

## Book Review

# Winged Sentinels: Birds and Climate Change

by Janice Wormworth and Çağan H Şekercioğlu

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The authors' passion for conservation and ornithology combined with climate change research provides an engaging account of how various populations of birds face heightened threats from accelerated climate change. The fascinating descriptions of avian ecology and the endurance of birds serve to balance the broad range of scientific concepts and well-referenced data that are presented.

The brief introduction, entitled 'The free advice of birds', gives an evocative description of the Southern Rockhopper Penguin *Eudyptes chrysocome* and how its recent drastic decline may be linked to climate change. Phenological data on these penguins, collected since the 1930s, has enabled ornithologists to measure just how drastic this decline is: 86% by 2007. Phenology is the topic of Chapter 1, which also discusses seasonal timing and mismatch, and shows how valuable historical phenological records are in providing a benchmark to which current data may be compared. Such records have already shown that some birds seem to be moving the dates of their seasonal activities, to allow them to adjust to the impacts of climate change.

Migratory birds appear to be affected by accelerated climate change, both directly and indirectly, at various points along their flyways, and this topic is discussed in detail in Chapter 2. The possibility of range shifts and consequent effects on ecosystems is the focus of Chapter 3, which highlights why accelerated climate change, in conjunction with habitat change, poses such a potent threat to wildlife.

Seabirds, some of which are extremely sensitive indicators of accelerated climate change, have been given their very own chapter. Already threatened by overfishing, long-line fishing, oil spills, marine pollution and introduced aliens, seabirds are regarded as being twice as vulnerable to extinction as all other bird species. Declining primary productivity and seasonal shifts of prey species within the oceans are seen as heralding change in the oceans. The results of further warming and of more frequent extreme weather events on changes in abundance and the possibility of extinction are considered in Chapter 5.

Extreme weather may be the warming of the poles or it may be drought and heatwaves, all of which impact

birds in the affected habitats. Fragmentation of habitats in combination with climate change is considered to be particularly lethal for certain bird species as this exacerbates range contraction. This leads to a discussion in Chapter 6 of how warming will affect tropical and island birds. Evidence reviewed by the authors counters the view that the effects of global warming will not be as severe in the tropics. Forest clearance is greatest in the tropics where 77% of endemic bird areas are found. Tropical forest destruction and fragmentation already contributes to extinction rates of endemic birds, which have restricted niches, and climate change can only exacerbate this trend. The authors wrap up the discussion by looking at conservation and the role of current protected areas, as well as how conservation managers will have to use adaptive management to tackle the unpredictable threat of accelerated climate change.

The book illustrates how complex the effects of accelerated climate change are and, although many of the future effects may be unknown, the flexibility shown by certain species in response to these effects inspires hope that they will persist. Throughout the book, the importance of long-term data sets is emphasised, and the value of citizen scientists in gathering this data, both historically and currently, is underpinned. These citizen scientists are particularly important in Africa, where funding and specialist skills are relatively scarce. The authors point out that most of the research funding and (perhaps consequently) most of the biologists are located in the Northern Hemisphere, and thus the scientific literature has been biased towards northern temperate species. *Winged Sentinels: Birds and Climate Change* bucks this trend by presenting examples of how accelerated climate change may affect birds in both the Northern and Southern Hemispheres, including examples from the Antarctic, the Brazilian cloud forest and the Wet Tropics of Queensland.

Written in simple, descriptive language, the book will be easily understood by general biologists, and will appeal to students as well as the interested amateur ornithologist. Each chapter follows a similar format, containing a section on knowledge gaps, and concluding with a succinct summary of the topics that it covers. The book avoids some of the problems encountered in other edited

works on the same topic (e.g. Møller et al. 2010), where chapters may be repetitive (Martin 2011), the result of multiple authors. The book is a sober reminder to heed 'the free advice of birds', at a time when accelerated climate change is already having devastating effects on bird populations around the world.

#### References

- Martin R. 2011. Book review: *Effects of climate change on birds*. *Ostrich* 82: 249–250.
- Møller AP, Fiedler W, Berthold P (eds). 2010. *Effects of climate change on birds*. Oxford: Oxford University Press.

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