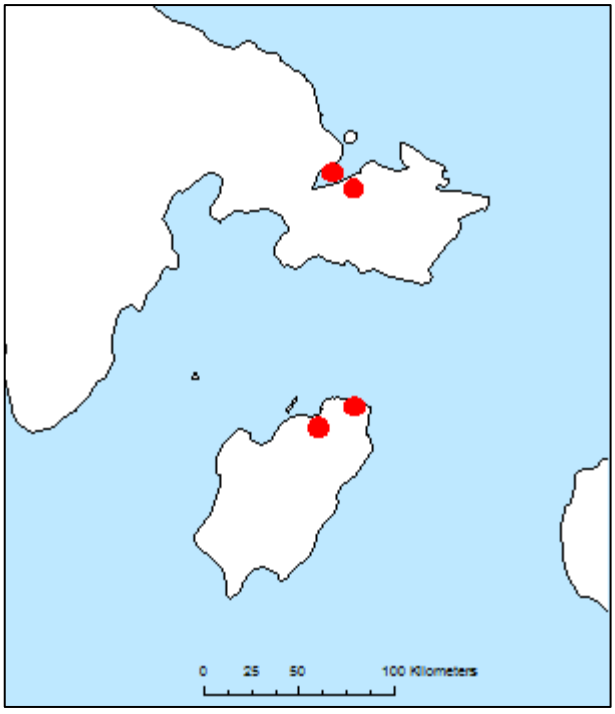
Migratory Bird Research 2016

East Bay, Southampton Island and Coats Island

Project Overview

Environment and Climate Change Canada has been conducting research on seabirds and shorebirds at East Bay since 1996 in an effort to understand the factors influencing northern bird populations. We continue to monitor the wildlife at East Bay but are also investigating potential impacts of several emerging issues in an effort to inform wildlife management decisions and conservation planning. There are two Environment and Climate Change Canada research stations at East Bay. The East Bay Island camp (Mitivik Island) focuses primarily on common eiders, and the East Bay Mainland camp focuses mostly on shorebirds. On Coats Island, we conduct shorebird research at a small camp to the west of Cape Prefontaine. In August 2016, we updated the aging seabird research station on Coats Island.



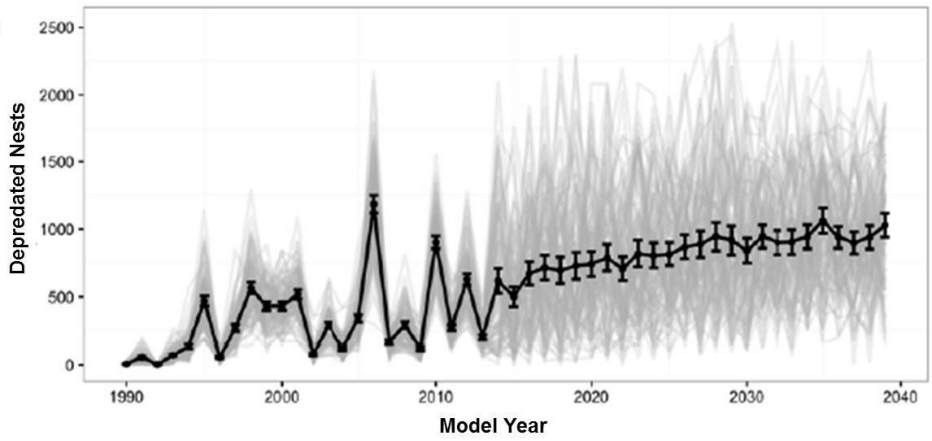
Many of the issues we are currently researching are in response to concerns raised by northern communities and environmental assessment initiatives, including:

1. Investigating polar bear predation on common eider nests as sea-ice diminishes.
2. Investigating direct effects of changing sea-ice dynamics on eider movement and habitat use.
3. Identifying key marine seabird habitats in an effort to mitigate potential issues related to northern industrial development, particularly year-round shipping.
4. Determining the effects of overabundant snow-geese on shorebird breeding habitat and lakes in areas near goose colonies.

