

Hudson Strait Common Eider and Polar Bear Surveys

2015 Field Season Report

Project Overview

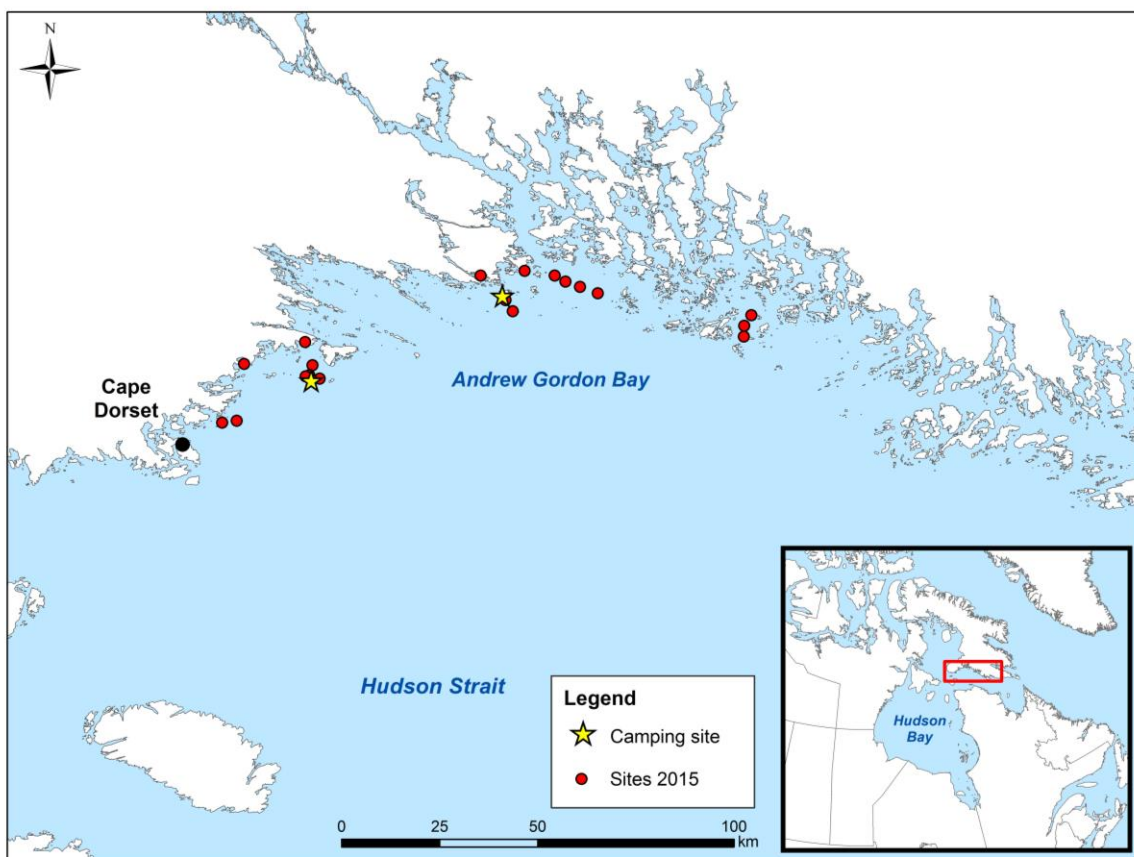
Our ongoing research investigates the status of common eiders and other birds nesting on coastal islands in the Hudson Strait and Foxe Basin marine regions of the eastern Canadian Arctic. Shifts in climate have apparently led to cascading ecological effects in this area, as polar bears are foraging on bird colonies instead of seals due to reductions in sea ice cover. In response, we are focusing on several issues of significant ecological and conservation importance:

1. Understanding the role of marine nutrient input from breeding common eiders on island habitat modification.
2. Identifying patterns of common eider nest predation by polar bears to better understand polar bear terrestrial foraging ecology in summer.
3. Quantifying the distribution and abundance of polar bears in summer along the south coast of Baffin Island and throughout Hudson Strait.



Context

The work was divided into two teams: 1) an 'eider team', working on island landscape modifications over time due to marine input from nesting eiders, and 2) a 'polar bear team', working on individual polar bear foraging behavior at eider colonies. Collectively, the groups travelled more than 100km from Cape Dorset to reach the furthest islands to survey, passing through Andrew Gordon Bay and the Chamberlain islands. In total, 16 islands were surveyed during a one week weather window in July when conditions permitted safe travel (see map below).



Map of visited sites and camping sites used in the region near Cape Dorset in 2015.

