Biodiversity Conservation Goals for Massachusetts

Massachusetts Habitat Working Group on Offshore Wind

November 4, 2025 | Presented by MA DFG Assistant Commissioner Jennifer Ryan

Executive Order No. 618:

A WHOLE-OF GOVERNMENT APPROACH TO BIODIVERSITY CONSERVATION

In September 2023, Governor Healey **made history** directing the Massachusetts Department of Fish & Game to review all existing efforts to conserve nature + recommend biodiversity conservation goals for 2030, 2040, and 2050.

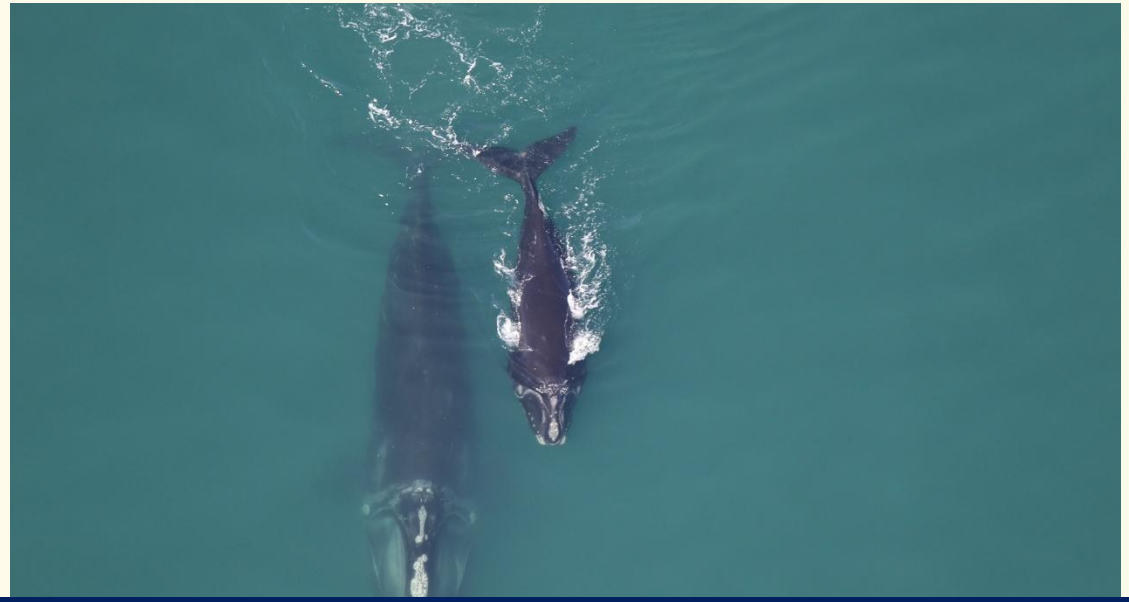
A GLOBAL MOVEMENT, AT A MASSACHUSETTS SCALE

BIODIVERSITY IS A KEY CLIMATE SOLUTION

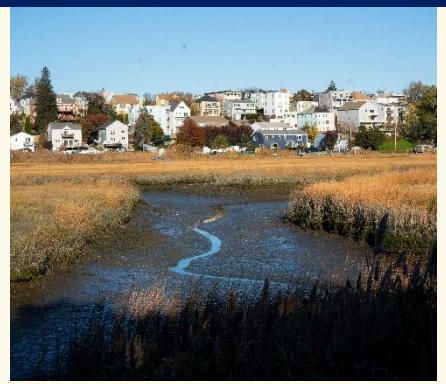

MASSACHUSETTS
BIODIVERSITY

BIODIVERSITY IN MASSACHUSETTS

Massachusetts is home to an **extraordinary variety and abundance of life.** This is biodiversity—all the species, habitats, and complex interactions that have inherent, intrinsic value, anchor our history + culture, and sustain our health, food security, + economy.



BIODIVERSITY IS ALL AROUND US!



BIODIVERSITY SUSTAINS US:

HEALTHY COMMUNITIES

FOR EVERY $1 SPENT ON WATER RESOURCE PROTECTION:

$27 ARE SAVED

ON WATER TREATMENT.

CLIMATE RESILIENCE & CARBON SEQUESTRATION

COASTAL WETLANDS SAVED COMMUNITIES

$625 MILLION

IN DAMAGES DURING HURRICANE SANDY IN 2012.

SALT MARSHES CAN STORE

OVER 10x

THE CARBON OF FORESTS ON A PER-ACRE BASIS.

OUTDOOR RECREATION & TOURISM

Massachusetts has the fastest-growing outdoor recreation economy in the nation.

IN 2023 ALONE, OUTDOOR RECREATION GENERATED

$13.2 BILLION

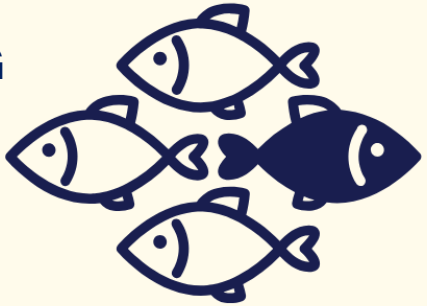
AND CREATED 103,000 JOBS.

SUSTAINABLE FISHERIES

MASSACHUSETTS' NATION-LEADING BLUE ECONOMY GENERATED

$8.3 BILLION

AND CREATED 87,000 JOBS IN 2021.



$687 MILLION:

EX-VESSEL VALUE OF SEAFOOD LANDED IN 2023.

THREATS TO BIODIVERSITY

POLLUTION OF LANDS, WATERS & OCEAN

Ecosystems are significantly degraded—legacy + present-day pollution threatens ecosystem + human health.

INVASIVE SPECIES

Fast-growing, non-native terrestrial, aquatic, and marine invasive species outcompete native species + **overtake the ecosystem**.

HABITAT LOSS

We are losing critical natural spaces at an alarming rate— poorly planned development + our changing climate threatens essential remaining habitats.

HABITAT FRAGMENTATION

Poorly placed infrastructure—defunct dams, undersized culverts, excessive pavement—**fragments habitats,** blocking wildlife migration + harming our state's ability to withstand climate impacts.

ENVIRONMENTAL JUSTICE

Stark disparities exist in access to nature and its many benefits, guiding investments and action to address this is key.

CLIMATE CRISIS

Climate change is amplifying threats— without action to reach net-zero, we will see unprecedented shifts + loss of biodiversity, threatening our public health, safety, food security, and economy.

BIODIVERSITY GOALS FOR MASSACHUSETTS

1

PROTECT

MOST IMPORTANT HABITATS FOR SPECIES & CLIMATE RESILIENCE

2

RESTORE

MOST IMPORTANT HABITATS FOR SPECIES & CLIMATE RESILIENCE

3

SUSTAIN

HUMAN HEALTH, FOOD SECURITY, ECONOMY

4

CONNECT

EVERYONE WITH NATURE

A NATURE-POSITIVE FUTURE – WHERE ALL LIFE CAN THRIVE.

BIODIVERSITY CONSERVATION AT ALL SCALES

PROTECT—Permanently secure from future harm; development, pollution, climate impacts.

Land conservation, regulatory protections, pollution control, active management.

RESTORE—Transform degraded habitats into healthy, resilient ones.

Invasive species removal, dam removal + culvert upgrades, salt marsh and eelgrass restoration, continued management.

