



**NOAA
FISHERIES**

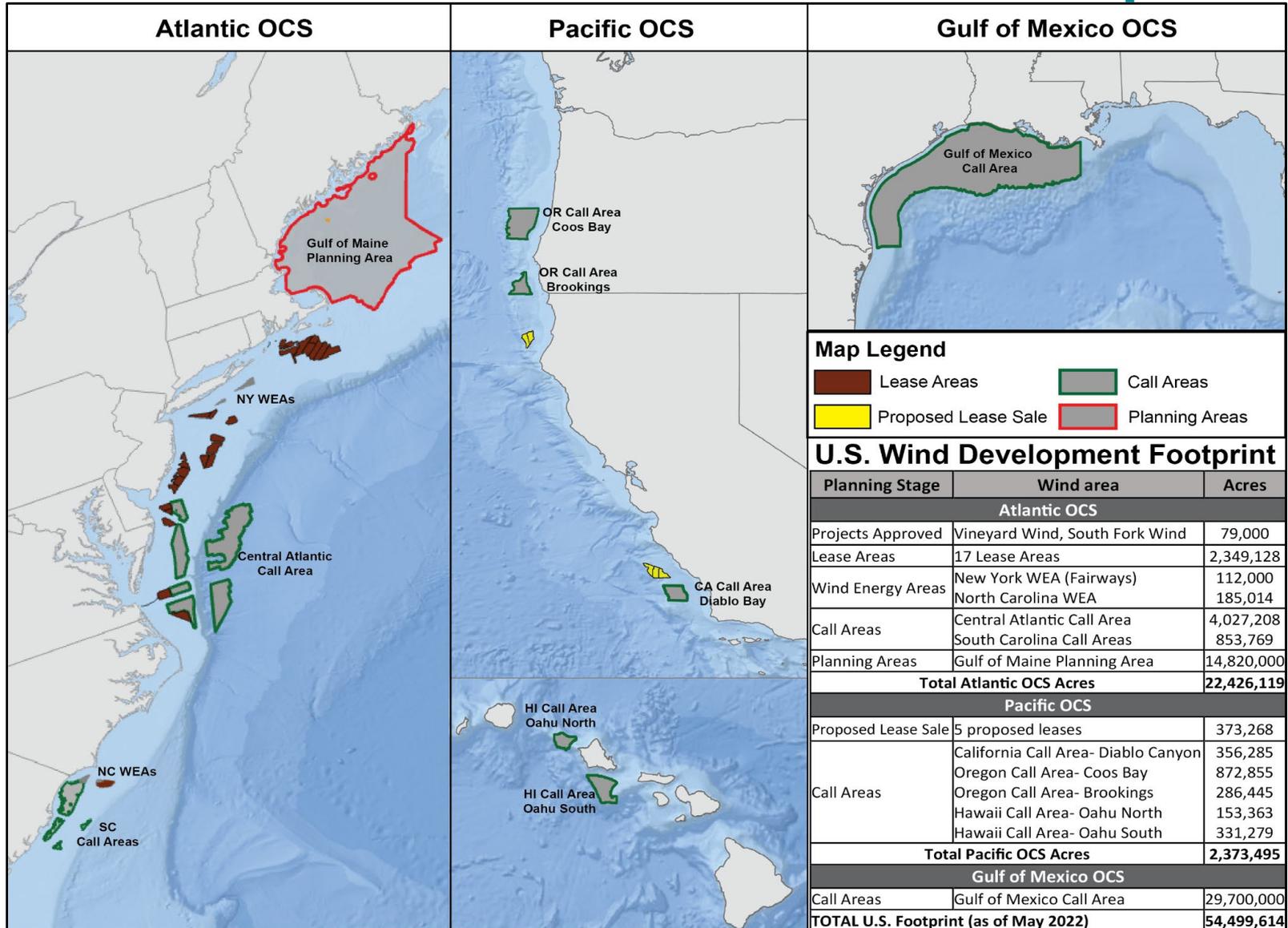
Science Priorities for Offshore Wind Fisheries Research in the Greater Atlantic Region: Perspectives from Scientists at NOAA Fisheries

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NOAA Fisheries

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U.S. Outlook - Scale & Pace of Development



