

Fisheries and Offshore Wind: Synthesis of the Science I & II

Fiona Hogan, Elizabeth Methratta, Angela Silva, Andrew Lipsky, Anne Hawkins, Lane Johnston, Brandon Jensen, and Brian Hooker



**NOAA
FISHERIES**



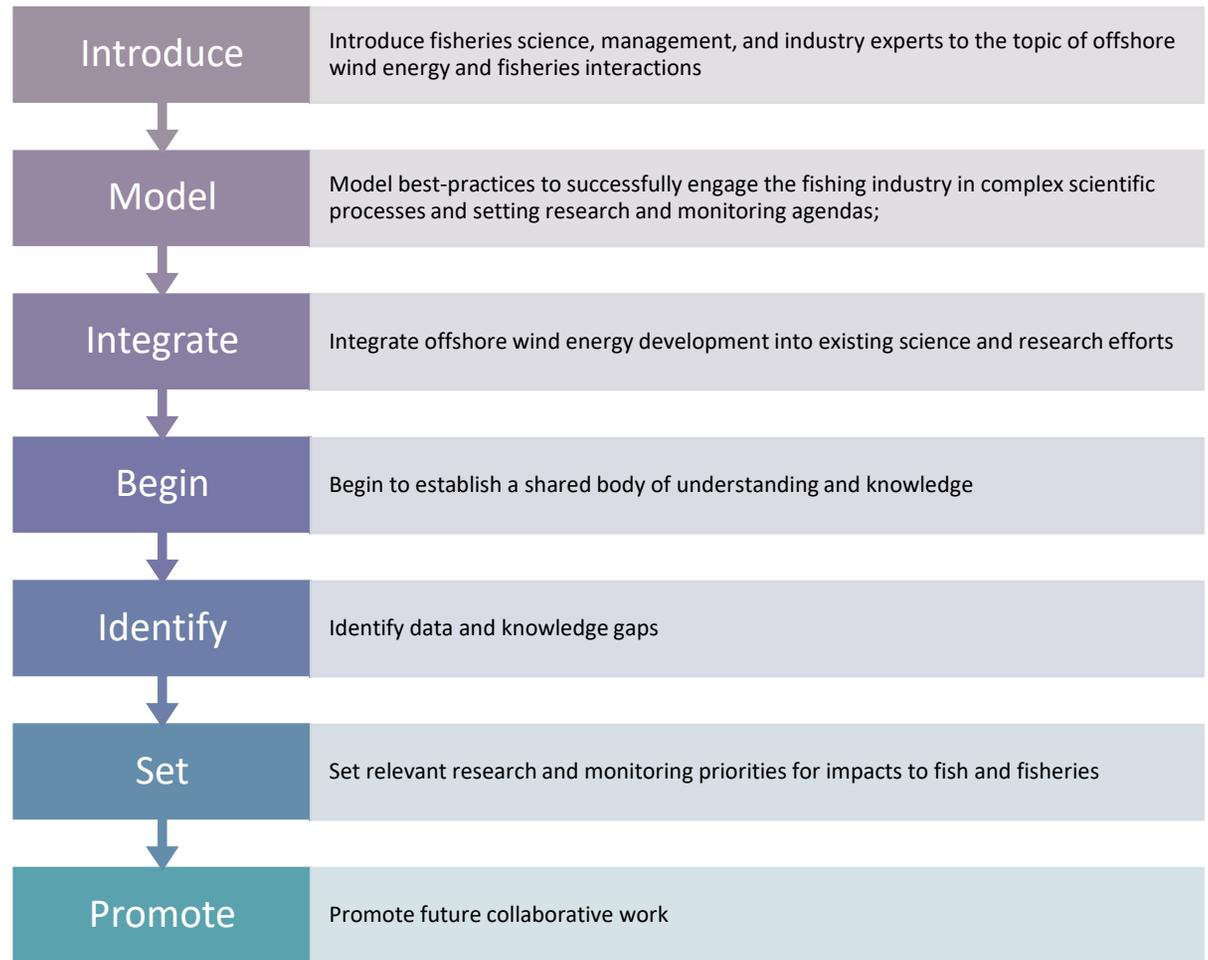
Synthesis of the Science: Fisheries and Offshore Wind Energy I & II

