

BOOK REVIEW

EDITED BY JEFFREY S. MARKS

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The Golden Eagle. By Jeff Watson. 1997. T. & A.D. Poyser, London, U.K. xx + 374 pp., 76 figures, 73 tables, 6 appendices, color frontispiece. ISBN 0-85661-099-2. Cloth, \$49.95.—This long-awaited volume from T. & A.D. Poyser originates in Scotland, where Golden Eagles (*Aquila chrysaetos*) have been studied for many years. In *The Golden Eagle*, Jeff Watson combines details of his own research on Golden Eagles in Scotland with information from studies of Golden Eagles and other *Aquila* eagles conducted throughout the world. Using this approach, Watson provides a comprehensive review of the ecology of the Golden Eagle and a general overview of the ecology of *Aquila* eagles. A tremendous amount of general and technical information is presented in the text and accompanying figures, tables and appendices; however, the book is relatively easy to read. Most chapters begin with an introductory statement and conclude with a brief summary. Each chapter is illustrated with beautiful black-and-white drawings by Keith Brockie and wash landscapes by Donald Watson. Two color plates, one by each artist, appear at the beginning of the book.

In his acknowledgments and opening chapter, Watson reflects on his experiences writing this book. As I read the book, I was struck with a great appreciation for how much work went into gathering, compiling and organizing the information for it; I think that readers will quickly gain a similar appreciation. Seton Gordon once said “I cannot imagine anyone studying the ways of the eagle without admiring the nobility of the bird.” Jeff Watson’s admiration, knowledge and enthusiasm for Golden Eagles come across loud and clear throughout the book.

Chapter 2 presents a review of field characteristics, reversed sexual size dimorphism, taxonomy and general ecology of Golden Eagles. The distribution of the Golden Eagle is reviewed in Chapter 3, and Watson introduces readers to the Scottish

Highlands in Chapter 4. Most of Watson’s work was conducted in the Scottish Highlands, an area rich in contemporary and historical Golden Eagle research and conservation. This chapter provides a good background for discussions of Watson’s research in Scotland through the rest of the book.

In Chapter 5, Watson describes the hunting behavior of Golden Eagles. This chapter is informative, despite the scarcity of studies on this subject. Descriptions of the food habits of Golden Eagles and other species of *Aquila* are presented in Chapter 6. The long-standing issue of Golden Eagles and livestock is discussed at the end this chapter. Chapter 7 focuses on nesting sites of Golden Eagles, including descriptions of nest structures, nest types, nest elevations, nest orientation, use of alternative nest sites and interactions with other species at nesting sites. I was surprised that interactions between nesting Gyrfalcons (*Falco rusticolus*) and Golden Eagles in western Canada (Platt 1989) were not mentioned in this chapter.

In Chapter 8, entitled “Ranging Behavior,” Watson describes home ranges and territories of Golden Eagles based primarily on observational studies from Europe and North America. A brief discussion on the ranging behavior of nonbreeding birds as determined using radiotelemetry is also presented. Watson also briefly discusses variation in home range size, competition with other species, communal roosting and ranging behavior of migratory *Aquila*. Chapter 9 begins with an overview of the mechanisms driving nest spacing and density of breeding birds. Using data from Scotland, Watson discusses the relationship between breeding densities and food supply. He also discusses winter densities of migratory Golden Eagles in North America.

Current population estimates and trends of Golden Eagle populations are addressed in Chapter 10. The strong point of this chapter is the review of the historical and current status of Golden Eagles in Europe. The weakest point is Watson’s North America population size estimate. Watson suggests that a total population estimate of 50,000

to 70,000 individual Golden Eagles in North America would "appear reasonable"; however, I would argue that insufficient data are available to make a continent-wide population estimate.

Chapter 11, entitled "The Pre-breeding Season" begins with a description of Golden Eagle behavior in winter, and continues with descriptions of territorial flights, nest building, courtship, mating and unusual mating systems. Chapter 11 concludes with a discussion on faithfulness to mates in Golden Eagles. Watson reminds readers that without empirical data, testing the assumption that Golden Eagles form lifelong pair bonds is difficult.