GLOBALLY RARE "BIODIVERSITY HOTSPOTS"

REGIONAL—LANDSCAPE & WATERSHED-SCALE

KEY HABITATS FOR RARE & IMPERILED SPECIES

LOCALLY-IMPORTANT BIODIVERSITY AREAS

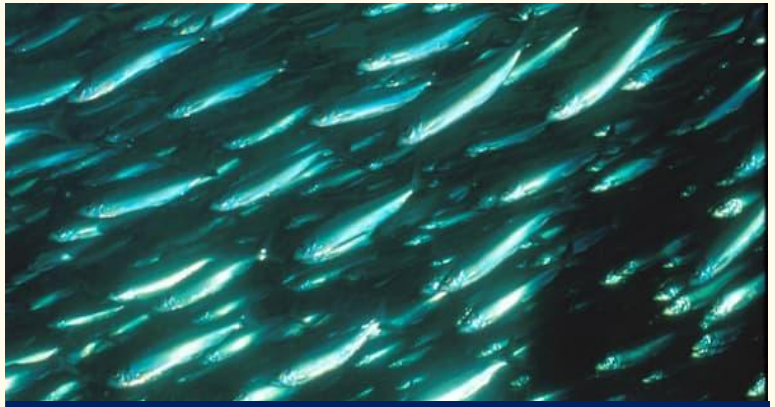
GOAL #1: PROTECT

CONVENE MARINE BIODIVERSITY TASK FORCE

COMPREHENSIVELY MAP MARINE HABITATS

DRAMATICALLY REDUCE POLLUTION, PLASTICS

GOAL #2: RESTORE



RESTORE FISH PASSAGE IN ALL COASTAL WATERSHEDS

RESTORE MOST IMPORTANT HABITATS: EELGRASS, KELP, SHELLFISH, COMPLEX HARD BOTTOM

EXPAND ARTIFICIAL REEF & OYSTER RESTORATION

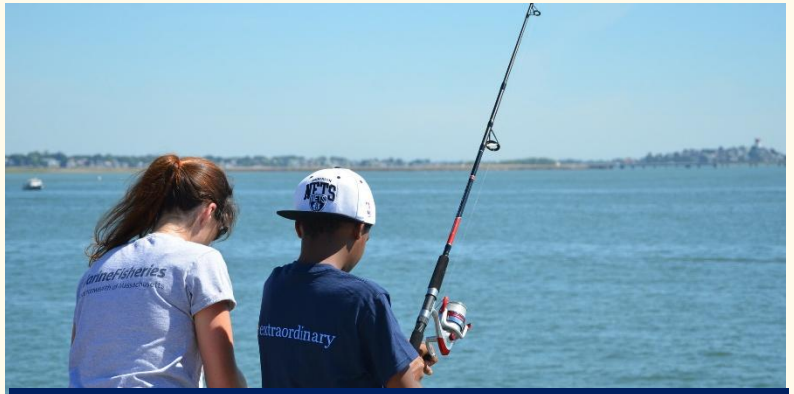
GOAL #3: SUSTAIN

ENSURE NO NET LOSS OF SHELLFISH

INVEST IN WORKING WATERFRONTS & SEAFOOD MARKETING

SHARE THE CATCH PROGRAM FOR SEAFOOD

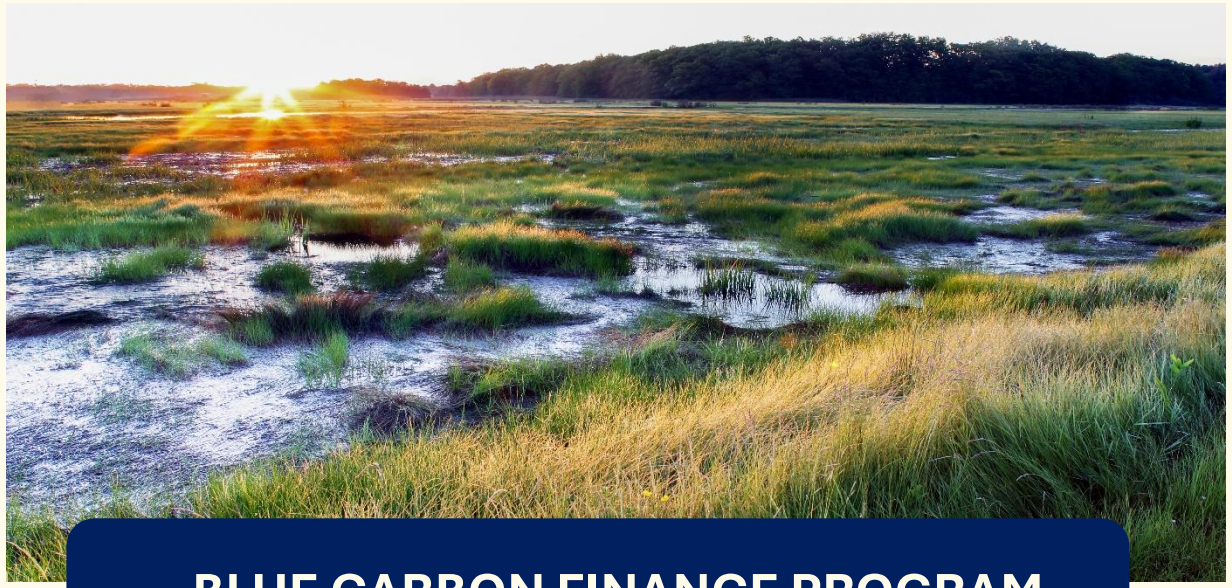
GOAL #4: CONNECT



NATURE IN THE NEIGHBORHOODS

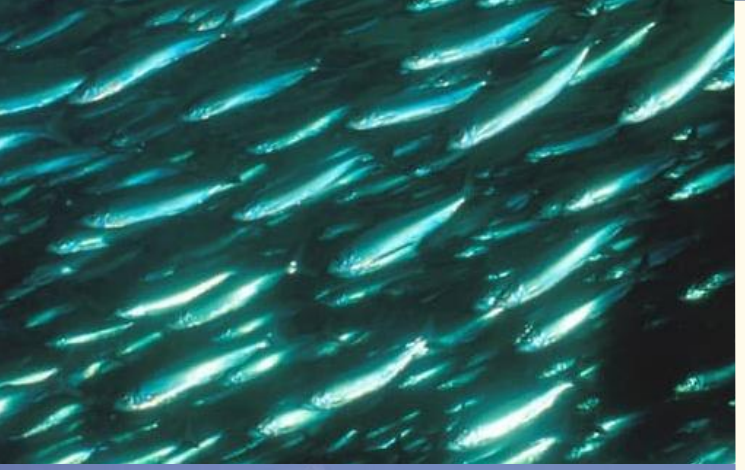
NATURE IN THE SCHOOLS

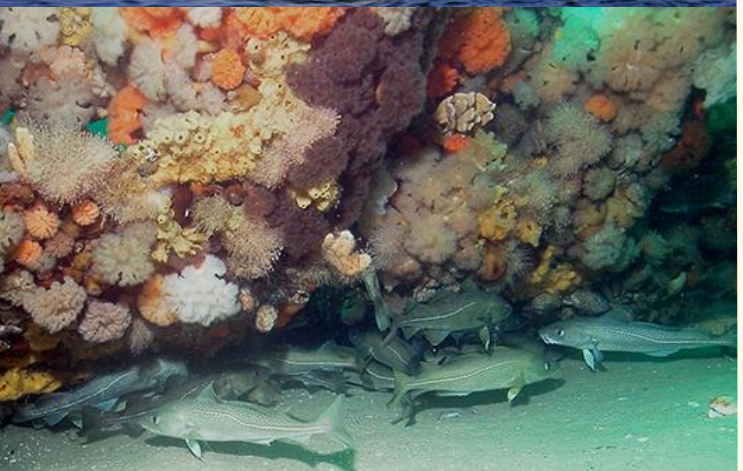
NATURE AT WORK



BLUE CARBON FINANCE PROGRAM

CLEANUP OF GHOST FISHING GEAR

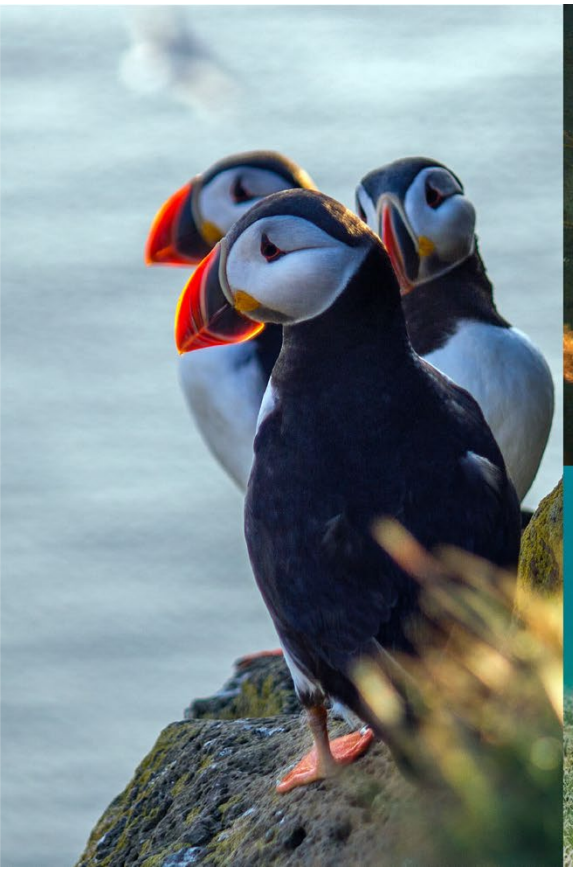




STAY IN TOUCH!

Visit our website to learn more and sign up for the latest news, updates, and announcements!

mass.gov/biodiversity




RWSC Update

Massachusetts Habitat Working Group
November 4, 2025

Emily Shumchenia, PhD
RWSC Director

Fisheries & Benthic Monitoring TechSurge

Key themes

- Newer technologies offer the potential to collect data more efficiently but surveys using legacy methods should continue (at perhaps lower levels of effort) to ensure integrity of long-term time series and points of comparison with new approaches.
- RWSC Subcommittees can provide the forum for coordination around the use and standardization of new tools/methods.
- Many technology development projects need help placing their individual project in the context of other data collection/research and current conditions (e.g., regional oceanography). RWSC Subcommittees can provide this.

RWSC
Regional Wildlife Science Collaborative

MTS marine technology society · Sea Grant Rhode Island · The University of Rhode Island Graduate School of Oceanography Coastal Resources Center · ROSA Responsible Offshore Science Alliance · NROC Northeast Regional Ocean Council · oeci · Baird Symposium

RWSC's coordination of research funding

- Convening Subcommittees and public webinars as forums for researchers to present progress (e.g., Sept 22 webinar)
