and connectivity of black sea bass early life stages** on the southern New England shelf at wind turbine, wind farm and regional scales using **field surveys**, **genetic analyses**, and an **individual -based model coupled with the FVCOM hydrodynamic model**.

TA 3: Fisheries Monitoring: Data Integration, Evaluation, & Analysis

Objective: explore the use of available data and/or conceptual frameworks to inform regional fisheries monitoring and cumulative assessment capability.

Impact of Wind Development on Pelagic Fishes New England Aquarium	OFW Regional Monitoring and Analysis UMass Dartmouth SMAST	Effective Acoustic Telemetry Smithsonian Environmental Research Center
Develop and implement a spatially explicit species distribution model framework to discriminate the localized effect of construction and operation of wind infrastructure from the influence of environmental conditions on highly migratory species presence in wind energy areas using acoustic telemetry and eDNA .	Investigate the applicability of modern spatiotemporal models to integrate data from existing local and regional monitoring programs for evaluating fisheries monitoring plans and assessing the regional and cumulative impacts of wind farm development on marine biodiversity and fisheries productivity.	Identify the most effective deployment locations for acoustic receivers that will increase the capacity of acoustic telemetry to produce usable and actionable data at the project and regional scales for assessments and decision making.

TA 3 Continued: Fisheries Monitoring: Data Integration, Evaluation, & Analysis

Objective: explore the use of available data and/or conceptual frameworks to inform regional fisheries monitoring and cumulative assessment capability.

Flyway Model University of Maryland Center for Environmental Science	Multi -frequency Acoustic Monitoring of Regional Offshore Wind Impacts ASA Analysis & Communication, Inc.	Fisheries Monitoring Mapping Tool INSPIRE Environmental
Use a framework, the Flyway construct, to develop baseline migrations for several species using historical telemetry data to enable measurement of cumulative offshore wind and climate impacts.	Process, integrate, and analyze wideband and narrowband sonar data collected from different acoustic technologies deployed from an uncrewed surface vessel (USV) to demonstrate the utility of a novel survey approach to develop regional -scale fisheries survey methods and analytical techniques to detect and monitor potential impacts of offshore wind installations.	Develop an interactive mapping tool (data layer) that depicts the spatial extent of current offshore wind developer monitoring surveys by gear type and focal species.

PROJECT SELECTION OVERVIEW

Topic Area	Lead Entity	Short Title	Region Addressed
Supporting Fisheries Access	UMaine	Co-Locating a Fixed Gear Fishery with a Demonstration Scale Floating Offshore Wind Turbine	GOM
Supporting Fisheries Access	SMAST	Gear Monitoring Technologies for Safe Fishing in OFW	SNE
Supporting Fisheries Access	GMRI	Supporting Fisheries Access in the Gulf of Maine	GOM
Larval Impacts	SMAST	Black Sea Bass Connectivity	SNE
Fisheries Monitoring	NEAQ	Impact of wind development on pelagic fishes	SNE
Fisheries Monitoring	SMAST	OFW Regional Monitoring and Analysis	SNE & Mid
Fisheries Monitoring	ASA Analysis & Communication, Inc	Multi -frequency Acoustic Monitoring of Regional Offshore Wind Impacts	SNE
Fisheries Monitoring	Smithsonian	Effective Acoustic Telemetry	SNE & Mid
Fisheries Monitoring	UMCES	Flyway Model	SNE & Mid
Fisheries Monitoring	Inspire Environmental	Fisheries Monitoring Mapping Tool	SNE & Mid

SYNTHESIS OF THE SCIENCE II: FLOATING
OFFSHORE WIND DEVELOPMENT AND
FISHERIES

Floating Wind Technology Overview

1st May 2025



Olivia Burke

Associate Director – US



Sam Strivens

Senior Manager - Floating
Wind

Floating Wind Technology Overview

1. Comparison between fixed and floating wind turbines
2. Spatial requirements of floating offshore wind
3. Platform and mooring designs
4. Cable and substation arrangements
5. Floating offshore wind O&M procedures
6. New technologies in development

About us



Who we are

Our mission is to accelerate the move to a decarbonised future. We are your expert guide to turn your climate ambition into impact. We have been climate pioneers for more than 20 years, partnering with leading businesses, governments and financial institutions to accelerate their route to Net Zero. We are one global network of over 400 experts, catalysing change by helping you succeed.

What we do

We provide solutions to the climate crisis. We support organisations globally as they accelerate towards Net Zero. From target setting, Net Zero pathways, assurance and footprinting, to policy advice, strategy setting and programme delivery, we seek smarter ways to turn intent into impact, where sustainability and economic realities go hand in hand.

Our Expertise

Focus Industries

Offshore Wind - Fixed

Offshore Wind - Floating

Offshore Energy Integration

Maritime Decarbonisation

Marine Energy

Collaboration

We are global leading experts in delivering large scale RD&D and collaboration programmes, with a track record of delivering real cost reductions .

- Programme Design & Set up
- Programme Management
- Stakeholder Mapping & Engagement
- Capacity Building and Knowledge Management
- Project scoping and building teams
- Deliverable reviews

Research & Insight

Over a decade of experience delivering market insights to international organisations to aid in their market & industry knowledge, analysis and feed into strategic expansion plans.

- Market Insight
- Policy, Technology, Strategy & Innovation Review
- Energy Systems & Future Energy Analysis
- Environmental & Social Analysis
- LCOE Modelling for Innovation
- Infrastructure and Logistical Reviews

Strategic Advice

We provide strategic policy and market support, cost reduction and economic development, and deliver insights into technology and industry progress to help understand market gaps and evaluate solutions.

- Innovation Needs Assessment
- Technology Guidance
- Policy Design & Recommendations
- Supply Chain Enablement
- Skills & Workforce Development
- Site Selection, Auction and Subsidy Support
- Scenario Planning
- Framework development on the societal effects of transition

Floating Wind Technology Overview

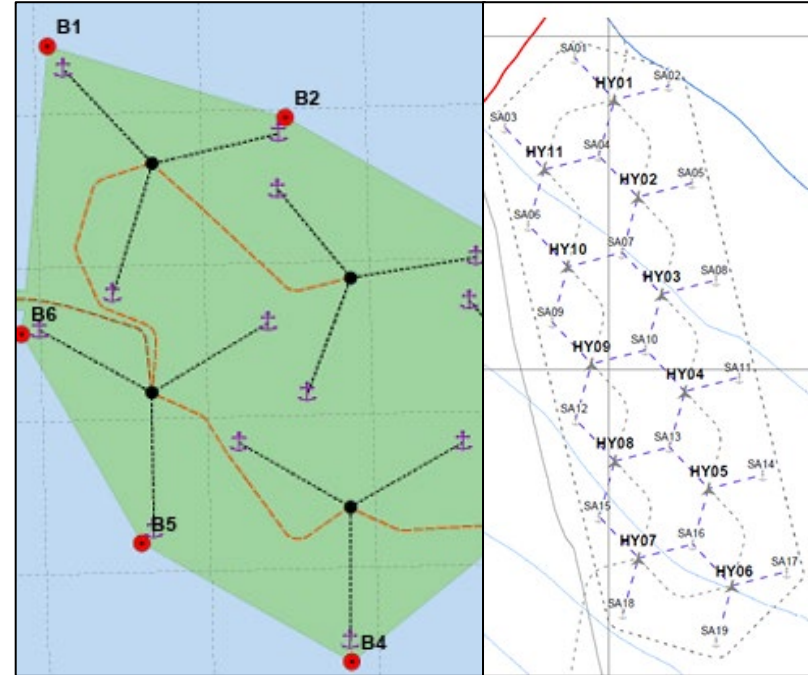
Comparison between fixed and floating wind turbines:

	Fixed	Floating
Installation methods	Fixed turbines using monopiles will require pile driving, which can affect marine species	Anchors, mooring lines and array cables installed first, platforms 'hooked up' after. Different anchor types
Scour / seabed interaction	Fixed turbines usually require rock dumping around tower base and inter-array cable route	Depending on mooring (and anchor type) scour may result from drag on catenary past touchdown point
Water column interaction	Fixed foundations (monopiles and jackets) can provide habitats for species such as mussels, and lobster / crab within scour protection.	Some research looking into mixing of the pelagic / midwater layers by mooring lines and how that can affect marine species spawning etc...
Cost / market maturity	Cost now well below other energy sources (renewable and non-renewable) in most markets. Capability to build GW scale wind farms in several markets	Cost higher than fixed, and not currently on parity with other generation sources. First small commercial projects in pipeline but only demonstration farms in the water