The breeding season is covered in Chapters 12 and 13. In Chapter 12, Watson describes Golden Eagle eggs and reviews nesting phenology, clutch size, replacement clutches, incubation period, behavior of adults during incubation and reasons why pairs fail to lay eggs. He also examines the relationship between latitude and median egg-laying dates. Watson states that "in the most northerly populations of Alaska and Siberia (65–70°N) laying does not commence until the first 10 days of May." This contradicts several published studies that documented mean laying dates for Golden Eagles in arctic Alaska and Canada from mid- to late April (Ritchie and Curatolo 1982, Poole and Bromley 1988, Young et al. 1995). In Chapter 13, Watson draws heavily on studies conducted in the western United States to describe activities associated with the nestling period. A review of the postfledgling period and time to independence is presented in Chapter 14. Few studies have focused on the behavior and activities of Golden Eagles from the time they leave the nest to the time they are recruited into the breeding population. Watson reviews the available information and is quick to point out that more study is needed to describe this portion of the Golden Eagle's life cycle.

In Chapter 15, Watson examines the factors that influence breeding performance of Golden Eagles, including food and weather. At the end of the chapter, Watson asks why Golden Eagles in North America typically breed more successfully than those in Scotland and includes an interesting analysis of the relationship between dietary breadth and reproductive performance. Based on an analysis using data from 24 studies, Watson suggests that breeding success is likely to be high when eagles can specialize on one or two types of prey in the "optimal size range." This is an interesting suggestion. Given the limitations of determining food

habits of Golden Eagles using prey remains collected at nests, however, more studies are needed before general conclusions regarding the dietary breadth of Golden Eagles can be made.

Patterns of molt and age-specific plumage characteristics are reviewed in Chapter 16. In Chapter 17, Watson discusses the movement and migration of Golden Eagles and other *Aquila* eagles using data collected through banding and telemetry studies in Europe and North America. Chapters 18 and 19 cover mortality and threats to Golden Eagles, respectively. In the first part of Chapter 18, Watson discusses the difficulty of estimating mortality rates of Golden Eagles using banding and marking studies. The major causes of Golden Eagle mortality are covered in detail in Chapter 18. The take-home message of this chapter is that most known Golden Eagle deaths in Europe and North America are attributable to humans. In Chapter 19, Watson lists the known threats to Golden Eagles including direct persecution by humans, unintentional human disturbance, pesticides and pollutants, power poles and land-use changes. Watson also describes the effects of large-scale afforestation of the Golden Eagle population in Scotland and the relationship between Golden Eagles and grazing animals. The last part of the chapter will be interesting to anyone managing lands where grazing animals and Golden Eagles interact.

Chapter 20, entitled "Conservation," is a good follow-up to the previous chapter. Watson addresses the various management and educational tools used for countering the threats outlined in Chapter 19. In Chapter 21, Watson draws on information from Europe, North America and central Asia to describe relationships between Golden Eagles and humans and to describe how these relationships have changed over time. Historically, Golden Eagles held high status in all three geographic areas. With the introduction of firearms, however, many eagles in Europe and North America were persecuted. Watson ends this chapter on a positive note and hopes that "some of the empathy for the natural world which was implicit in so many traditional societies, will be rekindled and embraced again by people in the so-called 'developed world.'"

In the closing chapter, Watson provides "food for thought" and makes recommendations for future Golden Eagle research. These recommendations include learning more about the distribution of Golden Eagles in the eastern Palearctic and re-

mote areas of northern North America and describing ranging behavior of nonbreeding and migratory Golden Eagles. In closing, Watson stresses the need to understand how land-use changes affect Golden Eagle populations. This is a worldwide concern that should be addressed sooner rather than later.

The 22 Chapters are followed by six appendices that provide additional information on the distribution and ecology of the genus *Aquila*, the Scottish Highland landscape, calculating dietary breadth, assessing food supply, calculating nearest-neighbor distances and densities and the scientific names of plants and animals mentioned in the book.

Overall, I enjoyed the book very much. The illustrations by Donald Watson (Jeff Watson's father) and Keith Brockie are superb. *The Golden Eagle* contains an enormous amount of technical and general information. At times, however, I felt that Watson tried to cover too much territory, that some of his statements were too general and that some of his statistical analyses were based on insufficient data to draw conclusions. Despite these minor

shortcomings, *The Golden Eagle* contains a wealth of information on Golden Eagle ecology, and I highly recommend it to anyone interested in raptors. Raptor bibliophiles will want this book for their libraries, and the book also is a must for public and university libraries.—**Carol L. McIntyre, National Park Service, P.O. Box 74680, Fairbanks, AK 99707 U.S.A. and Department of Fisheries and Wildlife, 104 Nash Hall, Oregon State University, Corvallis, OR 97331 U.S.A.**

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