Environmental Studies Program: Studies Development Plan | FY 2023–2024

Title	Piloting an Approach to Community-Informed Characterization of Environmental Justice (EJ) Communities Potentially Impacted by BOEM-Authorized Activities
Administered by	Office of Environmental Programs
BOEM Contact(s)	Laura Mansfield (laura.mansfield@boem.gov), Meghan Cornelison (meghan.cornelison@boem.gov), Kimberly Sullivan (kimberly.sullivan@boem.gov)
Procurement Type(s)	Contract, Inter-agency Agreement, Cooperative Agreement
Performance Period	FY 2022–2025
Final Report Due	Spring 2025
Date Revised	March 31, 2021
PICOC Summary	
Problem	Environmental analyses at BOEM could provide better support for decision-making with more specific information on the EJ communities that may be affected by BOEM-authorized activities. Sections within National Environmental Policy Act (NEPA) documents currently discuss potential EJ impacts in a general sense. To present analysis on potential impacts on communities, it is critical to first characterize communities so that impacts can be analyzed within local contexts, and ideally with local input.
Intervention	Develop and conduct a pilot application of an approach to utilize existing data in conjunction with community-provided input to produce short community characterization summaries.
Comparison	Without community characterizations, NEPA assessments will likely continue to describe communities generally and may fail to acknowledge local contexts and impacts to EJ communities, including overlooking impact nuances between communities.
Outcome	A collection of brief EJ community characterization summaries for approximately 10 communities within three chosen study areas, a subset of which would include targeted community input.
Context	A pilot study of selected areas representing various stages of BOEM's energy-related processes

BOEM Information Need(s): Various Federal statutes, including NEPA, require BOEM to examine the social and economic impacts of BOEM-authorized activities at the community level. Additionally, policy and guidance related to environmental justice calls for meaningful engagement and access to decision-making processes for EJ communities (E.O. 12898, E.O. 13985, E.O. 14008, U.S. EPA 2016). BOEM's planning and engagement efforts, and NEPA documents, could be improved with more detailed information about EJ communities. Sections on EJ in some environmental impact statements speak broadly about entire regions or discuss generalized impacts, rarely including information linked to a specific community context. Baseline information to support community characterization is available but has not been effectively applied in analyses to identify local contexts. With short summaries readily accessible, BOEM analysts could better understand the affected environment and potential impacts and could include select language from summaries or incorporate by reference into environmental analyses.

Furthermore, conducting community-informed research could advance earlier community awareness of BOEM activities and support building foundational and trusted relationships. Gaining first-hand information will help "ground-truth" some of the existing information that would be collated into the community characterization summaries. Considering the scale and pace at which energy planning, leasing, and development (especially offshore wind) is expected to occur over the next decade, BOEM may be well served to explore efficient yet meaningful approaches to understanding and describing EJ communities that can be implemented as needed.

Background: There is a substantial amount of data currently available and accessible to inform the EJ community characterization summaries, including indicators on poverty, population composition, and personal disruption. National Oceanic and Atmospheric Administration (NOAA) Fisheries maintains the Community Social Vulnerability Indicators (CSVIs), which is a national effort to develop indicators to uniquely characterize community well-being and evaluate vulnerability and resilience of coastal communities to disturbances (regulations, sea level rise, etc.). Other related information includes climate change indicators (sea level rise risk, storm surge risk), economic indicators (labor force structure, housing characteristics), and gentrification pressure (housing disruption, retiree migration, urban sprawl). Efforts to create EJ community characterization summaries would build upon all existing data or information on communities. However, community characterization summaries would focus on issues and concerns directly related to BOEM-authorized activities, particularly offshore wind, and engagement efforts with communities in collaboration with other agencies such as, but not limited to, the U.S. Department of Energy's Wind Energy Technologies Office, NOAA, and Sea Grant. This effort will also look at what indicators or other considerations should be expanded to better address new information needs or to meet the evolving guidance on EJ or best practices for assessing impacts and engaging with EJ communities. NOAA Fisheries and BOEM both recognize overlapping elements between equity and EJ and will work closely to shape this research to fully consider intersections with energy justice and other types of justice. NOAA Fisheries' subject matter experts have provided support to BOEM in identifying EJ research needs and will continue to work with BOEM to shape this research, recognizing the importance of a collaborative study to gain knowledge and fill knowledge gaps about EJ communities. NOAA Fisheries is working to update their fishing community profiles and can reference and use the information collected in BOEM's study to better characterize EJ concerns. This pilot study can also inform approaches for future data collections important to fulfilling both BOEM and NOAA Fisheries goals of understanding equity and EJ concerns.