Floating Wind Technology Overview

Spatial requirements of floating offshore wind:

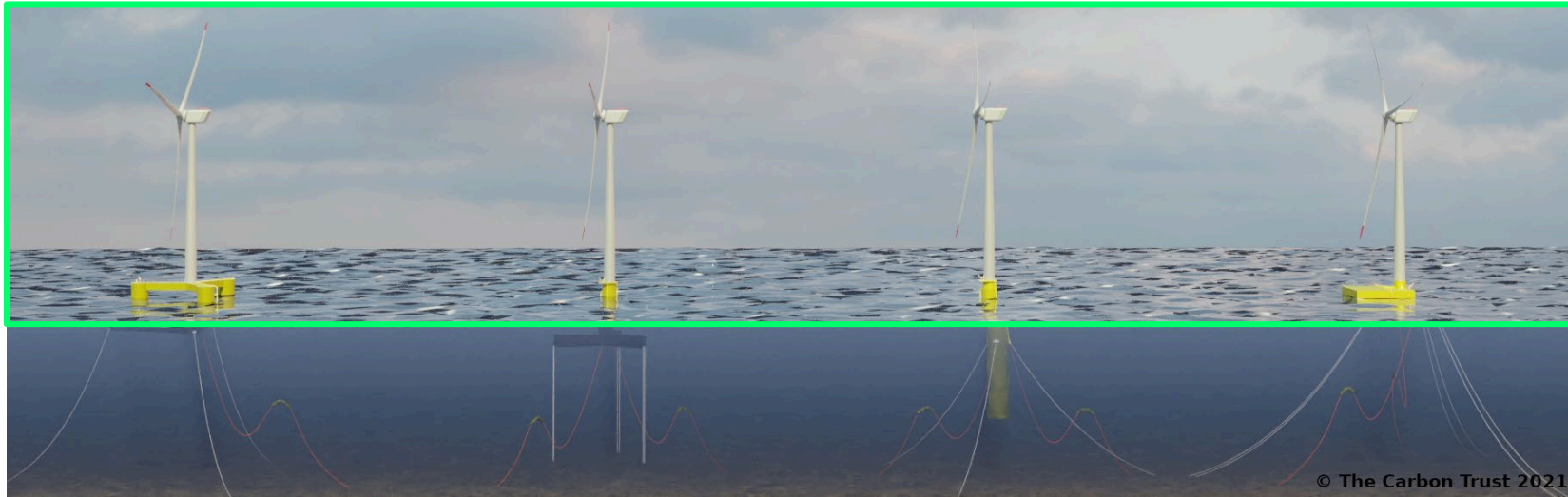
- Turbine spacing:
 - Interaction between turbine wake profiles is the main driver of turbine spacing. Normally a spacing of 7 rotor diameters is minimum
 - Commercial scale floating wind will likely use larger, 15 MW+ turbines with >250m rotor diameters (1.75km turbine spacing)
 - Water depth and mooring type / spread will dictate whether shared anchors or shared mooring lines are possible
- Station divination:
 - Depending on the mooring type (and size of watch-circle) floating platforms may deviate from their charted location due to wind loading or currents



Source: Scottish Gov [Hywind Scotland Park Map](#) & DOF [Hywind Tampen Installation](#)

Floating Wind Technology Overview

Platform typologies:



Semi submersible

Similar to a ship, maintains stability through volume within the hulls

Tension leg

Similar to a helium balloon, maintains stability by tension (lift) through the mooring legs

Spar

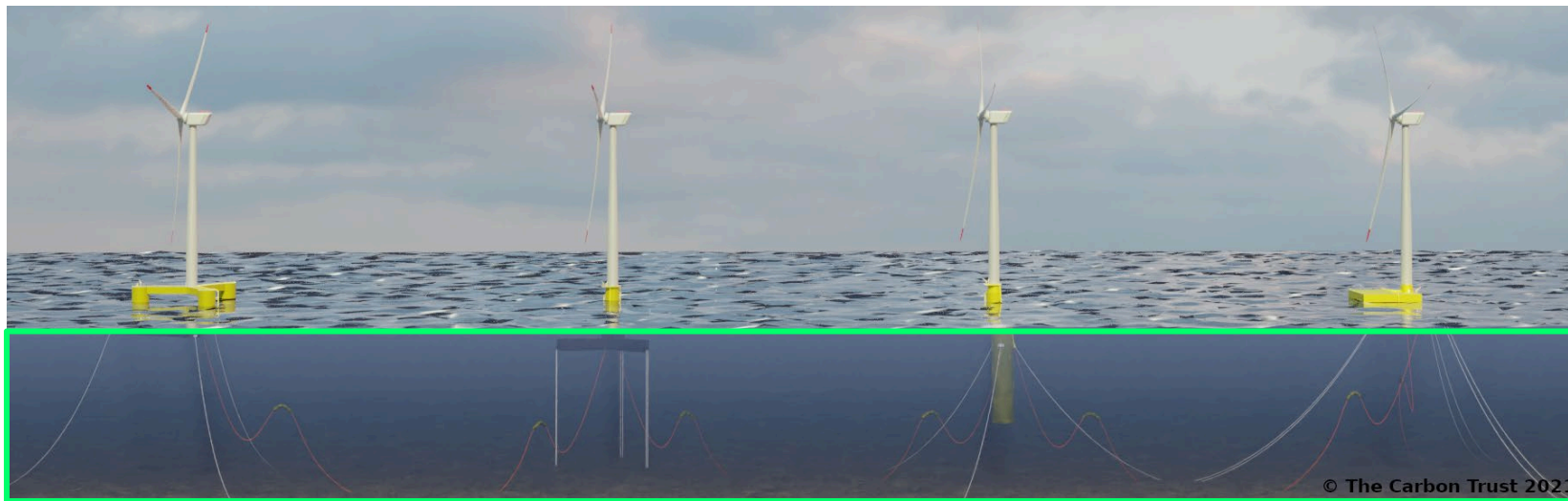
Similar to an iceberg maintains stability through ballast below the waterline

Barge

A hybrid design that uses element of volume, tension and ballast.

Floating Wind Technology Overview

Mooring system designs:



Catenary

Same as anchoring a vessel, larger anchor footprint used to maintain platform station

Tension leg

Steel or synthetic mooring legs normally within the footprint of the platform

Semi-taut

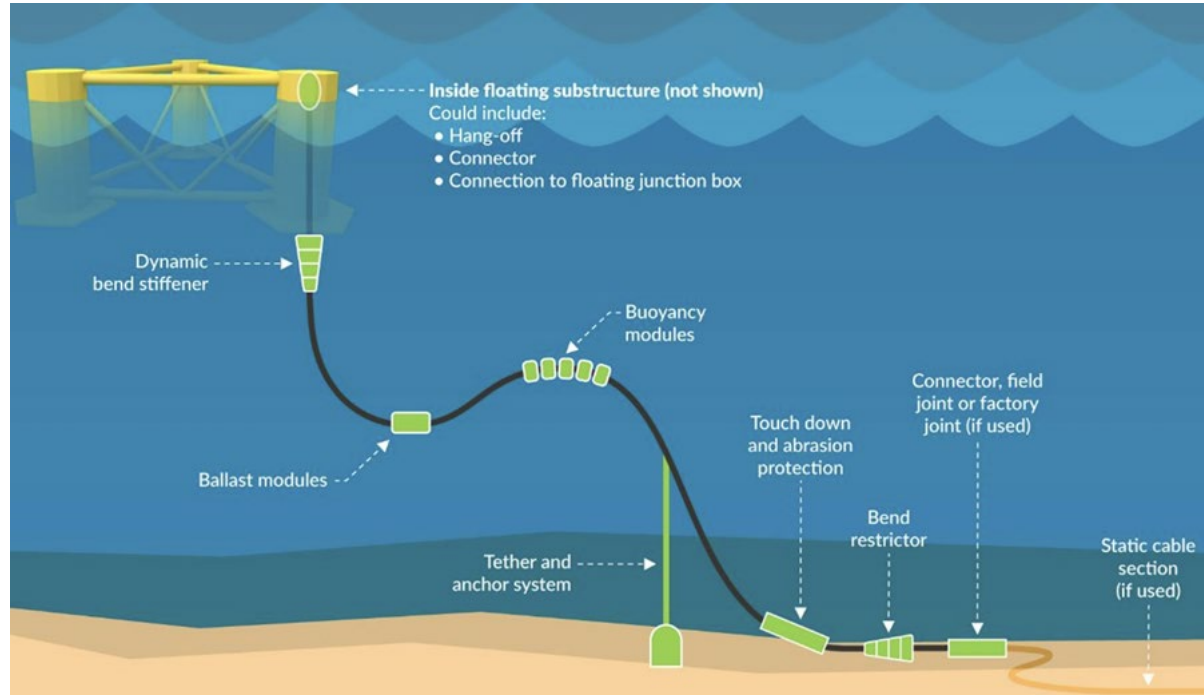
Weights midway along the line provide tension to the catenary, reduces footprint

redundant

Two (or more) mooring lines used in parallel to share line-loads

Floating Wind Technology Overview

Platform cable design:

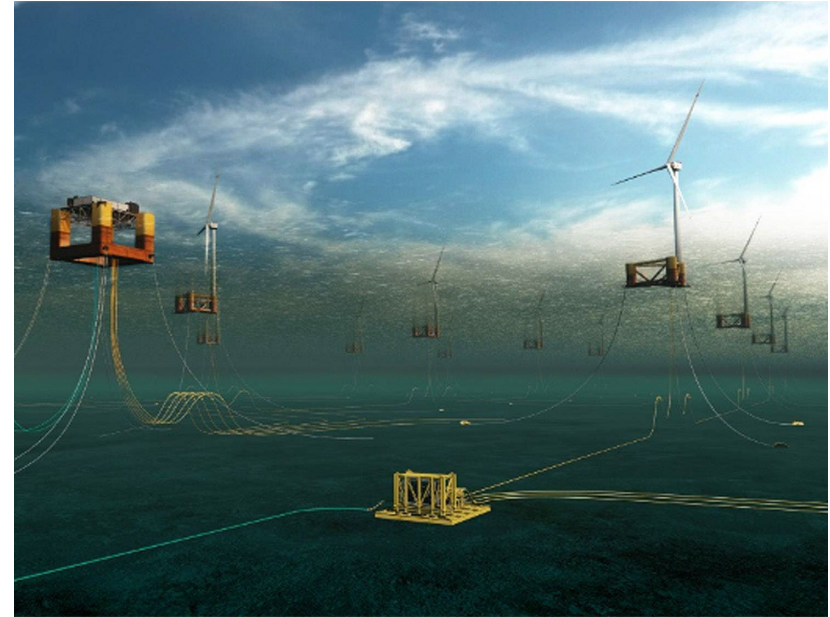


Source: WFO [Floating Offshore Wind Dynamic Cables: Overview of Design and Risks](#)

Floating Wind Technology Overview

Substation design types and power transmission:

- Static export cables and significantly cheaper to manufacture, experience less failure rates (due to reduced mechanical loading) and are more widely available compared to dynamic cables
- Offshore substation type may dictate amount of cable that can be buried compared to suspended:
 - Fixed substation: suitable for shallower / near-shore sites. Array cables (to substation) likely to be dynamic, then static to shore.
 - Floating substation: suitable for any water depth but likely deep water far offshore. Array cables likely to be dynamic, export cable likely to be dynamic past touch-down point then static (likely a factory joint).
 - Subsea substation: suitable for any water depth but likely very deep water. Array cables likely dynamic (with less midwater arch) and export cable fully static.

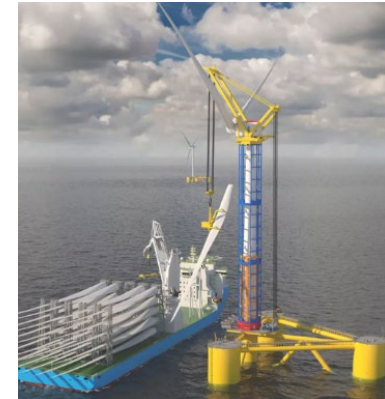


Source: Offshore Engineering [Floating Offshore Wind: Attention Turns Subsea for Power Transport](#)

Floating Wind Technology Overview

Floating offshore wind O&M procedures:

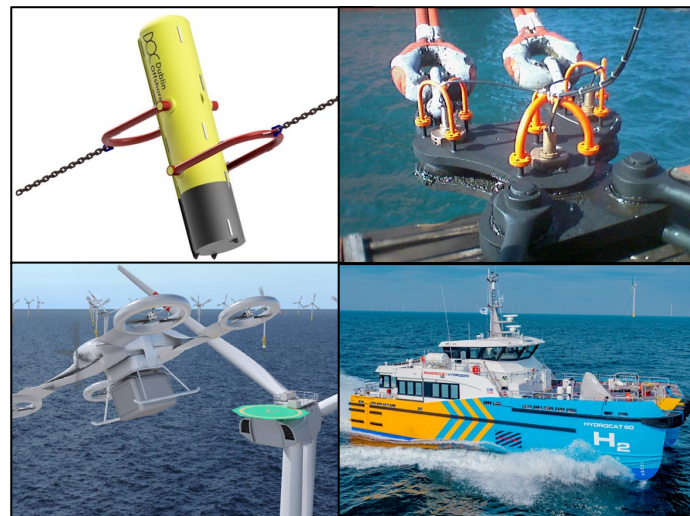
- Most minor O&M tasks (annual maintenance, minor corrective repairs) will continue to be undertaken via either crew transfer vessel (CTV) or service operations vessel (SOV)
- Major complete replacement for floating offshore wind will in most cases be too deep to use conventional jack up vessels, therefore two options remain:
 - Disconnecting a platform and towing back to port:
 - Proven process, likely to be used in short term
 - May increase navigational traffic in and out of ports
 - Undertaking replacement activities in situ, using either temporary cranes or floating vessels
 - Less track record offshore, especially for floating
 - Requires either large floating vessel (with availability issues) or novel technologies / technology qualification
 - Potential to reduce out of service time and therefore loss of generation capability (turbine availability)



Floating Wind Technology Overview

New technologies in development:

- Mooring integrity management systems:
 - Smart measurement of mooring line loads
 - Live reporting of collision (sea life / gear)
- Mooring components:
 - Load reduction devices
 - Synthetic mooring lines
- Remote access and automation:
 - drive to reduce personnel offshore and remove from hazardous procedures
 - Improve efficiency of cargo transfer using drones and remotely operated vessels
- Vessel decarbonisation:
 - Alternative propulsion such as battery hybrid, battery electric, hydrogen, methanol
 - Charging and replenishment both in port and offshore at the wind farm



Sources: [Dublin Offshore](#), [MSL](#), [Baltic Wind](#), [WindCat](#)



Q&A

**Thanks for
listening**



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Massachusetts Fisheries Working Group on Offshore Wind

