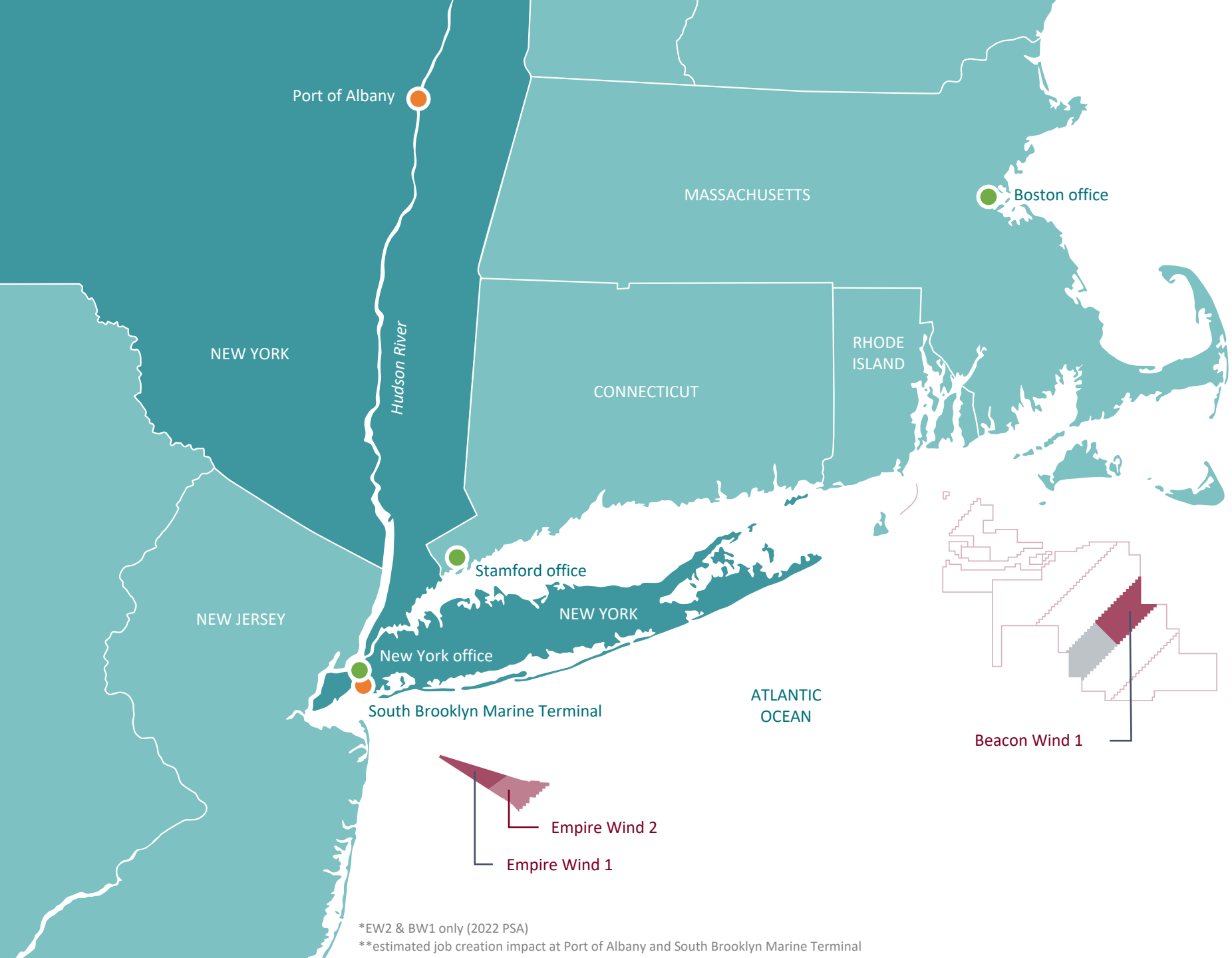
Empire Wind Munitions and Explosives of Concern

Name of Operation: **MEC Survey**

Project name: **Empire Wind Project**

Operation Window: **June - December 2023**

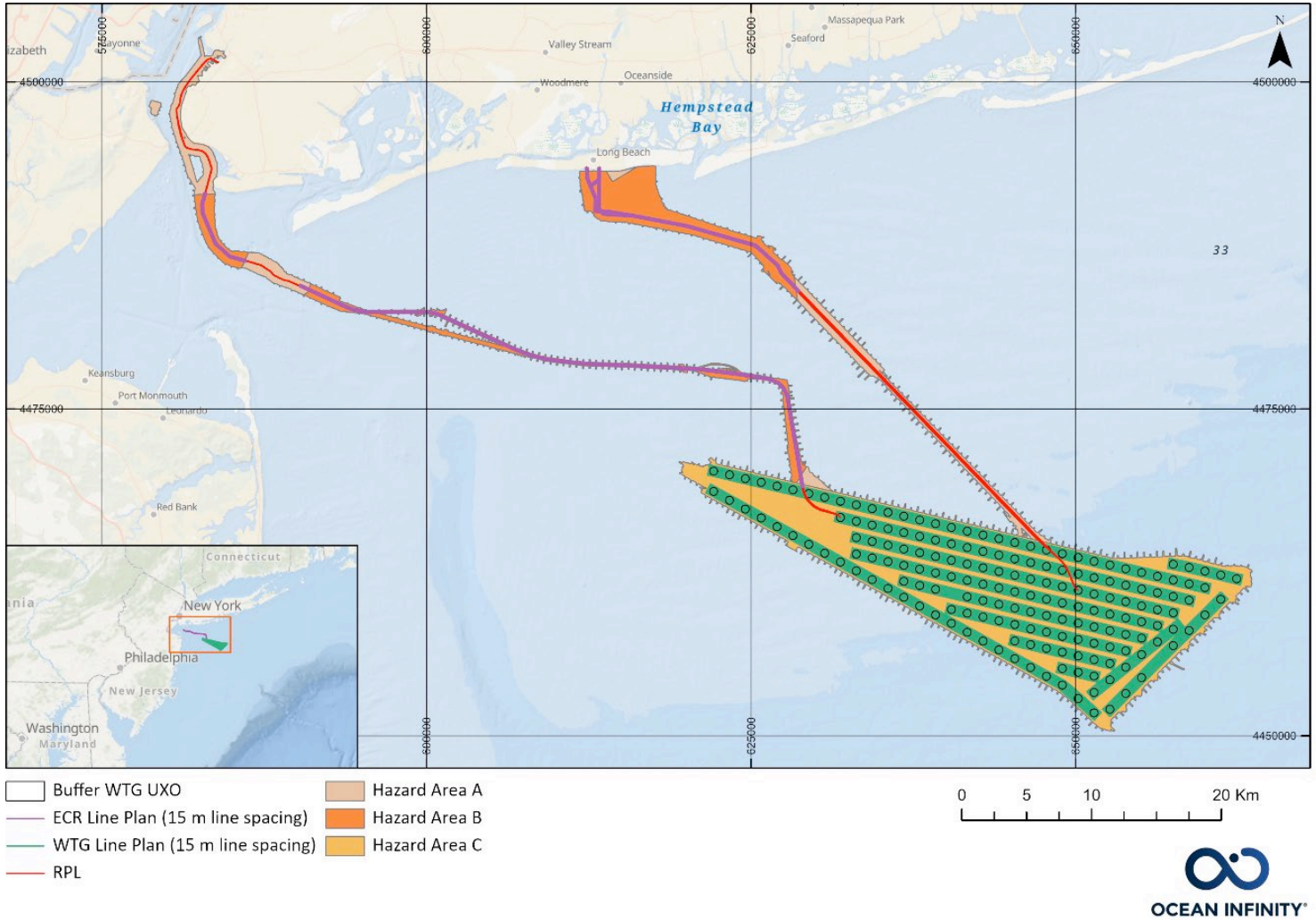


The Empire Wind and Beacon Wind projects will deliver:

- **3.3 GW** of renewable energy
- power for **~2 m** homes
- **$2.5 bn** in economic development commitments to NY*
- **$47 m** for community benefits
- **$25 m** for environmental research
- **1st US wind tower manufacturing facility** at Port of Albany
- **73-acre OSW port facility** at South Brooklyn Marine Terminal
- **500** long-term jobs**
- **1,500** short-term jobs**

*EW2 & BW1 only (2022 PSA)
**estimated job creation impact at Port of Albany and South Brooklyn Marine Terminal

Survey Location – Empire Wind Lease and ECR area



- The main objective of the Unexploded Ordnance (UXO) Survey involves a high-resolution gradiometer geophysical survey to locate and map any potential UXO targets (bombs, explosives, mines) in the Empire Wind lease and ECR area prior to any installation scope. Data is processed and any potential UXO's are then investigated with ROV and information is used to create ALARP certificates to show minimal risk is achieved.

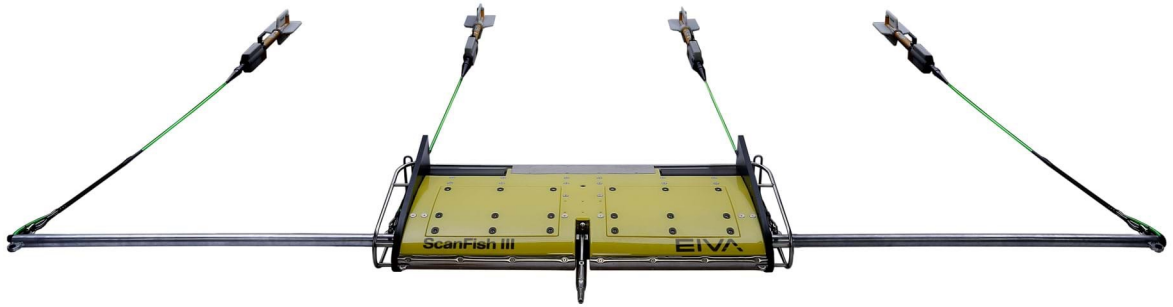
Deep Helder

Vessel Particulars:	Requested Information
Name of Vessel	Deep Helder
IMO	**9690872**
Country of registration:	Netherlands
Port of registry:	Den Helder
Type of Vessel	Dive Vessel / OS Supply
Gross tonnage	1856 Tons
Vessel Dimensions: Length x Breath x Depth	**64.8 x 15.77 m**
Total allowance of persons on board (PoB)	Complement : 50
Vessel operation area: Up to XX miles	Empire Wind – East Coast NY, USA

