

# **Biophysical drivers of bowhead whale distribution on the Alaskan Beaufort Shelf during a period of rapid environmental change**

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# Research Expedition Details

Dates: August 12 – September 3, 2022

Departs from: Prudhoe Bay, AK, USA

Returns to: Prudhoe Bay, AK, USA

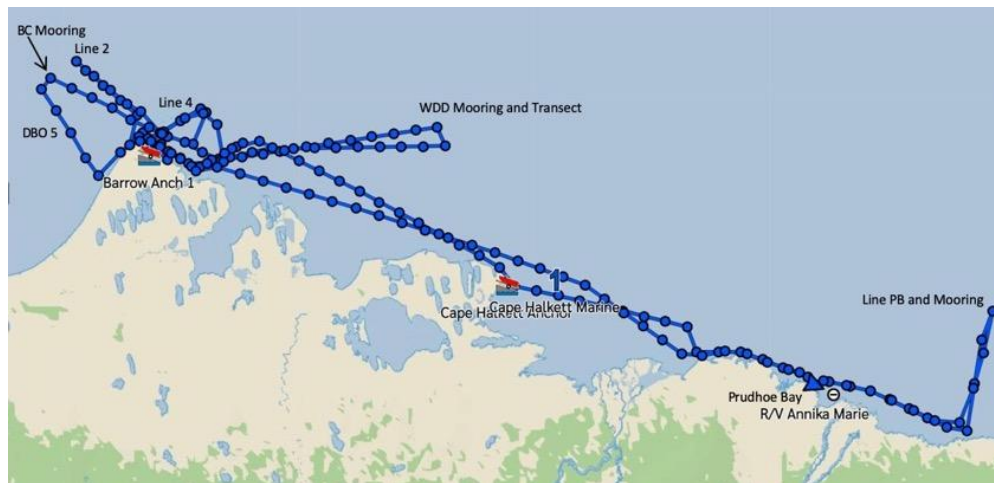
Research Area Location: Beaufort Shelf,  
Barrow Canyon

Vessel: *R/V Annika Marie*

Research website: NA

Project supported by: BOEM

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2021 vessel track. 2022 sampling will be conducted along the same transects and at the same locations

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# Key Scientific Questions & Motivations

- We worked near Pt. Barrow for 11 years (2005-2015) and demonstrated that patches of krill are reliably found on the shelf in response to local wind forcing and upwelling and are then available as prey for bowhead whales.
- Since 2015, there were at least two years (2016 and 2019) when whales were migrating too far offshore from Pt Barrow during fall whaling to safely hunt. Persistent west/downwelling winds were characteristic of those years.
- During those years, there was little work that would show if the krill prey were still available for the whales.
- This project renews sampling near Pt. Barrow as well as at key locations mid-shelf and east of Prudhoe Bay to understand year-to-year changes in bowhead whale prey (krill), and perhaps whale presence, during this period of environmental change.

# Key Activities & Data to be collected

- Sample along a transect east of Prudhoe Bay, across a shelf-break depression at  $\sim 153^\circ\text{W}$ , and along three sentinel transects near Pt. Barrow and across Barrow Canyon
- Collect hydrographic and bioacoustics data and plankton samples (abundance, size/age) and observe marine mammal and seabird distributions along the transects
- Measure krill and key copepod size and condition (C and N). Describe population structure using mtDNA analysis.
- Turn around year-round moorings equipped with CTD, ADCP, and acoustic recorders at the shelf-break NE of Prudhoe Bay,  $\sim 153^\circ\text{W}$ , and on the western side of Barrow Canyon. Deploy moorings equipped with AZFPs at the Barrow Canyon and  $\sim 153^\circ\text{W}$  locations
- Deploy a short-term (3 weeks) mooring equipped with CTD and ADCP on the 20-m isobath at  $\sim 155.25^\circ\text{W}$

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# Implications & Broader Impacts

- Determine if there have been changes in the availability of krill that could affect bowhead whale migration and distribution pattern
- Understand how alterations to broad-scale atmospheric forcing and local wind conditions impact the availability of krill especially near Pt. Barrow
- Provide understanding to the local community of the status of whale prey availability and the potential influence on whale migration patterns and distributions
- Provide data needed by the BOEM to responsibly manage environmental impacts on human, marine, and coastal environments in regions where offshore energy and marine mineral resource development may occur.

# Potential Areas of Collaboration

Is there available berth space? *No*

Is there space for other equipment and/or to collect data for other teams? *No*

Can you make your data available for other teams to collaborate on? And how? *Please contact Carin or Steve*

Opportunities to work with Indigenous and local communities? *UIC Science in Utqiagvik provides logistic support. The Barrow Whaling Captains Association has endorsed this project and is kept apprised of activities and findings. Personnel at the North Slope Borough Department of Wildlife Management continue to be valuable colleagues.*