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OCS A-0512
Empire Wind

New Jersey Offshore Env. Resources Working Group

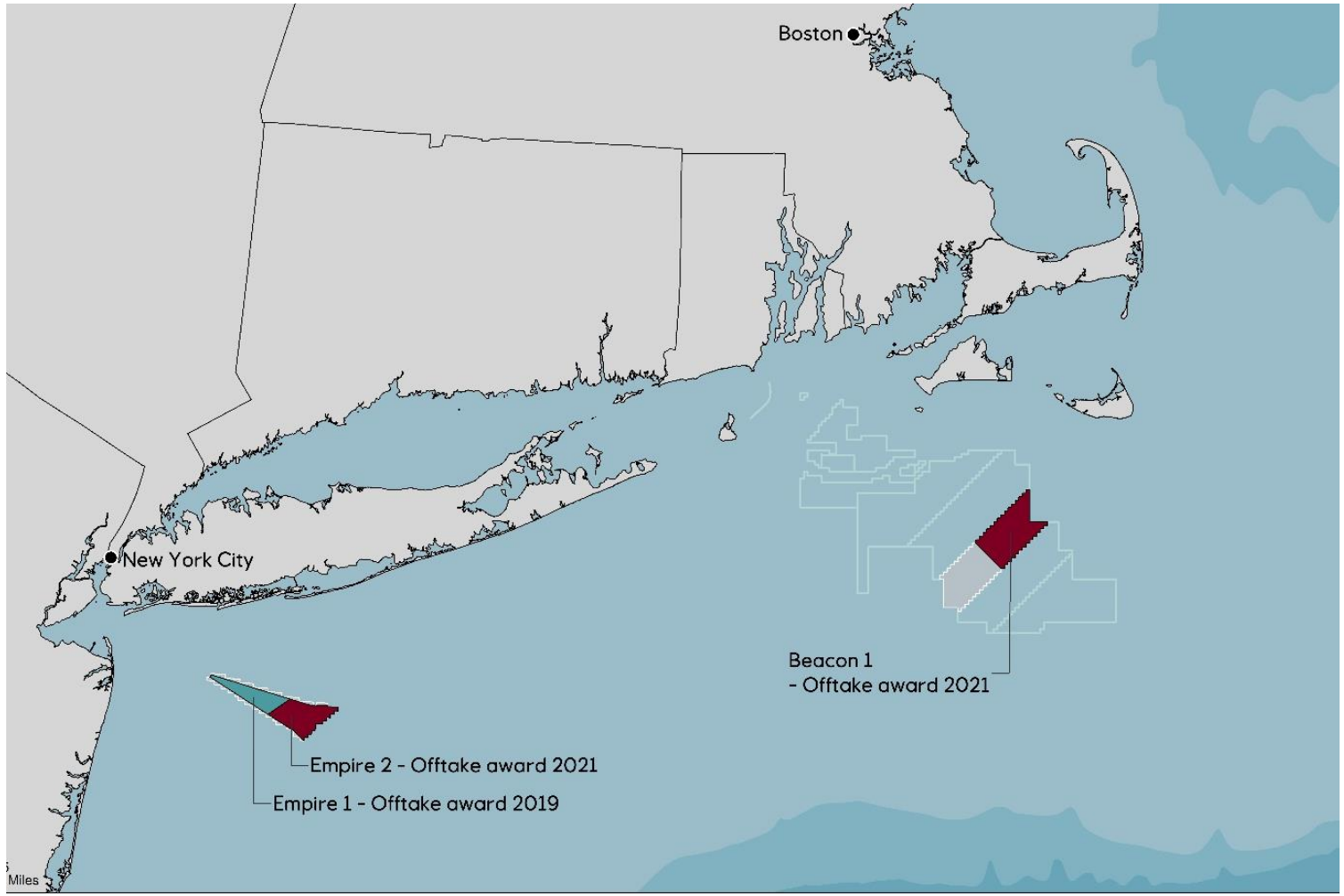
31 March 2022

Empire Wind Project Overview and Updates

Agenda

- Equinor Overview
- Empire Wind Overview
- Mitigation and Monitoring

US East Coast Lease Areas



- **>3 GW of offshore capacity total awarded**
- Empire Wind 1: 816 MW
- Empire Wind 2: 1260 MW
- Beacon Wind 1: 1230 MW
- Beacon Wind 2: Still available

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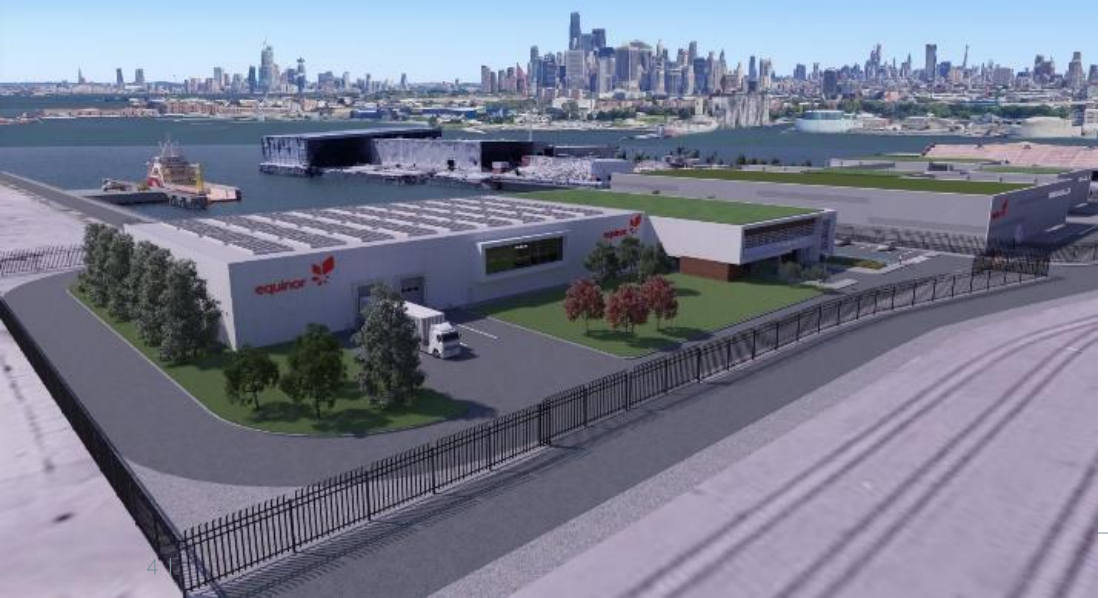

South Brooklyn Marine Terminal (SBMT)

- Staging facility, long-term O&M hub for Empire Wind 1, 2, and Beacon Wind
- Assembly for broader OSW industry in NY/NJ Bight
- One of largest dedicated OSW port facilities in U.S. (73 acres)
- Community learning center to support education and outreach for the South Brooklyn community and other visiting parties within the Tri-State Area

