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Canada

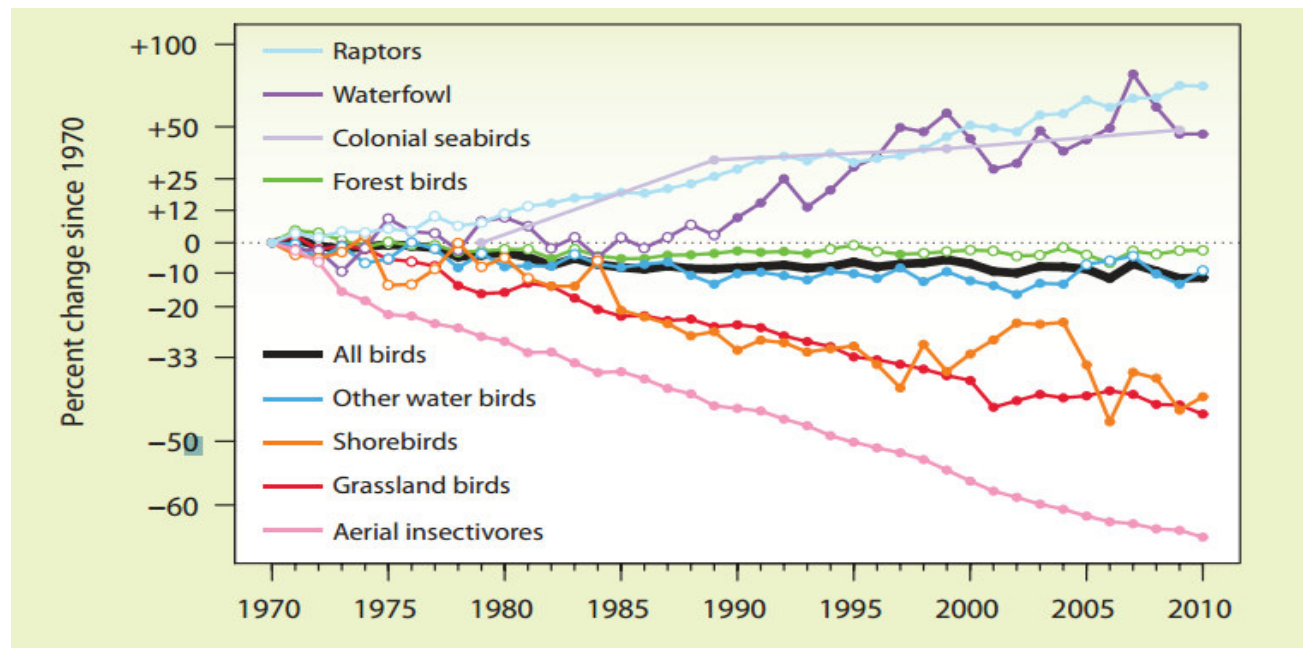
Effects of Geese on Arctic-breeding Shorebirds: *What do we Know?*

