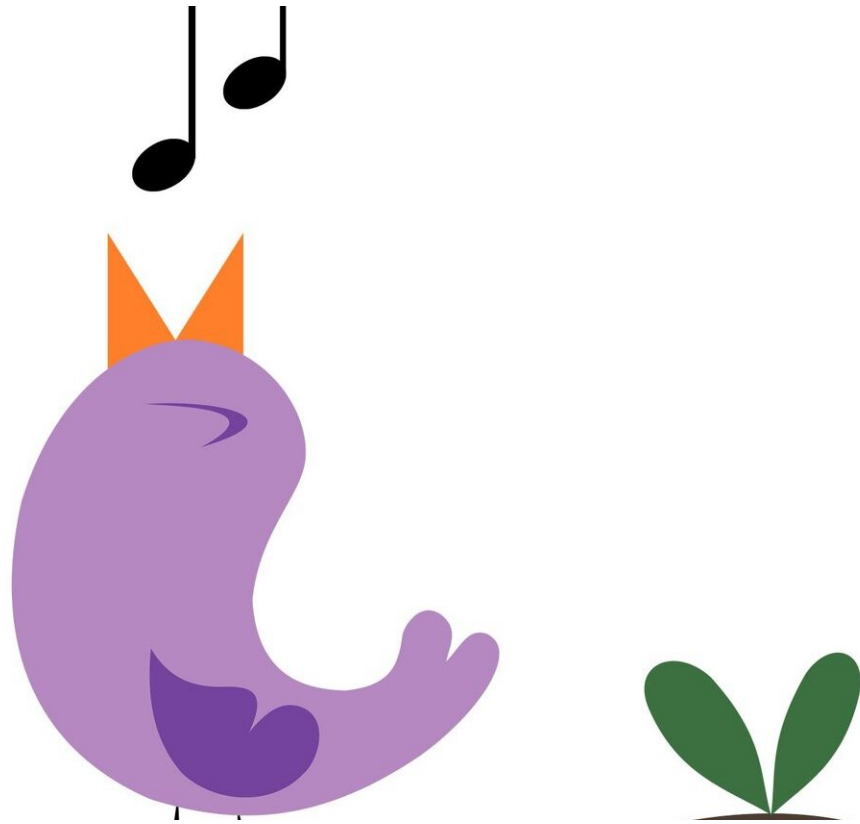


Not silent yet; the shifting sounds of spring

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Natural sounds, and bird song in particular, play a key role in building and maintaining our connection with nature—but a major new study reveals that the sounds of spring are changing, with dawn choruses across North America and Europe becoming quieter and less varied.

An international team of researchers led by the University of East Anglia (UEA) developed a new technique, combining world-leading citizen science bird monitoring data with recordings of individual species in the wild, to reconstruct the soundscapes of more than 200,000 sites over the last 25 years.

Lead author Dr. Simon Butler, from UEA's School of Biological Sciences, explained: "The benefits of nature contact are widespread, from improved physical health and psychological well-being to increased likelihood of participating in pro-environmental behavior.

"Bird song plays an important role in defining the quality of nature experiences but widespread declines in bird populations, and shifts in species' distributions in response to [climate change](#), mean that the acoustic properties of natural soundscapes are likely to be changing. However, historical sound recordings don't exist for most places so we needed to develop a new approach to examine this."

Annual bird count data from North American Breeding Bird Survey and Pan-European Common Bird Monitoring Scheme sites were combined with recordings for over 1000 species from Xeno Canto, an online database of bird calls and songs, to reconstruct historical soundscapes.

The acoustic characteristics of these soundscapes were then quantified using four indices designed to measure the distribution of acoustic energy across frequencies and time. These indices are driven by song complexity and variety across contributing species but quantify the diversity and intensity of each soundscape as a whole.

Commenting on the study, published today in the journal *Nature Communications*, Dr. Butler said: "We found a widespread decline in the acoustic diversity and intensity of natural soundscapes, driven by changes in the composition of bird communities.

"These results suggest that the soundtrack of spring is getting quieter and less varied and that one of the fundamental pathways through which humans engage with nature is in chronic decline, with potentially widespread implications for [human health](#) and wellbeing.

"Given that people predominantly hear, rather than see, [birds](#), reductions in the quality of natural soundscapes are likely to be the mechanism through which the impact of ongoing population declines is most keenly felt by the general public," he added.

The researchers say the relationship between changes in the structure of bird communities and resultant soundscape characteristics is not easy to predict.

Dr. Catriona Morrison, a post-doctoral researcher in UEA's School of Biological Sciences, conducted the analyses. She said: "In general, we found that sites that have experienced greater declines in either total abundance and/or species richness also show greater declines in acoustic diversity and intensity.

"However, initial community structure and how the call and song characteristics of species complement each other, also play important roles in determining how soundscapes change.

"For example, the loss of species such as skylark or nightingale, which sing rich and intricate songs, is likely to have a greater impact on the complexity of the soundscape than the loss of a raucous corvid or gull species. Critically however, this will also depend on how many occurred on the site, and which other species are present.

"Unfortunately, we are living through a global environmental crisis, and we now know that the diminishing connection between people and nature may be contributing to this," said Dr. Morrison.

"As we collectively become less aware of our [natural](#) surroundings, we also start to notice or care less about their deterioration. Studies like ours aim to heighten awareness of these losses in a tangible, relatable way and demonstrate their potential impact on human well-being."

"Bird population declines and [species](#) turnover are changing the acoustic properties of spring soundscapes" is published in *Nature Communications* on Tuesday November 2, 2021.

More information: Simon Butler, Bird population declines and species turnover are changing the acoustic properties of spring soundscapes, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-26488-1](#).
www.nature.com/articles/s41467-021-26488-1

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