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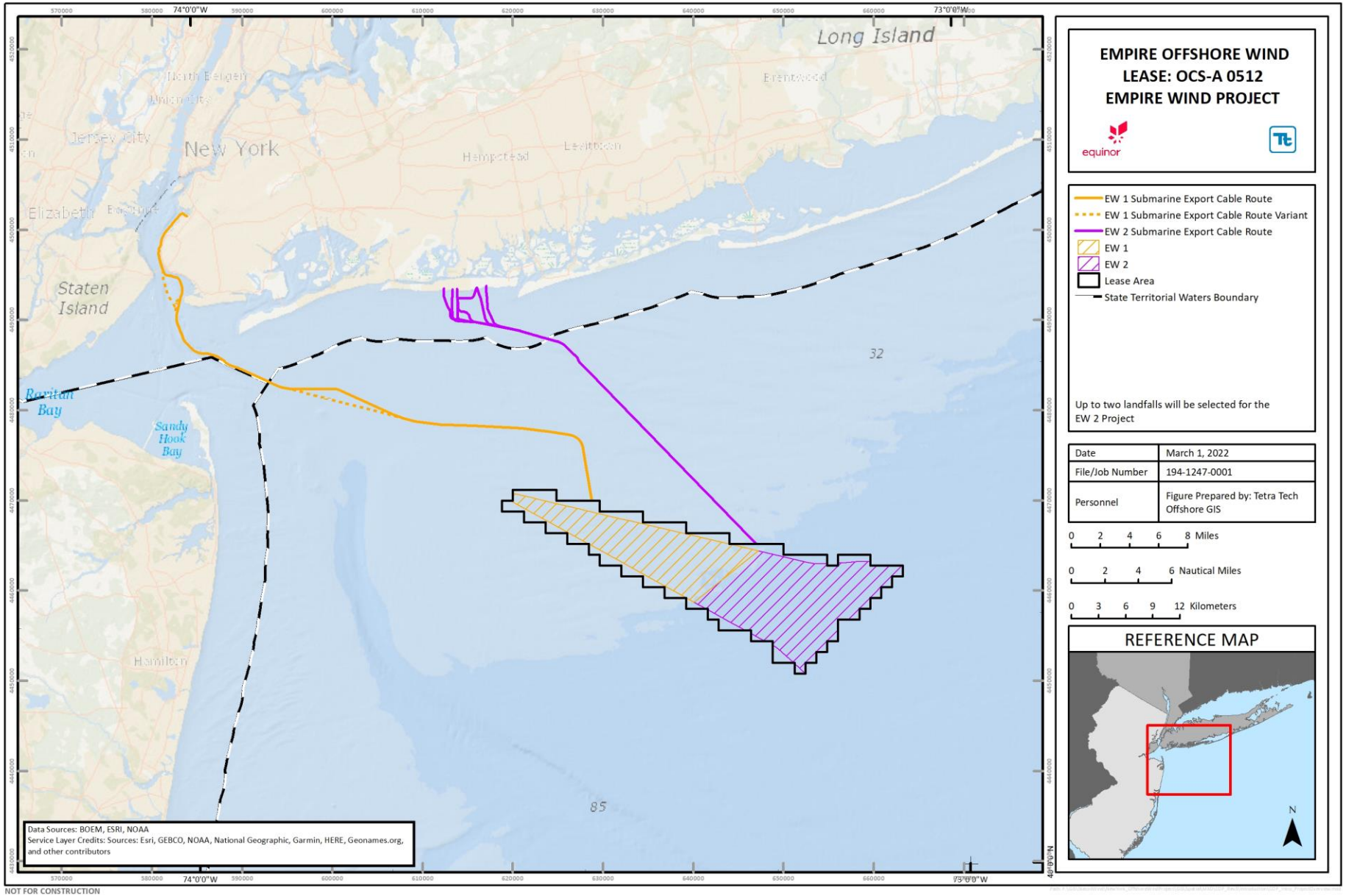
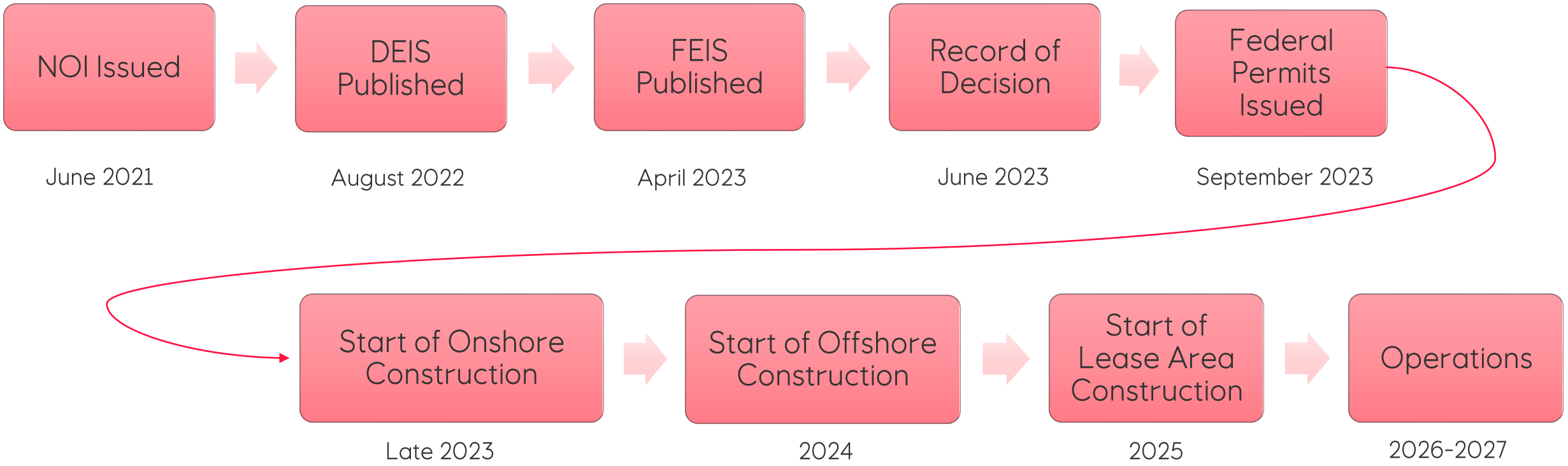
Empire Wind Project Overview



Lease Area OCS-A 0512

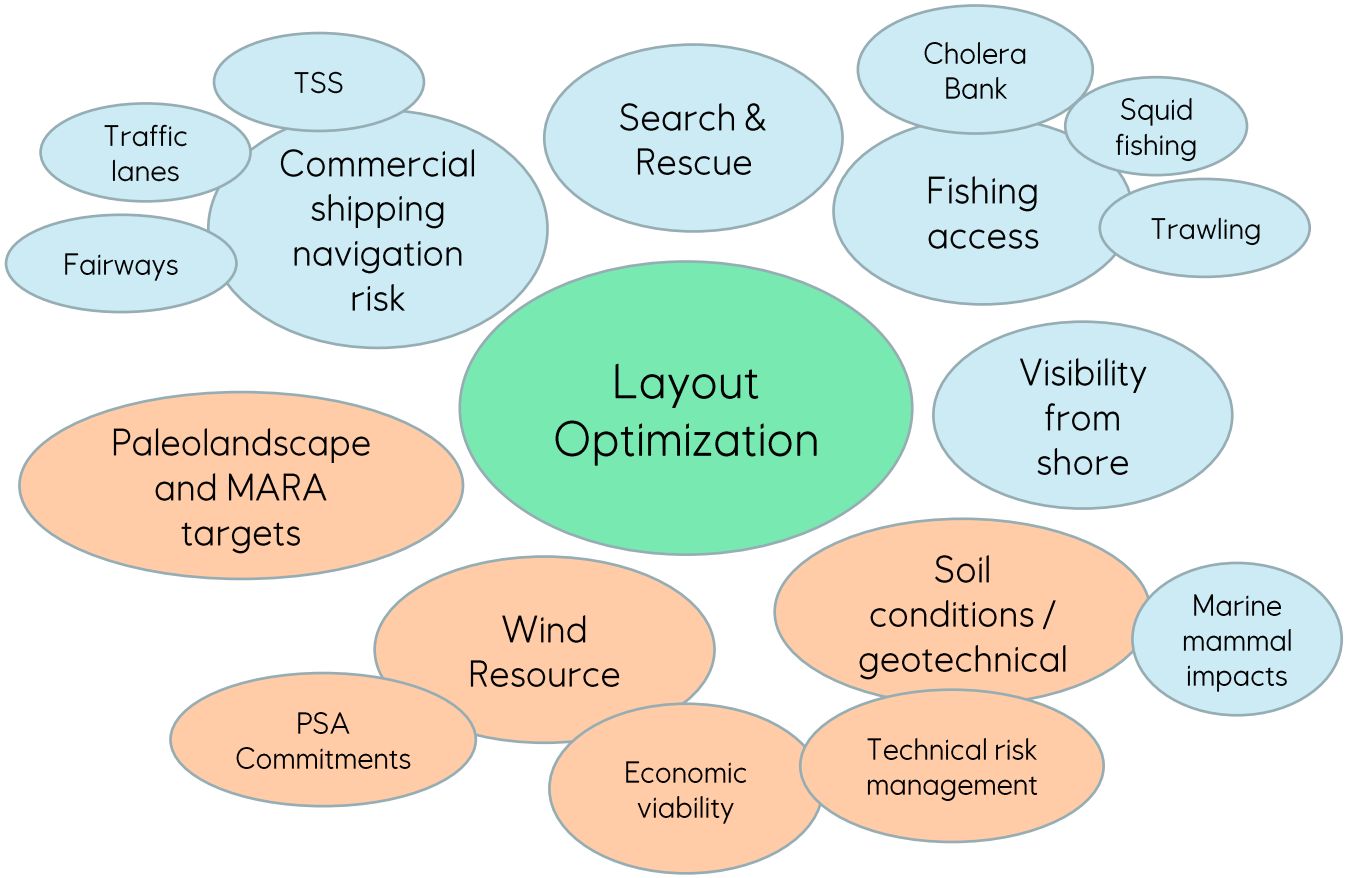
- Located ~ 14 miles from Long Beach, New York and ~19.5 miles from Long Branch, New Jersey at the closest points.
- Full build-out of the Lease Area, consisting of Empire Wind 1 (EW 1) and Empire Wind 2 (EW 2)
- EW 1
  - NY RFP Award July 2019
  - 816 MW
  - Two submarine export cables
  - Interconnection into Gowanus, NY
- EW 2
  - NY RFP Award Jan 2021
  - 1,260 MW
  - Three submarine export cables
  - Interconnection into Oceanside, NY

Project Schedule



- For information on Federal Permitting schedule reference the FAST 41 Dashboard
- NY state and local permitting running parallel to federal process

Empire Wind Development: Considerations



- Extensive stakeholder engagement has informed Empire Wind layout planning and led to the creation of the Layout Rules
- Competing existing uses necessitate a balance of external and internal requirements, with a desire for coexistence
- Safety is our number one priority
- To date, Empire Wind has performed in excess of 1,000 outreach activities.

Stakeholder considerations

Project viability

Fisheries and Maritime Affairs Contacts

Empire is committed to coexistence with the commercial and recreational fisheries and other maritime users. We aim to achieve this by proactively avoiding or minimizing impacts throughout all phases of the Project's life-cycle.

Consultations are ongoing to receive valuable feedback.

Maritime Affairs and Fisheries managers are always standing by.

EJ Marohn
Marine Affairs Manager
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Former USCG Captain
Over 27 years of service on Atlantic Coast, Pacific Coast, and Great Lakes

Elizabeth Ann Marchetti
Fisheries Manager
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Over 20 years working with the commercial and recreational communities as a fisherman and field scientist.

Steve Drew
Fisheries Liaison
sdrew@searisksolutions.com
908.339.7439

Over 40 years working with the commercial fishing and sub-sea cable industries.

