NCCOS
NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE

BOEM
BUREAU OF OCEAN ENERGY MANAGEMENT

MAPPING THE WAY FORWARD: SPATIAL DATA INVENTORY AND INSIGHTS FOR MARINE PLANNING IN THE CENTRAL ATLANTIC REGION OF THE UNITED STATES

Columbia, Maryland
October 16th & 17th, 2024
WORKSHOP SUMMARY

Mapping the Way Forward: Spatial Data Inventory and Insights for Marine Planning in the Central Atlantic Region of the United States

Columbia, Maryland Workshop Summary
October 16 - 17, 2024
The Maryland Innovation Center

NOAA NOS NCCOS Technical Memorandum 359

This workshop was co-led by the NOAA National Centers for Coastal Ocean Science, Marine Spatial Ecology Division, and the Bureau of Ocean Energy Management.

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Citation: Bryce O'Brien, Jennifer Au, Rich Wilson, Meagan Wylie, Alyssa Randall, Jacob Freedman, Seth Theuerkauf, James Morris. 2025. Mapping the Way Forward: Spatial Data Inventory and Insights for Marine Planning in the Central Atlantic Region. NOAA NOS NCCOS Tech Memo 359. 74 p. https://doi.org/10.25923/5dyp-nv24

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EXECUTIVE SUMMARY

Workshop Overview

The National Oceanic and Atmospheric Administration (NOAA) National Centers for Coastal Ocean Science (NCCOS), in partnership with the Bureau of Ocean Energy Management (BOEM), convened a multi-day marine spatial planning workshop in Columbia, Maryland on October 16th and 17th, 2024 (Federal Register Doc. 2024-23776). This technical memorandum summarizes the outputs of this workshop.

NCCOS and BOEM are building marine spatial planning capacity in the Central Atlantic region of the United States (US). Marine spatial planning holds great promise to assist coastal managers, Tribes, environmental organizations, and industry with planning for future development of the blue economy, including for prospects like offshore wind energy (OSW). Participants from around the region gathered to:

- Learn more about NOAA's marine spatial planning approaches and activities, particularly those related to offshore wind siting and transmission planning
- Inventory relevant spatial data for state and federal waters off Maryland, Delaware, and New Jersey
- Document the best available data and known data gaps
- Build on existing capacity and resources for regional ocean spatial planning
- Further develop a planning community to inform the marine spatial planning process

Workshop Organizers and Participants

NCCOS and BOEM formed a steering committee to develop the workshop agenda and associated facilitation strategies. Composition included federal and state partners with expertise in marine planning, coastal program management, geographic information systems (GIS) and fisheries ecology. The executive director of the Mid-Atlantic Ocean Data Portal (MARCO), the director of the Regional Wildlife Science Collaborative for Offshore Wind (RWSC), and the executive director of the Northeast Ocean Data Portal (NROC) also served on the committee. A facilitation team lent pre-workshop planning support, and later ensured broad participation at the workshop for both in-person and virtual participants. Bryce O'Brien, the NCCOS Marine Planning Coordinator for the Central Atlantic region, with support from Jennifer Au, NCCOS, provided overall workshop coordination. Jacob Freedman, NCCOS, led the initial data mining effort and has begun following up on data leads identified during the workshop.

More than 60 coastal and marine data specialists from around the region attended the Central Atlantic workshop. Participation included a broad cross-section of data expertise from state-level natural resource, coastal management and environmental protection agencies, one representative from the Delaware Tribe of Indians, and various regional science programs. The NROC and MARCO directors helped NOAA and BOEM frame the workshop within a regional context, and brought additional staff to participate at the event. Federal representation included GIS specialists, marine ecologists, Department of Defense (DOD) staff, and other data experts from NOAA, BOEM, the US Fish and Wildlife Service (USFWS), National Aeronautics and Space Administration (NASA), US Coast Guard (USCG), US Department of Energy (DOE), and the US Army Corps of Engineers (USACE).

Workshop Outcomes

The workshop produced a comprehensive list of issues and challenges, insights and available data sets across each ocean sector. The level and type of expertise among participants stimulated such extensive dialogue for the *Natural Resources*, *Fisheries*, *Industries*, and *Metocean and Other* sectors that the outputs described below required organization by distinct themes under the overarching data layer under discussion. Some described knowledge gaps, and thus additional work ahead, to better understand *Cultural and Social Resources*. DOD personnel provided the context for consideration of *National Security* data. Towards the end of the event, participants discussed different types of *Offshore Wind* data that will improve understanding of both conflicts and opportunities ahead for potential development of OSW in the Central Atlantic region.

This summary of workshop outcomes charts a path forward for increased coordination on marine spatial data in the months and years ahead between the federal government, regional ocean data portals, Tribes, non-governmental organizations, and state agency partners in the Central Atlantic region. Outcomes for each ocean sector—including any issues or challenges with the presented data, which data stand out as most relevant for

spatial planning, and identified data gaps and associated leads—are described below. The narrative text of this report has been kept in the conversational style of dialogue that occurred at the workshop. Given the nature of brainstorming across multiple topics, some repetition, both within and across ocean sectors, is expected.

As the workshop came to a close, attendees shared key takeaways and emerging insights to support the evolving nature of marine spatial planning in the Central Atlantic region. NOAA staff then shared next steps for the group's collective work ahead that will inform BOEM's OSW planning process. While much of the conversation during the workshop was framed within the context of OSW development, the insights shared by participants have broader implications for marine spatial planning and can be applied to any ocean planning need that may benefit from this process.

WELCOME AND OPENING REMARKS

Dr. James Morris, the Marine Spatial Planning Team Lead with NOAA's NCCOS, thanked everyone and expressed excitement to work with regional data experts over the course of the multi-day workshop. He acknowledged broad expertise in the meeting space, among both in-person and online participants, then briefly highlighted NOAA's support role to BOEM before sharing a longer presentation after welcoming remarks. NCCOS conducts marine spatial planning around the nation. Every region is unique, and this workshop, he noted, will tap into the deep knowledge and understanding that this group has of the Central Atlantic region. This type of collaborative engagement, Dr. Morris concluded, will bring forward informed and intelligent conversations that expand ocean literacy in the area.

Dr. Seth Theuerkauf, a Renewable Energy Program Specialist with BOEM, thanked the group for its commitment of time and energy to work together over two days. He briefly described BOEM's offshore wind lease planning process, then highlighted and thanked the steering committee for its work in developing the workshop agenda and putting materials together that were designed to foster collaboration and data development work. He shared that while this workshop is not formally part of BOEM's ongoing offshore wind lease planning process in the Central Atlantic region, it is anticipated that it will inform that process. Dr. Theuerkauf encouraged the group to dig deeply into the range of spatial data presented over the course of the workshop and expressed his interest in learning from the insights and commentary that regional experts bring forward.

APPROACH TO WORKSHOP COLLABORATION

Seatone facilitator Rich Wilson reviewed the workshop goals, agenda, and proposed approach to maximize idea generation and collaborative engagement amongst the group. He described how following the presentation of available data layers for each ocean sector, participants would work to silently generate individual ideas first, then collaborate in small groups, and finally come together as a full group to share insights and key considerations for the particular data layer or layers under discussion.

Key Ocean Sectors

The seven ocean sectors which served to focus group discussion included:

1. *Natural Resources*: information about protected species and sensitive habitats
2. *Fisheries*: areas where both commercial and recreational fisheries are active
3. *Cultural and Social Resources*: cultural uses of the environment, archaeological sites
4. *Industries*: key industrial concerns (shipping lanes), fishery independent surveys, weather forecasting, tourism
5. *National Security*: locations of various military and Space Force operation areas
6. *Metocean and Other:* distance from shore and ports, water depth and slope (bathymetry), boundaries and economics
7. *Offshore Wind*: data relevant to siting offshore wind and associated transmission lines

Background and Workshop Framing Presentations

Following the welcoming remarks, Dr. Morris shared NOAA's approach to marine spatial planning in order to set the stage for the regional data development task ahead. Dr. Theuerkauf followed with a more detailed overview of BOEM's planning process, and how NCCOS' spatial modeling informs BOEM's decision-making. Nick Napoli, NROC Executive Director and Senior Advisor to MARCO, provided an overview of the work conducted by the regional ocean data portals, and how this sets the context to introduce and discuss the best available science that will inform BOEM's OSW planning process.

Over the course of the workshop, various NCCOS data specialists, along with DOD personnel, helped to frame distinct, topically-focused conversations by presenting the baseline information collected to date for each ocean sector. These specialists included:

- Bryce O'Brien, NCCOS Marine Planning Coordinator (Affiliate), shared data for the *Natural Resources* and *Industries* sectors.
- Alyssa Randall, NCCOS Marine Planning Coordinator (Affiliate), shared data for the *Fisheries* and *National Security* sectors.
- Steve Sample, Executive Director of the Military Aviation and Installation Assurance Siting Clearinghouse, DOD, along with his colleague Nathan Owens,

Management Analyst, provided additional context and data related to the *National Security* sector.
- Jacob Freedman, NCCOS Marine GIS Analyst (Affiliate), shared data for the *Cultural and Social Resources* and *Metocean and Other* sectors.

Core Data Questions

After the presentation of available data for each ocean sector, the facilitation team used three prompting questions, with related follow-ups, to stimulate group discussion:

1. From the data layers presented, are there any major issues or challenges associated with these data that should be considered for spatial planning (e.g., assumptions, uncertainties, resolution, extent, etc.)? Are you aware of any efforts underway to address these issues or challenges?
2. Are there any data layers that stand out as the most relevant or representative for spatial planning?
3. Are you aware of any additional data layers that could be useful for spatial planning? If so, can you provide a lead to acquire these data?

As the workshop got underway, the facilitation team encouraged participants to be concise and share the air when working in small groups, stay focused on marine spatial data, and be sure to introduce themselves, including one's professional background, when sharing ideas with the full group. Additional facilitation support enabled a similar process of engagement for online participants, including their active participation when specific data layer topics came to full group discussion.

SITING OFFSHORE WIND

NOAA's NCCOS supports BOEM's efforts to facilitate the responsible development of renewable energy on the Outer Continental Shelf (OCS) of the United States and its territories. Specifically, NCCOS provides data development and suitability modeling to inform BOEM's offshore wind lease planning efforts through an interagency agreement.

Under BOEM's current regulatory framework (as of June 2024), there are approximately 40 leases/planning areas for OSW along the coastline of the US and its territories. The geographic scope under consideration at this workshop covers state and federal waters off Maryland, Delaware, and New Jersey. This Central Atlantic region report adds to a series of NOAA NCCOS Technical Memoranda which report the outcomes of similar marine spatial data development workshops held for the US Virgin Islands, Puerto Rico, the southeast Atlantic region, which includes Virginia, North Carolina and South Carolina, and the US Territory of Guam.

NOAA's Marine Spatial Planning Process

Dr. Morris shared NOAA's OSW mission and described how NCCOS uses marine spatial planning to help coastal communities balance tradeoffs between sustainable use and conservation of marine resources. NCCOS has developed a robust marine spatial planning framework over the last decade, but the origins of spatial planning go back more than 20 years at the agency. This workshop, he noted, will benefit from 15 years of data development work which has already taken place in the Central Atlantic among state-level experts, as well at MARCO, NROC and the RWSC, among others.

NCCOS has completed more than 75 spatial analyses to date, including two published regional scale atlases which compile best available science to inform the identification of Aquaculture Opportunity Areas (AOAs) in the Gulf of America (formally named Gulf of Mexico) and Southern California Bight. A third atlas will soon be developed to help identify AOAs in Alaska state waters. These established methods provide the foundation for the interagency coordination now occurring between NOAA and BOEM as wind energy projects are increasingly proposed in federal waters across the United States and its territories.

NOAA and BOEM collaborate with state agencies and other local partners in all regions of the US to advance marine spatial planning. A central goal of the NCCOS modeling process, particularly as it relates to siting nascent industries like OSW or aquaculture, is to identify conflict but also find opportunity. Moreover, NCCOS strives to build models that can be understood by the public and thereby improve awareness of the rationale behind BOEM's decision-making. As data come together, spatial suitability models are developed which generate heat maps that allow planners and coastal managers to:

- Analyze the whole ecosystem through defensible and transparent methods
- Identify both hotspots of conflict as well as areas of opportunity
- Conduct scenario planning and support comprehensive environmental review

