

Decline in shorebirds linked to climate change, experts warn

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The 'double whammy' of fewer babies hatching and decline in the survival of adults has had a devastating effect on population numbers of species such as the critically endangered Spoonbill Sandpiper (*Calidris pygmea*). Credit: Pavel Tomkovich

Climate change could be responsible for a substantial decline in

populations of shorebirds, say researchers from the Milner Centre for Evolution at the University of Bath, following a study published in *Science* analysing population data over a period of 70 years.

Historically, the rates of nest predation—eggs being stolen from nests by predators—are higher in the tropics, presumably due to higher variability of potential predators.

To counter this, shorebirds such as plovers and sandpipers migrate to the Arctic to lay their eggs as a safe place in which to build their nests and raise their young. Tropical birds, on the other hand, tend to have longer lifespans and longer periods of seasonal reproduction so their populations can generally withstand higher nest predation.

However an international team of researchers, including researchers from the Universities of Bath and Sheffield, have found that rates of daily nest predation in the Arctic have increased threefold in the last 70 years.

Rates of daily nest predation in the North Temperate Zone, which includes Europe, most of Asia and North America, have doubled.

Other studies have shown that over the same period, the survival of adult shorebirds has decreased due to habitat deterioration or hunting.

This "double whammy" of fewer babies hatching and decline in the survival of adults has had a devastating effect on population numbers, with species such as the Spoonbill Sandpiper (*Calidris pygmea*) becoming critically endangered.



The 'double whammy' of fewer babies hatching and decline in the survival of adults has had a devastating effect on population numbers of species such as the critically endangered Spoonbill Sandpiper (*Calidris pygmaea*). Credit: Pavel Tomkovich

The authors of the study in *Science* analysed data from 38,191 nests of 111 species in 149 locations across all continents.

The data suggest that the marked increase in nest predation in the Arctic and North Temperate Zone, in contrast to a smaller change in the tropics and Southern hemisphere, is linked to climate change.

The reasons for the increase in nest predation however are still unclear. The authors suggest it could be due to shift in the diet of predators towards eating more eggs instead of other food sources or perhaps change in [predator](#) species composition.

For example, lemmings, a key part of the Arctic food web have experienced a crash in numbers due to altered snow cover as a result of increased ambient temperature instability over several decades. With a lack of lemmings at many Arctic locations, predators may be searching for alternative prey in bird nests.

The authors also suggest that changes in vegetation or changes in behaviour or distribution of [nest predators](#) such as foxes may also be a factor contributing to the increased predation of shorebird nests.

Professor Tamás Székely, Royal Society Wolfson Research Merit Award holder from the Milner Centre for Evolution at the University of Bath, said: "These findings are alarming.

"The Earth is a fragile planet with complex ecosystems, thus changes in predator-prey interactions can lead to cascading effects through the food web with detrimental consequences for many organisms thousands of kilometres away.



The study linked climate change to a threefold increase in daily nest predation in the Arctic over the last 70 years. Credit: Pavel Tomkovich

"Migration of shorebirds from the Arctic to the tropics is one of the largest movements of biomass in the world. But with increased nest predation, the babies are no longer making this journey with their parents.

"This could be the last nail in the coffin for critically endangered species such as the Spoonbill Sandpiper."

Professor Robert Freckleton, Head of Department for Animal and Plant

Sciences at the University of Sheffield, said: "What is particularly striking about these results is that it is clear that nest losses to predators have risen really quickly in the Arctic over the past 20 years.

"The precise mechanisms are probably quite complex, but overall it looks like changes in climate are playing a leading role in driving such changes both in the Arctic and at a global scale as well.

"This is particularly threatening for this group of birds as large numbers of species are declining anyway—and many have formerly relied on the Arctic to provide relative safe breeding grounds."

Vojtěch Kubelka, former Erasmus+ Ph.D. student at Bath University during 2015-2016, added:

"The Arctic, with recently elevated rates of nest predation, is no longer a safe harbour for breeding birds: on the contrary, the Arctic now represents an extensive ecological trap for migrating shorebirds from a [nest](#) predation perspective."

The study underlines the need for understanding the effects of [climate change](#) not only for individuals and populations of specific species, but also for interactions between prey and predators in complex ecosystems.

More information: V. Kubelka et al., "Global pattern of nest predation is disrupted by climate change in shorebirds," *Science* (2018). [science.sciencemag.org/cgi/doi ... 1126/science.aat8695](https://science.sciencemag.org/cgi/doi/10.1126/science.aat8695)

Provided by University of Bath

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