- Developing "Recommended practices for research funding coordination"(for funders) including suggested language for contract statements of work and budgets that provide for interface with RWSC
- Coordinating information requests to developers, e.g., oceanography modelers seeking locations of installed foundations, turbine specifications

Stage	Entity
Projects selected & Announced	Massachusetts Clean Energy Center (MassCEC)
	NOAA Research Set Aside Program (NOAA RSA)*
	Responsible Offshore Science Alliance (ROSA)
	Maine OSW Research Consortium (ME OSW RC) - 1st Round
	National Fish & Wildlife Foundation Vessel Strike Risk Reduction (NFWF)*
	National OSW Research & Development Consortium (NOWRDC)
	Marine Mammal Commission technology grants*
	Maine OSW Research Consortium (ME OSW RC) - 2nd Round
Selection/ announcement underway	Northeast Sea Grant Consortium (NE SGC)
	New Jersey Research & Monitoring Initiative (NJ RMI)
	Regional Wildlife Science Collaborative (RWSC)
Upcoming and Open Funding Solicitations and Proposals Under Review	Massachusetts Division of Marine Fisheries (Mass DMF) Fisheries Innovation Fund
	Maine OSW Research Consortium (ME OSW RC) - 3rd Round
	ME GEO BlueTech Innovation and Monitoring at the UMaine Demo Floating Turbine
	Annual NOAA Research Set Aside Program (RSA)*
	New York State Energy Research & Development Authority Sturgeon Request for Proposals (NYSERDA)
*RFP was not exclusively OSW-related studies	

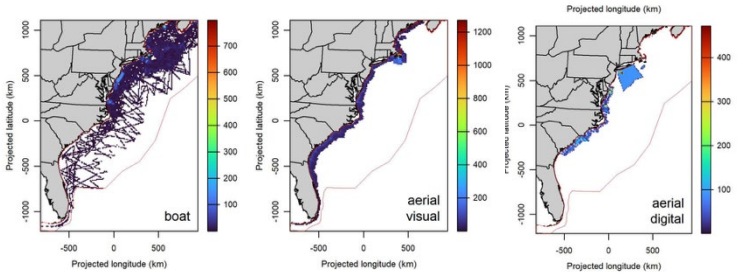
Data Governance Progress Since July 2025

Supported by funds from the Maine Governor's Energy Office, NROC, and MARCO:

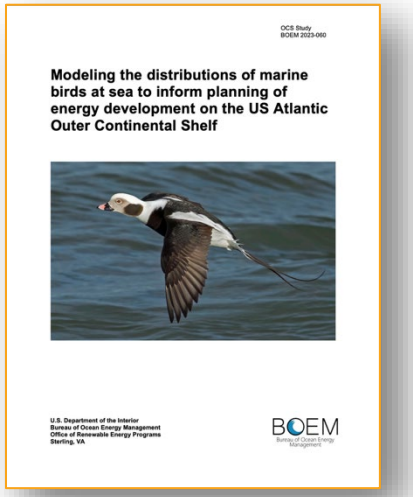
- Facilitated upgrades to OBIS-SEAMAP (marine mammal, sea turtle, seabird, fish observation data) that include DOI assignment to every former and future dataset submitted to that repository
- Facilitating redundancy and access to NW Atlantic Seabird Catalog data via OBIS-SEAMAP
- Seafloor Data Repository (https://seafloor.dataone.org) with new features including ability to mark data as sensitive and not available for download
- Next Data Governance Subcommittee meeting is Tuesday Dec 16, 2-4pm ET

1 **Data from at-sea surveys of marine birds to Northwest Atlantic Seabird Catalog from:**

- Government (fed, state)
- Nonprofits
- Universities/research institutions
- Industry and consultants



