

Status Survey and Conservation Action Plan 2000–2004

# Partridges, Quails, Francolins, Snowcocks, Guineafowl, and Turkeys

Edited by Richard A. Fuller, John P. Carroll, and  
Philip J.K. McGowan on behalf of WPA/BirdLife/SSC  
Partridge, Quail and Francolin Specialist Group



Status Survey and Conservation Action Plan 2000–2004

# Partridges, Quails, Francolins, Snowcocks, Guineafowl, and Turkeys

Edited by Richard A. Fuller, John P. Carroll, and  
Philip J.K. McGowan on behalf of WPA/BirdLife/SSC  
Partridge, Quail, and Francolin Specialist Group



The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views expressed in this publication do not necessarily reflect those of IUCN.

Published by: IUCN, Gland, Switzerland and Cambridge, UK, and the World Pheasant Association, Reading, UK.

Copyright: © 2000 International Union for Conservation of Nature and Natural Resources.

Reproduction of this publication for educational or other non-commercial purposes is authorised without prior written permission from the copyright holder provided the source is fully acknowledged.

Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

Citation: Fuller, R.A., Carroll, J.P., and McGowan, P.J.K. (eds.). (2000). *Partridges, Quails, Francolins, Snowcocks, Guineafowl, and Turkeys. Status Survey and Conservation Action Plan 2000–2004*. WPA/BirdLife/SSC Partridge, Quail, and Francolin Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK, and the World Pheasant Association, Reading, UK. vii + 63 pp.

ISBN: 2-8317-0538-X

Cover photo: Bearded Wood-partridge. Found only at a few sites in Mexico, this species is under continuing threat from habitat clearance and hunting.

Produced by: The Nature Conservation Bureau Ltd, Newbury, UK.

Printed by: Information Press, Oxford, UK.

Available from: IUCN Publications Services Unit  
219c Huntingdon Road, Cambridge CB3 0DL, United Kingdom  
Tel: +44 1223 277894, Fax: +44 1223 277175  
E-mail: [info@books.iucn.org](mailto:info@books.iucn.org)  
<http://www.iucn.org>  
A catalogue of IUCN publications is also available.

*The text of this book is printed on 115 gsm Zone Silk, which is rated as 4-star under the Eco-Check system and is made from 100% sustainable fibre sources using chlorine-free processes.*

# Contents

Foreword .....	v	Gorgeted wood-quail ( <i>Odontophorus strophium</i> ) .....	27
Acknowledgements .....	vi	3.2 Endangered Species .....	28
Executive Summary .....	vii	Nahan’s francolin ( <i>Francolinus nahani</i> ) .....	28
<b>Chapter 1. The Conservation of Partridges, Quails, Francolins, Snowcocks, Guineafowl, and Turkeys</b> .....	1	Mount Cameroon francolin ( <i>Francolinus camerunensis</i> ) .....	29
1.1 Introduction .....	1	Sichuan hill-partridge ( <i>Arborophila rufipectus</i> ) ....	29
1.2 Information on partridges, quails, francolins, snowcocks, guineafowl, and turkeys .....	1	Orange-necked hill-partridge ( <i>Arborophila davidi</i> ) .....	30
Species included in the Action Plan .....	1	Chestnut-headed hill-partridge ( <i>Arborophila cambodiana</i> ) .....	30
Distribution and general biology .....	1	3.3 Vulnerable Species .....	31
1.3 Relationship with humans .....	2	Swamp francolin ( <i>Francolinus gularis</i> ) .....	31
1.4 Other sources of information on partridges, quails, francolins, snowcocks, guineafowl, and turkeys .....	3	Harwood’s francolin ( <i>Francolinus harwoodi</i> ) .....	32
1.5 Background to the second edition .....	3	Grey-striped francolin ( <i>Francolinus griseostriatus</i> ) .....	32
Who are we? – the PQF Specialist Group .....	3	Swierstra’s francolin ( <i>Francolinus swierstrai</i> ) .....	33
Updating the Partridge, Quail, Francolin, Snowcock, Guineafowl, and Turkey Action Plan ...	4	Black wood-partridge ( <i>Melanoperdix nigra</i> ) .....	33
1.6 Threats to the survival of partridges, quails, francolins, snowcocks, guineafowl, and turkeys .....	4	Manipur bush-quail ( <i>Perdicula manipurensis</i> ) .....	34
Habitat loss and degradation .....	4	Udzungwa forest-partridge ( <i>Xenoperdix udzungwensis</i> ) .....	34
Hunting .....	6	Chestnut-breasted hill-partridge ( <i>Arborophila mandellii</i> ) .....	35
Effect of agricultural chemicals .....	6	White-necklaced hill-partridge ( <i>Arborophila gingica</i> ) .....	36
Disturbance .....	6	Hainan hill-partridge ( <i>Arborophila ardens</i> ) .....	36
Threatened subspecies and populations .....	6	White-faced hill-partridge ( <i>Arborophila orientalis</i> ) .....	37
Summary of the threat status of partridges, quails, francolins, snowcocks, guineafowl, and turkeys .....	7	Bearded wood-partridge ( <i>Dendrotyx barbatus</i> ) .....	37
1.7 Actions for the conservation of partridges, quails, francolins, snowcocks, guineafowl, and turkeys .....	7	Black-fronted wood-quail ( <i>Odontophorus atrifrons</i> ) .....	38
Clarifying taxonomic units .....	7	Dark-backed wood-quail ( <i>Odontophorus melanonotus</i> ) .....	39
Gathering basic information .....	7	Tacarcuna wood-quail ( <i>Odontophorus dialeucos</i> ) .....	39
Making conservation recommendations .....	8	White-breasted guineafowl ( <i>Agelastes meleagrides</i> ) .....	39
Types of conservation recommendations .....	9		
Implementing conservation recommendations .....	12		
Monitoring effects of conservation action .....	12		
Summary of conservation action .....	12		
<b>Chapter 2. Summary of the Conservation Status of Partridges, Quails, Francolins, Snowcocks, Guineafowl, and Turkeys</b> .....	15	<b>Chapter 4. Five-Year Plan of Action</b> .....	41
2.1 Critically Endangered Species .....	15	4.1 Global projects .....	41
2.2 Endangered Species .....	17	Project 1. Increasing the effectiveness of the PQF Specialist Group .....	41
2.3 Vulnerable Species .....	18	Project 2. Improving communication of research findings .....	42
2.4 Lower Risk Species .....	20	4.2 Regional projects .....	43
<b>Chapter 3. Species Accounts</b> .....	26	Project 3. Maintaining the WPA Asian Galliformes sites database .....	43
3.1 Critically Endangered Species .....	26	Project 4. Assessing the taxonomic and conservation status of the Andean wood-quails <i>Odontophorus</i> .....	43
Djibouti francolin ( <i>Francolinus ochropectus</i> ) .....	26		
Himalayan quail ( <i>Ophrysia superciliosa</i> ) .....	27		

Project 5. Assessing the conservation status of Neotropical quails in northern Central America ...	44	Project 15. Orange-necked hill-partridge ( <i>Arborophila davidi</i> ) .....	49
Project 6. Assessing populations of Asian Galliformes within protected areas .....	44	Project 16. Chestnut-headed hill-partridge ( <i>Arborophila cambodiana</i> ) .....	49
Project 7. Review of information on IndoChinese partridges .....	44	Project 17. Himalayan quail ( <i>Ophrysia superciliosa</i> ) .....	50
Project 8. Surveys for threatened partridges in Sumatra .....	45	Project 18. Gorgeted wood-quail ( <i>Odontophorus strophium</i> ) .....	50
Project 9. Surveys for threatened partridges in Borneo .....	45	4.5 Projects for Vulnerable species .....	50
4.3 Strategic project .....	46	Project 19. Swamp francolin ( <i>Francolinus gularis</i> ) .....	50
Project 10. Taxonomic reassessment of some partridges and New World quails .....	46	Project 20. Manipur bush-quail ( <i>Perdicula manipurensis</i> ) .....	51
4.4 Projects for Critically Endangered and Endangered species .....	47	Project 21. Hainan hill-partridge ( <i>Arborophila ardens</i> ) .....	51
Project 11. Djibouti Francolin ( <i>Francolinus ochropectus</i> ) .....	47	Project 22. Bearded wood-partridge ( <i>Dendrortyx barbatus</i> ) .....	52
Project 12. Nahan's francolin ( <i>Francolinus nahani</i> ) .....	47	<b>References</b> .....	53
Project 13. Mount Cameroon francolin ( <i>Francolinus camerunensis</i> ) .....	48	<b>Appendix 1. List of Contacts</b> .....	59
Project 14. Sichuan hill-partridge ( <i>Arborophila rufipectus</i> ) .....	48	<b>Appendix 2. Captive Populations of Partridges, Quails, Francolins, Snowcocks, Guineafowl, and Turkeys</b> .....	60

# Foreword

The WPA/BirdLife/SSC Partridge, Quail, and Francolin Specialist Group has been in existence since 1991 and has made phenomenal strides in understanding populations and threats to the 140+ species in this group. The Specialist Group (SG) has been involved with the World Pheasant Association and the Pheasant Specialist Group in two International Galliformes Conferences in Pakistan and Malaysia. A third is planned for the year 2000 in Nepal. In addition, the SG co-sponsored a workshop on Latin American Galliformes with the Cracid Specialist Group. We have undertaken some re-organisation of the SG to better reflect the diverse membership of the group, which presently represents 40+ countries. Most recently, the SG has added the Meleagridae (North American turkeys) to the rather eclectic group of species we already administer (partridges, quails, francolins, snowcocks, and guineafowl).

One of the most important undertakings of this group was the publication of the first Action Plan in 1995. What many of us found in compiling that plan was that we knew very little about many of the species we were supposed to be helping. The effort also allowed members of the SG and others to focus on particular species or groups of species, or even regions for research and conservation efforts. Although many of our assessments were based on poor data and are probably off base, I believe that effort was worthwhile because we gave people a starting point and some frames of reference.

Now, the first Action Plan has reached the end of its life. Holding to our desire to have the plan be a living document rather than something static, we developed the second five-year plan. This new effort has demonstrated how far we have come. A number of species, such as the bearded wood-partridge of Mexico and the Nahan's francolin of Uganda, were virtually unknown in 1995. The

latter has now been the subject of an intensive Ph.D. study and now probably ranks as one of the better-studied tropical species. The former was thought to be Critically Endangered in 1995, but has now been downgraded because a number of new populations has been found.

The new Action Plan also reflects evolving philosophies. Our collaboration with BirdLife in the recent publication of *Threatened Birds of the World* and their forthcoming *Threatened Birds of Asia*, as well as our closer collaboration on production of the Action Plan has helped to eliminate redundancy in conservation assessments. In addition, this has helped use the resources available to the two groups more efficiently. Finally, the Action Plan effort has forced us to think about issues that are important for conservation of these species. Not all have been resolved but, hopefully, progress has been made. Questions, such as what to do about subspecies or how to approach sustainable harvest issues, and issues of species management *versus* ecosystem management still need more work.

This Action Plan is meant to be used as a tool. I urge anyone who reads it to think about it in that way and consider how he or she might use it to accomplish its purpose, which is the conservation of partridges, quails, francolins, snowcocks, guineafowl, and turkeys. Please use it to help focus research or conservation projects, use it to help obtain funding, and, most of all please use the knowledge that you obtain to help us produce an even better Action Plan in the future.

Dr. John P. Carroll, Chair, IUCN-SSC/BirdLife/WPA Partridge, Quail, and Francolin Specialist Group, Daniel B. Warnell School of Forest Resources, University of Georgia, Athens, GA 30602, USA.

# Acknowledgements

This Action Plan is based on information, expertise, and advice contributed by many members of the Partridge, Quail, and Francolin (PQF) Specialist Group and others interested in the conservation of partridges, quails, francolins, snowcocks, guineafowl, and turkeys. We are extremely grateful to BirdLife International for providing species accounts from their landmark publication *Threatened Birds of the World* and the forthcoming *Threatened Birds of Asia*, developed through an extensive review process involving the BirdLife Partnership, the PQF Specialist Group, the World Pheasant Association, and a worldwide network of ornithologists co-ordinated by the BirdLife Secretariat. We have benefited greatly from this fruitful collaboration with BirdLife and look forward to continuing our relationship. We thank everyone who contributed information and opinions during the process of reviewing the species accounts and, in particular, would like to thank the members of the BirdLife Secretariat team at Cambridge: Dave Capper, Nigel Collar, Mike Crosby, Pete Davidson, Isabel Isherwood, Malcolm Starkey, Sue Shutes, Alison Stattersfield, and Joe Tobias. In addition, Alison Stattersfield provided sensitive co-ordination and communication throughout the process.

The World Pheasant Association provided logistical and financial support during the preparation of this Action Plan, including funds for the employment of Richard Fuller.

We are particularly grateful to the following for contributing and reviewing text: Nicholas Aebischer, Robert Atkins, Leon Bennun, Simon Dowell, Christine Dranzoa, Jack Clinton Eitnrear, Jonathan Eames, Steve Edwards, Luo Hong-Ren, Carol Inskipp, Salim Javed, Rahul Kaul, Guy Kirwan, Rab Nawaz, Roald Potapov, Gary Robbins, Alfred Simiyu, Manon Tentij, Xianji Wen, and Gao Yu-ren.

To the following, we extend our thanks for advice and information received during the course of the compiling process: Martin Adamian, Ashfaque Ahmed, Han Assink, Donald Bruning, Françoise Burhenne, Keith Chalmers-Watson, Susie Ellis, Jon Fjeldså, Peter Flint, Peter Garson, Dipankar Ghose, Anne-Marie Gillesberg, Mariano

Gimenez-Dixon, Jeff Gordon, Graham Hall, Alain Hennache, Derek Holmes, Keith Howman, Linette Humphrey, N. Krabbe, Suresh Kumar, Anni Lukács, Georgina Mace, L. Olarte, Derek Pomeroy, Asad Rahmani, Ettore Randi, L. Renfijo, Alison Rosser, Christine Sheppard, S. Sathyakumar, C. Sharpe, Pratap Singh, Pritpal Singh Soorae, Simon Tonge, Jack Tordoff, Bas van Balen, Roland van Bockstaele, Carola von Conrad, Rebecca Webb, Geoff and Hilary Welch, Roger Wilkinson, Nurul Winarni, Mengistu Wondafrash, Lu Xin, and Zhang Zhengwang.

We would also like to thank Lynx Edicions for granting us permission to use the fine illustrations from their *Handbook of Birds of the World* to accompany this document. We are also grateful to David Mead for other illustrations.

Bearded wood-partridge. This Vulnerable species is confined to a few sites in eastern Mexico.

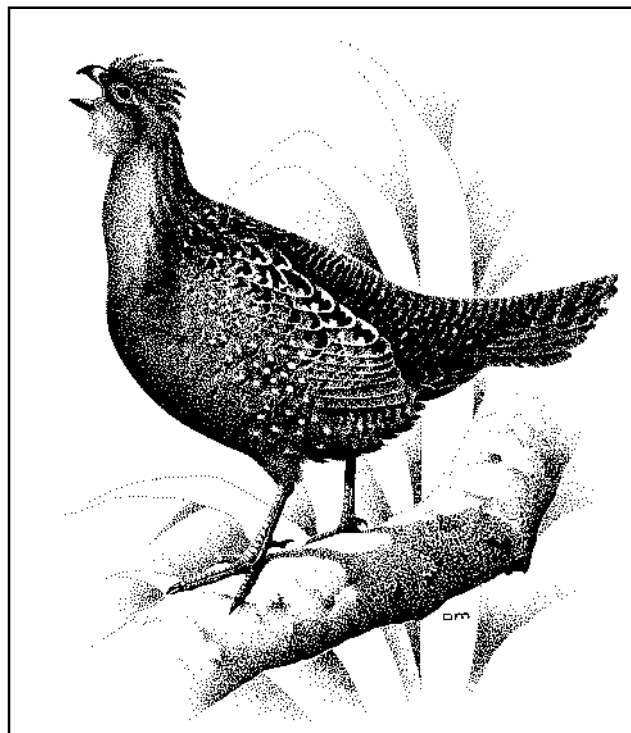


Illustration: David Mead

# Executive Summary

This Action Plan covers the partridges, quails, francolins, snowcocks, guineafowl, and turkeys, a group of nearly 150 ground-dwelling gamebirds found in every continent apart from Antarctica. They live in a wide variety of habitats from tropical forests, high-altitude alpine zones, temperate forests, and open country of various kinds, to desert environments. Although they are very widespread, little is known about the species occurring outside Europe and North America. Several species are considered to be at grave risk of extinction, while others are so poorly known that it is difficult to evaluate their conservation needs. In 1995, the first Action Plan for the conservation of partridges, quails, francolins, snowcocks, and guineafowl was published, and this document provides an update on the current situation. The objectives of this document are to identify the most threatened species within this group (Chapters 2 and 3), and prioritise the conservation action needed to protect them by outlining project briefs for the most urgent cases (Chapter 4).

This plan of action will be distributed to biologists, conservationists, politicians, policy-makers, government officials, educators, planners, grant-awarding bodies, and commercial concerns that are in a position to help. The greatest threats to the future survival of these fascinating birds are habitat loss, hunting of wild populations, and disturbance. Much can be done at the local level, although national and international support will prove helpful in some cases. This means that the projects in Chapter 4 should be considered by those with local influence in the areas concerned, as well as by national officials and politicians. The full co-operation and involvement of local people is fundamental to the success of any conservation project.

Chapter 1 gives an overview of the partridges, quails, francolins, snowcocks, guineafowl, and turkeys, outlines the major threats they face, and suggests possible ways to help protect them. It is intended as a broad introduction, and will be particularly useful to those unfamiliar with the group and conservation methods in general. Chapter 2 summarises the threat status of each species. The species identified as threatened are considered in more detail in Chapter 3, which gives information on distribution, threats, and possible conservation measures for each species.

Chapter 4 is the most important part of the document and contains details of practical work that is most urgently required to help protect each of the threatened species. There is a great variety of work proposed, from small-scale surveys suitable for university students carrying out short-term fieldwork, to more in-depth research programmes requiring much greater financial and logistical resources. Governments and politicians can use these larger projects as a basis for high-profile conservation initiatives, either alone or in conjunction with other conservation projects in the region. In any case, we recommend that researchers wishing to undertake any of these projects should develop their ideas in consultation with policy-makers, government officials, grant-awarding bodies, and the PQF Specialist Group.

The PQF Specialist Group is pleased to report a large increase in the amount and quality of conservation work since production of the first Action Plan in 1995, but many species remain highly threatened and little known in the wild. The PQF Specialist Group will continue to do its best to stimulate follow up of this Action Plan and will be pleased to advise on its implementation. We look forward to its continued success as a conservation tool.



# The Conservation of Partridges, Quails, Francolins, Snowcocks, Guineafowl, and Turkeys

## 1.1 Introduction

In 1995, the first Action Plan for the partridges, quails, francolins, snowcocks, and guineafowl was produced and provided a comprehensive review of status and outlines for conservation action. During the five-year implementation period of that Action Plan, a large volume of work on these species has been undertaken. The purposes of this update are:

- to provide a new overview statement on the conservation of partridges, quails, francolins, snowcocks, guineafowl, and turkeys worldwide (Chapter 1);
- to integrate this material into revised threat assessments (Chapter 2);
- to justify why certain species are priorities for conservation effort through updated species accounts (Chapter 3);
- to suggest a new set of conservation projects with international priority (Chapter 4).

This document has been prepared on the basis of the most recent information available during 1999, and the projects listed are intended for implementation during 2000–2004. It, therefore, supersedes the 1995 Action Plan, although some general information is repeated for new readers. This document provides specific conservation assessments and interpretation of conservation-related information, and the reader should not expect it to be a full account of the biology of this group of birds.

Every effort has been made to gather information and opinion that is up-to-date, from published and unpublished literature, and from correspondence and discussions with people currently involved worldwide in the conservation of partridges, quails, francolins, snowcocks, guineafowl, and turkeys, and their habitats. Wherever possible, all substantive statements are supported with references to the literature. As in the first edition of the Action Plan, a large amount of information has been reviewed and the originators and others have checked all suggested plans for action. The PQF Specialist Group is, therefore, confident that this plan has the full backing of its international network of members and that many of the proposed actions will be initiated within the five-year implementation period.

During 2004, the contents of this Action Plan will again be reviewed and updated, and a third edition drafted to cover the period 2005–2009.

## 1.2 Information on partridges, quails, francolins, snowcocks, guineafowl, and turkeys

### Species included in the Action Plan

This Action Plan covers the partridges, quails, francolins, snowcocks, guineafowl, and turkeys of the world. These birds belong to the avian order Galliformes, which contains all the birds often referred to as gamebirds: the megapodes (Megapodiidae), cracids (Cracidae), guineafowl (Numididae), New World quails (Odontophoridae), turkeys (Meleagrididae), grouse (Tetraonidae), and partridges, Old World quails, and pheasants (Phasianidae). Second edition Action Plans for megapodes (Dekker *et al.* 2000) and pheasants (Fuller and Garson 2000) are being published, while Action Plans for Cracids (Strahl and Brooks 2000) and grouse (Storch 2000) have already come off the press. This means that all Galliformes species are now covered by Action Plans.

