

Solari-Storni) and in English (pp. 125–133, by Verena Keller) precede the species accounts.

The species accounts occupy pages 135–541. For each species, the 1992–1996 atlas occupies two opposite-facing pages. At the left hand-corner of the left page figures the species name, in German, French, Latin, Italian, Romansch, and English. The left page includes one or two maps. The top map illustrates by means of contours the relative density of occupation of quadrats, on a scale varying from 0.05 (pale yellow) to 10 (red) (as for the Wood Pigeon [*Columba palumbus*]), or the actual observation sites (red dots) (as for the European Nightjar [*Caprimulgus europaeus*]). In some cases of rare or very localized species (for example the Black-necked Grebe [*Podiceps nigricollis*] or the White-backed Woodpecker [*Dendrocopos leucotos*]) the top map is lacking, because no contour map of their density can be drawn on the basis of just a few distribution sites. The bottom map shows the actual distribution per quadrat. Comparisons between the data from the 1972–1976 atlas and the present are easy to make, because the quadrats occupied by a given species in the earlier atlas are indicated by stippling, whereas those in 1993–1996 are in green. Overlapping and nonoverlapping quadrats can therefore be spotted at one glance. Below the map of quadrats is a summary table indicating number and percentage of quadrats occupied by a given species in the two atlases, and the plus or minus trends between the two mapping periods. The right page is occupied by the text (in two columns, with German on the left and French on the right). To the left of the text are several graphs and a map. The top graph shows percentage of square kilometers occupied by that species in number of quadrats in which it was censused. For the more common species (the majority), a parallel bar graph indicates percentage of the population in given quadrats, and an additional double bar graph below shows the territories per 100 km<sup>2</sup> in the areas, respectively, north and south of the Alps. Finally a map of Switzerland indicates frequency of regional atlases in percent. At the bottom of the page is a summary text in Italian and in English and a photograph of the species. The texts are signed by one or more of the nearly 120 authors who wrote them.

The atlas ends with an appendix (pp. 542–547, by Bernard Volet) discussing the five species that bred outside the political limits of the atlas, the four species that were observed within the atlas area but without proof of their breeding there, the six species escaped from captivity that bred within the atlas area, and the five species that bred at least once since 1977, but not during the period of the 1993–1996 atlas. That section is followed by a list of the collaborators of the project, a bibliography of 674 entries (pp. 555–567), and indexes of vernacular bird species names (in German, French, Italian, Romansch, and English) and of scientific names. The atlas endpapers are topographic maps of Switzerland at a scale of 1:800,000.

Having witnessed ornithological developments in Switzerland since the mid-1950s, I can state unequivocally that the *Schweizer Brutvogelatlas* is the crowning glory of a series of remarkable books on the avifauna of that country, starting with Glutz's *Die Brutvögel der Schweiz* in 1962, and continuing with the 1980 *Verbreitungsatlas der Brutvögel der Schweiz*. I am certain that my colleagues at the Swiss Ornithological Institute in Sempach will not rest on this achievement, however, and so I look forward to a third Swiss breeding bird atlas in a few years. Given the long-term involvement of the Institute, I am happy to report that the 1993–1996 atlas was dedicated to Alfred Schifferli. That is a fitting tribute to one of the Institute's former long-time directors, who was the initiator of the atlas project in 1972–1976, and thus is also ultimately responsible for the book reviewed here. I would like to mention two other publications that readers with an interest in the birds of Switzerland, central Europe, and the Western Palearctic in general, will consult with profit together with *Schweizer Brutvogel Atlas 1993–1996*, namely Rafael Winkler's *Avifaune de Suisse* (Nos Oiseaux supplement 3, 1999:1–254), and Bernard Volet, Hans Schmid, and Raffael Winkler's *Checklist of the Birds of Switzerland* (Swiss Ornithological Institute, 2000:1–16), which summarizes Winkler's earlier detailed annotated checklist.—FRANÇOIS VUILLEUMIER, *American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024, USA. E-mail vuill@amnh.org*