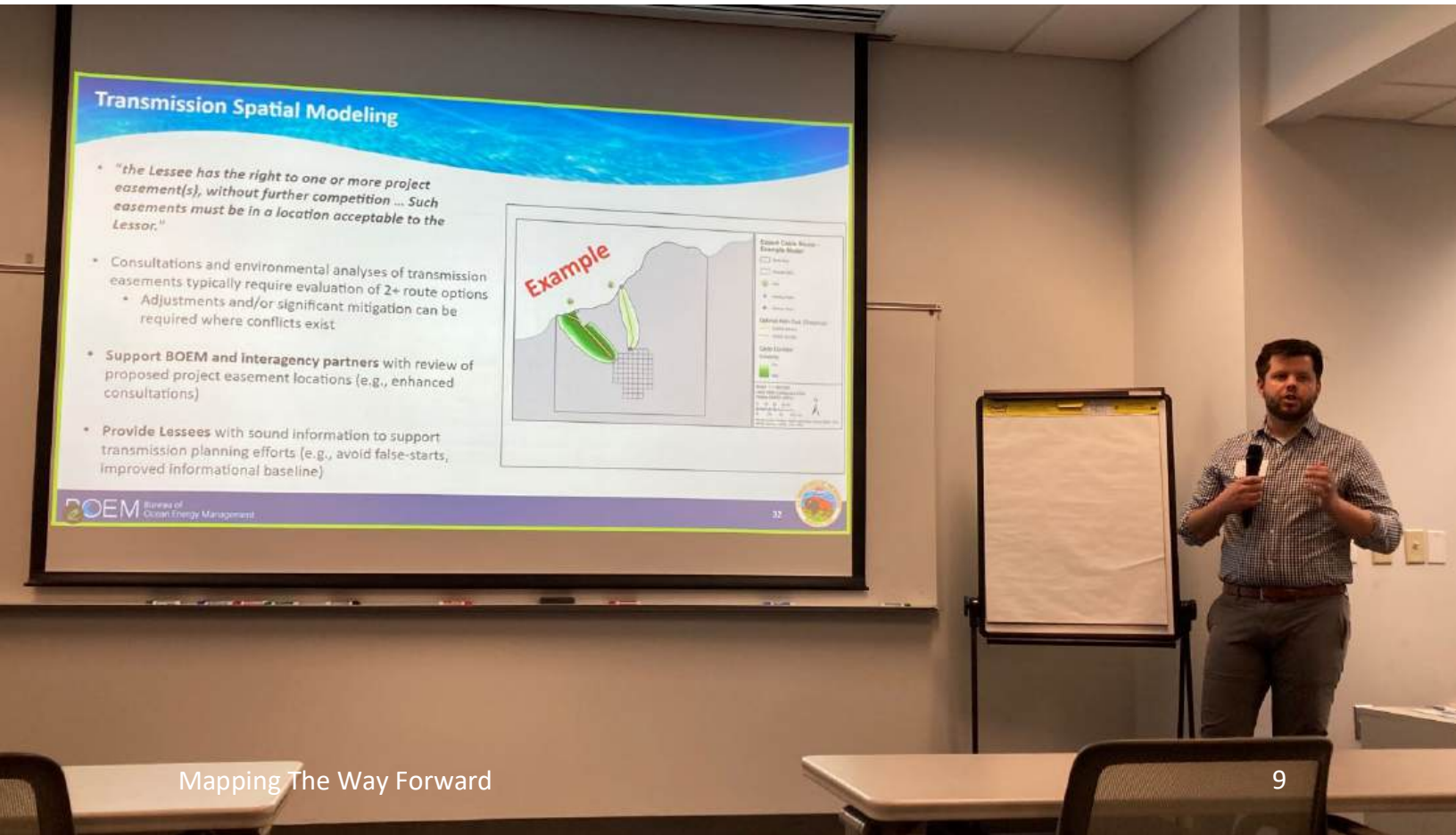
Given the caliber of data experts at this workshop, Dr. Morris described in detail the structure of the model and how NOAA works through formal and informal processes to build the database. He fielded several questions that helped further clarify the modeling process and the role that different parties play in contributing to the work. He concluded by emphasizing that direct engagement with local subject matter experts—building, for example, on the knowledge and data already possessed by individuals, organizations, and agencies in the Central Atlantic region—is a key element of the collaboration.

Later in the workshop, Dr. Morris shared a short educational video which NCCOS produced with BOEM. The video describes the US commitment to developing safe, reliable offshore renewable energy to power homes and businesses, provide good paying jobs and support a thriving economy. The video also details the important role that spatial planning plays in assisting BOEM to identify where there are the fewest user and environmental conflicts and the highest potential for OSW.

BOEM's Siting Process

Dr. Theuerkauf introduced BOEM and its mission to manage the development of US OCS energy, mineral, and geological resources in an environmentally and economically responsible way. He emphasized how best available data underpins BOEM's decision-making. Strengthening this foundation of data is essential to BOEM's planning process as it seeks to deconflict the coastal ocean for siting OSW leases. He shared that BOEM is entering its second round of lease planning in the Central Atlantic, with state-level goals for renewable energy having catalyzed the process. Data in state waters, he noted, is particularly important when considering potential transmission routes that will be evaluated in the future.

On August 21, 2024, BOEM published a Call for Information and Nominations for a second offshore wind sale in the Central Atlantic region. This Central Atlantic Call Area is more than 13 million acres located off the coasts of New Jersey, Delaware, Maryland, Virginia and North Carolina. Dr. Theuerkauf briefly described the focus and outputs of recent public meetings convened by BOEM throughout the region, held both virtually and in-person, and well attended in both forums. Securing this broad public input helps BOEM to learn and adapt, and is therefore critical to the offshore wind lease planning process. The collaborative effort among data experts to generate the best available science at this workshop, Dr. Theuerkauf concluded, will be used to develop models that help BOEM identify additional potential Draft Wind Energy Areas (WEA) in the Central Atlantic.

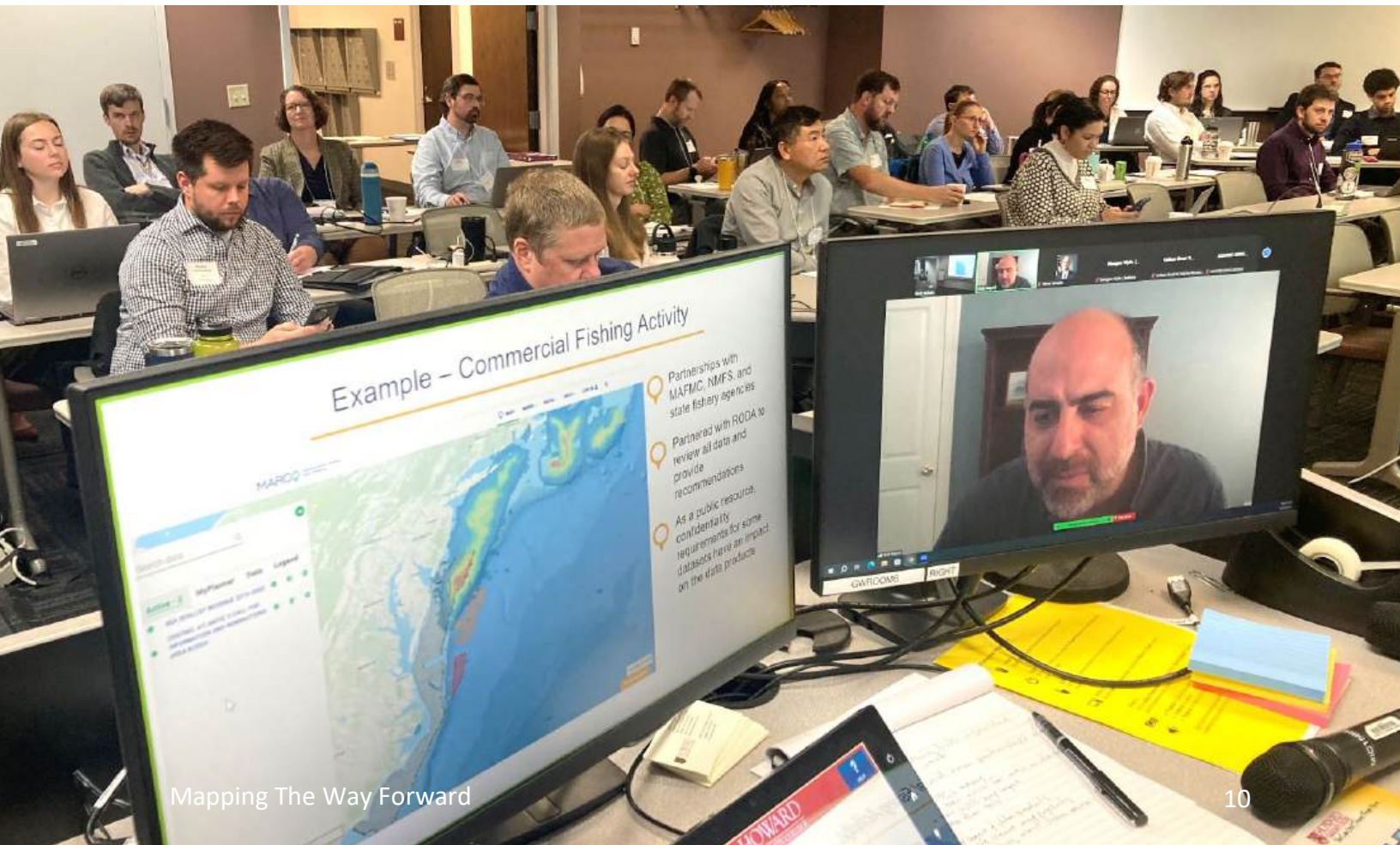


Regional Ocean Data Initiatives and Partnerships

Following the opening agency presentations, Dr. Morris introduced Nick Napoli, executive director of the Northeast Ocean Data Portal (NROC), and senior advisor to Mid-Atlantic Ocean Data Portal (MARCO). Mr. Napoli shared MARCO's origins as one of four regional ocean partnerships around the nation, then provided an overview of how this data portal is a source of extensive information that will inform BOEM's Central Atlantic OSW planning process. He also introduced the Regional Wildlife Science Collaborative for Offshore Wind (RWSC), a cooperatively established initiative led by four sectors—federal agencies, states, environmental organizations, and the offshore wind industry.

MARCO houses long-range data focused on ocean areas. The portal has more than 6,000 map layers organized under 14 themes, including tools for site users to share maps and collaborate in groups. MARCO also provides instructional and educational resources such as the portal blog, "Ocean Stories," a calendar, and webinars. RWSC aggregates information about who is funding offshore wind and wildlife research and what that research is producing. RWSC serves as a coordination hub for offshore wind research in order to increase collaboration, limit redundancy, suggest common data standards, and increase data sharing and transparency.

Workshop participants and interested parties may access the workshop framing presentations here.



DATA DEVELOPMENT ACROSS OCEAN SECTORS

After the presentations describing the rationale, goals and focus of the workshop, participants engaged in rapid data brainstorming across seven ocean sectors for the remainder of time working together. Each session began with NCCOS data specialists presenting known data layers for each ocean sector. All participants—including both those in-person and attending on Zoom—then worked in small groups to identify any issues and challenges with the presented data, discuss what stands out as most relevant for spatial planning, and surface outstanding data gaps and the leads to acquire said information. Each session culminated in full group discussion, which spurred information sharing, insights, and further engagement around the initial ideas discussed in small groups.

The overall data development outcomes for each session are summarized below. Only minor edits to improve readability and consistency of presentation have been made to the ideas captured on participant worksheets, by notetaking, or via chart writing during full group dialogue. Given the nature of brainstorming across multiple topics, some repetition of text both within and across ocean sectors is expected. The tables and associated bullets below reflect information collected in small groups for the sector under consideration, then subsequently discussed in a full group setting.

Workshop participants and interested parties may access the NCCOS and BOEM data layer presentations and area maps here. The NCCOS database presented for each ocean sector can be viewed here.

Session 1

NATURAL RESOURCES

Bryce O'Brien, the Marine Planning Coordinator with NCCOS for the Central Atlantic Region, reviewed data layers related to the *Natural Resources* sector. This review included information on protected species and sensitive habitats. Currently, NCCOS has 89 data layers for this sector, which include:

- Marine habitats
- Essential Fish Habitat (EFH)
- Critical habitat
- Habitat Areas of Particular Concern (HAPC)
- Management Areas
- Survey data
- Marine birds
- Marine mammals
- Sea turtles
- Fish biomass density (seasonal)
- Highly Migratory Species (HMS)
- Protected Species
- Protected Resources
- Southeast Blueprint Data
- Marine-Life Data and Analysis Team (MDAT) data layers and summary products

Issues or challenges with data presented for the *Natural Resources* sector that should be considered for spatial planning:

Data Quality and Resolution

- The data is available at different resolutions.
- Evaluate whether depth at which data occur is a necessary consideration, as benthic and surface areas face different stressors. Data could be modeled in three dimensions.
- The three-dimensional aspects of the water column density, fisheries, and mammal migration depths should be incorporated into the modeling process.
- Blanket layers are insufficient. More high-resolution data is needed.
- Older coral habitat data (e.g., as old as 400 years ago) of sufficient quality may be available. This may warrant consideration beyond a cutoff date of 2021.
- Marine life data appears to exclude information from state waters. Explore the possibility of combining state data despite different collection methodologies.
- Address the balance between "good" spatial data and data confidentiality, especially regarding endangered species.
- It is questionable whether or not shorebird data from 2001 from Maryland is still relevant.
- Ensure the data is recent, as it must reflect climatic changes that have already occurred. Some data sets end in 2012.
- Verify if more recent data is available. Some scallop data only goes up to 2014.
- The region of the US has not yet been thoroughly surveyed for corals.
- EFH is not useful for suitability modeling because it is not of a sufficient spatial resolution to differentiate relative importance of areas.
- Bottom trawl data is extensive but also has limits.
- The benthic habitat data layer seems to end at New Jersey.
- The data is limited in terms of its future climate change effects.
- Ecosystem services data was only available for Maryland, not for other states.
- There is uncertainty about how acoustic data contributes to the marine mammal data layers.
- The confidence interval for mathematically simulated data, such as for birds and marine mammals, needs clarification.
- Data aggregation from MDAT may require verification with other sources to confirm or dispute its accuracy.
- There are limitations in using current data. It will be important to incorporate better data in the future.

Methodology and Integration

- How will the team alter the data as it transitions from a grid to a hexagon format?
- For point data, will a grid be created first, or will the transition go directly to a hexagon?
- Is NOAA able to overlay the data during the modeling process in order to gain insight?
- How should blanket layers be handled? Are there standard methods for weighting?
- Consider how to handle blanket layers that were created before 2012 and whether they should be weighted lower due to potential inaccuracies.
- Consider whether blanket layers should be included. For example, homogenized fish habitat can be broken down into EFH, HAPC, and other specific categories.
- Think about co-occurrence layers for EFH. Parse out spawning areas and look at subsets of EFH data based on species groups and/or sensitivities. Make sure to incorporate data that is currently being updated by MARCO and National Marine Fisheries Service (NMFS).
- Some EFH layers are broad and thus not that useful. But this information at times triggers consultation and this is when it may be useful.
- HAPC should be preferred over EFH where possible, using HAPC text descriptions to weight the spatial layers. For example, multiple life stages within an HAPC increase its significance.
- Clarify how the combined habitat layer was created and identify the input layers; consider additional layers not included.
- Investigate potential double counting between state and federal agencies concerning shared resources.
- A given space can be 'double-counted' in valid or useful ways.
- For point data, polygons are more appropriate for representing artificial reefs.
- Consider buffers around corals, complex habitats, hard bottoms, and artificial reefs.
- Investigate how to overlay data layers with resolutions larger than the 10-acre hexagon.
- Determine how to integrate data with varying resolutions, especially if the resolution is 2-kilometer (km) x 2 km in relation to a 10-acre hex grid.
- Address challenges in integrating modeled data versus sampled data.
- Assess the impact of differences in species abundance, distribution, and fishing efforts on productivity.