Objectives:

- Characterize EJ communities, using existing information, to expand BOEM's knowledge of communities and populations that may potentially be affected by BOEM-authorized activities and associated onshore infrastructure.
- Pilot an approach to developing locally informed summaries that will highlight unique contexts and concerns of EJ communities around offshore energy planning and activities.
- Improve early engagement with EJ communities in offshore wind planning and incorporation of community information and data into environmental analyses.
- Record preliminary ideas on additional information, data, or decision tools needed in the future to more fully evaluate potential impacts on EJ communities.

Methods: This study would pilot an approach to develop community characterizations. These characterizations would involve several components, beginning with a discussion between the principal

investigator and BOEM to select 3 areas and identify approximately 10 communities in each area in which to conduct pilot community characterizations, for a total of approximately 30 community characterizations. The study would consolidate, review, and analyze the representation of existing data from multiple sources into a readily available format. BOEM and the principal investigator would then identify a small subset of communities, approximately three to five communities total, to collect primary information. The principal investigator would contact community leaders, key informants, and community organizations to request review of and local input into the characterizations of their community.

An important source of data will likely be NOAA Fisheries' CSVI Toolbox. NOAA Fisheries would provide support on best practices for using this data. Other data sources to consider include EPA's EJScreen, the Economics: National Ocean Watch (ENOW) data set, the U.S. Census Bureau, Bureau of Labor Statistics, and other sources of relevant information (including qualitative, written, or oral information). For primary research on the small subset of communities, the contractor shall fund and facilitate stipends to compensate community organization leaders or other selected key informants for their participation, modeled after contracts for BOEM's tribal engagement efforts. This research will identify specific vulnerabilities (e.g., displacement, gentrification), needs (e.g., resources to engage), preferences (e.g., desire to change jobs, cultural values), adaptive capacities (e.g., job training), barriers to engagement (e.g., languages, accessibility), or any other information deemed relevant through study planning or preliminary discussions. After conducting primary research, the community information would be coded and analyzed to develop a thematic analysis and identify where views aligned or were different.

Community summaries will highlight characteristics that identify vulnerabilities, themes, issues, or concerns of each community. Each community summary would include relevant history, demographics, economics, coastal and marine resource use, coastal land use including existing facilities, outreach approaches that are locally appropriate for that specific EJ community, identification of key community leaders and organizations, and other baseline conditions that will enable BOEM analysts to better incorporate specific community interests into environmental reviews and the decision-making process. These summaries would be accompanied by a methodology document describing summary objectives, methods, data sources, definitions, and other relevant information.

Specific Research Question(s):

1. What are the social, economic, and cultural characteristics of each identified EJ community, as reflected in available secondary data?
2. What additional insights and characteristics can be gained through community-provided information?
3. When is the best time within the planning, leasing, or development process to conduct community summaries for BOEM use?
4. Based on knowledge gained during this research, what are some additional data gathering efforts or decision tool developments that could be useful to develop in the future for assessing impacts on EJ communities?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites:

Webtool: https://www.st.nmfs.noaa.gov/data-and-tools/social-indicators/

Methodology: https://www.fisheries.noaa.gov/national/socioeconomics/social-indicator-supporting-information

References:

NOAA Fisheries Office of Science and Technology. 2019. NOAA Fisheries Community Social Vulnerability Indicators (CSVIs). Version 3. Silver Spring (MD): National Oceanic and Atmospheric Administration, Office of Science of Technology; [updated 2020 Dec 21]. https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-coastal-communities

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Environmental Studies Program: Studies Development Plan | FY 2023–2024

