

Biology of Marine Birds

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All published references are presented in superscript form in the text and the reader has to first check the reference number against a table of the references arranged in the order of use in the book and only then turn to the conventional list of references that give the full details. That system makes it easier for the casual reader to jump the long lists of numbers but difficult and irritating for those looking for additional reading.

Additional information not included in the species accounts can be found in the two appendices at the end of the book. The first appendix attempts to pinpoint what needs to be studied further to clarify our understanding of the taxonomical relationships of the species included in the book. Appendix 2 presents the comparative characters for the species and ranges from topics such as morphology (osteology, general, potential signal areas) to biochemical to behavior (general, courtship, breeding, vocals, foraging), and includes additional information such as parasites (blood, ecto-, endo-). The book ends with a species index that does not include subspecies.

In general, even though I have been critical about some points in the book, I consider this to be a commendable achievement. This book will serve both communities well, and the casual reader will want it with them on field trips—especially to the Old World—to help identify and understand this complex genera, and to help present the professional ornithologist with the major portion of research conducted to date in a concise manner and to suggest what to do in future studies. This can be especially instructive to advisors of graduate students looking for a research topic. I highly recommend this book and found it to be very well presented, pleasing to the eye, high quality, and informative and it does justice to a great and intriguing group of birds.—REUVEN YOSEF, *International Birding and Research Centre in Eilat, P.O. Box 774, Eilat 88000, Israel. E-mail: ryosef@eilatcity.co.il*

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Biology of Marine Birds.—E. A. Schreiber and J. Burger, Eds. 2002. CRC Press, Boca Raton, Florida. xxii + 722 pp. ISBN 0-8493-9882-7. \$79.95.—A text devoted to the biology and ecology of marine birds has not been published in the last 15 years. Although a number of more taxa-specific texts have been produced during that period, there has not been a single publication that attempted to review our knowledge of all the major seabird orders since the works of Nelson (1979), Croxall (1987), and Furness and Monaghan (1987). Following the publication of those works, a large and impressive body of literature has been produced. Given the rapid expansion of the field in the last two decades, the time was ripe for production of an extensive compendium on the biology, ecology, and conservation of the world's seabirds.

E. A. Schreiber and J. Burger are editors of this CRC publication, *Biology of Marine Birds*. The book consists of 19 chapters that vary in length from 15 to 51 pages. There are also two extensive appendices: (1) a list of seabird species (restricted to the orders Sphenisciformes, Procellariiformes, Pelecaniformes, and Charadriiformes, the latter limited to Stercorariidae, Laridae, Rhynchopidae, and Alcidae) and their IUCN status, and (2) a very useful table of species-specific life-history traits. The 19 chapters were prepared by 26 authors, among them some of the most respected and published seabird scientists in the world. A brief preface introduces the book, its objective (to provide an examination and summary of the research on seabirds), its audience (researchers, conservationists, managers, and policy-makers), and the taxa covered. The editors coauthored the introductory chapter, *Seabirds in the Marine Environment*. The authors describe distinctive characteristics of seabird life-histories in comparison to other taxa, hypotheses for why those lifestyles evolved and the potential role of energy limitation in the evolution of seabird life-histories. Along with a discussion of other common seabird traits, such as a propensity for colonial breeding, the authors also suggest directions for future research in seabird ecology.

Chapters 2–19 cover a wide array of topics and, for the purpose of this review, have been organized into the following subject groupings: systematics and taxonomy (chapters 2 and 3), breeding and foraging ecology (chapters 4–10), physiology and energetics (chapters 11–14), environment and conservation (chapters 15–17), and ecology of shorebirds and wading birds in the marine environment (chapters 18–19). For each chapter we provide an abbreviated title and author list.

