Comments on NJBPU Second Solicitation Guidance Document

Prepared by the Rutgers University Center for Ocean Observing Leadership (RUCOOL)

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The comments contained herein are in response to the NJBPU call for public comment on the draft NJ OSW second solicitation guidance document and attachments released in July 2020. Specific to this request, Rutgers University provides comment given our expertise in atmospheric science, ocean science, and fisheries science. Rutgers, The State University of New Jersey, is a leading national research university and the state of New Jersey's preeminent, comprehensive public institution of higher education.

Formed in 1992, the Rutgers Center for Ocean Observing Leadership (RUCOOL) focuses on understanding the interactions between physics, chemistry, and biology in the world's ocean and the corresponding impact on human society. At its core, RUCOOL operates a suite of ocean and atmosphere observing technologies including coastal meteorological stations, satellite based remote sensing, surface based radars, a fleet of unmanned ocean going robots, and ocean and atmosphere numerical modeling systems. These technologies now serve a wide range of applied users by providing open access high quality real time spatial data of the marine environment. The broad user community that includes private industry, state and federal government, and the general public, demonstrates the wide range of research and service that RUCOOL provides. Research results of the center have been published in leading academic journals including Science, Nature and the Proceedings of the National Academy of Sciences. Publications span fundamental research, engineering, education, and social science journals. Consistent with the Rutgers mission as a land grant institution, RUCOOL seeks to translate this science-based research in a way that informs applications, decision-making, and management of ocean resources.

Rutgers faculty are also engaged in the entire breadth of fisheries science from the wild fish or invertebrate population, to the recreational fishers and commercial fishers and processors who harvest and sell fish, and the managers who regulate fisheries for sustainability. We have experience performing collaborative fisheries research in Mid Atlantic shellfish fisheries including the lucrative commercial surfclam, ocean quahog and sea scallop fisheries. At the Haskin Shellfish Research Laboratory, faculty contribute annually to research priorities in the oyster fishery stock assessment, participate in the annual NJ oyster stock assessment, and have been a member of the federal Working Groups for the surfclam and Ocean Quahog assessments for nearly a decade. Faculty at Haskin and the Marine Field Station in Tuckerton also contribute to important work on habitat use and assessment of important recreational and commercial benthic-oriented species on the shelf, such as summer and winter flounder, black sea bass, striped bass, Atlantic croaker, weakfish, and others, as well as the connection between ocean spawning and estuarine nursery habitat.

Summary of the main point:

- We recommend the arrays of offshore platforms be utilized as an infrastructure to provide direct ocean and ecological observations throughout the water column as a required part of the submitted environmental and fisheries monitoring and impact mitigation plans (addressed in Sections 3.9 and 3.10 of the draft guidance document).

Instrumentation on Offshore Platforms

The preparation for and construction of offshore wind turbines provides a large number of offshore platforms which could be instrumented to collect oceanographic data. While wind energy developers would likely classify wind measurements as proprietary data, oceanographic and ecological data could be provided to the public, which would greatly benefit the scientific community, and ocean stakeholders in general. The types and spacing of instruments which could be deployed, and how this could be done in partnership with developers, should be assessed.

The surface ocean off the New Jersey coast and surrounding continental shelf areas is observed regularly via satellite and shore based remote sensing. However, information on subsurface conditions is incredibly sparse. Significant challenges to real time data collection include limited power supplies for marine instruments and lack of communication for data telemetry. Offshore wind platforms provide a unique opportunity to collect critical ocean and environmental data from structures that could allow for easy access to instrument power supplies and communications. These data should be an encouraged as an important component of both the Environmental Protection Plan (Section 3.9) and the Fisheries Protection Plan (Section 3.10). In addition to the direct value these observations would provide the developers and state agencies to monitor anticipated environmental and fisheries impacts, these data would also serve a much larger stakeholder community throughout the state and region. Below we summarize a representative set of variables among many others that can support developer, state, and stakeholder needs with deployment across the proposed offshore infrastructure arrays.

An array of offshore platforms provides an infrastructure to support various stakeholders in the region with direct ocean observations throughout the water column. In brief, the oceanographic variables with the broadest impact include:

- *Bottom Temperature, Salinity, and Pressure*: Given the intense variability in the seasonal ocean conditions highlighted by a strong summer thermocline, there is need to fill the gap in subsurface observations of these basic ocean parameters. While satellite based sensors provide expansive maps of ocean temperatures across the region, these observations are limited to the surface. During the intense summer stratification, the colder bottom temperatures are not observed. Low cost hydrographic sensors deployed near the seafloor on the offshore wind platforms would provide the research and stakeholder community with real-time bottom ocean measures. These data would map the evolution of the seasonal cold pool, providing critical data that will support storm intensity forecasting (Glenn et al., 2016), research, fisheries management, and the commercial and recreational fishing industry.
- *Water Column Velocity* While significant information on surface currents is available via HF Radar there are currently no real time measurements of subsurface currents on the continental shelf of the Mid Atlantic. In summer when the water column is highly stratified, bottom currents are de-coupled from surface measurements and little is known about their forcing mechanisms or their impacts on the local hydrography or ecosystems. Real time measurements from platform mounted acoustic Doppler current profilers would allow for increased understanding of the climate system, improved measures of the coastal ocean response to hurricanes and winter storms, and critically where subsurface pollutants or sediments might be dispersed.
- *Surface Waves:* One of the most critical measurements for safety at sea are surface wave conditions. Real time measurements of wave conditions can support broad stakeholder