For further details of the various taxonomic treatments of these species, see Peters (1934), Johnsgard (1973), Urban *et al.* (1986), Johnsgard (1988), Sibley and Ahlquist (1990), Crowe *et al.* (1992), del Hoyo *et al.* (1994), and Bloomer and Crowe (1998). A recent study tracing the evolutionary history of Phasianid birds using DNA analysis has concluded that the pheasants and partridges may not be separate natural groups (Kimball *et al.* 1999). With a few exceptions for the English names, the species taxonomy and names used in this Action Plan follow that of Sibley and Monroe (1990, 1993), which has also been adopted as standard by BirdLife International (BirdLife International, 2000). There are 106 species of Old World partridges, quails, francolins, and snowcocks, 31 species of New World quail, six species of guineafowl, and two turkeys, for a total of 145 species. A complete list of the species considered in this Action Plan is given in Chapter 2, to which the reader should refer for scientific names.

### Distribution and general biology

The partridges, quails, francolins, snowcocks, guineafowl, and turkeys are an ecologically diverse group of birds with a worldwide distribution, excluding the polar regions. The New World quails are distributed from southern Canada through Central America to central South America; the

Isthmus of Panama contains the highest diversity of genera. The Old World partridges and quails are found throughout the Old World, except Saharan Africa, extreme northern Europe, northern Siberia, and the Australian interior. Many areas have two or more genera present. The northeast Indian Subcontinent contains five genera, and various major land masses in Southeast Asia are home to six or seven (del Hoyo *et al.* 1994). The six guineafowl species occur only in Africa and Arabia (Urban *et al.* 1986).

Given their widespread distribution, it is not surprising that partridges and their allies can be found in virtually every terrestrial habitat. Only polar and boreal forest ecosystems lack representatives from the group. They occur in open country and in closed forest habitats. Open habitats in which these species are found include tropical open country (e.g., grey-breasted francolin), deserts (e.g., see-see partridge, Gambel's quail), temperate open country (e.g., grey partridge), and high-altitude alpine zones (e.g., Tibetan snowcock). They are also found in forested habitats, such as lowland tropical rainforest (e.g., crested wood-partridge, white-breasted guineafowl), montane tropical forest (e.g., red-billed hill-partridge and Venezuelan wood-quail), subtropical forests (e.g., Sichuan hill-partridge), and temperate forests (e.g., wild turkey).

Our level of knowledge and understanding of the vast majority of partridges and their allies is poor, although much work is being undertaken to address this issue. In contrast to most taxa, a few of the partridge and quail species have enjoyed high profiles as popular sporting and table birds, most notably the grey partridge and the red-legged partridge in Europe, and the northern bobwhite in North America. These species have been the subject of considerable research, initially on account of their economic importance, but more recently because of marked declines across much of their ranges. The northern bobwhite quail alone has been the subject of over 3000

publications (Church and Taylor 1992). This interest has led to significant gains in our knowledge of the ecology and population dynamics of certain temperate species that can occasionally (but not always) be usefully applied to other, less well-known species. Over the five-year implementation period of the first Action Plan, much excellent work has been undertaken on previously little-known species in the form of surveys and other field projects, and there is now a need to consolidate this material for publication (see Project 2 in Section 4.1). However, other species, particularly those from remote mountain and tropical areas, remain very poorly known, and, in some cases, there is still virtually no information on any aspect of their biology in the wild (e.g., buff-throated partridge, Schlegel's banded francolin).

### 1.3 Relationship with humans

Galliformes and humans have been closely associated throughout much of history. Chiefly terrestrial birds, they are easily trapped, and their meat and eggs provide rich sources of protein. Thirty-five species of partridges, quails, francolins, snowcocks, guineafowl, and turkeys have been introduced to locations outside their natural range for purposes as diverse as ornamental collections, recreation, sport, and production of meat (Long 1981).

Since the red-legged partridge was introduced in Britain in the 18th century, it has become a widespread and common species (Gibbons *et al.* 1993). Every year, of the nearly two million birds released in the UK, about 450,000 are shot. In southwestern Europe, the overall annual bag may be as high as 10 million. Shooting is a very popular sport in Europe and, with over nine million hunters, it represents a major economic interest (Aebischer 1997a).

Although not all species in this group have been introduced or domesticated, many are exploited to some degree in their native ranges, usually for meat consumption and sport. This can range from low-intensity, subsistence hunting to levels supporting local economies through sustainable use programmes. For example, sustainable hunting programmes of the grey-winged francolin in South Africa yield up to US\$40 per bird to the farmer (Simiyu 1998).

Partridges, quails, francolins, snowcocks, guineafowl, and turkeys, therefore, yield significant material benefits to human populations (both locally and internationally), and this raises the possibility of harnessing these benefits for conservation purposes. If sufficient economic incentives can be gained through harvesting and managing these populations in a sustainable manner, these species may be safeguarded in the long term. In addition to material benefits, partridges, quails, francolins, snowcocks, guineafowl, and turkeys also have impacted on human cultural and social life for centuries, and many species

Tawny-faced quail. Although considered at Lower Risk, there is little information available on this species.

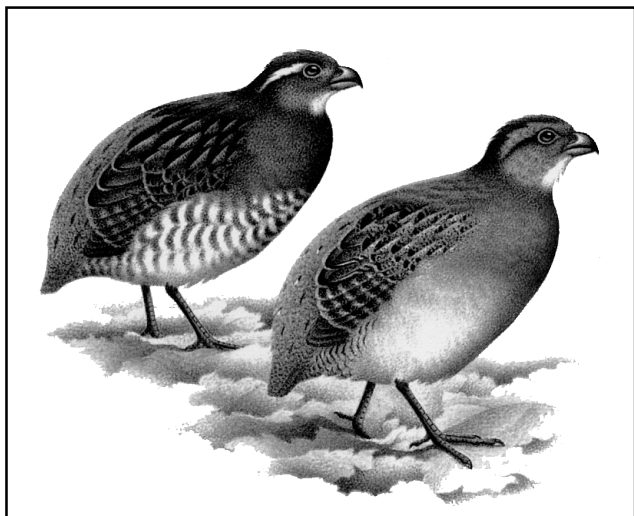


Illustration: David Mead



Illustration: David Mead

Northern bobwhite. A species of great economic importance, over 20,000 are harvested annually in the U.S.A.

have become intertwined with the arts, religion, customs, and folklore. In India, for example, grey and black francolins have been used in cock fighting for hundreds of years. The practice is still widespread, especially in rural areas, but becoming more uncommon (S. Javed *in litt.*).

### 1.4 Other sources of information on partridges, quails, francolins, snowcocks, guineafowl, and turkeys

Information on natural history, ecology, and behaviour of the species covered in this Action Plan can be found in Johnsgard's (1988) monograph, Potts (1986), and Hudson and Rands (1988), while a comprehensive account of the biology of all Galliformes can be found in del Hoyo *et al.* (1994, pp. 412–567). Detailed regional, national, and other avifaunal accounts are also available, including those by Blake (1977), Fjelds  and Krabbe (1990), and Hilty and Brown (1986) for the Neotropics, the *Birds of North America* series (eds. Poole and Gill, series ongoing) for North America, Cramp and Simmons (1980) for the Western Palearctic, Urban *et al.* (1986) for Africa, Ali and Ripley (1983) for South Asia, Cheng Tso-hsin (1987) for China, Grimmett *et al.* (1998) for the Indian Subcontinent, Wells (1999) for the Thai-Malay Peninsula, van Marle and Voous (1988) for Sumatra, Smythies (1981) for Borneo, Smythies (1986) for Burma, Lekagul and Round (1991) for Thailand, and Marchant and Higgins (1993) for Australia.

In addition, there have been two international symposia including partridges, quails, francolins, snowcocks, and

guineafowl held in Pakistan (1992) and Malaysia (1997). Proceedings have been produced following these symposia, as Jenkins (1993) and Carroll *et al.* (1998). The papers in these proceedings contain and provide original information on aspects of these species' biology, and especially on their conservation status.

*Forktail* (published by the Oriental Bird Club) and *Bird Conservation International* (published by BirdLife International) regularly carry papers with a regional emphasis. National Park checklists, etc. and other accounts of recent work can be found in the *Annual Review of the World Pheasant Association* (formerly the *Journal of the World Pheasant Association*).

## 1.5 Background to the second edition

### Who are we? – the PQF specialist Group

In 1991, The Game Conservancy Trust, jointly with the World Pheasant Association (WPA), hosted a symposium on partridges, quails, and francolins at their headquarters in Fordingbridge, England. It culminated in a decision to form a Specialist Group, affiliated to the Species Survival Commission of the World Conservation Union (IUCN), the International Council for Bird Preservation (now BirdLife International), and WPA, to deal with these much-neglected species. The Partridge, Quail, and Francolin Specialist Group (PQF Specialist Group) initially comprised the symposium delegates, but by 1999 had grown into an international network of nearly 200 specialists from 43 countries. The PQF Specialist Group has an Executive Committee that discusses issues by e-mail. There is also a wider committee of regional co-ordinators around the world.

The main purpose of the PQF Specialist Group is to promote the conservation of smaller Galliformes and encourage additional research into their sustainable use. The production and revision of the Action Plans has been a major manifestation of this role. Although the group has no funding directives, there is a proposal mechanism to allow researchers and conservationists to formally elicit support for specific projects. The Specialist Group has already assisted a number of principal investigators by making connections to funding organisations. Several funding bodies require PQF Specialist Group approval of projects before providing financial support.

The PQF Specialist Group always welcomes new members, and is open to anyone with a professional or amateur interest in the conservation biology of the smaller Galliformes. The Specialist Group produces a newsletter twice yearly and has a web page at <http://www.game-conservancy.org.uk/pqf/> (see Appendix 1 for contact details).

## Updating the Partridge, Quail, Francolin, Snowcock, Guineafowl, and Turkey Action Plan

The content of this Action Plan has built on that assembled for the 1995 edition (McGowan *et al.* 1995, see also McGowan *et al.* 1998), and has been reviewed by active researchers across the world through the network maintained by the PQF Specialist Group and BirdLife International. Each species has been assigned to a threat category based on the *IUCN Red List Categories* (IUCN 1994). This system of categorising threatened species, which has been adopted globally for expressing status information, was developed to provide a consistent and objective way of assessing threat levels. In order to provide a complete overview of the status of all partridges, quails, francolins, snowcocks, guinea fowl, and turkeys, a section giving conservation assessments was produced (see Chapter 2).

The species accounts in Chapter 3 were produced in close co-operation with BirdLife International to a standard format for *Threatened Birds of the World* (BirdLife International 2000), the latest global assessment of the status of threatened birds. Texts for Asian species have been derived from *Threatened Birds of Asia* (BirdLife International in prep.), a more detailed assessment of the status and conservation requirements of Asian birds. The accounts were designed to explain why each species has been placed in a particular threat category by reference to information on their past and present distributions, estimated population size and trend, and identified threats. Any work in progress is mentioned, and a set of explicit conservation targets has been developed for each species.

The final and most important part of the action planning process involved the selection and preparation of a series of project briefs. Through an assessment of progress on all projects proposed in the 1995 Action Plan, we have investigated the effectiveness of the first document. The results of this assessment are given in Chapter 4. Based on that experience, we provide outlines for a new set of priority projects for execution within the period 2000–2004. These projects generally follow directly from those targets given in the species accounts in Chapter 3. We suggest a variety of project types involving status surveys, taxonomic clarification, intensive research, population monitoring, habitat protection and management, and conservation awareness programmes. Suggested projects for each species are written in a standard format stressing the aims, justification, and means of implementation. Each outline includes details of objectives, methods to be employed, and estimated timescale and resources required. They should be used in conjunction with the threatened species accounts in Chapter 3 to develop full project proposals.

## 1.6 Threats to the survival of partridges, quails, francolins, snowcocks, guinea fowl, and turkeys

Threats to partridges, quails, francolins, snowcocks, guinea fowl, and turkeys are many and varied, and frequently a species is subject to two or more pressures simultaneously. This section provides background on the major types of threat faced by partridges, quails, francolins, snowcocks, guinea fowl, and turkeys, an overview of the severity of different threats, and gives specific examples to illustrate how they are affecting particular species.

### Habitat loss and degradation

Habitat loss is suspected to be causing a decline in the vast majority of the threatened species covered in this plan and is, by far, the most widespread and damaging threat to partridge, quail, francolin, snowcock, guinea fowl, and turkey species. It takes many forms. Areas of habitat may be destroyed, for example, through deforestation. Habitats may be degraded through intensive livestock grazing, gradually encroached upon through urban or agricultural expansion, or modified through human activities such as selective removal of vegetation for firewood, commercial purposes, or for food. More than one of these forms of habitat disturbance may affect one area simultaneously, or they may act one after another.

This section examines the most serious forms of habitat loss and change. These are complete habitat destruction and the fragmentation of a species' geographic range that often results, and habitat degradation, where vegetation is not completely destroyed, but its quality is significantly reduced.

Habitat destruction is characterised by complete removal of the existing vegetational structure. For species dependent on forests, the complete removal of all trees in an area (deforestation) causes a catastrophic decline. Timber extraction by logging operations is the primary reason for deforestation. Logging is especially common in areas with tropical forest over level ground, where commercially valuable trees can easily be extracted on a large scale. Logging operations are a major cause for concern in the lowlands of Indonesia, especially when combined with the expansion of human communities into the areas of cleared forest (van Balen and Holmes 1993).

On Hainan Island, China, destructive logging is putting pressure on the endemic Hainan hill-partridge, although as a result of a ban on logging primary forest in January 1994, habitat loss is less common now than formerly (Gao Yu-ren 1998, *in litt.*). In addition, it appears that Hainan hill-partridges are able to utilise some well-grown secondary forest in addition to primary forest. Habitat destruction through logging has been the primary cause of drastic

reductions in numbers or even extirpation of the gorgeted wood-quail in Cundinamarca Department, Colombia (Wege and Long 1995). The species is now restricted to a small area of remaining forest in Santander and is in critical danger of extinction (del Hoyo *et al.* 1994).

The clearance of habitat to make way for agriculture is another common reason for habitat destruction. Forests may be cleared for agricultural uses, such as plantations of coffee, rubber, and tobacco, or for the grazing of livestock. This is a particular problem where intensive farming methods are used subsequent to habitat clearance, as vast continuous tracts of land may become inhospitable. In India, reclamation and conversion of large tracts of the tall wet grassland in the Gangetic Plain has reduced the availability of such habitat and is a major concern for the conservation of the swamp francolin (Javed *et al.* 1999). The Tacarcuna wood-quail is a Vulnerable and little-known species inhabiting humid forest within its tiny range in Panama and Colombia. Clearance of its habitat to make way for coca *Erythroxylon coca* plantations is a major threat at present, as is habitat degradation through mining activities and hunting for food (Alvarez-Cordero *et al.* 1994). Increasingly, habitats are cleared for urban settlement, road building, or reservoir construction. The Sichuan hill-partridge is an Endangered species, and recent survey work by Dai Bo *et al.* (1998) revealed that road construction within the tiny range of this species is making its forest habitat more accessible to logging operations and to hunters. Although road construction itself may not be severely detrimental to habitats, the opening up of previously inaccessible areas means that habitat loss and degradation may be accelerated. In Panama, completion of the Pan-American Highway link through Darién could lead to severe, long-term damage to the forest of the Tacarcuna Ridge, thereby destroying habitat of the already Vulnerable Tacarcuna wood-quail (Alvarez-Cordero *et al.* 1994, Wege 1996).

Whatever the reason for habitat destruction, the inevitable result of the process is increased fragmentation in the distribution of a species. Habitat loss frequently leads to the disruption of all but small blocks of suitable habitat, which become separated from each other by large expanses of uninhabitable ground. These habitat “islands” contain populations that are often both small and isolated, making them particularly at risk of extinction through effects such as genetic drift, inbreeding depression, and local catastrophe (Primack 1998). For example, local populations normally able to recover from natural disasters, such as floods, may be rendered too small and isolated to withstand such devastating natural events. Several extinctions of isolated local populations through such episodes may rapidly add up to large-scale disappearances of a species.

The swamp francolin, found in northeast India, Bangladesh, and Nepal, has become localised in its

distribution through fragmentation of its wet grassland habitat. This fragmentation may have increased the vulnerability of this species to local extinction through random natural events (Javed and Rahmani 1998, Javed *et al.* 1999).

Habitat degradation is a reduction in the quality of a habitat without the loss of all original vegetation. It can result from activities such as selective removal of forest products and grazing by domestic or feral animals. One example is selective logging, where only a proportion of trees (usually valuable species) is removed from the forest in an area. This can vary in impact from the removal of a small proportion of the standing trees, to the loss of all but a few trunks. The associated problems, such as damage to residual trunks and soil compaction, are discussed by Whitmore (1984), while Marshall and Swaine (1992) more fully discuss the effects of selective logging on tropical forest. The term ‘selective logging’ is often taken to imply that trees are harvested according to sustainable principles and that alterations to forest structure are as limited as possible. At its most extreme, however, the resulting forest is severely degraded, with few trees left undamaged, and with an unnaturally patchy and irregular canopy.

The Nahan’s francolin, until recently a very little-known species, is found in a few localities in the Democratic Republic of Congo and Uganda. It is a strict tropical rainforest specialist, and degradation of its habitat in the Mabira Forest in eastern Uganda through intensive agricultural encroachment appears to have led to a dramatic reduction in bird densities in the area (Dranzoa 1998). However, nearly half of the Mabira Forest has now been given protection as a nature reserve and buffer zone. Work is in progress to understand why this species was unrecorded during a recent survey in Kibale Forest in southwestern Uganda. Grazing within non-protected forests on Hainan Island, China is considered to be one of the reasons for reductions in the populations of the Hainan hill-partridge (Gao Yu-ren *in litt.*).

Agricultural encroachment and habitat degradation are affecting populations of Nahan’s francolin in Uganda.



© Lynx Edicions

## Hunting

Although in many animal species, effects of direct exploitation are considered relatively minor, partridges, quails, francolins, snowcocks, guineafowl, and turkeys are often subject to very high harvest rates. Almost all wild Galliformes have been, or still are being, extensively hunted for subsistence, sport, or trade (Aebischer 1997a). It can be very difficult to distinguish between the effects of direct exploitation and more general threats to habitats. Habitat loss and modification are considered the primary reasons for declines in several European bird species, despite the fact they are regularly hunted (Aebischer 1997b). The effects of hunting are indeed hard to quantify, but there are several species for which direct over-exploitation is considered to be having significant negative impacts.

Recent meetings with local communities around Mabira and Bugoma Forests in Uganda, home to the Endangered Nahan's francolin, indicated that hunting for food may be widespread there. Work is underway to examine the potential impact of hunting for food on this species, which is considered vulnerable to extinction and appears to have declined in several areas since the early part of this century (Dranzoa 1998). Hunting has also led to considerable and rapid declines in part of the Chinese range of the chukar (Naifa 1995). Khan and Chaudhry (1999) used multivariate statistical techniques to estimate the relative importance of several variables on densities of grey francolins and black francolins in Punjab, Pakistan. They found hunting pressure through shooting and netting, much of which was illegal, to be the best predictor of population densities in both species i.e., that increased levels of hunting were associated with lower levels of francolin populations. The grey francolin is also a popular gamebird in northern India. The bearded wood-partridge in Mexico has been subject to sport hunting, despite its small and fragmented populations and protected status (J. Carroll *pers. obs.*), and the ocellated turkey is heavily hunted for food throughout its range, even in protected areas (Gonzales *et al.* 1996).

## Effect of agricultural chemicals

Little is known about the direct impact of many of the agricultural pesticides on partridges, quails, francolins, snowcocks, guineafowl, and turkeys in most countries. It is known that many organochlorines and organophosphate pesticides that are now banned in North America and Europe are widely used in the tropics. How these pesticides might impact species inhabiting farmland in many developing nations is unknown, but potentially serious (e.g., crested bobwhite in Latin America). It is known that agricultural pesticides have been used deliberately to poison the Vulnerable bearded wood-partridge in Mexico to stop depredation of bean crops (J. Carroll *pers. obs.*).

The increasing use of chemical herbicides in Southeast Asia is thought to be contributing to the decline of the blue-breasted quail in open agricultural land, a habitat in which they were formerly common (Wells 1999). However, recent work has indicated that pesticides do not present a major threat to black francolin and grey francolin populations in the intensely agricultural Punjab region in Pakistan (Khan and Chaudhry 1999). Still, this study did point out that investigations into the effects of pesticides can be hampered by the reluctance of farmers to provide information on types of chemicals used and rates of application.