June 2025

Floating Offshore Wind UK Study Tour May 2025

Carbon Trust

SAMBAS Consulting

Maine Fishing Industry

Maine DMR & GEO

Massachusetts Fishing Industry

Massachusetts DMF

Brad Schondelmeier

Erin Wilkinson

Jackie Odell

Credit: Principle Power

Study Tour Design and Objectives



Maine Offshore Wind
Research Consortium



SAMBAS Consulting LLC

Design

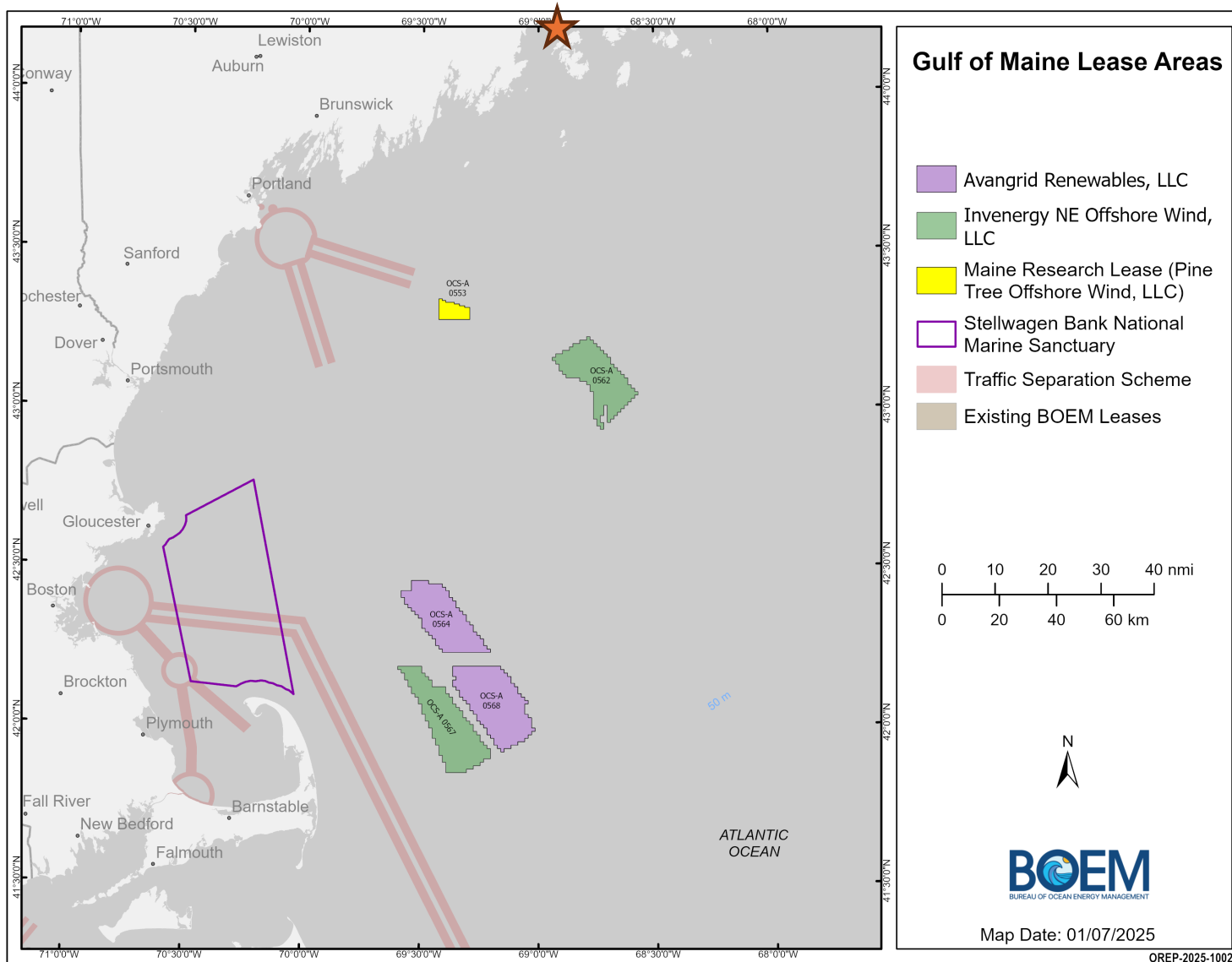
A one-week Study Tour for Gulf of Maine fishermen and marine resource managers to learn about floating Offshore Wind (FOSW) from Scottish government, developers, fishing industry and researchers.

Objectives

- Establish a common understanding of floating OSW technology,
- Understand the status of floating OSW development in Scotland, including planning, policy, science and research, and engagement with the fishing industry,
- Learn about Kincardine floating OSW project, focusing on the technology, design and installation, and engagement with the fishing industry and coastal community,
- Exchange best practices for assessing and mitigating the impacts of floating OSW development on the fishing industry and wider coastal communities.



Status and Timing of US Floating Offshore Wind



UMaine Quarter-scale Demonstration★
Deployed off Castine for next 18 months,
grid connection in July

Maine Research Array (OCS-A 0553)
State has lease, continuing to explore
research questions, begin survey work in
July

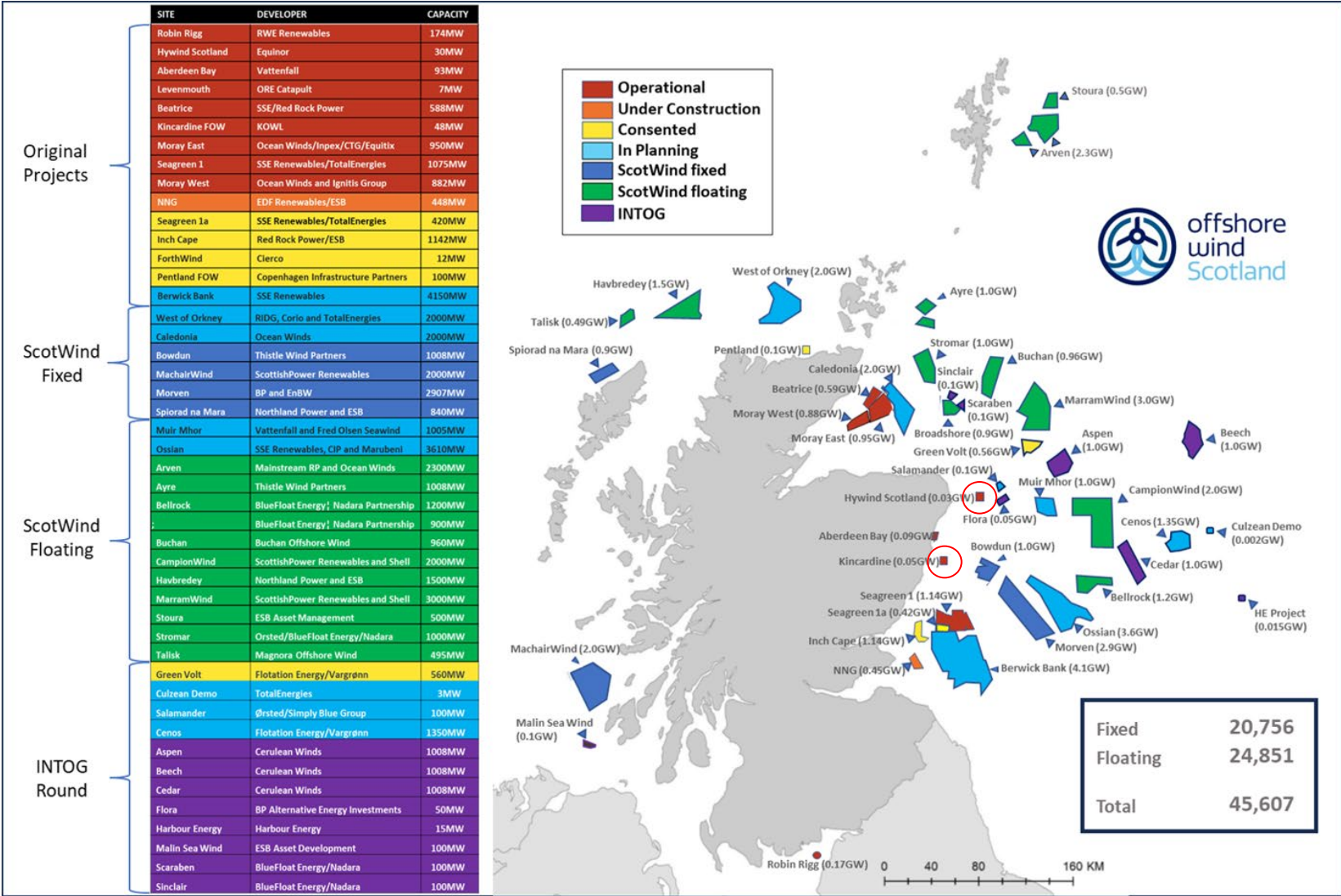
Avangrid Renewables (OCS-A 0564, 0568)
Communications Plans released, meetings
held, websites created

Invenergy NE Offshore Wind (OCS-A 0562, 0567)
Communications Plans in development

Realistic commercial-scale build timeline:
2030-2035



Status of (Floating) Offshore Wind Scotland



Projects in Operation	Max Output
Fixed	3,769 MW
Floating	78 MW
Kincardine	48 MW
Hywind Scotland	30 MW
Total	3,847 MW