Mitigation and Monitoring

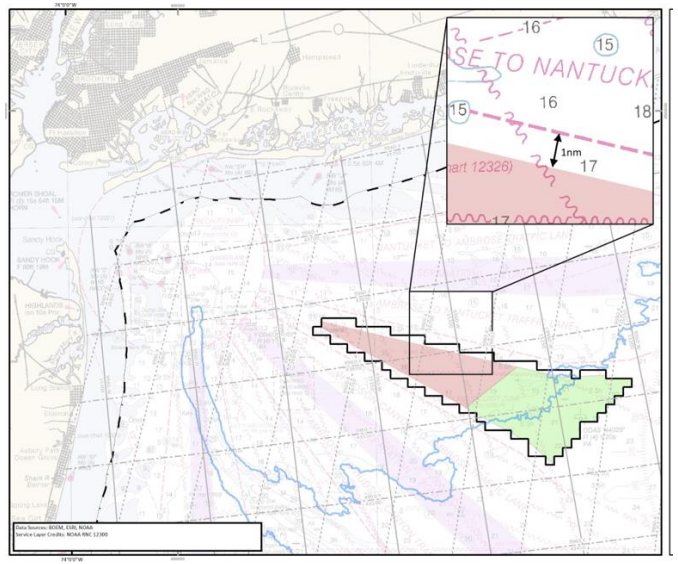
- Outreach efforts continue and will include both high level and focused workshops.
- No surprises philosophy…proactive solicitation for feedback which is incorporated into our planning.
- Framework for mitigation and monitoring being developed where outreach to stakeholders will be occurring in 2022 to inform the Draft Environmental Impact Statement being developed by BOEM.
  - Birds and Bats
  - Benthic and Pelagic Fisheries
  - Protected Species

Project Design Envelope: Layouts and Embedded Mitigations

COP PDE Layout Rules introduced in January 2020 to address stakeholder concerns. Continued maturation to June 2021 NOI.

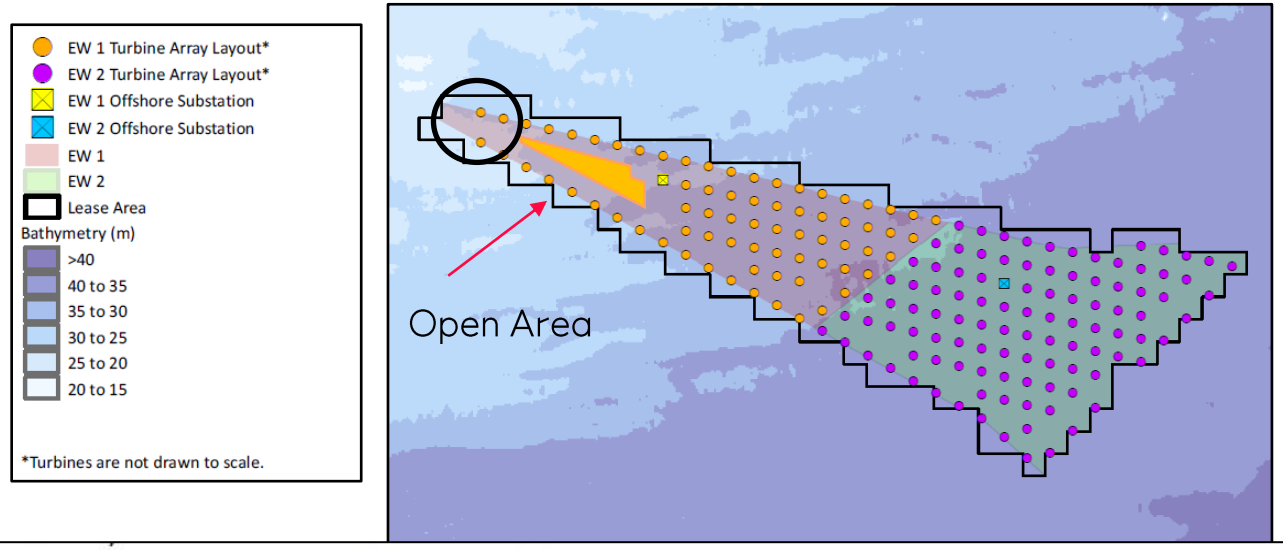
Layout Rules were informed by various uses and represent a balance of needs, both internal and adjacent to the Lease.

- Shipping traffic and navigational risk
- Fishing, trawling lanes, and access to Cholera Bank
- Viewshed considerations
- Marine archaeology
- Site-specific geotechnical data
- Wind resource and power production requirement



Avoidance

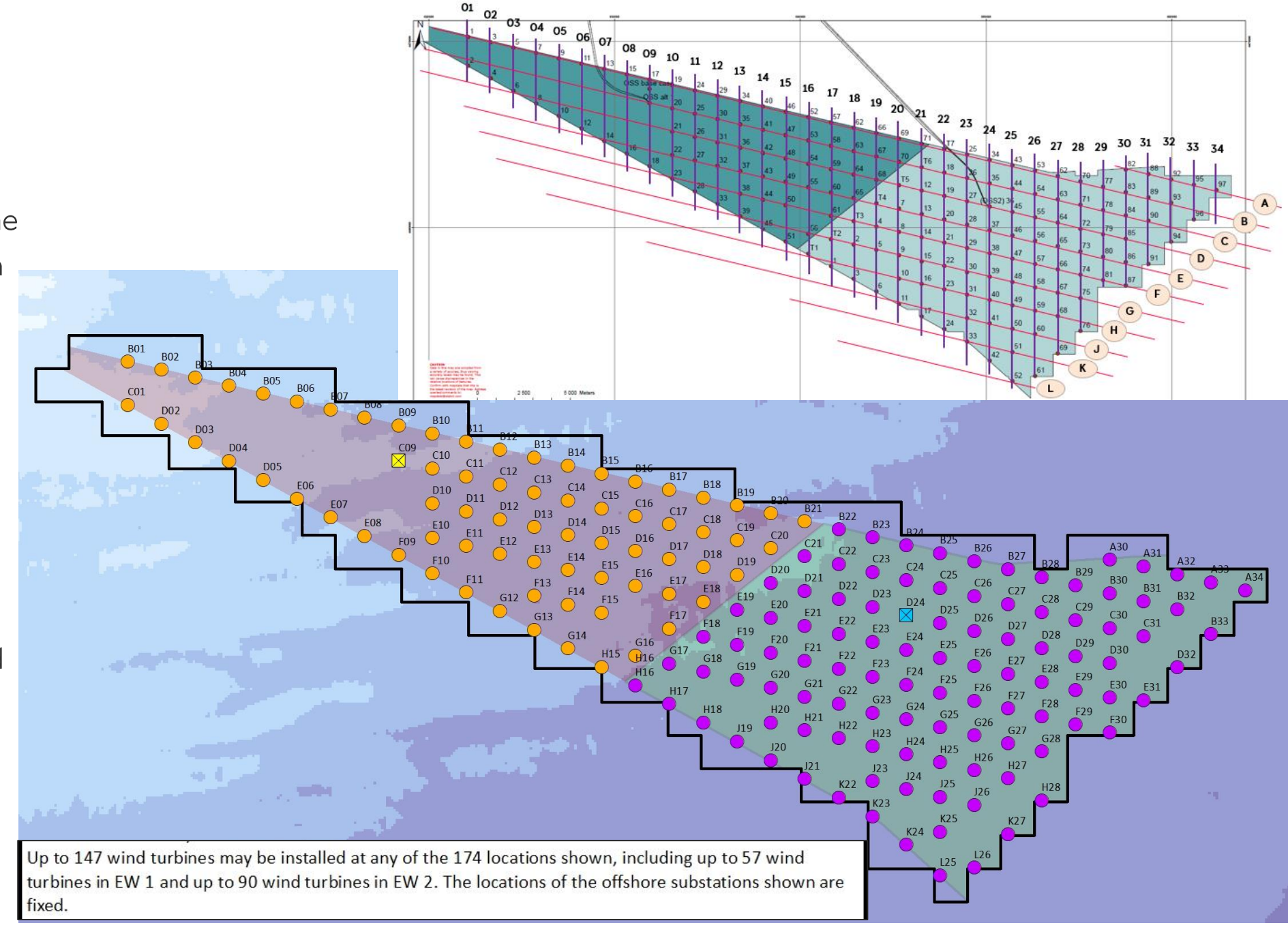
- 149 of the 174 locations needed
- 1 nm setback from the TSS executed within the licensed Lease Area
- Southern WTG positions aligned with Hudson Canyon to Ambrose traffic lane
- Navigation risk and buffer sensitivity demonstrated ALARP levels achieved with 1 nm setback
- Increases distance for closest turbines to shore reduces visual impact
- Includes an open area layout in northwest portion of the Lease Area for fishing access
- Potential flexibility to remove up to three locations in the northwest in EW 1 (black circle); contingent on technical feasibility and permitting.
- Other locations consider optimizing various factors (e.g,. wind resource capture, geotechnical feasibility). Locations are not 1:1 from that perspective.



