ASSESSING THE IMPACT OF ROSA'S MONITORING GUIDELINES ON OFFSHORE WIND PROJECT DEVELOPMENT

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Executive Summary

37 active offshore wind project leases are managed by the Bureau of Ocean Energy Management (BOEM), spanning the Atlantic, Gulf, and Pacific regions. While offshore wind expansion brings opportunities for renewable energy and fisheries research, it also raises concerns about its impact on the marine environment and industries reliant on it. The Responsible Offshore Science Alliance (ROSA), founded in 2019, is a nonprofit dedicated to advancing research and fostering collaboration between the fishing industry, offshore wind developers, and other stakeholders. ROSA published Monitoring Guidelines in 2021 to provide Construction and Operations Plan (COP) framework guidance. Despite progress, there remain challenges in balancing offshore wind development with fishing industry concerns, highlighting the need for ongoing research and science-based communication to inform policy and management decisions.

The following research questions will be answered through this analysis:

How are developers and consultants utilizing (or not utilizing) ROSA's framework in their COPs?

What aspects of the guidelines are most relevant to developers?

What management strategies can ROSA adopt to better engage with the fisheries and offshore wind community to improve future guidelines?

The analysis focused on Construction and Operation Plans published or republished since March 2021 to assess the incorporation of ROSA into monitoring and mitigation plans. COPs provide project overviews and detailed appendices on environmental and industry impacts, including fisheries communication, habitat assessments, mitigation and monitoring, and stakeholder engagement. This study used a systematic literature review (SLR) approach to identify and code references to ROSA. The analysis cataloged mentions of ROSA and coded them for common themes, revealing multiple references to ROSA across several COPs and highlighting its varied roles within these plans.

The analysis examined nine Construction and Operation Plans (COPs). Five major themes emerged in the references to ROSA: collaboration, use of scientific best practices, stakeholder involvement, research and monitoring standardization, and data-sharing protocols.

The analysis led to three key recommendations:

1. **Outreach to Mid-Atlantic Projects**: Focus on collaboration with wind farms south of New Jersey, particularly in Maryland, Virginia, and North Carolina, where ROSA's guidelines were minimally referenced or absent. Early engagement can help standardize fisheries monitoring in southern U.S. Atlantic regions.
2. **Stakeholder-Centered Research**: Incorporate stakeholder-driven research designs into monitoring and mitigation efforts to better understand the impacts of offshore wind on affected communities. ROSA can advocate for regional research that integrates social sciences and prioritizes collaboration with fisheries communities.
3. **Data Sharing Framework**: Develop standardized protocols for data saving and sharing across projects. Leveraging ROSA's Fish Forward database as a model can streamline data sharing and communication among projects, researchers, and the public, addressing gaps in regional fisheries monitoring.

Introduction

The Biden administration has set a goal of deploying 30 GW of offshore renewable energy by 2030. As of September 2024, ten commercial-scale offshore wind projects have been approved, totaling 15 GW of renewable energy once operational. 37 active leases are currently approved by the Bureau of Ocean Energy Management (BOEM), bringing opportunities for renewable energy and research to the Atlantic, Gulf, and Pacific. With the growing offshore wind industry comes uncertainty to the impact wind farms will have not only on the marine environment, but also on the industries that depend on the marine environment. The expansion of offshore wind offers an opportunity for large-scale monitoring and research in the fisheries space (Perry & Heyman, 2020).

The impact on regional fisheries is still a topic of research and there has been continued engagement with the fishing industry. Despite outreach and involvement, conflicts still arise between the fishing industry and the offshore wind industry. A need for neutral, science-based communication between fisheries and offshore wind was identified. Given the requirements for continuous research and monitoring on fisheries, offshore wind development presents an opportunity for cooperative, regional monitoring that can inform policy makers and marine managers.