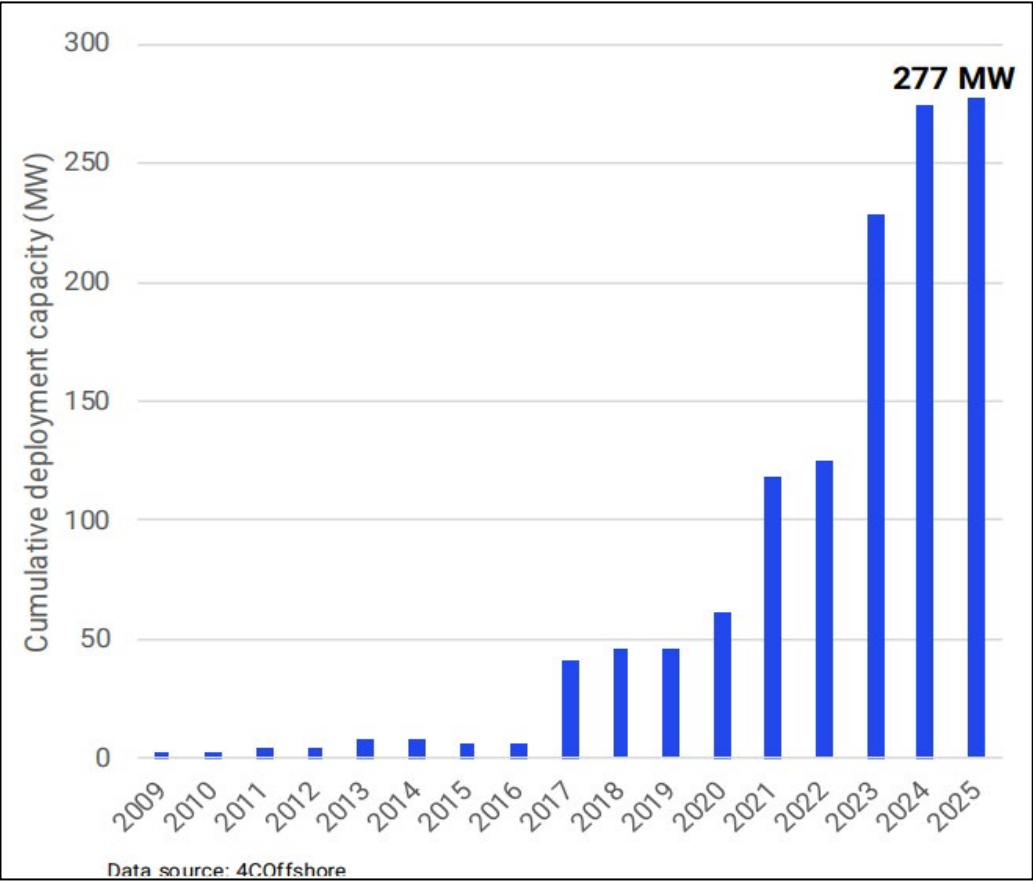


Source: <https://www.offshorewindscotland.org.uk/the-offshore-wind-market-in-scotland/floating-wind-in-scotland/>



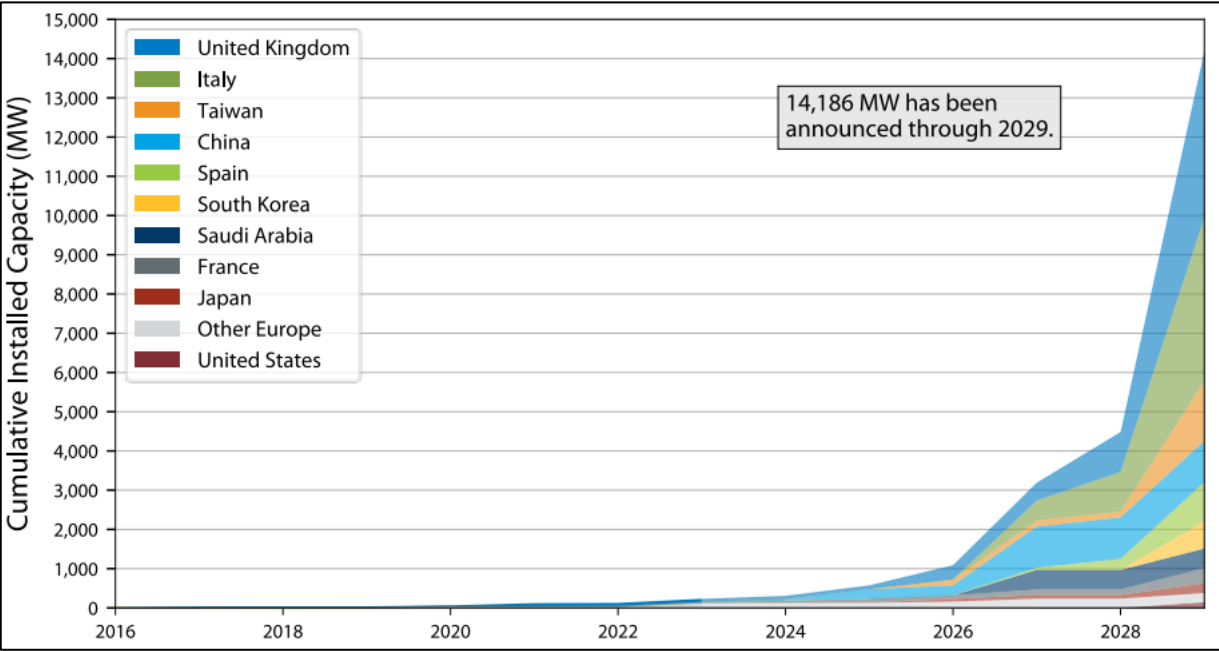
Status of Floating Offshore Wind Worldwide