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**Avian Research at the Savannah River Site: A Model for Integrating Basic Research and Long-term Management.**—John D. Dunning, Jr., and John C. Kilgo, Eds. 2000. *Studies in Avian Biology* no. 21, Cooper Ornithological Society. vi + 170 pp, preface, plus 19 contributed papers, numerous tables and figures. ISBN 1-891276-21-4. Paper, \$20.00.—A group of esteemed ecologists recently forwarded the idea that besides high-quality research and published results, good science should include informing the general public of the relevance and importance of the work (Bazzaz et al. 1998). Globally, biologists have a stake in maintaining biodiversity and evolutionary options (Sheail 2000, Ehrlich 2001), but ecological research is increasingly being conducted on lands modified by humans and occurring in wholly altered landscapes, thus the application of our research has regional and local relevance (Dale et al. 2000, Theobald et al. 2000). Many natural reserves are inade-

quately inventoried, monitored, and protected, and often little rigorous ecological knowledge is available to inform management decisions. Thus, in addition to our potential ethical responsibilities, we have a purely selfish reason to apply research to management; so much of our research depends on protection of the natural systems within reserves. Integrating research into resource management may be more difficult than it appears and relatively few prescriptions have been provided for developing successful collaborations. This monograph is an excellent collection of examples and prescriptions for such interaction.

This book is the proceedings of a workshop held at the Savannah River Site in 1996. For those of you unfamiliar with the Savannah River Site, it is a 78,000 ha U.S. Department of Energy facility in western South Carolina whose primary mission is production of nuclear weapon material. Its mission also includes natural resources management which has evolved from reforestation of abandoned farmland to sustainable management, restoration, and stewardship. The goal of the workshop was to provide an overview of the avian research conducted on site, examples of how research has influenced management and vice versa, and specific recommendations for enhancing research-management collaborations and integration of ecological data into specific management actions. In an introduction, the editors discuss the varied sources of conflicts between researchers and managers and potential resolutions. Both groups value long-term research, but for different reasons, and the subsequent papers make an effort to address both perspectives.

The papers are organized into three sections. The first section provides a historical perspective to the Savannah River Site and its history of research and management. The first chapter provides an overview of the site itself including a physical site description and a history of land use from presettlement to present. That includes an important perspective that should be retained throughout the rest of the book; at the time of acquisition by U.S. Department of Energy, the site was a mosaic of abandoned farmland and cut-over forests that differed dramatically from the presettlement landscape. The second half of this chapter illustrates the transformation of the site into a managed natural landscape. Early avian research at Savannah River Site was focused on developing inventories, and that work was followed by more specific single-species studies and then work on the distribution and abundance of species relative to habitats and landscape characteristics. Another chapter provides a history of past avian research and suggestions about future research. The last chapter in this section examines historical changes in the distribution and abundance of three upland *Ammodramus* sparrows in South Carolina. Although this paper is interesting in its own right, the authors make

little attempt to integrate their findings into the specific challenges of research and management at Savannah River Site.

The second section is a collection of summaries of long-term avian research conducted on site. As with many proceedings, relevance of individual papers to the overall goal varies, but some papers provide useful insights into integration of research and management; others provide relatively little. Many papers emphasize the need for long-term research and adaptive management that can respond to research findings. They also explore potential value of long-term monitoring; historical data can be used to test hypotheses about current observations. Most papers in this section are by researchers and thus might be useful for managers seeking to understand their perspective. For example, Bryan and his coauthors describe research on Wood Storks (*Mycteria americana*), some of which was conducted off-site because the appropriate conditions did not exist on Savannah River Site, emphasizing the point that local management needs may depend on biological data collected at multiple spatial scales. Several papers then deal with avian ecology at the landscape scale and how development of predictive bird-habitat models can influence management and how management needs provide novel hypotheses to test those models. Because much of the research at Savannah River Site has been motivated by management needs, it is quite possible that some species fall between the cracks. But the status of Savannah River Site as a national environmental research park should include "a more proactive attempt at comprehensive long-term monitoring of the avifauna" and McCallum and coauthors provide a review of which species have been well studied and which have not.

