Fisheries Monitoring of an Offshore Windfarm off New Jersey, Northeast U.S.

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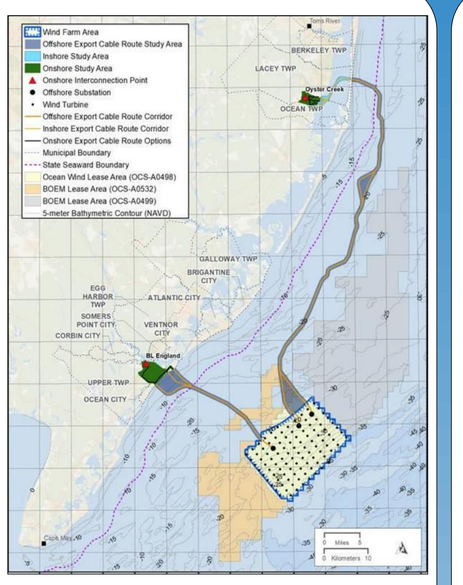
Objective

- To develop and execute a Fisheries Monitoring Plan of Ørsted's Ocean Wind 1 offshore windfarm off New Jersey, northeast U.S., in order to evaluate the impacts of construction on fisheries resources.

Methods

- Multiple coordinated and complementary surveys are being conducted before (2022–2023), during (2024–2025), and after (2026 –2027) windfarm construction, including:
  1. Bottom Trawl Survey
  2. Environmental DNA Sampling
  3. Structured Habitat Survey
  4. Atlantic Surfclam Dredge Survey
  5. Pelagic Fish Survey
  6. Acoustic Telemetry
  7. Oceanographic Data



Location of Ocean Wind 1 off New Jersey (left) and construction plans (above).

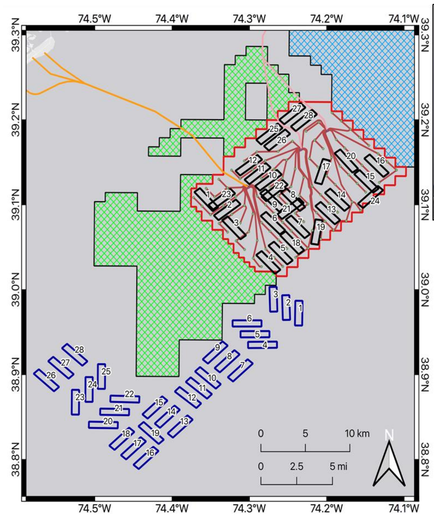
1. Bottom Trawl Survey

Aim: Quantify the relative biomass, distribution, and demographics of fishery resources within the wind lease and at a nearby control site before, during and after construction.

Methods:

- Seasonal surveys during Winter, Spring, Summer, and Fall
- Twenty 20-minute tows within both the lease and control areas during each seasonal survey over a six-year period
- Sample processing follows established protocols of long-term fishery-independent surveys in the region

Anticipated Outcome: Evaluation of changes in species biomass, size frequency, and condition, and community assemblage within the wind lease and at the control site.

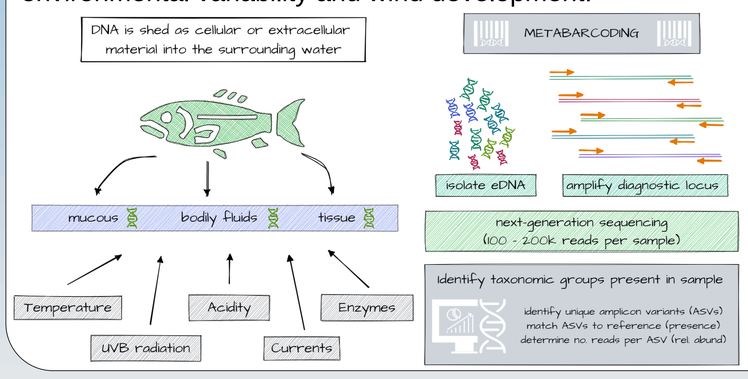


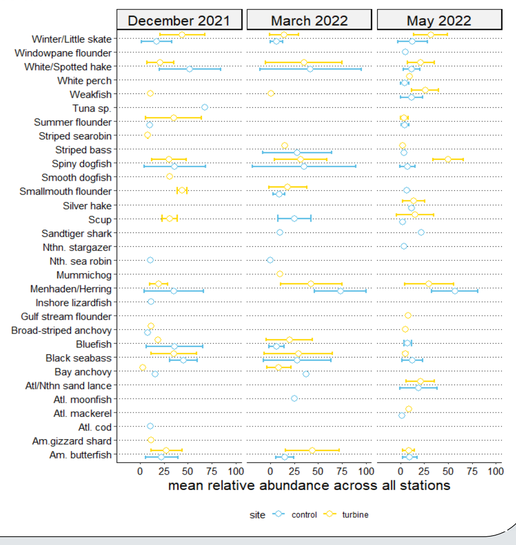
2. Environmental DNA Sampling

Aim: Quantify seasonal fish community composition to detect potential impacts from wind development.