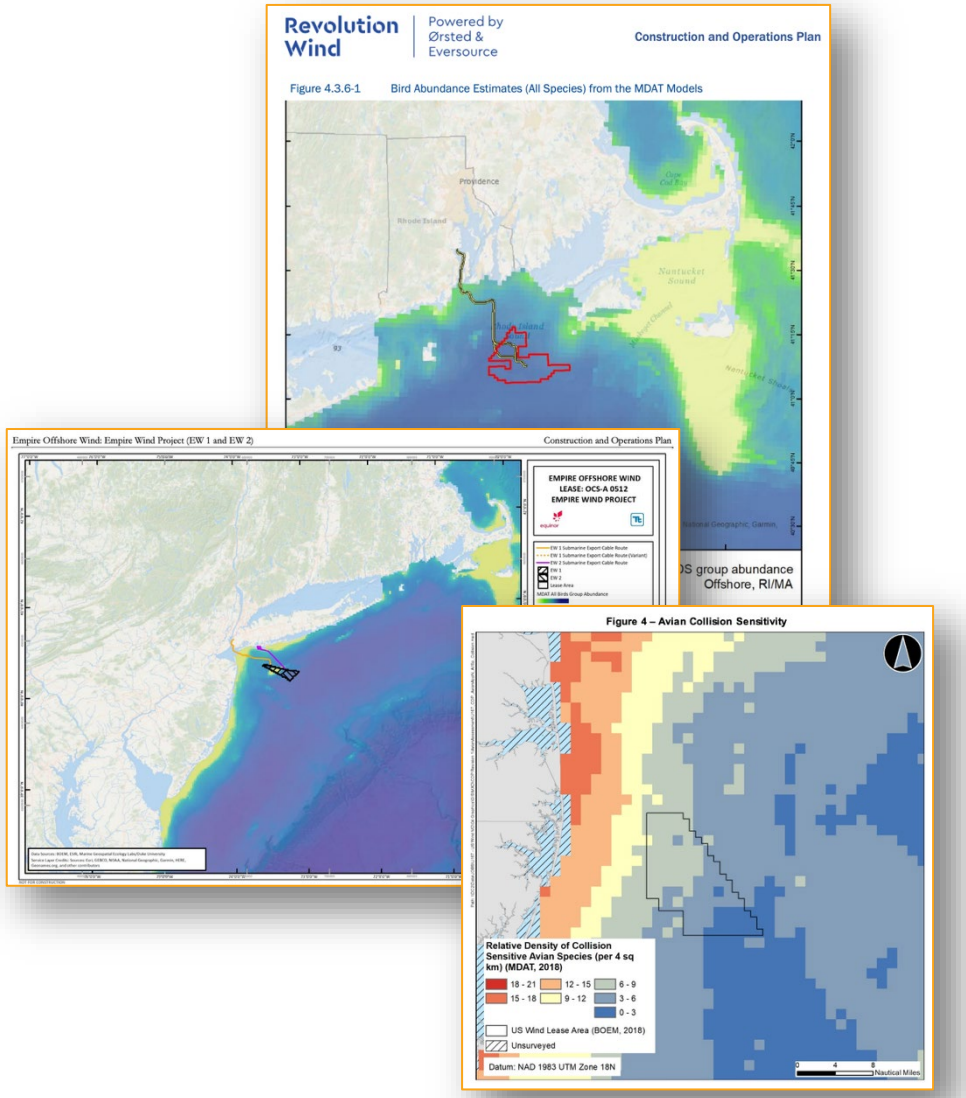
2 **Species distribution modeling** generates maps of estimated distribution for 49 species over the last 27 years



3 **Expert working groups** determine lists of species to map together to inform decisions. Map products generated by MDAT.

- All species
- Species of concern
- Ecological groups
- Spatial groups
- Stressor groups

4 **Map products used** to describe the affected environment and assessments of potential impacts for avian species; avian risk assessments in COP appendices



Continually add new data to Catalog
Maintain (fund) Catalog data infrastructure

Products used in decision-making reflect current data, research, information

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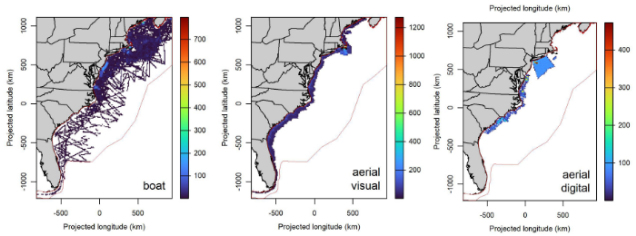

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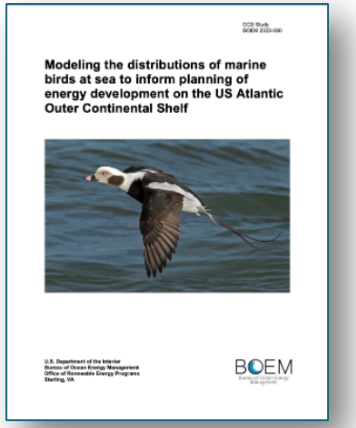

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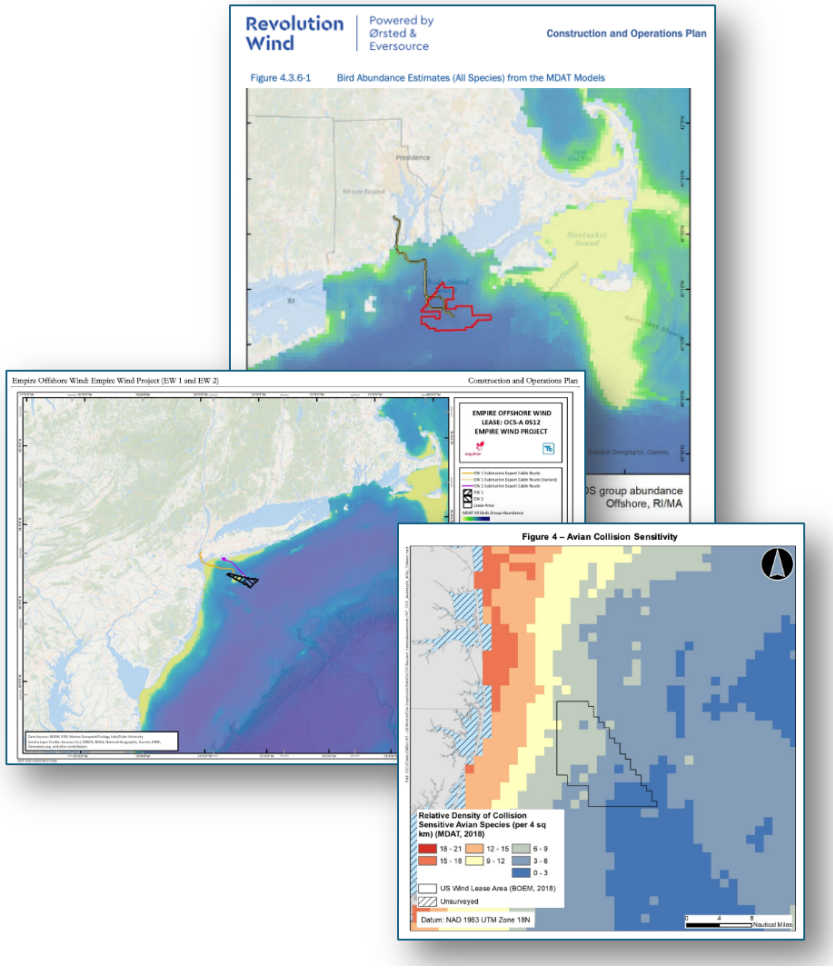

Regularly update models

NROC Fall Meeting – Nov 18-19

Register for virtual or in-person participation (at Innovate Newport, Newport RI)

Day 1 will feature a series of topics related to the identification of data and mapping priorities, improving ocean data management, and the use of data in coastal and ocean management and planning. Objectives:

- Increase participation in regional initiatives to prioritize data acquisition and to improve data management related to specific maps and products used to inform decisions.
- Emphasize the importance of improved ocean data management and increased data accessibility for ocean management and business decisions.

Research Coordination and Improving Ocean Data Management – session presenters include:

Julia Dombroski, RWSC; Marisa Guarinello, INSPIRE Environmental; Sarah DeLand & Jesse Cleary, Duke Marine Geospatial Ecology Lab; Kate Wing & Rachael Blake, Intertidal Agency

How to receive updates

RWSC
Regional Wildlife Science Collaborative

All RWSC Subcommittee meetings are open to the public: visit https://rwsc.org/events

Monthly e-newsletter: meeting invites and other news

Contact information

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Avalon Bristow, MARCO Executive Director
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Nick Napoli, NROC Executive Director, MARCO Senior Advisor
nnapoli@northeastoceancouncil.org

ThayerMahan
Sea beyond

November 04, 2025

Bubble Curtains

Presented by:
David Doyle, ThayerMahan

Agenda

1. Safety
2. Who invented bubble curtains?
3. Excellence in being prepared
4. How do bubble curtains work?
5. What frequency ranges are attenuated by bubble curtains?
6. What is the difference between single and double?
7. What factors influence the effectiveness of a bubble curtain?
8. How does ThayerMahan hear through the construction noise?