Paul Smith, Lisa Kennedy, Scott Flemming, Erica Nol





North America's Winners and Losers



State of Canada's Birds, 2012

Midcontinent Lesser Snow Geese

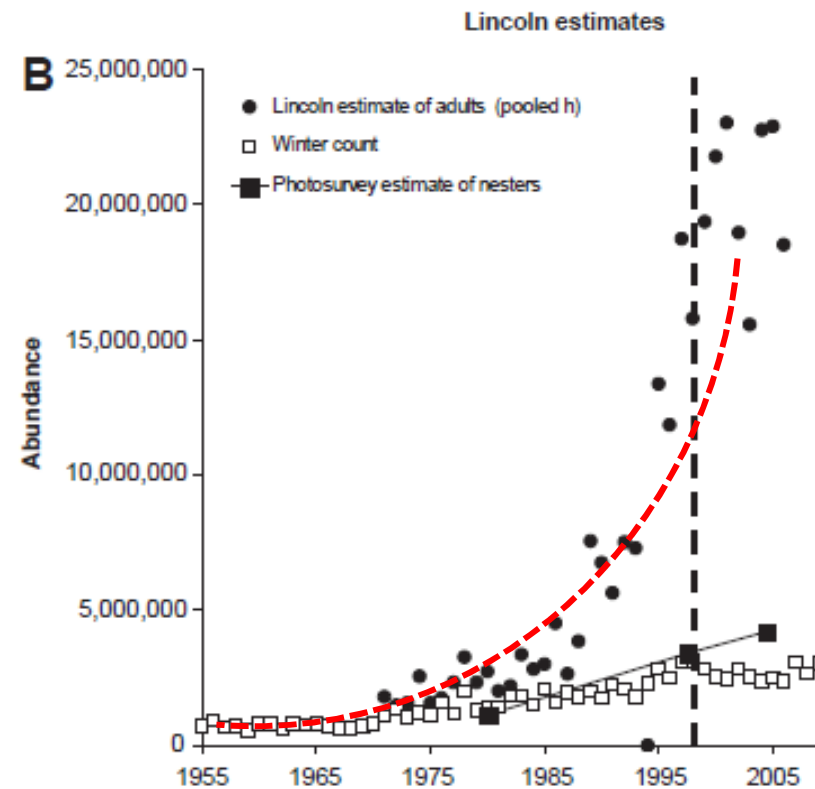


Midcontinent Lesser Snow Geese

- Numbers dwindling in early 1900s
- Reserves, *agriculture and reduced hunting supported range shifts and explosive growth
- Ecosystems “in peril” in 1997
- Even liberalised hunting cannot reduce population