- Biden Administration Goal: Deploy 30 Gigawatts of offshore wind by 2030

Role of NOAA Fisheries in Offshore Wind

- NOAA Fisheries provides advice to BOEM which is the lead Federal agency and primary decision maker for offshore wind
- NOAA Fisheries advice limited to statutory mandates provided by Congress
 - Advice and comments (NEPA, Magnuson)
 - Incidental Take Authorization (Marine Mammal Protection Act)
 - Biological Opinion (Endangered Species Act)
- NOAA Fisheries advice, recommendations and comments received by BOEM

Fisheries, endangered species, marine mammal, habitat and ecosystem science expertise needed to contribute regulatory process

Impacts are expected due to offshore wind development in the NE U.S. Shelf Ecosystem

- NMFS Fisheries surveys and assessments
- Management advice and recommendations
- Fishery operations

- Fishing communities through social, cultural, economic, equity, environmental justice, fishing displacement, fishing operations, space conflicts, etc.

- Habitat modification
- Fisheries resources via a multitude of impact producing factors
- Protected species

**Fisheries
Management**

**Human
Dimensions**

Ecosystem



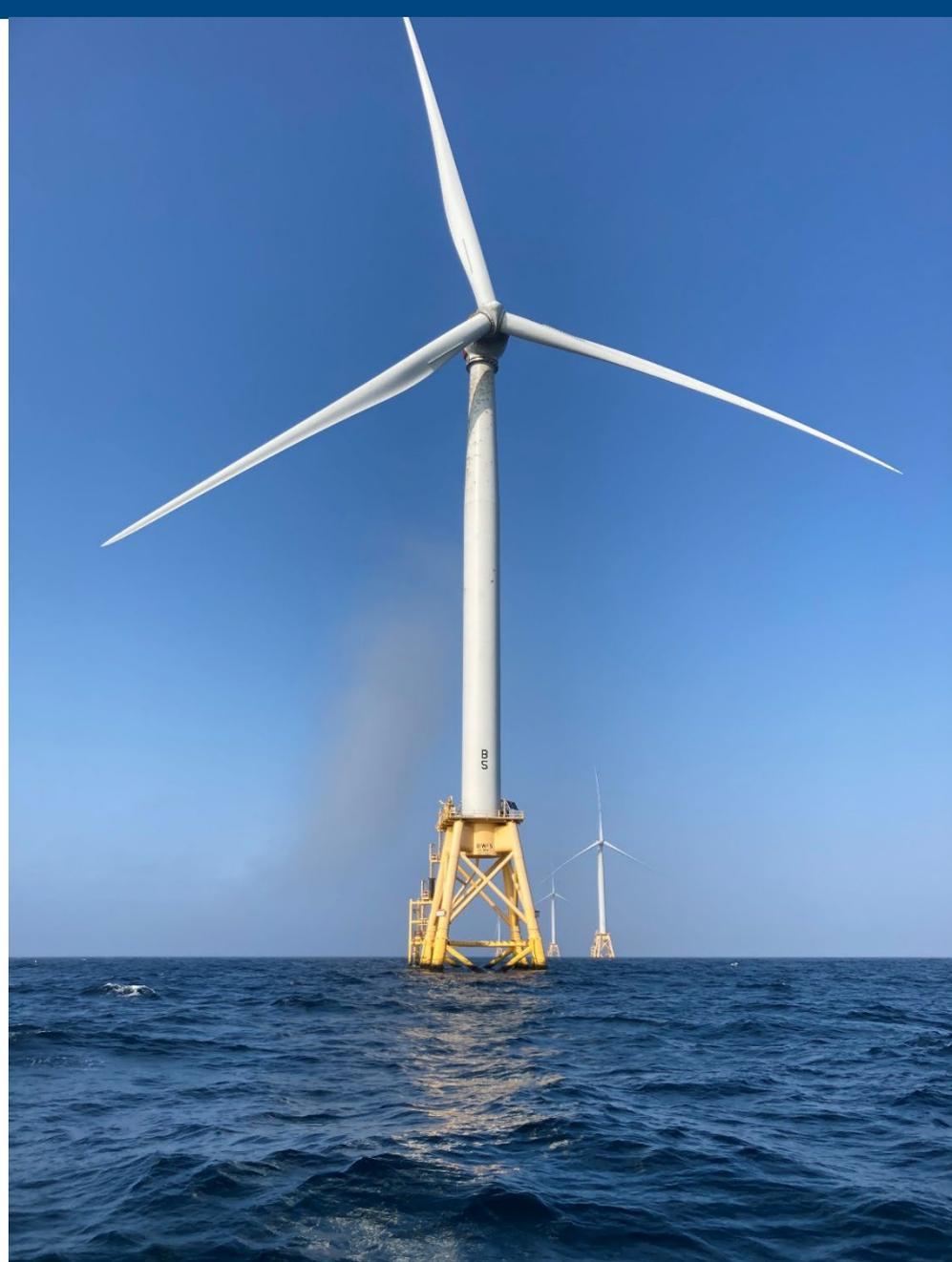
NOAA Fisheries Offshore Wind Priority Themes