Chapters 2 (“Fossil Record”, by K. Warheit) and 3

("Systematics and Distribution", by M. de L. Brooke) provide the taxonomic foundation for this book by reviewing the fossil record and current systematics of seabirds. Chapter 2 reviews the seabird fossil record and also demonstrates the relevance of those data to contemporary studies of seabird ecology, evolution, and community structure. For example, Warheit describes how the current composition of seabird communities off South Africa and in the north Pacific reflect continental drift and sea-level changes, and how those events are chronicled in the seabird fossil record. Although this chapter does not include a discussion of when and where certain key seabird traits evolved (e.g. flightlessness or wing-propelled diving), it provides the reader with a strong foundation in seabird paleontology. Warheit also includes a meticulously researched appendix to this chapter where 369 fossil taxa are listed with temporal, spatial, and bibliographic information. Warheit's discussion of the seabird fossil record prepares the reader for the following chapter, by M. de L. Brooke, which reviews current seabird systematics. Brooke describes the four orders considered by most to constitute the seabirds and discusses some of the taxonomic relationships that are being reconsidered due to advances in molecular genetic techniques. The author succinctly contrasts the anatomical and molecular-based classification schemes without becoming tangled in taxonomic details that lie outside the scope of the chapter. This chapter also includes a useful discussion of the defining features and distribution of each seabird family, although in some cases photographs are relied upon to portray anatomical features that illustrations might have communicated more effectively.

Chapters 4–10 review topics related to seabird breeding biology, demography, and foraging ecology, with most of this section devoted to the former subject. These chapters represent the bulk of research on seabirds over the past three decades, and their content includes discussions of some of the attributes that make seabirds so interesting (e.g. colonial breeding, long-range foraging, low annual productivity). Many of the issues covered in these chapters can be traced back to some of the original, classic hypotheses developed during the earliest stages of research into seabird ecology (e.g. Ashmole 1963, Lack 1967).

Chapter 4 ("Colonial Breeding", by J.C. Coulson) provides a lengthy review of colony structure and function in seabirds. Given that ~95% of seabirds are colonial (a short-list of those species considered noncolonial should have been included), this topic deserves considerable attention. Approximately one-third of the chapter is dedicated to a discussion of theories and functions of colonial breeding, including classic theories of colony function (e.g. predator defense, Wynne-Edwards' [1986] concept of population self-regulation, and the information-center hypothesis) and four recent hypotheses of colony function

proposed by Richner and Heeb (1996; group foraging) and Danchin and Wagner (1997; quality separation, sexual selection, and commodity selection). A substantial portion of the chapter is devoted to Coulson's discussion of 16 characteristics of colonial seabirds and seabird colonies. Many interesting speculations surface in this section, which is enhanced by examples from other taxonomic classes and avian orders.

Chapter 5 ("Demography", by H. Weimerskirch) reviews the unique demographic aspects of seabirds and discusses relationships among demographic parameters at the order, family, and species level. Weimerskirch uses principal component analyses to examine seabird life-history data. Those analyses illustrate how seabird orders and families group together in relation to life-history attributes such as fecundity and life expectancy, and highlight potential directions for further investigation. This chapter illustrates the importance of demographic studies to seabird ecology. The discussion on the relationship between seabird demography and the marine environment, however, would have benefited from the use of examples where seabird demographic responses have been measured alongside independent measures of prey availability.

The following chapter ("Foraging Behavior and Food", by D. A. Shealer) is well placed in the text to continue the discussion initiated in Chapter 5, given that the demographics of seabird populations are driven to a large extent by the ephemeral nature of the food supply and associated foraging strategies. Shealer reviews the current state of knowledge of seabird foraging behavior and food resources and discusses some of the morphological adaptations of seabirds that enhance their ability to forage in the marine environment. The author dedicates the majority of the chapter to a review of seabird foraging behaviors (e.g. daily patterns of foraging, olfaction, commensal foraging) and to a synthesis of the major prey items constituting seabird diets. Although already quite broad in its coverage, this chapter would have benefited from at least a brief overview of predictions from optimal foraging theory and its relationship to seabird foraging ecology. Also, there was little discussion of foraging via pursuit-diving in seabirds, although that topic might arguably be deserving of its own chapter given the wealth of research on the subject.

Chapter 7 ("Climate and Weather Effects", by E. A. Schreiber) examines how seabird populations are affected by climate and weather events that occur across a range of temporal scales from days to years. Both direct and indirect effects of climatic events on seabirds are considered, including issues related to thermoregulation, flight dynamics, and prey availability. Schreiber examines how those factors ultimately affect seabird population dynamics, often via changes in rates of annual productivity. Schreiber describes what has been learned about seabird ecol-

ogy in relation to El Niño southern oscillation (ENSO) events. The author drew on years of experience studying those relationships in the tropical Pacific to impart a keen insight into how such events may have shaped some of the early theories of and investigations into seabird breeding biology, especially in the tropics. In fact, this section provides an excellent review of the ENSO phenomena for any reader, whether concerned about seabird ecology specifically or ENSO events in general. Other longer-term climactic events, such as the Pacific decadal oscillation and global warming, were not discussed despite their potential and, in some cases, known effects on seabird populations.