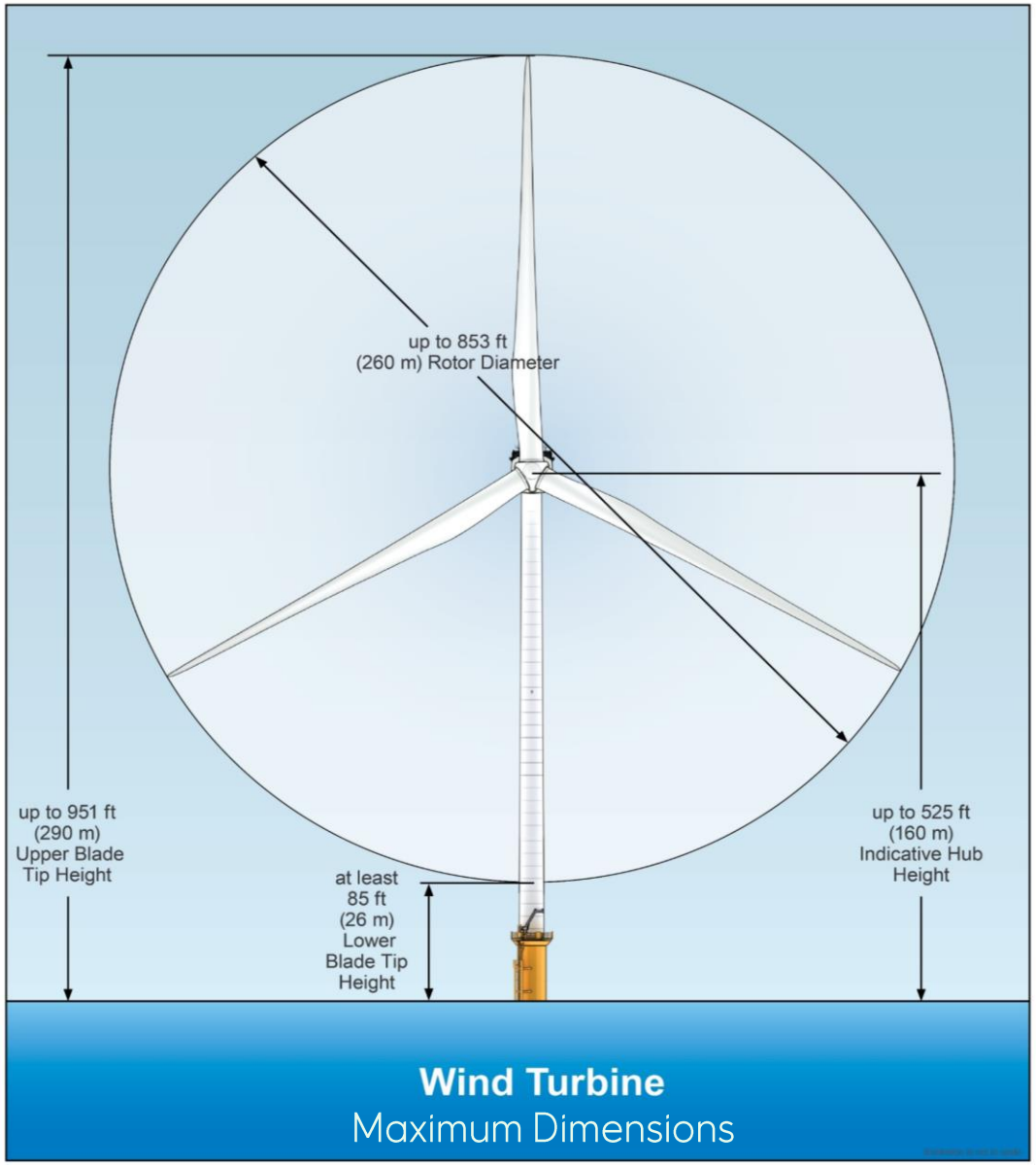
Up to 147 wind turbines may be installed at any of the 174 locations shown, including up to 57 wind turbines in EW 1 and up to 90 wind turbines in EW 2. The locations of the offshore substations shown are fixed.

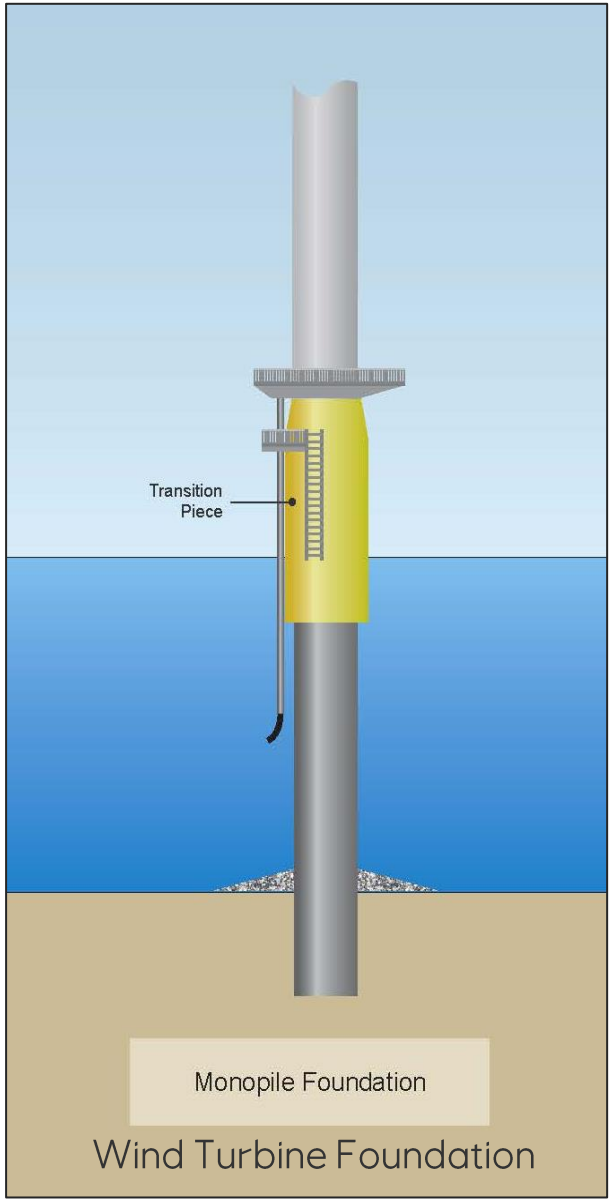
Project Marking

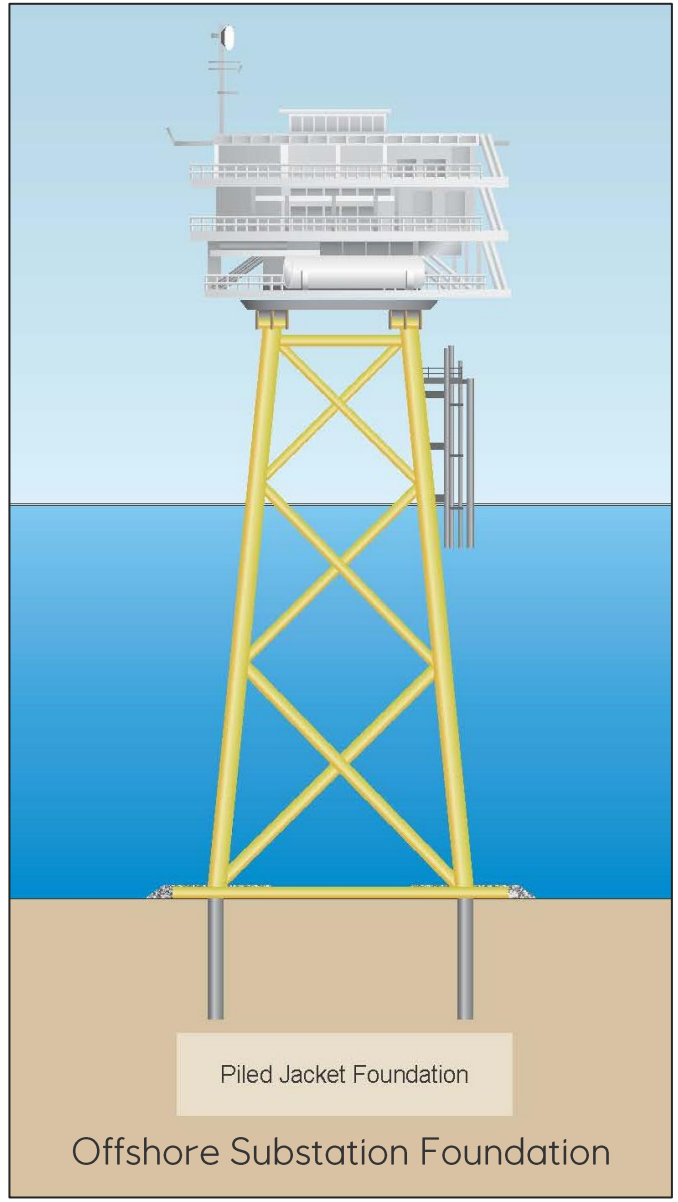
- Alphanumeric marking scheme
- Developed in conjunction with USCG
- Aligned with other offshore wind projects within the same USCG District
- Supports the existing layout rules
- Designed to facilitate navigation within the wind farm and SAR operations
- Where locations are not used in final design, the numbering/lettering will remain consistent.



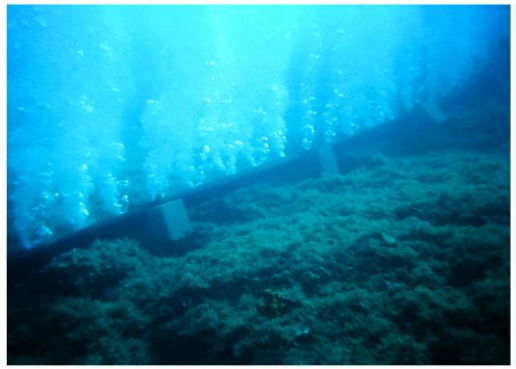
Empire Wind Foundations

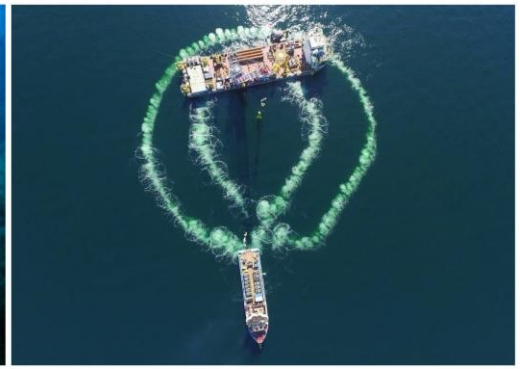






Monitoring and Mitigation: Pile-Driving





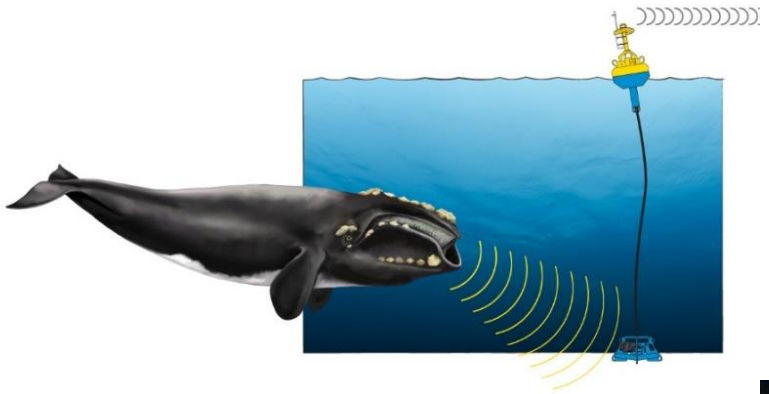
- Empire is updating modeling presented in the COP to reflect in-water noise impacts based on refined foundation dimensions and number of foundations.
- The Letter of Authorization (public notice anticipated October 2022) will also incorporate monitoring and mitigation
- Empire will follow standardized mitigations to minimize risk of noise impacts for marine mammals and sea turtles:
  - Seasonal pile driving restrictions over two years
  - Day-time pile driving only (sunrise/sunset restrictions)
  - Use of PAM systems;
  - Ramping up of noise generating activities;
  - Double bubble curtains or equivalent technology to achieve 10 dB reduction or more.
- Empire is committed in developing additional monitoring and mitigations taking into consideration:
  - Feedback from stakeholders
  - Public comments from BOEM's NOI
  - Panel of experts to evaluate potential mitigation technologies (source and receiver)
- Stakeholders will be updated on the development of the plan regularly.