2015 Research Highlights

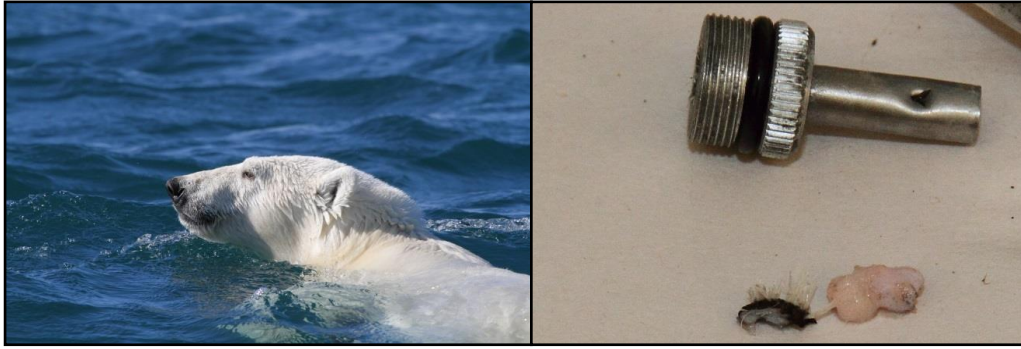
Polar Bears

There is growing evidence that polar bear predation on Arctic seabird nests is increasing as a result of earlier ice melt. Surveys conducted on the northern shore of Hudson Strait, near Cape Dorset, from 2010-2012 showed that 34% of common eider colonies had been visited by polar bears, and that these colonies had significantly lower eider nest success.

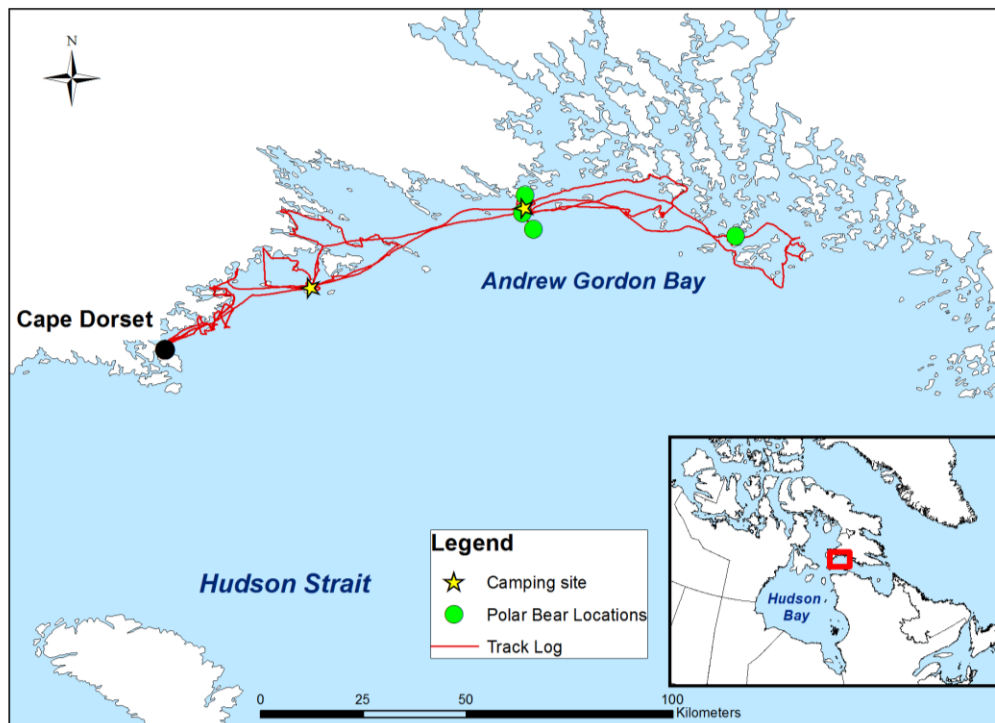
In 2015, we collected data on patterns of nest predation by polar bears in order to build computer simulation models exploring impacts of bears on seabirds. We found that polar bears had dramatic influences on common eider nest success at a local scale; at 4 large eider colonies visited by bears over 90% of nests had been destroyed. In areas not visited by bears, nest failure rates were low suggesting that bears cause intense, but patchy reproductive failure. We are now working to predict the impact of bear predation on Arctic seabirds across different ice cover scenarios, and trying to project how seabird populations might respond to increasing bear predation.



Reductions in the extent of Arctic sea ice have increased the amount of time polar bears spend in terrestrial environments. While on land, bears forage opportunistically making use of terrestrial food resources including eider eggs, and the potential population level impacts of such foraging on colonial nesting seabirds may be significant. The primary objectives of this research are to quantify individual polar bear foraging behavior at eider colonies through boat based observations, and to determine the extent to which individual bears influence nest success rates within eider colonies. In order to determine if foraging behavior is learned, and the extent to which individual bears make use of eider/seabird colonies, genetic identification of individual bears is required using biopsy darts.



In total, 4 polar bears were biopsy darted from a freighter canoe with local participants. All polar bears that were spotted by the team were darted except for dependent young. This pilot year provides important information on the positive feasibility of biopsy darting polar bears from freighter canoes. If repeated over multiple years, it will be possible to determine if individual bears are consistently feeding along the same coastal area, or if different bears feed opportunistically each year.