Methods: 20 bottom water samples with CTD data per season in Control and Turbine areas from trawl survey following a Before-After-Control-Impact (BACI) design.

Anticipated Outcome: Document the relationship of fish community composition to spatial and temporal environmental variability and wind development.





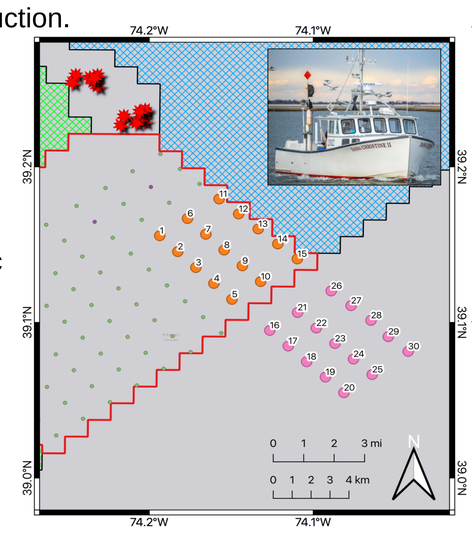
3. Structured Habitat Survey

Aim: Quantify the relative abundance, distribution, and demographics of structure-associated species within the Study Area and at nearby control sites before, during, and after construction.

Methods:

- Six years of seasonal (Winter, Spring, Summer, Fall) sampling within the windfarm and nearby control sand & shipwreck sites
- Simultaneous surveying with three techniques: Chevron traps, benthic and pelagic videos (BRUVs), and rod-and-reel

Anticipated Outcome: Evaluation of changes in species biomass, size frequency, and condition, and community assemblage within the wind lease and at the control sites.



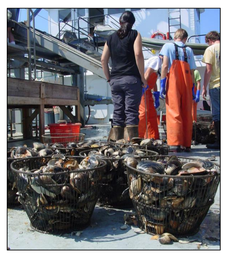
4. Atlantic Surfclam Dredge Survey

Aim: Quantify the dynamic abundance, distribution, and age of surfclams.

Methods:

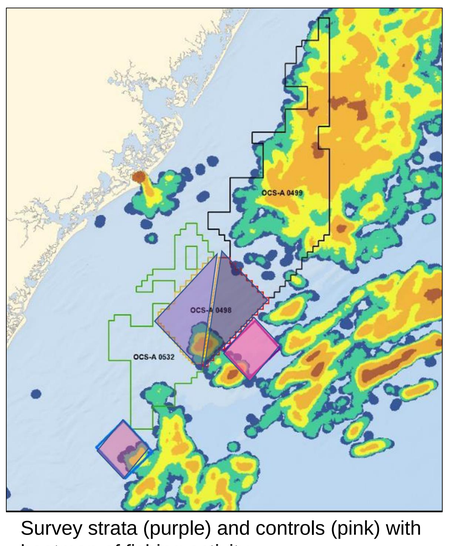
- Samples collected with a modified commercial hydraulic dredge
- Ten tows in wind lease area, ten tows in control area, per year
- Before-After-Control-Impact (BACI) design

Anticipated Outcome: Document the commercial clam resource within the wind lease and evaluate any changes to the stock over time or due to wind farm construction.



Sorted bushels of clams

Survey Vessel – F/V Joey D



Survey strata (purple) and controls (pink) with heatmap of fishing activity.

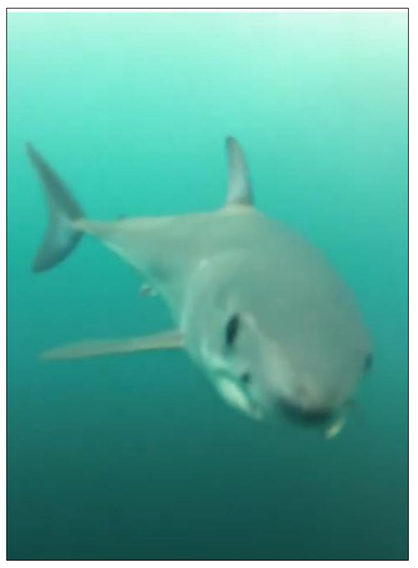
5. Pelagic Fish Survey

Aim: Quantify the distribution of pelagic fish that are not well surveyed by trawl, traps, or hook.