There is also the possibility of a link between pesticide contamination and contraction of diseases in some species that use agricultural habitats. Along with habitat destruction and poaching, this may be an important area for future research. The effects of organochlorines and organophosphates are well established and their deleterious impact on birds through breeding failure is also reasonably well documented, at least in raptors. It remains to be seen, however, whether the same impacts occur in Galliformes, owing to their different position in the food chain (S. Javed *in litt.*).

A potentially bigger problem, wherever agriculture has become chemical-dependent, lies in the indirect effects of herbicides and pesticides. Many of the common agricultural weeds support insects and produce seeds that are important to species found in farmed areas. When these weeds and associated insects are controlled, bird populations are negatively impacted. This was well described for the grey partridge by Potts (1986), but effects on many less well-known species have not been investigated.

## Disturbance

Bamboo shoots are collected in the spring and autumn in habitats favoured by the Endangered Sichuan hill-partridge. This creates substantial and regular disturbance during the breeding season of the birds, when many people are based temporarily in areas such as Daxuecao. There could be as many as 3,000 people collecting bamboo shoots in this 91km<sup>2</sup> area of forest in late April and early May, most of them concentrated near the road that bisects the area and along adjacent paths (Dowell *et al.* 1997). There is also evidence for bamboo collecting within the Dafengding Nature Reserve (Dai Bo *et al.* 1998). Although the Sichuan hill-partridge is negatively affected by disturbance, other species, such as the orange-necked hill-partridge are apparently able to tolerate some human disturbance, being found regularly in secondary and degraded habitats (Atkins and Tentij 1999).

## Threatened subspecies and populations

This Action Plan provides a status survey and recommendations for future conservation action for species.

The Species Survival Commission of IUCN works primarily at a species level, and our desire has been to produce a document entirely compatible with their past and future publications. On a practical level, there is very little information on which to make judgements on the conservation status of many subspecies and populations of partridges, quails, francolins, snowcocks, guineafowl, and turkeys, and in view of the worldwide push for increasing rigour in conservation assessments through strict application of the IUCN Red List criteria (IUCN 1994), such an exercise would be unjustified. However, there are several instances where certain subspecies and isolated populations of various species are known to be under threat in their own right and, in some cases, taxonomic opinion is divided as to whether particular forms represent subspecies or should be given full species status. Taxa of concern include the Moroccan subspecies (*sabyi*) of the helmeted guineafowl, the race *ridgwayi* of the northern bobwhite, the Sri Lankan race (*watsoni*) of the painted francolin, and several of the subspecies of the chestnut-necklaced hill-partridge.

### **Summary of the threat status of partridges, quails, francolins, snowcocks, guineafowl, and turkeys**

Of the 145 species assessed for extinction risk, three are judged to be Critically Endangered, five are Endangered, and 16 are Vulnerable. The remaining 121 species are considered Lower Risk (see Chapters 2 and 3), although 11 of these are considered Near Threatened.

Urgent attention must focus on the three Critically Endangered species (Djibouti francolin, Himalayan quail, and gorgeted wood-quail) and the five Endangered species (Nahan's francolin, Mount Cameroon francolin, Sichuan hill-partridge, orange-necked hill-partridge, and chestnut-headed hill-partridge), and detailed species-specific proposals for all these have been produced (see projects in Section 4.4, Projects for Critically Endangered and Endangered Species). The status of all species, including those currently placed in the Lower Risk category, will be monitored at appropriate intervals through future editions of the Action Plan.

### **1.7 Actions for the conservation of partridges, quails, francolins, snowcocks, guineafowl, and turkeys**

Incorporating experience gained from work carried out during the five-year implementation period of the first Action Plan, this section outlines the different forms of conservation action that have proved effective. They have been divided into five areas to emphasise the sequence of

actions that must be undertaken to ensure long-term conservation of species.

### **Clarifying taxonomic units**

In order to promote the conservation of all partridges, quails, francolins, snowcocks, guineafowl, and turkeys, it is important that the species are clearly defined. Only when populations or groups of populations have been identified as separate entities can they be studied and practical conservation measures proposed. In this Action Plan, conservation recommendations are made at the level of the species because it is important that the amount of biological diversity conserved be maximised, while keeping the list of threatened species from becoming too overwhelming. If too many populations are treated separately, conservation effort may be diluted. Conversely, if too few are treated separately, important biological diversity may be lost. This, in turn, means that species-level taxonomy remains an important basis for setting priorities in conservation.

### **Gathering basic information**

**Surveys:** These are the first steps toward understanding a species' requirements and potential threats to its survival. Extensive surveys begin with the collection of basic information on the presence or absence of a species at various sites. Once the distribution of a species has been documented, then data on relative abundance and, if possible, absolute abundance should be obtained. Conservation action cannot be proposed without such basic knowledge. Surveys of one sort or another are proposed for many threatened species that sometimes lack the most basic field information on distribution and abundance in parts of their range. To generate comparable results to allow detection of long-term changes in abundance, it is important that surveys are designed to leave the possibility open of repeating exactly the same work at a later date. It is particularly important that methods are clearly described (including seasonal and daily timings) and survey areas are accurately located. This last point cannot be overstated. Formal techniques must be used and data collection should be standardised.

**Basic biological research:** Research with conservation objectives should be designed to provide detailed information on the biology of a threatened species (e.g., relating directly to its habitat requirements, its tolerance of disturbance, or its use of secondary or marginal habitats). Collecting sufficient data of the type required on individuals or populations will always be physically demanding, labour intensive, and expensive in comparison with extensive

survey techniques such as those described above. Thus, research projects need to be designed carefully to tackle important but feasible objectives that are of immediate use in specifying conservation efforts for the species concerned. Data useful for conservation can also be a by-product of “pure” research projects. Research with conservation outputs is recommended here for nine threatened species.

At the time of the first Action Plan’s publication, the Nahan’s francolin was virtually unknown, but over the last few years, researchers from Makerere University in Uganda have undertaken a series of intensive studies on this species (Dranzoa 1998, Dranzoa *et al.* 1999, Sande in press). This work has demonstrated that Nahan’s francolin is a forest specialist that clearly needs conservation attention. The team discovered that, although the species occurs in reasonable numbers, it is being hunted for food and cultural uses (the extent and severity of which are still to be investigated). It is also being adversely affected by forest degradation and its distribution within the tropical forests of Uganda remains to be clarified.

Had this research programme not been initiated, the breeding ecology, ranging patterns, group sizes, and activity patterns of Nahan’s francolin would have remained a mystery. This research programme is ongoing and, subject to funding, further studies will investigate the taxonomic position of the species through DNA analysis. These studies have provided large quantities of new information and show well how much can be achieved in a relatively short period of time.

## Making conservation recommendations

**Identifying priority areas for conservation:** Once adequate data from surveys and basic biological research have been collected, the information must be synthesised and large-scale patterns described. It is at this stage that threat categorisations can effectively be applied and conservation priorities set in a global context. This is necessary before local and specific conservation recommendations can be made.

Wherever possible, conservation recommendations should be based on existing structures and frameworks (e.g., Dai Bo *et al.* 1998). One of the longest standing conservation actions is the creation of protected areas. Although it is true that enforcement is often weak in protected areas, the fact remains that there is some impetus behind them and they do have legal standing. Although we now see these places as being set aside specifically for the conservation of species or habitats, it is important to realise that there is a variety of reasons why protected areas were first designated (Pressey *et al.* 1994) — many of these areas were not, strictly speaking, set aside for species or habitat conservation. It is, therefore, advisable to assess how far protected areas are succeeding in conserving

partridges, quails, francolins, snowcocks, guineafowl, and turkeys. This sounds simple, but is, in fact, a challenging task, both scientifically and in practice. The first step involves assessing how well the current system of protected areas covers the species and identifying species poorly represented by, or even completely absent from, the current network. We can then provide recommendations for embarking on the difficult challenge of trying to fill in these gaps.

In practice, these steps are difficult because data are required at a large scale; the need is for information on localities across entire species’ ranges. Although difficult, this is possible and has been attempted for the Galliformes of eastern Asia (McGowan *et al.* 1999). This analysis identified 37 species, of which 20 are threatened, that are not included in at least three protected areas in IUCN management categories I–IV (see IUCN 1998b), and involved the establishment of locality databases in four countries. More than 5,000 records were collected for over 100 species. Such work can provide a valuable context for specific field projects. For example, the Sichuan hill-partridge of south-central China is one of six threatened Asian endemics not known from any of the protected areas considered. Dai Bo *et al.* (1998) made recommendations for the sympathetic management of two proposed forest parks, extension of an existing national nature reserve to suitable altitudes, and the establishment of a new nature reserve in the largest remaining forest block. A second example, which indicates the problems of data collection, involves the orange-necked hill-partridge from southern Vietnam. This species was known only from Cat Tien National Park until surveys were directed towards the adjacent proposed Cat Loc Reserve, where Atkins and Tentij (1999) recently recorded the species.

The critical feature of this interaction between desktop analysis and fieldwork is that analysis can help direct fieldwork to where it can make the most impact. In turn, the results of the fieldwork feed back to help the large-scale assessment of how well the protected area network is covering the region’s species.

A further benefit of large scale analyses of this nature is that they can identify specific protected areas that are irreplaceable within the context of a group of species. This means, for example, that scarce conservation resources can be directed to the smallest number of protected areas that will cover the greatest number of threatened species. McGowan *et al.* (1999) used the principle of complementarity to identify 82 protected areas in eastern Asia that provide one way of ensuring that all species occur in at least three protected areas. Of course, some species are not known from any, let alone three protected areas, and those demand special attention. The set of 82 protected areas should, in theory, be at the centre of efforts to ensure sound management of habitats in which these species occur (see Project 6 in Section 4.2 for ideas on how



this work could be developed over the implementation period of this Action Plan).

**Population dynamics of individual species:** once set in the context of large-scale patterns and priorities, it is often desirable to understand the dynamics of populations (changes in numbers over time), and how particular threats and proposed management strategies are likely to affect them.

One way of looking at the population dynamics of a single species is to perform a Population Viability Analysis (PVA). The basic aim is to use information on the life history, ecology, and distribution of the species to assess how population sizes might change in the future as a consequence of alternative management strategies, such as habitat improvement, controlled hunting, and captive breeding. The process allows combinations of actions to be identified that reduce the risk of extinction to a minimum, at least in theory (Clark *et al.* 1991). Various computer programs that simulate the behaviour of populations under different conditions have been developed (Lacy 1993), but data input into these programs must be carefully checked to avoid misleading results. Major constraints on population modelling are the adequacy and reliability of available data. The amount and extent of information needed to run a simulation providing meaningful and feasible models is enormous; hence, there is a need for great caution when attempting such an exercise with limited data.

For many threatened species, much of the information required for this analysis is not published, so a popular and useful approach has been to hold internationally attended meetings, where researchers familiar with a particular species exchange information and ideas while conducting the PVA. These meetings are also useful to discuss the feasibility of implementing different management strategies, and ideally result in the production of a comprehensive and achievable set of actions for the conservation of a species. The Conservation Breeding Specialist Group of IUCN regularly oversees meetings of this type, which are termed Population and Habitat Viability Assessments (PHVAs). They are held, wherever possible, within a range country of the species in question.

Although few comprehensive PHVAs have been held for the species considered here, it is a process that could clearly benefit several species. Anyone considering holding a meeting of this type should arrange it in close consultation with the PQF Specialist Group and the Conservation Breeding Specialist Group—the latter now provides training courses around the world (see Appendix 1 for contact details). Twenty people from 10 institutions attended the masked bobwhite (*Colinus virginianus ridgwayi*) PHVA workshop in southeastern Arizona. The bird's distribution is currently restricted to two locations in Arizona and Mexico, and the U.S. Government is currently maintaining

a propagation and release programme (Sheppard and Bruning 1999).

## Types of conservation recommendation

**Protecting habitat:** Given that habitat loss and degradation are major threats to partridges, quails, francolins, snowcocks, guineafowl, and turkeys, establishing (and maintaining) areas of suitable habitat is usually the best way of ensuring their long-term survival. Thus, even in the absence of detailed recommendations of the type emerging from a PVA, large-scale distribution and habitat information can be used to recommend the designation and expansion of important protected areas as described above. This may either occur formally or result from the development of a local partnership. Such action is proposed for 17 of the threatened species covered in this plan. It is necessary that recommendations for protected area designation are based on sound science, and effectively promoted through lobbying of governments, local groups, and other parties involved in the decision-making process (see below).

Designation of protected areas, often in addition to those already in existence, is considered to be an important next step for numerous threatened species, as is the protection and management of critical habitats within these areas. Conflicts can occur in managing protected areas, however, an example of which may be found among the 600+ national parks and sanctuaries in India, many of which were created to protect large mammalian species such as tigers and rhinos. Much of the management work in these areas is directed towards this mammalian megafauna, and its impact on non-target species remains unknown in the majority of cases. For example, terai grasslands are burnt annually from December to April in large areas (Javed *et al.* 1999), an activity aimed at providing suitable habitat for ungulates such as swamp deer *Cervus duvauceli*. The impact of this management strategy on swamp francolins and other small Galliformes should be investigated as a matter of urgency (Javed 1999).

**Regulating hunting and encouraging sustainable use:** Humans have always had a close relationship with partridges, quails, francolins, snowcocks, guineafowl, and turkeys, and most species are regularly hunted for economic gain, sustenance, and other purposes. It may seem obvious that as hunting results in the death of birds, it must cause reduction in populations and should, therefore, be restricted, particularly where threatened species are concerned. However, intensive quantitative work on Galliformes in Europe and North America over the past few years has shown that many species that are regularly hunted can increase their reproductive output or suffer reduced mortality, compensating for losses caused by

hunting (Aebischer 1997b). This is a density-dependent process—the birds respond to the lowering of population density with increased reproductive output and improved rates of survival. Under natural conditions, this process ensures that populations can recover quickly from catastrophes or limit their maximum density to match the capacity of the environment to support them. It is likely that most, if not all, Galliformes exhibit this density-dependent response, although for species with low reproductive rates and high annual survival, pilot studies should be conducted to estimate viable offtake rates assuming no density-dependent response (N. Aebischer *in litt.*).

If harvesting is kept to a reasonable level, populations may not be harmed in the long term and humans can continue to derive economic gain, sustenance, and other benefits from the birds. This depends on many factors, however, so the implementation of sustainable use programmes must always be accompanied by population monitoring. In some cases, partridges, quails, francolins, snowcocks, guineafowl, and turkeys may actually benefit from sustainable harvesting (the “paradox of wise use”) because the economic incentive may encourage habitat improvement through targeted management to increase population levels and allow an even greater sustainable yield (Aebischer 1997b, Simiyu 1998). However, modification of habitat is a complex issue and anyone considering such action should investigate the possible effects on other species in the ecosystem.

The relationship between sustainable harvesting programmes and protected areas needs to be investigated over the coming five years. Allowing controlled hunting within protected areas already affected by illegal hunting may mean that the whole process can be more tightly monitored and controlled, and may provide reliable data to understand further the dynamics of hunted populations. There should always be parts of protected areas set aside as hunting-free zones, to act as reservoirs for the hunted species. Such programmes should involve wide consultation between local people, conservation NGOs, species experts, and government departments. Sustainable hunting may not be applicable for all species and, where poaching/illegal harvesting pressure is already intense, any kind of harvesting concept has to be treated with caution. However, as a sustainable use approach is possibly more applicable to partridges, quails, francolins, snowcocks, guineafowl, and turkeys than any other group of birds, some examples of its implementation will be considered in detail.

Since the gamebird hunting ban in Kenya was lifted in 1984, management of the process has been centralised, with all monies being directed to the Kenya Wildlife Service, a governmental, parastatal body. This has provided little incentive for local communities to manage gamebird habitats sympathetically. However, recent work at the African Wildlife Foundation has developed and

implemented a model system for the sustainable management of gamebird hunting (primarily of yellow-necked francolin and helmeted guineafowl) (Simiyu 1998). Legal responsibility for managing local hunting around the Mbirikani Group Ranch has been transferred to a local committee, which monitors gamebird populations and offtake rates, collects revenue, and supervises hunters.

Carefully designed monitoring programmes and habitat studies have provided basic biological information leading to calculation of sustainable offtake rates, and the ranch has employed several staff to continue the monitoring procedures and oversee the hunting process. Staff at the African Wildlife Foundation have provided long-term training to ranch members and have assisted, wherever possible, in setting up the necessary management structures. Within the last year, management of the Mbirikani system has become almost entirely autonomous.

Hunting revenues have almost tripled since the programme was implemented and monitoring data indicate that there remains scope for increasing offtake rates further. This project has provided substantial economic benefits to the Mbirikani Group Ranch community, as well as a conservation incentive to effectively manage the birds and their habitats. The system has been replicated at the Kuku Group Ranch, and there are plans to do so at several other ranches that have expressed an interest in the scheme. The success of this system suggests that sustainable gamebird hunting can generate significant income for local communities.

In 1990, legislation in Cyprus for the first time required that funds from hunting licences be spent directly on the protection of game and other wildlife. This means that about US\$3 million is spent every year on improving habitat, rearing game species (chukar and black francolin) for release, and further research on sustainable management regimes. About 100,000 chukars are released every year on the island and a captive breeding and release programme is underway for black francolins, although it is too early to evaluate the effectiveness of the latter programme. Such co-operation between biologists, policymakers, and hunters provides an admirable model for the development and implementation of similar programmes (Cyprus Homepage Website 1999).

In North America, sustainable hunting programmes are effective in populations of northern bobwhite, mountain quail, scaled quail, California quail, and Gambel’s quail. While the North American management system has been a model for sustainable hunting and restoration of a number of species (e.g., wild turkey), it has failed to mitigate the impacts of major changes in land use on other species, such as the northern bobwhite in the southeastern United States. However, when the connection is made between a desired game species and habitat protection, then not only is the species protected, but also its critical native habitats. For example, small parts of southern

Georgia and northern Florida in the southeastern US have been maintained in native long-leaf pine ecosystems, which have been generally lost elsewhere because landowners in these two areas have an interest in hunting quail. The same is true in Britain, where landowners interested in hunting the grey partridge will modify their farming practices to accommodate the birds.

**Managing captive populations:** The value of captive populations has long been a subject of debate, and this debate is at its most vigorous among keepers of the many Galliformes species held in captivity. Traditionally, captive populations have been viewed as a safety net. In the event of extinction of wild populations or species, captive birds can be re-introduced into the species' native range or, in the face of heavy declines in wild populations, captive stock can be released to supplement those still extant but at low density. For this reason, effective genetic management of captive populations, both in terms of minimising excessive inbreeding and interpopulation hybridisation events, and maximising genetic diversity, has been a priority.

The process of re-introduction is extremely complex and expensive and the *IUCN Guidelines for Re-introductions* (IUCN 1998a) should be closely adhered to when designing such a re-introduction programme. In managing captive stocks, the critical issue is the maintenance of birds that resemble wild birds as much as possible genetically, morphologically, and behaviourally. There have been efforts to assess the genetic status of the closely related Vietnamese lowland *Lophura* pheasants by WPA/CBAC (Conservation Breeding Advisory Committee). Subsequent to this, a wider project involving DNA studies materialised, and the Museum of Natural History (Cleres, France) joined as a partner and contracted the Istituto Nazionale per la Fauna Selvatica (Bologna, Italy) to carry out the work (H. Assink *in litt.*). Through pioneering use of genetic techniques, researchers have estimated genetic variability of captive stocks and compared it with wild populations. Preliminary results on the Edwards' pheasant *Lophura edwardsi* indicate that variability in captive stocks is indeed low. Genetic techniques have also been developed to identify and remove hybrids from captive stocks (Hennache *et al.* 1998). This project will be extended to other Galliformes species over the coming years, and will provide an excellent foundation on which to build future management recommendations for captive stocks (Rietkerk *et al.* 1999). Studies such as this do indicate that we are a long way from being able to confidently mount re-introduction programmes for most species, but continuing work may change this situation in the future (A. Hennache *in litt.*).

It is now becoming clear that captive populations have much wider roles to play than as potential safety nets for declining species. In recent years, WPA/CBAC has begun to re-assess these roles. Their private breeders started the first regional Galliformes studbooks in 1992, joining the

zoo community to form the joint GalliTAG (Galliformes Taxon Advisory Group) in 1994. That joint arrangement continues today within the European Endangered Species Programme Galliformes TAG, with both private breeders and institutions working together to maintain Galliformes populations in captivity. Captive populations provide material for morphological, genetic, and behavioural research, and can raise public conservation awareness through zoo exhibits, particularly when these are within the range of threatened species. The Malaysian Department of Wildlife and National Parks formed the Pheasant Breeding Centre at Sungkai in the early 1980s, and has used this establishment to retain gene pools of endemic species and set up breeding groups in the UK and USA. A further centre is under construction in Johore State, which will provide stock for re-introduction programmes.

