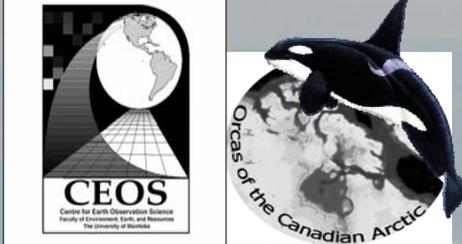


Marine Mammal and Bird Observations on Leg 1 & 2 of the 2005 Amundsen Cruise

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INTRODUCTION

Little is known about the distribution and abundance of marine mammals and birds in the Canadian Arctic. This lack of information arises because of the limited human activities and modes of transportation to survey animals as well as the extreme logistical difficulties of research in remote environments. Yet, understanding interrelationships between arctic marine organisms and their environment is critical to assess and mitigate future changes predicted with continued global warming. Using ships of convenience as observation platforms has proven to be a successful method of determining presence/absence and distribution (Harwood et al. 2004) provided that results are tempered by the constraints of the sampling design. Here, we report on observations of marine mammals and marine birds recorded along the cruise track expedition of the CCGS Amundsen on Leg 1 between Belle-Isle Strait and Kugluktuk, 7 August to 10 September 2005 and during Leg 2 from Cambridge Bay to Hudson Strait, 25 September to 17 October.

OBJECTIVES

- 1) Monitor the presence/absence of marine mammals and marine birds through the North Atlantic region and the Canadian Arctic (Fig.1) during the open-water season.
- 2) Describe the geographical (GPS position: latitude and longitude) relationship among species and observations.
- 3) Relate the occurrence and distribution of invasive marine mammals and marine bird species that may be extending their range concurrent with climate warming.

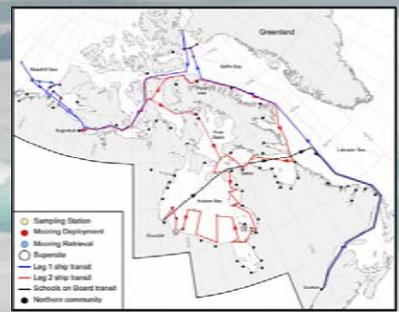


Fig.1 Leg1 & Leg2 Ship transit

MATERIAL & METHODS

Observers of marine birds and mammals recorded location (latitude and longitude), species, group size, and behaviour for each observation. Weather data (sky conditions, sea state, winds) and ice concentration (ice-free (0), 1-3/10, 4-6/10, 7-9/10, 9+/10 coverage) were also recorded during each survey period. The ship-based visual survey was conducted by one observer (C. Pomerleau, Fisheries & Oceans Canada) on Leg 1 from August 7 to September 10 and two observers (M. Simard and A. Samson, Nunavik Research Center) from September 25 to October 17 on Leg 2. The research platform was the Amundsen, a 98-m-long icebreaker operated by the Canadian Coast Guard based in Quebec City, which operated both in open water as well as in 9/10 ice cover. Observers occupied forward positions as high as possible, typically the wheelhouse (15 meters above sea-level) or the upper deck (20 meters). In some instances, observers conducted the visual survey from the ice, or from a zodiac or canoe. Sighting coordinates were recorded using a hand-held Garmin GPS or the ship-based GPS. The latitude and longitude were initially recorded in degree-minute-second (i.e. N78°, 25', 367"; W125°, 46', 742") and subsequently converted to decimal degrees for GIS mapping. Observations made by the crew and/or other scientists were included in the dataset.



Fig.2 Northern Fulmar



Fig.3 Ringed Seal



Fig.4 Pilot Whale

RESULTS

Approximately 170 hours of observation occurred during two legs and observations by the crew and other members of the scientific group were included. A total of 300 marine mammals were recorded, representing 14 species including Pilot Whale (*Globicephala melas*), Sei Whale (*Balaenoptera borealis*), Humpback Whale (*Megaptera novaeangliae*), Minke Whale (*Balaenoptera acutorostrata*), Bowhead Whale (*Balaena mysticetus*), Northern Bottlenose Whale (*Hyperoodon ampullatus*), White-Beaked Dolphin (*Lagenorhynchus albirostris*), White-Sided Dolphin (*Lagenorhynchus acutus*), Walrus (*Odobenus rosmarus*), Harp Seal (*Pagophilus groenlandicus*), Harbour Seal (*Phoca vitulina*), Bearded Seal (*Erignathus barbatus*), Ringed Seal (*Phoca hispida*) and Polar Bear (*Ursus maritimus*) (Fig. 5).