Safety – Heavy, Hard, Hot, High Pressure, Wet

Rules to Live by

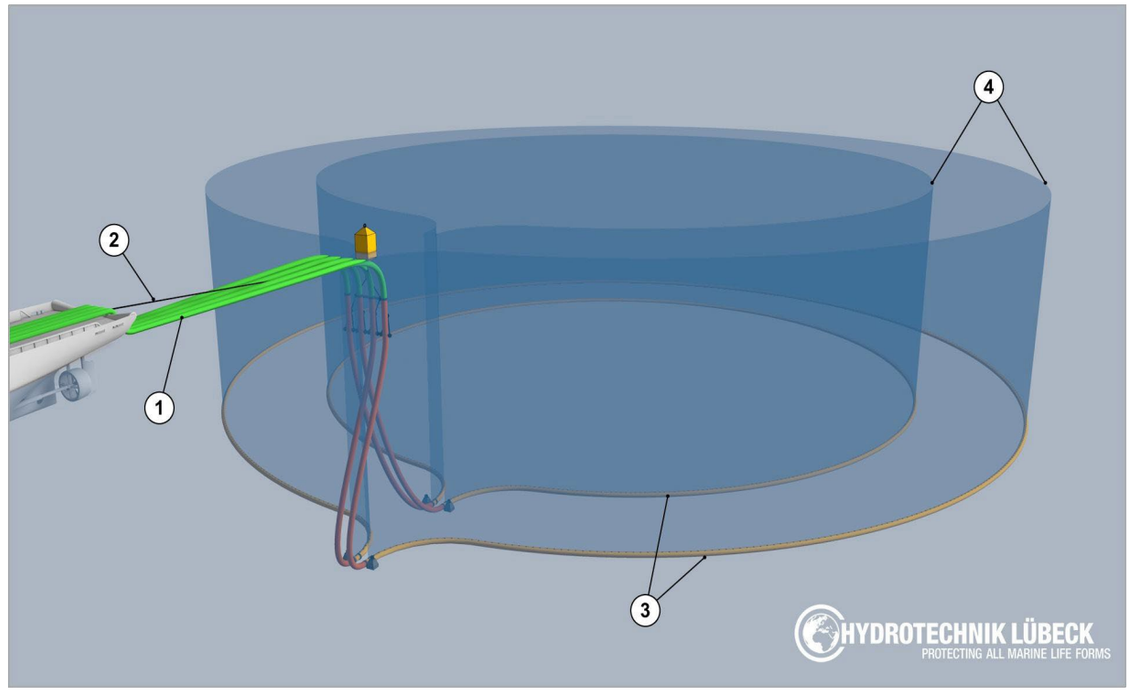
1. PPE – Proper PPE for the job, coach and accept coaching
2. Power Tools – do not alter, use as directed, LOF, Know how to use the equipment
3. Stop work authority, Questioning Attitude, Situation Awareness
4. Zero Energy Checks – Zero pressure, Zero voltage, if you can remove and work on bench
5. Rotating Equipment – Guards, Line of Fire, Danger Zones
6. LOF – Line of Fire, all team member understand where the energy is and where it can go.
7. Open Water – PFDs, Positioning restraints
8. Fall Protection – Harnesses, Tie off points
9. Suspended Loads/Rigging – Cone of safety, spotters, rope off areas.
10. Chemical – Hazardous substances and confined spaces.


Whale invented;
humans adopted to
protect all marine life.

Excellence in Preparedness

Practice till you can't get it wrong, practice again.

1. Leadership in excellence
2. Excellent engaged ThayerMahan team
3. Union Pile Drivers and Dock Builders from UBC.
4. Starts with Table Top.
5. On land walk through.
6. On Ship walk through.
7. Shortened version, practice till the crew can not get it wrong.
8. Re-enforce
    1. Every Shift walk through emergency disconnect.
    2. Every third retrieval, perform like an emergency shutdown.



Operating BBC

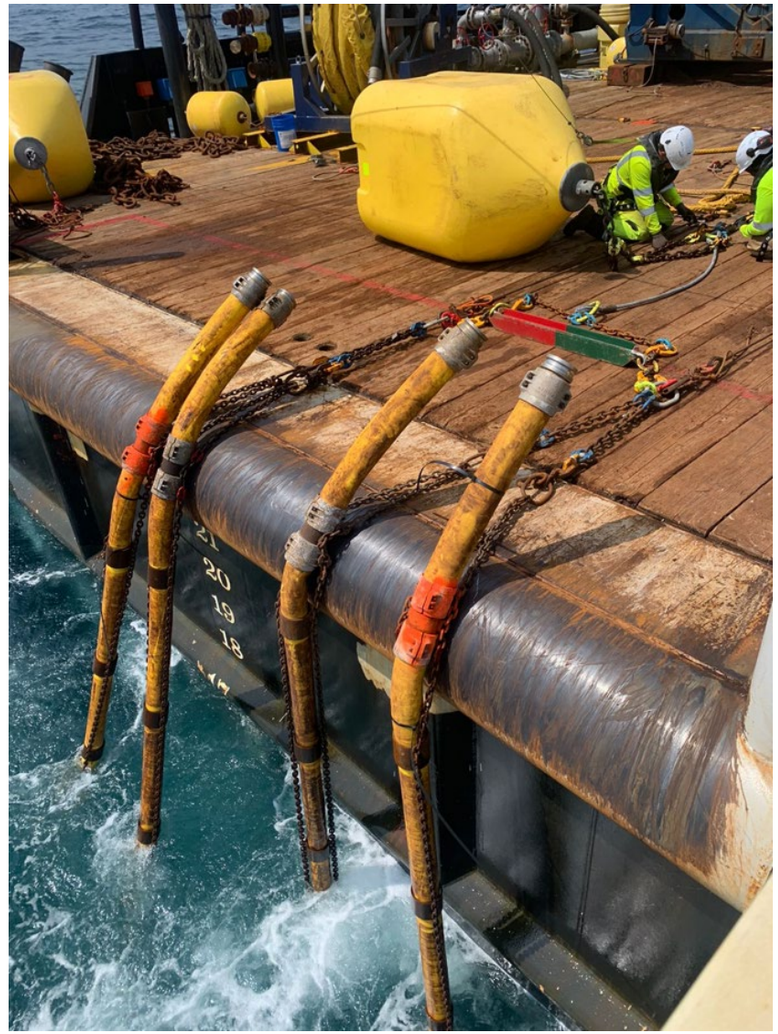
How do bubble curtains work?

Physical Barrier to Sound Transmission

A bubble curtain is created by releasing compressed air through a perforated hose placed on the seafloor. This produces a dense wall of rising bubbles that forms a barrier between the noise source (e.g., pile driving) and the surrounding water.

Air bubbles have a much lower density and sound speed than water, which causes sound waves to scatter and reflect when they encounter the bubble curtain.

This impedes the direct transmission of sound energy through the water column.



What frequency ranges are attenuated by bubble curtains?

Primary attenuation range:
100 Hz to 500 Hz
This range corresponds to the dominant frequencies generated during pile driving operations. Bubble curtains are most effective here due to the acoustic impedance mismatch between water and the bubbly medium, which causes strong reflection and scattering of sound waves.

What is IL? (Before wind industry I had no idea!)

Insertion Loss is the difference in sound pressure level (SPL) measured at a specific location (750m) with and without the noise mitigation system in place. It is typically expressed in decibels (dB)

Setups have measured insertion losses of up to 11 dB in the 100–500 Hz range when using optimized or double-layer bubble curtains.

What is the difference between single and double?

Double bubble curtains can achieve higher Insertion Loss (IL) even when the total air flow is the same as a single curtain.

The improvement is due to the creation of two distinct acoustic barriers, each maintaining effective reflective properties.

Why double bubble? With two curtains the sound wave encounters two separate impedance boundaries. Leading to multiple reflections and scattering events, reducing the energy that passes through.

Point of Reference: An **11 dB reduction** in sound pressure level corresponds to approximately a **92.06% decrease in acoustic energy.**

If your not a math major, this can blow your mind…

What factors influence the effectiveness of a bubble curtain?