Finding and studying wild populations of some threatened partridges, quails, francolins, snowcocks, guineafowl, and turkeys is extremely difficult and time consuming, and providing researchers are mindful of the limitations that are borne, captive birds can supply useful information (e.g., study of phylogenetic relationships, developing experimental protocols, etc.). Results from the captive breeding of Malaysian species in the UK indicate that new and valuable data are being obtained on behaviour and breeding biology (G. Robbins *in litt.*). Captive breeding may also limit the market for poached birds to supply zoos and parks, thereby reducing pressure on wild populations (Tonge and Wilkinson 1998).

It must be emphasised that effective management of captive populations remains extremely important. Firstly, ensuring genetic integrity and physical health of captive birds is important for maintaining populations in captivity over the long term for all of the purposes mentioned above. Secondly, other candidates and techniques for re-introduction or supplementation programmes may be identified in the future, and there must be vigorous captive stock available. This means that subspecies and distinct geographical forms should be managed separately wherever possible, particularly where there are disagreements over taxonomic rank.

The European GalliTAG hopes to develop a regional collection plan for Europe over the next few years (see Sheppard and Bruning 1999 for the American regional collection plan), and improve co-ordination and communication between zoos and private breeders (A. Hennache, *in litt.*). See Appendix 2 for information on global captive populations of threatened partridges, quails, francolins, snowcocks, guineafowl, and turkeys.

**Conducting conservation awareness programmes:** Because of the close relationship between humans and partridges, quails, francolins, snowcocks, guineafowl, and turkeys, there is great potential for conservation awareness programmes to highlight the plight of individual species,

and raise awareness of general principles of environmental stewardship and sustainable use. In many situations, especially where direct human causes have been implicated in the decline of a species, effective long-term conservation measures cannot be put in place without a rigorous and well-audited conservation awareness programme amongst local communities. Very few project proposals with a significant education component are received by the Specialist Group each year, but we nevertheless continue to urge that such initiatives are put together, and here present some guidelines on submitting funding proposals.

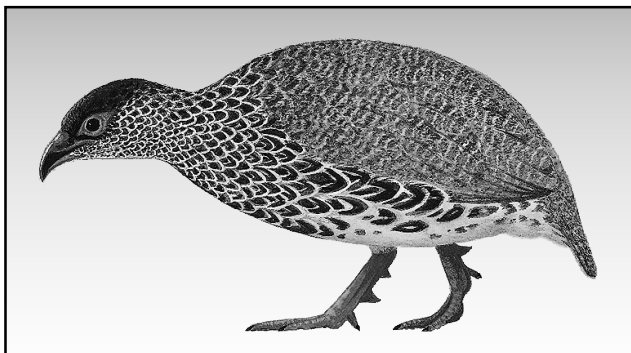
Specific conservation awareness programmes are most appropriate at the local community level where a species of concern occurs. Initiatives may include, for example, workshops involving stakeholders to discuss problems and possible solutions, and the establishment of mechanisms for distributing information in communities such as construction of an information centre, creating a nature trail, holding nature clubs at local schools with regular events (e.g., slide/video shows, field trips, and talks), and funding a field camp for schoolchildren or teachers.

More generalised awareness programmes could involve funding publications, visual education material, or exhibitions (travelling or static) to provide background information on the birds, why their conservation is important, and what people can contribute as individuals and as members of their communities. Material needs to be carefully designed for the target audience.

All conservation awareness programmes must be evaluated to reveal how people benefited from the initiative, and what conservation goals have been achieved. The latter may not be specific, but the former can be tested using questionnaires and feedback workshops, depending on the situation. Once again, such evaluation exercises must be carefully thought through and details submitted with the project proposal.

Although captive birds can provide the means with which to raise awareness among the general public of specific and general conservation issues, it is essential that such programmes are carefully thought through and that conservation benefits logically flow from the programme.

Harwood's francolin. A conservation awareness programme is recommended to highlight the uniqueness of this Ethiopian endemic.



© Lynx Edicions

For example, it is important to know who will be visiting the birds. The type of visitor will affect the conservation awareness outcomes – will visitors be local people, tourists, school children, teachers, or influential national officials? How will these different groups of people assimilate information? School children will need well-prepared activity sheets and thoughtfully laid out exhibits. How will information on the birds be presented? Details of distribution, ecology, threats, and conservation action should be provided in a clear and simple format—samples of labelling must be included with project proposals.

The overall message is that conservation awareness programmes should not just be added on to a biological conservation project because it seems the right thing to do. If they are to be effective for conservation, these important initiatives must be carefully planned, executed, and evaluated. All conservation awareness programmes must be evaluated to reveal how people benefited from the initiative, and what conservation goals have been achieved. Ideally, experiences and evaluations should be published both locally and internationally to aid the designing of further projects.

In North America a long history of conservation training has resulted in some changes in human perceptions of smaller Galliformes species. Hunters now generally view gamebird management and harvest as sustainable activities, and most areas in North America require some hunter education that includes basic components of sustainable management of harvested species (J. Carroll *pers. obs.*).

## Implementing conservation recommendations

There are a great many global, regional, and national conservation initiatives that deal with issues other than the single species or species group that are covered in this Action Plan. Many of these initiatives involve either incorporating conservation concerns into governmental policy, or issues relating to limiting the damaging impacts of development programmes. In these broad-scale programmes and others, such as protected area management, the kind of species information presented in these plans and arising from work suggested here can play a key role, particularly with respect to the objective of maintaining and enhancing biodiversity. Therefore, there is a need to ensure that reliable data on species are utilised when preparing conservation policy and assessing development needs.

One prime example of a global initiative that is having increasingly local impact is the Convention on Biological Diversity, which was framed during the United Nations Convention on Environment and Development (popularly known as the 'Earth Summit') at Rio de Janeiro in Brazil during 1992. The objectives of the Convention on

**Box 1.1. The Convention on Biological Diversity. Key articles relating to the conservation of biodiversity.**

- **Article 6: General measures of conservation and sustainable use**

Requires the development of national strategies, plans, or programmes for the conservation and sustainable use of biodiversity.

- **Article 7: Identification and monitoring**

Requires the identification and monitoring of biodiversity and of impacts upon it. It also considers the knowledge necessary for conservation and sustainable use.

- **Article 8: *In situ* conservation (i.e., conservation of biological diversity within natural habitats and ecosystems)**

Requires the management of biodiversity where it occurs naturally, and includes the need for protected areas and the needs of threatened species.

- **Article 9: *Ex situ* conservation (i.e., conservation of biological diversity outside natural habitats)**

Requires the management of biodiversity in places such as zoos and botanical gardens. It also deals with collection from the wild.

Biological Diversity are to ensure the conservation of biodiversity, its sustainable use, and the equal sharing of benefits from its use. There are four key articles that are relevant to the activities of the PQF Specialist Group (see Box 1.1).

In order to convert species information and conservation recommendations that flow from the activities outlined above into action, there is a need to identify which administrative level is most appropriate for implementation. The global importance of this convention is demonstrated in several ways. The first is the degree to which many countries are developing or have developed national biodiversity strategies and action plans as required under Article 6. The first step in this process is the production of a biodiversity assessment for a country.

In concert with the rest of the Galliformes Specialist Groups there is a clear need to ensure that accurate information on partridges, quails, francolins, snowcocks, guineafowl, and turkeys is made available to such national biodiversity assessments. This Action Plan, and all the supporting data used to produce it, should contain this. Subsequently, we must bring all available expertise to bear on the resulting national conservation recommendations as they affect threatened species.

## Monitoring effects of conservation action

Systematic monitoring of populations is an essential tool for detecting changes in the status of a species at particular sites over long periods of time, and should always be used to assess the effectiveness of conservation actions. Careful thought must be given to the design of monitoring

programmes, ideally through initial assessments of count reliability that include correlating results of index counts with detailed counts at appropriate times of year.

Call counts have proved to be appropriate for deriving relative abundance indices of vocal Galliformes even though the results may be of limited general utility (Khaling *et al.* 1998). Such a study by Khan and Chaudhry (1999) on two francolin species in Pakistan showed a significant relationship between call counts and attempted absolute counts using line drives. Indices generated through call counts (during breeding seasons) and transect walks (outside breeding seasons) also showed close agreement in painted francolin in Gujarat, India (Kaul and Howman 1992), suggesting the utility of both methods in designing monitoring protocols for other Galliformes. Difficulties in using line transects may be experienced, especially in hilly terrain where assumptions of line transect theory are violated. In such situations, use of encounter rates has been suggested as an alternative index of abundance.

In Pipar, Nepal, populations of Galliformes have been monitored for about 20 years (Howman and Garson 1993). Although counts at regular intervals have provided data to monitor changes in populations of these birds, it is suspected that lack of consistent methodology and observer bias (different teams or individuals on each survey) may have made the figures less reliable for comparisons between years (R. Kaul *in litt.*). Such problems illustrate how difficult and labour intensive this work can be, but the potential benefits of long-term and well-designed monitoring programmes are immense. Study sites established in Asia are amenable to long-term monitoring mainly because protocols are established and areas are demarcated. Some form of population monitoring has been recommended for five species in this Action Plan.

## Summary of conservation action

The PQF Specialist Group has concluded that of the different actions considered, the most urgent in terms of assisting threatened species conservation are surveys (23 of the 24 threatened species), habitat protection (17 species), large-scale assessments (10 species), basic biological research (nine species), and conservation awareness programmes (six species).

Although, at present, the remaining 121 species are not considered in need of conservation action on a global scale, action may already be needed locally to prevent them from becoming extinct in certain parts of their ranges. As the vast majority of partridges, quails, francolins, snowcocks, guineafowl, and turkeys are very poorly known in the wild, these species at lower risk present an ideal opportunity for research training. For

example, they may be suitable subjects for research into wise use through sustainable harvesting, which could provide an economic incentive to conserve both the birds and their habitats (Hudson and Rands 1988, Aebischer

1991). Such studies may also lead to the development of techniques beneficial in the context of conservation of threatened partridges, quails, francolins, snowcocks, guineafowl, and turkeys.

# Summary of the Conservation Status of Partridges, Quails, Francolins, Snowcocks, Guineafowl, and Turkeys

In order to prioritise species for conservation, it is desirable to place them in different categories representing the severity of threats they face and the likelihood of them becoming extinct. This allows conservation actions to be targeted at species and areas most in need of attention in a global or regional context.

In November 1994, the IUCN Council approved a new set of such threatened species categories (IUCN 1994) designed to provide an objective system that can be applied consistently by different people and across different groups of organisms, although this only became widely available in 1996. The new system also allows the user of threatened species lists to see exactly how and why each species has been placed in a certain threat category. The three categories indicating threatened status are Critically Endangered, Endangered, and Vulnerable. Species not considered under threat are placed in the Lower Risk category, subdivided into conservation dependent, near threatened, and least concern. All judgements of threat status should be reviewed on a regular basis.

Certain criteria must be met to qualify a species for inclusion in a particular threat category. For example,

## Box 2.1 The IUCN Red List Categories (from IUCN 1994).

### Critically Endangered (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.

### Endangered (EN)

A taxon is Endangered when it is not Critically Endangered, but is facing a very high risk of extinction in the wild in the near future.

### Vulnerable (VU)

A taxon is Vulnerable when it is not Critically Endangered or Endangered, but is facing a high risk of extinction in the wild in the medium-term future.

### Lower Risk (LR)

A taxon is Lower Risk when it has been evaluated, but does not satisfy the criteria for any of the categories Critically Endangered, Endangered, or Vulnerable.

a species represented by fewer than 2,500 mature individuals and with an estimated continuing decline of at least 20% within five years qualifies as Endangered (criterion C1), and one with fewer than 250 mature individuals and a 25% rate of decline within three years is considered Critically Endangered (criterion C1). These criteria have to be stated clearly and justified whenever a new threat categorisation is made. In this chapter, we present the results of an assessment conducted by experts in each species, through a process co-ordinated by the BirdLife Secretariat and using all relevant information available. The criteria for each threat category are reproduced from IUCN (1994), and presented together with the categorisations of each partridge, quail, francolin, snowcock, guinea fowl, and turkey species.

Full justifications as to why each species has been placed in a particular threat category are given in the following chapter.

## NOTE

In the first Action Plan, the conservation status of species was assessed using the criteria proposed by Mace and Lande (1991). These criteria were widely known as the Mace-Lande Criteria, and have now been given the version number 1.0 in the process to revise the IUCN Red List categories and criteria (IUCN 1994). *Because the criteria for assigning species to the categories have been revised, the present categorisations cannot be directly compared with those given in the first Action Plan.*

## 2.1 Critically Endangered species

The following three species meet criteria for classification as Critically Endangered:

### Djibouti francolin (*Fringilla oshani*)

**Distribution:** Djibouti

**Threat status/criteria:** CRITICALLY ENDANGERED/A1a,c,d; A2b,c,d

**Priority conservation actions:** surveys, research, promote effective habitat management, large-scale assessment of conservation status (see Project 11 in Section 4.4)

## Box 2.2 Criteria for Critically Endangered (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria (A to E):

### A. Population reduction in the form of either of the following:

1. An observed, estimated, inferred, or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:
  - a) direct observation
  - b) an index of abundance appropriate for the taxon
  - c) a decline in area of occupancy, extent of occurrence, and/or quality of habitat
  - d) actual or potential levels of exploitation
  - e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors, or parasites.
2. A reduction of at least 80%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d), or (e) above.

### B. Extent of occurrence estimated to be less than 100km<sup>2</sup> or area of occupancy estimated to be less than 10km<sup>2</sup>, and estimates indicating any two of the following:

1. Severely fragmented or known to exist at only a single location.
2. Continuing decline, observed, inferred, or projected, in any of the following:
  - a) extent of occurrence
  - b) area of occupancy
  - c) area, extent, and/or quality of habitat
  - d) number of locations or subpopulations
  - e) number of mature individuals.
3. Extreme fluctuations in any of the following:
  - a) extent of occurrence
  - b) area of occupancy
  - c) number of locations or subpopulations
  - d) number of mature individuals.

### C. Population estimated to number less than 250 mature individuals and either:

1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, or
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
  - a) severely fragmented (i.e., no subpopulation estimated to contain more than 50 mature individuals) or
  - b) all individuals are in a single subpopulation.

### D. Population estimated to number less than 50 mature individuals.

### E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer.

## Himalayan quail (*Ophrysia superciliosa*)

**Distribution:** Uttar Pradesh, India

**Threat status/criteria:** CRITICALLY ENDANGERED/  
D1

**Priority conservation actions:** surveys to locate the species  
(see Project 17 in Section 4.4)

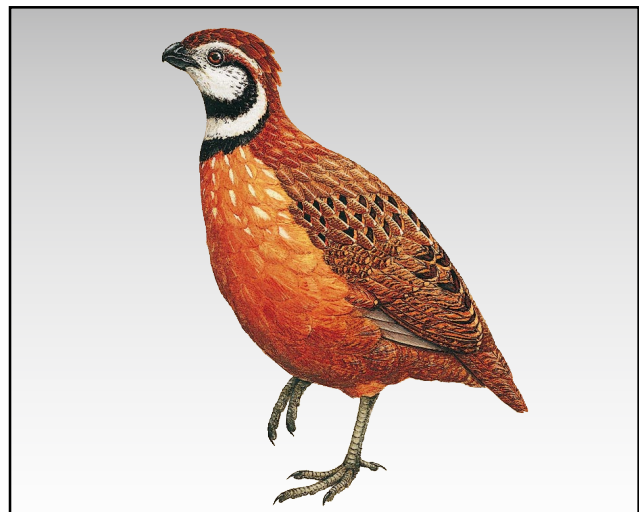
## Gorgeted wood-quail (*Odontophorus strophium*)

**Distribution:** eastern Andes in Colombia

**Threat status/criteria:** CRITICALLY ENDANGERED/  
B1+2a,b,c,e

**Priority conservation actions:** clarify taxonomic units,  
surveys, protect habitat, monitoring programme (see  
Project 18 in Section 4.4)

The Critically Endangered gorgeted wood-quail is now known only from the Cachalu Wildlife Sanctuary in Colombia.



© Lynx Edicions



## 2.2 Endangered species

The following five species meet criteria for classification as Endangered:

### Nahan's francolin (*Francolinus nahani*)

**Distribution:** Democratic Republic of Congo and Uganda

**Threat status/criteria:** ENDANGERED/B1+2b,c,e

**Priority conservation actions:** surveys, research, protect habitat, promote effective habitat management, monitoring programme (see Project 12 in Section 4.4)

### Mount Cameroon francolin (*Francolinus camerunensis*)

**Distribution:** Mount Cameroon

**Threat status/criteria:** ENDANGERED/B1+2a,b,c,e

**Priority conservation actions:** surveys, large-scale assessment of conservation status, promote effective habitat management, monitoring programme (see Project 13 in Section 4.4)

### Sichuan hill-partridge (*Arborophila rufipectus*)

**Distribution:** Sichuan, China

**Threat status/criteria:** ENDANGERED/C2a

**Priority conservation actions:** surveys, research, protect habitat, promote effective habitat management (see Project 14 in Section 4.4)

### Orange-necked hill-partridge (*Arborophila davidi*)

**Distribution:** Conchinchina, southern Vietnam

#### Box 2.3 Criteria for Endangered (EN)

A taxon is Endangered when it is not Critically Endangered, but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria (A to E):

##### A. Population reduction in the form of either of the following:

1. An observed, estimated, inferred, or suspected reduction of at least 50% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:
  - a) direct observation
  - b) an index of abundance appropriate for the taxon
  - c) a decline in area of occupancy, extent of occurrence, and/or quality of habitat
  - d) actual or potential levels of exploitation
  - e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors, or parasites.
2. A reduction of at least 50%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d), or (e) above.

##### B. Extent of occurrence estimated to be less than 5,000km<sup>2</sup> or area of occupancy estimated to be less than 500km<sup>2</sup>, and estimates indicating any two of the following:

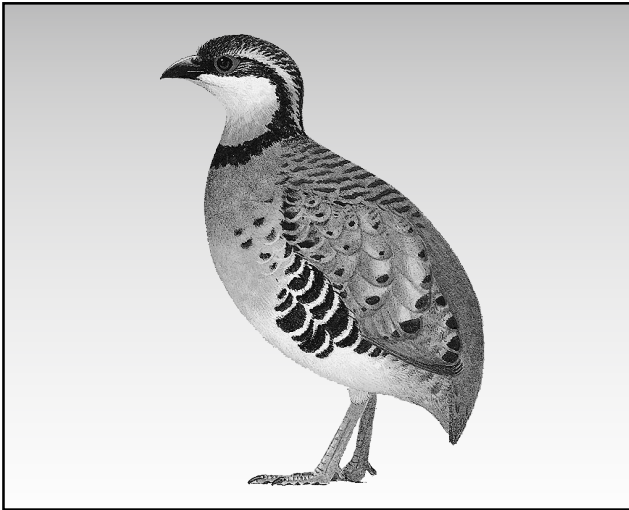
1. Severely fragmented or known to exist at no more than five locations.
2. Continuing decline, observed, inferred, or projected, in any of the following:
  - a) extent of occurrence
  - b) area of occupancy
  - c) area, extent, and/or quality of habitat
  - d) number of locations or subpopulations
  - e) number of mature individuals.
3. Extreme fluctuations in any of the following:
  - a) extent of occurrence
  - b) area of occupancy
  - c) number of locations or subpopulations
  - d) number of mature individuals.

##### C. Population estimated to number less than 2,500 mature individuals and either:

1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, or
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
  - a) severely fragmented (i.e., no subpopulation estimated to contain more than 250 mature individuals) or
  - b) all individuals are in a single subpopulation.

##### D. Population estimated to number less than 250 mature individuals.

##### E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer.



© Lynx Edicions

The orange-necked hill-partridge is known only from three sites in southern Vietnam.