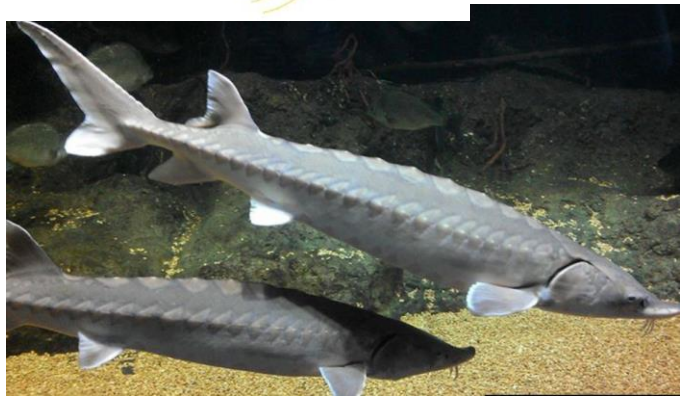
Monitoring and Supporting Other Research

- Committed to collaborate with the scientific community, state working groups, relevant stakeholders, developers and groups for research related to offshore wind and the affected resources.
    - Equinor Wind participates in AWEA Environmental Working Group, NYSERDA and MA environmental and fisheries working groups and developer collaborative groups across the region.
    - Laura Morales- Sits on the Regional Wildlife Science Entity Steering Committee
    - Scott Lundin- Sits on ROSA Board of Directors
    - Elizabeth Marchetti- New England Fisheries Mgmt. Council Habitat Committee Advisory Committee
- Non-proprietary data collected during baseline surveys/assessments has been and will continue to be made publicly available.
- Project design will consider innovative ways to equip Project's infrastructure with collect physical, chemical and/or biological data, including in-sea and above-sea.
- Studies will be informed by both Project-specific and regional priorities through coordination and collaboration
- To be executed across all project phases- survey, construction, operation and eventual decommissioning

Monitoring and Supporting Other Research

- Collaborative Grant Agreement with **Wildlife Conservation Society (WCS) and Woods Hole Oceanographic Institute (WHOI)** to deploy 2 x real-time and passive whale monitoring buoys in the Lease Area + 2 years (on-going).
    - Includes real-time observation exhibit for public outreach at the NY Aquarium.
- Collaboration with **SUNY Stony Brook** to attach four fish tag receivers on the SAP buoys
    - Designed to detect **Atlantic sturgeon** but capable of detecting other tagged species
    - Augments previously BOEM-funded study
        - "Atlantic Fish Telemetry: Monitoring Endangered Atlantic Sturgeon and Commercial Finfish Habitat Use Offshore New York"
    - Buoys (and receivers) to be removed from the field in December 2020
- Empire is looking into opportunities to continue existing collaboration and initiate new collaboration.





Questions?

Equinor Wind OCS-A 0512

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Community Engagement Manger
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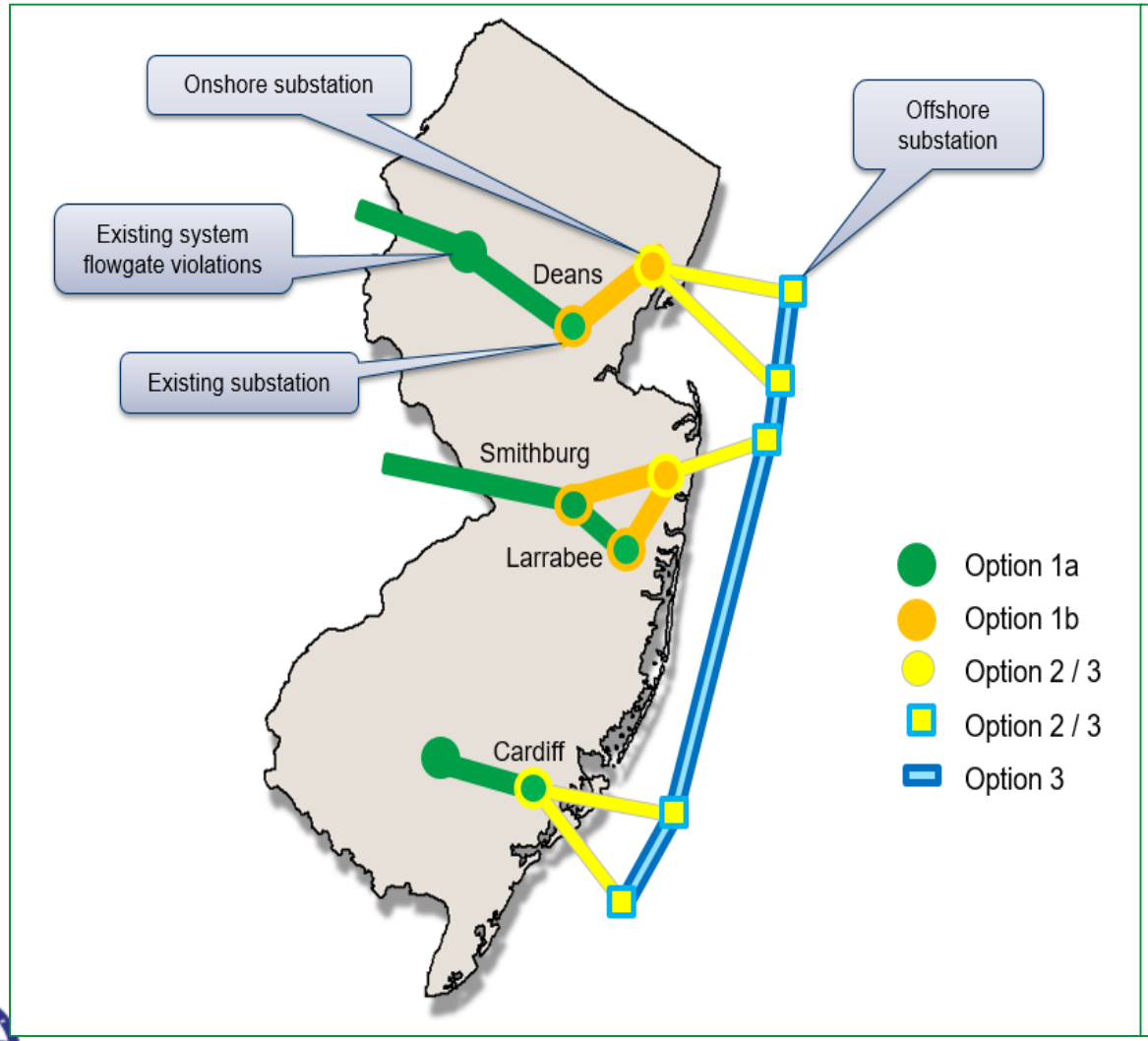
New Jersey Offshore Wind Update