For deep water offshore wind projects, the most effective underwater noise mitigation method depends on several factors:

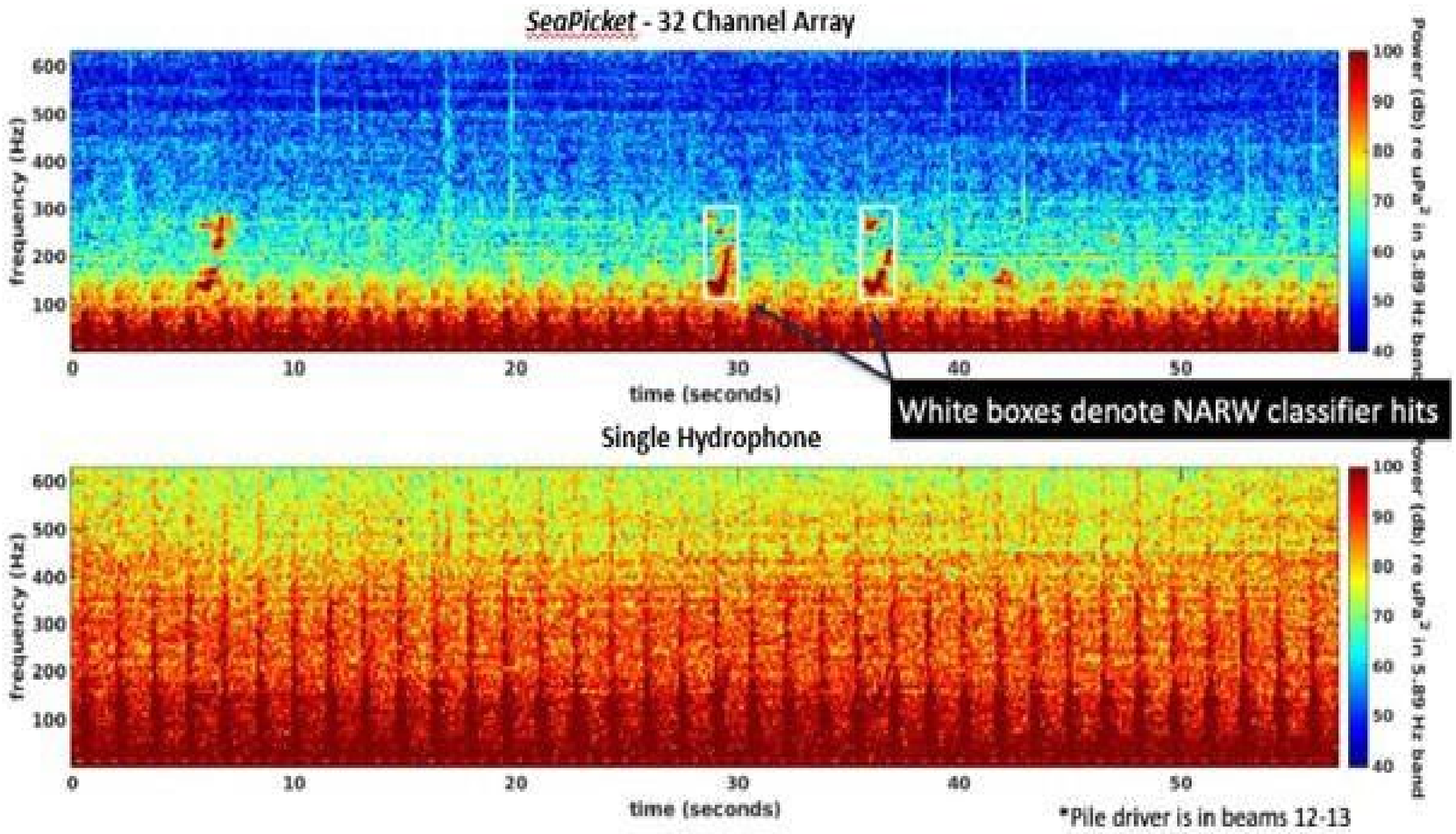
Depth - Typical Operational Depth Range
Up to ~50 meters (165 feet) is the most common depth for bubble curtain use in offshore wind projects.

Current - Strong lateral currents can tilt or bend the rising bubble column, preventing it from forming a vertical acoustic barrier. Experience has show in excess of 0.75m/sec (1.46 knots) is detrimental to effectiveness.

Bubble Dispersion
Currents can disperse bubbles horizontally, thinning the curtain and reducing bubble density.

Lower density means less acoustic impedance mismatch, which weakens the curtain's ability to reflect and scatter sound waves.

How does ThayerMahan hear through the Construction Noise?



Taken from a North Atlantic Right Whale signal injection study with pile driving data recorded on 01 August 2023

ThayerMahan leverages decades of Passive Listening experience USN Submarine Force, with technologies to listen through the noise.

ThayerMahan
Sea beyond

Questions and Comments?

We welcome your questions, insights, and collaboration as we continue advancing acoustic monitoring and mitigation technologies in offshore operations.