priorities for marine operations, including the offshore wind industry itself. Wave measurements in the proposed wind energy areas are severely lacking. Acoustic Doppler current profilers used for current measurements are also highly effective at measuring surface wave properties. These measurements would help all maritime industries as well as provide research information for sediment resuspension and transport in the region.

- *Dissolved Oxygen*: The coastal ocean is a highly variable system with processes that have significant implications on the hydrographic and oxygen characteristics of the water column. The spatial and temporal variability of these fields can cause dramatic changes to water quality and in turn the health of the ecosystem. While low Dissolved Oxygen (DO) concentrations are not uncommon in the coastal ocean, what is less understood is how the location and size of these low DO regions vary and what impact that variability has on ecosystem health. Both the U. S. Environmental Protection Agency (EPA) and the New Jersey Department of Environmental Protection (NJDEP) have prioritized monitoring the coastal waters off New Jersey in their long-term strategic plans as an essential component of the decision-making process. Offshore platforms would allow for continuous measures of DO across the mid-shelf within the bottom layer isolated from the atmospheric oxygen sources above.
- *Surface and near-bottom pH and pCO_2 (concentration of carbon dioxide in seawater)*: Measurements of pH and pCO_2 are critical to monitor the variability and trends of ocean acidification in the Mid-Atlantic Bight. The data produced from these sensors have the capability of serving a wide range of users including academic and government scientists, monitoring programs including those conducted by OOI, IOOS, NOAA and EPA, water quality managers, and commercial fishing companies (shellfish and finfish). Additionally, the potential of open accessible, automated near real-time data would provide a warning system that would assist scientists studying ecological processes, water quality managers and conservationists to monitor impacts, and commercial operators to implement adaptive strategies.

Simultaneous measures of the overlying ecology would complement the above ocean variables. The coincident ecological measurements would empower the research and management communities with a wealth of data to understand and model the coupled marine ecosystems. Theses variables include:

- *Fish Telemetry and Tracking*: Animal telemetry is a rapidly growing field that can provide information on the distribution of animals and, in combination with observing technologies, oceanographic conditions the animals inhabit. Inexpensive receivers deployed on the offshore platforms would provide an unprecedented resolution that would enable high resolution monitoring of tagged fish behavior within the offshore wind area and the seasonal and inter-annual variation of migratory passage through it. These data would inform fishery and conservation efforts.
- *Passive Acoustics:* Digital acoustic monitoring systems (DMONs) have been demonstrated to detect vocalizing right whales and other marine mammals as well as numerous species of vocalizing fishes. To date they have been deployed on fixed buoys on mobile platforms including gliders and on cabled observatories (Mann and Grothues 2009). If deployed on offshore turbines, these data could support ecological monitoring and decision-making

during the construction phase of offshore wind farms, enabling construction to occur on a 24-hour cycle.

- *Active Acoustics*: Possibilities include a moored or glider-mounted echo sounder (Acoustic Zooplankton and Fish Profiler, AZFP from ASL; or Simrad equivalent) to examine zooplankton and fish characteristics that will enable academic, state, and federal researchers and fisheries managers to quantify total biomass, identify zooplankton and fish species, quantify taxon-specific abundance and individual size, and examine the distribution and behavior of both fish and zooplankton. This will thereby improve understanding of distribution patterns and ecological relationships between these two major trophic levels in the ecosystem.

To ensure these data serve the entire stakeholder community, we further recommend that these data be distributed through existing regional data dissemination infrastructure and data visualization portals. The Mid-Atlantic Ocean Data Portal is supported by the Mid-Atlantic Regional Council on the Ocean (MARCO), and was developed with input and participation from BOEM and other federal, state, and not-for-profit data partners. Data present in the portal have been used to facilitate stakeholder participation and ocean planning efforts to enhance Mid-Atlantic Regional Ocean Action Plan and various federal agency initiatives in concert with the National Ocean Policy (Lathrop et al., 2017). The OceansMap portal supported by the Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS) allows users to access, visualize, and interpret a broad range of environmental data from around the globe, including both real-time observations and model forecasts, all with just a few simple clicks. OceansMap web portals combine sophisticated data visualization and analysis tools with an intuitive, map-based interface designed to facilitate data exploration and discovery. From maritime planning to water quality monitoring to operational search-and-rescue, regardless of your application, OceansMap makes met-ocean data easy.

References

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