Model and Data Usage

- What distinguishes observational data from model data? Be clear about which type of data is used and when.
- It is surprising to see model outputs, such as those for bottlenose dolphins, included here.
- The analysis should clarify the differences between modeled and monitored data, particularly in consolidated layers that lack specificity.
- What is the confidence interval for mathematically simulated data and for physically observed data?
- At what point do we use synthesized models or take individual data?
- For data layers with historical records (e.g., scallops from the 1960s), explore ways to illustrate species movement over time and potential future migration considering climate change.
- Run models simultaneously to identify optimal lease areas for transmission cable siting.
- Different taxa require specific modeling processes, for example, fish for transmission and birds for construction.
- Clarify how fisheries are included in natural resources, similar to their inclusion in the Gulf of Maine, by incorporating fish biomass into the natural resources framework.
- It is suggested to model natural resources data separate from fisheries data.
- Natural resources are often also cultural resources. Should these submodels be weighed equally to fisheries?
- There is a significant emphasis on natural resources, but they are not considered on par with cultural resources.
- Recognize that natural resources also hold cultural significance for tribal nations in the Central Mid-Atlantic.
- Acknowledge the dynamic nature of species and the limitations of existing data layers as snapshots.
- Discuss whether key species, like right whales, should have their own dedicated data layers.
- Assess the need for seasonal and annual data layers for fish, especially regarding fluctuations in species abundance.
- Explore whether summer and winter seasonal data layers are necessary for comprehensive fish assessments.
- Consider whether to include non-protected species in the analysis.
- Analyze the different natural resource layers for potential multicollinearity and their interactions.
- It is helpful to distinguish benthic versus pelagic species groups in the data layers.
- Recognize that natural resources can also hold cultural significance, which may not always be captured here.

Data Management and Collaboration

- Consult expert agencies to interpret data and provide context. Avoid using data in isolation.
- Establish data-sharing agreements with industry. Existing agreements vary by company.
- Tribal Nations and the USFWS share concerns about cultural propriety. Informal consultations are necessary to understand priority species of concern.
- Complete data layers are necessary, as combining up-to-date information can present both challenges and opportunities.
- For combined data from different sources, assess any concerns regarding overlapping survey areas.

Ecological and Species Considerations

- Working with biomass for protected fish is challenging due to significant differences.
- Species should be weighted or grouped according to state or federal management guidelines.
- NMFS advises against including scallops with natural resources because of their impact on deep-sea corals.
- Fish biomass data does not differentiate between vulnerable species. Will this be addressed?
- There is uncertainty regarding abundance at different depths.
- Break down nesting, migration, and population data for birds.
- The Maryland shorebird density data is from 2001, so it is important to assess its relevance. Is "bad" data better than "no data"? Could this data be grouped with similar datasets for more accurate representation?
- Seasonality must be considered, with fish populations varying in spring versus fall, while other MDAT species are recorded monthly and analyzed annually.
- Consider the seasonality of HMS in transmission planning, particularly regarding timing restrictions.
- Consider the impacts of climate change and incorporate future forecasting into the process.
- A buffer zone should be applied to artificial reef areas and other relevant sites.
- EFH is useful for consultations but may not effectively identify specific habitats. It is more important to include HAPC. It is also important to consider the interactions between habitat and animals.
- The lack of coral survey and observation data throughout the area may limit the effectiveness of coral models. Matt Poti's genus richness layer is currently under development.
- Clarify how much of the shelf and deep-water areas will be included in the models. Are deep areas being considered in this call, or in one or two specific models only? Different wind turbine technologies have varying ecological impacts.

- The scallop abundance data presented only extends to 2014. While more recent data exist, they have not been updated. This also applies to the spring and fall fish survey data from 2010-2019.
- Assateague Island National Seashore, Cape Hatteras National Seashore, and Cape Lookout National Seashore are designated Marine Protected Areas in addition to their status as units of the National Park System.
- The definition of "wetland" is crucial, as the details can vary. For example, the National Wetlands Inventory may categorize consolidated shorelines as wetlands, which might not be desirable for inclusion.
- Public interest in horseshoe crabs and the reserve in New Jersey is significant. There is a need for more information on how changes in benthic habitat will affect these species.
- Further information is required on the effects of benthic habitat changes in the Carl Shuster horseshoe crab reserve in Delaware.
- Areas closed to harvest should be evaluated for their specific management objectives.
- Determine if certain key species should be tracked over time to understand migration patterns.
- Clarify the impact of climate change on species dynamics and how those shifts will affect future planning.
- Examining different time periods for the North Atlantic Right Whale (2003-2009 and 2010-2019) may be useful to identify changes in area use/distribution.

Additional Comments

- Oregon combined its fishery data layer. A similar approach is encouraged here.
- Proxy data may be utilized in certain datasets.
- Historically, the focus remained on the OCS due to the size and complexity of bays.
- Use the best available science and continue coordinating with the RWSC.
- There is concern about the biases towards trawl-caught species in data representation.
- Develop strategies for integrating Traditional Ecological Knowledge (TEK) to enrich data layers.
- Some layers, such as those for bottlenose dolphins, show the entire immediate coastline in red. This raises questions about planning and construction feasibility.
- Footprints are more effective than point data for representing layers such as artificial reefs.
- Trawl survey biomass data could more effectively identify high-use fish areas than EFH because EFH encompasses such broad areas.
- Reconstruction of paleo-environments should incorporate not only geophysical data but also TEK to achieve a more holistic view.
- Having the data clipped to the project planning area would clarify which data may be less relevant due to species distribution, such as marine mammals that are densely populated offshore.
- National Park Service (NPS) geospatial data, particularly NPS unit boundaries, represent areas with relevance to multiple data categories and subcategories under consideration in the current data inventory including: fisheries, natural resources, including marine habitats, essential fish habitat, critical habitat, and habitat areas of particular concern, management areas, marine birds, highly migratory species, protected species, protected resources, cultural resources, and metocean. How might BOEM consider weighting layers differently when they fall within the NPS boundaries?
- Scoring areas based on economic value they provide (e.g., horseshoe crabs).

Natural Resources data identified by participants as more relevant or representative for spatial planning:

- Artificial reefs
- Bird collision data, especially in relation to OSW
- Nearshore bird data may not be as relevant
- Bottom/benthic habitat data
- Combined data for scallops
- Coral and sponge layers
- Coral habitat suitability layers
- EFH generated by OSW projects
- Fish species data
- Fish biomass data (include the same layer as in the Gulf of Maine)
- HAPC layers
- HMS combined layer
- Marine mammals, especially Endangered Species Act listed species
- Nearshore and bay areas as relevant to transmission corridors
- Need to consider how far the data development effort goes into bays and estuaries, especially when considering transmission lines
- Consider how to address lack of data in Chesapeake Bay and Delaware Bay
- NFSC vulnerability (biological) *also ongoing work
- Protected areas
- Protected species
- Recreational fishing
- Scallop habitat
- Species specific use areas
- State protected areas
- Turtle data
- USFWS layers for birds, bats, and viewsheds
- Wetlands
- Whale migration corridors
- Different data sets will be important during different steps of the process

Table 1. Available data and leads for the *Natural Resources* sector

Available Data	Lead(s) to Acquire
Species Data	
Updated Biologically Important Areas (BIA) for protected marine species	• NOAA
Shifting fish distribution under various climate scenarios	• NOAA, Vince Saba
Phytoplankton biomass (as a predictor of overall net ecosystem productivity)	• None provided
Acoustic monitoring data	• Maryland State • NOAA Northeast Fisheries Science Center (NEFSC) • NOAA National Centers for Environmental Information (NCEI)
Avian species with higher collision sensitivity	• None provided
Avian 30-year forecasting	• NCCOS • Mark Monaco
Shorebird migrations	• MDAT
Maryland bird data	• Maryland Audubon Society
Horseshoe crab data: fishing areas, beach areas, spawning grounds, migration patterns	• State agencies
Virginia Tech horseshoe crab survey	• Delaware Department of Natural Resources and Environmental Control, Division of Fish and Wildlife (DNREC DFW), Zina Hense
Deepsea coral and sponge observations	• NOAA • Fishery Management Councils • Maryland Department of Natural Resources (MDDNR) • Fishermen observations
Surfclam survey data	• Northeast Fisheries Science Center (link provided)
Endangered North Atlantic Right Whale migration routes	• None provided
Delaware impacted marine species	• Marine Education Research and Rehabilitation (MERR), Director Suzanne Thurman
2010-2019 Northeast Regional Marine Fish Habitat Assessment (NHRA)	• Duke University Marine Geospatial Ecology Lab (MGEL), Sarah DeLand
Turtle nesting sites	• None provided

Table 1. ***Continued***

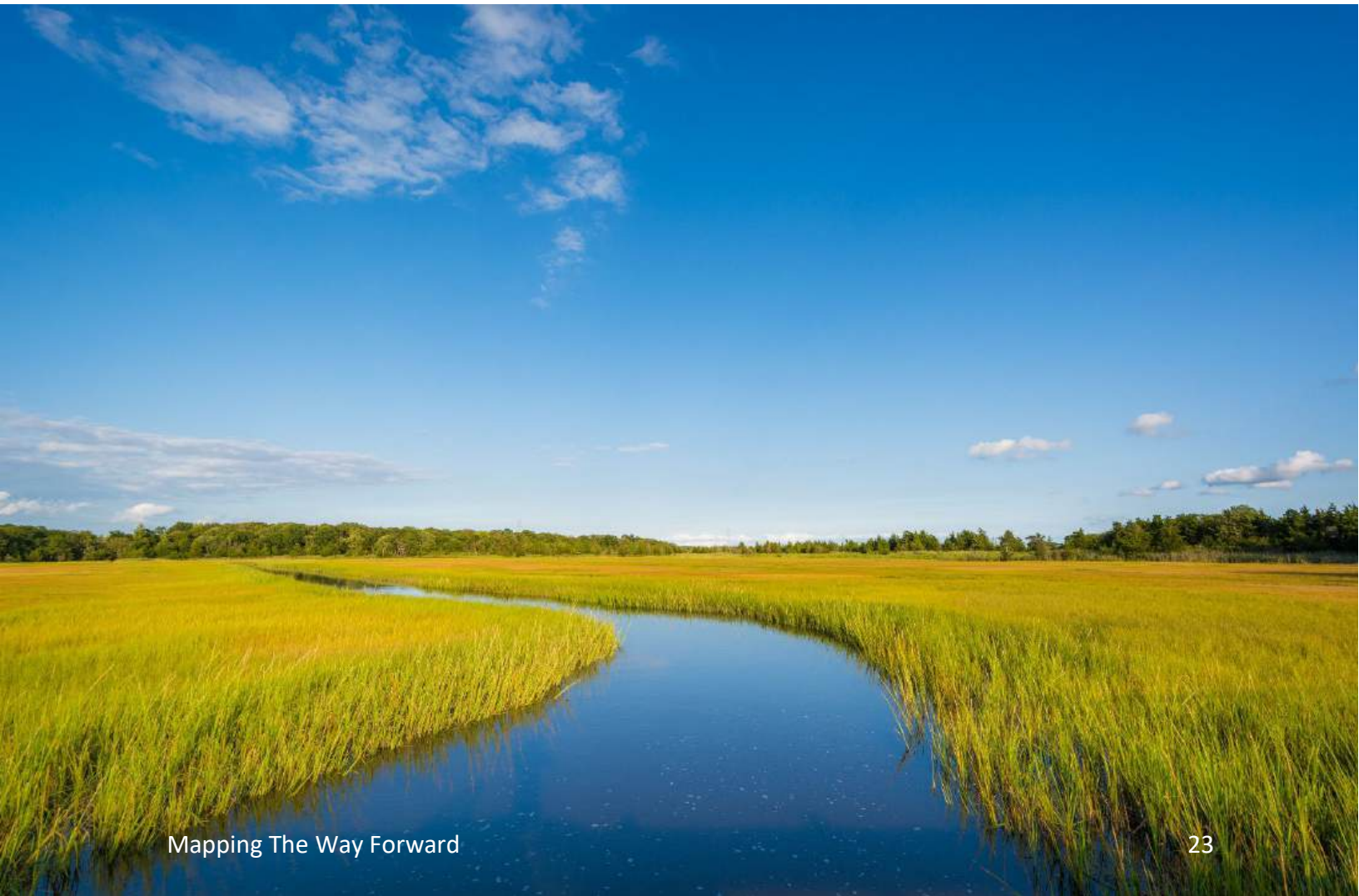
Available Data	Lead(s) to Acquire
Species Data *(Continued)*	
Turtle migration routes (e.g., annual tagging study of Loggerhead turtles)	• None provided
Striped bass data	• Katie Drew and Emilie Franke
Offshore eel spawning areas	• None provided
Habitat Data	
Habitat Mapping Camera (HABCAM) Data	• NOAA NEFSC • Dvora Hart
Convergence of rivers and tributaries	• None provided
Ancient Submerged Landform Features (ASLFs)	• None provided
Archeological sites	• NPS
Wetland adaptation areas data	• Maryland State
Wetlands and terrestrial data	• NPS Integrated Resource Management Application (link provided) • Ramsar Convention on Wetlands • Maryland Marsh Protection Index
Coastal data	• NOAA Environmental Sensitivity Index (ESI) maps
Refuges	• None provided
Salt marshes	• USGS “Lifespan of salt marsh units”
EFH	• NHRA Project • Mid-Atlantic Fishery Management Council (MAFMC), Julia Beatty
EFH omnibus amendment products	• None provided
Live bottom habitats, such as artificial reefs	• None provided
Benthic mapping	• Construction and operations plan (COP)-generated data • Developers • Maine Saildrone Project
Benthic habitat data	• The Nature Conservancy (TNC), 2010
Oyster reef/coastal habitat data	• None provided
Virginia barrier island nesting sites	• Virginia Tech, Sarah Karpanty • NASA, Shari Miller
Diamondback Terrapin nesting areas in Indian River Bay, Delaware Seashore State Park, and Beach Cove	• Jen Pawloski, Carefree Boat Club of Ocean City, Maryland
South Atlantic Fishery Management Council (SAFMC) and MAFMC special management zones (artificial reefs)	• TNC • USFWS, Patrick Roberts and Henry Woolley

