

formation collected by over 11,000 volunteers throughout the 900,000 km<sup>2</sup> that make up the province of British Columbia; the *Birds of British Columbia, Volume 4* summarizes the seasonal distribution of the wood-warblers through old world sparrows. Each species known to occur in British Columbia is indicated along with a distribution map of the species within the province. Included on each map are the season of occurrence (breeding and nonbreeding) at a scale of 15' latitude by 30' longitude as well as a more detailed chronology showing what months (or portions thereof) each species is present, including eggs and young. Along with the map for each species, the authors have provided descriptive text (~7.5 pages per species) on range (entire winter and summer ranges), status (general locations and frequency with which the species occurs in British Columbia), nonbreeding (general locations, habitat, and migration within British Columbia), breeding (general locations, habitat, nests, eggs, young, cowbird parasitism [49 of 101 species are parasitized in British Columbia], and nest success in British Columbia), remarks (comments about conservation status, loss of habitat, taxonomy, and other interesting facts), and noteworthy records (spring, summer [including Breeding Bird Surveys], autumn, and winter [including Christmas Bird Counts]). Each account also provides color photographs showing an adult bird and typical habitat. Some accounts include other information including images of the nest with eggs and additional figures such as trends in Breeding Bird Surveys, more detailed annual occurrence and breeding chronologies by subregion, related British Columbia banding or recovery sites in North America, number of eggs by month, fluctuation in numbers by locality, and sex ratios by regional locality.

Nonregular species (22) are listed separately with a brief description about range, status, occurrence, and remarks. Additions to the avifauna from 1987 (the cutoff date for data for volumes 1 and 2) through 1999 (the cutoff date for volume 4) includes 28 species of nonpasserines.

The final portion of the book, "Synopsis: the Birds of British Columbia into the 21st Century," consists of 64 pages. The first section is devoted to avian biodiversity, ecological distribution, and patterns of change in British Columbia. The ecoregions (defined as an area of similar climate or oceanography, topography, and geological history) that each species occurs within during the summer (or nesting season) are described. A summary of wintering areas is also provided. Included in this chapter are topics such as "hot spots;" major migrations; endemism; species density; changes in bird numbers; species showing decline; and rare, threatened, or endangered species. The second section within this synopsis discusses human effects on bird populations and types of resource management as they relate to British Columbia.

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**Birds of British Columbia, Volume 4—Wood-Warblers through Old World Sparrows.**—R. Wayne Campbell, Neil K. Dawe, Ian McTaggart-Cowan, John M. Cooper, Gary W. Kaiser, Andrew C. Stewart, and Michael C. E. McNall. 2001. UBC Press, Vancouver, British Columbia. 4 + 744 pp., 42 tables, 767 figures. ISBN 0-7748-0621-4. Cloth \$125.00 CDN.—Affectionately known by the authors as the "albatross," the *Birds of British Columbia, Volume 4* is the final book in the four-book set of the *Birds of British Columbia*. Over 10 years since volume 1 was published, volume 4 marks the culmination of nearly 25 years of work to bring this complete set to press. Based on the in-

To avoid excess costs, a 91-page set of appendices are not included in the book but have been made available on a website (available at <http://wlapwww.gov.bc.ca/wld/pub/BBC4appendFinal.pdf>). The appendices include: "Migration Chronology"; "Summary of Christmas Bird Counts in British Columbia, 1957 through 1993"; "Summary of Breeding Bird Surveys in British Columbia, 1968 through 1993"; and "Examples of Bird Species Richness and Density in Old-growth Coniferous and Deciduous Forests of British Columbia." The appendices can be downloaded as PDF files.

The book is a large format (23 × 31 × 4.5 cm) and printed with high-quality color photographs and figures. The inside covers provide two maps of British Columbia; one map indicates the ecoregions with key place names and the other the biogeoclimatic zones.

Because this is one book of a four-book volume, it seems unlikely that one would purchase this book without completing the set. The methodologies used in the preparation of volume 4 are not described but the authors direct the reader to either volume 1 or volume 3. Because it was over 10 years between the publication of volumes 1 and 2 and this volume, the authors have included a chapter on the 28 new species to the province in that time. Also, a final section (the synopsis described above) to the book summarizes significant information on the avifauna of the province from all four volumes. Thus, it would behoove any person interested in the distribution and breeding of birds within British Columbia to obtain the entire set.