UXO Survey Operations

Marine Operations

- Survey Operations will use Deep Helder, a DP class vessel to perform UXO geophysical survey by traditional lawn-survey using grid-style pattern throughout the Empire Wind Lease site and along the export cable routes
- 24 HR Operations
- Operations involve towed survey sensors from a rear A-Frame.
- All data is recorded and processed to locate potential UXO's



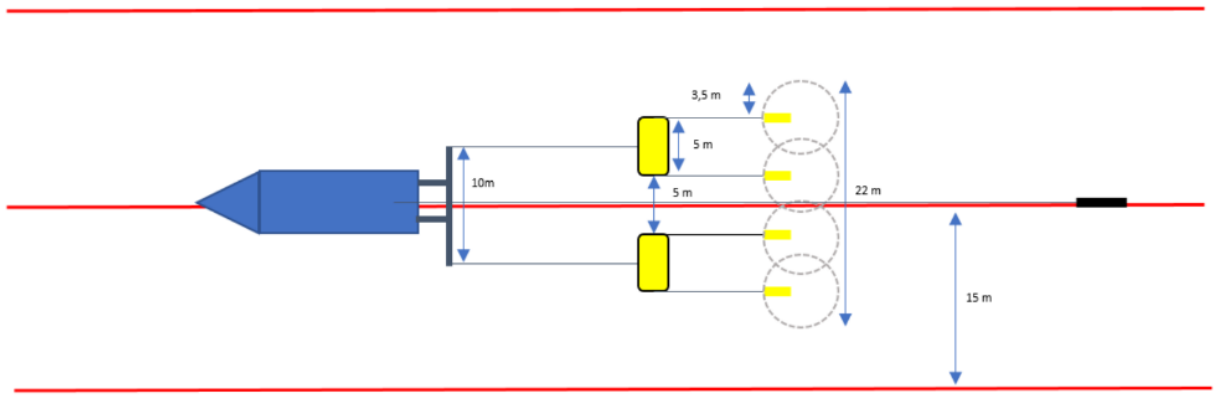


Figure 4 The equipment towing plan.

Fisheries Engagements

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Clint Baker
Offshore Fisheries Liaison Representative
Clint48.cb@gmail.com

Scout Vessel F/V Elizabeth Katherine
Captain Tyler Morrel
Mobile: 917.319.0202

Static gear may be present along the export cable route corridors

Recreational and Charter fishing primarily within the Empire Wind lease

https://www.equinor.com/en/what-we-do/empirewind.html

Avangrid A member of the Iberdrola Group

New England Wind

Lease Area OCS-A 0534 Commercial and For-Hire Fisheries Assessment

June 2023

Agenda

01 Introductions & Project Overview

02 Assessment & Economic Exposure of Commercial Fisheries

03 Assessment & Economic Exposure of For-Hire Recreational Fisheries

04 Avoidance, Minimization, and Mitigation Measures

05 Economic Impact Methodology

06 Discussion and Q&A

Introductions & Project Overview

New England Wind Team

Christina Hoffman
Director - Development

Caela Howard
Fisheries Liaison

Stephanie Wilson
Director - Permitting

John Harker
Lead Fisheries Liaison

Mark Roll
Federal Permitting Manager

Proposed Project Overview

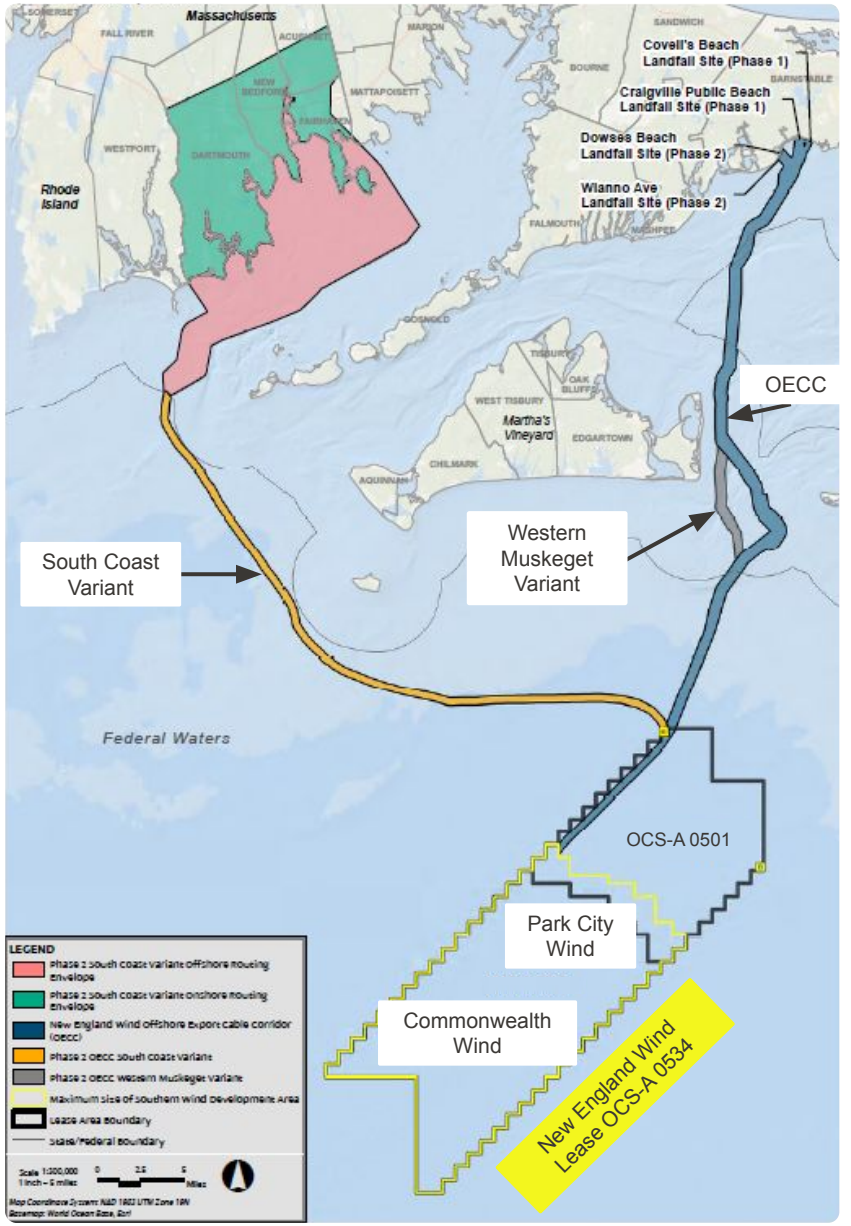
New England Wind includes offshore renewable wind energy facilities in Lease Area OCS-A 0534, along with associated offshore and onshore cabling and onshore substations

Two phases with a total maximum of 130 wind turbine generator (WTG) and electrical service platform (ESP) positions in the Lease Area

- **Phase 1** includes Park City Wind
- **Phase 2** includes Commonwealth Wind

Five offshore export cables within the Offshore Export Cable Corridor (OECC)

- Phase 2 includes two OECC variants



Assessment & Economic Exposure of Commercial Fisheries

Commercial and For-Hire Fisheries Assessment Overview

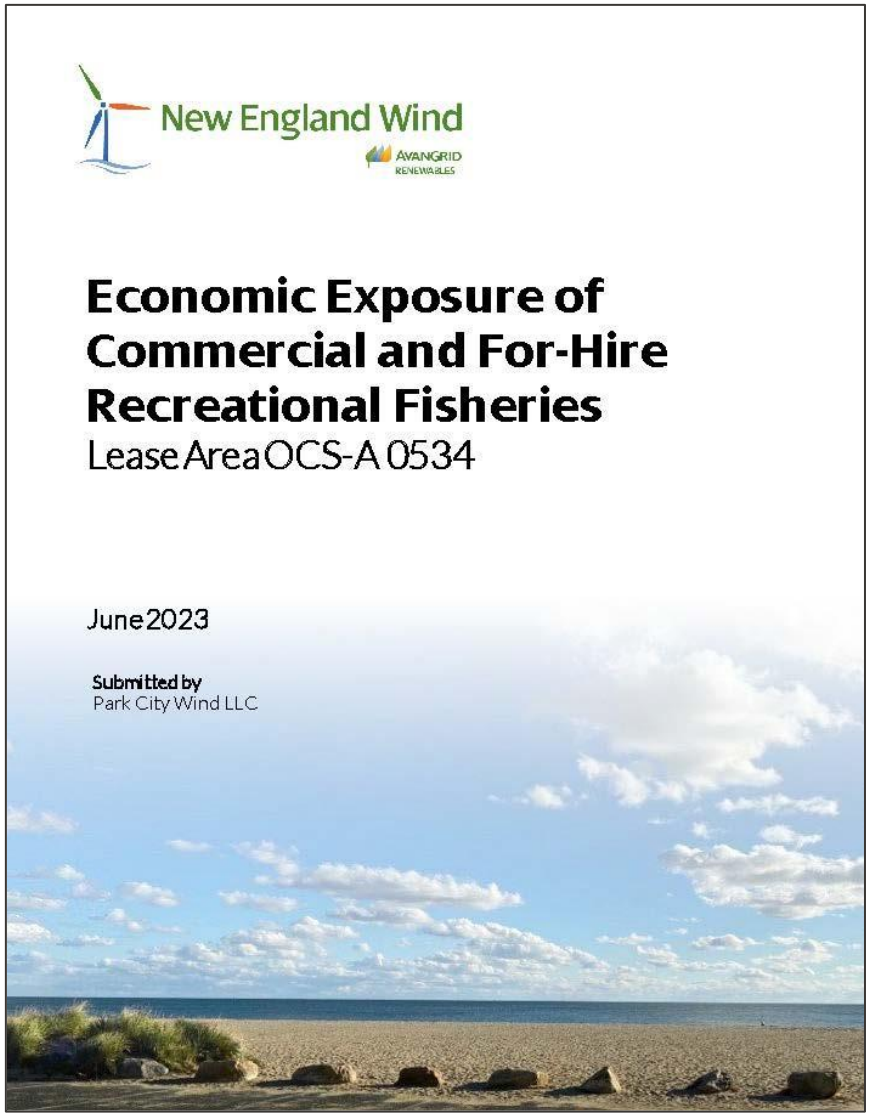
Data sources:

- NMFS Socioeconomic Impacts of Atlantic Offshore Wind Development database (2008-2021 landings and revenue data)
- WHOI's 2022 charter captain survey for Revolution Wind

Economic Exposure of Commercial and For-Hire Recreational Fisheries to the New England Offshore Wind Energy Development (Appendix III-N of COP)