Table 1. ***Continued***

Available Data	Lead(s) to Acquire
Habitat Data *(Continued)*	
Shelf habitat data	• MARCO Portal
Inland bay data	• None provided
Potential future wetlands based on sea level rise	• MDDNR
Passive acoustic monitoring (PAM) data	• RWSC
Conservation and Protected Areas	
Protected Areas database	• United State Geologic Survey (USGS) Protected Areas Database of the United States
Small conservation easements	• Land trusts
Coastal critical habitat designations	• None provided
Marine Protected Area (MPA) Carl Shuster Horseshoe Crab Reserve	• Jen Pawloski, Carefree Boat Club of Ocean City, Maryland
Delaware Protected Natural Resources: Delaware Seashore State Park, Assawoman Wildlife Area, Millsboro Pond, Cupola Park, Fresh Pond	• Jen Pawloski, Carefree Boat Club of Ocean City, Maryland
National Marine Sanctuaries	• None provided
National Monuments	• None provided
Protected area easements	• None provided
Fisheries Data	
Recreational fishing data	• MARCO • Responsible Offshore Science Alliance
Traditional fisheries knowledge	• Responsible Offshore Development Alliance Knowledge Trust (link provided)
Fish projections	• MAFMC Project, Brandon Muffley
Acoustic fish detections	• DNREC DFW, Zina Hense
Spring and fall trawl survey data	• NOAA (direct link to spring data, direct link to fall data)
Sea scallop industry biomass data	• Colleen Brust, New Jersey Department of Environmental Protection (NJDEP)
Other	
Tribal consultation data	• USFWS • Patrick Roberts, Henry Woolley, Tim Brinzen
TEK	• Regional tribes
Historic, submerged landforms	• None provided
Various	• NCEI data

Table 1. ***Continued***

Available Data	Lead(s) to Acquire
Other *(Continued)*	
Various	• NASA Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) Tool
Various	• NorthEast Area Monitoring and Assessment Program (NEAMAP)
Biological vulnerability	• NOAA Northeast Fisheries Science Center
Economic impact analyses	• None provided
Transmission corridor development layers	• OSW developers
Active wind farm survey data	• None provided
Offshore blue carbon stocks	• None provided



Session 2

FISHERIES

Alyssa Randall, the Marine Planning Coordinator with NCCOS for the US Northeast region, reviewed the *Fisheries* sector, highlighting areas where both commercial and recreational fisheries are active. She presented 36 data layers for this sector, which include layers related to:

- Vessel Monitoring System (VMS)
- Vessel Trip Reporting (VTR)
- Communities at Sea (CAS)
- Landings
- Boundaries and Management Areas
- Aquaculture locations
- Fisheries survey data products
- Additional fisheries data products

Issues or challenges with the data presented for the *Fisheries* sector that should be considered for spatial planning:

VTR and VMS Data

- VMS processed data does not capture transit between pings. Change this to identify transit lines.
- Some unmanaged fisheries in federal waters may be included in VTR data.
- Avoid double-counting from VMS data.
- Information from VMS on speed is being used to identify transit routes and fishing effort.
- Address uncertainties regarding VMS processing and avoid double counting between HMS EFH and HMS VMS.
- Apply a speed filter to VMS data, using different cutoffs for speeds above or below five knots.
- Include fishing vessel transit areas in the analysis.
- Differentiate between transit areas and fishing areas.
- Bottom complexity may be used as a proxy for fishing areas where VMS data is lacking.
- Several important fisheries do not require VMS data. VTRs provide more comprehensive information.
- Update the VTS dataset.
- Acquire state data given that Atlantic menhaden and striped bass move up and down the coast.

Data Inputs

- Management areas, scup herring transfer at sea boundary, gear areas, and mesh exemption areas may not be informative or useful for siting and modeling purposes.
- Make sure to prioritize the data of economically valuable species. But be inclusive in wrangling together a range of data sources (e.g., fishery independent surveys, VMS, VTR).
- The Atlantic red drum area is unhelpful because it lacks a commercial fishery. Consider using state-level data in federal waters.
- The Atlantic herring management area map does not provide useful information on landings, abundance, or fishing activities.
- Use layers that generate pertinent data rather than simply documenting survey occurrences.
- Only six canyons are marked on the spatial modeling slide for the mid-Atlantic, however, there are eleven recognized canyons.
- There is a gap in recreational fishing effort data.
- More recreational fishing data is needed outside of party boat charters.
- There is minimal data on private recreational fishing.

- Almost no data exists on unmanaged fisheries unless those vessels participate in managed fisheries and are required to report. Examples include conchs, Atlantic cutlassfish, and King whiting (northern kingfish).
- Check for updates to the Commercial Activity Survey dataset, as the most recent data period is 2011-2015, while maps indicate 2016-2020.
- Use state aquaculture sites instead of national ones.
- Consider creating a co-occurrence map for EFH.
- This data reflects current fishing activities. Is there concern for future fishing areas that may shift due to changing fish migration patterns as the climate changes?
- Does purse seine fishing include menhaden harvest?
- Build trust with fishermen and gain input on where they fish.

Data Analysis

- Determine how to weigh commercial versus recreational fishing data.
- Coastal aquaculture areas are mainly relevant for cable siting, not lease area siting.
- Investigate shoreside impacts.
- Reflect cumulative impacts on fishing ports.
- Use a combined fisheries data layer, similar to how it was done in Oregon.
- Derived products, such as scallop surveys, may be more important than general products.
- Evaluate the compatibility of scallop, clam, and quahog data presented, including whether their methods and backgrounds are similar enough to combine.
- Determine if gear-restricted data should be included, prioritizing source data over gear restriction data.
- Assess whether gray areas in individual fishing types indicate very low activity or a lack of data.
- Determine how to calculate various fishing regulated areas.
- Assess the value of large management areas. Do they provide meaningful insights if they are blanket layers?
- Not all management units are equally important. Some, like scallops, are more significant than others, such as red drum.
- High-value fisheries may have lower local impacts compared to locally important but lower-value fisheries. For example, a high-value fishery with a one percent impact might be less significant than a low-value fishery with greater local importance.

Data Gaps

- Large scale fisheries management areas are not particularly helpful. For example, there is no commercial fishery for red drum in federal waters, so no data. Atlantic herring is also missing from key areas. So it's difficult to know effort, presence/absence and abundance.
- We lack private, recreational fishing data, however, there is a recent effort to get this data via the NOAA Argo program and applications such as Navionics.
- The required Automatic Identification System (AIS) only captures data from vessels larger than 65 ft, so there is a lack of information from smaller vessels.

General Considerations

- Understanding TEK from fishers, along with modern and historic fishers' knowledge, is crucial for making informed fisheries decisions. However, tribes may not share knowledge or have documentation of ancient fisheries due to a history of removal.
- Ancestral fisheries represent traditional livelihoods for indigenous communities and thus should be included in environmental assessments and consultations linked to wind farm leasing decisions.
- Prime fishing areas should be updated, however, many individuals will not disclose those locations.
- Speed is not always the best metric to gauge vessel activity.
- Maintain confidentiality of local fishing data.
- Ensure data is up-to-date and relevant.
- Consult with the appropriate agency to determine which data sources to use.
- Not all regulatory areas exclude fishing. Gear-restricted areas and transfer-at-sea areas are not the same as closures and do not affect suitability for avoiding overlaps with fishing activity.
- Consider the seasonality of habitat use.
- Consider how to weigh the data when all relevant information is not available.
    - Time poses a challenge. Additional data layers could be created if sufficient time allows.
    - Be cautious with time series data. Some trends are long-term while others can reverse. Ten-year-old scallop data may not reflect current trends, and truncating data series might miss emerging trends.
    - Contextualize data by considering factors like the Covid pandemic and changes in administrative boundaries.
    - Organize data by gear type groupings and prioritize those that could be more impacted.
    - Consider cumulative impacts.
    - Consider the implications of management actions by fishery management councils, such as minimizing sturgeon takes within specific fisheries.
    - There are limitations based on management areas. Limited data may not accurately represent fisheries, as zero data does not imply no fishery exists. It may be necessary to use proxies to assess fishing effort.
    - Recognize the data limitations of each source.
- VMS is more relevant than logbook data.
- The fishing industry should provide comments on this submodel.
- Involve the right stakeholders, such as the New England Fishery Management Council (NEFMC) for sea scallops and the MAFMC for surfclams.
- Fishing requirements vary by type.
- Highlight the importance of specific ports, as large dollar amounts can mask impacts on smaller ports (e.g., scallop fisheries compared to others).
- State-licensed fishing by vessels without a federal permit is not represented.
- Considerations for individual species may complicate the analysis.
- Are buffer zones for traps a source of uncertainty?

Fisheries sector data identified by participants as more relevant or representative for spatial planning:

- Aquaculture
- Artificial reefs
- Economic contribution of landings/ports
- Different versions of economic value
- Fishery independent surveys
- History of removal
- Lease exclusionary zones
- Logbook data
- High traffic but also lower traffic ports
- Navigational corridors
- Net ecosystem productivity data
- Oyster lease areas
- Prime fishing ground layers by state
- Species aggregations
- Species specific use areas
- Trawl/dredge sites
- VMS data
- VTR data

Table 2. Available data and leads for the *Fisheries* sector

Available Data	Lead(s) to Acquire
Fisheries Data	
Range of fisheries data	• NOAA observer program data • Fishery logbook data • Long-term tagging projects • Stock assessments • Council Coordinating Committee • AIS data • NEAMAP data • Research Vessel (RV) Bigelow data • RV Albatross data • NEFSC federal waters surveys • Global Fishing Watch Synthetic Aperture Radar
Fisheries landings values (aside from scallop)	• None provided
Species specific landings by port	• NOAA • DNREC (for Delaware)
Fishing ground locations	• "Fish Rules" application • MAFMC, Julia Beaty • Participatory GIS data for local/small-scale fishers
Fishery management zones	• MAFMC, Jessica Conkley
State managed fisheries data	• State agencies
Ancestral fisheries locations	• Delaware Tribe of Indians
Specific Fisheries Data	
Scallop rotational areas, including Elephant Trunk and Hudson Canyon	• MAFMC
Striped bass data	• State agencies
Striped bass and sturgeon migratory corridors	• University of Maryland Center for Environmental Science, Dave Secor
Conk fisheries data	• VTRs
Eel pot fishing data	• State agencies
Menhaden data	• State agencies
Maryland lobster data	• MDDNR, Craig Weedon
Maryland Jonah crab data	• MDDNR, Craig Weedon
Whelk fishery data	• Virginia Institute of Marine Science
Canyon fisheries: Hudson, Hendrickson, Toms, Carteret, Lindernkohl, Spencer, Wilmington, Baltimore, Poor Man's, Washington, Norfolk, the Cigar	• Chesapeake Quarterly Article: *The Grand Canyons off Our Coast* (link provided) • Jen Pawloski

Table 2. ***Continued***

Available Data	Lead(s) to Acquire
Specific Fisheries Data *(Continued)*	
Seasonally important fisheries data	• None provided
Recreational Fishing Data	
Recreational fishing data	• Party boat charters • Private boat fleets
Recreational fishing data, Maryland	• Ocean City Reef Foundation sites
Recreational fishing reefs: Isle of Wight Reef and Automated Wreck and Obstruction Information System (AWOIS) #1053, Purnell's Reef, Research Reef, Kelly's Reef, Great Gull Reef, Bass Grounds, Great Eastern Reef, African Queen Reef and Electronic Navigational Charts (ENC) Wreck, Jackspot and AWOIS #1023 barge	• Jen Pawloski
Fishing tournament reports (i.e., links to permits, often HMS species targeted)	• None provided
Aquaculture and Shellfish Data	
Delaware aquaculture data and oyster lease locations	• DNREC DFW • Delaware aquaculture map
Delaware artificial reef locations	• DNREC
Shellfish density map for Delaware's Inland Bays	• DNREC
Survey and Monitoring Data	
Spatially referenced harvest logs	• State agencies
Delaware trawl data	• DNREC
HABCAM Survey data for Mid-Atlantic	• Coonamessett Farm Foundation, Michelle Duval
Sturgeon spatial data based on acoustic detections	• DNREC
Whale collision sites	• None provided
Fisheries bycatch data	• None provided
Other	
USFWS spatial recommendations	• USFWS, Patrick Roberts and Henry Woolley
EFH by lifecycle (larvae, juvenile, etc.)	• None provided

Session 3

CULTURAL AND SOCIAL RESOURCES

Jacob Freedman, Marine GIS Analyst with NCCOS, reviewed data for the *Cultural and Social Resources* sector. This sector includes data layers relevant to cultural uses of the environment and archaeological sites. NCCOS currently has 18 data sets for this sector, including data layers for:

- General recreational use and whale watching areas
- 2012 Recreational Uses Workshop data (Maryland, Delaware, New Jersey)
- Party/Charter recreational fishing (2011-2015)
- Historical infrastructure
- Centers for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry Social Vulnerability Index (SVI)
- New Jersey Recreation
- Delaware Recreation
- Maryland Recreational Fishing and Local Economy
- Maryland Coastal Hazard Index

Issues or challenges with data presented for the *Cultural and Social Resources* sector that should be considered for spatial planning:

Data Considerations

- Timing of data is crucial.
- All data layers should be as up to date as possible.
- How does the process reference emerging data sets?
- Privacy considerations and confidential information can pose a challenge.
- Current data covers only from colonization to present, excluding earlier periods.
- The purpose of including certain data and its potential impacts is often unclear.
- Some data is confidential and requires sharing agreements.
- Certain data, such as shipwrecks and submerged landforms, will remain unknown until surveys are conducted.
- This submodel data is very terrestrial-focused, making it likely more useful for cable siting planning.
- The mix of data types—points, lines, and polygons—presents a challenge to merging information, which may require prioritizing less impactful submodels.
- Would the datasets for boating routes and sailing race lines be buffered?
- Coastal hazard identification data is missing for Delaware and New Jersey.
- Consider if and how to incorporate land-based cultural resources.
- Census tracts aim to capture areas with similar populations, resulting in larger tracts for rural areas and smaller tracts for urban areas.

