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Dear Mr. Jylkka,

Thank you for the opportunity to provide input into the Bureau of Ocean Energy Management's (BOEM) Request for Information on commercial offshore wind leasing in the Gulf of Maine (Docket #: BOEM-2022-0040). The signers of this letter include members of the research and fishing communities who share a commitment to ensuring that Local Ecological Knowledge (LEK), including Fishermen's Ecological Knowledge (FEK), forms a cornerstone of offshore wind planning, permitting, and impacts evaluation in the Gulf of Maine and elsewhere.

In this letter, we wish to offer preliminary guidance to BOEM on the collection, integration, and utilization of FEK in an offshore wind planning context. Furthermore, we invite BOEM to collaborate with the signers of this letter to support the development of methodologies, best practices, and protocols that will ensure a thorough and accurate collection and integration of FEK into offshore wind planning in the Gulf of Maine.

The Gulf of Maine is a complex ecosystem that forms the basis of a rich and dynamic fishing economy. Although this ecosystem has long been the subject of intense study by research institutions and the Northeast Fisheries Science Center (NEFSC), much remains unknown about the system's dynamics, especially at the finer scale. Moreover, the Gulf of Maine ecosystem is changing rapidly, and new ecological patterns are emerging. The introduction of a major new use like offshore wind at a time like this necessitates the compilation and integration of as much information as possible on a very short timeline. The development of offshore wind has highlighted many data gaps in our understanding of the marine ecosystem in the Gulf of Maine and the people who rely on it. A concerted effort is needed to fill these gaps, and we advocate the incorporation of the knowledge of fishermen as vital to this effort.

FEK is the information fishermen accumulate over time, especially through daily interaction with the ecosystem, supplemented with knowledge passed on by previous generations and fellow fishermen (Hall-Arber). While existing data on fishing locations, effort, and value (e.g., VTR, VMS, landings data) are an important source of information

for offshore wind planning, FEK can provide far richer information about ecological and socioeconomic dynamics. In addition to filling in data gaps about marine ecosystems, FEK can provide important insights about the social and economic impacts of offshore wind, as well as ensure that planning and permitting efforts promote greater equity for the range of ocean users.

FEK has contributed to understanding of fisheries dynamics in the Gulf of Maine since the early days of fisheries science. Spencer Baird, in 1873, recognized the wisdom and insight of fishermen, and the importance of accessing their hard-earned knowledge to identify vital scientific questions that needed to be asked to effectively manage fisheries. Recognition of this importance by fishery managers and scientists has waxed and waned in the intervening 150 years but currently the acknowledged value of fishermen's knowledge has never been higher.

One of the most concrete applications of FEK to offshore wind planning is fishermen's mapping of their fishing grounds. For example, three Northern California commercial fishermen's associations recently collaborated with the Ocean Protection Council to map community fishing grounds by species/species complex, gear type, depth, seafloor substrate, and season. The primary goals of this compilation of peer-reviewed fishing data were to: (1) accurately map individual species or species complexes throughout the areas (habitat) where they can be targeted by fishermen employing specific gear types; (2) protect the proprietary personal fishing information of all individuals involved in commercial fishing along California's North Coast; and (3) graphically represent historic, long-term fishing grounds and recent and emerging fishing by area, species, gear type, substrate, and season (North Coast Fisheries Mapping Project, n.d.). A similar effort is being led by the Morro Bay Commercial Fishermen's Organization and the University of California at Santa Cruz, in which fishermen have mapped 19 fisheries and generated related data on biophysical features of the fishing grounds, vessel length and crew size ranges, seasonality, and associated homeports. The products of this work are owned by participating fishermen and will be viewable and explorable online at California's Offshore Wind Energy Gateway (Pomeroy, 2022).

Participatory mapping of fisheries usage in the Gulf of Maine was initiated over a decade ago by St. Martin and Hall-Arber (2008, 2009) who utilized 57 interviews with fishermen from Chatham, MA to Port Clyde, ME to produce an atlas documenting areas and resources important to fishing. A primary purpose of the atlas was to display patterns of fishery usage and spatial interaction with the Gulf of Maine ecosystem, so as to assist collaborative fisheries researchers in identifying fishermen who could potentially act as research partners. The research "suggest[ed] that most fishing communities in New England (even mobile gear fleets) have considerable knowledge of

specific environments and are amenable to area-based management provided spatial/community impacts are taken into account."

FEK can also provide detailed ecological information that may be especially useful to fill gaps in scientific datasets that exist at small spatial scales and in instances where environmental change has altered historical ecological patterns with a potential for future reemergence. For example, Ames (2004) utilized interviews with retired groundfish fishermen to identify historical subpopulations and spawning components of cod in the Gulf of Maine. This work documented that nearly half of historical coastal cod spawning grounds had been abandoned – a depletion that was undetected by system-wide stock assessments. DeCelles et al. (2017) utilized similar methodologies to collect FEK from 40 fishermen on fine-scale (i.e. <50 km^2) cod spawning aggregations on Georges Bank and Nantucket Shoals. Aggregations were often associated with specific habitat features, and many of the aggregations identified were previously unreported in the scientific literature.