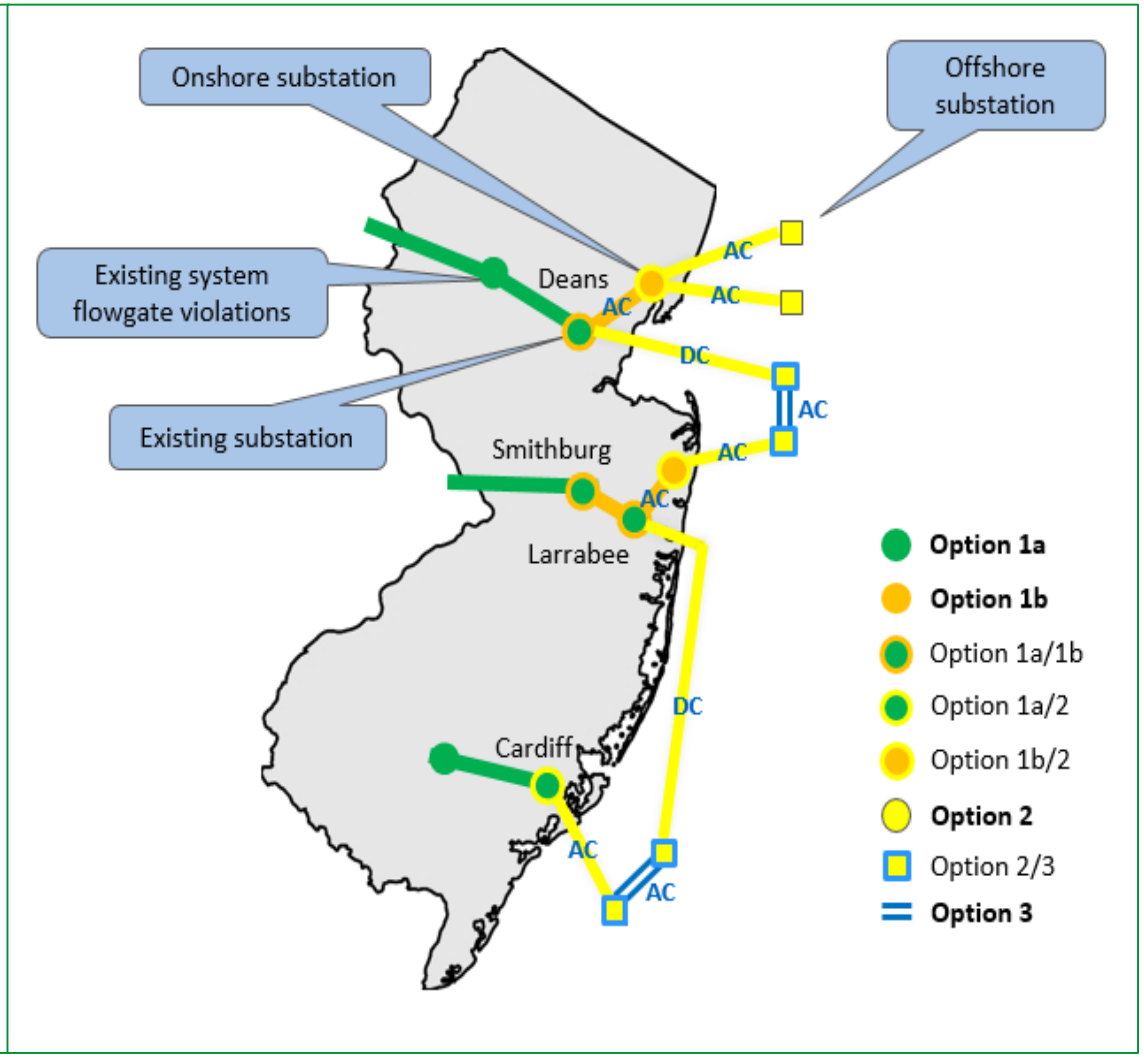
March 30, 2022

OSW Transmission Goals

- Inject 7,500 MW OSW into New Jersey's Transmission and Distribution System
- Minimize number of cables crossing the shore
- Minimize environmental and fishing impacts
- Lower the cost of OSW generation and transmission
- Consider regional collaboration
- Encourage competition
- Achieve these goals at the lowest reasonable cost and lowest risk to New Jersey ratepayers

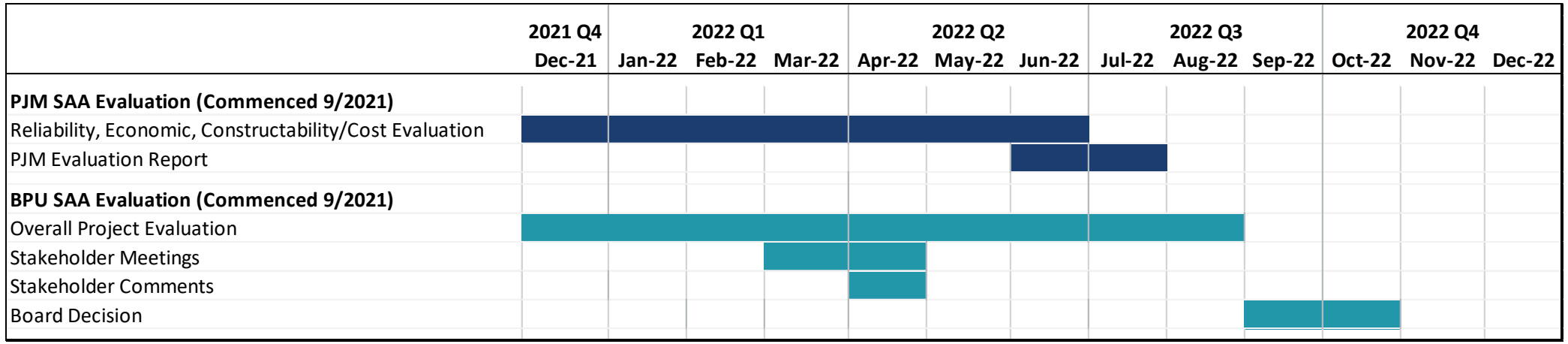
State Agreement Approach Transmission





SAA Status

- 80 project proposals received from a total of 13 transmission developers
- Evaluation is proceeding along the following schedule



- Evaluation criteria include PJM system reliability; constructability; costs; risk mitigation; environmental benefits; permitting plan; quality of proposal and developer experience; flexibility, modularity, and option value; market value of offshore wind; additional New Jersey benefits
- SAA Stakeholder Meetings ongoing: Monday, April 4th 10am - Environmental & Permitting Issues; Tuesday April 12th 10am - Ratepayer Protections and Cost Controls

Solicitation Schedule

- Published Solicitation Schedule to achieve 7,500 MW by 2035
  - Below schedule includes adjustment to Solicitation 3 schedule

Solicitation	Capacity Target (MW)	Capacity Awarded (MW)	Issue Date	Submittal Date	Award Date	Estimated COD
1	1,100	1,100	Q3 2018	Q4 2018	Q2 2019	2024-25
2	1,200 – 2,400	2,658	Q3 2020	Q4 2020	Q2 2021	2027-29
3	1,200		Q1 2023	Q2 2023	Q4 2023	2030
4	1,200		Q2 2024	Q3 2024	Q1 2025	2031
5	1,342		Q2 2026	Q3 2026	Q1 2027	2033
Total Awarded + Target	**7,500**					

BOEM/ NJ/ NY Regional Working Group on Supply Chain Development

- In February 2022, BOEM, New Jersey, and New York established a collaboration to transition to a clean energy future, create well-paying jobs, and establish a domestic supply chain through offshore wind development in the NY Bight.

- This collaboration seeks to:
  - Establish a durable domestic supply chain that will facilitate the responsible development of the offshore wind
  - Deliver benefits to residents of NJ and NY, including underserved, disadvantaged, and overburdened communities
  - Engage regional stakeholders
  - Strengthen state and federal collaborations to achieve regional offshore wind goals

- The working group will develop best practices, issue guidance, and meet quarterly to advance these objectives.

New Jersey Offshore Wind Research & Monitoring Initiative

03/31/2022

Where are we?

- **August 2021**
  - Presented short-term Research Priorities & answered clarifying questions
  - Provided survey for written comments
  - Met with federal, regional, state, and academic colleagues to solicit feedback

- **December 2021**
  - DEP & BPU MOU signed – officially creating the RMI
  - ERWG meeting: reviewed input received & provided process overview

- **March 2022**
  - Overview of project development & implementation
  - Current project progress updates

Offshore Wind

Research and Monitoring Initiative (RMI)

VISION STATEMENT

The Research and Monitoring Initiative addresses the need for regional research and monitoring of marine and coastal resources during offshore wind development, construction, operation and decommissioning as recommended in the New Jersey Offshore Wind Strategic Plan. Initial funding is provided by developers through New Jersey's Offshore Wind Solicitation 2.

This Initiative is a rigorous scientific approach to uphold the State's mandate to protect and responsibly manage New Jersey's coastal and marine resources while supporting the State's Offshore Wind Economic Development Act, Executive Order 8 and Executive Order 92, and the Energy Master Plan, which respond to climate change and protect our environment for future generations.

About | Phased Research Agenda | Process | RMI Team | Research & Monitoring Priorities | Projects

The Research and Monitoring Initiative (RMI) is administered by the Department of Environmental Protection in collaboration with our partners at the Board of Public Utilities (BPU).

The Initiative seeks to employ a rigorous scientific approach to research and monitoring of marine and coastal resources during the development, construction, operation and decommissioning of offshore wind as recommended in the New Jersey Offshore Wind Strategic Plan.

The goal of the Research and Monitoring Initiative is ensure that as New Jersey moves towards a clean energy economy, we also adhere to our mandate to protect and responsibly manage New Jersey's coastal & marine resources."