**Threat status/criteria:** ENDANGERED/B1+2b,c,d,e; C1; C2a

**Priority conservation actions:** surveys, protect habitat, monitoring programme (see Project 15 in Section 4.4)

### **Chestnut-headed hill-partridge (*Arborophila cambodiana*)**

**Distribution:** southeast Thailand and southwest Cambodia

**Threat status/criteria:** ENDANGERED/C1; C2a; D1

**Priority conservation actions:** surveys, monitoring programme, clarify taxonomic units, conservation awareness programme (see Project 16 in Section 4.4)

## **2.3 Vulnerable species**

The following 16 species meet criteria for classification as Vulnerable:

### **Swamp francolin (*Francolinus gularis*)**

**Distribution:** Nepal, India, Bangladesh

**Threat status/criteria:** VULNERABLE/A1c,d; A2c,d

**Priority conservation actions:** surveys, research, promote effective habitat management, large-scale assessment of conservation status (see Project 19 in Section 4.5)

### **Harwood's francolin (*Francolinus harwoodi*)**

**Distribution:** central Ethiopia

**Threat status/criteria:** VULNERABLE/B1+2c,e

**Priority conservation actions:** surveys, protect habitat, encourage sustainable use, conservation awareness programme

### **Grey-striped francolin (*Francolinus griseostriatus*)**

**Distribution:** western Angola

**Threat status/criteria:** VULNERABLE/B1+2a,b,c,e; C2a

**Priority conservation actions:** surveys, protect habitat, large-scale assessment of conservation status

### **Swierstra's francolin (*Francolinus swierstrai*)**

**Distribution:** western Angola

**Threat status/criteria:** VULNERABLE/B1+2a,b,c,e; C2a

**Priority conservation actions:** surveys, protect habitat, large-scale assessment of conservation status

### **Black wood-partridge (*Melanoperdix nigra*)**

**Distribution:** Peninsular Malaysia, East Malaysia, and Sumatra

**Threat status/criteria:** VULNERABLE/A1c,d; A2c,d

**Priority conservation actions:** surveys, research, large-scale assessment of conservation status, protect habitat (see Project 8 in Section 4.2)

### **Manipur bush-quail (*Perdica manipurensis*)**

**Distribution:** northeast India and apparently Bangladesh

**Threat status/criteria:** VULNERABLE/A1c,d; A2c,d; C1; C2a

**Priority conservation actions:** surveys, protect habitat (see Project 20 in Section 4.5)

### **Udzungwa forest-partridge (*Xenoperdix udzungwensis*)**

**Distribution:** Udzungwa Mountains, Tanzania

**Threat status/criteria:** VULNERABLE/D2

**Priority conservation actions:** study habitat requirements, study effects of human disturbance (see species account in Section 3.3)

### **Chestnut-breasted hill-partridge (*Arborophila mandellii*)**

**Distribution:** Bhutan, India, and Tibet

**Threat status/criteria:** VULNERABLE/C1; C2a

**Priority conservation actions:** surveys, research, large-scale assessment of conservation status, protect habitat

### **White-necklaced hill-partridge (*Arborophila gingica*)**

**Distribution:** southeast China

### Box 2.4 Criteria for Vulnerable (VU)

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the following criteria (A to E):

#### A. Population reduction in the form of either of the following:

1. An observed, estimated, inferred, or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:
  - a) direct observation
  - b) an index of abundance appropriate for the taxon
  - c) a decline in area of occupancy, extent of occurrence, and/or quality of habitat
  - d) actual or potential levels of exploitation
  - e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors, or parasites.
2. A reduction of at least 20%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d), or (e) above.

#### B. Extent of occurrence estimated to be less than 20,000km<sup>2</sup> or area of occupancy estimated to be less than 2,000km<sup>2</sup>, and estimates indicating any two of the following:

1. Severely fragmented or known to exist at no more than 10 locations.
2. Continuing decline, observed, inferred, or projected, in any of the following:
  - a) extent of occurrence
  - b) area of occupancy
  - c) area, extent, and/or quality of habitat
  - d) number of locations or subpopulations
  - e) number of mature individuals.
3. Extreme fluctuations in any of the following:
  - a) extent of occurrence
  - b) area of occupancy
  - c) number of locations or subpopulations
  - d) number of mature individuals.

#### C. Population estimated to number less than 10,000 mature individuals and either:

1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, or
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
  - a) severely fragmented (i.e., no subpopulation estimated to contain more than 1,000 mature individuals) or
  - b) all individuals are in a single subpopulation.

#### D. Population very small or restricted in the form of either of the following:

1. Population estimated to number less than 1,000 mature individuals.
2. Population is characterised by an acute restriction in its area of occupancy (typically less than 100km<sup>2</sup>) or in the number of locations (typically less than five). Such a taxon would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming Critically Endangered or even Extinct in a very short period.

#### E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

**Threat status/criteria:** VULNERABLE/C1; C2a

**Priority conservation actions:** surveys, research, protect habitat, promote effective habitat management

### Hainan hill-partridge (*Arborophila ardens*)

**Distribution:** Hainan Island, China

**Threat status/criteria:** VULNERABLE/A1c,d; B1+2b,c,d,e; C1; C2a

**Priority conservation actions:** surveys, large-scale assessment of conservation status, protect habitat, conservation awareness programme, encourage sustainable use (see Project 21 in Section 4.5)

### White-faced hill-partridge (*Arborophila orientalis*)

**Distribution:** eastern Java, Indonesia

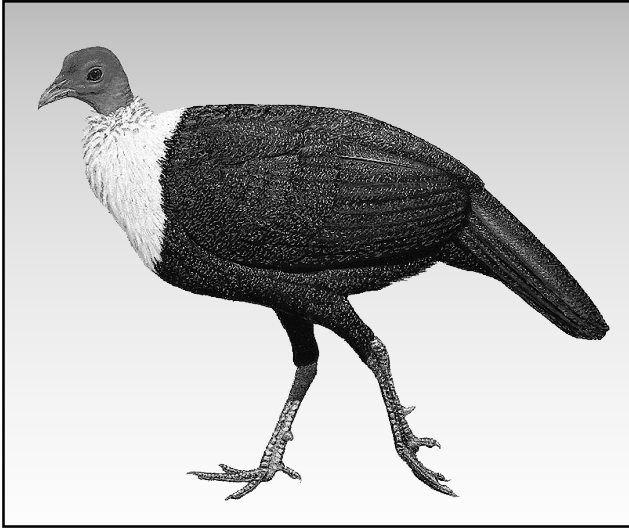
**Threat status/criteria:** VULNERABLE/A1c; A2c; B1+2b,c,e

**Priority conservation actions:** surveys, large-scale assessment of conservation status, protect habitat

### Bearded wood-partridge (*Dendrortyx barbatus*)

**Distribution:** eastern Mexico

**Threat status/criteria:** VULNERABLE/A1c,d; A2c,d; B1+2a,b,c,e; C1; C2a



© Lynx Edicions

The white-breasted guineafowl of West Africa has undergone a rapid population decline over the past 10 years.

**Priority conservation actions:** surveys, research, conservation awareness programme (see Project 22 in Section 4.5)

**Black-fronted wood-quail (*Odontophorus atrifrons*)**

**Distribution:** Colombia and Venezuela  
**Threat status/criteria:** VULNERABLE/B1+2a,b,c,e; C2a  
**Priority conservation actions:** surveys, protect habitat (see Project 4 in Section 4.2 and Project 10 in Section 4.3)

**Dark-backed wood-quail (*Odontophorus melanonotus*)**

**Distribution:** northwest Ecuador, southwest Colombia  
**Threat status/criteria:** VULNERABLE/B1+2a,b,c,e  
**Priority conservation actions:** surveys, protect habitat (see Project 4 in Section 4.2 and Project 10 in Section 4.3)

**Tacarcuna wood-quail (*Odontophorus dialeucos*)**

**Distribution:** eastern Panama and northwest Colombia  
**Threat status/criteria:** VULNERABLE/D2  
**Priority conservation actions:** surveys, protect habitat (see Project 4 in Section 4.2 and Project 10 in Section 4.3)

**White-breasted guineafowl (*Agelastes meleagrides*)**

**Distribution:** Ghana, Ivory Coast, Liberia, and Sierra Leone  
**Threat status/criteria:** VULNERABLE/A1c,d; A2c,d  
**Priority conservation actions:** surveys, promote effective habitat management, regulate hunting, conservation awareness programme

**2.4 Lower Risk species**

**Box 2.5 Criteria for Lower Risk (LR)**

A taxon is Lower Risk when it has been evaluated, but does not satisfy the criteria for any of the categories Critically Endangered, Endangered, or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:

**1. Conservation Dependent (cd).**

Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.

**2. Near Threatened (nt).**

Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.

**3. Least Concern (lc).**

Taxa which do not qualify for Conservation Dependent or Near Threatened.

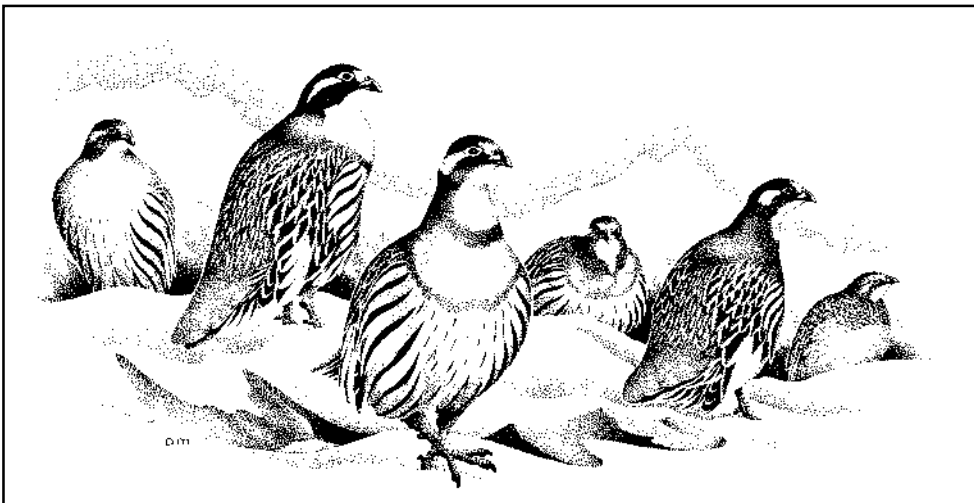


Illustration: David Mead

The Tibetan snowcock is found on open slopes above 3,700m in central Asia. Although not threatened, little is known of its ecology.

The following 121 species are considered to be at Lower Risk (either Near Threatened or Least Concern). The Near Threatened subcategory is given in brackets after each such justification; all other species are considered Least Concern.

Species	Distribution	Justification for Lower Risk <sup>1</sup>
Snow partridge <i>Lerwa lerwa</i>	Himalayas from Afghanistan to central China	widespread, population in hundreds of thousands
See-see partridge <i>Ammoperdix griseogularis</i>	southeast Turkey to Pakistan	widespread with little human disturbance
Sand partridge <i>Ammoperdix heyi</i>	Egypt and Arabian Peninsula	widespread and common, only local persecution
Caucasian snowcock <i>Tetraogallus caucasicus</i>	Caucasus	despite small range, population numbers hundreds of thousands
Caspian snowcock <i>Tetraogallus caspius</i>	south and east Turkey, Armenia, Iran into Transcaspia	global population estimated between 8,400 and 11,200; situation needs to be monitored
Tibetan snowcock <i>Tetraogallus tibetanus</i>	Tadjikistan to NW Sichuan	range over 500,000km <sup>2</sup>
Altai snowcock <i>Tetraogallus altaicus</i>	southern Siberia and Mongolia	range over 100,000km <sup>2</sup> , population estimated at 50,000–100,000
Himalayan snowcock <i>Tetraogallus himalayensis</i>	Tadjikistan to west-central China	range over 1,000,000km <sup>2</sup>
Chestnut-throated partridge <i>Tetraophasis obscurus</i>	western China	little known, although reasonably large range and very low human influence ( <b>nt</b> )
Buff-throated partridge <i>Tetraophasis szechenyii</i>	eastern Himalayas	little known, although very low human influence; situation needs to be monitored ( <b>nt</b> )
Rock partridge <i>Alectoris graeca</i>	southeastern Europe	despite human pressures, population still reasonable and widespread
Chukar <i>Alectoris chukar</i>	southeastern Europe to eastern China	very large global range
Philby's partridge <i>Alectoris philbyi</i>	Saudi Arabia and northern Yemen	restricted range, but locally common and subject to little human influence ( <b>nt</b> )
Rusty-necklaced partridge <i>Alectoris magna</i>	north-central China	restricted range, and human pressures possibly causing decline; situation needs to be monitored ( <b>nt</b> )
Barbary partridge <i>Alectoris barbara</i>	Morocco to Egypt	common to abundant across much of range
Red-legged partridge <i>Alectoris rufa</i>	southwestern Europe	although declining, still common over much of range, and widely introduced
Arabian partridge <i>Alectoris melanocephala</i>	Arabian Peninsula	locally common, but in view of restricted range and possible dependence on juniper, situation should be monitored
Black francolin <i>Francolinus francolinus</i>	Asia Minor to Bangladesh	still common across much of large range
Painted francolin <i>Francolinus pictus</i>	Indian Subcontinent	reasonably common across much of large range
Chinese francolin <i>Francolinus pintadeanus</i>	northeast India, IndoChina to southeastern China	global range over 1,000,000km <sup>2</sup>
Grey francolin <i>Francolinus pondicerianus</i>	Arabian Peninsula to Indian Subcontinent	global range over 1,000,000km <sup>2</sup>
Coqui francolin <i>Francolinus coqui</i>	parts of central and southern Africa	global range over 4,500,000km <sup>2</sup>
White-throated francolin <i>Francolinus albogularis</i>	western and central Africa	global range over 1,000,000km <sup>2</sup>
Schlegel's francolin <i>Francolinus schlegelii</i>	western Cameroon to southwestern Sudan	little known, but undisturbed in much of range; situation should be monitored
Forest francolin <i>Francolinus lathamii</i>	western and central Africa	global range over 2,000,000km <sup>2</sup>
Crested francolin <i>Francolinus sephaena</i>	eastern Africa	global range nearly 4,500,000km <sup>2</sup>
Ring-necked francolin <i>Francolinus streptophorus</i>	parts of central Africa	range about 150,000km <sup>2</sup> ; locally common although situation should be monitored

Species	Distribution	Justification for Lower Risk <sup>1</sup>
Finsch's francolin <i>Francolinus finschi</i>	Democratic Republic of Congo and Angola	range about 180,000km <sup>2</sup> ; little known and situation should be monitored
Grey-winged francolin <i>Francolinus africanus</i>	South Africa	range about 180,000km <sup>2</sup> , common in optimal habitat
Red-winged francolin <i>Francolinus levaillantii</i>	parts of central and southern Africa	patchy global range over 1,000,000km <sup>2</sup> , within which locally common
Moorland francolin <i>Francolinus psilolaemus</i>	Ethiopia, Uganda, and Kenya	range about 180,000km <sup>2</sup> , some human pressures so situation should be monitored
Shelley's francolin <i>Francolinus shelleyi</i>	southeastern Africa	patchy global range over 1,300,000km <sup>2</sup> , within which generally common
Orange River francolin <i>Francolinus levaillantoides</i>	southern and eastern Africa in two disjunct populations	patchy global range over 1,400,000km <sup>2</sup> , within which generally common
Hartlaub's francolin <i>Francolinus hartlaubi</i>	Angola to Namibia	range about 300,000km <sup>2</sup> , rare in places so situation should be monitored
Double-spurred francolin <i>Francolinus bicalcaratus</i>	western Africa	nominate race very common, although race <i>ayasha</i> is declining within tiny range in Morocco
Clapperton's francolin <i>Francolinus clappertoni</i>	central and eastern Africa	global range over 2,000,000km <sup>2</sup> , within which generally common
Heuglin's francolin <i>Francolinus icterorhynchus</i>	central Africa	global range over 1,400,000km <sup>2</sup> , within which common to abundant
Red-billed francolin <i>Francolinus adspersus</i>	Namibia to Botswana	global range over 700,000km <sup>2</sup> , within which generally common
Cape francolin <i>Francolinus capensis</i>	South Africa	global range about 185,000km <sup>2</sup> , numbers believed to be stable
Hildebrandt's francolin <i>Francolinus hildebrandti</i>	eastern Africa	global range about 1,200,000km <sup>2</sup> , locally rare so situation should be monitored
Natal francolin <i>Francolinus natalensis</i>	southeastern Africa	global range about 1,000,000km <sup>2</sup> , generally common
Ahanta francolin <i>Francolinus ahantensis</i>	western Africa coastal belt	global range about 200,000km <sup>2</sup> , in view of potential threats, situation should be monitored
Scaly francolin <i>Francolinus squamatus</i>	central Africa	global range about 2,300,000km <sup>2</sup> , generally common
Yellow-necked francolin <i>Francolinus leucoscepus</i>	eastern Africa	global range about 1,300,000km <sup>2</sup> , generally common
Grey-breasted francolin <i>Francolinus rufopictus</i>	northwestern Tanzania	restricted global range of about 30,000km <sup>2</sup> ; generally common, although situation should be monitored
Red-necked francolin <i>Francolinus afer</i>	southern Africa	global range about 5,000,000km <sup>2</sup> , generally common
Swainson's francolin <i>Francolinus swainsonii</i>	southern Africa	global range about 1,500,000km <sup>2</sup> , generally common
Erckel's francolin <i>Francolinus erckelii</i>	northern Ethiopia and Sudan	global range about 220,000km <sup>2</sup> , generally common
Chestnut-naped francolin <i>Francolinus castaneicollis</i>	Ethiopia, Somalia, and Kenya	global range about 270,000km <sup>2</sup> , generally common
Handsome francolin <i>Francolinus nobilis</i>	southwestern Uganda, Rwanda, and Burundi to Democratic Republic of Congo	global range about 130,000km <sup>2</sup> , generally common but little known and situation should be monitored
Jackson's francolin <i>Francolinus jacksoni</i>	west-central Kenya	global range about 50,000–60,000km <sup>2</sup> , locally common but situation should be monitored
Grey partridge <i>Perdix perdix</i>	Britain to northwestern China	very large range and still numbers in the millions
Daurian partridge <i>Perdix dauurica</i>	China	very large global range
Tibetan partridge <i>Perdix hodgsoniae</i>	Himalayas	widely distributed and fairly common
Long-billed wood-partridge <i>Rhizothera longirostris</i>	Peninsular Malaysia, Sumatra, and Borneo	probably common in suitable habitat, but in view of rapidly disappearing forests, situation should be closely monitored (nt)

Species	Distribution	Justification for Lower Risk <sup>1</sup>
Madagascar partridge <i>Margaroperdix madagascarensis</i>	Madagascar	population in the tens of thousands, although in view of habitat loss, situation should be monitored
Common quail <i>Coturnix coturnix</i>	Britain to central China, wintering in Africa, where also a resident population	very large global range and still generally common
Japanese quail <i>Coturnix japonica</i>	eastern China	widespread and fairly common
Stubble quail <i>Coturnix pectoralis</i>	southern Australia	expanding range and healthy population numbers
Rain quail <i>Coturnix coromandelica</i>	Indian Subcontinent	very large range and generally common
Harlequin quail <i>Coturnix delegorguei</i>	southern Africa	very large range and generally common
Brown quail <i>Coturnix ypsilophora</i>	Indonesia, Papua New Guinea, and Australia	large range and generally common
Blue quail <i>Coturnix adansonii</i>	southern Africa	large range, although generally uncommon
Blue-breasted quail <i>Coturnix chinensis</i>	India to southeastern Australia	large range, although locally uncommon
Snow mountain quail <i>Anurophasis monorhonyx</i>	Irian Jaya	very restricted range, but safe from human interference; very little known so surveys are needed to assess status ( <b>nt</b> )
Jungle bush-quail <i>Perdica asiatica</i>	Indian Subcontinent	large range and generally common
Rock bush-quail <i>Perdica argoondah</i>	Indian Subcontinent	large range and generally common
Painted bush-quail <i>Perdica erythrorhyncha</i>	Indian Subcontinent	large range and generally catholic habitat requirements
Common hill-partridge <i>Arborophila torqueola</i>	western Himalayas to northwestern Vietnam	fairly large range and generally common
Rufous-throated hill-partridge <i>Arborophila rufogularis</i>	northern India to central Vietnam	large range, but scarce in places; situation should be monitored
White-cheeked hill-partridge <i>Arborophila atrogularis</i>	northeastern India to south-central China	large range and locally common ( <b>nt</b> )
Taiwan hill-partridge <i>Arborophila crudigularis</i>	Taiwan	population about 10,000 birds, stable within protected areas; situation should be monitored ( <b>nt</b> )
Brown-breasted hill-partridge <i>Arborophila brunneopectus</i>	western Thailand to Vietnam	fairly large range, but habitat loss continuing, so situation should be monitored
Grey-breasted hill-partridge <i>Arborophila orientalis</i>	central Peninsular Malaysia, Sumatra, and eastern Java	overall reasonably healthy populations, although races <i>campbelli</i> and <i>orientalis</i> probably threatened
Chestnut-bellied hill-partridge <i>Arborophila javanica</i>	western Java	reasonably common, although little information; situation should be monitored
Red-breasted hill-partridge <i>Arborophila hyperythra</i>	northern Borneo	locally common, although little information; situation should be monitored
Red-billed hill-partridge <i>Arborophila rubrirostris</i>	Sumatra	montane habitat at relatively little risk, so populations should be stable
Scaly-breasted hill-partridge <i>Arborophila chloropus</i>	IndoChina	large range and apparently stable populations
Chestnut-necklaced hill-partridge <i>Arborophila charltonii</i>	Vietnam, Thai-Malay Peninsula, Borneo, and Sumatra	common in parts of its range, but nearly meets criteria for Vulnerable and situation should be carefully monitored ( <b>nt</b> )
Ferruginous wood-partridge <i>Caloperdix oculea</i>	Thai-Malay Peninsula, Sumatra, and Borneo	widespread, but large scale habitat loss means that situation should be monitored ( <b>nt</b> )
Crimson-headed partridge <i>Haematortyx sanguiniceps</i>	Borneo	possibly less than 10,000 birds, so situation should be monitored
Crested wood-partridge <i>Rollulus rouloul</i>	Thai-Malay Peninsula, Sumatra, and Borneo	widespread and locally common, but large scale habitat loss means that situation should be monitored ( <b>nt</b> )