Sources of potential fishery-related economic exposure include:

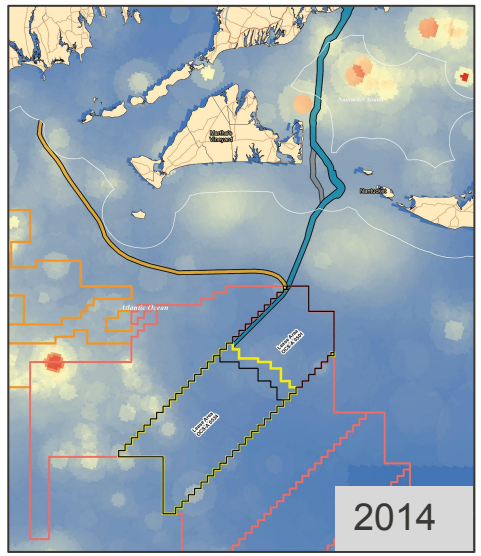
- Construction, operation, and decommissioning of WTGs and ESPs in the Lease Area
- Installation, use, and decommissioning of offshore export cables within the OECC

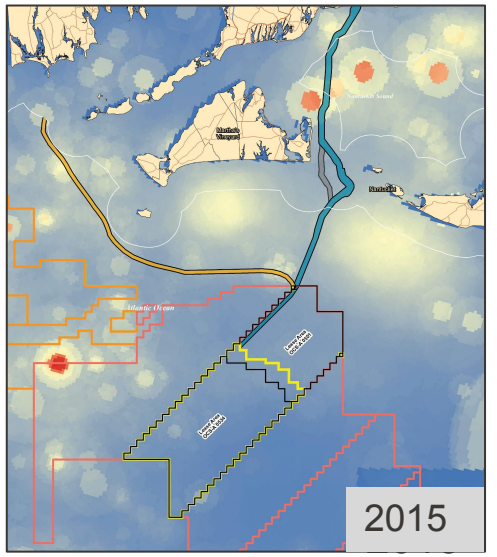


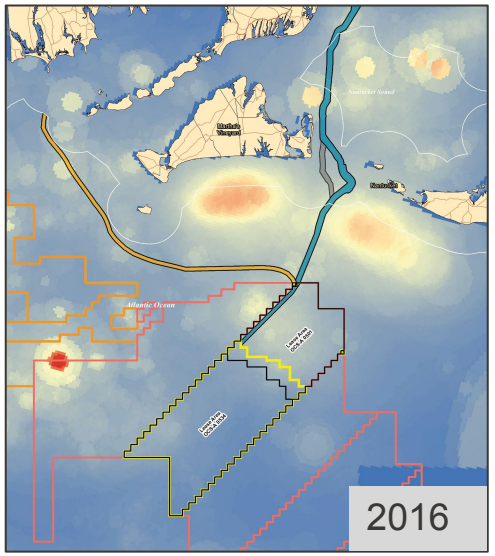
Fishing Revenue Density

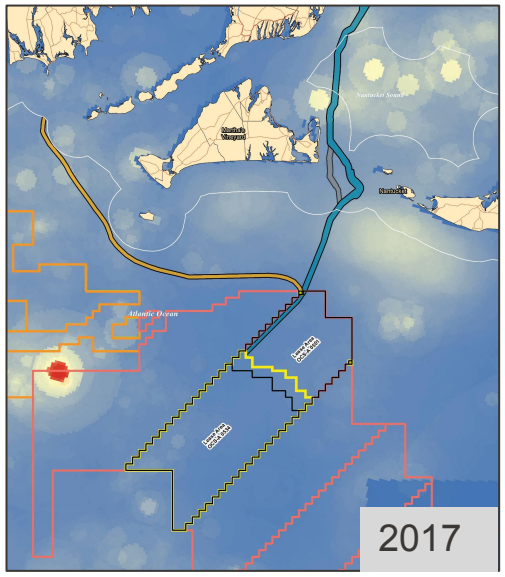
MA/RI Lease Areas	Annual Average Revenue per km^2 (2008-2021; 2021$)
Lowest Value	$534
New England Wind	$1,301
Average Value	$2,123
Highest Value	$4,700

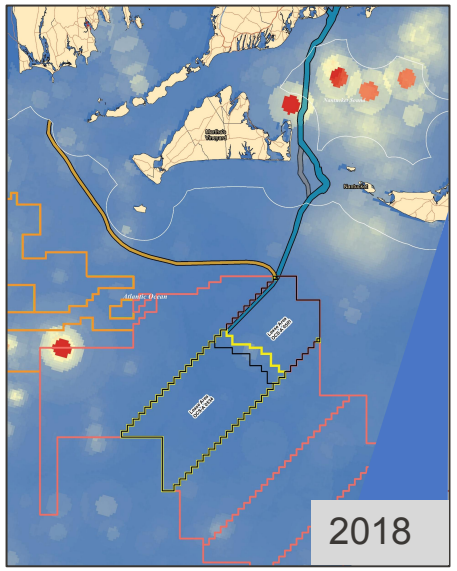
New England Wind	Baseline Annual Average Landing (2008-2021; pounds)	Baseline Annual Average Revenue (2008-2021; 2021 dollars)
Lease Area	530,444	$534,602
OECC	133,394	$209,331

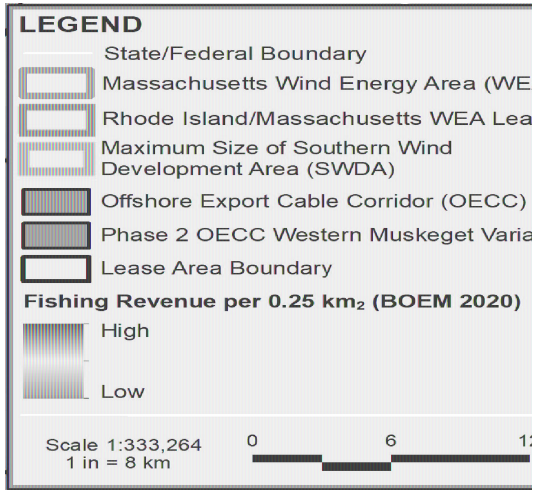












Baseline Commercial Fisheries Revenue in the Lease Area

Unadjusted for Lobster and Jonah Crab (2008-2021)

Total Fishing Revenues (2008-2021)	Annual Average Revenues	Annual Average Fishing Revenues per km^2
$7,484,427	$534,602	$1,301

Adjusted for Lobster and Jonah Crab

Total Fishing Revenues (2008-2021)	Annual Average Revenues	Annual Average Fishing Revenues per km^2
$8,720,081	$622,863	$1,515

Estimates of Commercial Fisheries Revenue in the Lease Area by State (2008-2021) Adjusted for Lobster and Jonah Crab

Most valuable species landed in the Lease Area include:

- Squid
- Silver hake
- Monkfish
- Jonah crab
- Skates

Most common gear types:

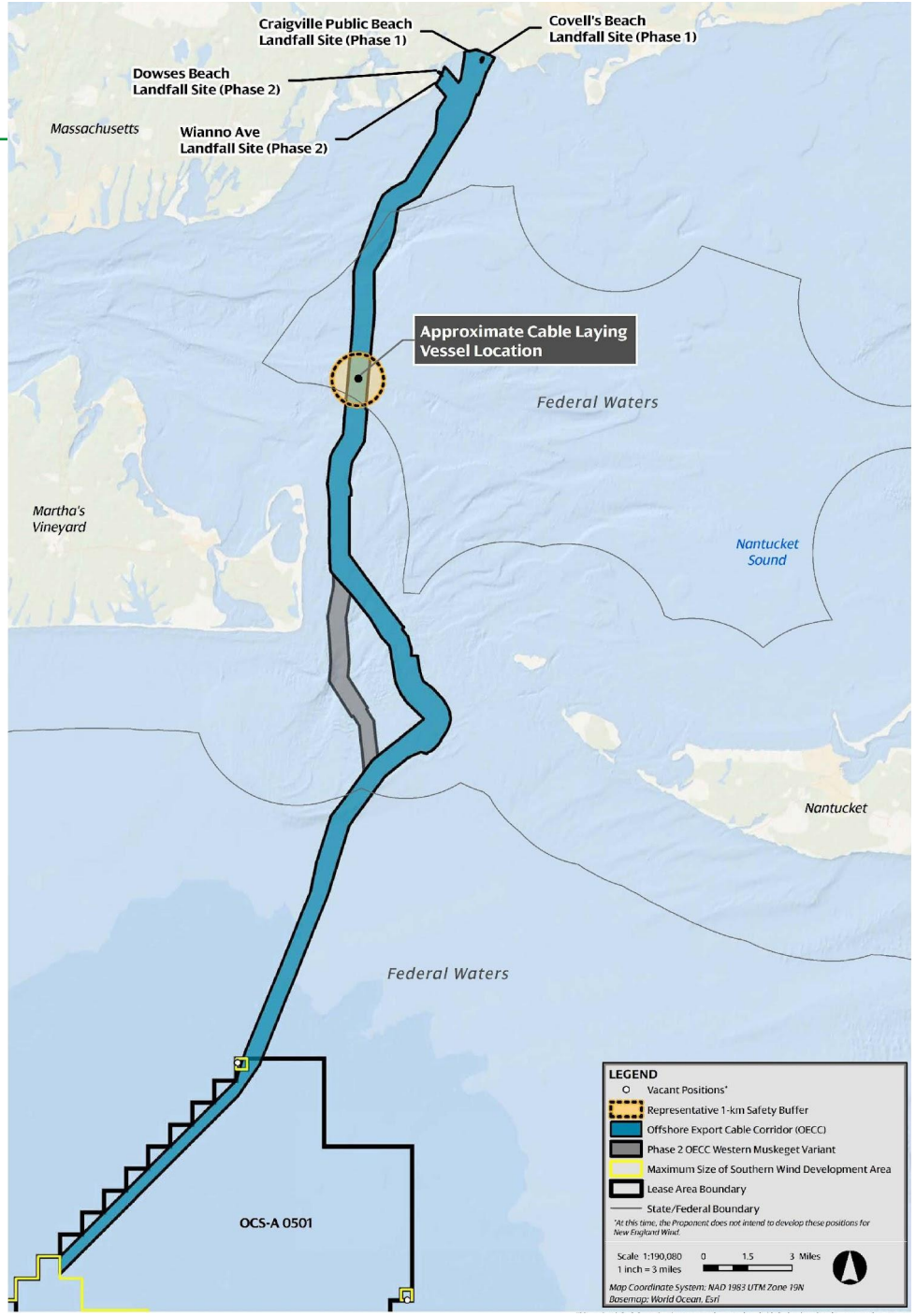
- Bottom trawls
- Lobster pots
- Gillnets (sink)