Priority Theme

1. Support Regulatory Processes
2. Mitigate Impacts to NOAA Fisheries Surveys
3. Advance Science to Understand Interactions with Trust Resources and the Marine Ecosystem
4. Advance Science of Mitigation for Trust Resources
5. Advance Data Management Methods

Purpose and Need

As the nation's leading steward of marine life, NOAA Fisheries has a need to define offshore wind and fisheries research priorities in order to support NOAA Fisheries' roles and responsibilities related to OSW and to inform the development of NOAA Fisheries' science plan for the Greater Atlantic Region



Goal of Our Project:

To identify research priorities for NOAA Fisheries Greater Atlantic Region from our perspectives as fisheries scientists and managers at NOAA Fisheries who are actively engaged in offshore wind science, and start to build out a framework including information on temporal scale and resolution, where research priorities should be addressed, and who potential collaborators could be.

Methratta et al. in review at *Marine and Coastal Fisheries*



Methods: Process of Identifying Research Priorities

Identified relevant documents



Compiled OSW research priorities into a spreadsheet



Organized and reduced the number of research priorities



- Formulated NOAA Fisheries research priorities
- Grouped priorities by theme
- Characterized key aspects of each priority



Methods: Criteria used to formulate research priorities

- Importance to NOAA Fisheries' offshore wind roles and trust responsibilities
- Urgency with which the research is needed
- Ability of the research to contribute to emerging knowledge and reduce uncertainties associated with ecological impacts, human dimension interactions, or fisheries management processes.



Results: Summary of Documents Containing Offshore Wind Science Priorities

17 Documents identified that contained research priorities or needs:

- 1 MAFMC
 - 1 NOAA
 - 3 NREL
 - 1 DOE
 - 2 BOEM
 - 2 MADMF
 - 1 NJDEP
 - 1 NYSERDA
 - 1 RODA
 - 4 Other NGOs/Academia
- 1 Fisheries Management Council
- 7 Federal Agency
- 4 State Agency
- 1 RODA
- 4 Other NGOs and Academia