Title	Qualitative Risk Assessment Approach Refining Acoustic Processes and to Explore the Inclusion of Cumulative Effect Analysis for Offshore Windfarm Construction and Operations
Administered by	Office of Environmental Programs
BOEM Contact(s)	Stanley Labak (Stanley.labak@boem.gov), Erica Staaterman (erica.staaterman@boem.gov)
Procurement Type(s)	Contract
Performance Period	FY 2023–2026
Final Report Due	TBD
Date Revised	May 4, 2022
PICOC Summary	
Problem	Offshore renewable energy development produces high levels of intermittent, impulsive noise and persistent noise due to vessel use and turbine operations. Current numerical approaches typically look at discrete examples of acoustic stressor impacts alone. These analyses have not been able to quantitatively assess and integrate the overall impact of acoustic and non-acoustic stressors. This integration is needed for qualitatively assessing cumulative effects.
Intervention	This proposed study would provide valuable insights on refining the fidelity and robustness of the current acoustic risk assessment approaches and identify potential methodologies to expand these approaches to also include non-acoustic stressors. This is all with a goal of quantitatively addressing cumulative effects for offshore windfarm activities.
Comparison	There are two BOEM-funded studies that have produced reports that use a risk assessment framework to quantify the aggregate acoustic risk for seismic and windfarm activities in the Gulf of Mexico (GOM) and off New England (BOEM reports BOEM-2021-022 and BOEM 2021-081, respectively). These studies were proof of concept evaluations for the risk assessment approach for specific acoustic sources. This study is the next natural step to refinement of those efforts and to expand them beyond just acoustic stressors.
Outcome	The study would establish methodologies and tools for beginning to quantify the cumulative effects of risk from multiple stressors using expert elicitation and allow comparisons of various alternatives and mitigation factors in National Environmental Policy Act (NEPA) documents and in regional activity planning.
Context	Nationwide relevance for developing a quantitative tool to assess cumulative effect, specifically for offshore wind farms but theoretically for all BOEM-regulated activities

BOEM Information Need(s): BOEM NEPA and Endangered Species Act (ESA) consultation documents (including environmental impact statements [EISs], Construction and Operations Plans, etc.) analyze the impacts of offshore energy and construction activities, including installation of large wind turbine structures. Part of the requirements of NEPA and ESA regulatory documents include analyses of the cumulative effects of the proposed activity, which up to now has been primarily qualitative. However,

with the ever-increasing complexity of the knowledge and quantification of the various stressors (both acoustic and non-acoustic) it has become obvious there is a growing need to quantitatively examine the cumulative effects of BOEM activities. Additionally, this work will potentially facilitate the evaluation of the various options available to BOEM, other regulators, and project planners and managers.

Background: In 2013, an expert working group (EWG) consisting of biologists, engineers, and underwater acousticians began working together (with the support of BP and Shell) on a systematic framework to evaluate potential effects of specific acoustic exposures on marine mammals. The objective was to develop a structured process that included logical elements of previous assessment methods that applied noise exposure predictions to estimate potential effects on hearing and behavior, but increasingly integrated relevant biological and ecological variables in predicting the probability of such potential effects and interpreting their significance. The framework was deliberately structured in a stepwise manner including elements (*e.g.*, level A and B takes) consistent with current U.S. regulatory assessment methods, but with additional stages that explicitly included biologically and ecologically meaningful contexts by which to interpret potential responses and that at least began to consider chronic influences. Notable aspects of the resulting framework included:

- Inclusion of ecologically relevant methods for predicting animal distribution.
- Incorporation of variance in animal density estimates.
- Integration of behavioral aversion in animal movement models.
- Integration of population consequences of disturbance (PCOD) approaches to evaluate potential effects relative to exposure magnitude and duration.
- Development of risk assessment methods that include biologically and environmentally relevant aspects of the context of exposure.