State	Average Annual Value (2021 dollars)	Percentage of Annual Average Lease Area Value
Massachusetts	$274,557	44%
Rhode Island	$262,510	42%
New York	$39,784	6%
Connecticut	$19,941	3%
Virginia	$10,350	2%
North Carolina	$9,814	2%
New Jersey	$5,356	1%
All Others	$550	0.1%

Estimates of Commercial Fisheries Economic Exposure in OECC

Economic exposure estimate:

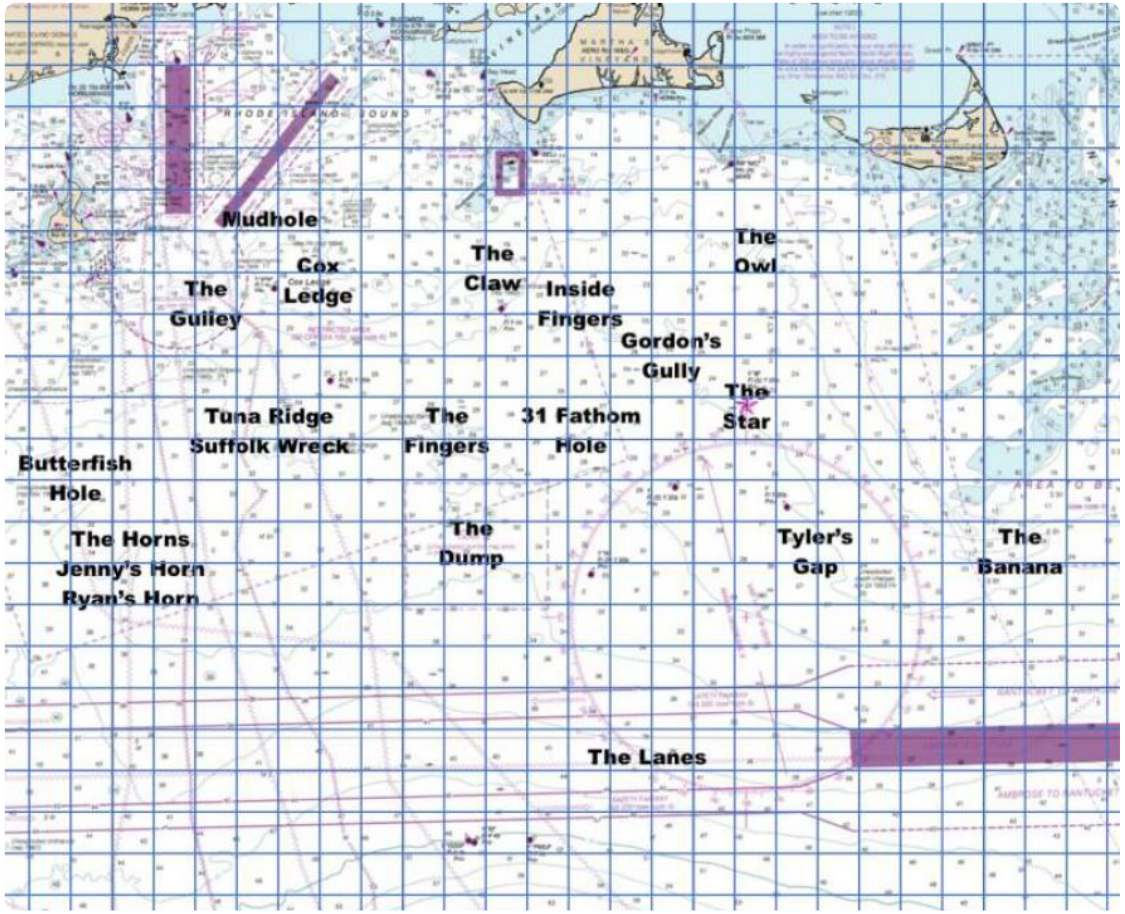
- Annual average fishing revenue per km^2 in OECC = $2,505
- Safety buffer of 1 km around cable installation activities results in fishing preclusion area of 3.14 km^2
- Total duration of cable installation activities for 5 cables (during both phases) = 1.875 years
- Expected economic exposure during cable installation = $2,505 x 3.14 km^2 x 1.875 years = **$14,748**
- Similar estimate of economic exposure for the Phase 2 OECC Western Muskeget Variant
- South Coast Variant: expected economic exposure during cable installation = $2,559 x 3.14 km^2 x 0.375 year = **$3,013**



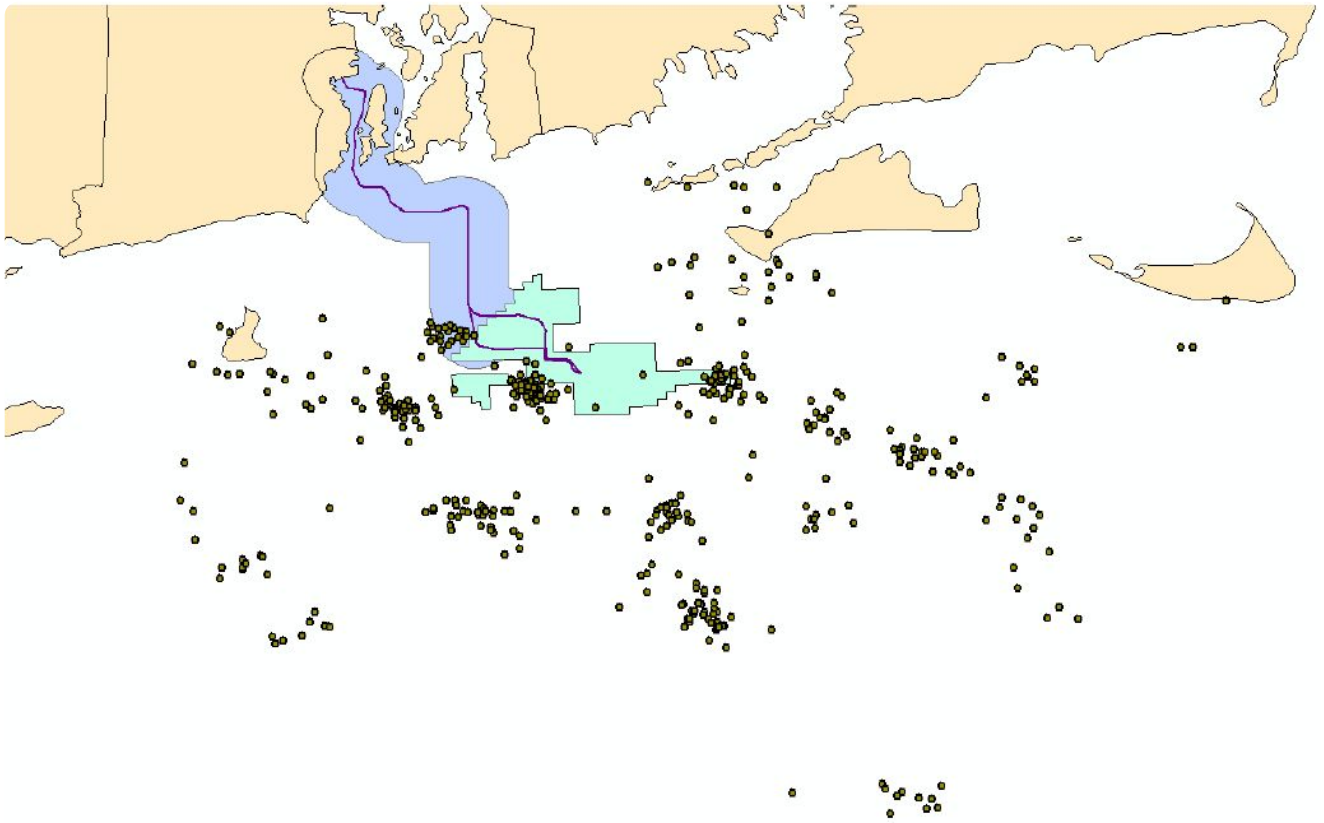
Assessment & Economic Exposure of For-Hire Recreational Fisheries

For-Hire Recreational Fisheries Assessment Approach

WHOI 2022 survey of MA- and RI-based charter vessel operators conducted for the for-hire fisheries assessment for Revolution Wind