Results

7 Federal Agency Reports

4 State Govt Reports

4 NGO led Reports

1 Fishery Management Council Report

1 RODA Report



533 Individual Research Needs Compiled



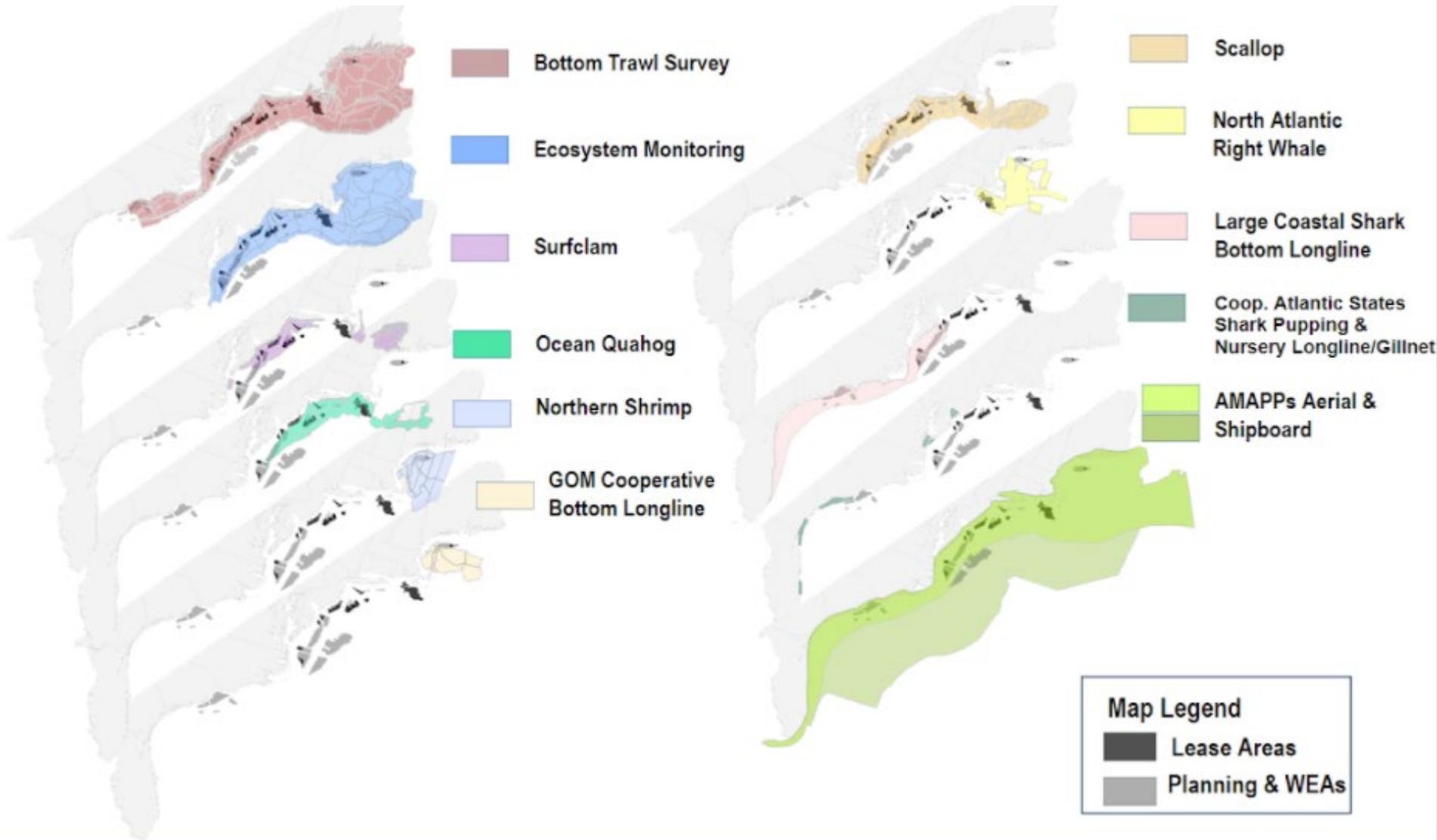
Number of Research Priorities	Priority Theme
15	Support Regulatory Processes
2	Mitigate Impacts to NOAA Fisheries Surveys
12	Advance Science to Understand Interactions with Trust Resources and the Marine Ecosystem
2	Advance Science of Mitigation for Fisheries Trust Resources
2	Advance Data Management Methods

1. Support Regulatory Processes

Research Priorities

1. Fishing Operations, Access & Safety
2. Displacement & Space Use Conflicts
3. Economics- Impacts & Costs
4. Fisheries Resilience & Adaptation
5. Economics- Shoreside business
6. Infrastructure: Port & Space Use Conflicts
7. Cultural- Traditional Values
8. Individual Well-being
9. Equity & Environmental Justice Concerns
10. Seafood Supply, Industry & Employment
11. Ecosystem Effects - Cumulative Effects
12. Catch Composition
13. Ecosystem Based Management
14. Fisheries Management - Thresholds for impacts
15. Fisheries Management - Data and Advice

