

Insights into a Changing Arctic: long-term beluga monitoring in the Inuvialuit Settlement Region

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Abstract: Recent changes in sea ice habitat along with increased interest in offshore Arctic shipping and industrial development have focused research and monitoring toward assessing the cumulative impacts of multiple ecosystem stressors. While the implications of reduced sea ice extent for biota are unclear, they may be dramatic for species that rely on sea ice habitat. The Eastern Beaufort Sea beluga utilize ice-associated prey such as Arctic cod, and recent climate driven-changes may alter the quantity and quality of prey resources and the availability of seasonal habitats.

Each year, the Eastern Beaufort Sea Beluga form one of the world's largest summer aggregations in the Mackenzie estuary of the Canadian Beaufort Sea, representing a critical food resource for Inuvialuit. Standardized harvest monitoring of this population has been ongoing since the early 1980s. The beluga monitoring program is recognized as one of the most long-term marine mammal datasets in the Arctic, and supports a co-management approach to resource management established under the Inuvialuit Final Agreement.

Recently, the program has evolved toward refining monitoring approaches that narrow on key ecological indicators, integrating local knowledge and perspectives to ensure the inclusion of meaningful and responsive indicators while expanding spatially and temporally to characterize ecosystem connectivity and regional-scale variability needed to understand ecological responses to stressors.

Examining some of the longer-term monitoring and recent process studies has revealed within-population shifts and dynamic temporal trends in contaminants that are partially related to diet and reductions in available sea ice habitat.

Overall, the long-term monitoring of beluga in the Beaufort Sea has provided insight into the consequences of climate change to their habitat use and diet, and will support the provision of advice needed for the consideration of cumulative impacts of multiple ecosystem stressors in a co-management framework.