WHOI 2022 MA- and RI-based charter captain survey – survey area

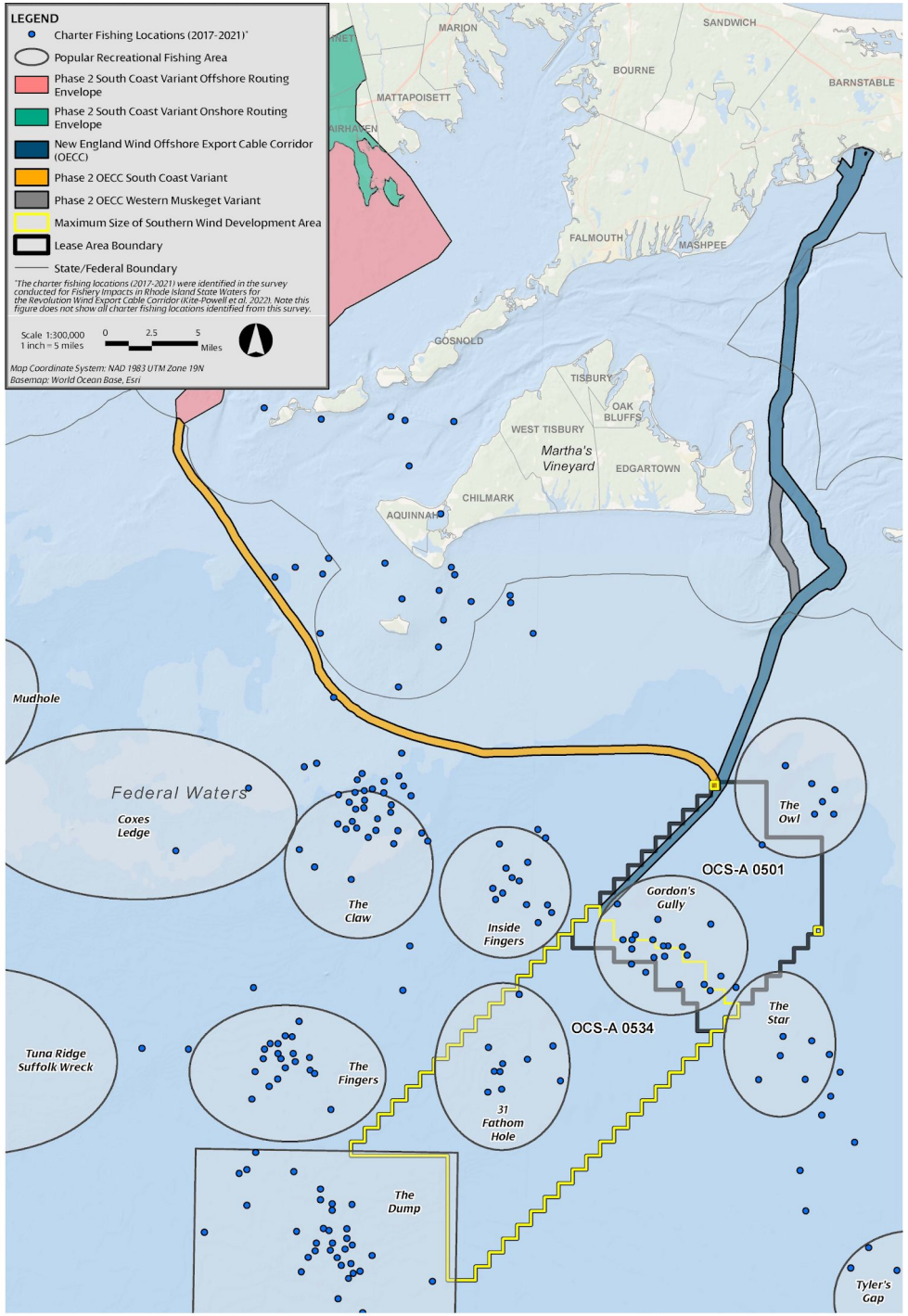


Charter fishing locations (2017-2021) identified in WHOI survey responses

For-Hire Recreational Fisheries Assessment Approach

Economic exposure estimate for MA for-hire fisheries based on an extrapolation of data from 2023 WHOI report:

- Percent of charter fishing locations from 2022 WHOI survey in Lease Area = 3.7%
- Annual economic exposure of MA-based for-hire fishing vessels in the Lease Area = $105,729
- Economic impacts are expected to be significantly less than economic exposure



Avoidance, Minimization, and Mitigation

Avoidance, Minimization, and Mitigation

–Biological impacts

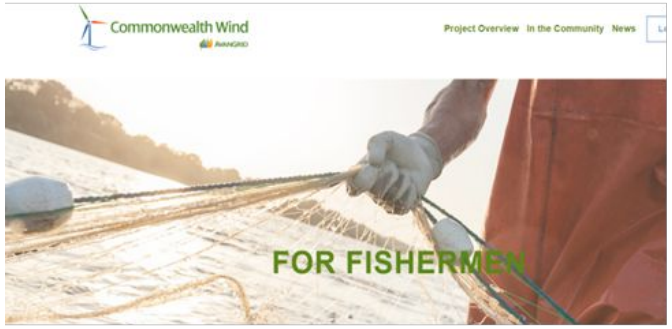
–Constrained access/navigation

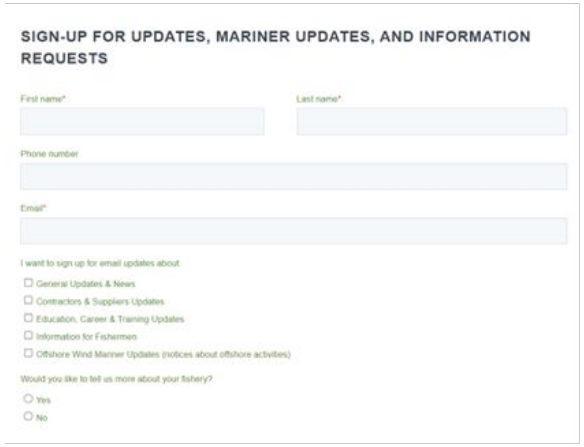
Avoid

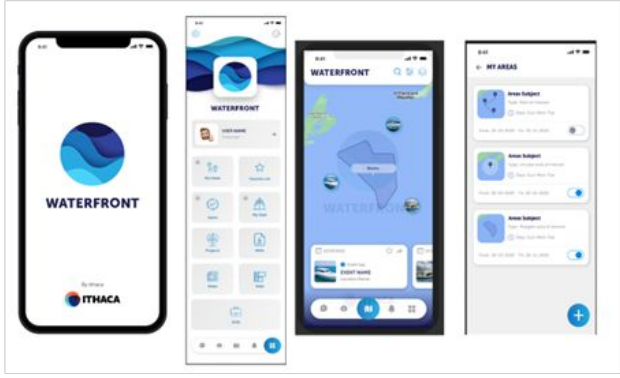
Minimize

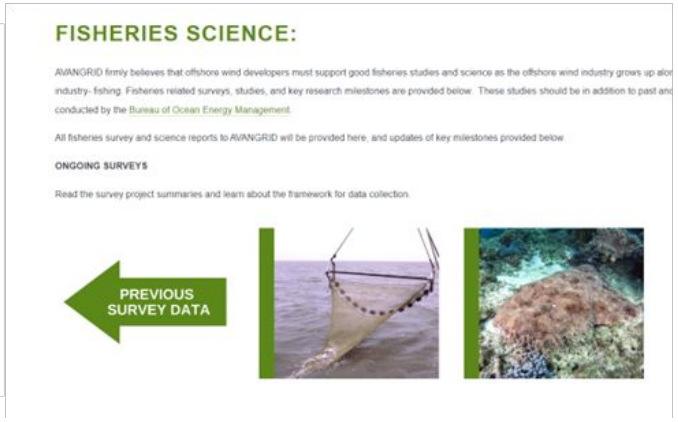
Mitigate

Residual Impact









Economic Impact Methodology

New England Wind Economic Impact Methodology - Massachusetts

Project Phase	Project Area	Assumptions/Effects	Duration
Construction	Lease Area	All (100%) commercial and for-hire charter landings lost	2 years
	OECC	All (100%) commercial landings lost from 3.14 km^2 safety buffer around cable installation activities	2 years
O&M	Lease Area	Draft BOEM guidance: • Yr 1: all (100%) commercial landings lost • Yr 2: 80% of commercial landings lost • Yr 3: 70% of commercial landings lost • Yr 4: 60% of commercial landings lost • Yr 5: 50% of commercial landings lost Plus: • Yrs 6-30: 5% of commercial landings lost	30 years
	OECC	None	n/a
Decommissioning	Lease Area	All (100%) commercial and for-hire charter landings lost	2 years
	OECC	All (100%) commercial landings lost from 3.14 km^2 safety buffer around cable decommissioning activities	2 years

Discussion and Q&A

Contact Us

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Avangrid
A member of the
Iberdrola Group

Sunrise Wind Fisheries Exposure Analysis - Massachusetts

Hauke Kite-Powell, Di Jin, and Michael Weir
Marine Policy Center, Woods Hole Oceanographic Institution
23 June 2023

Sunrise Wind Fisheries Exposure Analysis

Quantitative and data-driven approach

NOAA data on commercial landings for 2008-2019 for Sunrise WLA, WTGA +7.5km buffer, and ECC

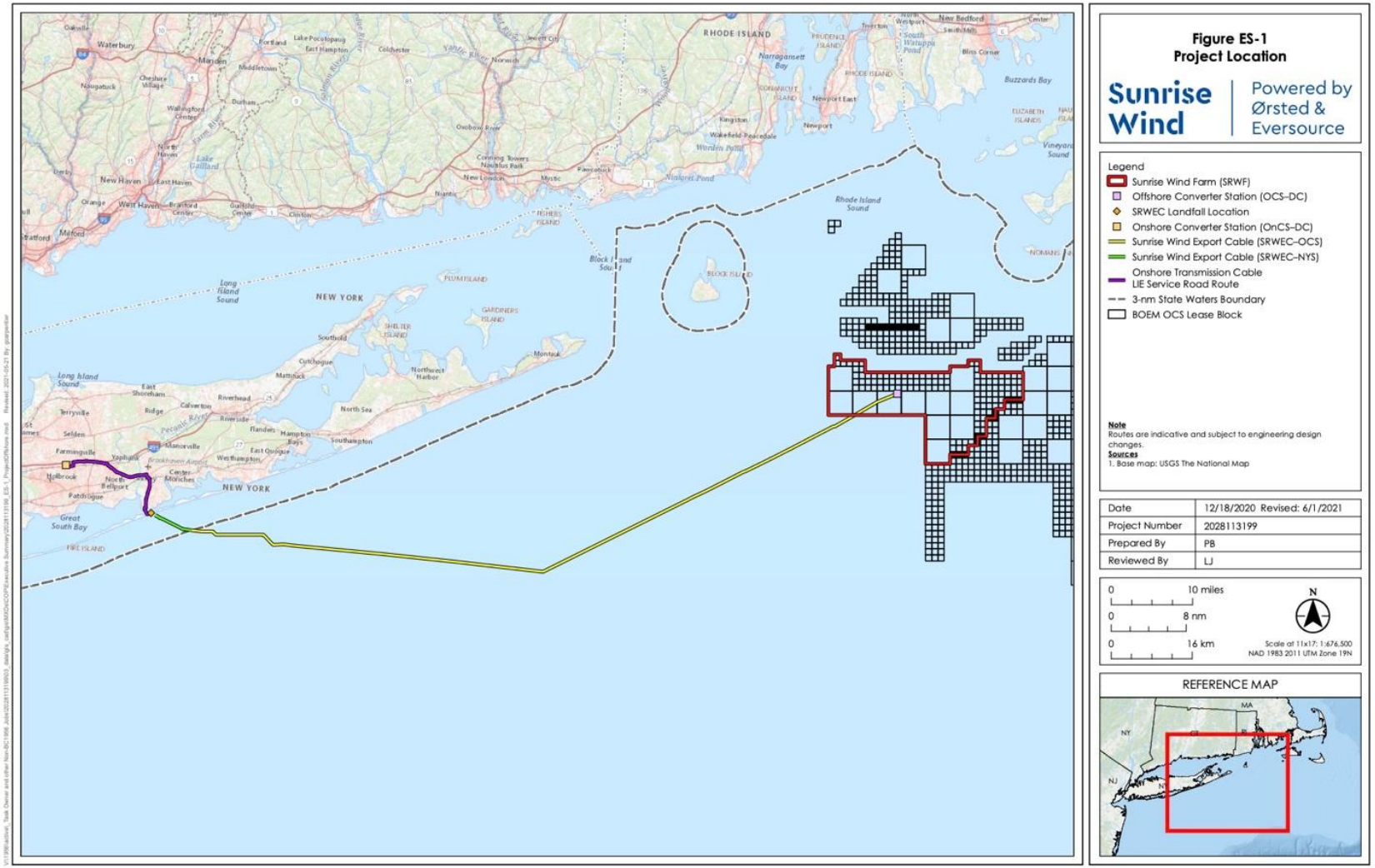
For-hire charter fishing revenue at WLA estimated from 2022 charter captain survey

Indirect and induced impacts in Massachusetts estimated via multipliers (I/O model)

Exposure of fisheries values estimated based on likely impacts to fishing during

- Construction
- Operations
- Decommissioning

Sunrise Wind project areas



NOAA baseline data

Average of 11 years of NOAA data (2008-2019) on commercial landings by weight and value from the Wind Lease Area (WLA) and Export Cable Corridor (ECC)

Updated NOAA dataset uses federal Vessel Trip Report (VTR) and clam logbook fishing trip data with observer data

Major species: Monkfish, scallops, skate wings (WLA); Scallops, quahogs, monkfish, squid (ECC)

Major gear types: Gillnets, bottom trawl (WLA)

Table 7a. Average annual landings in Sunrise WLA by state.

