



BOOK REVIEW

Golden-winged Warbler Ecology, Conservation, and Habitat Management

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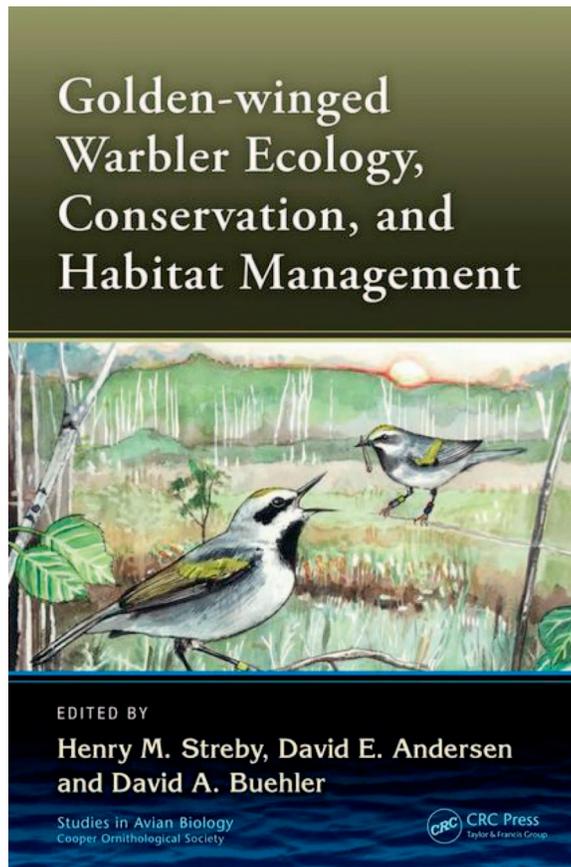
Golden-winged Warbler Ecology, Conservation, and Habitat Management edited by Henry M. Streby, David E. Andersen, and David A. Buehler. 2016. *Studies in Avian Biology* 49. CRC Press, Boca Raton, FL, USA. 238 pp., 14 color and 64 black-and-white illustrations. \$179.95 (hardcover), \$125.97 (ebook). ISBN 978-1-4822-4068-9.

Many avian biologists, conservationists, ecologists, and land managers are studiously aware of the steep population decline of the Golden-winged Warbler (*Vermivora chrysoptera*) during the last half-century, and many young ornithologists and their mentors have made significant contributions to the study and conservation of this species over the past 12 years. In an attempt to address and reverse the species' precipitous decline, editors Streby, Andersen, and Buehler have compiled most of the current research in this latest volume of *Studies in Avian Biology*. I started studying Golden-winged Warblers in 1987 and have studied the same populations every year since then. Despite my almost 30 years of study, I gained much insight from the outstanding scientific papers presented in this book, which includes analyses of breeding-site occupancy, nesting success, postfledging ecology, and habitat associations on the wintering grounds. Contributors provide recent details of the genetic research being conducted on the species, the hybridization that occurs between Golden-winged Warblers and Blue-winged Warblers (*V. cyanoptera*), and a synthesis of migratory connectivity among Golden-winged Warblers.

A total of 40 authors contributed substantial research, presented in 14 chapters organized into four parts. Part I, on the species' global distribution and status, has an

assessment of population declines and winter habitat associations. From reading this first part, I learned about the breeding distribution of Golden-winged Warblers prior to 1900 and potential conservation strategies for nonbreeding habitat of the species. It is disclosed that as of 2010, the population size of Golden-winged Warblers is estimated to be ~383,000 adult birds, with 90% of the breeding population occurring in a narrow zone across Minnesota, Wisconsin, Michigan, southern Ontario, and northern New York. While Part I has some detailed and critical information on the distribution and historical population declines of the species, the science within it relies too heavily on several unpublished reports and omits some of the published historical data and information from central Appalachian populations. Un-

fortunately, the knowledge presented on the patchy distribution of the Golden-winged Warbler in both breeding and wintering areas is based on a mosaic of methodologies and modeling, as outlined in Part I. However, the information and data, distribution maps, and historical declines and range shifts of the species



presented in this part of the book are not without high merit, given that they bring together a variety of surveys, methods, eBird data, published and unpublished work, historical and current research, and expert opinions to centralize what we currently know about the species' distributional biology and migration. This is a critically important first step toward conserving this migratory species. The book documents two remaining disjunct breeding populations, namely those of the Great Lakes and the Appalachian Mountains, where future knowledge gaps and conservation efforts will be concentrated.

Part II consists of eight chapters considering research on the Golden-winged Warbler's breeding grounds, including contributions on landscape-scale habitat, genetics and hybridization with Blue-winged Warblers, habitat use in the central Appalachians, plant-species influences on foraging ecology, nest-site selection, and survival and fledgling habitat use in the western Great Lakes region, as well as spatially explicit models of productivity and landscape management in that region. From Part II, I learned about the highly variable studies that are pinpointing the effects of landscape and habitat changes on the distribution and nesting success of Golden-winged Warblers. Part II also presents future directions, such as identification of plumage genes and high-throughput sequencing, that are noteworthy for young ornithologists looking for a model species to study. Postfledging survival and habitat use have often been difficult to study in Golden-winged Warblers, mainly because pairs with fledged offspring often do not remain very long on nesting territories and start moving south in a matter of days after fledging young. One of the studies in Part II used radio telemetry to help fill the gap in that area of study. Readers may also find it interesting that researchers used spatially explicit modeling to determine that upland forest types are crucially important to Golden-winged Warbler productivity.

Part III presents current work and issues associated with the species' nonbreeding wintering grounds and migration routes. Studies on social and foraging behavior during the nonbreeding season, conservation, and migratory connectivity derived from stable isotopes are described. Researchers used radiotelemetry and observations of color-banded birds during the nonbreeding season to quantify foraging behavior and habitat associations. I learned that male

Golden-winged Warblers rarely flock with conspecific males during the nonbreeding season. Using stable isotopes, researchers provide an analysis of migratory connectivity, and it is interesting to see which winter areas are utilized by populations that breed in the Great Lakes or the Appalachians.

In Part IV, the editors and contributing authors provide a conservation perspective. Synthesizing what is known about Golden-winged Warblers and the needs for future research, the authors review the recent science, list and discuss primary threats, and make conservation recommendations. They note that adequate forest cover and patch-level habitat configuration are important for successful reproduction and to buffer negative interactions with Blue-winged Warblers. This reminded me of a picture of narrow contour-mine bench habitat of Golden-winged Warblers in relatively dense, mature Appalachian forest that I presented at an Association of Field Ornithologists annual meeting in 1996, at which time the picture was perceived with some skepticism.

The book lacks detailed analyses of studies on (1) differential population variation in return rates; (2) impacts of Blue-winged Warblers, especially in areas of long-term secondary contact and sympatry; and (3) recruitment and dispersal. It is clear that some of these knowledge gaps, as well as other shortcomings, will be considered during future research. It is also clear from reading the book that the Golden-winged Warbler is now one of the most studied Neotropical migrant warbler species and, as is the case for the Cerulean Warbler (*Setophaga cerulea*), that large-scale collaborative research has generated a large amount of data required for demographic modeling and for development and implementation of conservation plans.

By publishing *Golden-winged Warbler Ecology, Conservation, and Habitat Management*, the editors and contributing authors have moved the biology, our knowledge, and perhaps the conservation of this beautifully magnificent and imperiled songbird forward by many leaps and bounds. This is another excellent contribution from the *Studies in Avian Biology* series and will serve as a detailed reference for many land managers, conservationists, and avian ecologists.

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