Species	Distribution	Justification for Lower Risk <sup>1</sup>
Stone partridge <i>Ptilopachus petrosus</i>	central Africa	very large range and generally common
Mountain bamboo-partridge <i>Bambusicola fytchii</i>	northeast India to northern Vietnam	large range, but fragmented populations mean that situation should be monitored
Chinese bamboo-partridge <i>Bambusicola thoracica</i>	southeastern China	fairly large range and generally common
Red spurfowl <i>Galloperdix spadicea</i>	Indian Subcontinent	large range and generally catholic habitat requirements
Painted spurfowl <i>Galloperdix lunulata</i>	Indian Subcontinent	large range and generally catholic habitat requirements
Ceylon spurfowl <i>Galloperdix bicalcarata</i>	Sri Lanka	still locally common, but in view of restricted range and habitat loss, situation should be monitored
Black guineafowl <i>Agelastes niger</i>	Nigeria to northeastern Democratic Republic of Congo	global population estimated at 100,000–500,000 birds
Helmeted guineafowl <i>Numida meleagris</i>	central and southern Africa	global population estimated at over 1,000,000 birds and common over much of range
Plumed guineafowl <i>Guttera plumifera</i>	Cameroon to Lake Tanganyika	population estimated at 10,000–100,000 birds and generally uncommon, so situation should be monitored
Crested guineafowl <i>Guttera pucherani</i>	parts of western and southern Africa	population estimated at about 100,000 birds and generally stable
Vulturine guineafowl <i>Acryllium vulturinum</i>	Ethiopia to Kenya	global population estimated at over 1,000,000 birds and common over much of range
Ocellated turkey <i>Meleagris ocellata</i>	southeast Mexico, north Guatemala, and northwest and west-central Belize	locally abundant in protected areas, although range and population declining so situation should be monitored ( <b>nt</b> )
Wild turkey <i>Meleagris gallopavo</i>	U.S.A.	global population estimated at about 3,500,000 birds and common over much of range
Long-tailed wood-partridge <i>Dendrortyx macroura</i>	southern Mexico	global population estimated at 20,000–200,000, but possibly some hunting pressure, so situation should be monitored
Buffy-crowned wood-partridge <i>Dendrortyx leucophrys</i>	southern Central America	global population estimated at 20,000–200,000, but possibly some hunting pressure, so situation should be monitored
Mountain quail <i>Oreortyx pictus</i>	western U.S.A. and northwestern Mexico	global population estimated at about 1,000,000 birds and stable over much of range
Scaled quail <i>Callipepla squamata</i>	southern U.S.A. and Mexico	global population estimated at about 1,000,000, possibly declining slightly
Elegant quail <i>Callipepla douglasii</i>	western Mexico	global population estimated at about 50,000–100,000 birds and locally common
California quail <i>Callipepla californica</i>	western U.S.A., Baja California	over 2,000,000 harvested annually in U.S.A., possibly declining slightly
Gambel's quail <i>Callipepla gambelii</i>	southwestern U.S.A., northwestern Mexico	global population estimated at about 1,000,000 birds and stable over much of range
Barred quail <i>Philortyx fasciatus</i>	west-central Mexico	global population estimated at under 100,000 birds, but apparently stable
Northern bobwhite <i>Colinus virginianus</i>	southeastern U.S.A., southern and eastern Mexico	over 20,000,000 harvested annually in U.S.A., possibly declining slightly
Black-throated bobwhite <i>Colinus nigrogularis</i>	southern Central America	global population estimated at about 100,000–1,000,000 birds and apparently stable
Crested bobwhite <i>Colinus cristatus</i>	northern South America	global population estimated at over 1,000,000 birds and generally common
Marbled wood-quail <i>Odontophorus gujanensis</i>	northern South America	global population estimated at over 1,000,000 birds, but possibly declining
Spot-winged wood-quail <i>Odontophorus capueira</i>	eastern South America	global population may number less than 50,000 birds and possibly declining, so situation should be monitored
Black-eared wood-quail <i>Odontophorus melanotis</i>	southern Central America	global population may number less than 50,000 birds and possibly declining, so situation should be monitored



Species	Distribution	Justification for Lower Risk <sup>1</sup>
Rufous-fronted wood-quail <i>Odontophorus erythrops</i>	northeastern South America	global population may number less than 500,000 birds, but locally common
Chestnut wood-quail <i>Odontophorus hyperythrus</i>	central and western Andes of Colombia	global population may number less than 10,000 birds and declining, so situation must be monitored ( <b>nt</b> )
Rufous-breasted wood-quail <i>Odontophorus speciosus</i>	western South America	global population may number over 500,000 birds, and possibly stable
Venezuelan wood-quail <i>Odontophorus columbianus</i>	north-central Venezuela	global population may number less than 10,000 birds and declining, so situation must be monitored ( <b>nt</b> )
Black-breasted wood-quail <i>Odontophorus leucolaemus</i>	Costa Rica to western Panama	global population may number less than 50,000 birds and possibly declining, so situation should be monitored
Stripe-faced wood-quail <i>Odontophorus balliviani</i>	Andes of southeastern Peru, and northern and western Bolivia	global population may number less than 50,000 birds and possibly declining, so situation should be monitored
Starred wood-quail <i>Odontophorus stellatus</i>	western South America	global population may number over 750,000 birds, and locally common
Spotted wood-quail <i>Odontophorus guttatus</i>	Central America	global population may number over 500,000 birds, and generally common
Singing quail <i>Dactylortyx thoracicus</i>	Central America	global population may number 100,000–500,000 birds, and locally common
Montezuma quail <i>Cyrtonyx montezumae</i>	southern U.S.A. and Mexico	global population may number over 500,000 birds, but declining slightly
Ocellated quail <i>Cyrtonyx ocellatus</i>	southern Central America	global population may number less than 50,000 birds and possibly declining, so situation should be monitored ( <b>nt</b> )
Tawny-faced quail <i>Rhynchortyx cinctus</i>	Honduras to Ecuador	global population may number over 500,000 birds, but declining slightly

<sup>1</sup> from del Hoyo *et al.* (1994). Most of the information therein was collected during preparation for the 1995 Action Plan (see McGowan *et al.* (1994), McGowan *et al.* (1995), and World Pheasant Association (unpub. data)).

# Species Accounts

The previous chapter presented an overview of the conservation status of all partridges, quails, francolins, snowcocks, guineafowl, and turkeys, and assigned each to a threat category. This chapter expands on this information and provides a detailed justification as to why each threatened species has been placed in that particular category. Species considered at Lower Risk are not treated here, as our aim is to draw attention to the species most in need of conservation action. These species accounts have been developed through an extensive review process involving the BirdLife Partnership, the PQF Specialist Group, the World Pheasant Association, and a worldwide network of ornithologists, co-ordinated by the BirdLife Secretariat. This means that the information presented here has been developed and reviewed by a wide range of active researchers.

Each species is treated in a standard format. After detailing the criteria supporting inclusion in each of the three categories of threat and supplying a summary justification, the following information is provided:

**Range and Population:** The full geographic distribution of the species is given, together with any available partial or complete estimates of population numbers or density. If any inferences can be made, or data exist on trends in population numbers and geographic range, these are given here. Facts are always distinguished from inferences.

**Ecology:** Brief details of habitat use, diet, and breeding biology are provided in this section.

**Threats:** The major known threats facing the species are described, together with some indication as to the relative importance of the different types.

**Conservation:** This section outlines whether the species is protected by legal instruments or occurs in existing protected areas. It also gives details of recent conservation research and action that has been carried out to help protect the species.

**Targets:** These are the recommendations supplied by various experts on each species, and endorsed by BirdLife International and the PQF Specialist Group. These targets outline the work most urgently required to help prevent the species from becoming more threatened or even extinct.

## 3.1 Critically Endangered species

### Djibouti francolin (*Francolinus ochropectus*)

**Critically Endangered** A1a,c,d; A2b,c,d

**An extremely rapid population decline has been observed exceeding 90% over the last 20 years. Assuming that this period is equivalent to no more than three generations, the species is classified as Critically Endangered. It is suspected that this decline could continue into the future (unless proposed conservation targets are urgently addressed), based on hunting levels and a continuing deterioration in habitat quality.**

**Range and population:** The Djibouti francolin is endemic to **Djibouti**, where it is known from only two sites: Forêt du Day (about 14–15km<sup>2</sup> (McGowan *et al.* 1995) and probably the only viable site) and the nearby Mabla Mountains. Available habitat at Forêt du Day was halved between 1977 and 1983 (del Hoyo *et al.* 1994) with a corresponding decline in the population from 5,600 to 1,500 birds between 1978 and 1985 (McGowan *et al.* 1995). The population at Forêt du Day was estimated at about 500–1,000 in 1998 (G. Welch and H. Welch *in litt.*). The size of the population at Mabla is unknown.

**Ecology:** It inhabits juniper woodland, with records occurring between 700 and 1,500m, but forest at Forêt du Day now only occurs above about 950m (Magin *in prep.*). It has been found in secondary forest and may occur in degraded woodlands. It feeds on seeds, berries, and termites, and also figs from the forest edge. The breeding season is December to February (del Hoyo *et al.* 1994).

**Threats:** At Forêt du Day, the forest is in poor condition with a high proportion of trees either dead or dying. The reasons for this are unclear, but a combination of factors, including high levels of grazing by cattle, camels, and goats, acid rain, climate change, and fungal disease have all been proposed as possible causes (Magin *in prep.*). Other concerns include collection of firewood on lower slopes (Magin *in prep.*), hunting, and human disturbance (G. Welch and H. Welch *in litt.*). At Mabla, there are signs of significant human disturbance in remaining stands of forest which have been heavily used for firewood and grazing (Magin *in prep.*).

**Conservation:** Part of Forêt du Day was apparently declared a national park in 1939, but the designation is no longer valid (Magin in prep.). Projects examining environmental and socio-economic issues in the Forêt du Day area have been carried out by the government and international agencies, but recommended measures have never been implemented, partly due to internal unrest since the early 1990s (Magin in prep.).

**Targets:**

- **Map suitable habitat and determine home ranges to determine the current population size and distribution.**
- **Conduct ecological studies to determine habitat limits and reproductive ecology.**
- **Develop a long-term integrated management project for the Goda Massif involving socio-economic and agro-pastoral surveys, and a conservation education programme (also applicable to Mabla, but work there considered unrealistic at present).**

## Himalayan quail (*Ophrysia superciliosa*)

Critically Endangered D1

The threatened status of this enigmatic quail is extremely difficult to judge given the paucity of information. If not extinct, its population is likely to be tiny and inference, therefore, points to its classification as Critically Endangered.

**Range and population:** The Himalayan quail is known only from the western Himalayas in north Uttar Pradesh, northwest **India**, where about a dozen specimens were collected near Mussoorie and Naini Tal prior to 1877 (Blyth 1867, Hume and Marshall 1879–1881). Field observations during the mid-19th century indicate that it may have been relatively common, but it was certainly rare by the late 1800s, potentially indicating a population decline (Comber 1905). The lack of records for over a century suggests that the species may now be extinct, although there have been few well-organised searches (Ali 1977a,b; see Rieger and Walzthöny 1990 and Sankaran 1990 for details on recent searches). The chances that a small population survives in some remote area in the lower or middle Himalayan range, however, seem slim.

**Ecology:** It was recorded in long grass and scrub on steep hillsides, particularly south-facing slope crests, between 1,650m and 2,400m. Generally encountered in covies of 6–12 birds, it was extremely elusive, never flying except when almost stepped on. It is unclear whether it was sedentary or a short-distance migrant. It was only recorded around Mussoorie and Naini Tal hill stations during the winter months, suggesting it may breed at higher altitudes (Hume and Marshall 1879–1881, Talwar 1995).

**Threats:** The species was last seen 60 years before independence, indicating hunting levels during the colonial period contributed significantly to its decline (Talwar 1995). Widespread land-use changes thereafter, particularly open-cast mining for limestone and related disturbance, are other likely contributing factors. Its contact call was apparently heard frequently in November and appears to have aided hunters in locating them (Ali 1977a,b). It has also been hypothesised that habitat changes at lower elevations during the post-Pleistocene glaciation might have pushed subpopulations to suboptimal higher elevations, causing local extinctions (Rieger and Walzthöny 1990).

**Conservation:** There has been a number of official and unofficial attempts to rediscover the species, covering most areas around Mussoorie and Naini Tal. However, none has yet been successful.

**Targets:**

- **Conduct interviews with local hunters, involving the state Forest Department, about possible locations for the species.**
- **Continue a comprehensive series of field surveys over several seasons based on these interviews, including the vicinity of old sites (Budraj, Benog, Jharipani, and Sherka-danda).**
- **Conduct further surveys in areas supporting cheer pheasant *Catreus wallichi*, another west Himalayan endemic with similar habitat requirements.**
- **Produce and distribute a poster-mediated information plea about the species within potential areas of occurrence.**

## Gorgeted wood-quail (*Odontophorus strophium*)

Critically Endangered B1+2a,b,c,e

This species is Critically Endangered because it has an extremely small range, with recent records from only one location where logging and hunting are probably causing some declines in range and population. However, it may occur more widely and surveys are urgently required to elucidate its status.

**Range and population:** The gorgeted wood-quail occurs on the west slope of the East Andes of **Colombia**. It was formerly known only from Cundinamarca, where it has not been reported since 1954 (Wege and Long 1995). It has since been recorded in Santander on the Cuchilla del Ramo in 1970, and Guaneta-Alto Rio Fonce Flora and Fauna Sanctuary from 1979 onwards.

**Ecology:** It inhabits humid subtropical and temperate forests dominated by oak and laurel. It is only known to

occur at 1,750–2,050m, but may range from 1,500–2,500m. Although probably dependent on primary forest for at least part of its life-cycle, it has been recorded in degraded habitats and secondary forest. It forages for fruits, seeds, and arthropods. The breeding season appears to coincide with peaks in annual rainfall in March–May and September–November.

**Threats:** Since the 17th century, the west slope of the East Andes has been extensively logged and converted to agriculture, including pastures and, at lower altitudes, coffee, plantain, and sugar cane plantations (Stiles *et al.* 1999). Forest loss below 2,500m has been almost complete (Stattersfield *et al.* 1998), with habitat in many areas reduced to tiny, isolated relics on steep slopes and along streams (Stiles *et al.* 1999). These landscape changes accelerated during the 20th century, especially after 1960, although in some areas habitat regeneration is beginning following the abandonment of marginal land (Stiles *et al.* 1999). Selective logging and hunting affect birds in the lower part of the Guanenta-Alto Rio Fonce, but the forest is largely intact above 1,950–2,200m. The small remnants of subtropical forest in Cundinamarca are unlikely to support the species, but less disturbed and ornithologically unknown forests in west Boyaca and Santander (P. Salaman *in litt.*, Stiles *et al.* 1999) might retain populations.

**Conservation:** The Guanenta-Alto Rio Fauna and Flora Sanctuary, protecting 100km<sup>2</sup> of forest extending from 1,950–2,200m to 3,000–3,900m, was gazetted in November 1993 (Andrade and Repizzo 1994, Wege and Long 1995).

**Targets:**

- **Identify and survey remnant forests outside Guanenta-Alto Rio Fonce Flora and Fauna Sanctuary, including on the Cuchilla del Ramo and in national parks such as Sumapaz in southern East Andes.**
- **Develop initiatives to protect any additional sites discovered.**
- **Estimate and monitor the population in Guanenta-Alto Rio Fonce Flora and Fauna Sanctuary.**

### 3.2 Endangered species

#### Nahan's francolin (*Francolinus nahani*)

Endangered B1+2b,c,e

This species is listed as Endangered because its very small, severely fragmented range is undergoing a continuing decline in area of occupancy, and in the extent and quality of habitat due to deforestation and forest degradation. However, the species may be discovered at new locations in the future, now that its distinctive calls are known (Rossouw *in press*).

**Range and population:** The Nahan's francolin is known from a few localities in the eastern **Democratic Republic of Congo** (DRC) from Yangambi eastwards, and in central and western **Uganda** in Budongo, Bugoma (401km<sup>2</sup>) and Mabira (320km<sup>2</sup>) Forests (del Hoyo *et al.* 1994, Dranzoa *et al.* 1999). Its reported presence in Bwamba (=Semliki) and Kibale (560km<sup>2</sup>) Forests (Uganda) has never been confirmed and is best discounted (Dranzoa *et al.* 1999, D. Pomeroy *in litt.*, M. Carswell *in litt.*). It is known to be uncommon in the still extensive Ituri Forest, DRC, and fairly common in Budongo Forest, Uganda (Plumtre 1996).

**Ecology:** It is found in lowland primary forest up to 1,400m, preferring riverine or swampy areas (del Hoyo *et al.* 1994, Dranzoa *et al.* 1999). In Uganda, it occurs in both unlogged and logged forest (Sande *in press*), including mixed forest subject to moderate logging and/or disturbance, or where natural gaps occur, but is not recorded from forest edge or plantations (Dranzoa *et al.* 1999). It prefers to forage in areas of dense understorey (Sande *in press*), searching the leaf litter for invertebrates, shoots, seeds, and bulbs (del Hoyo *et al.* 1994) and probably picking invertebrates from low vegetation (Sande *in press*). It is highly territorial and breeds throughout the year, though mainly towards the beginning of the rainy season (Sande *in press*). Most nests are placed on the ground between the buttresses of large trees (Sande *in press*).

**Threats:** Its habitat in Mabira Forest is highly degraded (Dranzoa *et al.* 1999). While logging in Bugoma Forest may not directly threaten the species, increased disturbance and poaching by pitsawyers may reduce its population (J. Lindsell *in litt.*). Both forests are surrounded by agricultural settlements, industrial development, and urban areas (Dranzoa *et al.* 1999). In Uganda, it is hunted for food and eggs are collected and eaten or used in traditional practices (Dranzoa *et al.* 1999).

**Conservation:** In the DRC, the population in the Semliki Valley is within the Virunga National Park (del Hoyo *et al.* 1994). In Uganda, it occurs in the Bugoma and Mabira Forest Reserves, as well as the Budongo Forest Reserve, which has been sustainably managed for timber since the 1920s (Plumtre 1996).

**Targets:**

- **Study its distribution in forest remnants, dispersal, and predation rates, and effects of selective logging in Budongo.**
- **Assess population densities in Mabira and Bugoma.**
- **Monitor the population in Uganda (Bugoma, Mabira, Budongo).**
- **Research levels, extent, and effects of hunting.**
- **Assess status in the DRC and other forests in Uganda where the species may occur.**

- Extend the Virunga National Park in DRC to include the east Ituri Forest.

### Mount Cameroon francolin (*Fringilla camerunensis*)

Endangered B1+2a,b,c,e

This species qualifies as Endangered because it has a very small range being found on only one mountain, where it now faces increasing threats from human-induced burning of its habitat and the retreat of the forest/savanna boundary in some places.

**Range and population:** The Mount Cameroon francolin is found on Mt Cameroon, **Cameroon**, where it is restricted to the southeast and northeast slopes (Urban *et al.* 1986). During survey work in 1984, it was found to be common, especially on the southern slopes of the mountain. Recent sightings have been irregular and are usually of single pairs (J. Acworth *in litt.*).

**Ecology:** It inhabits dense undergrowth in primary forest and clearings between 850 and 2,100m. It appears able to tolerate secondary forest and has been observed in savanna-scrub habitat following forest burning (J. Acworth *in litt.*). It feeds on berries, grass seeds, and insects, and breeds during the dry season with birds laying between October and December.

**Threats:** While fire is a natural phenomenon on Mount Cameroon, and lava flows occur about every 20 years, regular burning of grassland by hunters is probably the greatest threat to the species, causing the destruction of both eggs and young birds (J. Acworth *in litt.*). Recurrent bush fires destroy forest, particularly on the southeast slopes (F. Dowsett-Lemaire *in litt.*). Clearance is an additional problem, notably on the east side of the mountain, where it is extensive and could become more serious, with hunting posing a relatively insignificant (but continuing) threat.

**Conservation:** There is an internationally funded conservation and development project on Mt Cameroon, though efforts to date have mainly concentrated on lowland areas threatened with clearance for plantation agriculture (J. Acworth *in litt.*).

#### Targets:

- Collect detailed distribution information, including any evidence of fragmentation.
- Determine its habitat use more precisely.
- Determine, if possible, how the species can be monitored.
- Control/regulate human-induced burning of grasslands.