State	Mean		Standard Deviation	
	Value/year (2020 $)	Landings/year (lbs)	Value/year (2020 $)	Landings/year (lbs)
Rhode Island	1,034,863	1,124,470	267,459	277,149
Massachusetts	981,602	1,002,341	551,935	695,103
Others	99,838	64,361	--	--

Table 7b. Average annual landings in Sunrise ECC by state.

State	Mean		Standard Deviation	
	Value/year (2020 $)	Landings/year (lbs)	Value/year (2020 $)	Landings/year (lbs)
Rhode Island	22,218	19,853	8,703	3,996
Massachusetts	77,407	54,210	33,681	26,059
Others	46,394	28,347	--	--

NOAA baseline data

Average of 11 years of NOAA data (2008-2019) on commercial landings from the Wind Lease Area (WLA) and Export Cable Corridor (ECC; 180m)

Landed value (2020$) from MA commercial fishing:

$1,097,000/year in WLA
$80,000/year in ECC

$2.60 million/year in total, including indirect and induced effects

Estimated annual economic impact in Massachusetts (all values in 2020$)

Area	State	Average value of landings/year: VTR data only (Table 11, row 1)	Average value of landings/year: with lobster & Jonah crab adjustment	Average value of landings/year: with dockside sales adjustment (15% premium on RI lobster & JC landings)	Total impact/year "dockside sales" column multiplied by upstream & downstream multipliers, except RI lobster & JC
Sunrise WLA	total	2,116,815	2,366,693	2,397,234	5,214,570
Sunrise ECC	total	146,040	150,723	150,901	332,878
Sunrise WLA	MA	981,567	1,097,435	1,097,435	2,419,845
Sunrise ECC	MA	77,401	79,883	79,883	176,142

For-hire charter fishing survey (2022)

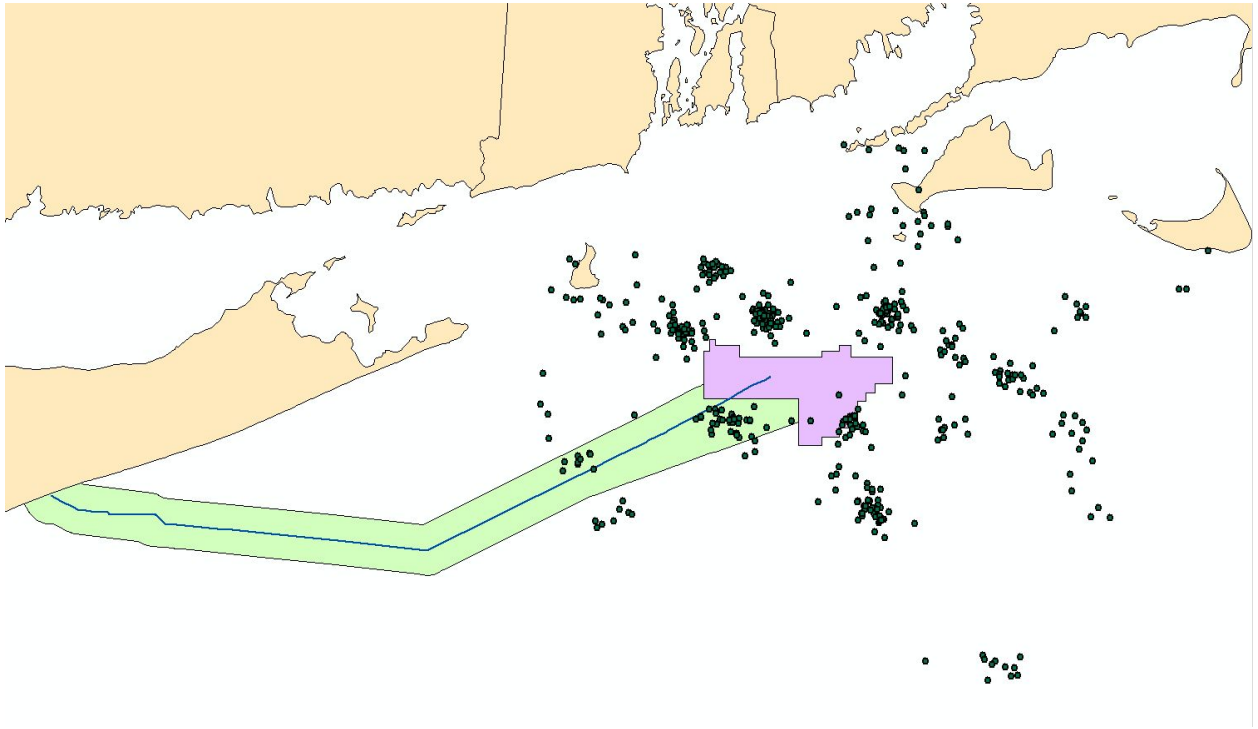


Table 16. For-hire charter fishing survey summary statistics.

Description	Number
Fished in the area and responded to the survey	66
Provided vessel names	62
of which based in Rhode Island	24.5
Provided annual vessel trip numbers	31
Observations with vessel trips reported (2017-2021)	142
Total trips per year	1 – 235
Average total trips per year	47.30
Passengers per vessel trip	2 – 25
Average passengers per vessel trip	5.41
Identified fishing locations on maps	29
of which based in Rhode Island	10.5

For-hire charter fishing baseline estimates

Table 20. Annual revenue and economic impact from MA-based charter fishing in Sunrise Wind areas.

Area	Annual anglers	Revenue per angler (2020$)	Scale factor	Annual revenue (2020$)	Impact multiplier	Annual impact (2020$)
WLA+7.5km	621.4	106.15	Low: 2.027	133,708	1.627	217,543
			High: 3.269	215,658	1.627	350,876
WTGA+7.5km	603.2	106.15	Low: 2.027	129,792	1.627	211,172
			High: 3.269	209,342	1.627	340,600
ECRA	24.0	106.15	Low: 2.027	5,164	1.627	8,402
			High: 3.269	8,328	1.627	13,550

Summary of baseline economics for Massachusetts

Commercial fishing:

Massachusetts landings from WLA & ECC: $1,180,000/year

Massachusetts landings with multipliers: $2,600,000/year

For-hire charter fishing:

Massachusetts revenue from WTGA+7.5 & ECRA: $218,000/year

Massachusetts revenue with multipliers: $354,000/year

(Note: some double counting in summing area values for charter fishing)

Sunrise Wind development exposure assumptions

Table 13. Assumptions for exposure of commercial fisheries to wind farm development.

Categories of Potential Exposure			Assumptions/Effects	Duration
Availability effects due to construction	WTGA+7.5km		100% of finfish leave area (a)	1 year
	WLA		Lobster/crab landings reduced 10% (b) Other shellfish landings reduced 10% (c)	2 years 5 years
	ECRA	1.6km WA	All landings reduced 10% (d)	1 year
		180m ECC	Lobster/crab landings reduced 25% (e) Other shellfish landings reduced 25% (f)	2 years 5 years
Construction constrained access	WLA		No fishing in 50% of area (g)	2 years
	ECRA	1.6km WA	No fishing in 5% of area (h)	1 year
		180m ECC	No fishing in 100% of area (i)	9 months
Effects during operations	WLA		Landings reduced by 5% (j)	30 years
	ECRA	1.6km WA	None	
		180m ECC	None	
Availability effects due to decommissioning	WLA		None beyond constrained access	
	ECRA	1.6km WA	All landings reduced 5% (k)	1 year
		180m ECC	Lobster/crab landings reduced 12.5% (l) Other shellfish landings reduced 12.5% (m)	1 year 4 years
Decommissioning constrained access	WLA		No fishing in 50% of area (n)	1 year
	ECRA	1.6km WA	No fishing in 5% of area (o)	2 months
		180m ECC	No fishing in 100% of area (p)	2 months

(a), (b), (c) etc. refer to detailed explanations in the text that follows

Exposure due to construction effects

Pile driving scheduled for < 9 months

Assume finfish leave when noise exceeds 160 dB: 7.5km buffer around WTGA

Assume shellfish mortality at 219 dB / 24 hours: 160m radius around turbine towers < 2% of WLA

Categories of Potential Exposure			Assumptions/Effects	Duration
Availability effects due to construction	WTGA+7.5km		100% of finfish leave area (a)	1 year
	WLA		Lobster/crab landings reduced 10% (b) Other shellfish landings reduced 10% (c)	2 years 5 years
	ECRA	1.6km WA	All landings reduced 10% (d)	1 year
		180m ECC	Lobster/crab landings reduced 25% (e) Other shellfish landings reduced 25% (f)	2 years 5 years
Construction constrained access	WLA		No fishing in 50% of area (g)	2 years
	ECRA	1.6km WA	No fishing in 5% of area (h)	1 year
		180m ECC	No fishing in 100% of area (i)	9 months

Exposure during operations

Gillnets and bottom trawls account for more than half of landed value from WLA

100m radius around turbine towers and converter station < 1% of WLA footprint

Likely “ramp” due to adjustment/learning effects

Effects during operations	WLA		Landings reduced by 5% (j)	30 years
	ECRA	1.6km WA	None	
		180m ECC	None	