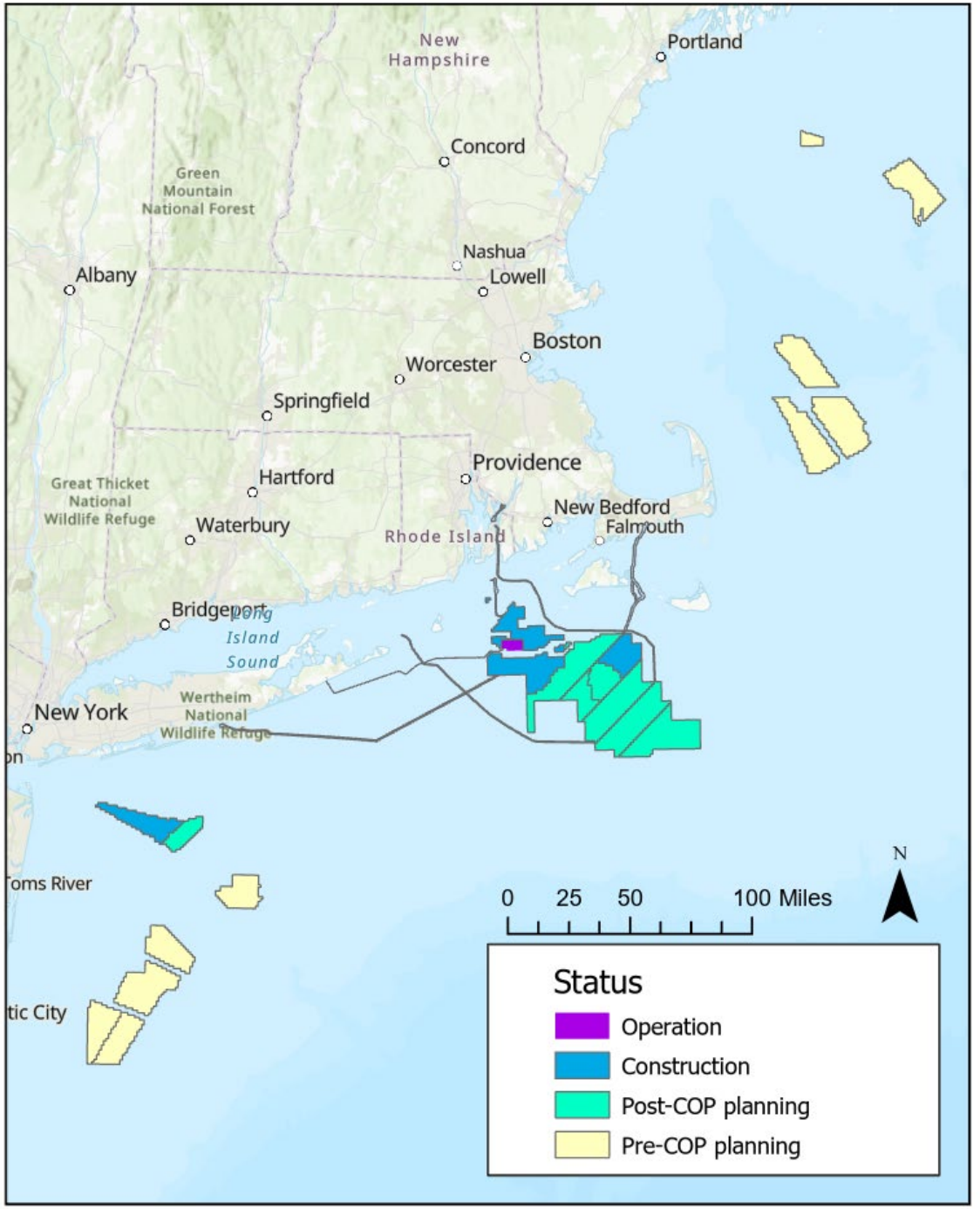
Habitat Working Group on Offshore Wind

Project Updates

November 4, 2025

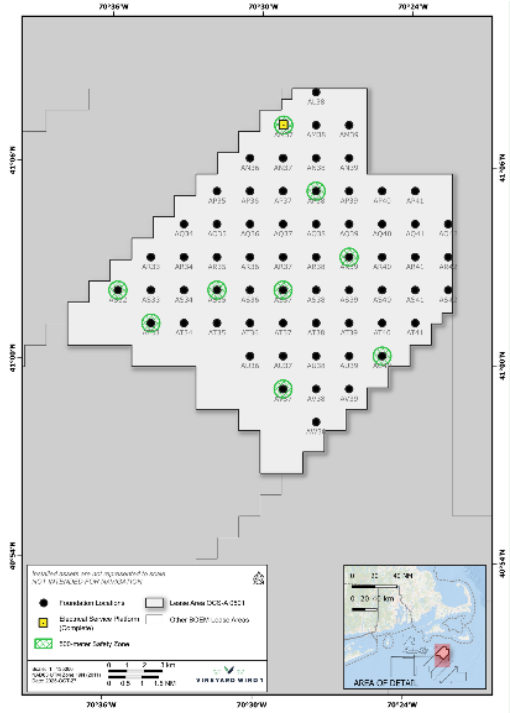
Offshore Wind Project Status

Status	Projects	Activities on the water (lease area and cable routes)
Complete and Operational	South Fork	May see occasional: - post-construction surveys - maintenance operations
Under Construction	Vineyard 1 Revolution Sunrise Empire	Likely to see one or more of: - seabed preparations (e.g., boulder relocation, PLGR, scour protection) - installation of jacket or monopile foundations, WTGs and OSSs - cable-laying and burial
Planning and Permitting (COP is published)	New England 1 & 2 SouthCoast Beacon Starboard Vineyard Northeast Vineyard Mid-Atlantic	May see occasional: - habitat/fisheries surveys - geophysical surveys - metocean buoys
Planning and permitting (pre-COP)	New York Bight (5) Gulf of Maine (5)	May see occasional: - habitat/fisheries surveys - geophysical surveys - metocean buoys

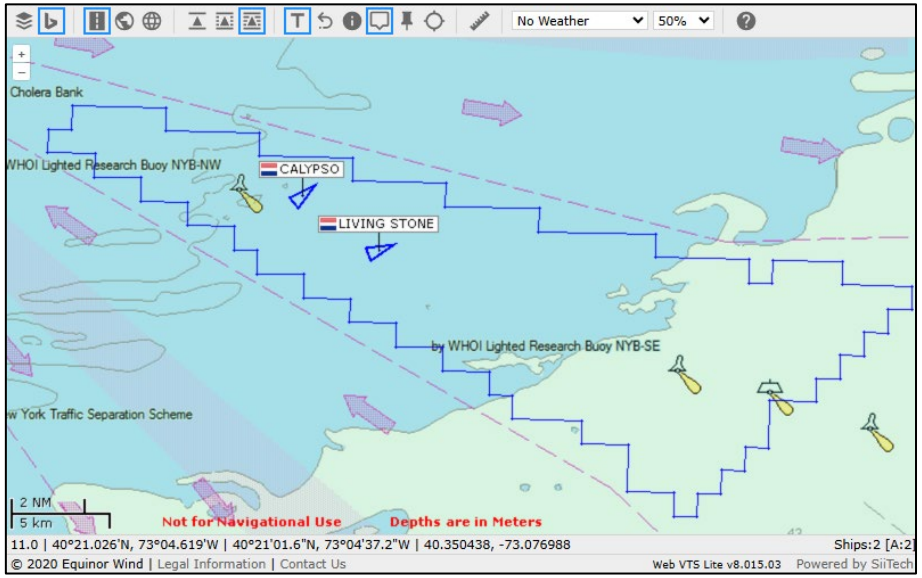


For projects currently Under Construction, activities include:

Project	Most recent update	Specific Activities on the water (lease area and cable routes)
Vineyard 1	October 27, 2025	• Installation of tower, nacelle and blades • Replacement of blades • Commissioning of WTGs
Empire	October 22, 2025	• Recently completed installation of foundations and transition pieces • Installation of subsea rock and scour protection • Export cable installation and jointing • IAC cable pre-lay surveys and trenching • Turbine installation to begin in spring 2026



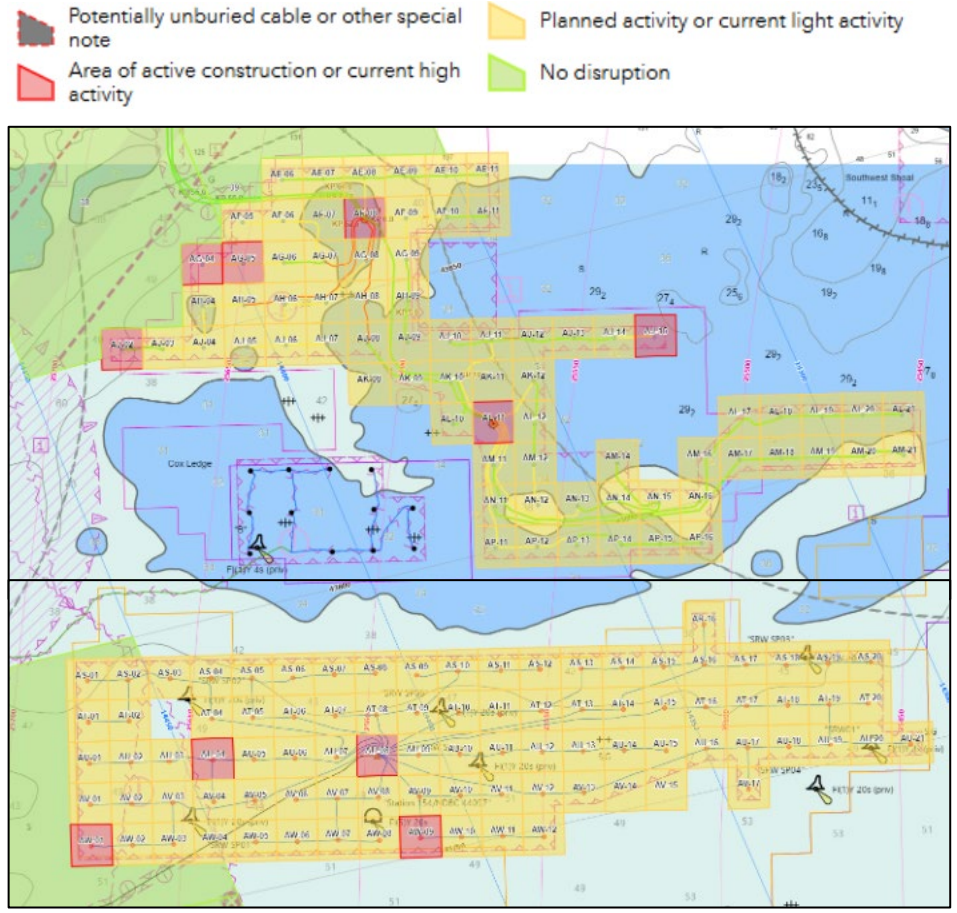
Source: https://www.vineyardwind.com/offshore-wind-mariner-updates