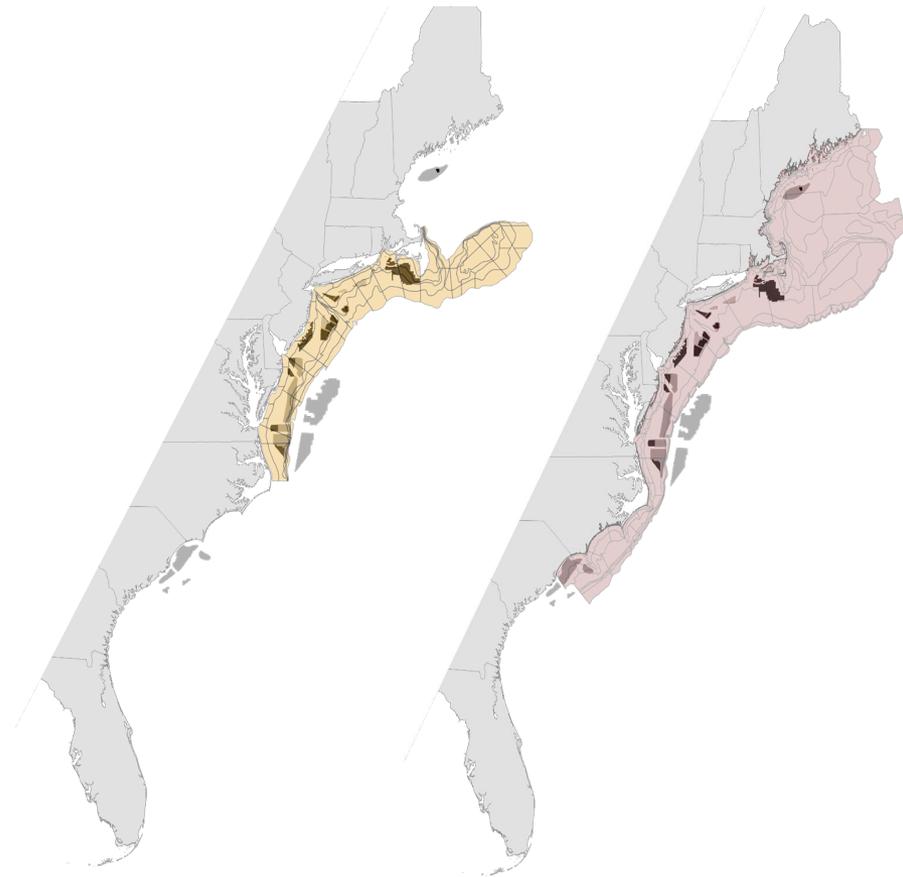
2. Mitigate Impacts to NOAA Fisheries Surveys



2. Mitigate Impacts to NOAA Fisheries Surveys

Wind Development Actuates Impacts to Scientific Surveys

1. **Preclusion**- displacement by infrastructure
2. **Impacts to Statistical Survey Design**
3. **Habitat Change** that affect species distribution, abundance, and vital rates within and outside wind energy areas
4. **Impacts to sampling** outside of developments by wind energy-induced transit effects that can result in lost sampling time



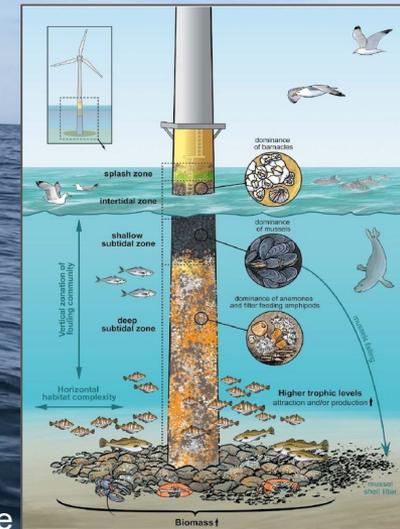
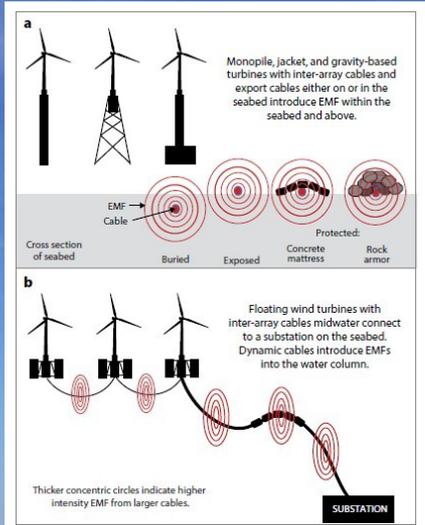
- Scallop Survey Strata
- Bottom Trawl Survey Strata
- Planning and Call Areas
- Lease Areas

