

Floating Offshore Wind Research Array

Summary of Wildlife Work Session #2

March 26, 2021

OVERVIEW

The Governor's Energy Office (GEO), in partnership with Maine Department of Inland Fisheries and Wildlife (MDIFW) and Department of Marine Resources (DMR), is holding a series of work sessions to inform the State's plans for an offshore wind research array and encourage engagement in the stakeholder process to inform the research lease application to the Bureau of Ocean Energy Management (BOEM). The second wildlife work session focused on the following objectives:

- Provide update on work to determine which species are present in the research area of interest, focusing on those populations most vulnerable
- Consider potential options for configuration of turbines
- Generate ideas for areas of research to consider as part of state's research framework

This summary focuses on the main points covered during the work session. The agenda, presentation slides and recording of the work session are available online:

<https://www.maine.gov/energy/initiatives/offshorewind/researcharray/worksessions>

ATTENDANCE

The work session was attended by approximately 86 people including many with expertise in wildlife data such as representatives from state and federal agencies, non-profit environmental organizations, academic researchers, the commercial and recreational fishing industry, and consultants, along with interested citizens. An initial poll indicated that 26% of the participants did not attend the first Wildlife Work Session. Please note that participating in these sessions does not constitute approval nor endorsement of OSW development in the GOM generally or the Research Array in particular.

DISCUSSION

Below is a summary of the key themes and topics discussed during the work session.

Siting Considerations

Presentation - Carl Wilson, DMR:

- Publicly available data has limitations when describing fishing activity and impacts. DMR is gathering available data from data portals, (<https://www.northeastoceandata.org/gulf-of-maine-floating-offshore-wind-research-array-area-of-interest/>), state information, and conversations with individuals or small groups.
- Themes around bathymetry, bottom structure and time of year. Platt's Bank is considered one of the last reliable recreational fishing grounds. Any promontories or other structures are important for fishing.
- 10% of lobstermen are required to report catch by zone in general areas (0-3 miles, 3-12 miles, and 12+ miles from shore). In general, the following areas have more potential for siting: further from shore; muddy bottom; less fishing activity. The amount of lobstering activity drops off further offshore and at depths of 80 to 90 fathoms lobstering activity begins to drop off.

- The southwest area of the area of interest is less likely to be preferred because of the WGOM closure, shipping lanes, and the rich area for fisheries and marine mammals on Jeffrey's Ledge.
- Groundfish fishery has VMS (vessel monitoring system) location data. The area between Platts and Jeffreys though relative deep has a history of active groundfish fishing.
- The area around Mistaken Ground and further south and east has recently been mapped and that information is helping to fill in gaps in bathymetry data.
- Shipping lanes and some of the traffic areas coming out of shipping lanes are less likely to be preferred by the US Coast Guard for the research array due to navigation conflicts and there are DOD closure areas that are highly likely off-limits.
- Marine mammal data from the Northeast Ocean Data Portal was shared (www.northeastoceandata.org). Summary data misses some of the seasonal differences. The technical report that describes the input data is here: <https://seamap.env.duke.edu/models/mdat/MDAT-Technical-Report.pdf>
- The Duke model for right whales was updated through 2018 specifically for the Decision Support Tool being used by NMFS in the new lobster fishery right whale regulations. Not sure if that update has been pushed to other places yet but it has been done. The Duke right whale model prior to 2010 and after 2010 shows a slight decline in use by right whales in the Gulf of Maine between those two time periods.
- Transit to and from research array by vessels to do work may have an impact on marine species and/or fishing activity and needs to be further considered.

Participant questions & feedback:

- Is DMR confident in new bathymetric data for Mistaken Ground area? Is this a good representation of what is available?
 - DMR responded that the data is accurate and fits with descriptions from fishermen who fish here. An interesting note: "Fishing Grounds of the Gulf of Maine", first published in 1929, matches with what the new data shows and what fishermen identify now.
- Is there economic data for lobster and whale watching data?
 - There are challenges as some fisheries don't have data in a way that is readily available (e.g., lobster harvester reporting extrapolated to a large area).
- A participant noted that COVID-19 has impacted economic activity for the seafood industry so economic impact surveys will be somewhat limited if based on recent years.
- Do we have any data on tuna fishing in this area?
 - DMR responded that both the recreational and commercial tuna fisheries are federally managed but do not require reporting that would provide a good spatial characterization of the fishery. Bottom habitat structure is important. Probably the entire area is important for harpooners, but hook and line probably more associated with bottom structure.
- Is lobstering allowed in that commercial closure area?
 - The Western Gulf of Maine Habitat Management Area is closed year-round to all fishing vessels, with some exemptions including recreational fishing, and vessels fishing with pots and traps such as lobster.