The Responsible Offshore Science Alliance (ROSA) is a nonprofit organization that advances research, monitoring, and methods on the effects of offshore wind energy development on fisheries across US federal and state waters. ROSA serves as an objective resource for all sectors and facilitate the coordination of regional scientific research to collaboratively and efficiently deepen understanding. ROSA was founded in 2019 and worked to collaborate with the fishing industry, offshore wind development, academia, state and federal agencies, and other

sectors to further regional research (rosascience.org). In 2021, ROSA published its first edition of guidance for monitoring and mitigation for fisheries. This document is one of the first efforts to establish consistent guidelines for offshore fisheries research. Since its release, nine Construction and Operation Plans have been published. ROSA is currently revising and updating its guidelines and expanding to cover benthic environments and socioeconomic impacts. ROSA does not yet know they extent of the impact their guidelines had on COPs published since 2021.

Problem Statement

As ROSA is a nonregulatory non-profit, the organization can provide guidance but cannot enforce their recommendations. ROSA is increasingly tasked to provide guidance in the fisheries and offshore wind space, and consistently works to ensure that they are utilizing the best available science and methods in their recommendations. The Guideline's scope of use has yet to be determined since the COPs have been revised and published post-2021.

Thus, an assessment of currently published COPs and their inclusion (or exclusion) of ROSA's guidance for fisheries monitoring and research methods is needed. This assessment will inform ROSA of their impact in COPs and will identify any gaps in their current recommendations.

The following research questions will be answered through this analysis:

How are developers and consultants utilizing (or not utilizing) ROSA's framework in their COPs?

What aspects of the guidelines are most relevant to developers?

What management strategies can ROSA adopt to better engage with the fisheries and offshore wind community to improve future guidelines?

Literature Review

Ecosystem level fisheries development has historically lacked consistent principles and goals at a global scale (Garcia & Cochrine, 2005). Contradicting priorities at the top-level increase uncertainty in research and monitoring focus in marine fisheries management (Lackey, 1974; Mather et al., 1995). Ecosystem-based management addresses the need for a profitable stock while balancing population management through improved scientific understanding (Gullestad et al., 2017). One part of successful fisheries management is capacity building (Garcia & Cochrine, 2005). Capacity building in fisheries management requires functional interconnectedness between the fisheries industry, researchers, and regulatory bodies. Macher et al. (2018) discusses the success in bio-economic tools in fisheries management. This speaks to the importance of ecosystem level monitoring with the inclusion of economic and social indicators. Organizations that prioritize communication between these sectors can direct resources to relevant areas of focus. ROSA is one such organization that operates in the capacity building space to increase communication and data sharing between offshore wind projects and researchers.

Commercial and recreational fisheries industries have been impacted by offshore wind development. While there is extensive impact to fish stocks, the outcomes of change at the ecological and socioeconomic level are not fully understood (Gill et al., 2020). Additionally, the overlap between offshore wind farms and benthic, pelagic, and demersal species needs to be better understood and consistently monitored across regions (Methrata, 2020). Monitoring and mitigation plans are created by developers and environmental consulting groups with some guidance from BOEM. However, there is no standardized approach to research monitoring or mitigation outside of National Oceanic and Atmospheric Administration (NOAA) fisheries and

BOEM proposed guidance. Regional and collaborative monitoring efforts are in fact still developing in the U.S. (Allen & Campo, 2020). Methratta, Lipsky & Boucher (2023) found that current project-level monitoring is not suitable for NOAA fisheries survey mitigation, indicating a gap in the level of data projects are currently collecting or are planning to collect. This gap can be addressed by expanding monitoring efforts and incorporating population level monitoring to project monitoring plans. There have been calls for holistic, ecosystem-level management strategies for fisheries as understanding the interactions between species leads to better stock management overall (Mid-Atlantic Fishery Management Council, 2019; Eger et al., 2022; Ore Catapult, 2024). As offshore wind expands, incorporating ecosystem level monitoring within and between lease areas can lead to an increased understanding of how wind farms impact fisheries across regions.

