

## Book review

### CHECKLIST OF THE BIRDS OF NEW ZEALAND, NORFOLK AND MACQUARIE ISLANDS, AND THE ROSS DEPENDENCY, ANTARCTICA, 4TH EDITION

By B. J. Gill, B. D. Bell, G. K. Chambers, D. G. Medway, R. L. Palma, R. P. Scofield, A. J. D. Tennyson, and T. H. Worthy  
2010. Published by Te Papa Press in association with the Ornithological Society of New Zealand. Wellington, NZ. 500 pp., maps. Paperback, AUS100, ISBN: 9781877385599.

Gill *et al.* (2010) is an annotated checklist providing a complete listing of all extant and extinct avian taxa in the New Zealand biogeographical region, including complete nomenclatural data with all synonyms, and distribution or occurrence notes. This publication represents a milestone in New Zealand ornithology and a significant advance on the third edition of the *Checklist of the Birds of New Zealand* (Turbott 1990). In 1990, the field of evolutionary genetics and phylogenetics, which today we take for granted, was in its infancy. Twenty-two years later, Gill *et al.* (2010) is a must-have reference book for students and researchers. It is also a good companion to the *Taxonomy and Systematics of Australian Birds* (Christidis and Boles 2008), because, as Gill *et al.* (2010) argue, the wildlife of New Zealand are a part of an Australasian fauna. Compared to Turbott (1990), there are several major advances in Gill *et al.* (2010). These are detailed below.

The fourth edition of *Checklist of the birds of New Zealand* is authored by the Ornithological Society of New Zealand checklist committee, which comprised a mixture of eminent ornithologists, avian evolutionary geneticists, palaeontologists and an entomologist. This new edition has greatly benefited from recent advances in evolutionary genetics and phylogenetics (including the analysis of ancient DNA). In consequence, the current checklist has split several taxonomic groups that Turbott (1990) clumped together. For example, Turbott (1990) accepted three species and seven subspecies in the parakeet genus *Cyanoramphus* from the New Zealand biogeographic region (excluding Norfolk and Macquarie Islands). Recent genetic and ecological research has prompted Gill *et al.* (2010) to identify seven species and four subspecies. Other significant taxonomic revisions include those within Dinornithiformes (moa), Procellariiformes (albatross, petrels, prions and shearwaters), Phaethontiformes (tropic birds) and Falconiformes (falcons). Specifically, Dinornithidae is now represented by reciprocally monophyletic North (*Dinornis novaeseelandiae*) and South (*D. robustus*) Island species, both of which exhibit marked sexual dimorphism and geographical size variation. In addition, there have been species level re-classifications within the genera *Pachyornis* and *Euryapteryx*. In Procellariiformes there are now four families: Pelecanoididae (diving petrels), Diomedidae (albatross), Procellariidae (fulmars, petrels, prions and shearwaters) and Hydrobatidae (storm petrels), although the inter-family relationships are unclear. Finally, tropic birds, and falcons are recognised as belonging to distinct orders. However, it is still being debated whether the closest relatives of tropic birds are pelicans

(Pelecanidae), gannets and boobies (Sulidae), cormorants and shags (Phalacrocoracidae) or their allies (darters; Anhingidae and Frigatebirds; Fregatidae).

DNA discoveries alone have not been the only reasons for proposing new taxonomic arrangements. For example, morphological rather than DNA evidence was used to classify *Petroica* (*Petroica*) *macrocephala* (Tomtits), and there is a conflict between DNA and morphological evidence in the classification of the extinct Chatham Island Rail (*Cabalus modestus*). Gill *et al.* (2010) uses a holistic and cautious approach to ensure that new taxonomic arrangements are not in danger of being reversed by future studies, thus providing nomenclatural stability. For example, Gill *et al.* (2010) have followed Turbott (1990) and Holdaway *et al.* (2001) in the generic placement of and relationships between cormorants and shags, until the debate is resolved. This nomenclatural stability is especially important in the fast changing world of avian taxonomy. Higher level relationships have only been accepted if there is more than one line of evidence supporting a view. For example, to reclassify Apterygidae (kiwi) and Anseriformes (swans, geese and ducks), DNA evidence was used, along with habitat preferences and behavioural and morphological traits. Furthermore, Gill *et al.* (2010) have tried to harmonise with Christidis and Boles (2008) and in most cases have done so. Two examples of where this present volume differs from Christidis and Boles (2008) include the resolution of the contentious inter-generic relationships within the subfamily Cuculinae (parasitic cuckoos) and the retention of *Zosterops* within Zosteropidae (white eyes and silver eyes) rather than Timaliidae (true babblers), pending further evidence. Entomological research focussing on avian feather lice has also played a significant role in the taxonomy proposed by Gill *et al.* (2010). In numerous cases, feather lice co-evolved with specific avian species, thus the lice and avian phylogenetic histories mirror each other and can be used to support and resolve taxonomic arrangements (e.g. within the Apterygidae).

