

The Beaufort Lagoon Ecosystem Long Term Ecological Research Program – Overview, Updates, and Next Steps...

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The Beaufort Lagoon Ecosystems (BLE) LTER program was funded by the US National Science Foundation (NSF) in 2017 and is based out of three nodes along the Alaskan Beaufort Sea coast: Elson Lagoon (western Beaufort) near Utqiagvik (formerly Barrow); Simpson Lagoon and Stefansson Sound (central Beaufort) near Deadhorse, and Kaktovik Lagoon and Jago Lagoon (eastern Beaufort) near the village of Kaktovik. Our research is diverse and interconnected and collects essential information about the lagoons such as their chemistry, hydrology, and biodiversity to establish baselines and answer the project's core questions. Field studies are conducted during ice covered, ice break-up, and open water periods. Moorings, weather stations, coastal time lapse cameras and a range of satellite remote sensing platforms collect data year-round. BLE follows LTER Data Policies, which typically means data are made publicly available within two years of collection. Each dataset includes metadata describing the data use agreement, the two most common for our case being CC BY (free to use with attribution) and CC0 (public domain).

Collectively, our research provides a much needed mechanism for tracking and understanding how natural climate cycles influence coastal ecosystems in the Arctic; and how climate change impacts such as permafrost thaw, shifting precipitation regimes, and losses of sea ice alter coastal ecosystems through effects on inputs, nutrient cycling, and ocean mixing. Specifically, our core questions address:

1. How nutrients and water arrive in the lagoons?
2. How changes in ice, river discharge, and barrier island morphology influence the connectivity between lagoons and Beaufort Sea shelf waters?
3. How biogeochemical processes within the lagoons linked to inputs of terrestrial organic matter, primary production, and nutrient cycling?
4. How changes in the lagoons influence community structure, resilience, and food webs?

Our fieldwork takes place within the homeland of the Iñupiat, whose subsistence lifestyles are built upon strong traditions and beliefs that promote both understanding of natural surroundings and a strong sense of place. The co-production of knowledge is important in our joint efforts to understand the changing ecological functioning of these systems. We honor the people who have acted as stewards of the coastal lands and waters we study since time immemorial, and respect the significant traditional ecological knowledge that is passed down by elders. We engage with local communities of Kaktovik and Utqiagvik, through regular, open meetings with as well as with Traditional Knowledge holders in Kaktovik. This project also includes a strong commitment to K-12 Programs in Kaktovik and Utqiagvik and offers employment opportunities to native high school seniors or recently graduated students living in these villages as field research assistants.