The original scope was intentionally narrow, focusing on relatively short-term, small-scale potential effects of discrete exposures (acute) on marine mammals from seismic airgun surveys in the GOM. The EWG framework built on a sequence of advances made in noise exposure criteria, PCOD modeling/framework, and environmental assessment and represented a significant step in evolving from relatively simplistic assessment methods to more sophisticated approaches that consider biological, environmental, and contextual covariates. However, the need to move beyond this acute paradigm to address aggregate exposures from multiple similar seismic activities and long-term, large-scale potential effects of chronic noise (e.g., masking effects) was identified as a critical evolution. Also, the utilization of expert elicitation was identified as a method of circumventing the obstacles that Population Consequences of Acoustic Disturbance (PCAD) and PCoD (National Academies 2005, 2017; Pirotta 2018) approaches required scientific input from numerous, diverse, complex, and slowly funded and executed scientific studies that may not be available in the near future.

With BOEM and National Marine Fisheries Service (NMFS) funding, this work continued and a risk assessment framework for seismic activities was developed for aggregate activities and also for chronic activities in the GOM (report BOEM 2021-022). Additionally, the framework was adapted to examine offshore wind farm activities for multiple projects in both their construction and operational phases. This work will concentrate on offshore wind projects for this study, but in general, the techniques and approaches could be applied to other impact sources. This study enabled the user to understand and manage many of the temporal and spatial variables involved, enabling decisionmakers to minimize their potential impacts. Two variations of the risk framework were used in the Gulf geological and geophysical EIS process. NMFS sponsored a specific study to examine the masking of marine mammal activities by

seismic surveys. This was not directly included in the EIS, but it facilitated NMFSs decisions on it. The second application introduced the concept and approach to the larger audience, and it was included in the EIS. As a new technique, it was not strictly relied on in the decision process, but it was used to assist the NMFS decision process.

Objectives: The objectives of this study are to:

- Expand the capabilities of the current windfarm risk framework by implementing improved temporal, spatial and environmental layering used in the framework (e.g., allowing expansion beyond the existing layers to items like prey species data or non-acoustic environmental factors), implement means to quantify the uncertainty and data gaps of critical local parameters (e.g., upwelling, runoff, etc.), and identify operational methods to allow the comparisons of results (initially, this will be used to examine results from multiple scenarios for an acoustic stressor, but it will also be expanded in the next bullet to include multiple stressor results),
- Expand the current aggregate acoustic framework to incorporate non-acoustic stressors into the current framework to quantify the cumulative effects for BOEM-regulated activities, and
- Develop a tool that is both useable and tunable for determining cumulative effects for BOEM-regulated activities.

Methods: The study would convene a team of experts in acoustics, marine biology, acoustic impact analysis, acoustic modeling, statistics, oceanography and the equivalent types of experts in other appropriate fields to first review what approaches and risk assessment framework developments are already available, and then refine and expand those approaches to meet the objectives. Integral to this effort is the building of the necessary databases and models/algorithms to examine, test, and evaluate the approaches identified and ultimately to build a tool, which is capable of assisting non-expert users to evaluate the risk for their specific scenario(s).

Specific Research Question(s):

- Identify and evaluate the numerous variables necessary to improve the acoustic risk assessment process and their volatility. What are they and how sensitive is a risk assessment framework to them?
- Identify the most important potential contributors to both acoustic and combined acoustic/non-acoustic cumulative effects. What are these contributors, how should they be “weighted,” and what gaps exist in trying to incorporate them into a combined risk assessment framework?
- Identify an approach to building a tool that can assist the regulator in assessing cumulative risk. Then build the tool. What is the technical basis for this tool and what does an operator need to be aware of to use it effectively?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

Pirotta E, Booth CG, Costa DP, et al. Understanding the population consequences of disturbance. *Ecol Evol*. 2018;8:9934–9946. 10.1002/ece3.4458

National Academies. 2005. Marine mammal populations and ocean noise; determining when noise causes biologically significant effects. Washington (DC): The National Academy Press.

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Southall B, Ellison W, Clark C, Tollit D, Amaral J. 2021. Marine mammal risk assessment for Gulf of Mexico G&G activities. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 99 p. Report No.: OCS Study BOEM 2021-022.

Southall B, Ellison W, Clark C, Tollit D, Amaral J. 2021. Marine mammal risk assessment for New England offshore windfarm construction and operational scenarios. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 104 p. Report No.: OCS Study BOEM 2021-080.