Exponential Growth





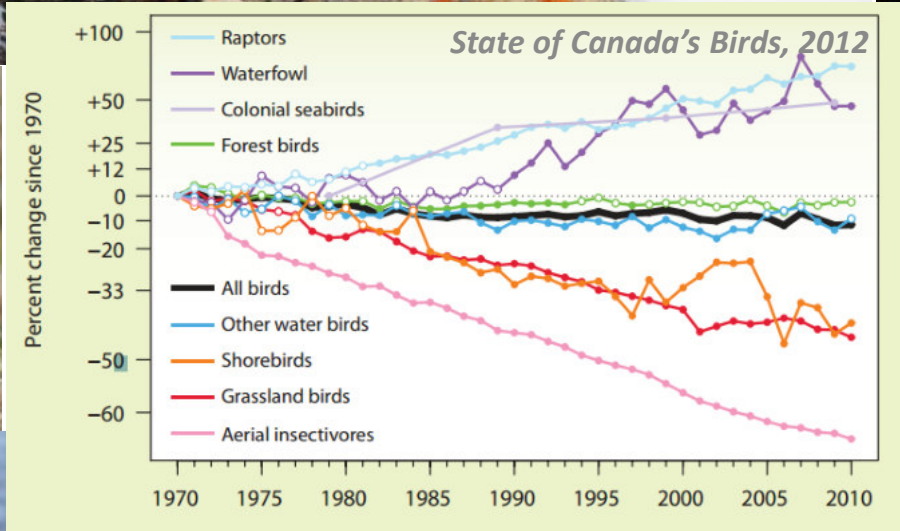




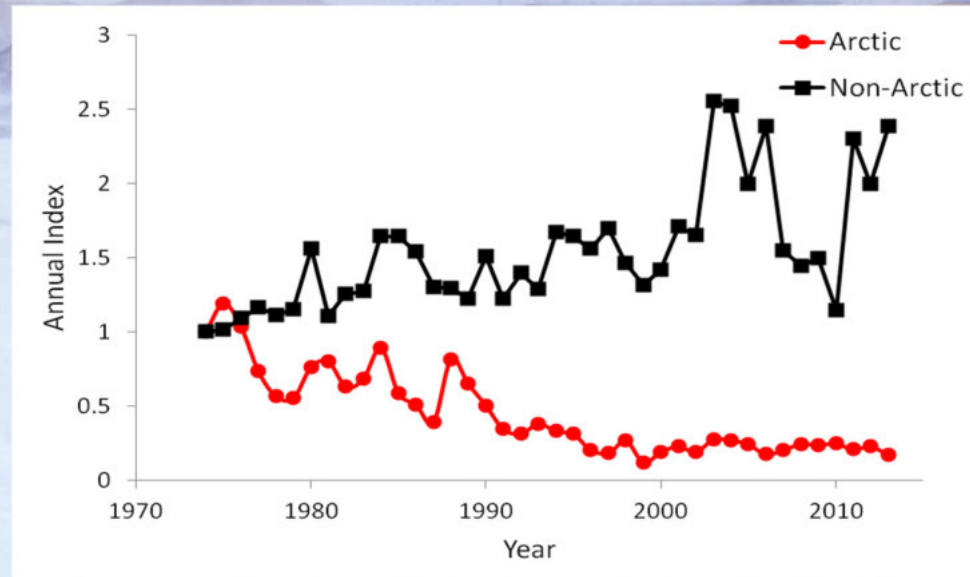
Habitat Alteration







Trends of North American Shorebirds: Arctic vs. Other



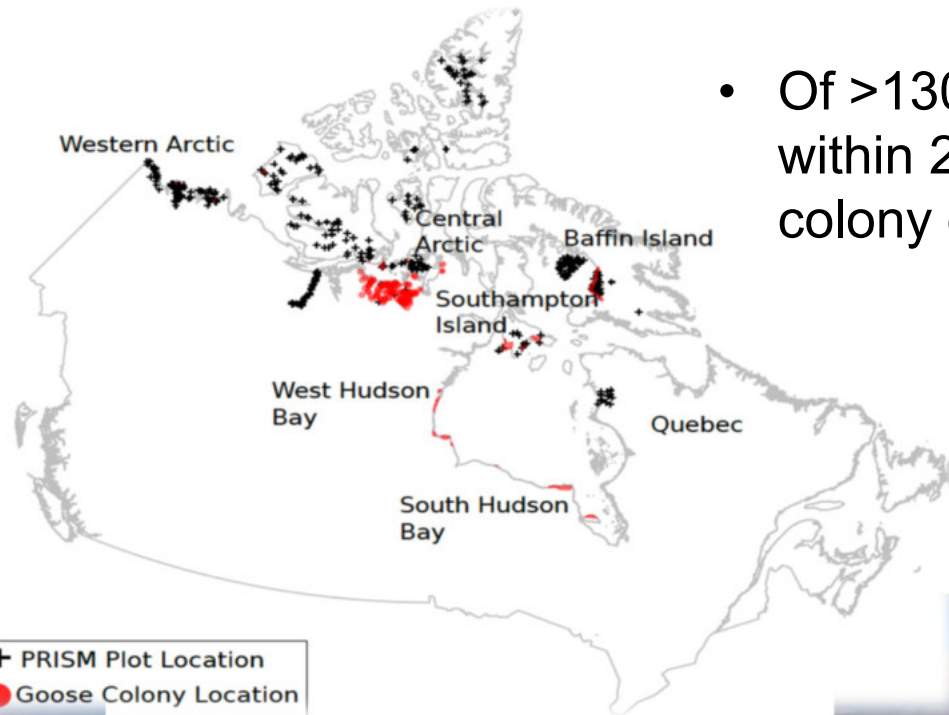
Goose Effects: Need to Understand the Mechanisms

- Large and small scale assessments of effects on habitats and invertebrate communities
- Altered predator populations
- Effects on shorebird individuals and populations