A total of 1925 bird sightings were recorded, representing 35 species (Fig. 6). Preliminary results indicated that the Northern Fulmar (*Fulmarus glacialis*) and the Black-Legged Kittiwake (*Rissa tridactyla*) were the most common species in the Labrador Sea area. Thick-Billed Murre (*Uria lomvia*), Dovekie (*Alle alle*) as well as Northern Fulmar were the most commonly observed species in the Baffin Bay area. For the Archipelago region, Greater White-fronted Goose (*Anser albifrons*), Brant Goose (*Branta Bernicla*), and Glaucous Gull (*Larus hyperboreus*) were commonly observed. Double-Crested Cormorant (*Phalacrocorax auritus*), Long-Tailed Jaeger (*Stercorarius longicaudus*), Parasitic Jaeger (*Stercorarius parasiticus*) and Surf Scoter (*Melanitta perspicillata*) were mainly observed in the western part of the transit. On Leg 2, Snow Goose was commonly observed in eastern Hudson Bay whereas Thick-Billed Murre were observed throughout the transects in Hudson Bay.



Fig. 5 Marine Mammals Observations



Fig. 6 Marine Birds Observations

ANALYSIS

-Marine Mammals

Six bearded seals were observed within their expected geographic range: Labrador Sea, Baffin Bay, and the Archipelago (Cleator 1996). Twelve bowhead whales were observed; three along Baffin Island and nine in Franklin Bay corresponded to their expected summer distribution (Dyke et al. 1996). Pilot whales (Fig. 4) were observed in the Labrador Sea in August, which is considered part of their summer distribution (Fullard et al. 2000). Eleven polar bears were sighted, including one female with two cubs observed during Leg1. All bear observations were within expected summer range of polar bears (Stirling 1986), and include an observation of two bears inside Gibbs Fjord. The most common marine mammal sightings were of ringed seals (Fig. 3) with a total of 180 observations, including two large groups of ~25 and ~60 observed in Peel Sound and Franklin Bay, respectively. Ringed seals are the most commonly observed marine mammal of the Canadian Arctic as their distribution includes all areas that are ice-covered during parts of the year (Richard 2005).

-Marine Birds

Arctic Terns were sighted in the eastern part of the cruise from Belle-Isle Strait to the south of Ellesmere Island. These areas corresponded to their summer (breeding) range. Black-Legged Kittiwake have been observed in the Labrador Sea, the Baffin Bay, slightly in the archipelago and in the Hudson Bay which is unusually. Most of the sighting are in the breeding range of the Black-Legged Kittiwake except for the archipelago and the Hudson Bay ones. Few Long-Tailed Jaeger were viewed and it was both in the western and in the eastern part of the arctic. One observation was in the migration range of the specie (Labrador Sea North) while the other sightings were in the breeding summer zone. Northern Fulmar (Fig. 2) (mostly light morphs) have been observed more than often in the Labrador sea which is their year-round range. The Snow Goose observations have been made in fall and they all correspond to the migration range of the specie. The majority of the Thick-Billed Murre observations made during Leg1 matched up with their summer range while the Hudson Bay sighting are unusual especially in the western and in the southern parts (National Geographic, 2002).

FUTURE WORKS

Future analyses include combining the results presented here with other data gathered by Fisheries and Oceans over the past 5 years that has used shipboard observers to gather sightings of marine mammals across the Canadian Arctic. We hope to eventually analyze the results spatially to provide indices of species distribution and abundance during the open-water season. With climate warming, predictions suggest that the carnivore dominated arctic marine ecosystem (polar bears and seals) will be replaced by a more temperate marine ecosystem of cetaceans with killer whales as top predators. A dedicated group of volunteers (Orcas of the Canadian Arctic, OCA) have organized research to monitor killer whale movement patterns, collect evidence of predation events, and elicit sightings from hunters and communities across the Canadian Arctic. Future expeditions by the Amundsen ice breaker, as part of ArcticNet research in 2006 will include research directed at recording killer whales and invasive species (e.g. humpback whales) into the arctic waters. One research goal is to start a photo-identification catalogue for killer whales in the eastern Canadian Arctic.

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