Methods:

- Tow underwater cameras behind vessels at 4 knots. Cameras are their own bait to large predatory pelagic fish.
- Use glider-mounted sonar to detect pelagic forage fish aggregations
- Map and smooth encounters (SONAR or video) as probability density functions
- Evaluate as Before After Gradient (BAG) design relative to installations on large (lease) and small (interturbine) scales

Anticipated Outcome: Document distribution of pelagic fish on large and small scales as effects of structure attraction or avoidance.



Juvenile shortfin mako shark approaches towed camera.

6. Acoustic Telemetry

Aim: Quantify shelf-estuary and long shore migratory connections, residency, and ranging.

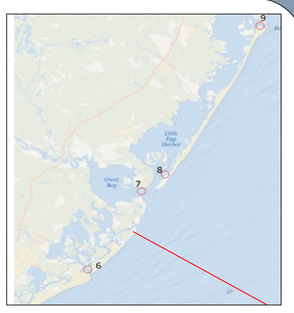
Methods:

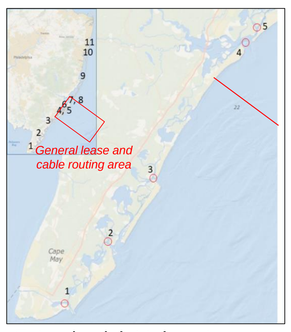
- Tag summer flounder, smooth dogfish, clearnose skates, horseshoe crabs, and black sea bass as guild representatives of species that will cross buried power cables to complete their life history
- Monitor all New Jersey inlets, map contacts on the continental shelf from gliders and vessels
- Cooperate with other taggers through the Atlantic Cooperative Telemetry Network to extend data to other species/locations
- Before-After-Control-Impact (BACI) design

Anticipated Outcome: Document movement into estuaries and along coast, evaluate change relative to cable placement.

Implanting transmitter in smooth dogfish

Tagged horseshoe crab



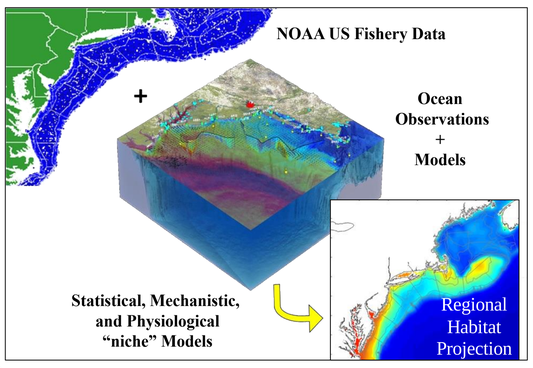


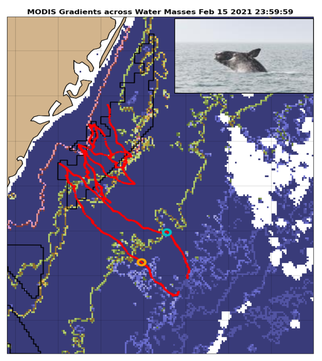
Estuarine inlet telemetry gates

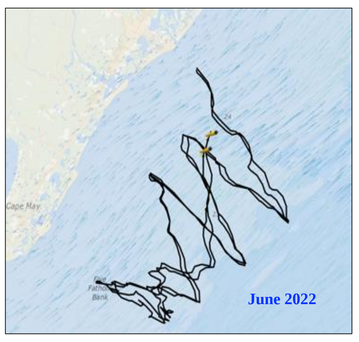
7. Oceanographic Data

Aim: Evaluate if the composition and distribution of fisheries resources are influenced by the seasonally-dependent ocean stratification.

Available oceanographic data will be leveraged to associate habitat with observations from all other surveys.







Temperature	Active acoustics (38 Khz)
Salinity	Active Acoustics (120 KHz)
Density	Active Acoustics (200 KHz)
Ocean currents	Passive Acoustics
Dissolved oxygen	Fish telemetry
Chl Fluorescence	
CDOM Fluorescence	
Optical backscatter	

Rutgers Offshore Wind Living Resources Studies (ROWLRS):

Visit the following webpage to learn more about these and other offshore wind studies: https://rowlrs.marine.rutgers.edu/

Acknowledgements

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