Current

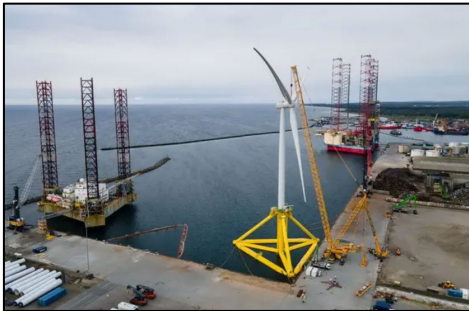


Source: CarbonTrust

Projected/Pipeline

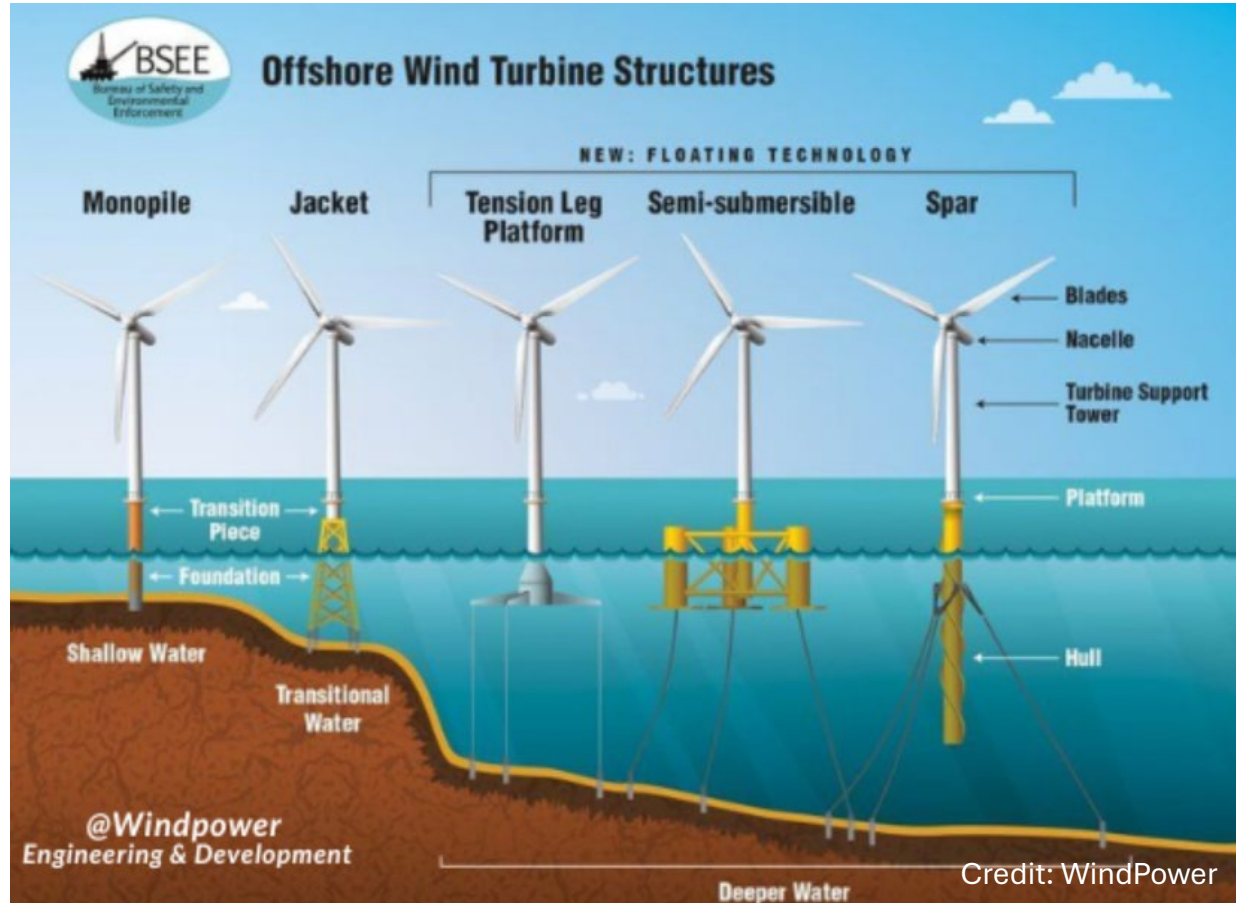


Source: NREL Report... Offshore Wind Market Report: 2024 Edition

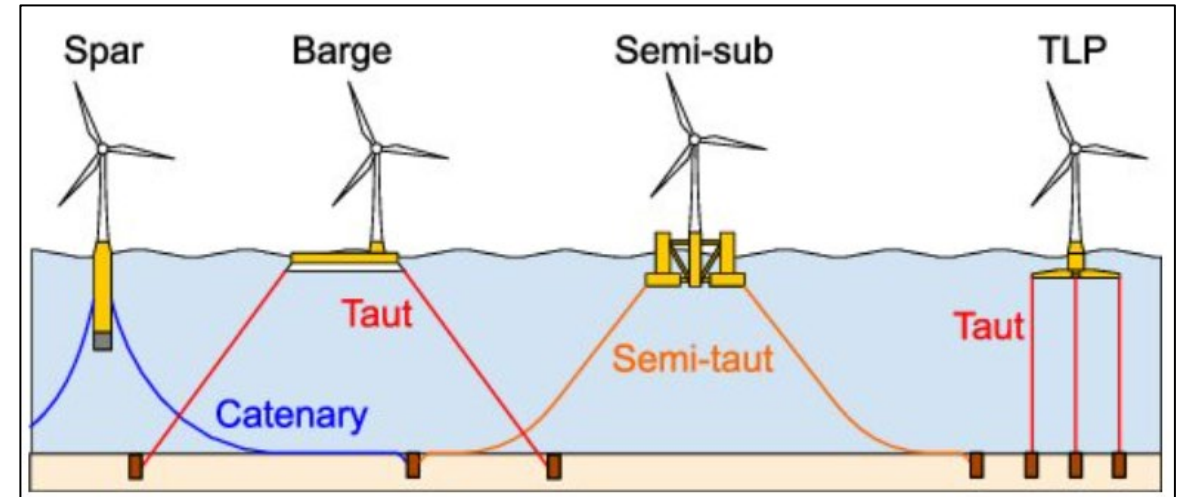


Floating Offshore Wind Technology Overview

Foundation Types

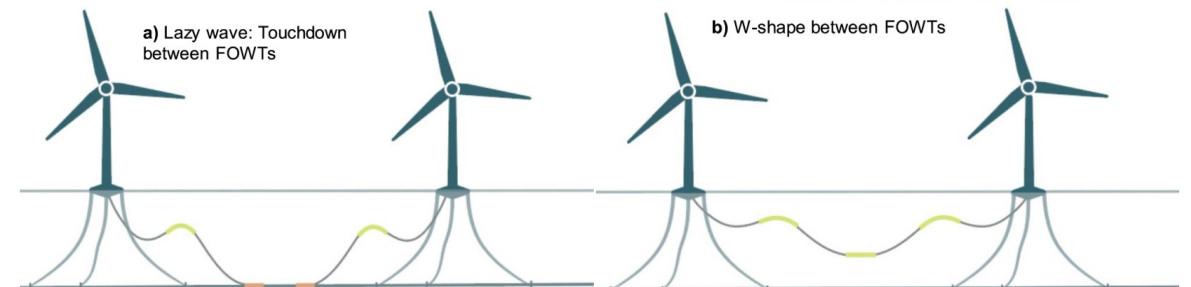


Mooring Types



Credit: Cerfontaine et al.

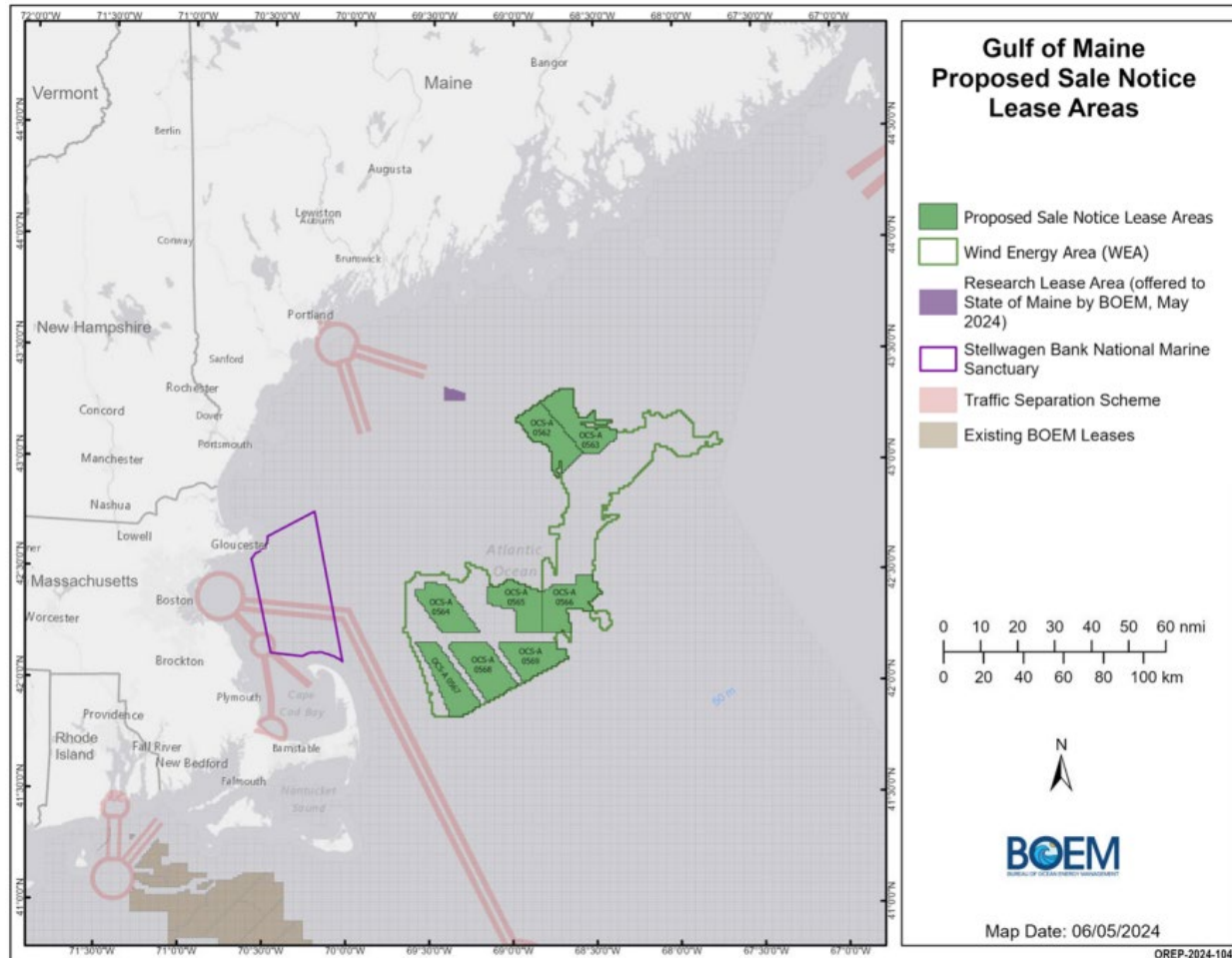
Dynamic Cable Arrangements



Credit: Cerik and Huang, 2024

UK FOSW Study Tour Participants (US group)

10 Fishing Industry members
4 Marine Resource Management staff
1 Facilitator



State of Maine
Fishing Industry
Lobster
Groundfish
Pelagic
Sector/Advocacy/Co-op
Resource Management
Carl Wilson
Erin Wilkinson
Meghan Suslovic