- Project Partners:
 - NOAA Fisheries
 - BOEM, states, offshore wind developers, tribes, environmental community
- Phase I
 - Workshop in late 2020 – videos of plenary sessions can be found here - <https://rodafisheries.org/portfolio/synthesis-of-the-science/>
 - Panels consisted of academic researchers, fishermen, offshore wind experts, and state/federal agency employees – recordings available on RODA's website
 - Report scheduled to be published in 2023
- Phase II
 - Specific to floating wind technology
 - Pending steering committee discussion, timeline through spring 2024

Project Rationale

- **Why develop the *Synthesis of the Science*?**
 - Unprecedented pace of offshore wind development in the U.S.
 - Urgent need for shared understanding of science
- **In 2019, NOAA, BOEM, and RODA entered into a memorandum of understanding** to explore potential collaborations on issues of mutual interest, including:
 - Effectively **engaging local and regional fishing interests** in the offshore wind development process;
 - Identifying the most effective ways to **bring fishing industry expertise and information into planning and development processes**; and
 - Developing a **collaborative** regional research and monitoring framework to ensure decisions are based on the best available science

Project Objectives



Workshop Objectives

1. Present the report framework and high-level overview of key topics by section;
2. Initiate dialogue between authors and among participants to frame issues and facilitate research networks;
3. **Identify important constituents and groups to work with the authors during the drafting process to ensure inclusive representation in the report and for recommendations of future research priorities;**
4. Inform and advance ROSA's regional science efforts through the synthesis of information across expert networks.

Workshop Elements

- Panel discussions with moderated Q&A
- Panelists included fishermen; academic, federal and state scientists; Council; regulators; managers
- Breakout sessions
- U.S. and European scientists
- Total attendance:
 - 358 attendees on day 1
 - 310 attendees on day 2
 - 297 attendees on day 3

Industry Involvement in the Workshop was crucial to framing the *Synthesis of the Science* NOAA Tech Memo

- RODA reached out to industry members and invited participation by individual fishermen
- Number of industry participants = **50**
- Identified key concerns such as:
 - Fisheries interactions
 - OSW impacts on fisheries advice and management
 - Specific species and taxa
 - Impact producing factors

NOAA Tech Memo Objectives

1. Synthesize existing knowledge on ecosystem, socio-economic, and fisheries management/data collection effects, and methods/approaches for research and monitoring, in order to examine how fisheries and fisheries resources interact with offshore wind;
2. Identify gaps in knowledge and make specific recommendations for future research needs to enhance our understanding of these interactions; and,
3. Establish a shared body of knowledge for industry, regulators, and fisheries managers to draw from.

NOAA Tech Memo Sections

1. Ecosystem Effects
 - A. Benthic Habitat Modification
 - B. Physical Habitat Modification
 - C. Interactions of OSW with Oceanographic Processes
 - D. Ecosystem Synthesis: Phyto/Zoop, Demersals, Small Pelagics, Large Pelagics/HMS, Shellfish/Crustaceans, Community Interactions
2. Fisheries Socioeconomics
 - A. Fishing Operations effects
 - B. Fisheries Economic Impacts
 - C. Fisheries Socio-Cultural Effects
3. Fisheries Management and Data Collections
 - A. Fisheries Dependent Data Collections
 - B. Interactions of OSW on federal fisheries independent surveys
 - C. Impacts of OSW energy development on fisheries management
4. Methods and Approaches
 - A. Cumulative Impacts
 - B. Integrated Ecosystem Assessment
 - C. Innovative Monitoring Approaches and Technologies
5. Regional Science Planning
 - A. Regional Science Planning
 - B. Fishing Industry Identification of Research Priorities

Consistent Elements included in each Section of the NOAA Tech Memo

1. Description of the state of our knowledge and understanding on this topic with regard to interactions with offshore wind
 2. Identification of major knowledge gaps
 3. Characterization of the perspectives of commercial and recreational fishing communities on this topic (e.g., anticipated impacts or consequences, suggested research topics and approaches)
 4. Recommendations for future directions/studies (These could be presented as key questions or hypotheses and/or potential methods)
- All sections underwent independent peer-review followed by technical review at the NOAA NEFSC