Further improvements on Turbott (1990) include a more regional focus and a changed philosophy towards species concepts. The fourth edition is a checklist for the biogeographic realm of New Zealand, and therefore includes subantarctic Macquarie Island, and Norfolk Island, despite their geopolitical status as Australian. However, Lord Howe Island is not included as it has less close biogeographic links to New Zealand. Turbott (1990) used the Biological Species Concept, which has not stood the test of time, especially in birds. For example, 44% of Australo-Papuan terrestrial birds which are good biological species are paraphyletic (Joseph and Omland 2009) and applying the biological species concept to the many allopatric taxa and populations in the New Zealand region is problematic. Many species have multiple allopatric populations, penguins are a famous example, and there is also widespread hybridisation in some species (e.g. *Cyanoramphus* parakeets). Gill *et al.* (2010) have used a derivative of the Phylogenetic Species Concept (PSC) called the Diagnostic Species Concept, and have continued to recognise subspecies (which are elevated to full species under the PSC) but not allospecies.

The layout of Gill *et al.* (2010) is easy to follow. It begins with an introduction that succinctly argues the case for how the checklist committee approached the fourth edition, and includes several good general references on avian palaeontology, feather lice and regional checklists. This is followed by detailed taxonomic accounts of each avian order in phylogenetic order with complete fully referenced synonymies for all indigenous and endemic New Zealand avian taxa. This will provide a valuable tool for future research into New Zealand birds and Gill *et al.* (2010) have gone to a lot of trouble to source rare seminal references. In some cases these synonymies are extensive, covering entire pages (e.g. Sooty Shearwater, *Puffinus griseus*). Introduced species are denoted by an asterisk, whereas extinct species are denoted by a cross. Gill *et al.* (2010) have also tried to standardise the use of common names. Although the majority have stayed, some have changed in an attempt to maintain stability or appropriateness (e.g. the extinct Stephens Island Wren, *Traversia lyalli*, is now referred to as Lyall's Wren, as the Stephens Island population was a relic of a formally more widespread species (North and South Island, Stephens Island), making Stephens Island Wren an inappropriate common name). In addition, Gill *et al.* (2010) have highlighted taxonomic groups that need review, advocating a conservative taxonomy, while providing ample research ideas for ornithologists. Detailed temporal–geographical distribution and occurrence notes are also listed for each species, including modern, midden, subfossil and vagrant distributions.

Following the taxonomic accounts are several in-depth appendices. Appendix One focuses on fossil birds older than the middle Pleistocene (1 million years ago (Mya), fossils less than 1 Mya are included in the main checklist as extinct species of the Recent fauna, e.g. Waitaha Penguin, *Megadyptes waitaha*). There have been several new additions to the fossil birds section with the discovery of the rich fossil sites near Saint Bathans, Otago, although unfortunately it is already outdated by more recent additions of fossil taxa to acanthisittids (New Zealand wrens), ardeids (herons), palaeolodids (extinct sister taxon of flamingos), and psittacids (parrots). Nonetheless, it is good to see a comprehensive checklist focussing on extinct and extant New Zealand birds.

Appendix Two lists the failed introductions of exotic birds to New Zealand. Unlike the main checklist and Appendix One, which are listed in taxonomic order, Appendix Two is confusingly ordered into five sections, of which only three are expanded upon. Within each of these three sections taxonomic order is followed, but I wonder if the whole of Appendix Two could have been listed in taxonomic order with symbols denoting failed introduction status. Despite this confusion, Appendix Two is detailed, and Gill *et al.* (2010) critically examine suspect records and discard a surprising number of records that do not meet the grade.