Commonwealth of Massachusetts
Fishing Industry
Groundfish
Longline & Pelagic
Resource Management
Brad Schondelmeier

Trip Planning/ Facilitation
State of Maine
Caroline Coccoli
Laura Singer
Jade Dieumegard-Meyrick



UK FOSW Study Tour Participants (UK group/hosts)



Caroline Coccoli – Senior Manager, OSW
Mary Harvey – Manager, OSW

Mike Archer – Senior Associate, OSW
Alistair Morris – Manager, OSW



Offshore Wind Directorate

Caroline Daumich – Strategic Engagement and Policy Officer

Marine Directorate

Kirsty Wright – Senior Marine Fish and Fisheries Scientist



Elsbeth MacDonald - CEO

Andrew Innes – Industry Advisor and Commercial Fisherman

Elena Balestri – Fisheries Policy and Science Manager

Fahim Hashimi – Offshore Energy Policy Manager



Peter Duncan – Head of Commercial Fishing

Offshore Wind Fisheries Managers

Fingal McKiernan

Cameron Moffat



Iain McMyn

Michael Sutherland



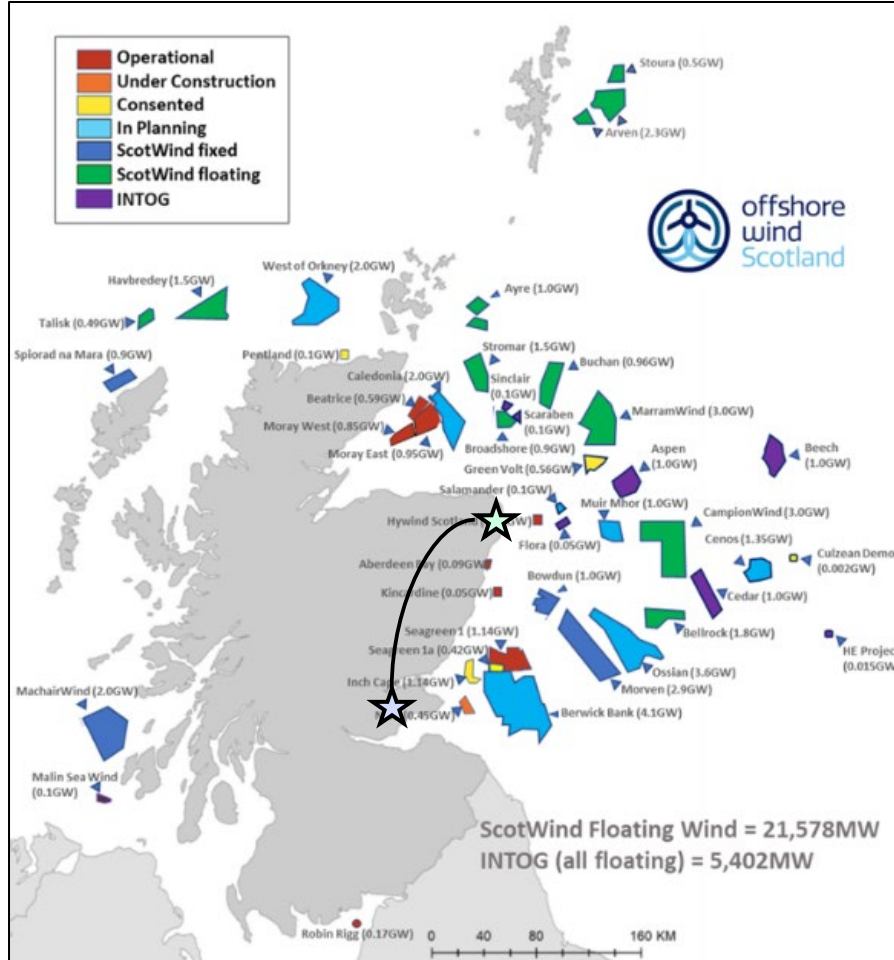
**THE UNIVERSITY
of EDINBURGH**

Dr. Laura-Beth Jordan – Experimental Officer



UK FOSW Study Tour Schedule

Sunday 5/18: Arrive in Edinburgh, Scotland
Saturday 5/24: Depart Edinburgh for Boston



Scottish Government
Riaghaltas na h-Alba



FloWave



SCOTTISH
FISHERMEN'S
FEDERATION



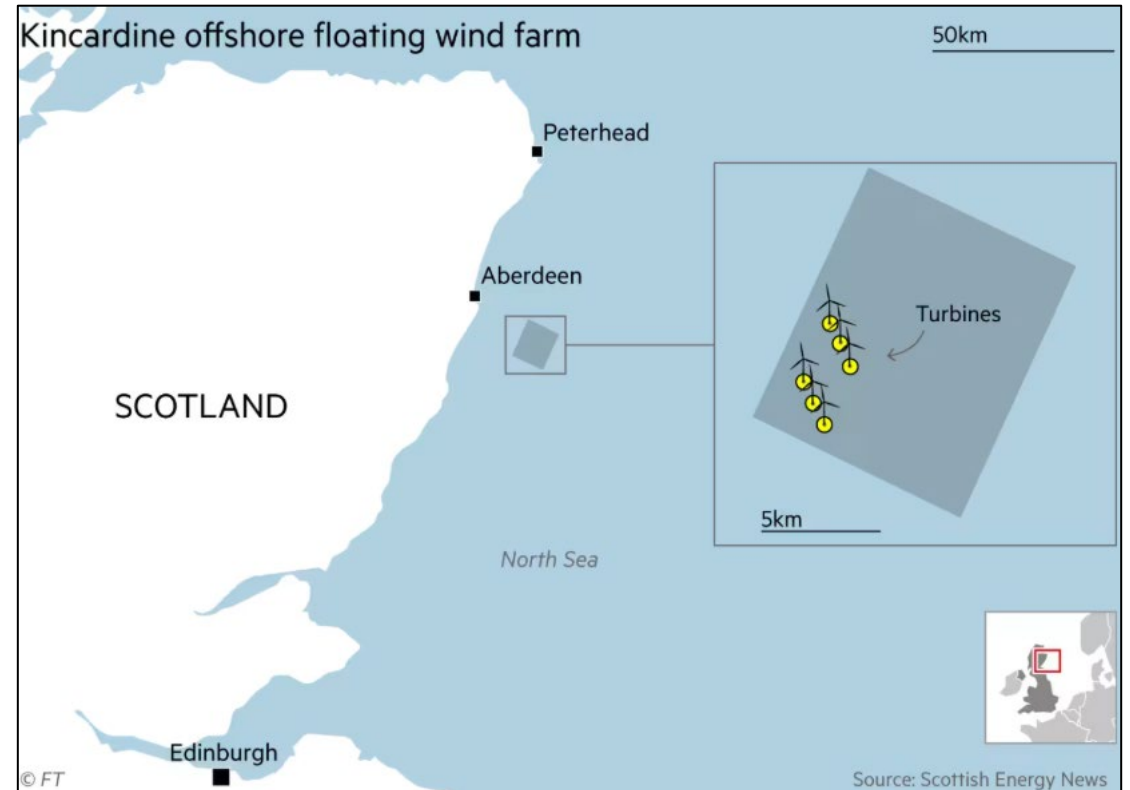
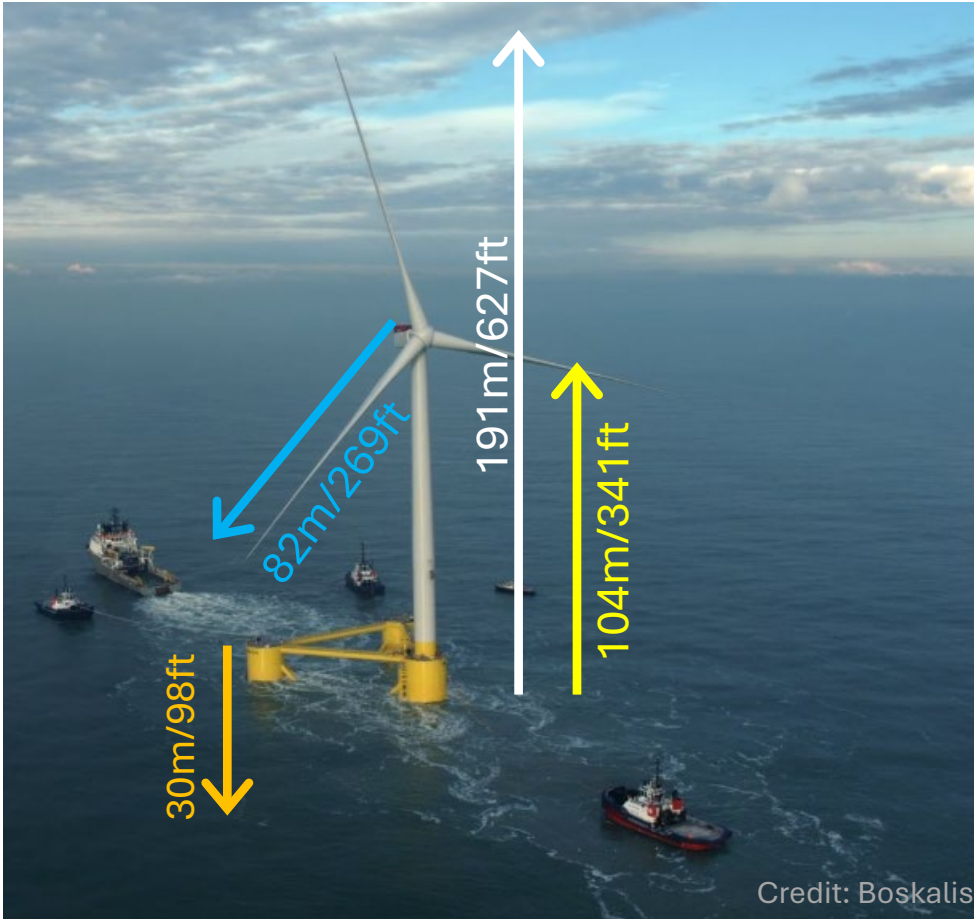
KOWL
cobra