Changing Relationships Between Common Eiders and Polar Bears

Polar bear predation of common eider nests at East Bay is increasing, apparently because of earlier seasonal sea-ice break-up. This has resulted in complete reproductive failure for eiders at East Bay in 3 of the past 5 years. Using our past years of research from East Bay and the Hudson Strait, we have developed a model to test how these changes may affect both eiders and polar bears.

Our study suggests that for polar bears, eating more eider eggs will not compensate for declines in their body condition caused by longer ice-free summers. For eiders, our study predicts that in response to increasing pressure from polar bears, eider colonies will become smaller, more dispersed, and closer to the mainland. These changes will increase their exposure to other land-based predators such as Arctic foxes. These changes in the locations of eider colonies will also influence people who collect eider eggs and down.



Model predictions of nest predation in relation to year (Dey et al. 2016).

The Influence of Sea-Ice on Eider Habitat Use

In recent decades, the annual ice-free period has been growing longer. At the same time, shipping activity has been increasing to support resource development in the Arctic. This project is an ongoing partnership between Environment and Climate Change Canada, Inuit communities, Canadian universities, and Baffinland Iron Mines to provide the information we need to limit the potential overlap between sensitive marine habitats and shipping traffic.

We are using existing satellite tracking data from common and king eiders tagged at East Bay to identify which habitats are most important for eiders. We are also using radar imagery of coastal sea-ice to investigate how sea-ice conditions throughout the year influence the eiders' use of these habitats. Our goal is to get a better understanding of how changes in sea-ice will affect the migration, reproduction and population dynamics of eider ducks.

The Effects of Overabundant Geese on Shorebird Habitat

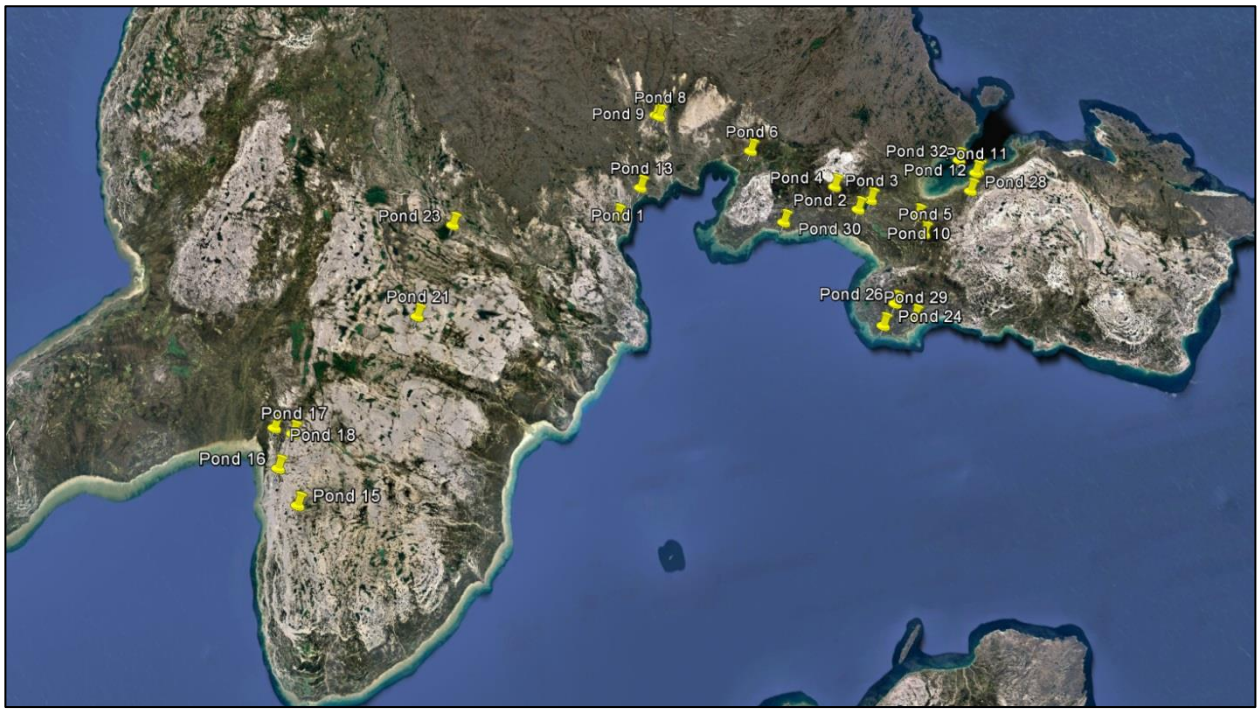
Since 2014, our team has been working to understand how abundant Arctic-breeding geese influence tundra habitats that may be important for other species. In 2015 at Coats Island and in 2016 at East Bay Mainland, we repeated habitat surveys completed at both sites in 2004. At Coats Island, we found that there was a decrease in overall cover height but at East Bay Mainland we found little to no change in cover height. These results support previous work, which suggests that the majority of the goose-induced habitat change at the East Bay Mainland study site occurred prior to 2004.