Track log and locations of polar bears that were biopsy darted in the Hudson Strait during July 2015.

Eiders as 'Ecosystem Engineers'

As bear predation on eider colonies is predicted to increase, shifts in how and where eiders are nesting may take place. One possible outcome is that common eiders may shift from nesting in large, dense colonies as they do now, to a more dispersed pattern. To better understand the possible consequences of this shift, a second part of this year's surveys was dedicated to investigating the nutrient dynamics of common eider colonies in the Hudson Strait region.

Common eiders have the potential to transport marine-derived nutrients from their prey species across ecosystem boundaries to the terrestrial environment of their nesting islands. Other studies have shown that seabird species can have dramatic effects on the areas surrounding their colonies, and this effect is even more pronounced among species that nest on small islands.



Islands with common eider colonies may have benefitted from nutrient inputs, leading to increased growth and productivity of plant communities. This increase in growth could in turn eventually lead to better nesting habitat for the birds, as well as aiding in retaining the nutrients they deposit. Over long time scales, this process could have led to the formation of the diverse biological communities that we see on islands with eider colonies today.

To explore these issues, we collected various samples and mapped habitat features on islands in the Hudson Strait region over the past two years (2014-15). During this time, we worked out of Ivujivik, Quebec and Cape Dorset, Nunavut. We collected samples of plants, soil, invertebrates, and guano on all of these islands to look for eider nutrient inputs.

Disease Monitoring

Since 2012, coastal eider colonies in Nunavut and Nunavik have been monitored to detect evidence of avian cholera outbreaks. To date, cholera has been detected near communities in Nunavik (Aupaluk and Inukjuak), as well as at East Bay on Southampton Island. There has been no evidence of avian cholera near Cape Dorset, but monitoring of the islands is ongoing so that if the disease emerges it can be detected as soon as possible.

For more information or to report suspected avian cholera at a colony contact Catherine Soos (Environment Canada, Catherine.soos@ec.gc.ca) or the Canadian Cooperative Wildlife Health Centre (1-800.567.2033).

Outreach and Communication

A key priority of this project is to inform northerner communities and partners about the research. This summer we presented an overview of the coastal survey program at an Open House in the community of Cape Dorset. This presentation provided information on the results from previous research conducted in the area, as well as techniques used to collect plants, water and sediments. In addition to providing information, this interactive activity was a good opportunity to exchange information with the community about safety and knowledge. The activity was warmly received and will now be a regular part of our summer program. We also work closely with the Cape Dorset Hunters and Trappers Organization year round to ensure appropriate communication occurs before the projects begin, and to follow up with results after they are completed.



Future Plans

Priorities of the program include:

- Continued monitoring and biopsy darting of polar bears along coasts.
- Evaluation of Polar Bear foraging strategies.
- Assessing and quantifying the impact of Polar Bear foraging on Common Eider nesting success rates, nesting strategies, and nesting locations.
- Investigating links between Common Eider colonies and other species that utilize the same island habitats (eg. Snow Buntings).
- Continued monitoring of avian cholera and other disease epidemics.
- Eventual hand over of basic population monitoring to local communities.



Research Partnerships, Field Support, and Financial Partners

A multi-disciplinary approach to research requires a significant level of logistical support. Grant Gilchrist and Christina Semeniuk, and Evan Richardson are the primary investigators for this project. Field logistics and planning and field operations were led by Nik Clyde, and the science team included Frankie Jean-Gagnon, Cody Dey, David McGeachy, Kathryn Hargan, Sarah Robinson, and Amie Black. Expert guiding was a key component of this study and was provided by local guides and assistants Charlie Qiatsuq, Mosha Ragee, Ottokie Animuiq, Ezee Suvega, Adamamie Qaumagialq, Salamonie Animuiq, Zeke Ejesiak, Nathaniel Joanasie, Luutaaq Quamagialq, and Luke Animuiq.

Logistics and permitting for this project were supported by Mike Janssen and Jake Russell-Mercier at Environment Canada; support in Cape Dorset was provided through the Cape Dorset HTO by Adamie Nuna, Annie Suvega and Members of the Board. Accommodation in town was provided by Cristiina Alariaq at the Dorset Suites Hotel.

Research in Canada's North is expensive and funding for this work is necessarily provided by a network of partnerships that includes: Environment Canada Science and Technology Branch, the Canadian Wildlife Service, Baffinland Iron Mines, The Pew Charitable Trusts, Oceans North, Nunavut General Monitoring Plan, ArcticNet, Polar Knowledge Canada, Northern Scientific Training Program, NSERC, the Canadian Museum of Nature, Queen's University, and Carleton University. Importantly, The Nunavut Inuit Wildlife Secretariat and the Nunavut Wildlife Management Board facilitated efficient payment for guides.



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