### Sichuan hill-partridge (*Arborophila rufipectus*)

Endangered C2a

This species is listed as Endangered because its population is very small, and severely fragmented, and it is continuing to decline because of ongoing habitat loss.

**Range and population:** The Sichuan hill-partridge is endemic to **China**, where it is known from south-central Sichuan, with probable records from northeast Yunnan. Surveys in 1996 and 1997 estimated densities of 0.48 and 0.24 calling males per km<sup>2</sup> respectively (Dowell *et al.* 1997, Dai Bo *et al.* 1998). The total area of suitable habitat within its known range was then estimated at 1,793km<sup>2</sup>, and on the basis of the densities recorded, and on the (untested) assumption that each calling male represents one pair, the total population was very approximately estimated at 860–1,722 birds (Dai Bo *et al.* 1998). However, it was recorded at a new site in 1998 and 1999, so this population estimate may prove to be too low.

**Ecology:** It is found in subtropical broadleaf forest, mainly mixed evergreen and deciduous, at 1,100–2,250m (Dai Bo *et al.* 1998). When foraging, it appears to favour closed-canopy forest with an open forest floor, sparse bamboo growth, and damp leaf litter. It occurs in disturbed and secondary forest, but usually within 0.5km of primary forest (Dowell *et al.* 1997, Dai Bo *et al.* 1998).

**Threats:** The main threat is habitat destruction through commercial clear-felling of primary forest (King 1989), as most remaining primary broadleaf forest within its known range is at risk from logging in the next 20–25 years. In some areas, forest is being cleared for agriculture or illegally logged. Many people enter its forest habitat to collect bamboo shoots in spring and early autumn, which creates substantial disturbance during the breeding season. Additional disturbance is caused by livestock either grazing in or moving through the forest. It is also illegally hunted (Dowell *et al.* 1997, Dai Bo *et al.* 1998).

**Conservation:** It is a nationally protected species in China. In 1998, it was recorded in Mabian Dafengding Nature Reserve, where there was estimated to be 192km<sup>2</sup> of potentially suitable habitat (Dai Bo *et al.* 1998). Several recent surveys have greatly improved knowledge of its distribution, population density, and ecological and conservation requirements. Some forestry practices may be of benefit to its conservation, notably leaving strips of primary forest along ridge tops and replanting with native broadleaf trees (Dowell *et al.* 1997).

**Targets:**

- Establish a network of four protected areas, including an extension to Mabian Dafengding Nature Reserve.
- Promote beneficial forestry practices.
- Conduct surveys to establish its presence and population densities to the west and south of its known range.
- Conduct a radio-telemetry study to establish the details of its habitat requirements and breeding biology to help develop the most appropriate management recommendations.

**Orange-necked hill-partridge  
(*Arborophila davidi*)**

Endangered B1+2b,c,d,e; C1; C2a

This partridge qualifies for Endangered because it has a very small population and a very small range, both of which are declining and undergoing severe fragmentation owing to habitat loss. High levels of hunting are an additional pressure.

**Range and population:** The orange-necked hill-partridge is endemic to southern Vietnam. It is known from just three sites, with recent records from just two (Eames *et al.* 1992, McGowan 1992, Robson 1996, J. Eames *in litt.*, Nguyen Cu *in litt.*, Nguyen Tran Vy *in litt.*): Cat Tien National Park, where it occurs on at least three isolated hills in the eastern half and is described as being quite common (Robson 1997), and Bu Kroai. It may be widespread in southern Lam Dong, Dong Nai, Binh Duong, and Bunh Phuoc Provinces, where suitable habitat remains. In 1994, its global population was estimated at <1,000 individuals (McGowan *et al.* 1994)

**Ecology:** It is resident in evergreen forest in lowlands and foothills, from 120m to at least 300m, particularly favouring steep hills covered with non-thorny bamboo (Eames *et al.* 1992). It also thrives in a variety of secondary habitats including tall scrub, bamboo, acacia, logged evergreen, and semi-evergreen forest plantations, perhaps preferring bamboo-covered slopes with a thick leaf-litter layer. Thus, it appears to be able to tolerate considerable habitat disturbance and modification (Atkins and Tentij 1999). Pairs call in duet and can be heard from early April, perhaps indicating the commencement of breeding.

**Threats:** Extensive deforestation, particularly from herbicide spraying during the Vietnam War, presumably triggered its decline. Habitat loss through commercial logging, unofficial timber collection, and clearance of land for cultivation, compounded by high hunting levels across its restricted range, continue to act as the main threats. Until recently, these factors operated in Cat Loc and Cat

Tien protected areas as a result of ineffective management and regulation enforcement, stemming from lack of resources and staff (J. C. Eames *in litt.*).

**Conservation:** In May 1998, a five-year project began in Cat Tien National Park and Cat Loc Nature Reserve (now administratively integrated), focusing on research with the aim of developing a conservation management plan, capacity building, community development, and conservation education. The orange-necked hill-partridge is one of the project's flagship species and will feature on a national stamp in 2000.

**Targets:**

- Conduct surveys for additional populations in suitable habitat in southern Lam Dong, Dong Nai, Binh Duong, and Bunh Phuoc Provinces, particularly Bui Gia Map which is predicted to support a population.
- Monitor the populations in Cat Tien and Cat Loc.
- Continue conservation management improvements in Cat Tien and Cat Loc.
- Propose that sites found to support additional populations be considered for formal protection.

**Chestnut-headed hill-partridge  
(*Arborophila cambodiana*)**

Endangered C1; C2a; D1

This little-known partridge qualifies as Endangered because it may have a very small population that is inferred to be declining and undergoing severe fragmentation, owing to ongoing large-scale logging operations and high levels of hunting. These factors are believed to be operating across much of its range, which, until very recently, has been highly unstable owing to political and security problems.

**Taxonomy:** The two subspecies, *A. c. diversa* and *A. c. cambodiana*, are morphologically distinct and may prove to be different species.

**Range and population:** The chestnut-headed hill-partridge is endemic to southeast Thailand (subspecies *diversa*) and the Cardamom Mountains of southwest Cambodia (subspecies *cambodiana*). In Thailand, it is known from Khao Sabap, within the Namtok Phliu National Park, and Khao Soi Dao Wildlife Sanctuary, with just two confirmed recent records, both from Khao Soi Dao (J. Dymond *in litt.*, Poole 1999). In Cambodia, it is known historically from specimens collected in Bokor National Park, and recently from a captive individual photographed near Kirirom National Park (from where it apparently originated) in 1998 (Poole 1999). The Thai population is estimated to number 100–200 individuals, and the total

population is estimated at 100–1,000 individuals (McGowan *et al.* 1995, P. Round *in litt.*).

**Ecology:** It is presumed resident in evergreen forest on slopes and plateaux, and has also been recorded in open areas (Delacour 1928, Engelbach 1938). It is generally found in mountains from 700–1,400m in Thailand and on plateaux up to 1,000m in Cambodia, although it has been recorded down to 300–400m in the two countries, respectively.

**Threats:** Large-scale, military-controlled logging is the major threat in Cambodia, compounded by widespread, uncontrolled hunting. Both Bokor and Kirirom National Parks are subject to heavy logging, much of it clandestine, which has affected an estimated 80% of Bokor (Poole 1999). Selective logging and small-scale forest encroachment are the main threats in Thailand. Disturbance through occasional dry season fires and perhaps the local avicultural trade may be additional threats. Levels of hunting are high in areas where the species occurs (Round 1988, P. Round *in litt.*).

**Conservation:** The species is afforded full legal protection in both Thailand and Cambodia. It occurs within Namtok Phliu National Park and Khao Soi Dao Wildlife Sanctuary, Thailand and Bokor, and probably Kirirom National Parks in Cambodia. However, protected area status at the latter two sites conveys very little effective protection. Political instability and uncleared landmines have precluded any conservation action within its range in Cambodia (Poole 1999).

**Targets:**

- **Conduct extensive surveys to establish its distribution, status, and habitat requirements, especially along the Cardomom chain north of Bokor in Cambodia.**
- **Monitor the Khao Soi Dao population.**
- **Establish the taxonomic relationship between *A. c. diversa* and *A. c. cambodiana*.**
- **Promote public awareness of its conservation status and legislation pertaining to the species in Thailand and Cambodia.**
- **Lobby for a moratorium on logging in Bokor and Kirirom National Parks, Cambodia.**

### 3.3 Vulnerable species

#### Swamp francolin (*Francolinus gularis*)

Vulnerable A1c,d; A2c,d

This species is classified as Vulnerable because it has undergone a rapid population decline, which is projected to continue,

**concurrent with the rapid decline in extent and quality of its specialised habitat. Hunting is an additional pressure.**

**Range and population:** The swamp francolin is endemic to the Ganges and Brahmaputra River Basins, from the terai of western Nepal through Uttar Pradesh, Bihar, West Bengal, Sikkim, Assam, and Arunachal Pradesh, northern India, to Chittagong, the Chittagong Hill Tracts and the Sundarbans, Bangladesh (Ripley 1982). In India, populations have been found in all well-protected terai grasslands, suggesting it exists in greater numbers than previously thought. In Nepal, where its range covers about 2,400km<sup>2</sup> with a 330km<sup>2</sup> area of occupancy, the population is estimated at <500 birds and perhaps gradually declining. There are no recent records from Bangladesh, where it was once abundant.

**Ecology:** It is resident in tall, wet, natural grasslands, particularly those dominated by *Phragmites*, *Saccharum*, and *Narenga*, and also occurs (at lower densities) in wet agricultural areas dominated by sugarcane and paddy interspersed with natural vegetation (Baker 1921–1930, Javed 1993, Javed *et al.* 1999). It is predominantly known from the lowlands (generally <250m), but does move to slightly higher altitude during periods of high flood (Godwin-Austin 1870).

**Threats:** Most remaining habitat within its range is subject to intense pressures from drainage for agriculture, human encroachment, fire, grass harvesting, grazing by domestic stock (especially during chick rearing), commercial forestry plantations, and dam and irrigation schemes (Peet *et al.* 1999). Hunting and trapping for sport (cock fighting) and food poses an additional threat. Agricultural pesticides may be affecting its numbers either through direct mortality or reduction in potential invertebrate food sources (Rajat Bhargava *in litt.*).

**Conservation:** The species is legally protected in India and Nepal. It is currently known from at least 14 protected areas in India, the largest populations surviving in North Pilibhit Wildlife Sanctuary, Dudwa National Park, and Kishanpur Wildlife Sanctuary (Uttar Pradesh), Valmikinagar Tiger Reserve (Bihar), and Kaziranga and Manas National Parks (Assam). Important populations occur in two protected areas in Nepal.

**Targets:**

- **Map and identify gaps in the current distribution.**
- **Conduct further research into its ecology, both inside and outside protected areas, to investigate how changes in land-use patterns affect survival.**
- **Regulate fire, grass harvesting regimes, and encroachment at key known sites to avoid coinciding with the breeding period.**

- Identify the most important conservation sites for the species and make management recommendations for these localities.
- Study trade-related aspects of the species.

### Harwood's francolin (*Francolinus harwoodi*)

Vulnerable B1+2c,e

This species qualifies as Vulnerable because hillside habitat is being lost within its small, possibly fragmented range. However, it is unclear what its essential habitat requirements are and thus suitable habitat could be more extensive than is currently believed.

**Range and population:** Harwood's francolin is restricted to the highlands of central Ethiopia around the Blue Nile River and its tributaries (del Hoyo *et al.* 1994). According to local reports, its range extends northwards into Southern Wello and northwest into Eastern Gojam Administrative Zones (Wondafrash 1998). Research in 1996 found it locally abundant in the Jemma and Jara Valleys and the adjacent valleys and river catchment systems of North Showa Zone, with an estimated maximum density of 92 birds per km<sup>2</sup> at Jemma Valley (del Hoyo *et al.* 1994, Wondafrash 1998). It is not known if birds move between adjacent valleys, but it is probable that some populations number more than 1,000 individuals (P. Robertson *in litt.*). Surveys in 1998 found it at a number of new sites within its known range (A. Shimelis *in litt.*).

**Ecology:** The species was believed to be almost entirely restricted to *Typha* (bulrush) beds growing along small, shallow watercourses and *Acacia* woodland (EWNHS 1996). However, studies in 1996 found it at a site with no permanent river or *Typha* and evidence of birds roosting in extensive thorn scrub on hillsides (Robertson *et al.* 1997). The breeding season is reported to be from September to December and clutch-size between four and seven. It may be polygamous (Robertson *et al.* 1997, Wondafrash 1998).

**Threats:** There is intense pressure on resources within the species' range and, consequently, even marginal scrub land (favoured by the species for cover) is being cleared for agriculture (EWNHS 1996, Wondafrash 1998). Land is also cleared to provide wood for fuel and construction (EWNHS 1996). Surveys in 1998 found areas between localities to have thin and patchy vegetation (A. Shimelis *in litt.*). *Typha* beds are burnt annually so that farmers can plant cotton and are also cut for thatching (EWNHS 1996, Robertson *et al.* 1997). The species is heavily hunted for food and is sometimes also caught for sale at local markets

(EWNHS 1996, Wondafrash 1998). Eggs are taken for food (Robertson *et al.* 1997, A. Shimelis *in litt.*).

**Conservation:** Although four or five game reserves in the Blue Nile Basin have been proposed, none has been established (EWNHS 1996).

**Targets:**

- Carry out population surveys to the north and northwest of the species' currently known range.
- Conduct further surveys to assess the distribution, habitat requirements, and importance of different threats.
- Develop and implement a community-orientated action plan for the conservation of the species and its habitat, based on this research.
- Protect key areas in collaboration with local communities.

### Grey-striped francolin (*Francolinus griseostriatus*)

Vulnerable B1+2a,b,c,e; C2a

This species qualifies as Vulnerable due to an inferred continuing decline in its small, severely fragmented range and population. However, there is little information and it may prove to be more evenly distributed along the Angolan scarp.

**Range and population:** The grey-striped francolin is restricted to the escarpment zone of western Angola, occurring in two populations separated by 400km, in Cuanza Sul and southern Benguela Provinces. It was first collected in 1957 and, as far as is known, has been recorded on only a few occasions since (W. Dean *in litt.*).

**Ecology:** It is found in secondary and gallery forest, occurring in thickets and weed-covered areas in the north of its range. It feeds in grassland and abandoned cotton fields adjacent to the forest in the early morning and late afternoon, on small arthropods, shoots, and seeds (del Hoyo *et al.* 1994).

**Threats:** A review in 1992 suggested that the forest on the escarpment was slowly but steadily decreasing. At one known site, Chongoroi in Benguela Province, clearance of vegetation for subsistence farming may threaten the species, though the steepness of the escarpment may provide some protection (Dean *in prep.*). It is almost certainly very heavily hunted. Civil unrest is widespread throughout its known range and the situation may have deteriorated further with the movement of displaced people into the Luanda area (Dean *in prep.*).

**Conservation:** It occurs in the Quicama National Park (Dean *in prep.*). A protected area of about 20km<sup>2</sup> at



Chongoroi was recommended in the early 1970s, but has not yet been established (Huntley 1974a, Huntley and Matos 1994).

**Targets:**

- **Conduct extensive surveys to assess the species' status and recommend future action (though the military situation in the country currently precludes this).**
- **Use satellite imagery to assess the current extent of forest cover and identify potential areas of suitable habitat (so that surveys can start once civil unrest abates).**

**Swierstra's francolin  
(*Francolinus swierstraï*)**

Vulnerable B1+2a,b,c,e; C2a

**This species qualifies as Vulnerable owing to its small, highly fragmented range and population. It is inferred that there is a continuing decline in the area, extent, and quality of forest within its range and consequently in overall numbers.**

**Range and population:** Swierstra's francolin is found in western **Angola**, from Tundavala in Huila District north to Cariango in Cuanza Sul District, on inselbergs in Huambo District, and the Bailundu Highlands (Dean in press). On Mt Moco in the Bailundu Highlands, the area with the most forest remaining, only 15 forest patches (1–15ha) survive and all are located in deep ravines (Dean in prep.).

**Ecology:** It is found in montane areas, where it is known mainly from forest and forest edge, but also recorded from rocky and grassy mountainsides, tall grass savannas on mountain-tops, and gullies. In forests, it stays within dense undergrowth of bushes, shrubs, grasses, and large ferns. It feeds on grasses, legume seeds, and insects picked from leaf litter. Its breeding ecology is virtually unknown, but specimens collected in August suggest a breeding season in May or June.

**Threats:** On Mt Moco, it is threatened by logging, clearing, and burning, and the remaining forest patches are disappearing rapidly (Dean in prep., Huntley 1974b). Hunting may also be a serious problem.

**Conservation:** A protected area of about 60km<sup>2</sup> at Mt Moco was proposed in the 1970s, but has not yet been established (Huntley 1974a, Huntley and Matos 1994).

**Targets:**

- **Conduct surveys to determine distribution, population size, and habitat requirements (though the military situation in the country currently precludes this).**

- **Use satellite imagery to assess the current extent of forest cover and, if possible, identify potential areas of suitable habitat (so that surveys can start once civil unrest abates).**

**Black wood-partridge  
(*Melanoperdix nigra*)**

Vulnerable A1c,d; A2c,d

**The continuing rapid reduction in extent and quality of habitat across much of this partridge's range implies that its population is undergoing a rapid decline, qualifying it as Vulnerable.**

**Range and population:** The black wood-partridge is known from Peninsular and East **Malaysia** (including both Sabah and Sarawak), and Kalimantan and Sumatra, **Indonesia** (Smythies 1981, van Marle and Voous 1988, Wells 1999). It is described as local and sparse to uncommon in Peninsular Malaysia, and there are recent records from at least three sites in Kalimantan and one in Sumatra (Dutson 1990, Wells 1999). However, its distribution and population status are generally very poorly known, and lack of information on vocalisations has hampered the success of searches. It is presumably declining because of dramatic ongoing reductions in its habitat (D. Holmes *in litt.*).

**Ecology:** In Peninsular Malaysia, it is judged to be a lowland specialist, where it has a proclivity for primary or mature, regenerated, closed-canopy evergreen forest on alluvial soils (Wells 1999). In Indonesia, it has been recorded in peat swamp forest, and historically was described as inhabiting brushwood and high bamboo-jungle (van Marle and Voous 1988). Recent evidence from Borneo suggests that it probably ranges up to at least 900m, perhaps 1,200m (Wilkinson *et al.* 1991).

**Threats:** The overriding threats are habitat loss, degradation, and fragmentation as a result of large-scale commercial logging (even within protected areas) and widespread clearance for plantations of rubber and oil palm (Wells 1999, D. Holmes and G. Davison *in litt.*). In Indonesia, the full impact of the major fires of 1997-1998 has still to be fully assessed, but drought fires appear to be increasing in frequency and severity on Sumatra and Borneo (Legg and Laumonier 1999, D. Holmes *in litt.*). At current rates of habitat loss, given no change in current forest management policy, dryland lowland rainforest could disappear completely by 2005 on Sumatra, and 2010 in Kalimantan (D. Holmes *in litt.*). Hunting for food may pose an additional, more localised threat (McGowan *et al.* 1995).

**Conservation:** It is known to occur in at least six protected areas: Taman Negara and Krau Wildlife Reserve (Peninsular Malaysia), Kinabalu National Park (Sabah), Gunung Mulu National Park (Sarawak), Tanjung Puting National Park and Gunung Palung Nature Reserve (Kalimantan), and Berbak Game Reserve (Sumatra). It also occurs in Pasoh Reserve Forest in Peninsular Malaysia (McGowan *et al.* 1995).

**Targets:**

- **Identify and record its vocalisations to aid field surveys.**
- **Identify remaining suitable habitat tracts, and conduct extensive field surveys and village interviews within these areas to clarify its current distribution and population status.**
- **Conduct research into its ecological and habitat requirements.**
- **Advocate protection of further areas following surveys, if necessary.**
- **Afford the species full protection under Indonesian and Malaysian law.**

### **Manipur bush-quail (*Perdicula manipurensis*)**

Vulnerable A1c,d; A2c,d; C1; C2a

This poorly known species' specialised habitat is undergoing a continuing rapid decline and severe fragmentation. In addition, there have been no confirmed records of the bird since 1932, indicating it may have a small population. These factors, combined with ongoing hunting pressures across its range, qualify it as **Vulnerable**.

**Range and population:** The Manipur bush-quail is endemic to northern West Bengal, Assam, Nagaland, Manipur, and Meghalaya, northeast **India**, its range apparently previously extending into Chittagong, Chittagong Hill Tracts, and Sylhet Districts, **Bangladesh** (Karim 1982, Khan 1982). Described historically as local but not very rare, the species was documented as declining in Manipur by the 1930s (Higgins 1933-1934). There are no recent records, just one unconfirmed report from Dibru-Saikhowa Wildlife Sanctuary, India, in March 1998 (Allen 1998). If it does occur in Bangladesh, any remaining populations must be small.