Industry was Involved from Initial Phases to Final Product

- RODA reached out to industry members and invited participation by individual fishermen
- Number of industry participants = **50**
- Authored, contributed content, edited content, provided critical review

Benthic Habitat - Introduction

- Installations introduce sediments and hard substrata
 - Turbines serve as hard structure for habitat
 - Potential for artificial reef effect
- Sand habitat also affected
- Scale of impact
 - Species
 - Spatial
 - Temporal

Benthic Habitat - Major Gaps in our Knowledge

- Primary criteria: focus on certain focal species of importance (i.e., receptors)
 - Commercial and recreational species and their associated Essential Fish Habitat (EFH)
 - Forage species
 - Federally protected species
- Secondary criterion: risk assessment
 - What is the likelihood of occurrence and effect size (i.e., magnitude of effect)?
- Tertiary criteria: information return on technological and financial investment
 - Technical complexity of studies
 - Scale in space and time
 - Factors evaluated (e.g., depth, position within array, habitat type)
 - Financial implications

Benthic Habitat - Perspectives of the Fishing Industry

- Main concerns
 - Concentrating fish and fishing pressure
 - Introduction of invasive/nonindigenous species
 - Contaminants introduced by construction materials
 - Untowable bottom
 - Reduced access to area in wind energy area
 - Can't switch target species depending on permits owned
 - Scale of construction in U.S.
 - No restrictions on number of leases
 - Work needed on gear coexistence
 - Potential for new fisheries

Benthic Habitat - Recommendations

- What are the impacts to regional availability of fish?
 - Benthic organisms are basis of food web but don't know how food web might be affected
 - Focus should be on:
 - Carbon flow in the vicinity of wind turbines
 - Carbon flow models accounting for spatiotemporal dynamics of selected fish species
 - Identification of "baseline" benthic conditions
 - Barriers
 - Financial

Fishing Economics

- Changes in CPUE
 - DAS Effects/Time to Market
 - Bycatch Composition Shifts and Changes in CPUE
- Direct Cost Effects
 - Crew/Labor and Fuel Costs
 - Cost of insurance
 - Cost of Moorage
- Revenue, Income, and Livelihoods
 - Support Businesses
 - Product Quality Effects

Fishing Economics - Major Gaps in our Knowledge

- A lot is unknown
 - Scale of economic impacts
 - If fish population shifts, what impact does that have on revenues, CPUE?
 - Crew/labor costs
 - Fuel Costs
 - Cost of insurance, moorage
- Preliminary work or discussions on the topics covered in this section
 - Revenue data available but limited regional analysis to quantify changes

Fishing Economics - Recommendations

- Standardized data collection (surveys and protocols) to allow comparison across studies
- Focused studies to fill gaps in all the topics covered here
- Mitigation

Fishery Dependent Data

- Contingent on the ability of fishing to occur
- Physical obstacles or management restrictions can impact FDD
 - For example, offshore wind turbines present physical obstacles and/or cause changes to local ecology
 - Potential response of fishing to OSW – avoidance
 - Could change behavior at sea

Fishery Dependent Data - Major Gaps in our Knowledge

- Accuracy, completeness, precision
- VTRs reported at the statistical area level
- Research questions
 - Link to economic impacts
 - Verification of area fished
 - Spatial resolution

Fishery Dependent Data - Perspectives of the Fishing Industry

- Cooperative Research is essential
 - Responsible Offshore Development Alliance
 - Fisheries Knowledge Trust
 - Ocean Data Portals Project
 - Science Center for Marine Fisheries (SCeMFIS)
 - Impacts to the Mid-Atlantic cold pool
 - Review of the Vineyard Wind Supplement to the Draft Environmental Impact Statement

Fishery Dependent Data - Recommendations

- Improving access to fishery dependent confidential data by non-federal scientists
- Improving spatial and temporal resolution of FDD to better understand fisheries behavior and needs in relation to OSW, etc.
- Discuss and address impacts to FDD in the event fewer trips are taken or if areas shift and lose data from an area
- Examine the different scales and types of FDD submitted by various fisheries and fishery/gear type
- Explore alternative metrics of economic impacts beyond ex-vessel value
- Expand investigations into data related to “support businesses” for fisheries