2. Mitigate Impacts to NOAA Fisheries Surveys

Research Priorities

1. Fisheries Management - Survey access and Advice
2. Survey Impacts Mitigation

3. Advance Science to Understand Interactions with Trust Resources and the Marine Ecosystem



Oceanography 2020: 33: Special Issue on Offshore Wind Science

3. Advance Science to Understand Interactions with Trust Resources and the Marine Ecosystem

Research Priorities

1. Energy Emissions - Displacement by Noise
2. Energy Emissions - Impacts of Noise
3. Energy Emissions - EMF impacts
4. Habitat - Benthic habitat impacts
5. Habitat - Ecological function of benthic habitat
6. Habitat-Artificial Reef - Benthic and Epibenthic invertebrates
7. Habitat-Artificial Reef – Finfish
8. Habitat - Impacts to pelagic habitat
9. Distribution - Larval transport
10. Distribution - Species distribution
11. Contaminants
12. Ecosystem effects

4. Advance Science of Mitigation for Fisheries Trust Resources



4. Advance Science of Mitigation for Fisheries Trust Resources

Research Priorities for NOAA

1. Fisheries Compensation Framework and Monitoring Methods
2. Fisheries Mitigation



5. Advance Data Management Methods

Research Priorities

1. Data Management - Data systems
2. Data Management - Data standardization



Methods: Characterizing Key Aspects of each Priority

- Research Priority
- Research Questions under each priority
- Temporal Scale and Resolution
- Need for Baseline Data
- Question Stated as a Null Hypothesis
- Available Methods/Approaches
- Location
- Entity who should Lead
- How NOAA would be involved in this work
- Importance to NOAA Fisheries
- Management Implications