Exposure due to decommissioning

Similar to construction but less severe (no pile driving)

Availability effects due to decommissioning	WLA		None beyond constrained access	
	ECRA	1.6km WA	All landings reduced 5% (k)	1 year
		180m ECC	Lobster/crab landings reduced 12.5% (l) Other shellfish landings reduced 12.5% (m)	1 year 4 years
Decommissioning constrained access	WLA		No fishing in 50% of area (n)	1 year
	ECRA	1.6km WA	No fishing in 5% of area (o)	2 months
		180m ECC	No fishing in 100% of area (p)	2 months

Potential exposure of Mass. fishing to Sunrise Wind

Categories of Potential Exposure		MA Direct Landed Value/Revenue (2020$)
Construction-related effects	WLA+	$1,882,000
	ECRA	$154,000
Effects during operations	WLA	$629,000
	ECRA	---
Decommissioning-related effects	WLA	$100,000
	ECRA	$12,000
Subtotal MA commercial direct effects		**$2,777,000**
MA for-hire charter fishing direct effects		$218,000
Total MA direct effects		**$2,995,000**

Categories of Potential Exposure	MA Total Impact with Multipliers (2020$)
Subtotal MA commercial fishing	**$6,123,000**
MA for-hire charter fishing	$356,000
Total Massachusetts impacts	**$6,479,000**

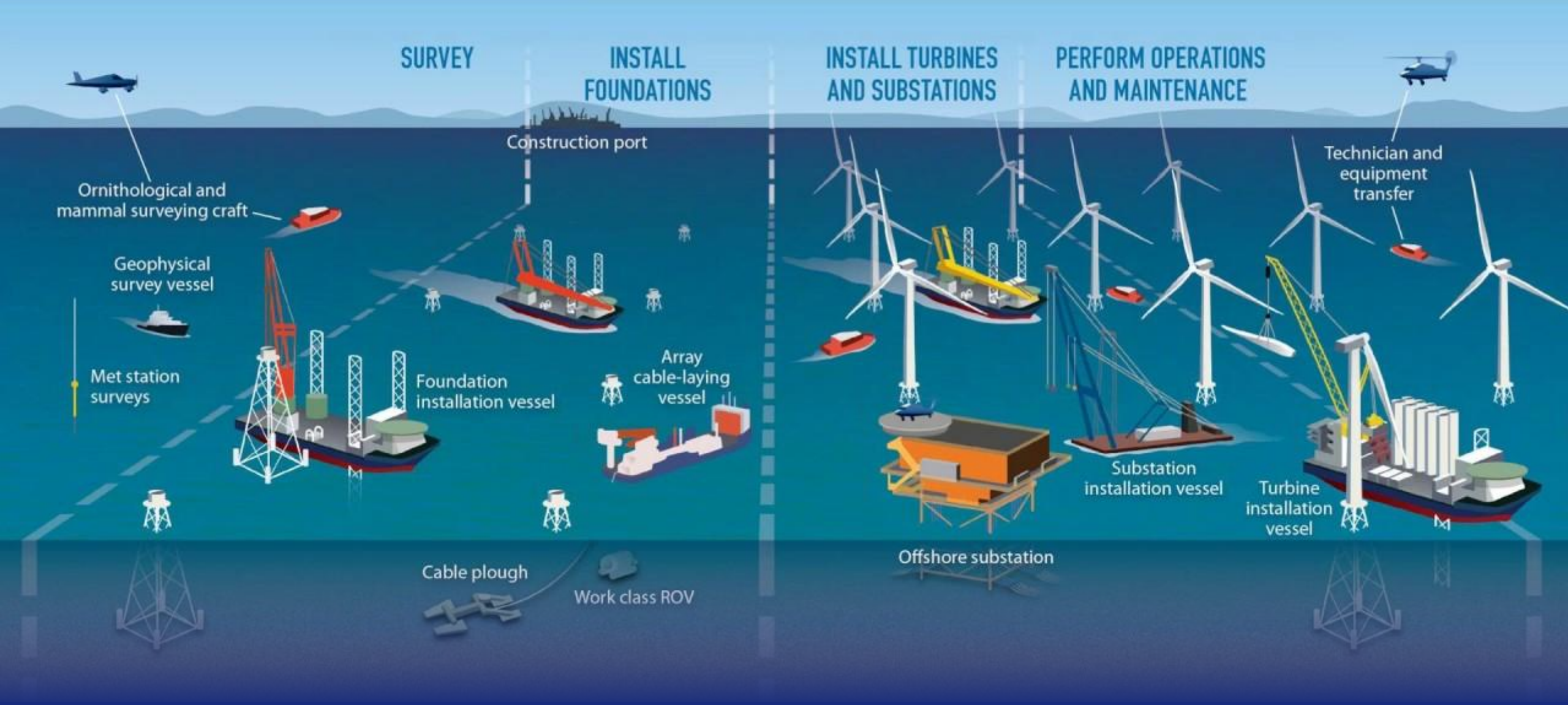
ITHACA

WATERFRONT

MA Fisheries Working Group

June 21, 2023

Marine Stakeholder Engagement App



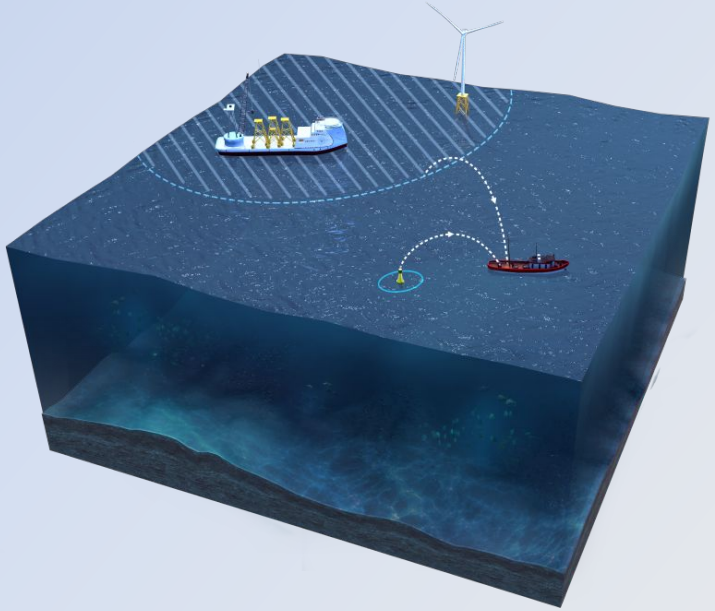
Target Market:
Offshore wind industry stakeholders

Marine Stakeholders

Offshore Wind

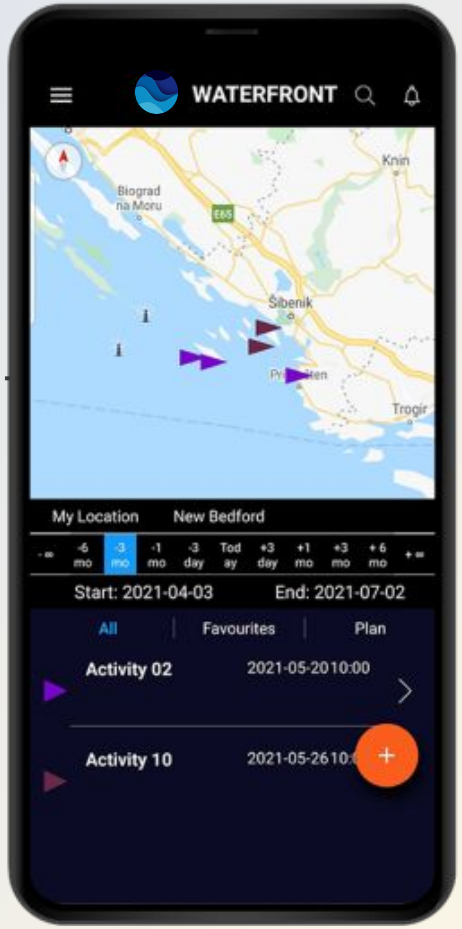
WATERFRONT is the ‘gold standard’ Marine Stakeholder Engagement App