Appendix Three is a list of Maori names for New Zealand birds and their comparison to Turbott (1990). A full reference list up to 2008 is included. This list will be a vital resource for any ornithologist. The checklist ends with in-depth indexes of synonyms and current taxonomic names, followed by New Zealand and Antarctic maps with place names mentioned in the text marked on the maps. However, unlike Turbott (1990), Gill *et al.* (2010) does not include a 'Suspense List' of species previously listed but now not accepted as valid records

in New Zealand. Interested readers will have to consult Turbott (1990).

The drawbacks of Gill *et al.* (2010) are few and far between. As with any scientific publication, there has to be a date when the text is finalised, in this case 2008, and the fast changing pace of avian taxonomy will always mean some publications cannot be included.

Overall, Gill *et al.* (2010) is a milestone in New Zealand ornithology and an important reference for anyone interested in New Zealand ornithology whether amateur, student or researcher. The \$100 price is fully justified (compared to the \$10 I paid for Turbott 1990 from Auckland Museum) given the amount of work that has gone into this greatly expanded and revised checklist. Given the rapid advances in avian taxonomy in the past couple of years and the increased detection of vagrants in New Zealand (e.g. juvenile emperor penguin, *Aptenodytes forsteri*, at Pekapeka Beach, 2011), this will not be the last word on the taxonomy of New Zealand birds. In another 20 years I'm sure the situation will have changed again and I look forward to the fifth edition.

Nic Rawlence

School of Earth and Ocean Sciences, University of Waikato  
Hamilton, New Zealand

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## FACING EXTINCTION – THE WORLD'S RAREST BIRDS AND THE RACE TO SAVE THEM

By Paul Donald, Nigel Collar, Stuart Marsden and Deborah Pain 2010. Published by T & D Poyser, London, UK. 312pp., colour photographs, line drawings, maps. Hardback, \$99, ISBN 9780713670219.

*Facing Extinction* provides a detailed and authoritative analysis of some of the predicaments of the world's rarest birds. There can be no doubt that this carefully researched and beautifully presented book will provide a valuable resource for birdwatchers, students and researchers alike. The reference section alone is impressive; it is detailed and comprehensive, indicative of a high-quality research publication.

The book opens with a preface that briefly outlines the demise of two species, both of which could only have been described

as once extremely abundant: the Passenger Pigeon (*Ectopistes migratorius*) and the Eskimo Curlew (*Numenius borealis*). Although the history of the loss of these species is a classic tale of greed and overexploitation, the authors provide a fascinating account of this journey. The Passenger Pigeon was declared extinct in 1914; unbelievably, 50 years earlier a flock estimated at 3 billion birds took 14 hours to pass a single point. How does a species go from that type of superabundance to extinction so quickly? As the authors point out, there were unforeseen repercussions: the end for the less well-known Eskimo Curlew. As many as 2 million curlews were killed per year in North America towards the end of the 19th century as Passenger Pigeon numbers plummeted and professional hunters switched targets. These examples highlight the far-reaching effects of human activities and set the context for this informative and skilfully presented book.

The authors have approached the devastating problem of the decline of our planet's avian biodiversity and the peril that many species now face, by a careful analysis of rarity and a detailed look at 20 case studies from around the world. This publication both inspires and informs; it is neither excessively optimistic nor unduly pessimistic – it presents impressively detailed analysis in a highly readable format. The book's arrangement is simple and effective; it is not an exhaustive list of threatened species, rather it arranges the key case studies in a logical progression from species that are currently in peril through to rarity and extinction on islands and a look at success stories.

Rare species hold a fascination for people and the introductory chapters of this book include an insightful look at how scientists measure rarity and the evolutionary distribution of critically endangered species. The authors incorporate concepts at the heart of conservation biology including the causes and consequences of populations that decline to critically low levels or populations that persist as small numbers of individuals. The analysis of the IUCN data that appears in Chapter 1 is absorbing. Birds represent one of the most data-rich vertebrate groups especially in comparison with amphibians, and the proportion of globally threatened bird species is 12% compared to almost 30% for amphibians. This wealth of knowledge about birds and the positive effect this has on attempts to protect bird species are suggested to be due in part to human fascination with watching birds and the relative ease of watching birds compared to mammals or reptiles. The first chapter ends with a noteworthy section on the ecological and social significance of rare species and the influence that bird extinctions might have on the extinction of associated species such as specialised parasites.