PRISM Arctic Surveys

- Of >1300 plots, 209 are within 20 km of mapped colony extents

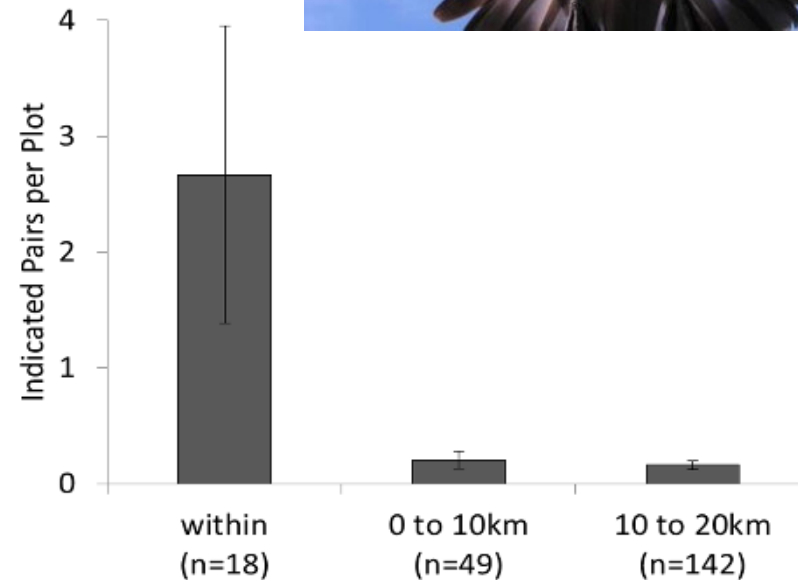


+ PRISM Plot Location
● Goose Colony Location



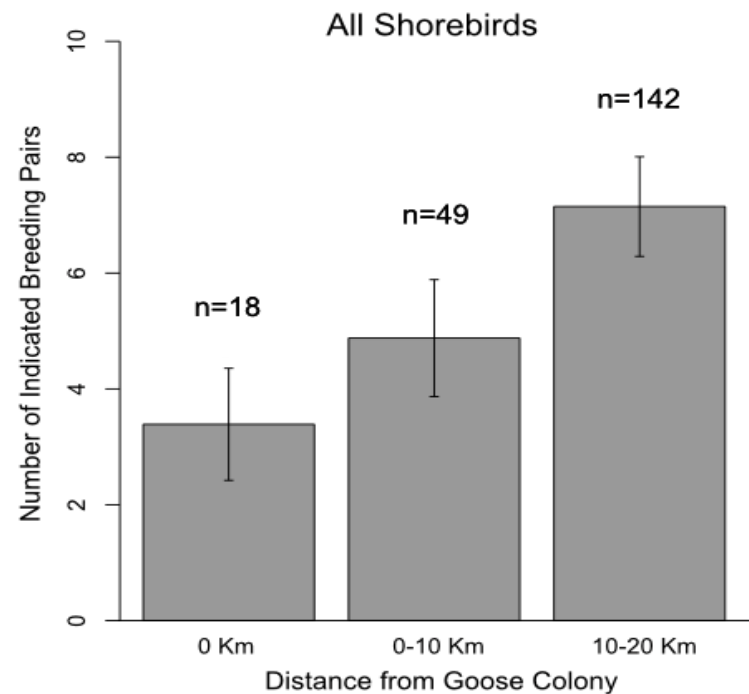
Effects on Shared Predators?

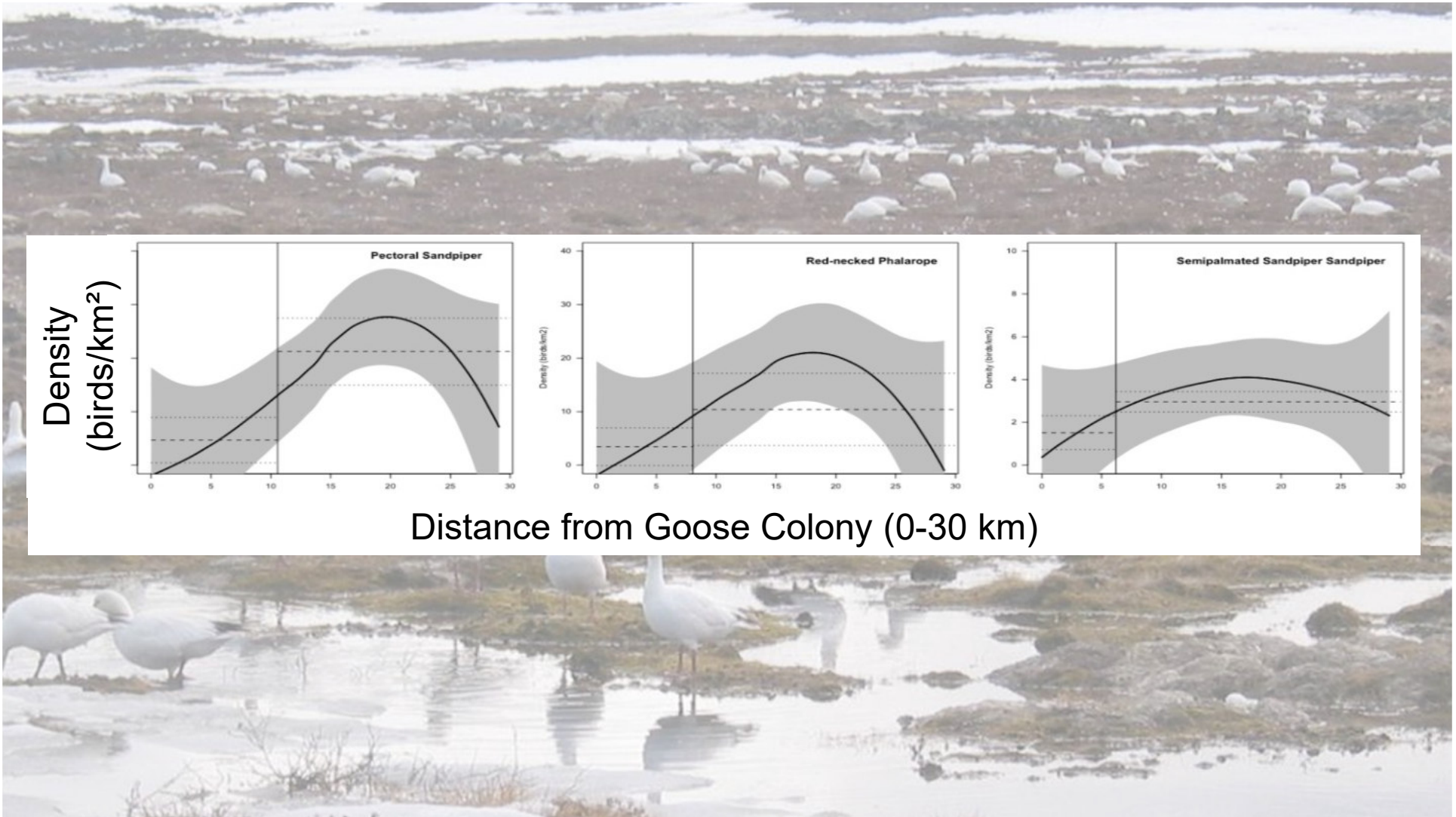
- 15x variation in abundance of avian predators in colony vs. 20km away
- Suggests strong possibility of elevated predation risk for shorebirds within/near colonies



