Fisheries Monitoring of an Offshore Windfarm: Surveying Structure-Associated Species off Southern New Jersey

Joseph O'Brien*[1], Andre Ascura**[1], Douglas Zemeckis[1], Jason Morson[1], and Kevin Wark

Joey O'Brien*
Email: jo461@hsrl.rutgers.edu
Lab Technician

Andre Ascura**
Email: ama404@hsrl.rutgers.edu
Lab Technician

Background

- Rutgers University and Monmouth University are developing and executing a fisheries monitoring plan (FMP) to evaluate the potential impacts of windfarm development on fisheries resources at Ørsted's Ocean Wind 1 offshore windfarm.
- This component is designed to assess response of structure-associated species that are not adequately surveyed by benthic trawl. This is one of seven components in the larger FMP.
- Objectives
  - To 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 of the windfarm.

Methods

- Implement a Before, After, Control, Impact (B.A.C.I.) survey design at three location types:
  - Ocean Wind 1- Impact Site
  - Phantom Turbines- Control Site 1
  - Atlantic City Reef Shipwrecks- Control Site 2
- Six years of seasonal (Winter, Spring, Summer, Fall) sampling utilizing one non-extractive (**Benthic and Pelagic BRUVs:** Figures 2-4) and two extractive (**Chevron Traps:** Figure 5, **Hook and Line:** Figure 6) surveying techniques deployed simultaneously across all three sites.

Study Area

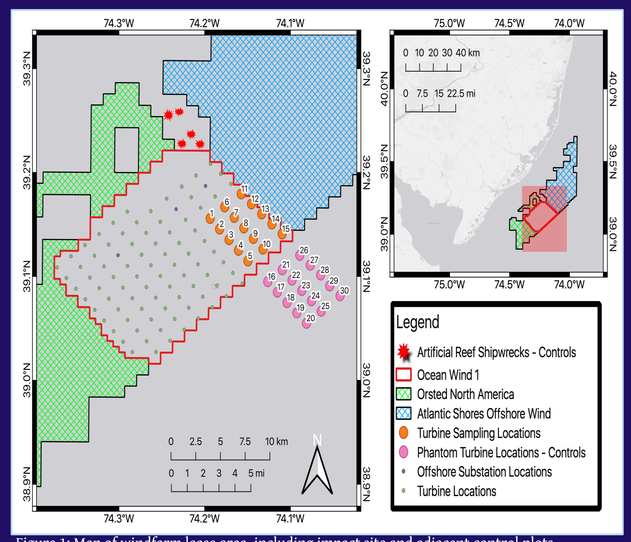

Figure 1: Map of windfarm lease area, including impact site and adjacent control plots

Additional Resources

- Rutgers Offshore Wind Living Resources Studies (ROWLRS)
  - rowlrs.marine.rutgers.edu

Non-Extractive: Benthic and Pelagic Baited Remote Underwater Video (BRUVs)

Both BRUVs are baited with chunked bunker and deployed for 1 hour while recording continuous, stereo footage using GoPro Hero 9 cameras. The footage is edited in Adobe Premiere Pro and annotated using B.O.R.I.S.

Figure 2: BRUV platforms, benthic (left) and pelagic (right). 10 cm markings, totaling 2 m, are placed along the pole for visibility and fish length estimations

Figure 3: Benthic BRUV capture of Roughtail Stingray interacting with the bait bag at end of pole

Figure 4: Synchronized side-by-side screen shot of Benthic BRUV with Summer Flounder, Sea Robins, and a Skate

Extractive: Chevron Traps

Six traps are baited with 20 whole bunker and deployed for 1.5 hours while recording continuous footage.

Figure 5: Chevron trap being deployed, GoPro Hero 9 camera attached above the funnel

Extractive: Hook-and-Line

Five anglers fish while the boat drifts along a transect for three 8-minute drifts per site (24 minutes/site) using surf clam pieces.

Figure 6: Set-up of hook-and-line rig. Two hooks are placed 12" apart and weighed down with either 8,10, or 12 oz. sinker weights

Preliminary Results

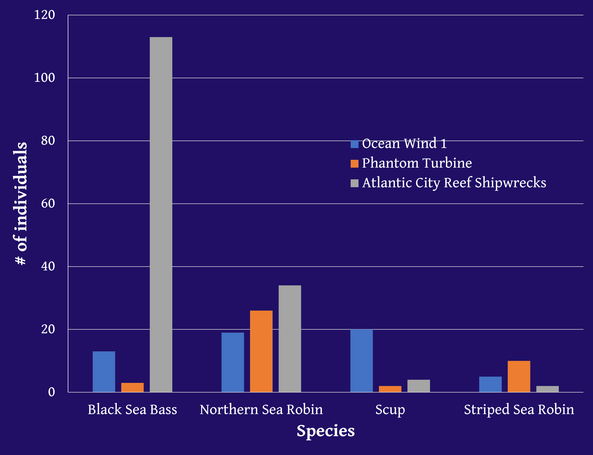

Figure 7: Summary of common species caught on hook-and-line during the October 2022 survey season

Species	Hook-and-Line	Chevron Trap
Northern Sea Robin	180	23
Black Sea Bass	169	19
Striped Sea Robin	24	4
Tautog	1	0
Cunner	1	0
Summer Flounder	2	2
Scup	26	27
Grey Triggerfish	1	0
Northern Kingfish	1	0
Little Tunny	3	0
Chub Mackerel	1	0
Smooth Dogfish	7	6
Rock/Jonah Crab	0	126
Common Spider Crab	0	6
Effort	**72 Hours**	**486 Hours**

Table 1: Summary of species caught by hook and line and traps from the Spring, Summer, and Fall sampling season (BRUVs recorded 87 hours of footage and is currently being analyzed)

Early Take-Away and Challenges

- Simultaneous deployment of these three gears will provide an excellent opportunity to evaluate the efficacy of extractive and non-extractive methods for surveying fisheries resources around structure.
- These combined methods show promise for effective fisheries monitoring of offshore windfarms.
- One challenging aspect to date has been the time it takes to analyze many hours of BRUV footage. We are currently testing several sub-sampling routines to reduce video processing time.

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RUTGERS [1] New Jersey Agricultural Experiment Station

MONMOUTH UNIVERSITY

Ørsted