Chapter 8 ("Breeding Biology and Life Histories", by K. C. Hamer, E. A. Schreiber, and J. Burger) begins by reviewing life-history traits of seabirds and by clarifying the often-confused terms "life-history traits" (characteristics that are influenced at the evolutionary scale) and "life-table variables" (indices of individual performance). A discussion of the influences of age, weather, and food availability on the timing of breeding follows, although the discussion of effects of food availability merits more attention than is given. The core of this chapter consists of an excellent and thorough discussion of seabird breeding biology and life histories. This section, which is one of the strongest in the entire book, includes discussions of the evolution of nestling obesity, the relationship between latitude and chick-rearing period, the importance of stomach oil production in the Procellariiformes, and the variation in chick attendance among species. This section includes many thoughtful hypotheses that are backed up by clearly illustrated tables and figures.

Chapter 9 ("Site and Mate Choice", by J. Bried and P. Jouventin) provides a well-referenced discussion of site and mate choice that concentrates on the relationship between seabird reproductive constraints and the degree of mate fidelity from an evolutionary point of view. The chapter begins by reviewing classic site- and mate-choice theories and progresses to a discussion of the constraints on site and mate selection of low clutch size, extended parental care, high juvenile mortality, and breeding latitude. Unfortunately, the discussion of habitat selection in reference to breeding site choice was relatively brief and merely touched upon the relationship between nest-site location and its proximity to key food resources. One of the strengths of this chapter was the discussion of mate-selection theory, which reviewed some of the costs of mate selectivity and included a review of current theories examining mate choice on the basis of physical characteristics (e.g. body condition), time of arrival, and territory quality. This chapter also included an extensive table that compiled information on nest-site fidelity, mate fidelity, survival, average life expectancy, and body mass for 93 seabird species.

Colonial nesting marine birds have always provided an outstanding opportunity for biologists

to examine the roles and complexity of visual and auditory displays during courtship, mating, and chick-rearing. J. B. Nelson and P. H. Baird present the reader with a wealth of examples on those topics in chapter 10 ("Communication and Displays"). The chapter is organized into four primary sections based on the four major seabird orders. Each section covers basic breeding biology, territorial behavior, pair relationships, incubation and chick-rearing, and behavior outside the breeding season. The authors also discuss a wide-range of visual displays and provide written and illustrative descriptions of those, although little attention is given to vocal or olfactory communication. Although the illustrations greatly aid the reader in understanding those displays, the publishers could have supplemented the text via the web or a CD with a collection of images, sounds, or even short video clips exemplifying seabird communication and display.

The following three chapters (chapters 11–14) provide a review of the major physiological and energetic features of seabird ecology. Over the past three decades, research on the physiology and energetics of seabirds has grown considerably and has provided a great deal of insight, not only into seabird ecology, but also into the broader fields of avian physiological ecology and environmental physiology. The study of seabird energetics provides an opportunity to understand the mechanisms and constraints underlying seabird life history and demography and, although not stated explicitly in the text, the material presented in those four chapters clearly makes that point.

Chapter 11 ("Energetics", by H. I. Ellis and G. W. Gabrielsen) thoroughly reviews the biology of adult seabird basal and field metabolic rates (BMR and FMR, respectively) as well as ecological correlates of both. This well-referenced chapter includes extensive data tables that compare BMR measures in 77 seabird species and FMR measures in 37 species. Each of the comparisons leads to a new allometric equation relating metabolic rate to body mass. The authors also provide useful reviews and critiques of measurement techniques for both BMR and FMR. Ellis and Gabrielsen also discuss central issues related to seabird thermoregulation, which they summarize in an extensive table reviewing thermal conductance in 35 seabird species. The authors use those data to produce a new allometric equation relating conductance to body mass. The new allometric equations presented by the authors advance our understanding of seabird energetics in important ways and enhance our ability to predict energetics and conductance. The chapter would have benefited, however, from the addition of figures that illustrated those allometric relationships and from more discussion of the ecological (as opposed to physiological) relevance of those attributes.