The middle two sections of the book cover rarity and extinction on islands and outline classic examples from locations around the world. It makes sombre reading, but the authors review recent research to identify the causes and outcomes of these extinctions and declines. A highlight of the book is the section entitled 'Saving the world's rarest birds'. Six case studies are presented that show the role of science, public advocacy and community action in conservation. Intriguingly, in the final section of the book, 'The lost and the found', the authors examine those species that 'straddle the dividing line between extreme rarity and extinction'. The authors divide these few species into rediscovered species that were perhaps unlikely

to have become extinct (Table 22.2), extant species that are probably not seriously at risk (Table 22.4), species that have been rediscovered and are indisputably rare (Table 22.4), and finally those species that, upon scrutiny, plainly need to be rediscovered and require urgent conservation intervention (Table 22.5). This final table is sobering and in the text the authors use the case of the Ivory-billed Woodpecker to address the question of how we know that a species has become extinct (i.e. proof v. probability). This section aptly demonstrates the double-edged sword of rediscoveries: they bring optimism, but they also highlight the need for continuing conservation efforts – 'this chance to save them will be the last'. The 'rediscovery' case studies that follow were for me one of the most fascinating and informative aspects of this book; a wonderful mixture of human and scientific narrative, rare photos, and collations of the current state of knowledge of these very rare species. Each of the accounts is fascinating and different, making it difficult to choose a favourite. However, Chapter 24 on the Forest Owlet (*Heteroglaux blewitti*) provides an inspirational tale.

The Forest Owlet was first described in 1873, inhabiting jungle in the northern Indian subcontinent. This species was then lost and later found and is now on the brink of extinction. The authors outline the dedicated search for this species including early deceitful claims of sightings by a then-influential ornithologist, Richard Meinertzhagen (1878–1967). The account follows the route by which Professor Pamela Cecile Rasmussen, a prominent American ornithologist and expert on Asian birds, researched and developed an important ornithological handbook: *Birds of South Asia. The Ripley Guide*. This process led her through the intrigue of fraudulent claims by Meinertzhagen resulting in a reassessment of the Meinertzhagen skin of the Forest Owlet. If this skin was a fraud then it could curtail efforts to find remnant populations of this species because conservationists would likely be searching in the wrong area. Her findings were influential and she led the team that successfully rediscovered the first [two] Forest Owlets in 113 years in low hills near Shahada. This, as the authors describe, is 'a true triumph of dedication and scholarship'. The story doesn't end there as Rasmussen then raised funding for further work on the species and collaborated with the Bombay Natural History Society and a young Indian researcher, Farah Ishtiaq. The account follows Ishtiaq's findings and subsequent work by Girsih Jathar and other dedicated researchers and describes the obstacles in their path. For example, a number of local tribal people inhabiting the same forest as the Forest Owlets were found to believe that owl's eggs are good luck and that adult owls feed on human souls.

The book concludes with a chapter that looks to the future. The authors explain that island extinctions of birds are slowing but they predict a new wave of extinctions for continental species because of the pressures of the rapidly expanding human population. In this final chapter, the process of extinction is explored, including a look at extinction debt – the delay between events that hasten species extinction and when the last individual is lost. This chapter also covers the issue of vulnerability and explores our (limited) ability as scientists and conservationists to predict what species are at greatest risk from direct human action. The authors explore recent and unpredictable threats, for example, the threat of wildlife exploitation for the pet trade exemplified by the harvesting



of 'Nemo fish'. These examples stress the speed and unpredictability with which new pressures arise. Climate change is also identified as a looming danger. The book concludes with a segment entitled 'Meeting future challenges'; where the role of ordinary people in saving species is emphasised. The conclusions are cautiously optimistic and the authors advocate a broadening of concern by the world's bird watching community to include other groups of animals and plants and to put pressure on governments around the world to secure our natural environment.

Finally, this is a substantial book of high quality and the calibre and experience of this team of authors warrants mention. The authors are clearly passionate and proactive about conservation and well qualified to produce this book; it is laudable that all of the royalties from this publication will go to Birdlife International's Preventing Extinctions Programme – a case of the authors demonstrating a commitment to conservation of the world's avian biodiversity. This publication will become essential reading for tertiary students in conservation biology and ornithology.