Environmental Studies Program: Studies Development Plan | FY 2023–2024

Title	Substrate-Borne Vibroacoustic Disturbances from Offshore Wind Construction: Measurements, Physical Characteristics, and Propagation
Administered by	Office of Environmental Programs
BOEM Contact(s)	Shane Guan (shane.guan@boem.gov), Hilary Kates Varghese (Hilary.Katesvarghese@boem.gov)
Procurement Type(s)	Contract or Cooperative Agreement
Performance Period	FY 2023–2026
Final Report Due	TBD
Date Revised	May 19, 2022
PICOC Summary	
Problem	Offshore construction activities, such as installation of large wind turbine structures, generate high levels of vibration on the seabed and in the substrate, in addition to intense water-borne sound, that could impact aquatic organisms and their environment. While there have been numerous studies on characterization and propagation of water-borne noise from these activities, there is virtually no dedicated research on characterization and propagation of substrate-borne vibroacoustic waves. Without the understanding of physical characteristics and propagation of substrate-borne vibrations, BOEM will not be able to address the potential effects of these disturbances on marine life, especially the benthic ecological communities, from offshore wind construction.
Intervention	This proposed study would gain valuable insights on the physical characteristics and propagation of various substrate-borne vibroacoustic disturbances through field measurements and numerical modeling during wind turbine pile driving.
Comparison	Currently, there are almost no studies investigating substrate-borne vibration and its potential environmental effects. BOEM has funded a study to analyze some of the sediment-borne vibroacoustic data that were collected during pile driving for the Real-time Opportunity for Development Environmental Observations [RODEO]) and Coastal Virginia Offshore Wind (CVOW) projects (AT-2022-08). However, those datasets were limited and focused on water-borne particle motion measurements. This study would focus on substrate-borne vibration using sensors dedicated to collect such data.
Outcome	The study would establish methodologies for substrate-borne vibroacoustic disturbance data collection and provide physical characteristics of these mechanical waves. The knowledge gained from the study is needed to accurately assess potential impacts on benthic organisms and their environment from wind project construction.
Context	Nation-wide relevance for activities involving wind turbine pile driving, and potentially for other marine engineering activities that cause disturbances to the seabed

BOEM Information Need(s): Offshore construction activities, including installation of large wind turbine structure during in-water pile driving, generate intense vibroacoustic disturbances that propagate both

through the water column and in the substrate. While there have been numerous studies addressing water-borne acoustic disturbances and particle motion, there is essentially no information on the types and characteristics of these substrate-borne vibroacoustic disturbances. Without such knowledge, it would be difficult for BOEM to accurately assess potential impacts on marine life due to exposure to these disturbances, in particular the benthic organisms, many of which are commercially important species. The results will directly feed into the Center for Marine Acoustics impact models, as well as being used for impact assessments. Therefore, this information will benefit multiple BOEM programs for required decision-making related to National Environmental Policy Act and Endangered Species Act processes and in Office of Renewable Program's Construction and Operations Plan development.

Background: Pile driving for offshore wind farm construction generates various substrate-borne vibroacoustic disturbances, including compressional and shear waves that propagate within the sediment, as well as interface (Scholte) waves along the seabed (Miller et al. 2016). Some of these wave disturbances could contain high energy that, in cases of land-based impact pile driving, could cause structure damage to nearby buildings (Whyley and Sarsby 1992). There is increasing realization that fishes and marine invertebrates primarily sense sound as a form of particle motion (Popper and Hawkins 2018; Hawkins et al. 2021). Benthic-dwelling species are particularly sensitive to, and could potentially be impacted by, substrate-borne particle motion (Roberts and Breithaupt 2016; Roberts et al. 2016a; 2016b; Roberts and Elliott 2017).