Tribal and Community Engagement

- Tribes need support in order effectively to provide input.
- Some cultural data may be confidential. Outreach and trust building is an important part of the process.
- Acknowledge that tribal and ancestral data may be underdeveloped or lost due to historical removal. And Tribes may have staffing capacity challenges. Agencies should still strive for proactive collaboration with tribes on lease area choices.
- Tribes would benefit from accessing web applications before they become public to provide their best suggestions.
- Consideration should be given to communities with high-rise buildings and large populations that may have visibility of OSW compared to smaller communities.

Environmental and Technical Concerns

- Considerations for transmission differ significantly.
- Viewshed impacts are a concern.
- The coastal hazard index is only available for Maryland. Check if similar data exists for Delaware and New Jersey.
- SVI data is organized by census tracts, which may pose challenges regarding size, population, and urban versus rural distinctions.

Recreational Uses

- Separating recreational uses may help identify incompatible activities with OSW.
- Counting the number of recreational uses in an area helps identify potential challenges. Higher numbers may indicate that areas could be more difficult to use due to increased traffic and volume of activity.
- The recreational uses workshop highlighted weak data quality and outdated data.
- The recreational uses workshop data is 12 years old, as noted at the time.
- The Maryland recreational fishing data shown in this presentation is old.
- Several more whale-watching businesses have emerged since the original data was created.
- Does whale-watching data correlate with previously presented whale migration and population data?
- The whale-watching layer is inaccurate, and the suggested vessel routes are incorrect. Avoid using this data as it is AIS biased. Some whale watching data may also be old and need updating.

Additional Comments

- Review the WEA report from the BOEM Central Atlantic Round 1 Call for Information to check depth contours for colonizable depths and human occupations.
- Characterize the most valuable wrecks based on their recreational and historical or cultural value.

- Each layer should be carefully considered, and its relevance described, such as addressing viewshed concerns, impacts from transmission, or other factors.
- Consider using tools to identify communities accessing water and coastal resources, thus ensuring cultural resources are recognized and public health is not negatively impacted by turbines, construction, or cables.

Data identified by participants as more relevant or representative for spatial planning:

- Community access maps
- Social Vulnerability Indices
- Socioeconomic data
- Historical infrastructure
- Cultural infrastructure
- State-level recreational data

Table 3. Available data and leads for the *Cultural and Social Resources* sector

Additional Data	Lead(s) to Acquire
Archeological and Historical Data	
Archaeological sites for Maryland and Delaware	• Medusa (link provided)
National Natural Landmark sites	• NPS (link provided)
National Heritage Areas boundaries	• NPS (link provided)
Ancient submerged landforms	• None provided
Submerged paleo-landforms data	• None provided
Tribal burial sites	• Library of congress 1600
Historic fishing grounds	• MARCO
Historic shipwreck locations	• Maritime Registry of Historic Wrecks, Regional Portal • Naval History and Heritage Command (link provided) • REEF.org • USGS • BOEM Atlantic Shipwrecks Database
Documented Wrecks off Ocean City, MD • Ocean City inlet 6' Wreck (Gulf Rambler #2 #2476) • 50' ENC Wreck (#1042) • 51' ENC Wreck (#1043/1044 "Concrete barge") • 62' ENC Wreck • 59' Wreck (#1062) • 80' Wreck (#1075 "Elizabeth Palmer") • 95' Wreck (#1061 "Washingtonian") • 77' Wreck (#1052 Sandy's Anchor Wreck) • 42' ENC Wreck ("Paul Russell") • 70' ENC Wreck ("Brass Spike Wreck") • 73' Wreck (#1032 "Saetia") • 86' Wreck (#1031 "Oklahoma") • 27' ENC Wreck • 52' ENC Wreck ("Lead Wreck") • 50' ENC Wreck • 53' ENC Wreck (#14228 F/V "Hiwal") • 47' ENC Wreck (#1029) • 40' ENC Wreck • 49' ENC Wreck • 103' ENC Wreck (barge)	• None provided

Table 3. ***Continued***

Additional Data	Lead(s) to Acquire
Social and Cultural Data	
Tribal traditional cultural properties	• None provided
Social vulnerability data	• Esri demographic data
Traditional cultural properties	• Delaware Tribe of Indians, Joanna Maurer • USFWS Regional Native American Liaison, Tim Binzen • USFWS Cultural Resources, Amy Wood
Maximum underwater depth of human occupation	• None provided
Visual Resources Inventory at Assateague Island National Seashore (in progress)	• NPS, Kristin Andel and Mark Meyer
Subsistence fishing activities	• None provided
Marine economy job data	• NOAA Economics: National Ocean Watch (ENOW) Explorer Tool
Social use information for New Jersey	• MyCoast.org • MARCO (forthcoming in 2025)
Tourism and Recreation	
Recreational dive sites	• MARCO, Karl Vilacoba • Reef Environmental Education Foundation (www.reef.org) • MARCO, Nick Napoli
Working waterfronts	• MDDNR
Viewshed data (e.g., historic locations, shore-based use, environmental and cultural values)	• USFWS Refuge Viewshed Buffer, Henry Woolley
Tourism index	• None provided
Maryland ocean access points	• MDDNR
Whale watching data	• MARCO, Nick Napoli • Happywhale observations
Waterways trails for sea kayakers	• MARCO
Scenic rivers	• NPS
Vulnerability and Environmental Impact	
Impact of sea level rise on cultural resources in Delaware Bay	• Nikitina, et. al, 2022

Table 3. ***Continued***

Additional Data	Lead(s) to Acquire
Vulnerability and Environmental Impact *(Continued)*	
Impact of climate change on New Jersey shoreline areas	• Resilient NJ
Vulnerable New Jersey communities	• Maps of New Jersey Overburdened Communities
Upland terraces adjacent to oxbow areas of riparian environment	• None provided
Geophysical data to find cultural sites (hot spots)	• None provided
Convergence of rivers and paleo-environments environments in collaboration with TEK	• None provided
Maryland coastal hazard data	• USGS (2023 data set) • Maryland sea level rise data
Coastal Facilities Vulnerability Assessments for Assateague Island National Seashore, Cape Hatteras, Fort Raleigh National Historic Site, Wright Brothers National Memorial, Colonial National Historical Park, and Cape Lookout	• NPS
Hydrography data	• USGS National Geologic Map Database (alternative link provided)
Hotspot and site vulnerability models	• Delaware Tribe of Indians

Session 4

INDUSTRIES

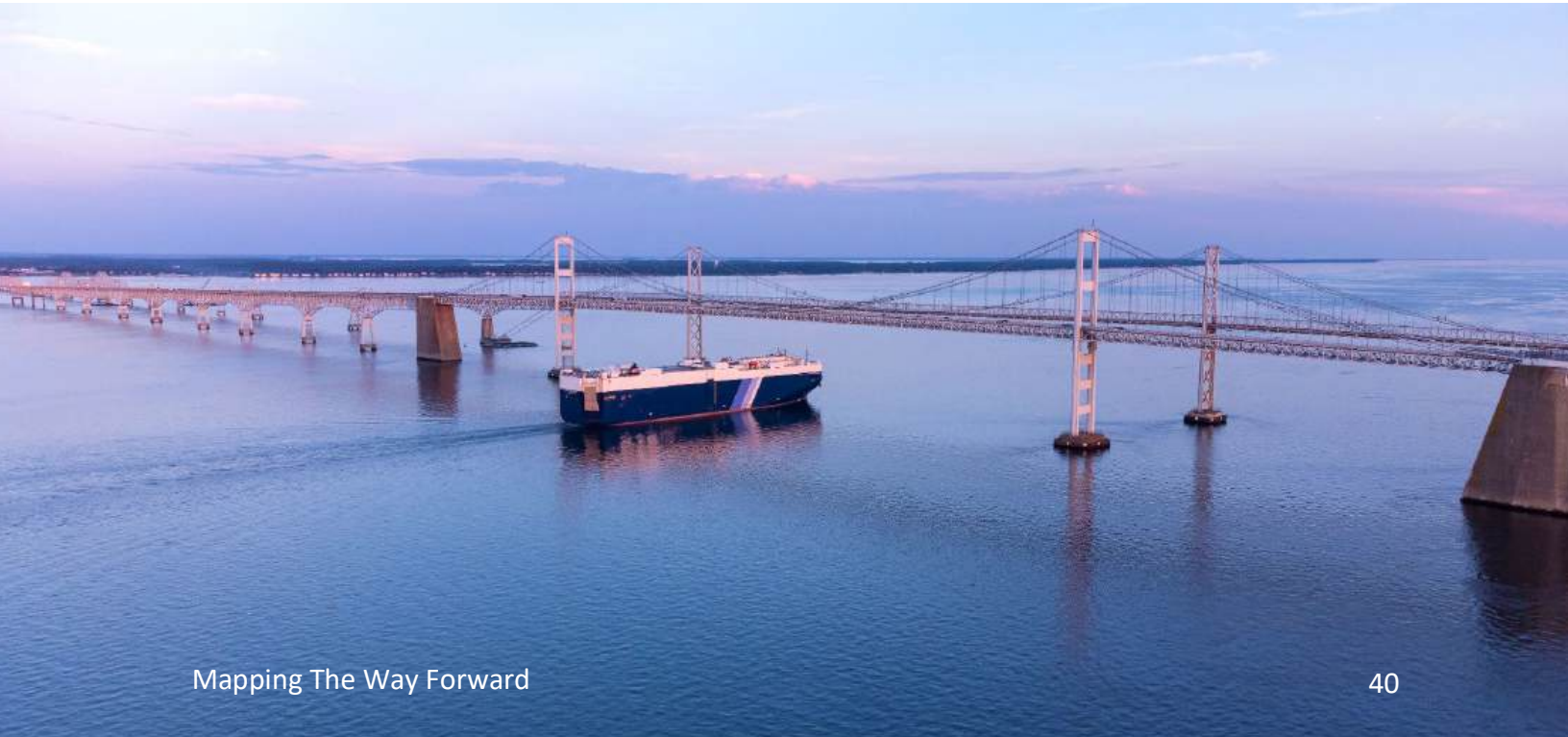
Bryce O'Brien reviewed data for the *Industries* sector. This sector includes information about key industrial concerns (shipping lanes), fishery independent surveys, weather forecasting, and tourism. He presented 36 data layers for this sector, including for:

- Shipping fairways
- Channels, terminals and ports
- OSW and electricity
- Anchorage, pilot boarding, and disposal sites
- Pipelines and submarine cables
- Ocean lease areas
- Ocean resources
- Environmental sensors and buoys
- Aids to navigation
- Beach nourishment
- Automatic Identification System Vessel Data
- NOAA fisheries independent surveys
- Wrecks and obstructions
- Passive Acoustic Monitoring Network

Issues or challenges with the data presented for the *Industries* sector that should be considered for spatial planning:

Data Quality and Updates

- There are concerns about the age of the data in some cases.
- The PAM deployment map shared is outdated.
- More PAM deployments are planned. The current layer is likely outdated and may not include gliders or telemetry receiver locations.
- The accuracy of submarine cable positions is questionable.
- Are there any supplements for the age of wrecks and obstructions data?
- Update the USCG fairway layer.
- Updated shipping fairways are needed for 2024.
- How often are BOEM layers on the GIS page updated? For example, the landfall for Kitty Hawk North was reportedly moved because of Back Bay National Wildlife Refuge (NWR), but the cable landfall layer from the BOEM GIS page shows it landing on Back Bay NWR.
- The BOEM cable landfalls, specifically the Kitty Hawk landfall, need updating more frequently.
- How frequently are infrastructure layers updated, and how often do they need to be updated?
- Some of the "updated" dates on InPort appear to be incorrect. Most industry data was updated this year, but some have not been, such as navigation channels.
- More accurate, small-scale data is needed.
- The survey slide seems to have more data layers than those listed in the data inventory.
- Transmission line data needs clarification on whether it includes all data or only above a certain kilobit threshold.
- It is assumed that sand resource data is up to date with state information.



Data Usage and Clarity

- Clarify how to use blanket layers and ensure the data is more pointed.
- The purpose of some included data layers is unclear.
- Distinguish between different types of telecomm cables.
- Assess the pros and cons of including both AIS and lane data.
- Is there a way within the data layers to separate types of industry vessel traffic to better understand where conflicts might be greater or incompatible?
- Determine how wreck point data would be incorporated.
- Ensure appropriate buffers and offsets, adjusting them based on the positional accuracy of data (e.g., cables) and the risk of being too close.
- The regional data portal includes information about positional accuracy.
- There is a plethora of navigation data, and it is essential to be clear about which data are used and why they are needed.
- There is potential for double counting in areas like vessel traffic and shipping. Clarity is needed on which layers are used and why.
- Do older shipwrecks qualify as historic or cultural sites?

