book review

Look northward to the boreal, the home of many migrating birds

Boreal birds of North America: A hemispheric view of their conservation links and significance, by Jeffrey V. Wells (editor), 2011, Studies in Avian Biology No. 41, University of California Press, 136 pp. £30.95 (Hardback) ISBN: 9780520271005; http://www.ucpress.edu/

To many people, the term "boreal forest" evokes an image of a vast, cold, and inaccessible wilderness far from home. Most of us live south of the boreal, and when we think of bird diversity we tend to look toward the tropics, where species diversity is high and species range size tends to be small, placing many species under threat of extinction due to human-caused habitat destruction. This book provides an eye-opening look to the north, strongly demonstrating the importance of North America's boreal forest to avian biodiversity both there and throughout the Americas via seasonal migration. The book also shows that, while being one of the largest wilderness areas left on the planet, the boreal forest is under growing threat.

Despite its small size for an edited volume (9 chapters totaling 125 pages), this book presents a remarkably balanced and comprehensive overview of the biogeography, ecology, and conservation of the boreal birds of North America. Most chapters focus on broad biogeographic patterns; these include contributions on the threats to the boreal forest, the global role of the boreal in sustaining bird populations, the use of survey data in geospatial modeling of bird abundance, and the role of boreal migrants in winter bird communities far to the south. These are supplemented by contributions that focus on geographically more narrow areas, including chapters on waterfowl conservation in the western boreal forest, boreal landbird migrants in eastern North America, and boreal migrants in the tropical Andes. Finally, two contributions provide examples of in-depth research on two species that have experienced alarming declines: surf scoters and rusty blackbirds. The mix of broad-scale overviews with focused looks at individual species in decline leaves the reader with a remarkably rich understanding of the importance of the boreal forest and the research being undertaken (and needed in the future) to better understand and protect its avifauna.

Some remarkable statistics emerge from this book. Spanning from interior Alaska across the continent to Newfoundland, North America's boreal forest covers 5.9 million km^2, representing 25% of remaining intact forests on Earth. Over 300 bird species regularly breed there, accounting for 43% of all species that regularly occur in Canada and/or the U.S. The total number of adult boreal breeders is estimated at somewhere between 1.65 and 3 billion, accounting for 30% of all breeding landbirds of Canada and the U.S., 38% of waterfowl, and 30% of shorebirds. Between 3 and 5 billion adults and immature birds migrate south from the boreal every fall; during the northern winter, they play important ecological roles in North, Central, and South America, where they can comprise up to 50% of the species composition in some feeding guilds. While the above numbers are impressive, the threats to boreal birds are as well. From 1966 to 1994, Saskatchewan's boreal plain was deforested at a rate of 0.89% per year, three times the global rate of deforestation, and rates of boreal forest disturbance due to oil and gas exploration, hydropower projects, agriculture, and other industrial development are also alarming.

One of the strengths of this book is that it goes beyond the presentation of patterns, and argues for a subtle change in conservation values. While traditional approaches to conservation have emphasized rarity and endemism in prioritizing conservation efforts, Wells and Blancher (p. 8) advance the idea that "some regions have a high stewardship responsibility for maintaining species that are still abundant." This point is well taken,

but I feel it could have been better clarified and developed. All conservationists would agree that it is good to maintain abundant species as well as rare ones, but it is unclear whether the authors are also saying that conservation efforts and funding should be diverted from rare species to common species. They do make the valid point that governments should focus on the conservation values that make their jurisdictions globally unique. In the example of Ontario, this would be abundance of boreal species. But are the authors saying that, within Ontario, conservation efforts should be focused on maintaining abundant species at high abundance, at the potential cost of reduced protection of rare species? If so, that position would be likely to elicit much debate. On the other hand, the chapters in this book do demonstrate the collective importance of boreal species because of their abundance—this is what makes boreal migrants such important players in ecosystems throughout the Americas. So there is a responsibility for managers of the boreal forest to not just prevent species from extinction but to also maintain them at high abundance. This view represents a potentially important new perspective on conservation biology, which as a field has been highly focused on preventing extinction.

Given this book's compact size, it is natural that it focuses solely on the boreal forests of North America. A consequence, however, is that it generally omits potentially interesting comparisons with other northern forests of the world. In particular, Eurasia also has extensive boreal forests—perhaps a future volume could compare the importance of the boreal birds of Eurasia and North America in terms of numbers and impact on their wintering communities. Another important and highly relevant region is the Cordilleran Forest region of British Columbia; this forest has many similarities to the boreal forest and is inhabited by many of the same bird species. Considering this forest would affect some of the details in the analysis of winter distributions presented by Robertson et al. in Chapter 7. For example, Figures 7.1 – 7.3 present winter distributions of species that breed in the boreal forest. Because many of these species also breed in high numbers in the Cordilleran forest, the winter distributions are likely heavily affected by those Cordilleran forest breeders. I suspect that the high densities along the west coast seen in these maps are primarily due to these Cordilleran populations rather than the boreal populations, since many of these species have migratory divides between western and eastern migratory groups (e.g., Wilson's warblers, Irwin et al. 2011; Swainson's thrush, Ruegg and Smith 2002, Delmore et al. 2012; and the recently separated Pacific and Winter wrens, which were likely included as a single species in this analysis; Toews and Irwin 2008).

One key threat to boreal birds that receives relatively little attention in this book is global warming, which is predicted to have disproportionate effects in northern high latitudes and the interiors of continents, exactly the location of much of the boreal forest (IPCC 2011). Research in Finland, where boreal species are more easily surveyed due to a more extensive road network, has shown declines of more northern species and increases of more southern species over a 14 year period in which mean temperature increased 0.7-0.8°C (Virkkala & Rajasärkkä 2010). Such heating combined with impacts on the boreal forest due to industrial development are likely to cause large changes to boreal bird populations during the coming decades.

This book provides a welcome wake-up call regarding the importance of boreal birds, and does a nice job of clarifying the large areas of uncertainty. It is clear that we need to greatly improve our methods of surveying boreal landbird populations, since established methods that are successful elsewhere (such as North American Breeding Bird Survey and the Christmas Bird Count) cover little of the boreal forest. In Chapter 5, Couturier provides a nice discussion of the value of breeding bird atlas projects and how they can be used to estimate maps of relative abundance. Also welcome in this regard are efforts such as the Boreal Avian Modelling Project (Cumming et al. 2010), which has shown how survey data from a wide variety of studies can be integrated into a single analysis of abundance and distribution. It will be important for conservation

managers to establish a strong system of surveying boreal birds over time, so that the upcoming changes can be observed accurately. Few people have a chance to directly observe human impacts in the boreal forest, but if we don't practice good stewardship, many of us in more southern areas may come to dearly miss those northern visitors whose arrival we presently take for granted each fall and spring.

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