Fishery Independent Data Collection - Impacts

- (1) **Preclusion** – The developments preclude safe operations of survey vessels and aircraft because of the presence of wind turbines and connecting electrical cables.
- (2) **Habitat changes** – The wind turbines and electrical cables alter habitat, which may affect the distribution, abundance, and vital rates of marine animals. If these changes are significant and are not observed through scientifically robust monitoring, resulting survey indices could become biased and impact fisheries managers' ability to accurately monitor stock status.
- (3) **Changes in statistical design** – Many NOAA surveys are based on a stratified random statistical design that will be disrupted by wind development; fixed station and transect designs may also be impacted.
- (4) **Reduced sampling productivity** – Navigation impacts of wind infrastructure can decrease the ability to collect data that are already limited by annual sea day allocations by increasing vessel transit times between stations and reducing the amount of area that can be sampled.

Fishery Independent Data Collection - Major Gaps in our Knowledge

- Best practices for adapting survey design and methodology
- Approaches for accounting for differences in species distribution, abundance on stock assessments and conservation of protected species
- Quantification of stock assessment impacts
- Quantification of changes in habitat and effect on availability of species to surveys

Fishery Independent Data Collection - Perspectives of the Fishing Industry

- Inclusion of commercial and recreational fishermen in all aspects of planning of OSW
- Cooperative efforts
 - RODA
 - ROSA
 - NEAMAP
 - NTAP
 - Cooperative research programs

Fishery Independent Data Collection - Recommendations

- **Evaluate survey designs:** Evaluate and quantify effects and impacts of proposed project-related wind development activities on scientific survey operations and on provision of scientific advice to management.
- **Identify and develop new survey approaches:** Evaluate or develop appropriate statistical designs, sampling protocols, and methods while determining if scientific data quality standards for the provision of management advice are maintained.
- **Calibrate new survey approaches:** Design and carry out necessary calibrations and required monitoring standardization to ensure continuity, interoperability, precision, and accuracy of data collections.
- **Develop interim provisional survey indices:** Develop interim indices from existing data sets to partially bridge the gap in data quality and availability between pre-construction and operational periods while new approaches are being identified, tested, or calibrated.
- **Wind energy monitoring to fill regional scientific survey data needs:** Apply new statistical designs and carryout sampling methods to effectively mitigate survey impacts due to offshore wind activities for the 30+ year operational life span of offshore wind energy projects.
- **Develop and communicate new regional data systems:** New data collections will require new data management infrastructure, analysis, management, dissemination, and reporting systems. Changes to surveys and new approaches will require substantial collaboration with fishery management, fishing industry, scientific institutions, and other partners.

Cumulative Impacts

- Evaluates the combined impact of past, present, and near future projects to determine overall effect on environment
- Challenge of understanding interactions between marine environment and offshore wind development
 - Multiple developments proposed in short term
 - Cumulative buildout of all projects
 - Other stressors

Cumulative Impacts- Major Gaps in our Knowledge

- Assumptions about impact producing factors
- Offshore wind technology and project planning
 - Cables
 - Construction vessel availability
 - Job creation
 - Port changes
- Generalized Impact Assessment

Cumulative Impacts - Perspectives of the Fishing Industry

Concern regarding quantity and quality of cumulative impact assessments in U.S.

Perceptions of fishing industry may introduce bias

Cumulative Impacts - Recommendations

- synthesis of available lessons learned from other cumulative impact assessments;
- incorporation of more representative spatial and temporal scales;
- consideration of new advancements in wind technology;
- dedicated assessments of site-specific pressures and potential impacts across ecological receptors;
- further understanding of the footprint of spatial and temporal scales;
- research into the long-term (i.e., 30-year OWD lifespan) effects of offshore wind development;
- dedicated pressures resulting from climate driven impacts (e.g., temperature, oxygen, and pH) changes across commercial species and areas of main activities;
- programmatic CIA conducted on appropriate scale for development in U.S. waters;
- inclusion of greenhouse gas analyses within the CIA to improve the public's understanding of full-scale impacts; and
- outreach and dissemination of key areas and activities that will need to be restricted (e.g., pile-driving noise over fish spawning areas and or/ nursery areas)

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