Perhaps of most use to both managers and researchers is the final section which presents a variety of conceptual approaches to merging research and management needs. Those papers discuss different characteristics, attitudes, and motivations of researchers and managers and also their common goals. Moorman suggests that adaptive resource management, in which management actions are treated as large-scale scientific experiments, is the best approach to integrating research and management. Research at that scale may have some constraints, such as lack of randomization and true replication and cost and logistics of field work. Although inductive statistics may be hampered by such research designs, deductive results can be applied to management and may lead to inductive experimental designs that can be conducted at smaller scales (Okasanen 2001). Several papers also mention the need for academia to reward publication in manager-oriented publications. As in the previous section, some papers admirably achieve their goal, but others seem more like self-serving appeals illustrating how Savannah River Site is ideal for their partic-

ular research interest without really illustrating how that perspective might aid management.

Although most of us conduct our research in smaller areas, without the resources or broad management perspective of Savannah River Site, this collection of papers aptly illustrates the difficulties of successfully integrating research and management. Blake and LeMaster provide an educational review of the history of identifying management information and research needs, designing research with both credible and useful results, and translating those results into land management decisions at the Savannah River site. Having worked on public lands for years, I can only admire the process they developed, the research that has resulted, and the management that has occurred. This book deserves to be carefully read by everyone whose research depends on the continued management of their research site and by every manager. Ecologists struggling with the dichotomy between "basic" and "applied" ecology can find heart in the rigorous research opportunities that exist within an applied framework.—REED BOWMAN, *Archbold Biological Station, P.O. Box 2057, Lake Placid, Florida 33862-2057, USA. E-mail: rbowman@archbold-station.org*

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- + 852 pp. ISBN 84-87334-28-8. Cloth, \$115 (launch price \$95.00).
- This is an encyclopedic work—3.5 kg, large pages, very small print, 2,300 references, six forewords (two of them royal), and 1,000 contributors. No other book covers this subject as exhaustively, and this work thus becomes the standard reference on threatened birds worldwide. As such, it should be in every library and may be an excellent purchase for many individuals, at both the lay and professional levels, if they are interested in bird conservation and will not become morbidly depressed by the magnitude of the problem described. A short introductory chapter lays out the nature of bird extinction—over 12% (1,186) of all birds globally threatened, 99% by human activities, and a real prospect of 500 species declining to extinction by 2100. A world map shows the distribution of the threat, with Brazil and Indonesia sharing the lead with 114 threatened species each (the United States is in tenth place, with 53). A series of histograms shows the distribution among habitats (75% of those species depend on forests). Another set of histograms shows the threats (the main three, by far, are habitat loss or degradation, exploitation, and invasive species). For habitat loss, it is not surprising that various kinds of logging and agriculture are the dominant problems, but it may surprise readers to learn the scope of the threat posed by exploitation. For instance, 233 birds are affected by hunting for food and 111 by trapping for the cage trade. Among introduced species, predators (especially on islands) are well-known threats, affecting 298 species. It is not as well known that ~70 birds are threatened by introduced plants and another 70 by introduced herbivores. In other words, the threats of introduced species and habitat destruction are often similar.

The heart of the book is a half-page for each of the 1,186 threatened species plus three conservation-dependent species, complete with range map and small but accurate and vividly colored picture. Each account gives identification features, range and population data, trends, basic ecology, threats, conservation activities and plans, short-term targets, and (for most species) references. Over 700 species at lower risk each receive shorter treatment, minus map and illustration, as do 128 species extinct since 1500. In the final section, all those species are again listed, this time by nation, and tabulated with respect to threat category. The species accounts are prefaced by one chapter on how degree of threat is established and another on how to use the book. The latter is important, because the editors have managed to include a huge amount of information by using a plethora of symbols and conventions that will be mysterious without explanation.

In spite of the dire situation, this book relentlessly projects an air of optimism, arguing convincingly that, if humankind wants to save these species, they can all be saved. A short early chapter details the

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