Another interest of our research group is how nearby goose colonies can indirectly influence the risk of predation of other species. We predict that predators such as jaegers and foxes are attracted to goose colonies, increasing the risk of predation for shorebird nests. To test this prediction, in 2015 we initiated an artificial nest experiment where we placed and monitored simulated shorebird nests. We found that nests placed within and near the goose colony survived for fewer days than nests far from the colony.

The concealed nest of a Dunlin. Photo credit: Malkolm Boothroyd.

Water Chemistry Changes in the Presence of Abundant Geese

We revisited a series of 26 ponds spread across Southampton Island, first sampled in 2001/2002, to determine whether water chemistry had changed as a result of the presence of abundant geese. Our results demonstrate strong changes in water chemistry over this 14 year period. For both time periods, nutreint levels were elevated for ponds within goose colonies. These differences in nutrient loads between lakes inside and outside of goose colonies affected the aquatic biota.



The 26 ponds first sampled by Mark Mallory (2001/2002) and revisited by us 14 years later to evaluate changes in water chemistry.

We have established that the water chemistry of ponds and lakes has changed over the last 14 years across Southampton Island and that the patterns are most consistent with an effect of geese rather than climate change or other environmental change. Lakes located within goose colonies have signs of high nutrient loadings. The acute change in nutrients across Southampton Island could lead to changes in the biology of the lakes associated with change in lake trophic status.

Research Partners

The research at East Bay is logistically complicated and labour intensive, requiring a strong, dedicated crew. We are particularly grateful for the guidance and assistance provided by our new crew members, Michael Shimout, Gary Tinashlu, and Clifford Natakok and our returning crew members Jupie Angootealuk and Josiah Nakoolak. We also appreciate very much the continued support provided by Louisa Kudluk, the Coral Harbour Hunters and Trappers Organization, and the Irniurviit Area Co-management Committee.

Research in Canada's north is expensive and funding for this work is necessarily provided by a network of partnerships that includes but is not limited to: Environment Canada Wildlife Research Division, Environment Canada Ecotoxicology and Wildlife Health Division, Baffinland Iron Mines Corporation, the Canadian Wildlife Service, the PEW Charitable Trusts, Mitacs, Oceans North, Polar Knowledge Canada, ArcticNet, Nunavut General Monitoring Plan, Université du Québec à Rimouski, University of Windsor, Carleton University, Acadia University, Polar Continental Shelf Program (PCSP), Northern Scientific Training Program, Northern Contaminants Program, NSERC, and the Canada Research Chairs program.

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