Accuracy Concerns

- AIS data is not all-inclusive, as smaller vessels can be excluded.
- AIS data does not always accurately characterize fishing vessels. For example, some for-hire recreational fishing vessels are listed as passenger vessels despite conducting fishing activities.
- There are terrestrial range limitations for AIS. Satellite information is available only up to the shore.
- AIS is an effective source for vessel traffic, providing high-resolution spatial data. However, it does not cover operations beyond 12 miles offshore or smaller vessels under 65 feet. Multiple years of data should be utilized, as annual fishing regulations can impact the activity of fishing and passenger vessels.
- Only commercial fishing vessels over 65 feet use AIS. Many of these vessels rely on Plan B, which has limited short-range coverage, while Plan A uses satellite technology for broader visibility on maps.
- The position of submarine cable data can be inaccurate positionally.
- There is a lack of potential borrow areas in the USACE dataset.
- The USACE borrow areas do not include any borrow areas off Delaware, even those that are currently in use.
- State-maintained navigation channels may not be represented. USACE channels are primarily for revenue.
- The navigation channels layer does not include state-maintained channels, but these exist in Delaware's inland bays and rivers.
- Do not use the Marine Cadastre navigation channels. Use the service directory from USACE instead. Marine Cadastre data has not been updated recently.
- The data on channels, terminals, and ports appears to be generalized, unlike AIS or VMS data.
- Is there not enough data on tourism and leisure activities?

- Should the width of shipping fairways be buffered to enhance safety?
- The data portal includes a layer that distinguishes active from out-of-service cables. High-priority active cables should be known.
- If a shipwreck data source no longer collects data, is another entity taking over?
- Where does the data for fishery independent surveys come from? Is it volunteered data, or is it collected regularly across the fishing industry?

Project-Specific Considerations

- How can we assess DOE readiness when considering onshore electrical infrastructure?
- Have areas for OSW, electricity ports, and infrastructure been evaluated for longevity considering sea level rise (SLR) and storm surge? How can decision makers identify key or important ports?
- Structures are prohibited in regulated fairways.
- We may need updated information when considering any cable landfall.
- Changes to ports, such as modernization, dredging, and widening channels, are occurring due to, and separately from, offshore wind activities.
- Do offshore wind projects require warning beacons?
- Does dredging exclude offshore wind? Can they coexist?
- Do the USACE borrow areas for sand and sediment include those identified by the Philadelphia District as potential future borrow sites? This layer is crucial, as it is necessary to prevent development that could impede dredging in these areas, given their usage rate and associated issues.

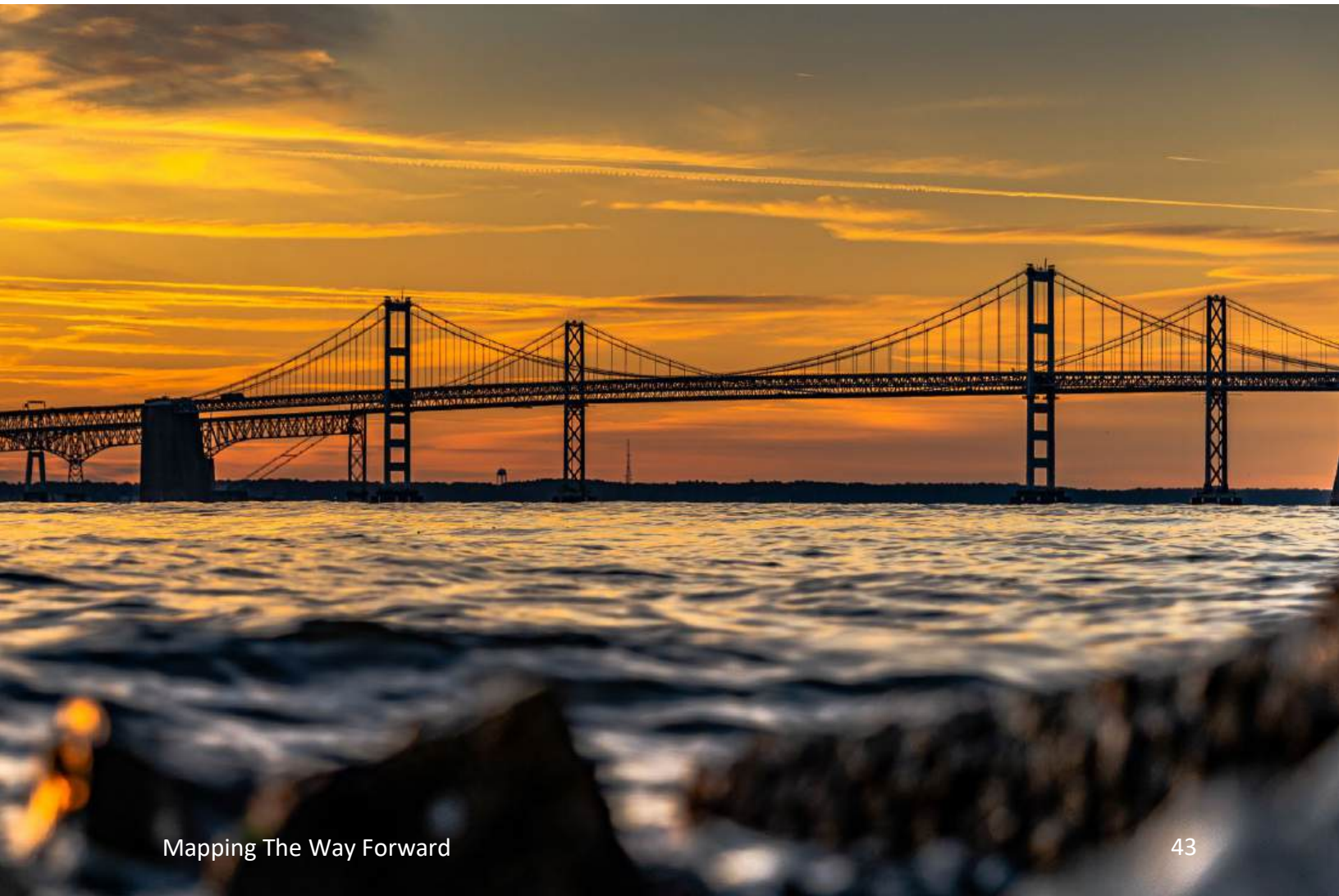
Submodel Considerations

- Why are fishery surveys not included in the fishery submodel?
- What merit does the fishery independent survey data hold, given that it consists of large polygons defining survey areas?
- Should state-level fishery independent surveys be considered in the aggregate layer?
- Should recreational areas be included in this submodel?
- Should OSW transmission lines be categorized under the OSW subcategory?
- Should the commercial aerospace industry be represented in this submodel?
- Consider whether planned wind layers should be moved to the wind submodel instead of remaining with industry data.

Additional Comments

- The new anchorage in the Shipping Safety Fairways layer should be moved to the anchorage category.
- Be sure to double-check if identified telecommunications cables are in use versus not in use.
- There are uncertainties regarding the PAM reserve locations, including future funding. The BOEM POWERON Program will reduce some of that uncertainty.

- Shoals are habitats that have remained stable for thousands of years. Swales are also habitat.
- The area offshore from Cape Charles, Virginia to Ocean City, Maryland is unique and valuable as it is the only part of the Mid-Atlantic region without borrow areas.
- Navigation safety should be a priority for pilots, maritime associations, and port operators.
- Is port infrastructure sufficient for development of wind, and how will ports adapt to SLR?
- Future rulings on fairway regulations may prohibit building.
- These issues and conversations have been consistently pursued in meetings such as Section 106 of the National Historic Preservation Act public comment meetings, interactive base model application (IBMA) meetings, the Bluepoint Wind historic resources virtual assessment, and marine archaeological research assessments. The answer always seems to be that data sharing is a future concern, as lease properties are preliminary, but collaboration and assistance are possible.



Industries sector data identified by participants as more relevant or representative for spatial planning:

- Navigation safety considerations
- Aids to navigation
- Anchorage, pilot boarding
- US Coast Guard Port Access Route Studies (PARS)
- Shipping lanes
- Fairways
- Future and proposed shipping fairways
- Coastal maintained channels and navigable waterway network lines
- Channels, terminals, and ports
- Planned Ports
- Planned Ports versus Principal Ports
- Offshore wind planned ports
- AIS data
- Vessel traffic density
- Vessel count
- Marine highways (US Marine Highway Program or MARAD)
- Ferry routes and scenic byways
- Telecommunication lines and other submerged infrastructure
- Substation and grid infrastructure
- Any potential points of interconnection (POIs), narrowed down for OSW compatibility
- Environmental sensors and buoys
- Weather buoys and sensors
- PAM data
- IBMA that shows proposed and existing planning/lease areas in real-time
- Sand borrow areas
- Potential new sand resources layers
- Bottom obstructions
- OSW and electricity, with data separated into onshore versus offshore layer

Table 4. Available data and leads for the *Industries* sector

Available Data	Lead(s) to Acquire
Navigation	
PAM Stations	• MARCO, Nick Napoli • RWSC • Local universities
Motus stations/data buoy locations	• None provided
Detailed data on buoys, wrecks and obstructions	• Maryland and other state agencies
Updated wreck data	• NOAA Office of Coastal Management
Current and likely/future fairways	• RWSC
Proposed shipping fairways from 2024	• USCG
Delaware Coastal Zone Act Program Map	• Delaware Department of Natural Resources and Environmental Control (DNREC), available on FirstMap
Location of Billy Mitchell Fleet and other sunken German warships	• NOAA
USCG Navigation Center Local Notices to Mariners	• MARCO, Jes Watts
New GIS files for Notice of Proposed Rulemaking (Proposed Shipping Fairways) January 2024	• USCG
MARAD Marine Highway System M-95	• MARAD • Marine Cadastre
Updated 2024 data on regulated fairways	• USCG
Updated NASA data layers	• NASA
High Frequency Radar	• NOAA Integrated Ocean Observing System (IOOS) • USCG
Updated USCG PARS	• Link provided
State maintained navigation channels	• State agencies
Future/proposed anchorage areas	• None provided
Wind wake and localized affects	• None provided
Limited access areas near military areas	• None provided
Various	• NOAA's ENOW Explorer Data
Various	• Delaware River Basin Commission
Various	• Delaware River and Bays Authority
Transmission and Infrastructure	
Transmission backbone data	• None provided
OSW transmission study data	• National Renewable Energy Laboratory • DOE

Table 4. ***Continued***

Available Data	Lead(s) to Acquire
Transmission and Infrastructure *(Continued)*	
Proposed High-Voltage Alternating Current and High-Voltage Direct Current lines	• None provided
Submarine cable data	• North American Submarine Cable Association
Proposed cable landfall sites and POIs	• DOE
Homeland Infrastructure Foundation-Level Data electric substation and natural gas pipeline layers	• None provided
Confidential natural gas pipeline layer obtainable by federal agencies	• United States Pipeline and Hazardous Materials Safety Administration
New telecommunications layers	• Federal Communications Commission
Acoustic telemetry locations	• None provided
Acoustic telemetry deployment POIs	• None provided
Fisheries	
New Jersey fishery-independent trawl surveys	• New Jersey Department of Environmental Protection
New Jersey Vessel Layer	• New Jersey Department of Transportation's Office of Maritime Resources • Renee Reilley, Responsible Offshore Science Alliance
New Jersey ocean trawl information	• Colleen Brust, NJDEP
Long line surveys	• NOAA
Large coastal shark bottom longline survey	• Link provided
Maryland oyster lease areas	• None provided
Environmental and Resource Management	
Marine Protected Areas (MPAs)	• None provided
Updated sand borrow areas and sediment placement areas	• USACE National Sediment Framework layers (direct link for borrow areas, direct link for placement areas)
Disposal sites	• USCG
Cooperative Atlantic States Shark Pupping and Nursery survey	• Link provided
PAM deployments – gliders and telemetry	• RWSC
Offshore shoals	• None provided
Sand bars as well as placement areas and borrow areas off the Delaware coast	• USACE • NASA, Doug Voss

Table 4. *Continued*

Available Data	Lead(s) to Acquire
Environmental and Resource Management *(Continued)*	
Unmined sand areas that are important fish habitat (e.g., Cape Charles, Ocean City Maryland)	• None provided
Past Minerals Management Service data (i.e., BOEM data)	• BOEM
Recreation and Tourism	
Leisure and tourism data	• Open Street Map
Scenic byways	• None provided
Waterway trails	• MARCO
Commercial aerospace data	• None provided
Wrecks important for recreational uses	• State agencies
General recreational fisheries tournament transit lines	• None provided

Additional comments from participant worksheets:

- There is a need for an "under development/restricted access" designation for data related to tribal decision-making, preservation, and mitigation efforts, acknowledging that not all data can be public.
- Access to GIS clearinghouse discussions is essential for improving data transparency and to facilitate proactive decision-making regarding cultural resource impacts.
- Overlaying this data onto Delaware Tribe of Indians' areas of interest would enable the Tribe to provide informed suggestions to BOEM about lease areas.

Session 5

NATIONAL SECURITY

This *National Security* session focused on locations of various military and Space Force operation areas. Alyssa Randall reviewed 12 data layers available for this sector which are specific to:

- Military boundaries
- Danger areas
- Military airspace
- Military surface grid
- BOEM Central Atlantic Navy Mission Compatibility Assessment

Immediately following Alyssa's presentation, the facilitation team welcomed Steve Sample, Executive Director of the Military Aviation and Installation Assurance Siting Clearinghouse, DOD. Attending virtually, Steve was joined by his colleague Nathan Owen, who has provided data development assistance at previous marine spatial planning workshops. The facilitation team encouraged Steve and Nathan to offer feedback on the data layers presented and talk about DOD's role in the OSW planning process, including how it coordinates with BOEM and NOAA.

Steve brought important context to the *National Security* session. He shared additional DOD data that is publicly available, stressed the importance of compatibility of different ocean uses, and described various issues and challenges that OSW may present to DOD operations. In general, he noted that DOD looks for anything that presents a risk to US military operations. He then described the DOD Siting Clearinghouse process by which DOD assesses the potential level of impact of any proposed offshore wind facilities, and, where appropriate, identifies mitigation measures which can be taken. He emphasized the importance of use of a formal DOD assessment produced by the Clearinghouse in any spatial analysis versus incorporation of individual datasets.