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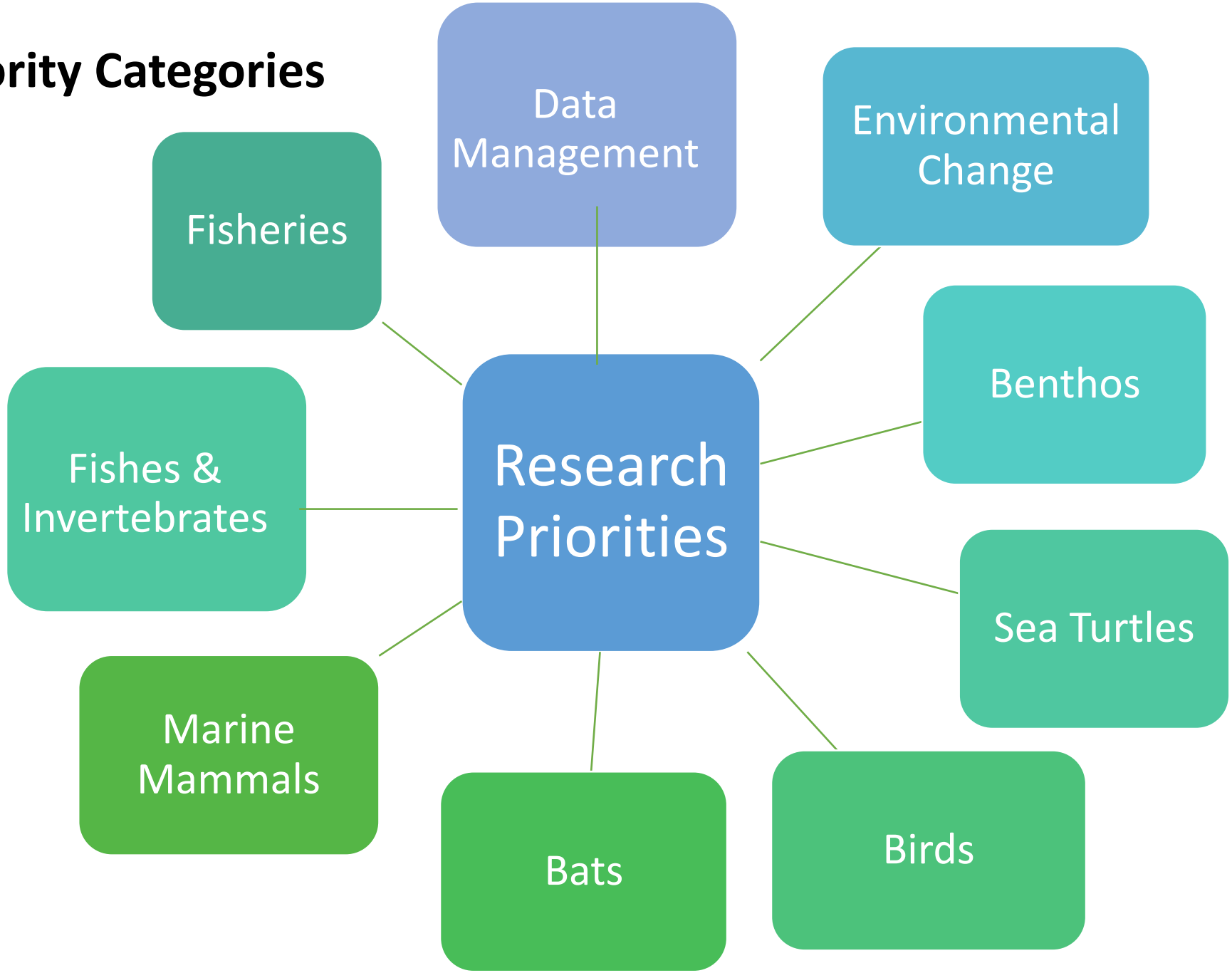
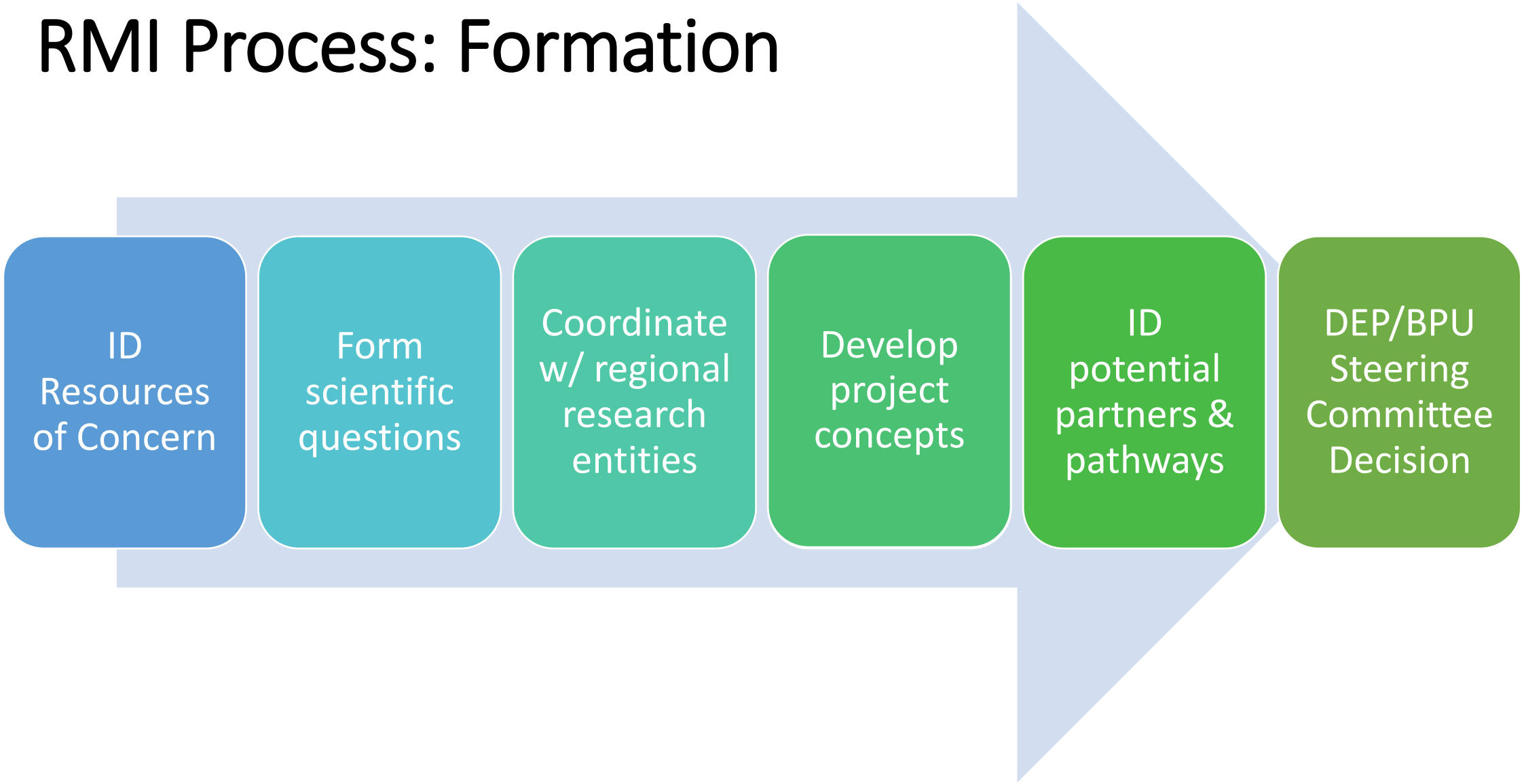
Research Priority Categories



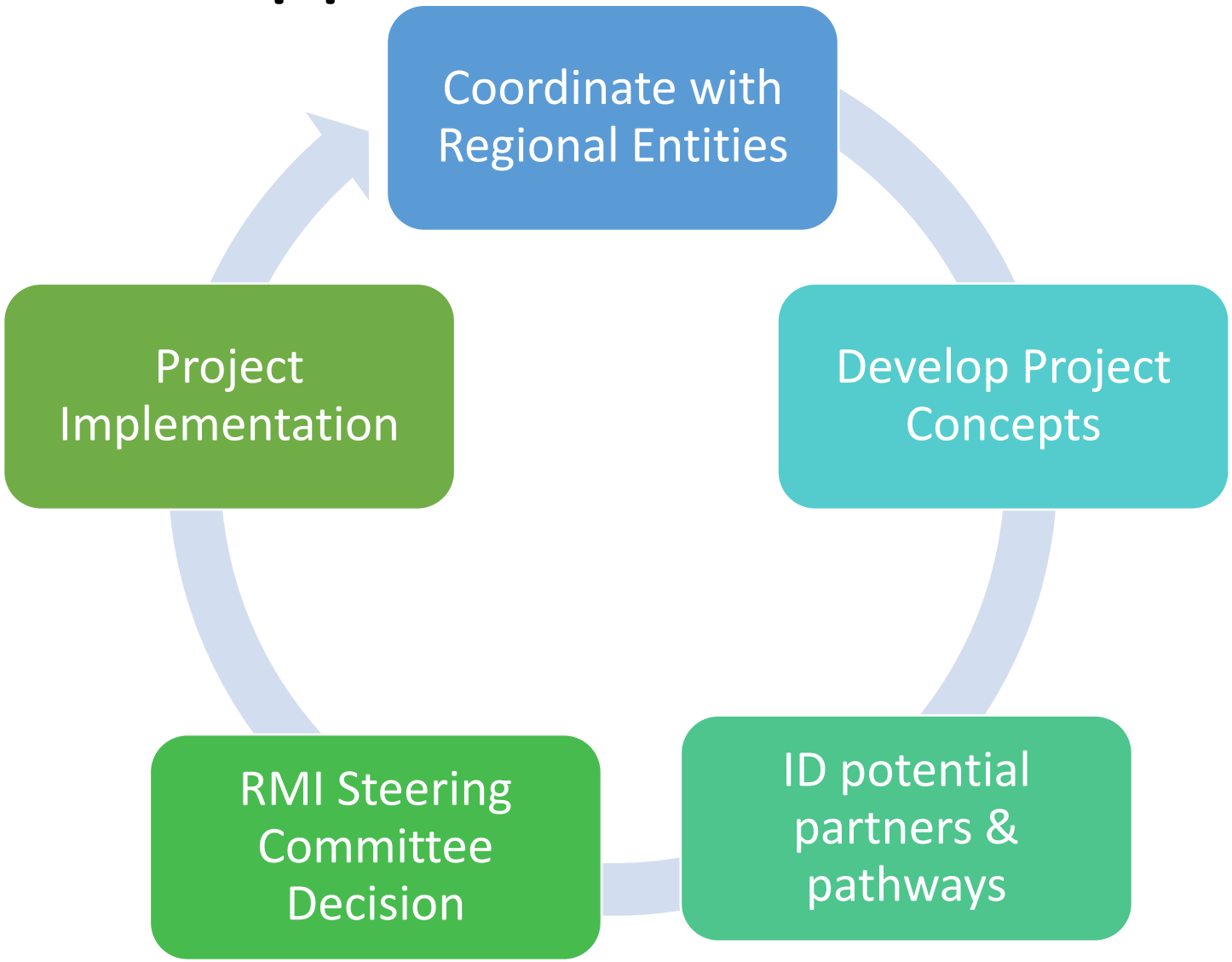
Regional Coordination

Organization/Group
Bureau of Ocean Energy Management (BOEM) Office of Renewable Energy Programs
Coastal States Organization
Interstate OSW Fisheries Call
Mid-Atlantic Regional Council on the Ocean (MARCO)
Mid-Atlantic Committee on the Ocean (MACO)
Multi-state Offshore Wind Calls
NJ Climate Change Alliance (NJCCA - Rutgers University)
NOAA Fisheries
New York State Energy Research Development Authority (NYSERDA)
Regional Wildlife Science Entity for Atlantic Offshore Wind (RWSE)
Responsible Offshore Science Alliance (ROSA)
US Environmental Protection Agency
US Fish & Wildlife Service