Several studies and reports have been published through BOEM to provide guidance for monitoring and mitigation in marine renewable energy development (McCann, 2012; Ecology and Environment, Inc., 2014; Petruny-Parker et al., 2015; Secor, 2018). Developing a framework for monitoring and mitigation is crucial to determine short-term, long-term, and population-level effects on the populations of interest (Williams et al., 2024). Currently, federal regulations and state-mandated monitoring priorities make up a patchwork of monitoring activities for individuals projects (Gill et al., 2020). This method makes it challenging to conduct fisheries research at the appropriate scale to determine ecosystem-level impacts of offshore wind development. Current monitoring efforts are not producing ecosystem level data. As the coastal environment continues to be developed, it is important to approach monitoring strategically and reduce ‘data-rich, information-poor’ research efforts and to instead focus on producing regionally relevant data that can inform ecosystem management and regulatory efforts (Wilding et al.,

2017). This problem in monitoring and resource management continues to be an issue in the offshore space. A recently published review article found that 86% of possible offshore wind farm effects on ecosystem services is unknown or not well understood in the peer-reviewed literature (Watson et al., 2024). Additionally, effective monitoring plans are often difficult to develop due to a lack of information sharing among peers on what is successful in a monitoring plan (Zollett et al., 2015). Incorporating key environmental covariates into monitoring techniques would improve outcomes in offshore wind monitoring plans (Chapman et al., 2024). In order for a robust understanding of these covariates, information sharing needs to occur. Boenish et al. (2020) emphasizes the importance of an understanding of biological and socioeconomic aspects of a fishery along with a continuously improving relationship between project staff, researchers, and fisheries stakeholders to ensure optimal monitoring outcomes. Fisheries stakeholders have been increasingly involved in the offshore wind development process (Bureau of Ocean Energy Management, 2013). This additional resource to developing monitoring and mitigation standards is crucial to develop a holistic standard. Offshore wind development in the Atlantic serves as an opportunity for researchers and project managers to gather and share multi-year ecosystem level data to better inform management strategies across the region. Standardizing how this data is collected, stored, and shared will improve the understanding of how offshore wind impacts fisheries and the marine environment.

Methods

The data from this analysis Construction and Operation Plans (hereby referred to as COPs) that have been published or republished since March 2021 (after the ROSA Monitoring Guidelines were published). This source will be used to identify if and how ROSA is incorporated into monitoring and mitigation plans. COPs are comprised of a project overview

and several appendices detailing how developers plan to address potential impacts to the environment and industry. The sections of the COP included in this analysis are Fisheries communication and outreach plan; Essential fish habitat assessment; Fisheries mitigation and monitoring; Fisheries and benthic monitoring plan; Summary of agency and stakeholder engagement. There is no set guideline for titles and formatting for COPs so the appendices placement and titles may vary slightly between projects.

I analyzed COPs and coded the references to ROSA using a systematic literature review (SLR) approach to determine how often ROSA is referenced and in what capacity they are included in COPs. I catalogued the information that included ROSA. Several COPs mentioned ROSA in multiple capacities. I coded the portions of text that referenced ROSA to determine common themes.

Results

Nine COPs were included in the analysis. Seven of the nine published COPs included ROSA to some extent in their Project Description and appendices. The two wind projects that did not reference ROSA were Kitty Hawk North in North Carolina and Maryland Offshore Wind. Five major themes emerged from the analysis. References to ROSA included: collaboration, utilizing scientific best practices, stakeholder involvement, research and monitoring standardization, and data sharing protocols. Table 1 identifies which themes were found in each project COP.

Wind Project	Theme				
	Collaboration	Monitoring & Research Design Standardization	Scientific Best Practices	Stakeholder Engagement & Outreach	Data Storage & Sharing Protocols
Ocean Wind 1	x				
Atlantic Shores South	x	x		x	
Atlantic Shores North		x	x	x	x
Sunrise wind		x		x	x
Empire Wind	x	x			x
South Fork Wind				x	
CVOW-C				x	

Table 1: Thematic scorecard of each wind project that referenced ROSA

Below is a description of each theme in the context of COP submissions.

Collaboration

Developers emphasized their willingness to collaborate with researchers, stakeholders, agencies, and the public throughout the offshore wind development process. ROSA was consistently included as an example for developers to show how they work with relevant stakeholders. Examples provided in COPs included attending ROSA meetings, helping to found ROSA, and sitting on ROSA's board.