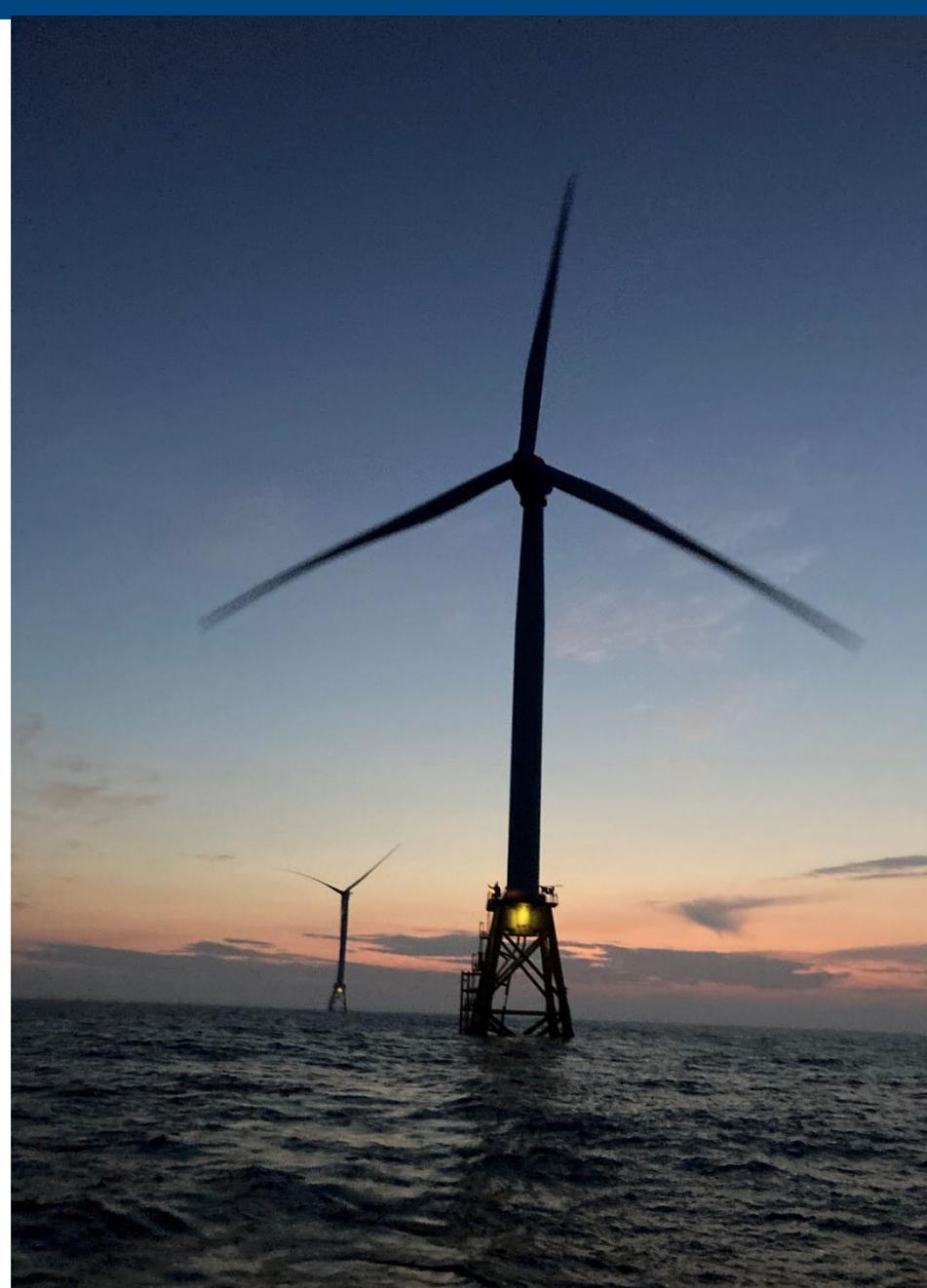


Example Research Priority: Energy Emissions - EMF Impacts

Research Theme 3	Advance science to understand interactions with trust resources and the marine ecosystem
Research Priority	Energy Emissions - EMF impacts
Research Questions under each priority	How do fisheries species respond to EMF-emitting cables? Responses include behavior, movement, navigation, physiology, foraging, egg development, hatching success, larval fitness; Are EMF-sensitive species aggregating or avoiding energized cables?
Temporal Scale and Resolution	5-10 years; longer depending on outcome of studies; Seasonal and annual data before and after construction
Need for Baseline Data	Yes, 3-5 years of baseline needed to assess interannual variation and compare to post-construction
Question Stated as a Null Hypothesis	Fisheries species behavior, movement, etc. will not be affected by the presence of energized cables; Abundance of EMF sensitive species will not differ from baseline along the cable route.
Available Methods/Approaches	Acoustic tagging and telemetry, fish sampling; direct measurements of EMF gradient in situ; Concurrent laboratory studies to examine species and life stage specific responses
Location	Subset of developments; Focus on developments where EMF-sensitive species are expected to be abundant and/or transit during migration
Entity who should Lead	Academic and agency scientists collaborating with the scientific research community
How NOAA would be involved in this work	Provide expertise and advise on study design; Review proposed monitoring program; Review data reports; Participate in research; Provide funding through RFP
Importance to NOAA Fisheries	Will enable development of thresholds for EMF levels that will avoid/minimize impacts to marine fish and fisheries
Management Implications	Changes in distribution and abundance patterns will affect advice and quotas

Next Steps

- This work represents the perspectives of a subset of scientists at NOAA Fisheries who are working to support the agency's goal of sustainable co-existence of fishing communities with marine renewable energy.
- Use the outcome of this project to support the formulation of a formalized NOAA Fisheries science plan in offshore wind



Key Take-Aways

- Research priorities identified here will inform a formalized NOAA Fisheries science plan for the Greater Atlantic Region, discussions with regional partners, and a regionally integrated framework for research and monitoring
- Having an established science plan will support the coexistence of offshore wind and sustainable fisheries by advancing our understanding of offshore wind impacts; enhancing our ability to avoid, minimize, and mitigate impacts; informing accurate and precise population assessments; and reducing regulatory and fisheries management uncertainties.
- Strong leadership combined with cross-sectoral collaboration are essential for each priority science need.
- New research endeavors will foster opportunities for innovation in the areas of monitoring technology, experimental design, cooperative research, and data management.



Thank you!
Feel free to contact me with any additional questions.

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