Effects on Breeding Densities?

- Shorebird densities clearly lower within and near colonies







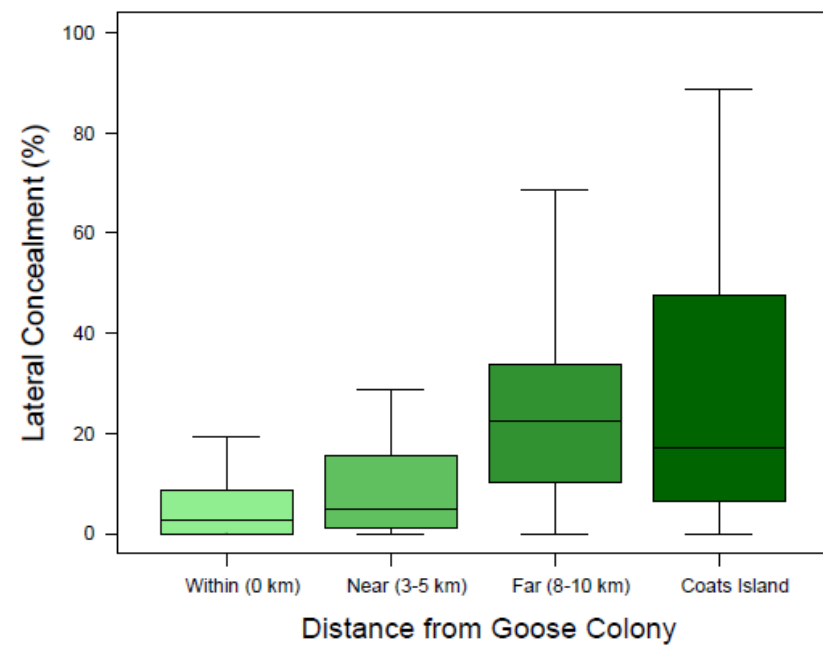
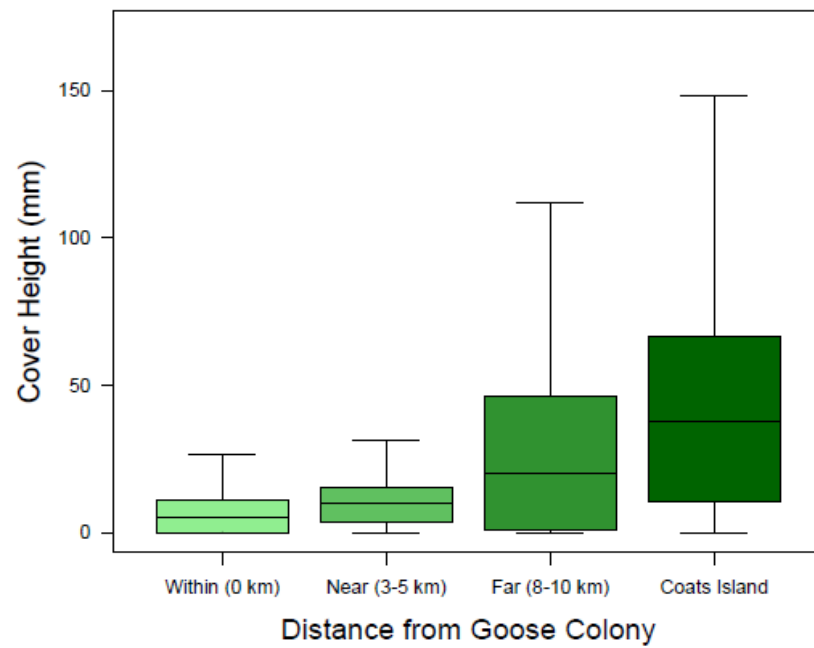
East Bay: Goose colony