RMI Process: Formation



RMI Process: Application



Projects Approved for funding through the NJ RMI

Membership in the Regional Wildlife Science Entity

Calibration Experiments for a Novel Clam Survey Dredge and Monitoring Carbonate Chemistry of Surfclam Habitat

An ecological and oceanographic baseline to inform offshore wind development Over the Continental Shelf Off the Coast of New Jersey

Bottom-mounted Passive Acoustic Monitoring for Cetaceans in the NY/NJ Bight

NJ Membership in the RWSE

The Regional Wildlife Science Entity (RWSE) formed last year

- Coordinate regional monitoring and research of wildlife and marine ecosystems
- Support the advancement of environmentally-responsible and cost-efficient offshore wind power development and natural resource stewardship
- Current State Members are Connecticut, Maryland, Massachusetts and New York

Surfclam Dredge, Calibration, & Ocean Chemistry

- Collaborative effort
  - Rutgers University
  - NOAA and Northeast Fisheries Science Center
  - Surfside Seafood Products, LLC
- Manufacture & calibrate specialized surf clam dredge
- Conduct research where known surfclam fishing grounds overlap with wind-turbine lease areas
- Examine impacts of ocean acidification caused by increasing levels of CO_2 in the atmosphere on surfclams to provide critical baseline information

Photo courtesy NOAA Fisheries: https://www.fisheries.noaa.gov/species/atlantic-surfclam

Glider monitoring

- Ecological & physical oceanographic conditions
  - Seafloor bathymetry
  - Sunlight availability
  - Temperature, DO, pH

  - Fish telemetry
  - Passive acoustics for marine mammals

- Vast area of the Outer Continental Shelf
  - From Sandy Hook to Cape May

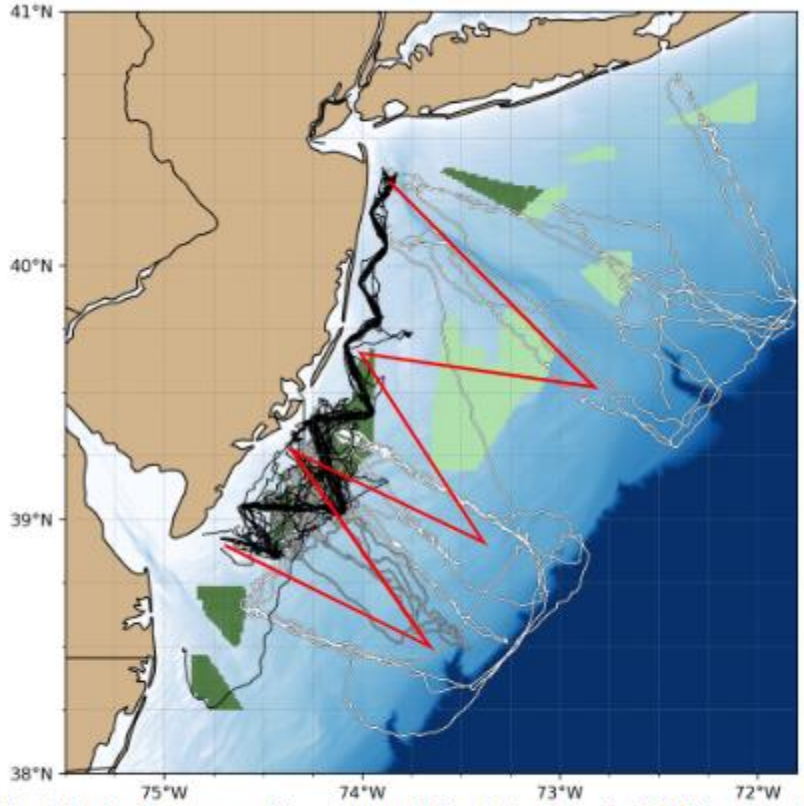
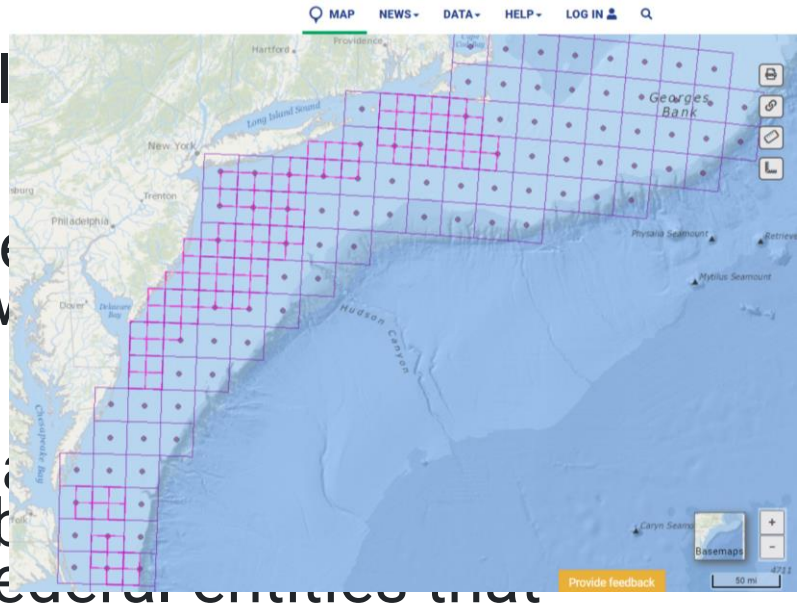


Figure 1. Map indicating the coverage of three relevant glider missions including NJDEP water quality (black), NOAA and NYSDEC pH (white), and Ørsted Marine Mammal Monitoring (Grey). The proposed environmental coastal survey track is shown in red. All these deployments occur within the footprint of a nested HF radar surface current network. The offshore wind lease areas are also shown in shades of green.

Passive Acoustic Monitoring for Whales

- Request for proposal
- Better understand the behaviors of baleen w
- This project will be pa which includes collab state, regional, and fe seeks to protect marine mammals as offshore wind farms are developed along the eastern seaboard.



Project Concepts in Review

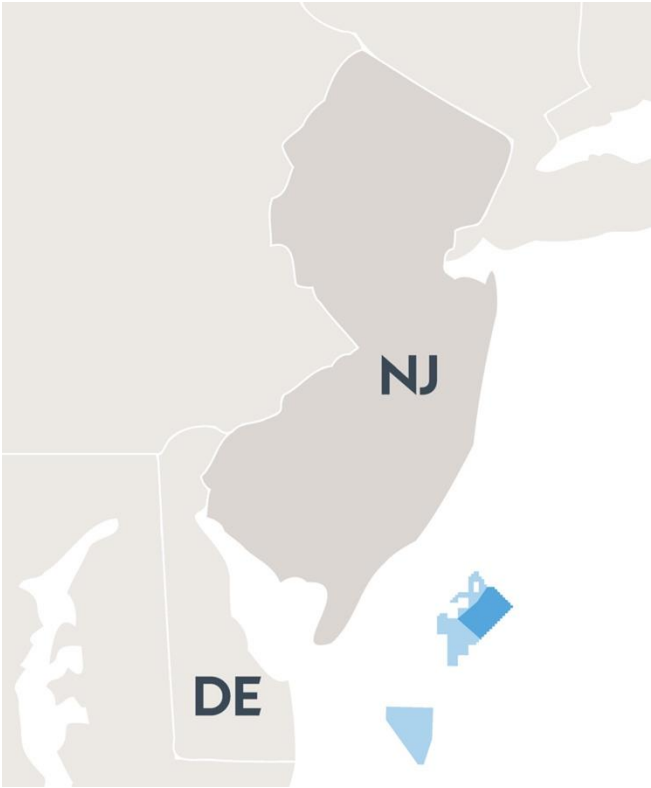
- Wind Farm contributions to a regional environmental and ecological monitoring system to address multi-user needs
- Monitoring the socioeconomic impacts of NJ's OSW development on recreational fisheries economy
- Acoustic telemetry and eDNA for monitoring protected, prohibited, and commercially/recreationally important fish species
- Offshore wind pre-construction study of harbor seal health and ecology: a collaborative effort to understand the status of harbor seals in the Mid-Atlantic region

Ørsted

NJ Navigational Safety Enhancement and Training Program Overview

Overview

- Ocean Wind 1 (OCW1) and Ocean Wind 2 (OCW2) have pledged to create the NJ Navigational Safety & Training Program to help address navigational and safety concerns raised by NJ fishing interests
- The program is an outgrowth of efforts in the Northeast and is based on stakeholder feedback
- The program addresses navigational safety by providing eligible commercial, charter, and party vessels/crew operating in the OCW1 & OCW2 wind farms with reimbursement for new navigation and safety equipment as well as training courses
  - Eligible upgrades will include: pulse compression radar systems, AIS transceivers, other necessary navigational or safety equipment
  - Eligible training will include: captain's license courses, license upgrade courses, radar courses, rules of the road refreshers, or any other type of maritime training
- OCW1 & 2 will finance the program and provide vouchers to eligible applicants
- Approved retailers and training facilities will provide equipment and training
- The program will be rolled out prior to the start of OCW1 construction



BOEM Central Atlantic Offshore Wind Planning

Winnowing