Presentation – Wing Goodale, Biodiversity Research Institute:

- Area of interest is both data rich and data slim, so look to regional models such as the MDAT (Marine-life Data Analysis Team) models
- Local data is also available such as the Northwest Atlantic Seabird Catalog. Though the data is inconsistent, it can be used to augment other data.
- Absence of data does not mean there are no birds there – just no data.
- When the data sets are brought into MDAT, all the bird species are weighed the same. Analysis is needed weigh species differently for those species that are most vulnerable.
- MDAT Analysis Approach:
 - Step 1. Spatial Assessment with MDAT model - Looking at Collision, displacement (avoidance and habitat flexibility), and population
 - Step 2: Covariate Considerations – considering relationships, conflicting and uncertain relationship, species groups and life cycle, general heuristics possible for some species
 - Step 3: Tracking and Other Data - use to help prioritize monitoring for permitting (optimized survey methods) and to identify data gaps and research questions (exposure of terrestrial migrants, flight heights and avoidance rates)

Participant questions & feedback:

- Some proportion of those unknowns may also be Roseate Terns
- What about tracking data, will you weight for tracking data we have?
 - Wing is open to discussion on how to incorporate tracking data. Don't want multiple data sets for same species. More qualitative incorporation of tracking data to help confirm or adjust other data sets.
- Some of these covariate relationships are not only uncertain, but also may not be static -- some variables seem to matter more in some years than others, even for the same species in the same locations (see Goyert et al 2016: https://www.researchgate.net/publication/299604060_Predicting_the_offshore_distribution_and_abundance_of_marine_birds_with_a_hierarchical_community_distance_sampling_model). So trying to also look at things like prey distributions, if we can obtain any of those data, would be helpful as well to develop better predictions of avian distributions.
- One of the slides discussed proportion of population exposed. What is the scale of population – state? range wide?
 - Wing responded that most broadly, thinking about population in MDAT models from Gulf of Maine to Florida. Could confine that just to the Gulf of Maine. What is your suggestion?
- For roseate terns, we have a small fraction here, but it would be worthwhile to think about how our small fraction of that highly endangered population uses the Gulf. If impacts are 100% of the roseate tern population in Maine, even if this is a small fraction of the population, then this is still very important.
- Do you see ways to expand current monitoring technologies/techniques to collect information on a very broad geographic area and/or technologies to be re-configured or are on the lab

bench that might be used? There seems to be a lack of fundamental data -which could result in slowing the understanding of impact and growth of the GOM wind sector.

- Wing thinks of baseline surveys that are aerial flights and boat-based surveys. Flights are difficult so mostly boat based or digital aerial surveys (depends on scale and types of information you want to get at). Boats are usually more cost-effective for a smaller area.
- Are there certain species that are ESA listed that we should focus on or how are we prioritizing?
 - ESA listed species included 3 bird species (roseate tern – highest priority, piping plover, and red knots), 1 bat specie (northern long eared bat).
- For the Arctic tern, Maine supports about 94% of the birds nesting in the lower 48 states. So, very important nationally.
- For Atlantic puffin and razorbills, Maine is the only state to support nesting populations of these two species.
- Is there a way to use the fishing ground usage data as a predictor of habitat uses for the wildlife in areas where we have little data?
 - Wing responded that yes, DMR data will be really important and we are starting to see these correlations. Further discussion needs to take place about quantitatively bringing information together or doing simple overlays.

Considering Array Configuration

- Amanda Cross (MEIF&W) provided some context for the potential array configurations and shared some graphics to consider. What do we mean by configuration? General features – we are not talking about final layout or micro-siting. Consider: 1) potential to reduce impacts to wildlife; 2) potential for new research questions
- Indicative wind farm geometry – talking about the elements of turbines above and below the water. Using 1 statute mile as a starting point as spacing between turbines.
- From a wildlife perspective to reduce impacts, seeking input on:
 - Configuration
 - Orientation of lease
 - Spatial distribution

Participant questions & feedback:

- Many arrays already installed are at less than 1 mile spacing. How did 1 mile (as opposed to some other number) become the starting point for the conversation? Is 12 the magic turbine number for the research array or just a discussion number?
- Spacing and number of turbines are dependent on several factors. One mile is a starting point, with probably between 10 – 12 turbines. For best efficiency, turbines should be spaced
- Are there examples from other types of large-scale infrastructure that has applied configurations chosen to minimize impact to wildlife? The special distribution grids presented are complete construction/operation biased.
- Pods vs lines - pods might allow for some birds to pass through vs. lines.
- Concern was expressed that it seems that the configuration discussion will be similar to the siting discussion. The perception is that the fisheries concerns and locations outweigh the

wildlife pieces and therefore a feeling that the wildlife input is less important. Therefore, would advocate for research array taking up less space.