Whereas chapter 11 focuses on adult seabirds, the emphasis of chapter 12 ("Reproductive Physiology", by G. C. Whittow) is its coverage of incubation and

embryonic physiology. The author discusses the reproductive physiology of breeding adults, describes the process of egg formation, and briefly touches upon adult hormone changes associated with incubation. A review of egg formation and the energetics of incubation follow, although differences in incubation strategies among taxa are not discussed. The author also provides an overview of embryonic development, which provides a good transition to the following chapter ("Chick Growth and Development", by G. H. Visser). In chapter 13, Visser focuses on growth patterns and energetics of young seabirds and methods for measuring energy budgets. This clear and well-written chapter begins with a discussion of interorder, interspecific, and intraspecific variation in growth-rate parameters, with emphasis on deviations from the seabird norm. That approach allowed for clear comparisons among taxa and for easy identification of species that were most different from the norm. A major emphasis of the chapter is the energetics of chick growth. Important components of chick energy budgets are summarized, including a brief review of available data on assimilation efficiencies in seabird chicks, and a detailed overview of methods used to measure energy budgets in developing chicks. Visser also presents detailed methodology for four techniques used to measure energy budgets: periodic chick weighing, time-energy budgets, water influx rates, and the doubly labeled water method. The author draws particular attention to fractionation effects on the accuracy of the doubly labeled water method and rightfully argues for a set of standardized assumptions to be used when calculating energy expenditure rates using that method. The chapter concludes with a novel comparative analysis of energy budgets for seabird family units.

Chapter 14 ("Water and Salt Balance", by D. L. Goldstein) is, with the exception of chapter 1, the shortest of the book. It begins with a discussion of the avenues of input and output for water and salt in marine birds, including a summary of recent work on renal form and function in marine birds, much of which the author has been involved with. The section on salt (nasal) glands is brief, seemingly too brief for a group of birds that have taken that adaptation to its pinnacle. The section on inter- and intraspecific variation in seabird osmoregulation is thin, mostly because recent research in that area has been limited, but some studies were missed. This chapter would have benefited from illustrations of some of the anatomical features discussed in the text. The role of osmoregulation as a constraint on seabird reproductive behavior and ecology presents opportunities for new and interesting avenues of investigation.

Chapters 15–17 focus on management and conservation issues pertaining to seabirds. The editors included chapters covering effects of extrinsic chemicals and pollutants on seabirds (chapter 15), interactions

between seabirds and fisheries (chapter 16), and seabird conservation issues (chapter 17). Although this list does not cover all of the pertinent conservation issues (e.g. predation and competition from invasive species could warrant a chapter all its own), it does provide the reader with a substantive review of some of the most important conservation and management issues facing seabird biologists.

Chapter 15 ("Chemicals and Pollution", by J. Burger and M. Gochfeld) draws on the authors' many years of research experience on effects of marine pollutants on birds to develop a discussion of the various major pollutants (metals, organochlorine compounds, petroleum products, and plastics). Burger and Gochfeld provide a thorough discussion of the utility and limitations of using seabirds as bioindicators of pollutants. Differences in vulnerability of seabirds as related to trophic feeding level, age, gender, and taxa are reviewed, although that discussion is limited to differences in documented contaminant levels within each of those aforementioned groups, rather than mechanisms underlying those differences. The authors include contaminant-specific reviews for cadmium, lead, mercury, and selenium, and also provide case studies of their research into effects of lead exposure on seabirds. Treatment of organochlorine compounds focuses on pesticides and PCBs. Petroleum products and oil spills are only briefly covered relative to the magnitude of their effect on seabird populations. Biomarkers of pollution, particularly induction of mixed-function oxidases and their uses and limitations, are not discussed. The chapter does well, however, at emphasizing the relationship between sublethal toxicity at the individual level and effects on reproduction and population dynamics.