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

For projects currently Under Construction, activities include:

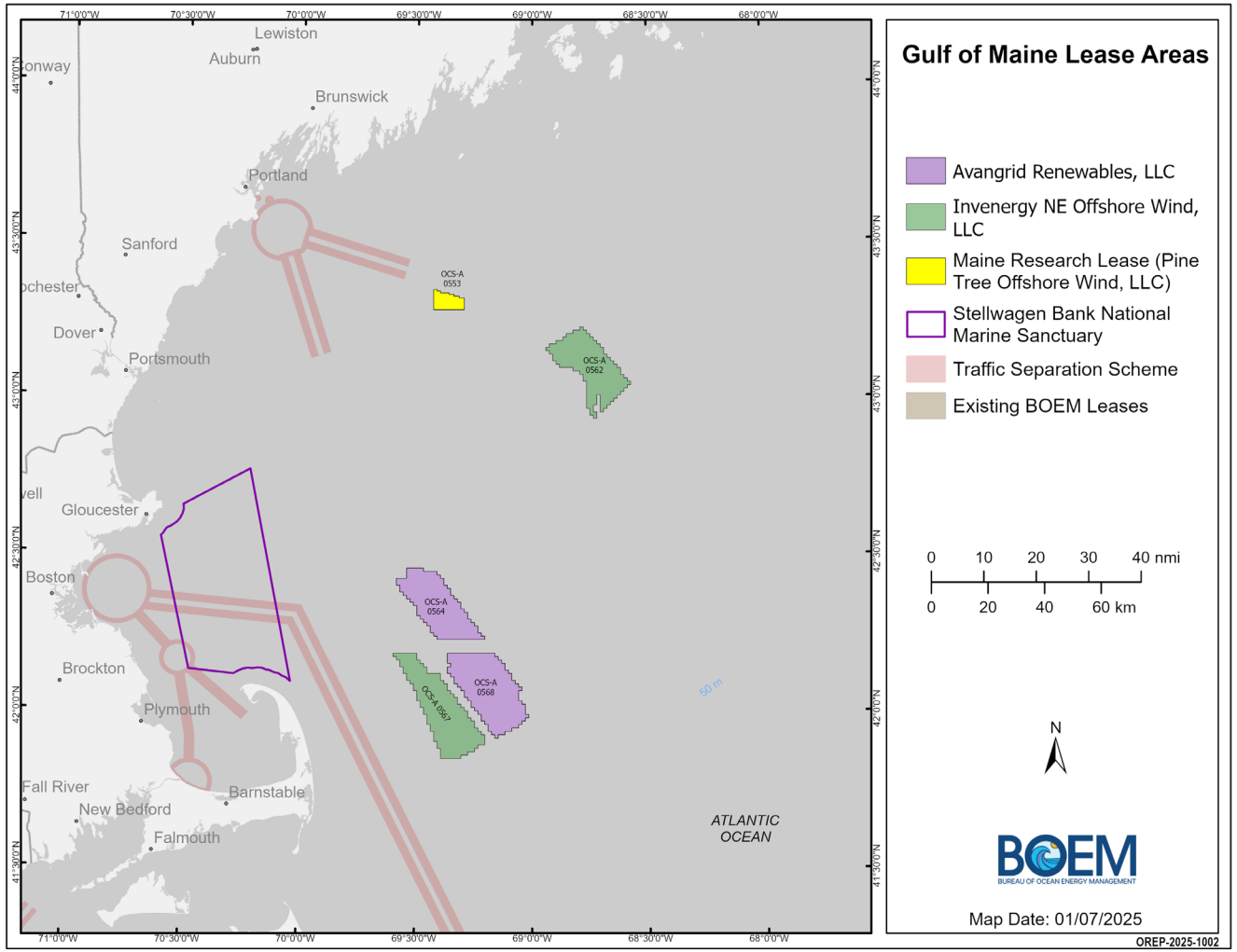
Project	Most recent update	Specific Activities on the water (lease area and cable routes)
Revolution	October 27, 2025	• BOEM issued Stop Work Order on 8/22/25 • Preliminary Injunction issued on 9/22/25 and work commenced that day • WTG installation • OSS installation and commissioning • Inter-array and interlink cable seabed preparation, trenching, installation and protection.
Sunrise	October 27, 2025	• Deployment of bubble curtains, sound monitoring buoys, protected species observers • Installation of monopile WTG foundations • Installation of WTG transition piece • Commissioning of OSS • Seabed preparation for export cable soon

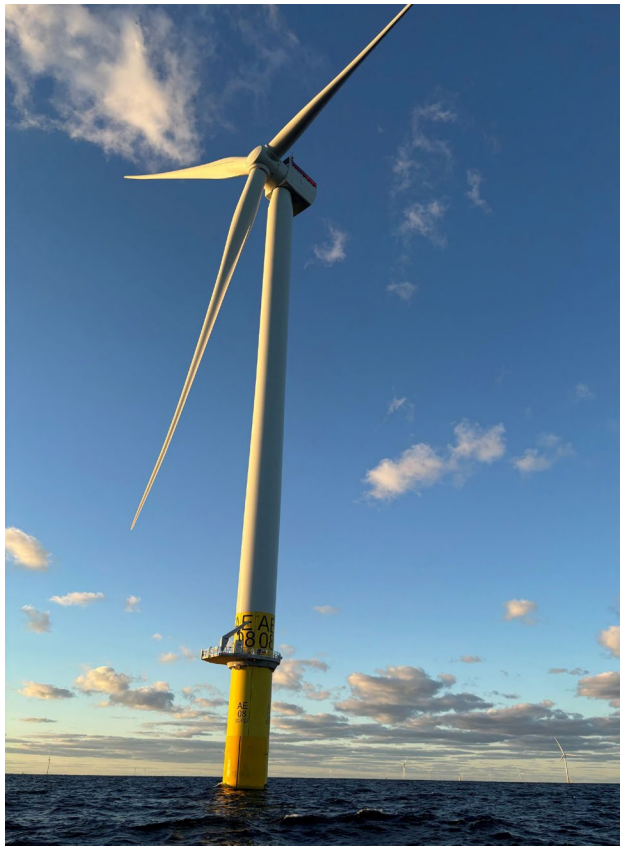


Source: https://a2f3e3.emailsp.com/frontend/nl_preview_window.aspx?idNL=1035

For GOM projects currently planning and permitting, activities include:

Project	Specific Activities
Avangrid OCS-A 0564 OCS-A 0568	<u>Communications Plans</u> • Agency • Native American Tribal • Fisheries <u>Project Websites</u> • www.ocs-a0564.com • www.ocs-a0568.com
Invenergy OCS-A 0562 OCS-A 0567	<u>Communications Plans</u> • Initial Communications Plan meetings held
Maine Research Array OCS-A 0553	Conducting survey and monitoring work






MADMF Sampling Trip to Revolution Wind

- October 10 trip out of Westport, MA with Capt. Ray Jarvis
- Gain experiences and impressions from fishing in a wind farm
- Better understand recreational fishing interactions and concerns

Takeaways from DMF Staff

- New(ish) foundations were well-populated by structure-oriented fish (BSB, scup, cunner)
- Impressive biodiversity, especially for late-season visit (6 species caught)
- No interactions with construction or safety vessels
- Spacing seemed adequate for recreational fishing
- Navigating in low-vis/at night will require vigilance, modern electronics and updated charts

Questions?