- Participants advocated for more monitoring and mitigate as realistic.
- Paper that modeled bird movement based on array configuration <https://royalsocietypublishing.org/doi/full/10.1098/rsif.2012.0121>
- The smaller the overall footprint the better. Given some bird movement will be east/west and other birds will be moving onshore /offshore it seems like keeping the cluster small would be better.
- One suggestion was to look at predominant winds or currents. Based on flocking, a hybrid of lines and pods layout options with 3x2 above another 3x2 below with 2nm in between.
- In southern New England, developers adopted regular grid pattern at behest of local fishing industry, but maybe we don't need this for Gulf of Maine. Developers want prevailing winds and to reduce wake effect is actually something more random looking. Think about what's going on below the water, too, with the floating technology, wider footprint. 3D way of representing would be useful.
- Is there any information about whether the turbines could be attractive or repulsive to wildlife? For example, are some animals attracted to the noise/vibrations of the turbines?
 - Kate Williams (BRI) responded that some animals are attracted to artificial reefs around turbine foundations and scour protection though unclear how much this still holds true for floating designs. Some birds are also attracted to turbine platforms for perching (e.g. cormorants).
- There were concerns about a too tightly clustered configuration causing impacts to marine mammals with the type of floating technology being considered.
- It was suggested that it is good to think through the most likely configuration for larger scale floating OSW projects, then do in the research array so we gain knowledge for the future development. For birds, will birds be responding to individual turbines or if they perceive it as a full array – how to answer? Try to configure research array to be realistic for what commercial development will be. However, there was not universal agreement on this approach and others advocated for selecting the configuration that minimizes impacts first and foremost.
- A participant suggested there is opportunity for research around different anchoring systems. Can we try to test these within the research array? Do you need different substrate to test the different anchoring systems? If you do, does the lease area have to be one continuous block or can there be two separate blocks to try anchoring in different substrates?
 - Celina Cunningham (GEO) responded that it would be preferable to have one lease area to minimize impacts, but if compelling reasons otherwise, the state would consider other options. Lots of engineering into these different layout options and there are some technical practicalities to consider with different substrates and different depths.
 - Chris Wissemann (NEAV) offered that NEAV is keenly interested in trying different anchoring and mooring line configurations and predicts that there will be different substrates in one lease area. Economically, the two blocks would need to be near one another because of the cost of running the cable between the two.
- Can birds sense windmills in conditions of fog or at night when the windmills have powerful lights on?

- Linda Welch (USF&W) responded that some birds are significantly attracted to lights at night, increasing collision risk.
- Here's an older study that looks at the risks for nocturnal migrants during poor visibility: https://www.researchgate.net/publication/227769181_Bird_migration_studies_and_potential_collision_risk_with_wind_turbines

Generating Research Ideas

Key Questions:

1. What baseline data and initial monitoring should be considered prior to project operation?
2. What key questions should the research array investigate to better understand potential interaction of floating turbines with wildlife and the marine environment?

Marine Mammals

1. *What baseline data and initial monitoring should be considered prior to project operation?*
 - There is real value in getting baseline data from pre-construction to understand how those changed during and post construction
 - Baseline plastics data, if they are using plastic moorings how will those degrade over time
 - Ambient noise levels, what are the natural noise levels in the area
 - Get the baseline noise before you look at the noise from construction and operation
 - Aerial surveys and passive acoustics, could vary inter-annually so having a multiyear survey prior to construction would be beneficial
 - Summary of marine mammal data, and seeing what data gaps we have and what data gaps needs to be filled, both temporally and spatially.
 - Key to minimizing interactions with boat traffic
 - Understanding the flow dynamics and currents in the area because the turbine farm may impact the oceanography of the area
 - Distribution of prey species like herring in the area of interest
 - Survey (ORV) on deep sea corals to map out where they are to minimize the impact
 - Marine mammal distribution before, during, and after construction in the research array
 - Impacts of EMF on marine mammals
 - Directed economic surveys on fisheries
2. *What key questions should the research array investigate to better understand potential interaction of floating turbines with wildlife and the marine environment?*
 - Considerations that study the balance between how these turbines will impact marine mammals, bird and bats, and fish and how we can find the balance between all of those
 - Siting in one spot may minimize the impact to birds and bats, but will have a greater impact on marine mammals
 - How do we determine where to site the array when the impacts on different species are not the same in space and time in the area of interest?