Stakeholder involvement

ROSA was included in stakeholder involvement for all seven of the projects. Two of the developers were founding members of ROSA and discussed the extent of their involvement in the organization. Involvement ranged from attending meetings to being on the board. Fishing industry representatives hired by the developers to work with the fishing industry were also included in ROSA meetings. Developers also highlighted that engagement would continue from pre-construction through decommission.

Research & monitoring design standardization

Several developers emphasized the importance of standardizing monitoring, surveying, and research methods across regions to better understand the impact of offshore wind development on the environment. Developers indicated ongoing collaboration with ROSA to develop standard research designs. Research, monitoring, and mitigation standardization were all emphasized in the COPs.

Scientific best practices

ROSA was included as an example of an organization that developers are looking to for best practices and several developers discussed collaborating with ROSA to ensure their research and monitoring designs meet industry standards.

Data storage & sharing

Developers overall were willing to work with ROSA and defer to recommendations on data sharing and data dissemination. Developers were open to protocols for data storage and sharing across projects to be informed by organizations such as ROSA.

Overall, ROSA is included as an outreach facilitator for stakeholders in the fisheries and offshore wind space. Some COPs relied on the Monitoring Guidelines to inform fishery survey techniques and monitoring plans as best practices. Some projects also referenced ROSA as an organization to look to for data protocol development.

Recommendations

The following recommendations have emerged from the results of this analysis.

Outreach to projects in the mid-Atlantic region

Prioritize collaboration with southern wind farms (south of NJ). Working with these projects as they move forward in the leasing process will help to create a standardized approach to fisheries monitoring in southern regions of the U.S. Atlantic coast. Projects in Maryland,

Virginia, and North Carolina did not include ROSA's guidelines or had minimal references. This indicates there is opportunity for outreach in these regions.

Stakeholder-centered research

Implement stakeholder-centered research design into monitoring and mitigation to better understand impacts of offshore wind development on impacted communities. From this analysis, several developers look to ROSA as a stakeholder entity that engages with the fisheries community. As developers acknowledge the importance of working in this space with impacted communities, ROSA is able to advocate for a stakeholder-centered approach to regional research

efforts that incorporate the social sciences to research design.

Develop a framework for data sharing protocols

Several projects discussed the intent to look to ROSA for guidance on data saving and data sharing protocols. As research and monitoring efforts produce survey data, ROSA is in a position to advise on how that data should be shared and communicated between projects, researchers, and the public. ROSA is already capturing research initiatives and gaps in regional fisheries monitoring with their Fish Forward database. Leveraging fish forward to develop a similar database or framework would help to standardize data sharing in offshore wind and fisheries.

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Appendix

state	wind project	developer	Consulting groups	COP approval date	cites ROSA (y/n)	theme
MD	Maryland Offshore Wind	US wind	Sea Risk Solutions	Jul-24	no	
NC	Kitty Hawk North	Avangrid			no	
NJ	Ocean Wind 1	Orsted	HDR		y	collaborative research; founding member
NJ	Atlantic Shores South	Atlantic Shores	EDR, Epsilon associates	Dec-21	y	scientific expertise sharing, community engagement for recreational and commercial fisheries; emphasizes being a founding member; monitoring plan heavily influenced monitoring plan ofr this project; fishing industry reps participate in ROSA as needed to represent fishing industry
NJ	Atlantic Shores North	Atlantic Shores	Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. Epsilon Associates, Inc.	Apr-22	y	vessel monitoring system data; meetings and community involvement; ROSA referenced to enhance fisheries monitoring plan; stakeholder guidance; sampling and scientific best practices; expectation that ROSA will contribute to data storage and sharing
NY	Sunrise wind	Orsted		Dec-23	y	stakeholder engagement; participation in two ROSA meetings; monitoring/sampling design standardization; trawl survey; data access/data sharing
NY	Empire Wind	Equinor	Tetratech	Feb-24	y	baseline data characterization for monitoring and research of benthic and fisheries data; consult with ROSA on research for monitoring for potential impacts; willing to explore collaborative research with ROSA; data standardization; data sharing protocols
NY	South Fork Wind	Orsted		Jan-22	y	outreach
VA	CVOW-C	Dominion Energy		Jan-24	y	stakeholder engagement

Figure 2: SLR Thematic notes