As these examples suggest, FEK can be a source of many different kinds of information that may be relevant to spatial planning, including but not limited to fisheries usage, habitat, population dynamics, and ecosystem structure and function. Farr et al. (2018) explored the distribution of FEK as it corresponds to different types of fishing activities and experience among fishermen in the eastern Gulf of Maine. Utilizing a network approach, they analyzed cognitive maps of the ecosystem structure and dynamics described by fishermen during in-depth, open-ended interviews. The interviews revealed unique perspectives on complex interactions between species and their habitat, providing insights about local fluctuations in water temperature and weather patterns, predator-prey dynamics, and interspecies competition, with a particular focus on species of commercial interest. Resources like this may provide an entry point to understanding what kind of FEK fishermen may possess and how this knowledge is distributed among individuals in the fishing community.

Experience from these and other FEK efforts show that, to be as complete and reliable as possible, FEK should be collected using systematic methodologies by trusted intermediaries trained in social science research methods. It is vital that FEK collection efforts be carried out by individuals with competence in the particulars of FEK collection, and that these individuals possess a demonstrated ability to build confidence among both FEK holders (i.e., fishermen) and end users (e.g., NOAA, BOEM). Many of the undersigned researchers have training and experience in collection of FEK in the New England region, and they are willing to help BOEM identify and carry out FEK collection projects in the Gulf of Maine and elsewhere that can inform offshore wind planning.

If poorly or insensitively designed, FEK collection projects risk causing harm, damage, and disaffection. To inform development and management in the Gulf of Maine, a community of practice and development of best practices is needed to avoid harm and to enhance success. A notable example of a best practice is the Responsible Offshore Development Alliance's Fishermen's Knowledge Trust. The Trust recognizes FEK as a valuable and hard-earned asset that belongs to its holders. In respect of this ownership, the Trust established ground rules relating to privacy and intellectual property at the outset of an FEK collection project.

FEK can provide value at every step of the offshore wind process, including planning, siting, permitting, and impacts evaluation. Unfortunately, as offshore wind development continues to ramp up, neither BOEM nor NOAA have an established roadmap in place to guide the application of FEK in offshore wind or any other agency processes. This is a conspicuous gap, and the signers of this letter would like to indicate our willingness and ability to work with BOEM to fill it.

Offering a model of what an FEK roadmap could look like, we point to several parallel agency guidelines and precedents relating to the application of Indigenous Traditional Ecological Knowledge (ITEK) (also called Indigenous Ecological Knowledge or IEK, or Traditional Ecological Knowledge or TEK) in agency decision making. Although FEK is not the same as ITEK, these processes may provide a template for greater integration of FEK in agency activities and decisions as well. Three formal documents lay a strong foundation for integration of ITEK into offshore wind planning:

- NOAA's 2019 memo on "Guidance and Best Practices for Engaging and Incorporating Traditional Ecological Knowledge in Decision-Making" (NOAA Fisheries and National Ocean Service 2019);
- The White House's 2021 "Memorandum on Indigenous Traditional Ecological Knowledge and Federal Decision Making" (Lander and Mallory 2021); and
- BOEM and NOAA's 2022 "Memorandum to Responsibly Advance Offshore Wind Energy" (NOAA-BOEM MOU to Responsibly Advance Offshore Wind Energy, 2022).

In addition, if BOEM's oil and gas activities are considered, the use of ITEK in agency decision making goes back much further in time. In fact, BOEM and its predecessor, the Minerals Management Service, have been taking steps to access, understand, and incorporate ITEK into environmental analyses, scientific research, and decisions since 1995 (Kendall et al. 2017).

The publications and practices that we have listed above provide clarity and commitment relating to the utilization of ITEK alongside science in federal activities and

decisions, including BOEM's offshore wind process. Although some FEK may also be ITEK (i.e., when FEK holders are members of indigenous communities), a great deal of FEK falls outside the scope of the memoranda listed above. As a result, BOEM's utilization of FEK in the offshore wind planning process does not benefit from the support of clear agency protocols. In order to fill this gap, the undersigned researchers seek to work closely with BOEM on three near-term actions.

First, BOEM should support and fund a convening of FEK researchers and practitioners, for the purposes of exchanging ideas and identifying needs. The Responsible Offshore Science Alliance (ROSA) would like to express its interest in convening a workshop for this purpose. Alternatively, this convening could take place as an addition to the stakeholder workshop currently planned for early 2023 by the NEFSC as part of its "Comprehensive Assessment of Existing Gulf of Maine Ecosystem Data and Identification of Data Gaps to Inform Future Research using an Integrated Ecosystem Assessment (IEA) approach," led by PIs Sean Lucey (Fisheries Biologist, NEFSC) and Fiona Hogan (Research Director, RODA).