Dianne Brunton

Ecology and Conservation Group, INS  
Massey University, Auckland, New Zealand

## EFFECTS OF CLIMATE CHANGE ON BIRDS

Edited by Anders Pape Møller, Wolfgang Fiedler, Peter Berthold 2010. Published by Oxford University Press, Oxford, UK. 336 pp., 75 black and white illustrations, and 4 pp. colour plates. Paperback, £34.95, ISBN 9780199569755.

*Effects of Climate Change on Birds* is a timely synopsis of this broad topic, assessing current knowledge of observed changes, potential causes and the ecological and evolutionary consequences. A sentence in the introduction highlights the editors' views of the importance and urgency of the problems posed by climate change: 'No other field of scientific inquiry into the biological sciences is currently of greater significance than an understanding of the consequences of climate change for all living beings, including humans' (Chapter 1, p. 4).

The book is divided into four sections. The first section provides an overview of the significance of climate change for living things, the value of using model systems to study and understand the effects of climate change and the importance of birds as exemplary model species. The significance of having a class of fauna so closely observed by amateur birdwatchers as well as by scientists is highlighted. Ornithologists are fortunate to have access to long-term, spatially extensive datasets, something rare in ecology.

After the introduction, the rest of the book is broad-ranging but logically organised into three sections. Section 2 is an excellent summary of global climate processes and patterns and the state of knowledge about anthropogenic forcing. Importantly, it includes discussion of climatic extremes and their significance as drivers of change. It lists the range of effects of climate

change on terrestrial biological systems and gives examples of the complex ramifications of changes in systems. It makes clear the reality of climate change as one component of a set of dynamic, interacting anthropogenic pressures affecting the natural environment.

In Section 3, six chapters deal with examples of available datasets and methods for investigating the effects of climate change. This section goes further than simply listing approaches by summarising the known biological consequences of climate change, identifying gaps in knowledge and suggesting directions that might yield new insights. Acknowledging bias in study species and habitat types is especially valuable in encouraging work outside the dominant climate change research paradigms.

The biological consequences of climate change are examined in Section 4, in 11 chapters that summarise our current understanding of a range of affected life history parameters. Knowledge is limited in even the best-documented systems, but some effects of climate change are obvious and well-recognised, such as changes in the timing of migration and breeding and shifts in species' ranges. Others are more subtle, such as effects on sexual selection, predator-prey and host-parasite interactions. This complexity comes in the context of weather systems that are dynamic, evolving and interacting with other anthropogenic effects. Understanding the ecology of a species in such circumstances is daunting; and Chapter 19 deals with the conservation consequences of climate change.

The final chapter, 'Conclusions', lays out five key areas the authors believe are priorities for future research. The first is the challenge of examining the effects of climate change even as it interacts with multiple variables in addition to weather. The second is to recognise and document the complexity of climate itself, and the interplay of different climatic parameters, such as temperature with the quantity and quality of precipitation. The third area highlights the need to improve our understanding of the range of interacting effects that occur at different trophic levels to produce an apparently simple outcome such as a change in breeding phenology. Fourth, the importance of extreme weather events as components of climate change needs investigation; the implications of such events for selection are obvious but little documented. Finally, all four of these research areas would provide much-needed data to inform modelling and predictions of climate change effects on populations, an area presently characterised by 'weak and untested assumptions' (Chapter 20, p. 313).

No attempt to cover such a wide-ranging and evolving research field will be without flaws. It is important to recognise the bias in drawing on findings from northern hemisphere species and habitats: this reflects the realities of the studies available to date, but highlights a need to expand work in the southern hemisphere. Here there are not only very different weather systems but a huge range of species with very different ecologies from those studied in the northern hemisphere. Australia presents an example – a continent representing the source of the passerine radiation, but one with a naturally variable climate and seasonality, supporting species with very different life history strategies and vulnerabilities to climate change. The authors make only passing mention of the significance of climate change for thermal tolerances and

body size; this is an emerging area of research with potential to provide new insights into ecological and evolutionary responses to climate change and to identify vulnerabilities in species and ecosystems. In spite of these omissions the authors are to be commended on producing an important and comprehensive book that deserves to be read widely.

*Janet L. Gardner*  
Fenner School of Environment and Society  
Australian National University, Australia

*Peter R. Marsack*  
Canberra, Australia