- Are there species that have a higher priority for minimizing the impacts from the array?
- How sensitive are species to disturbances caused by the turbines?
 - Will the added stressors of floating turbine construction and operation have an impact on marine mammals? Will it increase strandings?
- How will marine mammals respond to the addition of more vertical lines from the turbines?
 - Will the addition of vertical lines from offshore wind offset the reductions the lobstermen are being required to do?

Birds and Bats

- Multiple people pointed out there is an opportunity to learn a lot from this project to help evaluate future offshore and even terrestrial wind developments
- Research suggestions included testing technology (e.g., collision detection technology, accelerometers UV lights as a deterrent, nanotags), and evaluating impacts of underwater noise on diving birds
- Concern was expressed about birds navigating in the fog because they tend to fly lower which could increase collision risk
- There was some caution expressed about MDAT because it is low resolution, and therefore is not appropriate for fine scale evaluations
- There was a suggestion to look at realistic areas for offshore development and do more wildlife surveys
- There was a suggestion that we need to collect data before and after construction in the specific area and a broader area so our findings can be applied to a larger area, and allow us to learn more about displacement from the project area
- Research on offshore wind in Norway was brought up as a possible resource for evaluating the project, but it was cautioned that there were smaller turbines and distances between them
- Lighting of the structures was discussed, with it being said that white light is bad because it acts as an attractant and has led to large migratory fallouts around lighthouses
 - The FAA will require red lights on top, and the Coast Guard will require low amber colored navigation lights, so there may not be much white light generated by the project, except in areas where people are working
 - Aircraft detection lighting is possible, thereby reducing the FAA's lighting requirements
- Specific research questions:
 - <https://docs.google.com/spreadsheets/d/1qbiRiBJYpmbu8GafG2h9IPCel0AzZFEXqUUowm2ETUI/edit#gid=0>

Additional Research Feedback

Using an on-line tool, participants were asked to respond to the following prompt and input their ideas into a common database. Participants could put in as many ideas as they liked and they were allowed to

“upvote“ others’ ideas (only a single time). This was not a deliberative ranking exercise, but allowed a sense of energy and enthusiasm from the group to emerge around more compelling ideas.

“Of the ideas discussed today, what's the most compelling research question to prioritize?”

Question/Topic/Idea	Upvotes
What are the behavior changes for wildlife with respect to the array?	20
Gulf of Maine scale comprehensive wildlife survey.	16
Real time automated data collection using latest technologies related to wildlife presence/migrations, hand held and vessel equipped.	12
What is the abundance and distribution of birds in and around the research array?	11
Understand how marine mammals interact with floating offshore wind and how anchor chains and/or transmission cables affect marine mammals?	9
[Impact on marine] Mammals whales noise and EMF.	8
Important to define baseline and ambient conditions.	8
Promoting development of offshore wind-ready collision detection technology.	8
Researching technologies that are more effective at avoiding/minimizing impacts to bats and birds than current deterrent methods, i.e. UV illumination.	7
What is out there? Baseline data.	6
Secondary entanglements of fishing gear and potential risk to marine mammals.	6
Noise, EMF, and structure effects on all pelagic species.	6
Changes in water column flow dynamics and impacts to zooplankton and other prey species.	6
Compare inside and outside of array and to wind farms further south.	5
What are the best long-term questions to ask when hundreds of turbines will be asking for natural resource leases across the Gulf of Maine?	4
Baseline data on habitat parameters.	3
EMF impacts- especially lobster and groundfish.	3
Fill data/knowledge gaps in economics. How is the area valued in space and time by key stakeholder?	3
Real time follows or tagging of marine mammals to see how they interact around turbines and cables.	3
Can the wind farms act as type of marine sanctuary? How many fish will be attracted to the floating structures?	3
Potential for entanglement from cables.	2
Potential attraction of birds and bats to offshore turbines and collision risk	2
Level and timing of bat activity in the marine environment	2

What might we learn from OSW work in Western Pacific- China, Japan Taiwan etc.?	2
Deep sea corals.	2
How floating offshore wind affects benthic habitats?	2
How will lobstermen feel about the wind farm being allowed to add more vertical lines?	1
Understand the interaction with large whales and marine mammals.	0
What is the actualized detrimental impact to marine wildlife that *would* cause harm not just *might*?	0
What steps can immediately be taken to add research efforts to existing off-shore in Europe, that could help more direct research in GOM?	0