UK FOSW Study Tour – Kincardine Wind Farm

Five Vestas V164-9.5MW WTGs

Fully commissioned in 2021, largest FOSW array in world (until 2023)



15km/9.3 miles from shore
Water depth ~80m/260ft

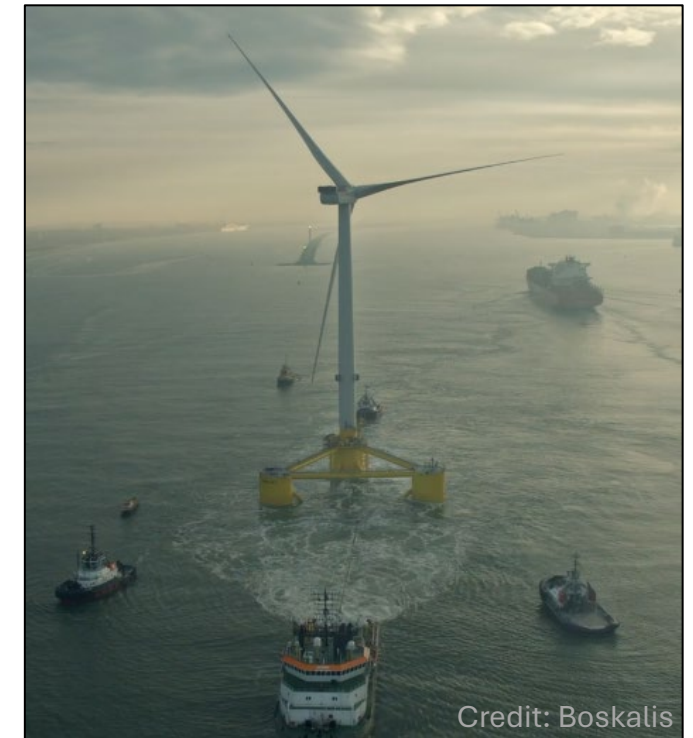
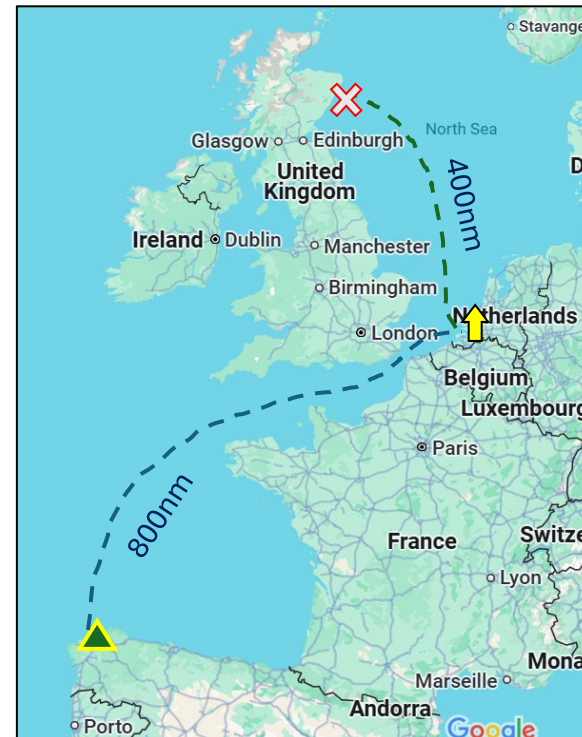
UK FOSW Study Tour – Kincardine Wind Farm

Construction Timeline	Phase1 (2018)	Phase2-3 (2020-2021)
Turbines	(1) Vestas V80-2MW	(5) Vestas V164-9.5MW
Built		Ferrol, Spain
Assembled	Dundee, Scotland	Rotterdam, Netherlands
Generating Power	September 2018	October 2021

~1200nm journey for each turbine



Credit: Boskalis



Credit: Boskalis

[Boskalis Kincardine Towing/Install Video](#)

Floating Offshore Wind UK Study Tour – May 2025



UK FOSW Study Tour – Kincardine Wind Farm



Floating Offshore Wind UK Study Tour – May 2025



Study Tour Takeaways



- Engagement of the fishing industry was limited to non-existent during the initial leasing phase
- No BSEE in Scotland to hold developers accountable for mistakes or safety issues, just permitting
- Government has been limited in their guidance for mitigation and impacts
- Working through ScotMER, working groups and fisheries liaisons to improve process

Developers



- No government guidance or engagement on financial mitigation, creating a disjointed, inequitable process between developers and fishermen
- Concern with lack of engagement from government in helping wind and fishing “co-exist”
- Lack of data (e.g. fishing, environmental) noted as a significant issue
- A lot of challenges per development continue to exist. Shoreside infrastructure and grid connections, transmission location suitability

Study Tour Takeaways



- Concern with the lack of monitoring and government pro-active engagement and guidance
- Over time, the fishing industry has learned to work with (and around) the oil and gas industries, which have a smaller spatial footprint.
- Scottish fishing industry is feeling the “squeeze” of their spatial fishing footprint. Regulations, MPAs and offshore development projects are reducing their CPUE, and they have great concern about being displaced into less productive fishing grounds
- Scottish fishermen are frustrated over the lack of public understanding of the importance of the fishing industry - economic contribution to the country and localized food production

Kincardine Offshore Wind Farm

- Almost entirely a different sector than fixed OSW, requiring very different infrastructure and vessels
- Different scale and distance from shore than GOM, making visualization of GOM arrays difficult
- Despite clear movement of water (1+kt current, 6-8' seas), not much noticeable movement of WTG
- Impressive structures and engineering! Would like a way to visualize sub-surface infrastructure (mooring lines, cables, etc.).

Study Tour Takeaways

Final Thoughts

- UK decarbonization goals have broad public buy-in and are driving the offshore wind efforts
- Success and viability of FOSW very dependent on port and shipping infrastructure
- Grid connection, shoreside infrastructure and development costs are real problems at the moment
- Scottish fishing industry has serious concerns with the environmental impacts, lack of monitoring and spatial conflicts
- Both fishermen and developers desired more oversight and guidance from government
- Some felt that our GOM lease siting process, and state/federal involvement, was better than what we heard about
- UK Study Tour experiences created experts who can lead productive discussions and engagement with developers in early stages of GOM floating OSW development. Incredible value.

Acknowledgements

- Maine DMR and Maine GEO
- Mass DMF, EEA and MassCEC
- Carbon Trust
- Laura Singer
- UK Hosts
- Private ME Donor

Questions?



Floating Offshore Wind UK Study Tour – May 2025



Questions?

[WindFloat Atlantic \(Portugal\) in 9m seas during Winter Storm Dora](#)

[Boskalis Kincardine Towing/Install Video](#)