Coats Island: No
breeders, fewer geese

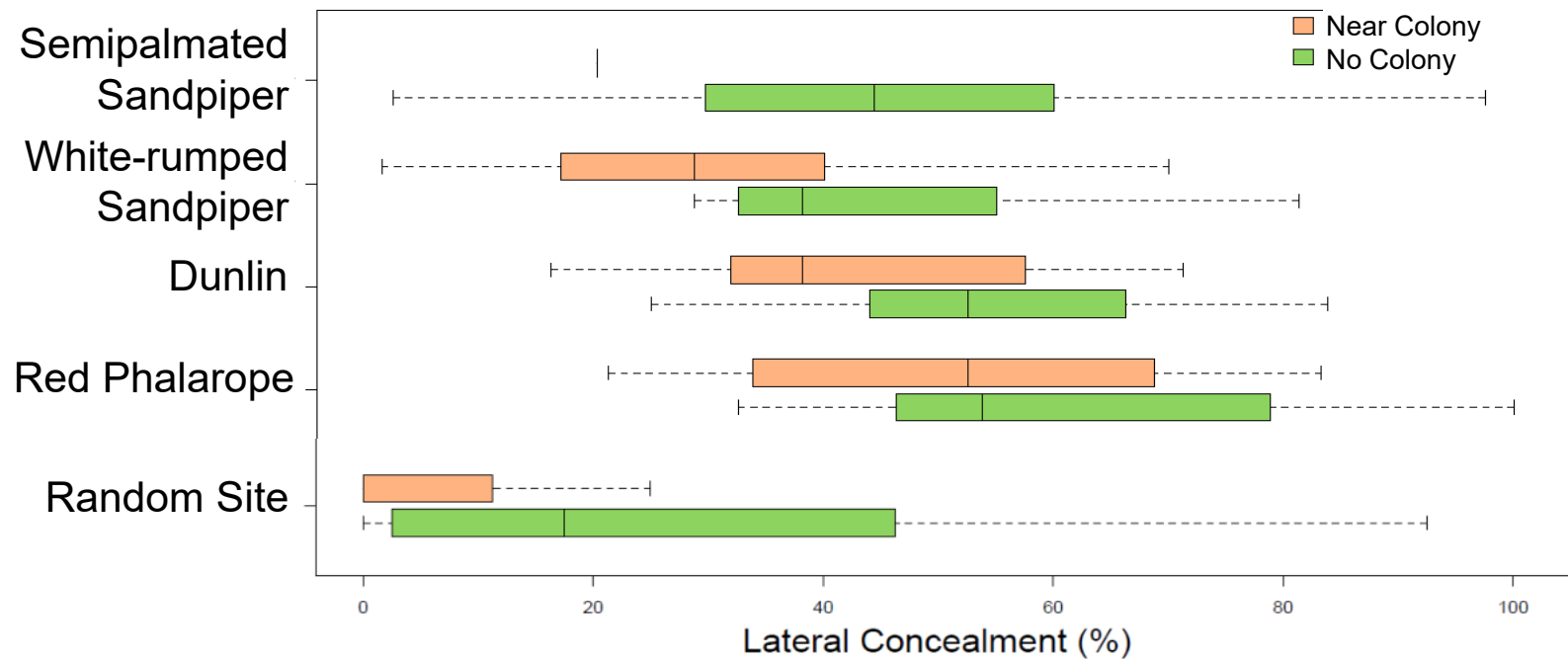
Effects on Nest Concealment?



Random site concealment lower near goose colony...



Nest concealment lower near goose colony...