Currently there is limited information on the physical characteristics and propagation of substrate-borne mechanical waves, and there is no dedicated and systematic study to address these topics (e.g., Miller et al. 2016; Hazelwood and Macey 2016; Hazelwood et al. 2018; Potty 2020). Results from the recent BOEM-funded Block Island Wind Farm study showed that at ranges of 500 m and 1,500 m, particle acceleration levels measured on the seabed were well above the behavioral sensitivity for the Atlantic salmon, plaice, dab, and Atlantic cod up to a frequency of approximately 300 Hz (HDR 2019). In FY 2022, BOEM is funding another study to conduct in-depth substrate-borne mechanical wave measurements during RODEO and CVOW projects (AT-2022-08). However, data collection from these studies are mainly focused on water-borne acoustic pressure and particle motion, with substrate-borne data only available from one geosled and one Ocean Bottom Recorder (OBX) at limited distances between 725 and 1,150 m. Without additional data collected at a wide range of distances, it is impossible to gain enough insight of wave propagation to be able to sufficiently model this complex phenomenon accurately.

This proposed study would contribute to knowledge on substrate-borne mechanical waves from marine engineering activities, including offshore wind construction. The information obtained from this study would greatly assist BOEM decision-making using scientific knowledge that is first in class. In addition, this study would explore additional data collection methods and identify the most appropriate geoacoustic sensor(s) to obtain substrate-borne vibroacoustic signals at different ranges and layers of the sediment.

Objectives: The objectives of this study are to

- Establish appropriate methodologies to collect and analyze substrate-borne vibroacoustic disturbances from offshore wind construction activities that could potentially affect benthic ecological communities, and
- Obtain critical knowledge on the characteristics and propagation of different types of substrate-borne mechanical waves at various source ranges and at various sediment depths for impact assessment modeling.

Methods: The study would first develop an appropriate methodology for the collection and analysis of substrate-borne vibroacoustic disturbances based on preliminary study results from a currently BOEM-funded project (AT-2022-08). Then, using that methodology, additional substrate-borne mechanical wave measurements would be made on at least one newly approved offshore wind project (e.g., Vineyard Wind and/or South Fork Wind) during construction activities. Vibroacoustic data would be collected at various distances from the source and sediment depths using appropriate geoacoustic sensors. For field data collection, vessel(s) will be needed to deploy and retrieve acoustic sensors and recording equipment. Finally, the data will be analyzed to in a way that propagation models can be developed in the future for impact assessments.

Specific Research Question(s):

1. What are the appropriate methods to collect substrate-borne vibroacoustic disturbance data from an offshore wind construction project that are relevant to environmental impact assessment (including the suitable geoacoustic sensors, signal processing, and acoustic metrices)?
2. What are the types of substrate-borne vibroacoustic disturbances from offshore wind construction activities and how are they related (e.g., compressional, shear, and interface waves)?
3. What are the physical characteristics of substrate-borne mechanical waves from offshore wind construction activities (i.e., amplitude, frequency, directivity, propagation speed, duty cycle, etc.)?
4. What are the propagation characteristics of substrate-borne mechanical waves from offshore wind construction activities and how they relate to different types of sediments (i.e., decay rate over distance and depth, frequency-dependent propagation, etc.)?
5. How can substrate-borne mechanical waves be modeled for their physical characteristics and propagation so ranges to effects can be predicted for impact assessment?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

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HDR. 2020. Field observations during offshore wind structure installation and operation, volume I. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 332 p. Report No.: OCS Study BOEM 2021-025. https://espis.boem.gov/final%20reports/BOEM_2021-025.pdf

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Environmental Studies Program: Studies Development Plan | FY 2023–2024

