



Bird Conservation on Golf Courses: A Design and Management Manual AND Managing Wildlife Habitat on Golf Courses.

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Bird Conservation on Golf Courses: A Design and Management Manual.—Scott W. Gillihan. 2000. Ann Arbor Press. Chelsea, Michigan. xiv + 335 pp. ISBN 1-57504-113-8. Soft cover, \$34.95.

Managing Wildlife Habitat on Golf Courses.—Ronald G. Dodson. 2000. Ann Arbor Press. Chelsea, Michigan. xii + 177 pp. ISBN 1-57504-028-X. Hard cover, \$49.95.

The elimination of traditional wildlife habitat through urbanization of natural and agricultural areas has increased the importance of urban green space as habitat for wildlife, particularly birds. Golf courses, as one form of urban green space, are being increasingly recognized for their potential to provide wildlife habitat. To maximize that potential, however, new paradigms and philosophies for golf course management are needed, as well as practical recommendations and guidelines on how to implement projects that establish or improve habitat for wildlife. Both Gillihan and Dodson provide positive contributions to that effort.

Bird Conservation on Golf Courses: A Design and Management Manual, written by Scott Gillihan of the Colorado Bird Observatory, is an excellent resource that translates conservation concepts into on-the-ground projects and strategies to benefit birds and other wildlife. I would highly recommend this book to managers and designers of golf courses, as well as anyone involved in planning, managing, or restoring wildlife values to human-modified landscapes. In addition to management practitioners, students of conservation biology will benefit from reviewing Gillihan's ability to transform concept into action.

Gillihan's book is easy to read and succinct, which I believe to be a critical formula for getting information into the hands of the primary target audience: golf course managers. Summaries at the end of each chapter give quick reviews of major points. Throughout the book, Gillihan uses straightforward terminology and suggestions and illustrations to clarify examples. The book begins with philosophical and pragmatic arguments as to why golf courses can and should integrate wildlife areas into planning and management programs. These arguments specifically target birds, but the principles and strategies

described can likewise benefit other wildlife. Chapter 2 categorizes birds into different guilds and describes basic biology such as habitat requirements. The concept of scale is introduced which sets the stage for explaining how and at what level management strategies can improve value of golf courses as habitat to birds.

Chapters 3 and 4 discuss how to implement conservation efforts at large (landscape) and small (habitat feature) scales in terms that a golf course superintendent or designer might encounter. Examples include planning the design of golf courses to maximize woodland interior, where to situate buildings and cart paths to avoid increasing edge or disturbance, and the importance of maintaining habitat patches and riparian corridors. Prioritization strategies are outlined for designating conservation areas that include principles of reserve and corridor design, but also include the role of adjacent lands and the concept of habitat rarity over the larger geographical area.

At smaller scales, differences between natural and artificial features are discussed, with an emphasis on natural features such as snags, waterways, and the importance of diversity in vertical structure. Strategies to implement habitat improvements, such as establishing planting programs, using native plants, and creating suitable littoral habitat are described. Artificial features, such as feeders and bird baths are not recommended as true conservation tools, although nest boxes are discussed and designs are provided for over 30 species and species groups. Perhaps the most interesting component in this chapter is the plan of action outlined for prioritizing habitat improvement projects that identify and target species in greatest need of conservation. To accomplish that, Gillihan provides breeding bird lists for 61 different regions of the United States and Canada (as designated by Partners in Flight), and provides habitat requirements and conservation status for each in a separate appendix. By cross-referencing between those lists, decisions may be made regarding which species are most in need of assistance and how to plan habitat improvements to benefit those species.

Chapters 5 and 6 discuss golf course management practices and dealing with problem birds, respectively. The reliance upon pesticides versus integrated pest management, maintenance of native grassland areas, and education of golfers as to the objectives and purpose of "poorly maintained" areas is discussed. Nonlethal mechanisms of managing problems with overabundant waterfowl, nest-defending raptors, and noisy woodpeckers are suggested. Chapter 7 highlights several species of special concern that golf courses are particularly suited to benefit through targeted management programs, and Chapter 8 briefly describes how golf course conservation efforts can also benefit bats and butterflies. The majority of this book, ~75% by page volume, is dedicated to reference information, including a short

glossary of commonly used terms, references used in compiling the book, a listing of key organizations (web sites included) for additional information, a list of North American plants and their benefits to birds, nest box dimensions for >30 species, and regional breeding bird lists with descriptions of habitat requirements and conservation status for each.