Second, BOEM should support and fund the development of a set of protocols and best practices for collecting and utilizing FEK in the context of offshore wind planning, permitting, and impacts assessment. Above, we listed three examples of formal agency declarations which specify best practices for integrating ITEK into the information used as a basis for agency decision making. Integration of FEK into the information base for offshore wind would be greatly aided by the development of a similar set of best practices for FEK. The signers of this letter would be interested in working towards creating this set of guidelines, with BOEM's support and collaboration.

Third, BOEM should work with the undersigned parties to identify and fund projects in the Gulf of Maine to help fill key data gaps and provide information relevant to every step of offshore wind planning, siting, permitting, and impacts assessment. There is considerable experience and knowledge among the undersigned that can be drawn on to develop research priorities that bridge fishing community interests and offshore renewable energy development. For example, a community-based collaborative effort, co-led by Angela Sanfilippo (Massachusetts Fishermen's Partnership) and Jynessa Dutka-Gianelli (University of Massachusetts Amherst Gloucester Marine Station) is underway to engage local fishermen in participatory mapping efforts exploring commercial fishing locations, landings, types of gear and fishing areas used, and historical data based on FEK. While this pilot project focuses primarily on fishermen from Gloucester, this type of effort is well positioned to expand. Collaborating with other scientists, fishing communities, and organizations, the team could develop proposals that support filling socioeconomic, biological, and

environmental data gaps, as well as reinforce initiatives that foster meaningful engagement of fishermen in decision-making and regulatory processes related to offshore energy development.

The collaborative identification of priority projects would be well informed by the collective knowledge of the undersigned drawn from research and practical experience as well as the New England Fishery Management Council and Mid-Atlantic Fishery Management Council research priority setting processes, the Atlantic States Marine Fisheries Commission identified needs, knowledge of state agency staff and state Sea Grant program specialists, and examples from other regions. This approach to draw on expertise across a wide set of perspectives is well supported in the literature as an important step towards developing robust and durable solutions to complex natural resource management challenges, particularly in the face of uncertainty and change.

We solicit BOEM's partnership in making these efforts possible and we reiterate our goal of assisting BOEM to develop an appropriate approach to collecting and integrating FEK into the offshore wind process. A response to this letter may be submitted to Mike Pol, Research Director, Responsible Offshore Science Alliance (mike@rosascience.org).

Thank you for the opportunity to share these recommendations.

Sincerely,

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References

Ames, E. 2004. Atlantic cod stock structure in the Gulf of Maine. *Fisheries* 29 (1): 10-28.

DeCelles, G. R., D. Martins, Zemeckis D. R., and S. X. Cadrin. 2017. Using Fishermen's Ecological Knowledge to map Atlantic cod spawning grounds on Georges Bank. *ICES Journal of Marine Science* 74:1587-1601.

Farr, E., J. Stoll, and C. M. Beitl. 2018. Effects of fisheries management on local ecological knowledge. *Ecology and Society* 23 (3): 15.

Kendall, James J., Jeffrey J. Brooks, Chris Campbell, Kathleen L. Wedemeyer, Catherine C. Coon, Sharon E. Warren, Guillermo Auad, et al. 2017. Use of traditional knowledge by the United States Bureau of Ocean Energy Management to support resource management. *Czech Polar Reports* 7 (2): 151-163. https://doi.org/10.5817/CPR2017-2-15.

Lander, E. S., and Brenda Mallory. 2021. Indigenous Traditional Ecological Knowledge and Federal Decision Making. The White House. https://www.whitehouse.gov/wp-content/uploads/2021/11/111521-OSTP-CEQ-ITEK-Memo.pdf.

Memorandum of Understanding between the National Oceanic and Atmospheric Administration and Bureau of Ocean Energy Management to Responsibly Advance Offshore Wind. 2022. Bureau of Ocean Energy Management. https://www.boem.gov/sites/default/files/documents/about-boem/MOU-NOAA-BOEM.pdf.

NOAA Fisheries and National Ocean Service. 2019. Guidance and Best Practices for Engaging and Incorporating Traditional Ecological Knowledge in Decision-Making. National Oceanic and Atmospheric Administration. https://www.noaa.gov/sites/default/files/2021-11/19-065933-Traditional-Knowledge-in-Decision-Making-Document-Signed.pdf.

North Coast Fisheries Mapping Project. n.d. Commercial Fishing Grounds West of Del Norte, Humboldt, and Mendocino Counties. Accessed September 27, 2022. https://storymaps.arcgis.com/stories/ec90562aada545acb6bb1bf6f3c8f228.

Pomeroy, Carrie. Personal communication, September 4, 2022.

St. Martin, K., and M. Hall-Arber. 2008. Creating a place for community in New England fisheries. *Human Ecology Review* 15 (2): 161-170.

St. Martin, K., and M. Hall-Arber. 2009. *An Atlas-based Audit of Fishing Territories, Local Knowledge, and the Potential for Community Participation in Fisheries Science and Management.* Final Report Submitted to the Northeast Consortium. https://apps-nefsc.fisheries.noaa.gov/coopresearch/pdfs/St._Martin_Atlas_Final_Rpt_Sep09.pdf.