First Mover Advantage

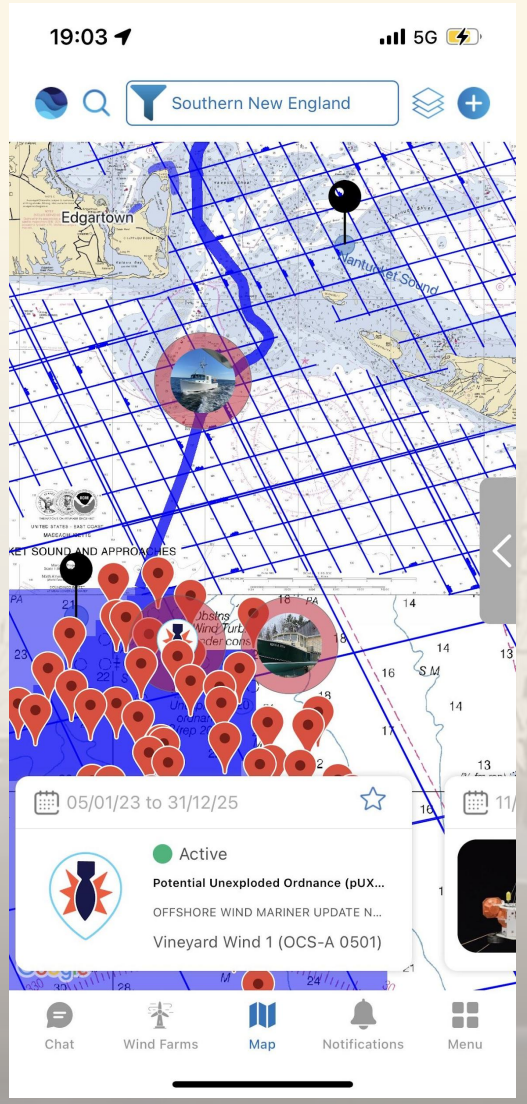


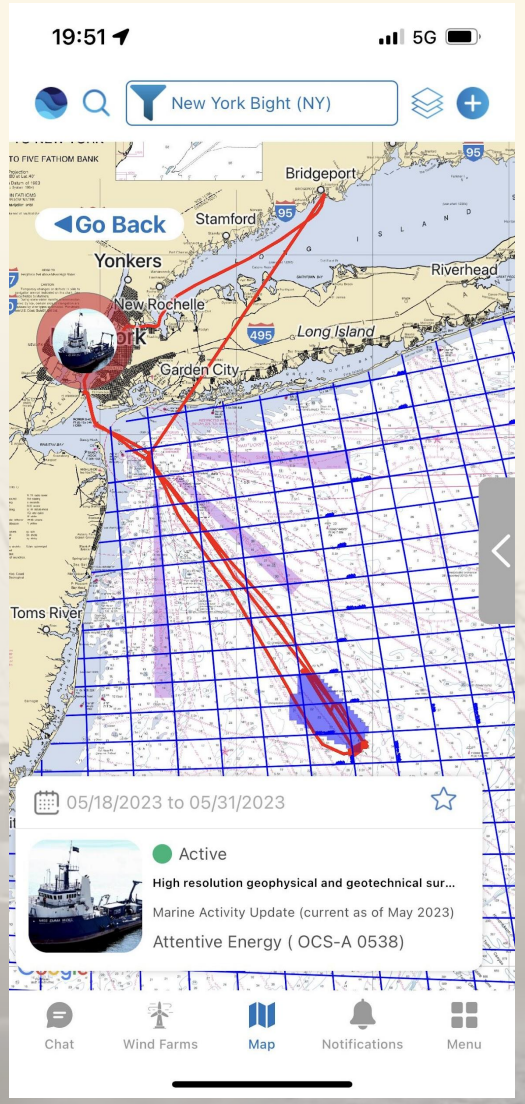
WATERFRONT

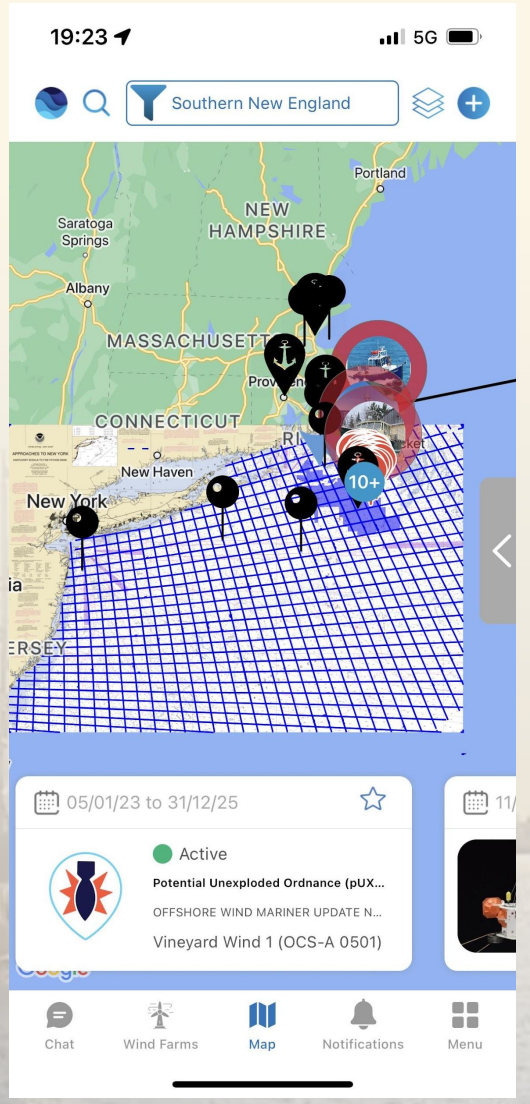
B2B SaaS MODEL

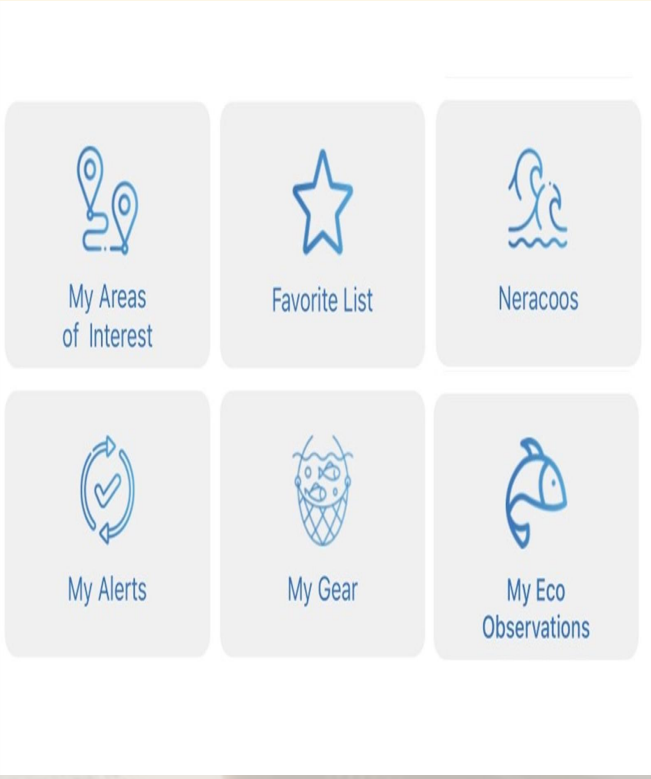


WATERFRONT Functionalities









MILESTONE UPDATES

Current clients: Avangrid (Commonwealth & Park City) | Vineyard Wind 1 | BOEM

Pipeline of 7x new offshore wind contracts (4 of which are immanent)

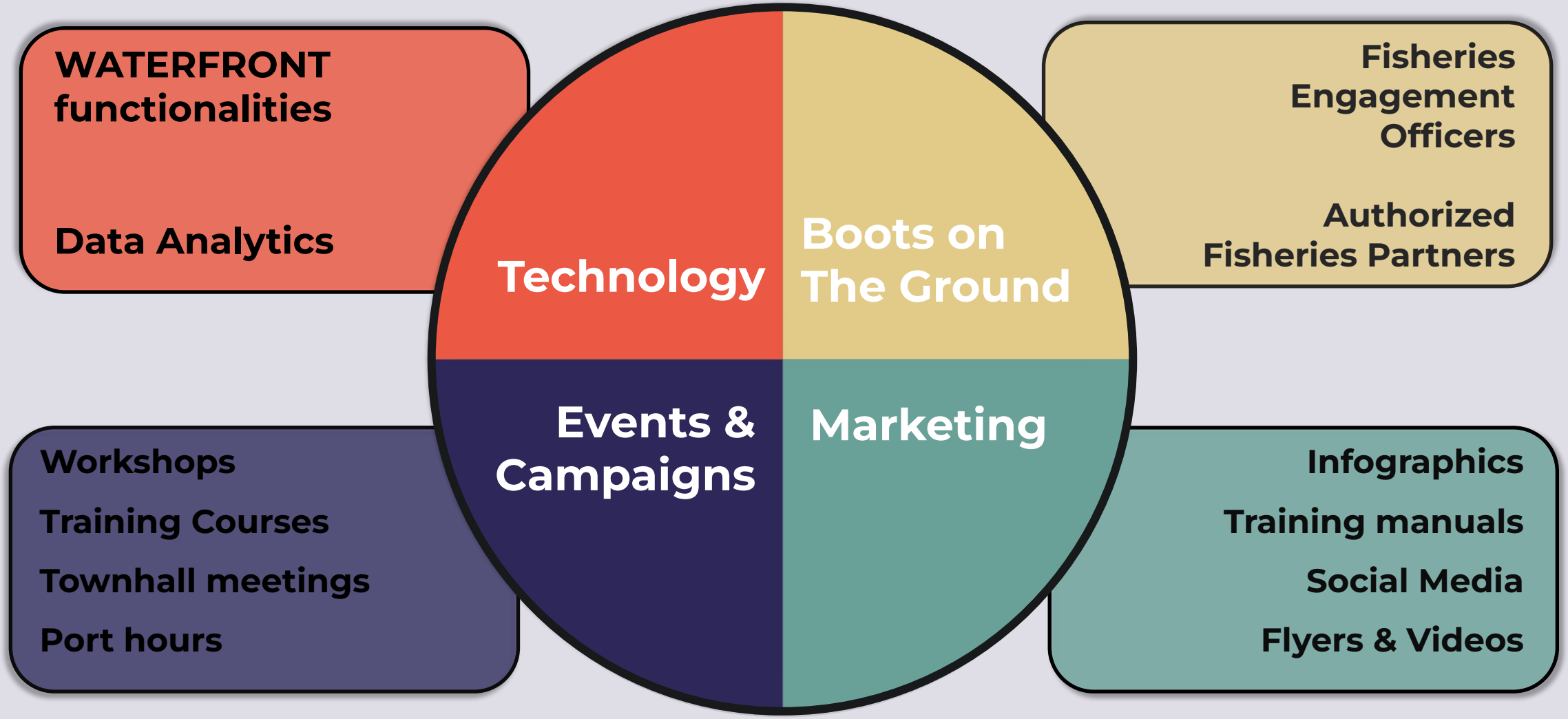
Public Launch of App on 06/16/23 after successful Beta Test

Successfully conducted privacy and security vulnerability testing on app

Won an EU and Google funded grant to open an office in Poland – company incorporated

Won MassCEC Innovate grant 2022-2023 (£250K to continue developing WATERFRONT)

Onboarding Users



Our Team

Mark Abdalla, CFA
Chief Financial Officer
Co-Founder

Khalid Kamhawi, PhD
Chief Executive Officer
Co-Founder

Tracie Wagman
Chief Marketing Officer

Michael Abdelmessih, MS
Operations Manager

Bailey Schmidt
Fishing Engagement Officer

Gayle McNulty
Fishing Engagement Officer

Jordan Tavares
Marketing

MASSACHUSETTS CLEAN ENERGY CENTER

NSF CORPS NSF Innovation Corps

BlueSwell

LaunchNY

ITHACA

IEA International Energy Agency

BUSINESS NETWORK FOR OFFSHORE WIND IPF 23

CLEAN TECH OPEN A LACI PROGRAM

10+ Years Offshore Wind Expertise

Lack of Marine Data Utilization

Obstacles to Permits

h

Low Vessel Utilization During Installation

Inspection & Maintenance Delays

Every 2 Months of downtime

$50 Million in lost electricity generation

280,000 tons of CO2 emissions

Benefitting Fisheries

Pre-emptive conflict mitigation [Gear Pinning]

OWF asset & marine activity straight to stakeholder fingertips

Connect with all stakeholders via a single platform

Hotspot GPS alerts To support safer navigation

Benefitting Wind Developers

Meeting Regulatory Requirements

Securing Leases

Data-Driven Claims Workflows

Data analytics for insight and decision making

Offshore Wind Developers on WATERFRONT

Early Stages of Discussion

Final Stages of Discussion

Signed or Agreed