Another important anthropogenic factor affecting seabird populations is the interaction between seabirds and fisheries. W. A. Montevecchi reviews that topic in chapter 16 ("Fisheries Interactions"). The introduction describes both current and historic interactions between seabirds and fisheries. Montevecchi then discusses both positive and negative influences of fisheries on marine birds, as well as effects of seabirds on fisheries. Emphasis is placed on differentiating potential effects of fisheries on adult survival from those on reproduction. This chapter provides excellent examples of direct effects of fisheries on seabirds (e.g. gear entrapment), as well as examples of indirect effects of fisheries on seabirds (e.g. ecological repercussions of prey depletion). Although the author discusses sources of adult mortality related to fisheries and provides suggestions for management and mitigation, there is no discussion of the methods used to assess mortality estimates or other fishery-seabird interactions. The author's review of the positive effects of fisheries on seabirds highlights the ecological interactions between fishery activities and the marine food web, and demonstrates the difficulty in catego-

rizing an interaction as positive or negative for all seabirds. The author offers valuable suggestions for management, such as using consumer pressure and economic incentives as means to promote ecologically responsible fishing practices.

Chapter 17 ("Conservation", by P. D. Boersma, J. A. Clark, and N. Hillgarth) briefly reviews conservation issues for seabirds, with special attention to effects of habitat modification, introduced species, human harvest, and human disturbance. Other threats to seabirds, such as pollution and fisheries interactions, are covered in their own chapters, but mentioned here as well. The chapter provides an overview of the degree of legal protection afforded to marine birds as well as a discussion of progress that has been made in the arena of seabird conservation. Although this chapter presents a succinct review of conservation issues, including case studies that highlight both successes and ongoing challenges in seabird conservation would have enhanced it. A notable omission from this chapter was the lack of discussion pertaining to global warming and its current and potential effect on seabird populations, especially at high latitudes. The authors refer the reader to chapter 7 for a discussion of climate change, but nowhere in the book are the conservation implications of global warming fully discussed.

Chapters 18 ("Shorebirds in the Marine Environment", by N. Warnock, C. Elphick, and M. A. Rubega) and 19 ("Wading Birds in the Marine Environment", by P. C. Frederick) broadened the scope of this text by including reviews of taxa that are not typically considered marine birds but that may spend substantial portions of the annual cycle in marine environments. The shorebird chapter provided a brief review of shorebird biology before focusing on shorebird use of coastal habitats and influences of tides and climate on ecology, with particular emphasis on foraging behavior. This chapter also included brief sections on phalarope ecology, shorebird migration in the marine environment, and conservation issues. Similarly, chapter 19 reviewed wading-bird biology as it relates to the marine environment. Frederick provided the reader with an extensive overview of the current state of knowledge of marine waders, emphasizing wading-bird reproductive and behavioral ecology. This chapter thoroughly reviewed the broad range of foraging strategies employed by waders in marine environments, as well as foraging constraints and prey. As in the previous chapter, the author also provided an overview of conservation issues related to waders in the marine environment.

Biology of Marine Birds fills a vacant niche for those seeking a current review of seabird biology and ecology. The 19 chapters cover a wide array of topics, although a noticeable inconsistency within the book is the breadth and depth of each chapter. For example, some chapters are quite lengthy and

provide in-depth reviews of the material as well as new analyses, whereas others provide only a brief overview of the focal topic. Most chapters do, however, provide the reader with a substantive review of prior research and suggestions for future research. Furthermore, although the book covered a wide array of topics, we felt that certain areas deserved greater attention. Those include, but are not limited to predation, disease, and parasites at colonies; behavior and physiology of pursuit-diving; nutritional ecology; genetics and population structure; ecology during the nonbreeding season, including migration behavior; decadal-scale shifts in marine trophic structure; and global warming. The inclusion of the shorebird and wading-bird chapters increased the scope of the text, but the omission of sections on other marine-dependent species such as sea ducks, loons, and grebes was notable.

We found few editorial problems throughout the text, with the exception of numerous errors in many of the literature-cited sections (i.e. citation appearing in the text but not the references list, and vice versa). Most chapters made good use of tables and figures, although specific chapters (e.g. "Fossil Record", "Foraging Behavior", "Site and Mate Choice", "Energetics", and "Chick Growth and Development") provided extensive summary tables that should prove very useful to seabird biologists whereas illustrations were especially valuable and well placed in other chapters (e.g. "Communication and Display", "Chemicals and Pollution", and "Interactions with Fisheries"). Overall, we believe the editors and authors should be complimented for producing a timely and very useful volume that deserves to find a home on the shelves of those interested in research, management, and biology of marine birds the world over.—PATRICK G. R. JODICE, *U.S. Geological Survey, South Carolina Cooperative Fish and Wildlife Research Unit, Clemson University, Clemson, South Carolina 29634, USA. E-mail: pjodice@clemson.edu.* DANIEL D. ROBY, *U.S. Geological Survey, Oregon Cooperative Fish and Wildlife Research Unit, Oregon State University, Corvallis, Oregon 97331, USA.* MICHELLE ANTOLOS, DONALD E. LYONS, DANIEL J. RIZZOLO, SADIE K. WRIGHT, CYNTHIA D. ANDERSON, SCOTT K. ANDERSON, S. KIM NELSON, AND ADRIAN E. GALL, *Department of Fisheries and Wildlife, Oregon State University, Corvallis, Oregon 97331, USA.* LIV WENNERBERG, *U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Corvallis, Oregon 97331, USA.*

