



# Migratory Birds and Climate Change

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A flock of Snow and Greater White-fronted Geese staging in a Texas coast rice field during spring migration. (Photo by Jay VonBank)

The term *climate change* causes an array of different reactions depending on your understanding of the topic. Climate change is a major topic in the scientific community and migratory birds are the exemplar for understanding recent changes in climate. Birds are highly mobile species and many have evolved to be able to capitalize on changing resources, thus they are able to acclimate quickly to changing local conditions. Because of these characteristics, migratory birds can be valuable indicators of changing climatic conditions.

There have been many large changes in distributions of birds in North America that are related to changes in climate conditions.

For example, as recently as 20 years ago, the Texas coast wintered over a million white geese (including the Snow Goose and Ross' Goose). In recent years, our numbers of wintering white geese are only about a quarter of that.

Currently, states like Kansas, Missouri and Arkansas winter the lion's share of white geese, and these states historically wintered few to none. Warmer winters allowing lakes to stay unfrozen and provide reliable roost sites, as well as less snow cover enabling geese to access abundant waste corn in agricultural fields have allowed this shift in winter distribution northward.

Similarly, during my goose surveys as a master's degree candidate almost 30 years ago, the Canada Goose was the most abundant species of goose encountered in South Texas. Over the last 20 years, Canada Geese do not migrate as far south in winter, have become uncommon visitors to South Texas and are a rare occurrence in the hunter's bag in this region.

Other evidence that birds are shifting their distribution in response to climate change can be found in the Mallard Duck. Recent analyses show that the centroid of band returns from the Mallard harvest in North America has been gradually shifting northward each of the last three decades.

Additionally, the breeding distribution of tropical species such as the Great Kiskadee and Green Jay have also moved northward. There is plenty of information from migratory and resident birds to suggest that climate change is real, and birds are responding with noticeable shifts in their distributions.

Another result of climate change has been an earlier onset of spring. In other words, warmer temperatures, spring green-up and availability of resources are occurring earlier. Not all species of migratory birds have shifted their winter ranges north, but many have responded to climate change by migrating earlier in response to the earlier onset of spring.

Birds breeding in northern latitudes where the breeding season is compressed due to a short growing season typically time their arrival as early as possible to capitalize on the resources that become super-abundant for a short period of time. Thus, timing their arrival for their offspring to have access to these resources is paramount because resources are not available very long. Missing the flush of resources by arriving late often results in failed reproduction for that year.

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Short and medium-distance migratory birds that winter relatively close to breeding areas have the advantage to respond to changing spring weather as the onset of spring progresses northward. For these species, an earlier onset of spring can be sensed, and they are able to leave wintering areas earlier to match the earlier spring conditions.

For long-distance migrants that breed in northern latitudes and winter south of the equator, they are unable to sense the changing spring conditions. These species usually use changing day length as the indicator to initiate migration north. Thus, they cannot sense the changes in the onset of spring and are not matching their arrival on northern breeding areas with the availability of resources.

We are now noticing a mismatch with timing of some long-distance migratory birds with optimal arrival on breeding areas. Because the changing climate is occurring at a much faster rate than would occur naturally, the birds are not able to respond through evolutionary processes at the same rate. Therefore, the ability of migratory birds to respond to climate change is based on their migration strategy with some species being able to respond and others not having indicators available to enable them to respond.

As climate change proceeds, we will likely see some species respond with changes in their winter distribution and/or earlier timing of migration, whereas others will not be able to respond and may become reduced in abundances due to a mismatch in timing of arrival and availability of resources on breeding areas. 🌱



Short-distance migrants winter relatively close to breeding grounds where they can detect changes in the onset of spring and are able to respond by leaving earlier. Long-distance migrants winter too far from breeding areas to be able to detect changes in spring phenology.

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