Projects as mammoth as the *Birds of British Columbia* take many years to assimilate and analyze data. As such, the authors were forced to choose an arbitrary endpoint for data inclusion. In this case, it varies depending upon the nature of the data. For example, Breeding Bird Survey data stop at 1994, Christmas Bird Counts at 1993, and new additions to the avifauna at 31 December 1999. At best, the information is out of date by at least a year upon publication but that is unavoidable. Why the authors chose to restrict Breeding Bird Survey or Christmas Bird Count data to seven or eight years prior to publication is unknown, and is obviously limiting. Evidence of how fluid the ranges of avian populations can be is provided by the data on new additions to the province. In only 12 years (the Black Vulture [*Coragyps atratus*] was actually observed only as recently as 1982), 28 new species were added to the province's avifauna (including six that now breed). And in 52 years (from 1947–1999), 108 species were added to the avifauna of British Columbia (82 of those species now breed in the province). It is, however, questionable whether all of the birds cited by the authors as being new actually are. For example, both Purple Martins (*Progne subis*) and Skylarks (*Alauda arvensis*) were known to breed within British Columbia prior

to 1947 and should not be considered new within the last 52 years. Mountain Quail (*Oreortyx pictus*) are listed as extirpated, but whether introduced species should be considered in counts of extirpation is also open to debate. Nevertheless, it appears that about two species per year can be expected to be added to the avifauna if the trend continues.

Summarizing our present state of knowledge enables others to realize gaps that exist. As the authors point out, if the reader "fails to find in these volumes anything that he knows about the birds, he can blame himself for not having sent the information to the authors." Alternatively, readers may not have been aware that their observations were not documented. For example, there are only two areas listed in the interior of British Columbia (Okanagan Valley) where Palm Warblers (*Dendroica palmarum*) have been observed. Having personally seen a fall migrant nearly 150 km northwest of those records I now realize the importance of my observation. Had it not been for the publication of this book, many others like me would continue to be ignorant of our state of knowledge with respect to avian distributions and the need for better documentation.

Even though the appendix title listed in the book (p. 697) for the Breeding Bird Surveys says 1993, the data actually go through 1994 (and is indicated as such in the title on the web page). Likewise, there is a slight change in the title of appendix 4 between the book and the web page. Other minor errors include two figures each labeled "514" and two figures each labeled "751." Although it is important to document new additions to the avifauna, inclusion of photographs that are blurry and out of focus are questionable. Out of the 13 images presented in the "casual, accidental, extirpated, and extinct species" section, seven are blurry and out of focus. Improvements to the book could have included a map of the province indicating areas where observer coverage is lacking by showing the number of observations per geographic area. There are many places in British Columbia that are disproportionately depauperate (e.g. northern boreal mountains). Distribution information may be misleading when observation effort is biased towards populated areas (e.g. near Vancouver, Victoria, and the Okanagan). In fairness to the authors, information on observer effort was provided in volume 1. The index is limited to just four pages and it does not include any species mentioned in the final 64 pages, "Synopsis: the Birds of British Columbia into the 21st Century," but it does include concepts within that section (e.g. peripheral species).

The target audience for this book will be mixed. The high-quality color photographs and striking figures for each species will be attractive to a general audience. Because British Columbia provides breeding habitat for 20% or more of the global populations of at least 21 species, information about their distribution and biology within the province is notably

important to avian biologists studying those species. For example, up to 90% of all Barrow's Goldeneyes (*Bucephala islandica*) and Northwestern Crows (*Corvus caurinus*) and at least 50% of White-tailed Ptarmigans (*Lagopus leucurus*), Ancient Murrelets (*Synthliboramphus antiquus*), Cassin's (*Ptychoramphus aleuticus*), and Rhinoceros (*Cerorhinca monocerata*) auklets breed in British Columbia, according to the authors. Testament to the value of the information contained within the *Birds of British Columbia* set is the frequency with which avian biologists have cited the previous three volumes of this set in the *Birds of North America* series (partly sponsored by the American Ornithologists' Union). In examining 40 of the most recent accounts in the series, the authors of every species that occurred within British Columbia cited one of the volumes from the *Birds of British Columbia* set for which information was available. The Science Citation Index indicates that the previous three volumes have been cited 73 times (as of the writing of this review) in the database of peer-reviewed journals. Clearly, this set is the most comprehensive summary of avian biology for British Columbia that has ever existed. Birders and other field biologists will probably find the "noteworthy records" section for each species to be of interest. It will allow them to fill in some of the missing gaps in our knowledge with respect to locations and date of observations so that a more comprehensive database can be constructed in the future. Overall, the *Birds of British Columbia* will be a valuable resource to biologists, birders, and land managers in various capacities (e.g. forestry, parks, and environment) because species information is summarized in a concise and easy-to-read format.

Documenting the distribution and breeding of all avian species within such a large and important geographical landmass as British Columbia is daunting. The authors have done a marvelous job and I would highly recommend volume 4 (of this four-book set) to anyone interested in the avian species that occur in British Columbia. The albatross has flown—the responsibility now rests on the observers of today and tomorrow to ensure it stays aloft.—ERIC L. WALTERS, *Department of Biological Science, Florida State University, Tallahassee, Florida 32306-1100, USA. E-mail: ewalters@bio.fsu.edu*

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