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The UK SPA network: Its Scope and Content.—

D. A. Stroud, D. Chambers, S. Cook, N. Buxton, B. Fraser, P. Clement, P. Lewis, I. McLean, H. Baker, and S. Whitehead, Eds. 2001. Joint Nature Conservation Committee. Peterborough, United Kingdom. Volume 1: Rationale for the Selection of Sites, xiii + 90 pp. ISBN 1-86107-529-4. Volume 2: Species Accounts, vii + 438 pp. ISBN 1-86107-530-8. Volume 3: Site Accounts, vi + 391 pp. ISBN 1-86107-531-6. Paper.—This three volume set was published to meet the obligations of the United Kingdom to identify a network of Special Protection Areas (SPAs) as specified by the European Union's directive on the conservation of wild birds issued in 1979. That directive provides for the establishment of an international network of protected areas for a defined set of rare or vulnerable bird species and for regularly occurring migratory species, with special emphasis on wetlands. The current volumes represent a major revision of the previous effort in 1992 and identify a network of 243 SPAs in England, Scotland, Wales, and Northern Ireland. This network was selected for the protection of 103 species of birds. Volume 1 of the set describes the process, procedures, and guidelines used in selecting the SPAs. Volume 2 includes an account for each species describing its status and extent of occurrence in the SPA network. Volume 3 contains a description of each of the 243 sites, including a locator map and list of qualifying species.

The species included in this process are derived from Annex I of the European Union birds directive, which designates a list of endangered, vulnerable, or rare species, supplemented by regularly occurring migratory species. The criteria for inclusion of a site in the SPA network are modeled very closely after the Ramsar Convention criteria for selecting wetlands of importance: 1% or more of the Great Britain or whole Ireland population of a species in Annex I; or 1% of the rather nebulously defined biogeographical population of a migratory species; or an area used by 20,000 or more waterfowl or seabirds. Other areas can be included by applying a range of apparently qualitative criteria such as population size and density, geographic range, breeding success, species-rich areas, naturalness, and severe weather refuges. The network of sites was assembled in a series of inter-agency review workshops.

Application of those species and site-selection criteria—especially given the emphasis on conforming to Ramsar criteria—generates a species list and site network that heavily emphasizes wetland-associated species, with many sites being on or near the coast. In fact, of the 103 species provided for in the SPA network, there are only 6 passerines. The authors deserve a great deal of credit, however, for pointing out that for many species it is either not possible to identify concentration sites or that site-based conservation action is not the best protection tool. This is one of the few publications to directly make the point that these broadly dispersed migrants, many of which are passerines, must have their conservation addressed by policy measures across the entire geographic and political landscape. Some very good suggestions on ongoing efforts to protect such species in the United Kingdom are listed.

I was impressed by the thoroughness of this publication in documenting not only the resulting site network, but the complete steps used to select sites and the data for each species. This really should be a model for how to publish the documentation for any such site selection procedure. However, as a non-United Kingdom based reader of this work, I was struck by the overall similarities of this project with the well-known and widely used criteria and publications used by BirdLife International to identify their network of Important Bird Areas. In fact, BirdLife published a list of Important Bird Areas in Europe very recently (Heath and Evans 2000) based on similar but slightly different criteria. Therefore, there now exist two similar but slightly different sets of reserve network specifications for bird conservation in the United Kingdom (and presumably the whole of the European Union in the future). Although those are both commendable efforts, I fail to see how multiple lists of important sites containing basically the same areas will do much to advance the cause of bird conservation. Some form of collaboration and synthesis