SEEING THE WOOD FOR THE TREES

Widespread responses of birds to woody encroachment

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Two of the species most impacted by changes in woody cover. The Long-crested Eagle is a winner, while the Greater Blue-eared Starling is a loser.

Across southern Africa, native woody plants are encroaching into open systems. Multiple factors have changed the fine balance between grasses and trees, including increases in atmospheric carbon dioxide and changes in rainfall, temperature, fire frequency and herbivore densities. In many areas shrubs and trees are winning their competition with grasses.

Satellite imagery allows us to map and document this change. In the past decade, several science teams have harnessed this imagery to record changes in grasslands and savannas. Importantly, archived images enable us to measure the historical rates of change. Such studies have shown a general shift from open grasslands to woodier, more closed ecosystems both in southern Africa and more broadly across the world's grasslands.

The use of technology has also been effectively harnessed in the world of ornithology. The Southern African Bird Atlas Project 2 (SABAP2) is an excellent example of how to bring together passionate and dedicated citizen scientists and technology.

From several local case studies, we know that woody encroachment can influence the distribution of animal populations, linked to their habitat requirements. Grasses provide very different food sources, nesting sites and cover compared to shrubby or woodland areas. The finer spatial resolution of both SABAP2 and satellite imagery enables us to ask whether bird populations are being impacted by woody encroachment at the scale of entire countries. Over a 10-year period between 2007 and 2016 we assessed the range changes of 266 bird species across the grasslands and savannas of South Africa, Lesotho and Eswatini. This led us to classify birds as winners, losers or neutral in response to the current and predicted changes in woody plant cover.

Our preliminary findings show that more than 200 of these bird species have decreased in range over the past decade, suggesting that overall bird distributions are shrinking. Most of these declines are small and slow, but nonetheless worrying. Of the 81 species that showed a strong preference for open, grassy habitats, 64 were losers. These species are losing habitat as woody plants slowly but steadily invade open ecosystems. An increasing population trend was recorded in only 12 species and all of them had a preference for closed, woody habitats.

Winners, losers and neutral species showed large spatial variability in distribution trends, with both increases and decreases across their ranges. This lets us identify regional hotspots where several species may experience population changes and to target these regions for restoration or protection.

Our research adds to the mounting evidence that woody encroachment is impacting on biodiversity and will continue to do so. This information is valuable to land-use managers and environmental policymakers when deciding whether and where to control woody encroachment, although any restoration decisions need to be carefully balanced with the complexity of protecting landscapes for both ecosystem services and biodiversity across different plant and animal groups.

Our study, among others, shows that advances in technology together with dedicated citizen science programmes like SABAP2 provide crucial ecological information. SABAP2 will certainly be used to generate beneficial scientific insights at a large scale.

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