Environmental Studies Program: Studies Development Plan | FY 2022–2023

Title	Collaborative synthesis to understand the impacts of vessel presence and sound on the marine environment and subsistence activities in the Pacific Arctic (AK-22-02)
Administered by	Alaska Regional Office
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Procurement Type(s)	Cooperative Agreement
Conducting Organization(s)	TBD
Total BOEM Cost	TBD
Performance Period	FY 2022–2024
Final Report Due	TBD
Date Revised	April 30, 2021
PICOC Summary	
Problem	Increased vessel traffic associated with reduced sea ice could lead to a range of effects in the Arctic. Marine mammals and other protected species may be exposed to higher noise levels, increased possibility of collision, and potential impacts from vessel discharges and other pollutants, including an increased chance of oil spills in a region with limited response capacity. These same factors could also impact subsistence communities.
Intervention	This study will synthesize spatial and temporal trends in vessel presence and quantify marine mammal vulnerability to related impacts. Indigenous knowledge holders, conventional scientists, and other partners will be invited to discuss and prioritize community concerns, to co-design and interpret research that measures effects of vessel traffic and sound data.
Comparison	This study will estimate the increase in vulnerability to marine mammals and those that rely on them for food security and cultural identity that might be attributed to increased vessel traffic in the Arctic.
Outcome	This study will provide spatial and temporal information on vessel activities, related vulnerabilities to marine mammals, and impact on subsistence activities, including noise footprints of these vessels.
Context	Bering Strait, Chukchi Sea, and Beaufort Sea

BOEM Information Need(s): BOEM considers information about effects on marine mammals and subsistence activities from vessel traffic in its NEPA documents. To support these analyses, better information is needed about spatial and temporal trends in vessel traffic in the Arctic and effects associated with their presence (e.g., increased noise, discharges). This study will estimate effects on species protected under the Marine Mammal Protection Act and Endangered Species Act (ESA) from the

Bering Strait, and into the Chukchi and Beaufort OCS areas to support NEPA and ESA Section 7 consultations. This research also will assess future vessel activity, which will inform development of mitigation measures.

Background: Increased vessel traffic in the Pacific Arctic triggers questions of potential effects and growing focus toward mitigating the impacts. The accelerated loss of sea ice has restructured physical and ecological patterns in the 'Pacific Arctic Gateway' and is leading to expanded anthropogenic activities in the region (Moore and Stabeno 2015, Duffy-Anderson et al. 2019, Wood et al. 2015). Vessel transits of the Bering Strait have notably increased in recent years, presenting environmental and cultural threats in the Arctic (Huntington et al. 2015, Raymond-Yakoubian 2018, Raymond-Yakoubian and Daniel 2018). Arctic marine mammals are particularly vulnerable to effects from vessels (Reeves et al. 2014), including potential increases in underwater noise, marine mammal strikes, disturbance to Indigenous hunters, vessel discharges and other pollutants, groundings, and oil spills (Hauser et al. 2018, Halliday et al. 2017, McWhinnie et al. 2018).

Objectives:

- Establish a collaborative Expert Steering Committee to share knowledge and expertise, and to prioritize and evaluate key indicators of vessel-related effects.
- Synthesize spatial and temporal trends in vessel presence within marine mammal concentration areas.
- Identify and catalog sound sources associated with vessel traffic.
- Quantify changes in vulnerability of marine mammals to vessel presence and sound in the Pacific Arctic.
- Engage with the Expert Steering Committee for shared perspectives on the results for shared or joint interpretation of the findings to allow for all voices and both knowledge systems to contribute.

Methods: Researchers will identify relevant partners to form an Expert Steering Committee. The perspectives of this diverse and collaborative panel (e.g. composed of Indigenous hunters and elders, agencies, academic scientists, co-management organizations, non-governmental organizations, industry representatives) will be incorporated using a collaborative research approach valuing different knowledge systems. The Committee will provide their expertise and input to determine information needs, scale, and concerns to be analyzed by researchers and mechanisms to deliver results.

Researchers will compile and analyze coastal and offshore vessel tracking data to document vessel presence and vessel speeds on monthly or seasonal scales, categorized by vessel type. They will develop geospatial products (as heatmaps or routes) to overlap vessel presence information with existing information on important habitat areas for feeding, migrations, and subsistence use. These products will be used to develop estimates of population-specific marine mammal exposure to vessels in areas and during periods of concern identified by local users. Researchers will develop methods to quantify and analyze 'exposure' and 'sensitivity' for potentially affected populations. Methods may include artificial intelligence techniques for AIS data coupled with the exposure of species building from previously published estimates and incorporating factors such as relative species sensitivity to strikes, disturbance, noise exposure, and oil spill potential. Researchers and the Expert Steering Committee will address how best to look toward the future of both increased vessel traffic and changes in the environment relating to climate.

Specific Research Question(s):

1. How can vessel mitigation measures balance Indigenous community concerns, industry or research activities, and protected species conservation?
2. What trends have been observed in vessel presence, type, speed, cumulative sound in the Pacific Arctic?
3. Where, when, and how has marine mammal vulnerability to vessels changed in recent years?
4. How does population-specific vulnerability to vessels vary for different routing scenarios?
5. What has been the number and distribution of different types of vessels relative to traditional harvesting areas and/or seasons?
6. Where, when and how have there been potential vessel-based conflicts with subsistence species or harvest areas?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

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