



FACTSHEET

Effects of climate change on arctic migratory birds

Background

During the summer many bird species migrate northwards to nest in arctic regions. The Arctic is expected to undergo extreme and relatively rapid changes as a result of climate change. This could impact on bird species that use the region for nesting purposes. However, birds are extremely mobile creatures and can move over large areas during a short period of time. This means that birds are not necessarily as vulnerable to climate change as other less-mobile organisms, and not all bird species that nest in the Arctic are experiencing a downward population trend (although our knowledge about many of these species is poor). Few of these birds stay in the Arctic for more than three months per year so that climatic changes occurring in areas inhabited by migratory birds outside the nesting season could be equally important. One good example is the ruff (*Philomachus pugnax*) which has suffered a drastic decline in all of its nesting areas outside the Arctic, compared to stable and even increasing numbers in northern arctic areas.

Migration patterns will change

Generally climate change in the Arctic will not be overly detrimental to the adaptation capacity of the birds that nest there. Higher temperatures during the summer will result in earlier snow-melting and a later onset of autumn frost.

Scientists have already observed that several bird species are laying their eggs earlier. Higher temperatures are also beneficial for successful nesting for species from more southern climates

because of nesting opportunities further north due to a longer season for rearing their young. Access to nesting and feeding areas will be the most important factors for changes in migration patterns. Wetland areas, for example, are important feeding and nesting areas for ducks and geese. As permafrost melts, greater areas such as these will become available, thus enabling wetlands species to migrate northwards.

However, this is also conditional on there being an increase in local access to food. It is highly likely that some sub-arctic species will obtain improved access to food as their growth season becomes longer. A warmer winter climate will affect the length of migration routes so that some species that nest in the Arctic will no longer need to migrate over such vast distances in order to reach a good winter habitat. Several different bird species that were rarely seen in Norway ten years ago are now spending the winter there.



Ruff (*Philomachus pugnax*)
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For those species that nest in the northern parts of the Arctic, the situation is more dramatic. Scientists estimate that between 39% and 57% of tundra habitats will disappear by the end of the century. It is thought that 76% of the areas inhabited by the tundra bean goose (*Anser fabilis*) will be affected by changes in vegetation.

New challenges

One problem for bird species that traditionally nest in the Arctic is that other species that normally nest further south are now moving northwards. These species could become competitors for the same nesting sites and the same food. New species migrating to the Arctic as a result of climate change could import new diseases and parasites that would threaten indigenous species. Even though the growth season in the Arctic will be extended, an anticipated increase in cloud formation and precipitation could have a detrimental effect. Increased rainfall could also result in increased mortality rates among vulnerable young birds.

However, the most serious consequences of climate change on migratory birds will almost certainly occur in non-arctic areas. Successful nesting is dependent on the physical condition of the birds when they arrive at their nesting sites. Weather conditions and access to food at their stop-over sites will therefore be important. Stop-over sites along the coast are under threat of disappearing due to rising sea levels. An increased frequency of drought could threaten similar inland areas.

Consequences for sea birds

Some of the largest sea bird populations in the world are found in the Arctic. Over 60 different bird species inhabit this area and 40 of these nest there. It is likely that sea birds like the ivory gull (*Pagophila eburnea*) and the little auk (*Alle alle*) will suffer from a reduction in the sea ice and subsequent changes in the environment in which they live. The ivory gull has an intimate relationship with the sea ice throughout its life; it nests on precipitous, stony cliffs and flies to the ice edge to obtain food.

However, the distance between its nesting areas and the sea ice is increasing as the latter retreats. Scientists have already observed huge reductions in ivory gull populations. In Canada, the ivory gull population has decreased by as much as 90% during the last 20 years.



Ivory gull (*Pagophila eburnea*)
© WWF-Canon / Peter PROKOSCH

Many bird species are vulnerable to changes in the fish and crustacean populations (the birds' food source). It will be particularly difficult for the bird species that have become specialised to eat just one type of food. This applies to the little auk that specialises in eating copepoda. If its access to this food disappears, then the conditions necessary for the survival of this species will also disappear. On the other hand, species that are hunting generalists, such as the glaucous gull (*Larus hyperboreus*), are able to switch to alternative sources of food and have a greater chance of survival if one or several of their food sources disappear.



Common guillemot
(*Uria aalge*)

© WWF-Canon / Kevin
SCHAFFER



Horned puffin (*Fratercula corniculata*) standing on a rock Round Island, Alaska, United States of America © WWF-Canon / Kevin SCHAFER

Conclusion

There is little doubt that changes resulting from climate change will have a major impact on sea and land birds in the Arctic. However, it is still not known exactly what these changes will be, partly because different species will react very differently to any changes. Another reason for this is that the changes will not be uniform changes, but will vary with the seasons and the geographic areas involved.

Climate change presents several new challenges. Stop-over nesting sites along the coast are under threat of disappearing due to rising sea levels. New bird species migrating to the Arctic as a result of climate change could import new diseases and parasites that would threaten indigenous species.

It is also difficult to predict the follow-on effects that losses of or a reduction in some species would have on the food chain in arctic areas. For example, the collapse of stocks of Icelandic capelin in 1987 was linked to climate change and resulted in a dramatic drop in the success of nesting for sea birds on Bjørnøya, Norway.

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