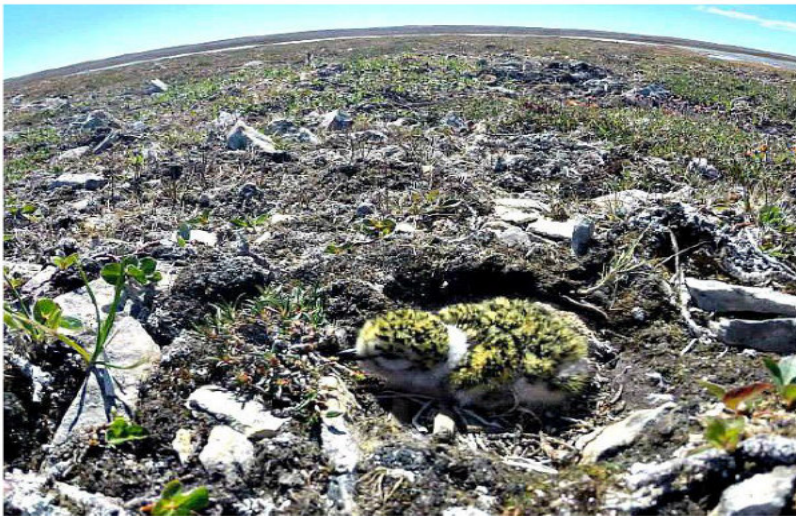




Predator-Prey Interactions



Nest survival is lower at East Bay



East Bay (near goose colony):

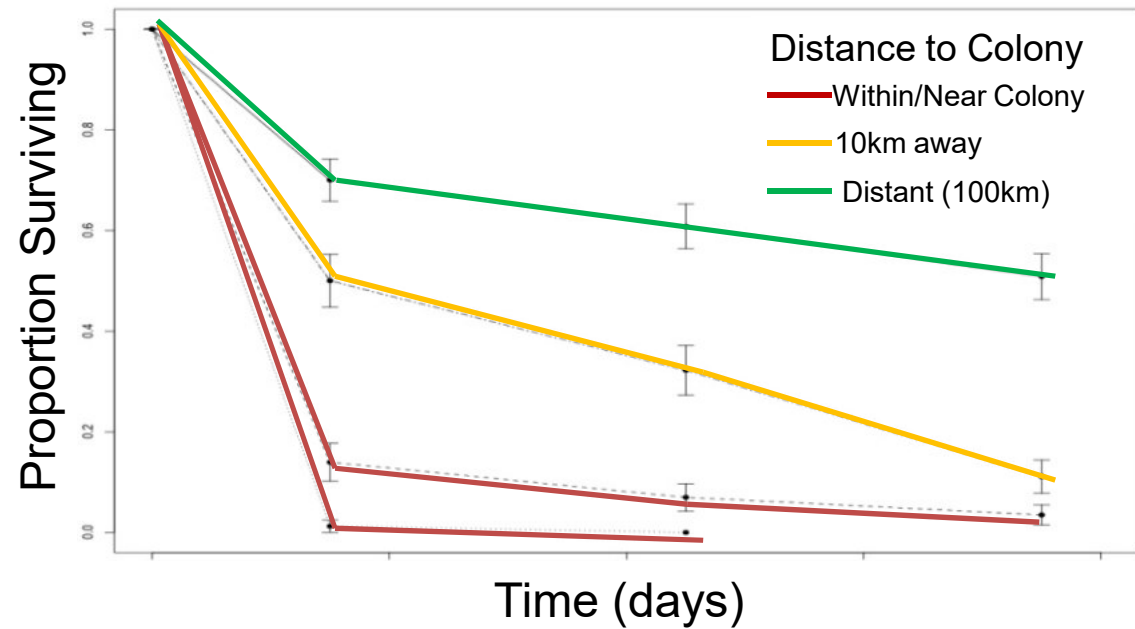
27% hatch success

Coats Island (no goose colony):

43% hatch success

Effects on Nest Predation

- Greatly elevated predation risk for artificial nests within/near colonies



Extent of Impacts



Colonies: 0.2% of N. Amer. Arctic, 3% of wetlands



Range: 26% of N. Amer. Arctic, >40% of wetlands





Shorebird declines and overabundant geese?

- The scale of the issue could be big enough to matter
- What effects are plausible?
 - Habitat avoidance, habitat degradation
 - Increased predators and reduced nest survival
 - Physiological effects, carry-over effects, effects on arthropod prey...



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