Title	Understanding Potential Health Impacts of Outer Continental Shelf (OCS) Energy Activities on Environmental Justice (EJ) Populations
Administered by	Office of Environmental Programs
BOEM Contact(s)	Laura Mansfield (laura.mansfield@boem.gov), Stephanie Sharuga (stephanie.sharuga@boem.gov)
Procurement Type(s)	Contract
Performance Period	FY 2023–2025
Final Report Due	TBD
Date Revised	March 31, 2022
PICOC Summary	
Problem	Many of BOEM's National Environmental Policy Act (NEPA) documents, including the National Programmatic environmental impact statement (EIS) and the Office of Renewable Energy Program's EISs do not describe potential health impacts of OCS energy related activities. Consideration of potential health impacts on EJ communities is required by Executive Orders (E.O.) 12898.
Intervention	This study proposes to conduct a literature review and synthesis to provide BOEM with information to use in EJ sections of NEPA documents. The synthesis will highlight potential health impacts relevant to EJ communities located in coastal areas near OCS energy activities.
Comparison	Without this study, potential human health impacts related to OCS energy activities will continue to be inadequately considered in environmental assessments.
Outcome	This study will help BOEM better identify, assess, and communicate potential human health impacts related to OCS energy activities. The synthesis of existing information will improve BOEM's understanding and communication of how offshore energy activities could potentially affect the health of residents in potentially affected EJ communities. Furthermore, this study will allow for identification of specific data gaps and facilitate better prioritization of human health information needs.
Context	This study will be carried out at national level and will include data and other information collected from all regions. Deliverables are applicable at both a national and regional level.

BOEM Information Need(s): National-level assessments can be improved with more information about how OCS energy activities could potentially affect the health of residents in EJ communities. Understanding linkages between these activities and potential health impacts would enable BOEM to make more equitable and environmentally-just decisions. It would also help BOEM to meet E.O. 14008, E.O. 12898, E.O. 13985, and E.O. 13990. Synthesized information would offer NEPA document authors a common knowledge base to advance consistency across the bureau.

Background: Current information on potential linkages between OCS activities and human health and well-being is spread across a variety of sources. Much of the available information typically evaluates impacts from environmental disasters, such as oil spills, rather than with respect to routine activities. While some activities or factors have been explored in relatively good detail, it is necessary to synthesize information specifically for BOEM's context to better understand the impact of OCS activities on human health. There is limited research specifically on the health of residents of EJ communities.

Objectives: Improve BOEM's ability to understand the affected environment of EJ communities, including the health and potential vulnerabilities of residents, and assess potential health impacts related to BOEM-authorized activities.

- Determine what information is available on EJ community health useful for the BOEM context.
- Identify types of potential environmental impacts created by BOEM-authorized activities that could possibly create health impacts on residents of EJ communities.
- Identify potential pathways that could expose residents of EJ communities to health impacts.
- Identify the types of potential health impacts on residents of EJ communities from OCS energy activities.
- Identify data gaps and future research needs related to human health impacts from OCS energy activities.

Methods: This study will compile relevant existing literature and data available on potential health impacts on EJ communities. The scope will cover OCS energy activities, including both offshore components and onshore support infrastructure. Sources will include existing peer-reviewed literature, models, databases, Subject Matter Expert (SME) input (where applicable and available), and other data sources. The literature review will focus on public health information. The review will highlight information that could help BOEM assess types and levels of human health impacts for activities. There will be coordination with BOEM SMEs throughout the process to ensure the deliverables maximize usefulness to the agency's needs and identify future information needs.

A comprehensive list of potentially impacting activities and factors will be compiled from the literature review and those already considered by BOEM in its EISs and national program analyses (e.g., noise, lighting, traffic, routine discharges, air quality, water quality, bottom/land disturbance, fisheries, visible infrastructure, space/use conflicts). Possible pathways through which humans may be exposed to potential health impacts from those activities and factors will be determined. Information on all potential human health effects of those activities or factors will be compiled. Conceptual models will also be created to visualize potential human health impacts and will include the following: "source" (i.e., potentially impacting activity or factor), pathways (i.e., how the impacts are transferred to the receptor, or potentially affected communities), and "sink" (i.e., specific potential human health impacts). Additionally, data gaps and future research needs related to OCS energy activities potential impacts on human health will be identified. All information collected will be synthesized to create a set of resources for SMEs consisting of an information database (i.e., collection of relevant literature and/or data), conceptual model(s), and synthesis summary report. The information database will build upon resources in the EJ Methodologies database related to health and will be provided in a format that can be integrated into that database.

Specific Research Question(s):

1. Can potential human health impacts be identified and, if so, what are the ways they are being identified and measured?
2. What are the OCS energy activities and factors that can have potential human health impacts on residents in EJ communities and what are those health effects?
3. Can available literature provide insights into what may contribute to potential health impacts being different in one area versus another?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References: N/A