Although work in small groups did not occur during this session, both DOD personnel and workshop participants identified issues or challenges with the data presented for the *National Security* sector that should be considered for spatial planning:

- Military range and training areas impose limitations on OSW projects, particularly regarding restrictions in "danger areas."
- Confidentiality issues must be addressed.
- Secret movements and operations require consideration.
- Collaboration with the DOD is essential.
- Radar interference may pose significant challenges based on the size and position of OSW projects and must be assessed.
- The US Fleet Forces Command N46524 monitors encroachment.
- Much of the “blanket data” may be ineffective for initial siting, as DOD assessments will be necessary later in the process.

Data identified by DOD staff and on some participant worksheets as more relevant or representative for spatial planning:

- High frequency radar interference
- Long range radar
- Military training routes
- Military airspace
- Special use airspace
- Flight obstructions
- Crane height (e.g., locations such as Chamber Field, VA)
- Danger areas
- High priority areas
- Unexploded ordnances
- Activities further out from shore
- Ultra Large Container Vessel routes
- One way traffic patterns in and out of ports

Table 5. Available data and leads for the *National Security* sector

Available Data	Lead(s) to Acquire
Updated NASA Assessment for impact areas with respect to BOEM's Central Atlantic 2 Call Area	• NASA, Doug Voss
United States Navy (USN) encroachment management protocol developed with Dominion Energy, USN, USCG, VA Pilots, Port of VA (can be translated to DE, NJ, MD)	• USN
Space X and Blue Origin landing and launch sites and private industry data	• None provided
Military Submarine Transit Lanes (formerly in Marine Cadastre but removed upon request)	• None provided
Export cable landing areas	• None provided
Wind turbine radar interaction studies	• None provided
Defense Installations Spatial Data infrastructure (DISDI)	• DISDI

Additional comments shared on participant worksheets:

- In the data layers table, use Marine Cadastre as the "original source" when the download link redirects here, and direct DOD sources are unavailable. This ensures transparency about the geospatial translation of the data.
- DOD's perspective of constraints versus core national security needs is appreciated.
- It may be useful to consider USCG's assessment of response time for OSW-related incidents and rescues, if available.
- There is alignment overall between the NASA layer and the Atlantic Navy mission.

Session 6

METOCEAN AND OTHER

Jacob Freedman shared the current data inventory for the *Metocean and Other* sector, covering aspects like oceanographic and climatic factors, water depth and slope, boundaries, and projected onshore impacts. He discussed 51 data layers for this sector, which include:

- Sea Floor Shear Stress
- Coastal Relief Model (CRM)
- Sea surface height and ocean waves
- Ocean currents
- Ocean winds
- Tropical storms
- Primary production
- Zooplankton
- Ocean boundaries
- Sea level rise projections
- Erosion rate in Maryland

Issues or challenges with data presented for the *Metocean and Other* sector that should be considered for spatial planning:

Data Quality and Availability

- Is current data available? Some data is more than 10 years old.
- Much of the data is outdated.
- The current data is outdated and could be updated using the Hybrid Coordinate Ocean Model (HYCOM).
- Layers need updating, with climate change considered.
- Climate change and forecasting layers are missing.
- There is a lack of predictor data.
- Much of the metocean data is old, but it is unclear if this is a significant issue.
- Biological information for primary production and zooplankton is outdated.
- More substrate data is generally needed.

Data Accuracy and Relevance

- How accurate are the modeled wind speed and direction?
- Current data shows very little variability in currents across the study area. Is this accurate?
- For ocean waves, maximum height might be more relevant.
- Is Marine Eco Worlds regularly used as a classification designation and, if so, in what context? It has not been used in previous models.
- For SLR, what is the "time zero" water level (or base sea level) data based on?
- What is the relevance of primary production to OSW?
- How relevant is primary production and zooplankton to OSW? Should this be categorized with natural resources?
- Is the zooplankton layer misleading due to its "North Atlantic" nomenclature, or will it serve as an indicator species for whales and/or fish biomass?
- The relevance of chlorophyll-a and zooplankton may be better suited under the Natural Resources submodel.
- Primary production shows negative mean values for milligram/meter^3 of chlorophyll-a.
- Most of the data presented are modeled from observations. It seems peculiar to include both primary and secondary (zooplankton) layers in this section, as these layers are valuable predictors for baleen whale concentration areas.
- Some oceanographic data included as covariates in species models may not provide useful information on their own.
- The CRM bathymetry data is not very informative.
- There may be a symbology issue with the bathymetry layer, which displays one color up to the shelf break.
- Erosion data may be less useful as erosion rates are dynamic.

Oceanographic and Environmental Concerns

- What about the flooding already occurring upstream, as shown by Westchester University's SLR research? Is this within BOEM/NOAA regulations?
- What actions are being taken regarding flooding already occurring upstream?
- There is an assumption that tropical weather is the only threat.
- Tropical storm data indicate that climate change is likely to increase the frequency and intensity of future storms, making these datasets potentially less useful.
- Tropical storms do not include Nor'easters, which are significant drivers of episodic shoreline change.
- Could sea surface temperature provide more insights into Gulf Stream locations?
- Developers may care about wind speed height.
- Wind speed data is needed at different heights.
- For mean wave height/average wind speed, maybe also use a different statistic such as one standard deviation over the average.
- Ocean heat content being observed is unprecedented.
- Stress on the seafloor is important for engineering structures, but it is also important to consider impacts on habitat and animals.

Data Integration and Use

- A clearer delineation of ocean sea-level rise coloration is needed.
- It is important to understand what the Atlantic state boundary data layer represents as it extends to 200 miles; it may not be particularly accurate or useful for modeling. Distance to a state may be more useful in this context.
- The Atlantic state layers should be vetted with the states.
- Some data layers focus heavily on shoreside areas. It is necessary to clarify where and how they are used.
- Some data relate to the shoreside aspect of OSW, while offshore data may require different approaches for model integration.
- Consider blending primary production and chlorophyll-a data together with other natural resources information.
- Including zooplankton on its own may be redundant.
- Do developers provide feedback on the usefulness of this data for determining lease areas, especially if they rely on their own proprietary data?
- IOOS will integrate PAM data with metocean data to support modeling and products for offshore wind partners, regulators, and stakeholders. This will also aid habitat models and other tools useful for marine spatial planning and OSW.
- IOOS provides real-time and near-real-time metocean data certified by NOAA/ IOOS to meet or exceed federal standards. Users can access these data through the IOOS portals and other federal pathways. IOOS utilizes this quality-controlled data to create seasonal and climate-scale products that will benefit marine spatial planning. Some of this information is available in MARCO's portal.

Methodological Considerations

Most of the data presented come from models based on observations that are over 10 years old. Contact the MDAT Team, Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS), and other NOAA offices for updates, especially regarding the current elevated ocean heat content.

- Averages for some datasets may be less useful than maximum values or one standard deviation.
- Averaged data can be less useful than data from episodic events (maximum/ minimum), so alternative data may be preferable.
- Be cautious regarding the universality of the time series of data sets – be careful not to simply truncate the most recent years.
- Does assigning equal weight to a submodel like the metocean submodel inadvertently give it too much influence compared to more data-rich submodels?

Data identified by participants as more relevant or representative for spatial planning:

- Bathymetry
- Climate change projections
- Coastal relief model
- Currents
- Ocean waves
- Seafloor composition
- Seafloor shear stress, useful for:
    - Buried cables
    - Turbine placement
    - Transmission siting
    - Proxy for ecological sensitivity to anthropogenic seafloor disturbance
- Sediment and sediment movement
- Tropical storm data
- Water depth
- Wind speed and direction
- Winter storm data

Table 6. Available data and leads for the *Metocean and Other* sector

Available Data	Lead(s) to Acquire
Climate Change and Sea Level Rise	
SLR projections	• None provided
Localized SLR projections for Delaware Bay (includes three greenhouse gas scenarios for 2030, 2050, 2070 and 2100 at low(5%), intermediate (50%) and high (95%) risk)	• None provided
Impact of SLR on cultural resources in Delaware Bay Region	• Nikitina et al., 2022 • West Chester University, Daria Nikitina and Heather Wholey (Pennsylvania) • Delaware Tribe of Indians, Joanna Maurer
Delaware SLR inundation maps will be updated in 2025 with Light Detection and Ranging	• None provided
Finer scale ecoregion information	• Wilkinson et al., 2009
Blue carbon sinks	• USGS • State Geologic Surveys • Smithsonian Environmental Research Center (studies of Chesapeake Bay and coastal Virginia)
Climate resilience evaluations of ports and other infrastructure	• None provided
Oceanographic and Environmental Data	
Net ecosystem production	• MARACOOS Ocean Map
Updated primary and secondary zooplankton layers	• NOAA NEFSC, Sarah Gaichas • MDAT • Duke University
Chlorophyll-a	• NASA PACE Tool, Jeremy Werdell • NCCOS Harmful Algal Bloom program
Sea surface elevation (SSE)	• HYCOM SSE 1992 – 2024 (Google Earth Engine [GEE])
Sea surface temperature	• None provided
Water temperature and salinity	• HYCOM Water temp and salinity 2024 (GEE)
Water velocity	• HYCOM water velocity 1992-2004 (GEE)
Wind speed U10	• None provided
Wind speed at hub height for the Mid-Atlantic Bight region	• None provided

Table 6. ***Continued***

Available Data	Lead(s) to Acquire
Storm and Weather Data	
Sea, Lake, and Overland Surges from Hurricanes model data	• National Weather Service
Winter storm data and Nor'easters	• None provided
Storm surge data	• MDDNR
Meteorological data	• Rutgers University Weather Research and Forecasting Model
Sea Floor and Sediment Data	
Bathymetry	• General Bathymetric Chart of the Oceans
Shoals	• None provided
Dredging locations	• None provided
Canyon layers	• None provided
Seafloor sediment/substrate	• USGS • MARCO • Delaware Geological Survey
Longshore sediment transport modeling	• Virginia Institute of Marine Sciences, Chris Hein • The Water Institute, Ioannis Georgiou • NASA, Shari Miller
Northeast canyons and seamounts national monument	• None provided
Shear stress map	• USGS • MARCO, Nick Napoli
Delaware offshore geology	• Delaware Geological Survey • BOEM
Erosion and Flooding	
Upstream flooding	• Nikitina et al., 2022
Updated MD erosion rates (western shore updated ~2016, eastern shore ~2009)	• Maryland Geological Survey
Maryland flooding and storm damage	• Maryland MyCoast
Modeling and Projections	
NOAA projection data for shift in Gulf Stream location, wind speeds, etc.	• NOAA
Data forecasts for changes to the Gulf Stream	• None provided
Projected future storm data, based on climate change impacts	• None provided
Projected future wind speed, wave height etc. based on climate change	• None provided

Table 6. *Continued*

Available Data	Lead(s) to Acquire
Modeling and Projections *(Continued)*	
Storm modeling data	• USACE North Atlantic Coast Comprehensive Study
Rutgers University Weather Research and Forecasting Model	• MARCO Portal
Additional Resources	
Fishery Management Council Boundaries	• MAFMC, Julia Beaty
EPA Airsheds and Class 1 areas	• EPA
USACE North Atlantic Coast Comprehensive Study	• USACE
MARACOOS Data	• MARACOOS
NASA PACE Tool (Plankton, Aerosol, Cloud, Ocean Ecosystem)	• NASA, Jeremy Werpell
Delaware regulatory coastline setback	• DE FirstMap

Additional comments shared on participant worksheets:

- For layers like primary production and zooplankton, researchers might investigate which habitats are impacting hotspots, as populations are dynamic.
- Assess the value of shear stress as a proxy for how benthic organisms and communities respond to anthropogenic disturbances.
- Can the erosion rate model presented for Maryland be applied to other states?
- Forecast and characterize Nor'easters in relation to elevated ocean heat content.
- Regarding ocean boundaries, modelers should consider the Northeast Canyons and Seamounts National Monument. Although it lies outside the BOEM Call Area, it is important to be aware of this area in the event of turbine damage and debris dispersal.
- Is the metocean data from NCCOS and data partners robust enough to add significant value to the discussion compared to what developers possess? What feedback might the industry provide?

Session 7

OFFSHORE WIND

Dr. Seth Theuerkauf of BOEM introduced the 'Offshore Wind' session as a complement to the previous six sessions. He focused on ways in which certain datasets previously considered in the other sessions could be used to inform the most opportune locations for offshore wind development. He was joined by Destin Webb, Policy Advisor at DOE's Grid Deployment Office, who described the support role that DOE provides to the OSW planning and development process, particularly as it relates to transmission planning.