My criticisms of this book are minor. The book ends rather abruptly and would have benefited from a short summary chapter, possibly with some examples of success stories. Although I made only a cursory review, I found errors in the conservation status of Wood Stork (*Mycteria americana*) and Snail Kite (*Rostrhamus sociabilis*), both of which are on the federal endangered species list, but were not indicated as such in Appendix 5. These are small errors, however, and small errors invariably creep into all books. My overall impression is that Gillihan has produced an important contribution that I hope will be widely used to guide efforts to promote conservation for birds on golf courses as well as in other human-modified landscapes.

Managing Wildlife Habitat on Golf Courses, written by Ronald Dodson, current president of Audubon International, is directed primarily toward golf course managers or students of golf course management and much of the discussion is written from a golfing perspective. Although this book clearly targets golf course managers, many of the general concepts would be pertinent for classroom discussion on providing for wildlife habitat in urbanized areas.

I was somewhat disappointed in the organization and readability of this book. For example, excessive discussion sometimes obscured key points, which may reduce readability among the target audience. Also, most of the information in Chapters 3–5, which dealt with the history of golf, the history of the conservation movement, and basic biology of taxonomic groups, was superfluous to the primary objective of providing practical guidelines to creating and managing wildlife habitat on golf courses.

Information more pertinent to managing wildlife habitat was found in Chapters 6–12. Despite some redundancy, the author does a good job of describing conceptual needs of wildlife and ways to meet general wildlife habitat requirements in the context of an urbanized setting. Chapters 6–8 outlines concepts and strategies for enhancing habitat diversity on golf courses, which includes a discussion regarding benefits of native plants. Chapter 9 summarizes habitat components, both planted and structural (e.g. snags and nest boxes), that may be used to enhance habitat value.

Dodson describes six simple examples of habitat enhancement projects in detail (building a brush pile, creating butterfly gardens, erecting bird feeders and nest boxes, leaving snags, and planting aquatic vegetation). Although simplistic, these projects may be useful to golf course managers looking for quick projects to implement. I was disappointed that there was

not more attention provided to describing project strategies to increase habitat diversity and connectivity across the landscape, such as how to link areas in native vegetation, waterways, and so forth. More attention should have been paid to the need for shallow littoral zones as nursery areas for fish and foraging and nesting areas for water birds. Golf course superintendents also would benefit from advice on how to educate golfers as to the purpose of leaving areas in seminatural states through interpretive signage, as well as some cost-outlay and cost-savings estimates for incorporating wildlife areas on golf courses, but this book does not address those topics in any detail.

Chapter 11 provides perspectives on the game of golf and golf course management that illustrate the growing interest in balancing environmental stewardship with economic gain and entertainment value. Most importantly, this chapter discusses the responsibility that must be shared by golfers, golf course architects, course superintendents, professional golfers, and the media in changing how the public views golf courses and, subsequently, how golf courses should be managed. In many ways, I wish this chapter had been the introductory chapter for the book. Chapter 12 presents 14 testimonials of success stories and wildlife improvement efforts from golf courses throughout the United States. These examples illustrate how natural areas have been successfully incorporated into existing golf courses to benefit wildlife, and how those management efforts have reduced maintenance, chemical use, and operating costs.

These two books complement each other nicely. Gillihan's book is an excellent guide to the design and management of golf courses for the benefit of birds and other wildlife. Dodson's book is not as thorough as a guide to management, but provides more detail on philosophical arguments for environmental responsibility that may lend themselves to classroom discussion and provides examples of golf courses where environmental stewardship has been successfully incorporated.—MARTIN B. MAIN, *Department of Wildlife Ecology and Conservation, Southwest Florida Research and Education Center, University of Florida IFAS, 2686 State Road 29N, Immokalee, Florida 34142, USA. E-mail: mbma@gnv.ifas.ufl.edu*