To catalyze the discussion, Dr. Theuerkauf provided examples of certain data layers that have previously been identified as important in defining the most technically or economically feasible locations for offshore wind development, such as:

- Wind resource data
- Wake effects/power loss
- Seabed geology and subsurface conditions
- Seabed bathymetry and topography
- Technical and engineering considerations
- Subsurface infrastructure and hazards
- Distance to shore
- Distance to inlet

Dr. Theuerkauf concluded by noting the importance of considering future infrastructure that is needed to bring energy generated from OSW to connection points on land. He fielded a range of questions on the challenges associated with finding those points of interconnection, the role of meteorological modeling to better understand wake effects on wind farms, and how to track BOEM's activities in the Central Atlantic region. The facilitator then asked the group what stands out as the most relevant for spatial planning. Participant responses included:

- Think into the future, as well as early in the planning process, about points of interconnection (e.g., distance from farms, some more appropriate than others).
- The wake effect from OSW turbines could impact local climate and reduce visibility in shipping lanes.
- One important challenge is to look at cable burial depths and identify the type of data that would inform this.
    - There may not be enough benthic data.
    - Do we have good subsurface geology data?
    - We need to understand environmental impacts and how developers can navigate the process.
    - USGS has a seafloor sediment map but it is old.
    - The General Bathymetric Chart of the Oceans has both data and a predictive model.
    - BOEM should acquire the benthic work done by TNC.
    - Data collected by developers provides a rich database of information.
    - There is value in collating local data.
- Maryland's Coastal Atlas has limited OSW data, mostly from around 2010.
- Acquire the core inventory of data off the coast of Delaware.
- Processed seafloor data from developers could be submitted to MARCO.
- The location of decommissioned fossil fuel plants or substations, if available, could be an informative data layer.
- Integrating transmission planning with WEA planning can help minimize future transmission challenges.
- The Truescape time-lapse visualization model is a useful tool.
    - 360 degree view
    - Include cabling, substations etc.
    - If possible, share restricted access version of the tool
- Additional data and leads that are relevant to siting may be available from:
    - EPA for ocean disposal sites
    - Marine Protection, Research, and Sanctuaries Act
    - Points of contact for Transmission System Operator/Independent System Operator planning processes
    - Developers

KEY TAKEAWAYS AND NEXT STEPS

As the workshop came to a close, participants shared key takeaways and emerging insights to support the evolving nature of marine spatial planning in the Central Atlantic region. Occasionally, Dr. Theuerkauf offered brief responses to questions put forward. Given the focus of the workshop—initial brainstorming of data development ideas, leads and gaps—no effort was made to either assess or build consensus on any comment.

- "There is an opportunity—particularly given that we have now seen more of the state-level data and discussed transmission issues—for BOEM and the states in the Central Atlantic to continue discussing how all the offshore and onshore pieces will work together. We need to consider what kind of infrastructure will be needed to support this industry and what the implications will be for coastal communities. Ongoing community engagement will be a critical element of the process."

- "It seems a lot of information is missing from the cultural and social resource data layers. In the future, NOAA and BOEM should consider contacting Tribes and various organizations that collect and manage historical data. If some data is sensitive, we can perhaps find ways to generate high-level heat maps or other products in a way that protects confidential information while simultaneously helping agencies and developers avoid impacts to important cultural resources."

- "There is great value in the variety of people that have been pulled together to support this data development work. It's useful to get feedback on different data sets from the range of perspectives and expertise in the room. This collaboration helps generate broad understanding of the data we are considering."

- "In the future it would be great to have individual presenters go data layer by data layer in order to discuss caveats and constraints. Having summary presentations is certainly useful, but if we go deeper we can generate more nuanced insights about the data."

- "It's really critical that we collaborate, discuss how states are impacted and better understand the role that each of us will play in this process. It's very helpful to balance different impacts and foster broad understanding of everyone's needs."

- "I'm impressed by everyone's expertise. Are there efforts underway to address missing data or some of the challenges that surfaced during this workshop?"
    - Dr. Theuerkauf: BOEM has an environmental studies program that helps fund needed research to inform OSW planning and permitting.

- "It's really impactful to be in the room with so many different people representing a wide range of disciplines. Zoom meetings are useful, but it's much easier to do the work in person than online. We make lasting connections by working together in this type of collaborative forum."

- "There is a lot of work still to come and we, the states, look forward to helping. We produced a lot of outputs during this workshop. This information holds great potential to inform the OSW leasing process, and will have other uses as well."

- "I represent a commercial fishing association in Long Island, New York. I appreciate being included in this dialogue. Our community feels there are issues and challenges associated with offshore wind that haven't been addressed over the last 12 years. I would request that agencies look closely at all the fisheries data so we can avoid developing areas that are valuable for fishermen."

- "The regional associations of the US Integrated Ocean Observation Systems have data sharing agreements in place with some developers, and additional agreements are being negotiated. If we know the data needs for marine spatial planning, these elements could be included in existing and new agreements and provided through existing or new channels to the relevant communities. These data sharing interactions are expanding to all developers as an element of permit related requirements that NOAA and BOEM have in place to mitigate impacts of offshore wind on existing radar systems. While these data are not part of the permit requirements, the interactions we have to fulfill their permit requirements opens a door for additional dialogue to request on a voluntary basis the provision of additional data that would support marine spatial planning."

- "The data that is collected by current offshore wind lessees are our greatest assets to planning with respect to the subsurface geology. It would be very helpful to make these data publicly available."

- "During BOEM's public engagement process, do people understand the level of credibility and technical modeling that goes into the planning work?"
    - Dr. Theuerkauf: At public meetings BOEM is generally able to convey the process, how data flows into the model, and how this information is considered and informs agency decisions.

- "I'm struck by how many different resources we are balancing. This planning effort is a big undertaking. I'm grateful for the work that all the federal, tribal and state partners are advancing, and doing it together."

Dr. Morris (NOAA) and Dr. Theuerkauf (BOEM) jointly thanked all the workshop participants for their commitment to this collaborative data development effort over two days together. Next steps that will guide NOAA's work in the months ahead include:

- Develop and distribute the workshop report (NCCOS website, technical memo)
- Follow up on identified data leads – NCCOS team will be in touch
- Continue to develop NCCOS marine spatial planning data inventory/geodatabase
- Work with state and federal governments on planning priorities
- Incorporate identified best-available data in BOEM's on offshore wind energy planning priorities
    - Offshore wind transmission modeling
    - Central Atlantic Round 2 Wind Energy Area development

Dr. Morris concluded by noting that the federal government and its many partners, including the states, are making tremendous investments in data collection and marine spatial planning. This workshop is reflective of that commitment. He again thanked everyone for sharing and trusting NOAA and BOEM with the ocean intelligence of the Central Atlantic region.

APPENDIX A: Acronyms and Abbreviations

AOA	Aquaculture Opportunity Area
ASLF	Ancient Submerged Landform Features
AWOIS	Automated Wreck and Obstruction Information System
BIA	Biologically Important Area
BOEM	Bureau of Ocean Energy Management
CAS	Communities at Sea
COP	Construction and Operations Plan
CRM	Coastal Relief Model
DFW	Division of Fish and Wildlife
DISDI	Defense Installations Spatial Data infrastructure
DNREC	Delaware Department of Natural Resources and Environmental Control
DOD	Department of Defense
DOE	Department of Energy
EFH	Essential Fish Habitat
ENC	Electronic Navigational Charts
ENOW	Economics: National Ocean Watch
EPA	Environmental Protection Agency
ESI	Environmental Sensitivity Index
GEE	Google Earth Engine
HABCAM	Habitat Mapping Camera
HAPC	Habitat Areas of Particular Concern
HMS	Highly Migratory Species
HYCOM	Hybrid Coordinate Ocean Model
IBMA	Interactive base model application
IOOS	Integrated Ocean Observing System
km	Kilometer
MAFMC	Mid-Atlantic Fishery Management Council
MARACOOS	Mid-Atlantic Regional Association Coastal Ocean Observing System
MARAD	United States Department of Transportation Maritime Administration
MARCO	Mid-Atlantic Ocean Data Portal
MDAT	Marine-Life Data and Analysis Team
MDDNR	Maryland Department of Natural Resources
MERR	Marine Education Research and Rehabilitation
MGEL	Marine Geospatial Ecology Lab
MPA	Marine Protected Area
NASA	National Aeronautics and Space Administration
NCCOS	National Centers for Coastal Ocean Science
NCEI	National Centers for Environmental Information
NEAMAP	Northeast Area Monitoring and Assessment Program
NEFMC	New England Fishery Management Council

NEFSC	Northeast Fisheries Science Center
NHRA	Northeast Regional Marine Fish Habitat Assessment
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NPS	National Park Service
NWR	National Wildlife Refuge
OCS	Outer Continental Shelf
OSW	Offshore wind
PACE	Plankton, Aerosol, Cloud, ocean Ecosystem Tool
PAM	Passive acoustic monitoring
PARS	Port access route studies
POI	Point of interconnection
RV	Research Vessel
SAFMC	South Atlantic Fishery Management Council
SLR	Sea Level Rise
SSE	Sea Surface Elevation
SVI	Social Vulnerability Index
TEK	Traditional Ecological Knowledge
TNC	The Nature Conservancy
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USFWS	United State Fish and Wildlife Service
USGS	United States Geological Survey
USN	United States Navy
VMS	Vessel Monitoring System
VTR	Vessel Trip Reporting
WEA	Wind Energy Area

APPENDIX B: Workshop Agenda

Day 1
Maryland Innovation Center: Wednesday, October 16, 2024

Time	Activity
8:30 am - 9:00 am	Registration
9:00 am - 9:15 am	Welcome and Agenda Review
9:15 am - 10:00 am	Overview of NOAA's Marine Spatial Planning Process and How It Informs BOEM's Siting Process
10:00 am - 10:15 am	Overview of Existing Regional Ocean Data Initiatives and Partnerships
10:15 am - 11:15 am	Session 1: Natural Resources
11:15 am - 11:30 am	Break
11:30 am - 12:30 pm	Session 1 continued: Natural Resources
12:30 pm - 1:30 pm	Lunch Break
1:30 pm - 3:15 pm	Session 2: Fisheries
3:15 pm - 3:30 pm	Break
3:30 pm - 4:45 pm	Session 3: Cultural and Social Resources
4:45 pm - 5:00 pm	Wrap Up Day 1 and Preview Day 2

Day 2
The Maryland Innovation Center: Thursday, October 17, 2024

Time	Activity
8:30 am - 9:00 am	Registration
9:00 am - 9:15 am	Recap of Day 1 and Preview Day 2
9:15 am - 10:45 am	Session 4: Industries
10:45 am - 11:00 am	Break
11:00 am - 12:00 pm	Session 5: National Security
12:00 pm - 1:00 pm	Lunch Break
1:00 pm - 2:30 pm	Session 6: Metocean and Other
2:30 pm - 2:45 pm	Break
2:45 pm - 4:15 pm	Session 7: Offshore Wind
4:15 pm - 4:45 pm	Key Takeaways and Next Steps
4:45 pm - 5:00 pm	Closing Remarks

APPENDIX C: Workshop Participants

In-Person Participants

Name	Affiliation
Rachel Bacher	Maryland Department of Natural Resources
Julia Beaty	Mid-Atlantic Fishery Management Council
Avalon Bristow	Mid-Atlantic Ocean Data Portal
Max Brown	NOAA National Centers for Coastal Ocean Science (Affiliate)
Ken Choi	Maryland Department of Natural Resources
Sarah DeLand	Duke University – Marine Geospatial Ecology Laboratory
Jacob Freedman	NOAA National Centers for Coastal Ocean Science (Affiliate)
Josh Gange	Bureau of Ocean Energy Management
Becky Golden	NOAA Habitat and Ecosystem Services Division
Keith Hanson	NOAA
Julie Harris	Department of Energy
Kevin Hassell	New Jersey Department of Environmental Protection
Maureen Kallgren	US Coast Guard
Supriya Khadke	NOAA Office for Coastal Management
Joanna Maurer	Delaware Tribe of Indians
Catherine McCall	Maryland Department of National Resources
Angel McCoy	National Renewable Energy Laboratory
Mark Monaco	NOAA National Centers for Coastal Ocean Science
Robert Newton	Maryland Department of Natural Resources
Ashley Norton	Delaware Department of Natural Resources and Environmental Control – Coastal Management Program
Bryce O'Brien	NOAA National Centers for Coastal Ocean Science (Affiliate)
Jay Odell	Mid-Atlantic Ocean Data Portal
Jasmin Papas	NOAA National Centers for Coastal Ocean Science (Affiliate)
Melissa Pauley	Bureau of Ocean Energy Management
Johnathan Peros	New England Fishery Management Council
Alyssa Randall	NOAA National Centers for Coastal Ocean Science (Affiliate)
Renee Reilly	Responsible Offshore Science Alliance
Janet Reimer	Mid-Atlantic Ocean Data Portal
Kirby Rootes-Murdy	Bureau of Ocean Energy Management
Seth Theuerkauf	Bureau of Ocean Energy Management
Marek Topolski	Maryland Department of Natural Resources
Richard Watson	US Coast Guard
Jess Watts	Mid-Atlantic Ocean Data Portal
Destin Webb	Department of Energy
Henry Wooley	US Fish and Wildlife Service
Briana Yancy	NOAA

Online Participants (via Zoom platform)

Name	Affiliation
Kristin Andel	National Park Service
Jennifer Au	NOAA National Centers for Coastal Ocean Science (Affiliate)
Caitlin Beebe	US Fish and Wildlife Service
Bonnie Brady	Long Island Commercial Fishing Association
Colleen Brust	New Jersey Department of Environmental Protection
Douglas Christel	NOAA National Marine Fisheries Service – Greater Atlantic Region
Kerby Dobbs	Bureau of Ocean Energy Management
Michelle Duval	Mid-Atlantic Fishery Management Council
Drew Faulhaber	Delaware Department of Natural Resources and Environmental Control – Coastal Management Program
Naomi Handell	US Army Corps of Engineers
Zina Hense	Delaware Department of Natural Resources and Environmental Control – Division of Fish and Wildlife
Todd Janeski	Virginia Marine Resources Commission
Brandon Jensen	Bureau of Ocean Energy Management
Gerhard Kuska	Mid-Atlantic Regional Association Coastal Ocean Observing Program
Joanne Lewis	Bureau of Ocean Energy Management
Shari Miller	NASA Goddard Space Flight Center – Wallops Flight Facility
Nick Napoli	Northeast Ocean Data Portal and Mid-Atlantic Ocean Data Portal
Ashley Norton (day 1)	Delaware Department of Natural Resources and Environmental Control – Coastal Management Program
Nathan Owens	Department of Defense
Jen Pawloski	Carefree Boat Club of Ocean City, Maryland
Patrick Roberts	US Fish and Wildlife Service
Steve Sample	Department of Defense
Emily Schumchenia	Regional Wildlife Science Collaborative
Karl Vilacoba	Monmouth University Urban Coast Institute
Doug Voss	National Aeronautics and Space Administration

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