**Ecology:** A probable resident, it inhabits damp grassland, particularly stands of tall grass, and sometimes bogs and swamps, from the foothills up to about 1,000m (Ripley 1982). Historical records indicate that it was generally encountered in small groups of 4–12, and was shy, reluctant to fly and extremely difficult to observe, although covies

were occasionally seen feeding in the open on recently burnt ground (Turner 1899, Wood 1899). The few available data indicate that it breeds between January and May.

**Threats:** Drainage and destruction of tall grasslands to meet the demands of an exploding human population has been extensive in Manipur and Bangladesh, presumably greatly reducing and fragmenting available habitat. Any extensive patches of elephant grass that might remain in Bangladesh are inundated for two-thirds of the year and thus unlikely to support significant populations. Its habit of running in tightly knit groups when fleeing disturbance makes it easy to kill several birds with a single shot, a factor that likely contributed to its decline during the 20th century (R. Kaul *in litt.*). A dramatic rise in hunting levels across its range, particularly in Bangladesh, probably also contributed.

**Conservation:** No conservation measures are known to have been taken. It is not known to occur in any protected areas, and surveys for it in the border regions of Manipur, Nagaland, and the Chittagong Hill Tracts have been precluded due to security problems (P. Thompson *in litt.*).

**Targets:**

- **Identify and survey any remaining suitable habitat in or near known localities in Manipur and Assam.**
- **Investigate its occurrence in Bangladesh.**
- **Afford protection to any areas of grassland found to support populations at the earliest opportunity.**

### **Udzungwa forest-partridge (*Xenoperdix udzungwensis*)**

Vulnerable D2

This species qualifies as **vulnerable** because, although it is known from only four locations, its small population is inferred to be stable as three of the locations lie within protected areas, and, currently, no major factors appear to threaten it. Nevertheless, any indication of a continuing decline would result in its immediate classification as **Endangered**.

**Range and population:** The Udzungwa forest-partridge is endemic to Tanzania, being known only from the eastern Udzungwa Highlands (Mt. Luhombero (T. Butynski *in litt.*), and the Ndundulu and Nyamanitu Mountains (Dinesen *et al.* 1994)) and the northern Rubeho Mountains (Mafwemiro Forest) (Fjeldså *in prep.*), about 150km to the north. It seems genuinely absent from the rest of the Udzungwa Highlands and from Image Forest, but may occur in the unexplored Gologolo Mountains (Fjeldså *in prep.*, D. Moyer and E.A. Mulungu *in litt.*). Its area of

occupancy has been estimated at 160–300km<sup>2</sup>, suggesting a total population of about 3,500 individuals (Dinesen *et al.* in prep.). However, a recent study in Luhombero Forest indicated that the density there was probably lower (T. Butynski *in litt.*), so this may be an overestimate. A decline has been “observed” at one locality visited at different times of the year, but this may be explained by seasonal altitudinal movements (D. Moyer and E.A. Mulungu *in litt.*).

**Ecology:** It inhabits montane and sub-montane evergreen forest, occurring on ridges, steep rocky slopes, and flatter ground, especially where the understorey is open. It may occur below 1,350m in the Udzungwa Highlands (Dinesen *et al.* in prep). It feeds on invertebrates and seeds found in the leaf litter on the forest floor (del Hoyo *et al.* 1994). Breeding possibly starts with the onset of the rains. Adults have been seen with chicks in late November and in early December.

**Threats:** Snaring of ground-dwelling birds and mammals at Nyumbanitu may have affected the population locally. However, throughout the Udzungwa Highlands there is no evidence that hunting is a threat (D. Moyer and E.A. Mulungu *in litt.*).

**Conservation:** Ndundulu and Nyumbanitu Mountains lie within the West Kilombero Forest Reserve and Luhombero is in the Udzungwa Mountains National Park (D. Moyer and E.A. Mulungu *in litt.*). The latter protected area is supported by an ongoing conservation project that includes a community outreach component.

**Targets:**

- Establish the precise altitudinal range and breadth of habitat types used.
- Evaluate the effects of human disturbance by comparing population densities, habitat use, and breeding success in undisturbed parts of the forest with areas where there is logging, pole cutting, and subsistence hunting.

### **Chestnut-breasted hill-partridge (*Arborophila mandellii*)**

Vulnerable C1; C2a

It is inferred from limited available data that this partridge has a small population, which is declining and becoming increasingly fragmented. It is, therefore, classified as Vulnerable.

**Range and population:** The chestnut-breasted hill-partridge is endemic to the eastern Himalayas north of the Brahmaputra, known from **Bhutan**, West Bengal

(Darjeeling only), Sikkim and Arunachal Pradesh, northeast **India**, and southeast Tibet, **China**. There are recent records from several sites in Bhutan, including the ThrumsingLa National Park and Shemgang Dzongkhag (Grimmett *et al.* 1998). It is locally common in the remaining forests of Arunachal Pradesh and perhaps also parts of West Bengal, suggesting it may be evenly distributed right across its range wherever suitable habitat occurs (Kaul *et al.* 1995, R. Kaul *in litt.*).

**Ecology:** It is resident in undergrowth of evergreen forest, including bamboo. Often found close to streams, the species ranges from perhaps as low as 350m up to 2,500m (McGowan *et al.* 1995), but invariably 1,700–2,000m based on recent records.

**Threats:** Forest degradation and fragmentation, as a result of shifting cultivation, timber harvesting, and clearance for tea plantations, are increasing problems in northeast India (McGowan *et al.* 1995). Hunting in the Mishmi Hills (including within protected areas) is apparently rampant, with snares set for mammals also responsible for the deaths of many Galliformes (Kaul 1994). Singalila National Park suffers high incursion rates from visitors coming to hunt, collect forest products, and graze livestock (R. Kaul *in litt.*). Extensive grazing across much of its range presents a further threat. As Bhutan’s population increases, shifting agriculture and grazing are likely to become problems, despite the country’s admirable forestry policy.

**Conservation:** It is known from at least two protected areas, Singalila National Park (West Bengal) and Thrumsing La National Park (Bhutan), and has been reported recently from Mehao and Dibang Valley Wildlife Sanctuaries, Arunachal Pradesh (Kaul 1994, Kaul *et al.* 1995). A recent ban has been placed on timber export from forests in Arunachal Pradesh. Bhutan’s national policy of maintaining forests over 60% of the country potentially goes a long way toward ensuring a safe long-term future for this species there (Adams 1989).

**Targets:**

- Verify all recent records based on vocalisations, and distribute recordings of the species to assist fieldworkers.
- Conduct extensive surveys to clarify distribution, status, altitudinal preference, and habitat requirements throughout its suspected range.
- Conduct ecological studies, focusing on habitat selection, population status, and threats.
- Promote effective enforcement of the ban on timber export from Arunachal Pradesh and control of timber supplies to plywood industries operating within the state, and campaign for further protection of natural habitats within its core range.

## White-necklaced hill-partridge (*Arborophila gingica*)

Vulnerable C1; C2a

This species is listed as Vulnerable because its severely fragmented population is assumed to be small, and it is continuing to decline because of on-going habitat loss.

**Range and population:** The white-necklaced hill-partridge is endemic to China, where it is known from scattered localities in the mountain ranges in the southeast, in Zhejiang, Fujian, Jiangxi, Guangxi, and Guangdong. There have been few studies of its population size and distribution, but it is now considered to be rare in many parts of its range, and no longer found in some areas, with a total population of probably less than 10,000 individuals (Li Xiangtao 1996). However, it is still locally common in some regions, for example in northern Guangdong (Mell 1922, Lewthwaite 1995), and its population may prove to be larger than the recent estimates.

**Ecology:** Its typical habitats are broadleaf and mixed broadleaf and coniferous forest, bamboo, and scrub at 500 to 1,900m in the higher mountains of southeast China (Cheng Tso-hsin 1987, Li Xiaoliu *et al.* 1990, P. Alström *in litt.*). It is confined to densely forested areas, where it stays on the ground in thick undergrowth all day but roosts communally in trees, and is very noisy before going to roost (Rickett 1900, Caldwell and Caldwell 1931).

**Threats:** This species is threatened mainly by the continuing loss and fragmentation of its habitat, as most forest has been cleared or modified as a result of the demands for agricultural land and timber (Smil 1984). Hunting for food and market trading is also a threat (King 1987, Zheng Guangmei and Wang Qishan 1998).

**Conservation:** There are many protected areas in or close to its range, but most of these reserves are relatively small and isolated, and it is not clear how many of them contain large enough areas of suitable forest to support viable populations. The large Wuyi Mountains Nature Reserve (565km<sup>2</sup>) in Fujian is likely to be especially important for its long-term survival (Stattersfield *et al.* 1998).

### Targets:

- Advocate listing as a nationally protected species in China.
- Conduct surveys in protected areas throughout its range to determine which of them support significant populations.

- Conduct studies of its habitat requirements to help develop appropriate management practices in protected areas for the conservation of this species.
- Manage existing protected areas where it occurs to better protect closed-canopy forest.
- Propose the designation of new protected areas, if required.

## Hainan hill-partridge (*Arborophila ardens*)

Vulnerable A1c,d; B1+2b,c,d,e; C1; C2a

This species is listed as Vulnerable because it has a small population, it has a small, severely fragmented range, and it is continuing to decline because of ongoing habitat loss. In addition, it is thought to have undergone a rapid population reduction.

**Range and population:** The Hainan hill-partridge is endemic to Hainan Island, off the south coast of China. A preliminary survey of the core area of Bawangling Nature Reserve in 1997 tentatively estimated a population density of 6–8 birds per km<sup>2</sup>. The total area of suitable habitat on Hainan is estimated at about 660km<sup>2</sup>, and extrapolating this density estimate to the extent of remaining forest gives a possible population of 3,900–5,200 birds (Gao Yu-ren 1998).

**Ecology:** It may be mainly restricted to primary tropical evergreen forest, both broadleaf and mixed coniferous and broadleaf, usually between 600m and 1,200m. It is also found in some evergreen forests, which have been logged but are now well recovered. It is never found in young secondary forest that has not fully regrown (Gao Yu-ren 1998, Gao Yu-ren *in litt.*).

**Threats:** Forest cover has been lost and fragmented very rapidly on Hainan in the past 50 years. In the 1940s, the area of natural forest was estimated at up to 17,000km<sup>2</sup> but this had declined to below 3,000km<sup>2</sup> by the 1990s, mainly as a result of excessive timber extraction, the replacement of forest by rubber plantations, shifting agriculture, and the unrestricted cutting of wood (Zhou Guang-yi 1994). Illegal hunting for food is also a threat (McGowan *et al.* 1995, Gao Yu-ren 1998, Zheng Guangmei and Wang Qishan 1998; see King and Liao 1989).

**Conservation:** It is a nationally protected species in China. Suitable forest habitat is estimated to cover a total of about 660km<sup>2</sup>, of which about 410km<sup>2</sup> is in reserves (Gao Yu-ren 1998). There are populations in Bawangling, Jianfengling, Wuzhishan, and Nanwei Ling Nature Reserves. The Hainan Government has enforced a ban on the logging of primary forest since January 1994, which

should have lessened the pressure on its habitats, and is currently considering extensions to Bawangling and other existing reserves (Gao Yu-ren *in litt.*).

**Targets:**

- **Conduct further surveys to determine its distribution and habitat use throughout the island, and especially to identify which protected areas support significant populations.**
- **Assess whether the existing protected areas network is adequate and, if necessary, establish more protected areas for this species, or link together areas of protected and unprotected forest in parts of Hainan.**
- **Upgrade Nanwei Ling from county to provincial level nature reserve.**
- **Conduct public awareness programmes on the plight of the threatened and endemic forest wildlife of Hainan.**
- **Attempt to reduce hunting through public education and the enforcement of relevant legislation.**

### **White-faced hill-partridge (*Arborophila orientalis*)**

Vulnerable A1c; A2c; B1+2b,c,e

**This species is thought to be undergoing a continuing rapid decline and severe fragmentation in range and population owing to habitat loss and degradation. It is, therefore, classified as Vulnerable.**

**Taxonomy:** This form is separated from the remaining races of grey-breasted hill-partridge *A. sumatrana* with which it has previously been lumped, namely *sumatrana*, *rolli*, and *campbelli*, owing to substantial morphological differences and its isolation (with chestnut-bellied hill-partridge *A. javanica* interposing in West and Central Java) (Mees 1996, BirdLife International in prep., V. Nijman *in litt.*).

**Range and population:** The white-faced hill-partridge is apparently restricted to the eastern part of East Java, **Indonesia**, from the Yang Highlands eastwards. Its habitat requirements suggest that its range, which historically covered only about 7,000km<sup>2</sup>, today covers less than 2,500km<sup>2</sup> (V. Nijman *in litt.*). Its population was initially estimated at 1,000–10,000 individuals (McGowan *et al.* 1995), but it has been subsequently found at several more sites and may exceed this upper limit.

**Ecology:** While data on this species are extremely scant, current information suggests that it is similar to its close congeners in that it frequents the interior of montane evergreen forest (from 500m, but usually above 1,000m) on mountains whose summits tend to be higher than

1,700m (V. Nijman *in litt.*). It is also probably relatively resilient to habitat degradation and hunting pressure, although this remains to be confirmed.

**Threats:** Most forest in the Yang Highlands has been cleared. Degradation in other areas occurs along the edges of remaining blocks and clearance of fragments due to logging and agricultural encroachment remains commonplace (V. Nijman *in litt.*). Furthermore, partridges are frequently caught and eaten or traded by local people on Java (van Balen 1992). The combination of these factors is likely to be rapidly reducing its population.

**Conservation:** A game reserve, perhaps embracing 15km<sup>2</sup> of forest, has existed in the Yang Highlands since 1962. However, this has proved an ineffective designation in terms of protection (van Balen *et al.* 1995). The species also occurs in Meru Betiri National Park and the Kawah Ijen Ungup-ungup Nature Reserve. A small captive population of about 20 birds exists in Belgium (R Sozer *pers. comm.*).

**Targets:**

- **Conduct fieldwork to determine the range, altitudinal distribution, population density, and ecological requirements of the species so that an effective conservation strategy may be formulated.**
- **Examine 450km<sup>2</sup> of forest remaining on the Yang Highlands and establish its protection, if possible.**
- **Survey the estimated 1,300km<sup>2</sup> of forest in the Gunung Raung and Gunung Maelang complexes, and implement conservation action where necessary.**

### **Bearded wood-partridge (*Dendrortyx barbatus*)**

Vulnerable A1c,d; A2c,d; B1+2a,b,c,e; C1; C2a

**This species has a small range and population that continue to decline rapidly. Therefore, it qualifies as Vulnerable.**

**Range and population:** The bearded wood-partridge is confined to the Sierra Madre Oriental and Sierra Madre de Oaxaca in east **Mexico**. Surveys in 1994–1998 found the species in Hidalgo (north of Tlanchinal, from where it was known previously (Howell and Webb 1995, Gómez de Silva and Aguilar Rodríguez 1994) and Veracruz (11 sites), and provided the first records for Oaxaca (Sierra Mazateca (Aguilar Rodríguez 1999), Querétaro (Sierra Gorda and adjacent areas (Clinton-Eitnien *et al.* 1999, Rojas-Soto *et al.* in press)) and the only record for San Luis Potosi since 1951 (also Sierra Gorda (J. Clinton-Eitnien *in litt.*)). It is locally extinct in many areas with no

records from Puebla since 1977. The spate of recent records suggests that it is more numerous than previously thought, but remaining populations are fragmented and, perhaps with the exception of those in the remote Sierra Gorda, continuing to decline.

**Ecology:** It inhabits humid montane and pine-oak forest at elevations of 900–3,100m, but has been recorded in older secondary growth forest, edge, and disturbed habitats associated with agriculture (Clinton-Eitniear *et al.* 1999, Montejo and Tejeda 1996). Many fragmented populations are restricted to vegetation along creeks and rivers (J. Clinton-Eitniear *in litt.*).

**Threats:** Habitat destruction and fragmentation are the result of logging, clearance for agriculture, road building, tourist developments, intensive urbanisation, sheep ranching, and grazing (Dinerstein *et al.* 1995). Fragmented populations are susceptible to subsistence hunting, predators, genetic retrogression, and further human encroachment (J. Clinton-Eitniear *in litt.*). In Veracruz, there is widespread conversion of habitat to monoculture crops, human settlement, and livestock grazing (Clinton-Eitniear *et al.* 1999) and, in Hidalgo, there is little remaining habitat.

**Conservation:** There are recent records from Sierra Gorda Biosphere Reserve (384km<sup>2</sup>) (Clinton-Eitniear *et al.* 1999) and near Pico Orizaba National Park (20km<sup>2</sup>) (Montejo and Tejeda 1996). There are historical records from areas now within Cofre de Perote and Cañon del Río Blanco National Parks, but the species' current status in these reserves is unknown. Environmental education in Veracruz has included the development of posters and roadway signs (J. Carroll *pers. obs.*).

**Targets:**

- **Survey for additional populations in San Luis Potosi, Hidalgo, Veracruz, and Oaxaca.**
- **Document habitat requirements, especially within the Sierra Gorda.**
- **Implement a conservation awareness programme, especially within the Sierra Gorda targeting villages near known populations.**

**Black-fronted wood-quail  
(*Odontophorus atrifrons*)**

Vulnerable B1+2a,b,c,e; C2a

This species qualifies as **Vulnerable** owing to its small range and population, both of which must be declining in response to habitat loss. The overall range is small and fragmented with recent records from only one area.

**Range and population:** The black-fronted wood-quail has three disjunct populations: the nominate subspecies in the Sierra Nevada in Santa Marta Mountains, northeast **Colombia**; subspecies *navai* in the Sierra de Perija on the Colombia-**Venezuela** border; and subspecies *variegatus* in the northern East Andes of Colombia (Norte de Santander and east Santander) (Fjeldså and Krabbe 1990, Hilty and Brown 1986). The only recent records are of a small family party on the San Lorenzo road in the Santa Marta Mountains in October 1994, but none of the races *navai* or *variegatus* (P. Salaman *in litt.*). It appears to be declining, with total numbers likely to be below 10,000 individuals (McGowan *et al.* 1995, P. Salaman *in litt.*).

**Ecology:** It inhabits montane humid forests at elevations of 1,200–3,100m (McGowan *et al.*, 1995, P. Salaman *in litt.*). It is wary and secretive, foraging in dense undergrowth (Fjeldså and Krabbe 1990). Two breeding condition males and one laying female have been found in August, and an immature in July (Hilty and Brown 1986).

**Threats:** The Colombian East Andes have been subject to four centuries of extensive degradation with progressive deforestation on its lower montane slopes (Forero 1989, Stiles *et al.* 1999). In Boyaca and Santander, however, where forest loss was gradual until the 1960s and 1970s, some sizable tracts remain and habitat is beginning to regenerate owing to land abandonment (Stiles *et al.* 1999). The Sierra Nevada de Santa Marta is threatened by agricultural expansion, logging, and burning (Dinerstein *et al.* 1995). On the west slopes, marijuana plantations expanded widely in the 1980s and were sprayed by the government with herbicides in the early 1990s (L. Olarte *in litt.*, L. Renjifo *in litt.*). The Sierra de Perijá is heavily deforested by cattle-ranching at lower elevations and narcotics cultivation above 2,000m (C. Sharpe *in litt.*). It is hunted in some parts of its range.

**Conservation:** Although it occurs in the Sierra Nevada de Santa Marta Biosphere Reserve (7,310km<sup>2</sup>), Colombia, and the Perijá National Park (2,953km<sup>2</sup>), Venezuela, neither of these formal designations provides adequate protection (C. Sharpe *in litt.*, Wege and Long 1995). It is legally protected from hunting in Venezuela.

**Targets:**

- **Conduct a complete distributional survey to assess status and habitat preferences.**
- **Survey Perijá National Park, especially the less well known southern section, and assess the population and extent of habitat loss.**
- **Map remaining habitat and assess the extent and rate of habitat loss.**
- **Produce and promote management recommendations for Sierra de Perijá National Park.**

## **Dark-backed wood-quail (*Odontophorus melanonotus*)**

Vulnerable B1+2a,b,c,e

**This species has a small range with recent records from few sites. Available habitat, and presumably the population, is declining. The species, therefore, qualifies as Vulnerable**

**Range and population:** The dark-backed wood-quail has a very small range in the Chocó (West Andes) of northwest **Ecuador** (Esmeraldas, Carchi, Imbabura, Pichincha, and Cotopaxi) and southwest **Colombia** (Nariño) (Best *et al.* 1996, Hilty and Brown 1986, N. Krabbe *in litt.*, McGowan *et al.* 1995). The population is estimated at 10,000–20,000 individuals and declining (Salaman and Strewé *in prep.*). Although considered rare in Ecuador (Ridgely *et al.* 1998), it remains common in Río Nambí and La Planada Nature Reserves, Colombia (Salaman and Strewé *in prep.*) and Mindo-Nambillo Protected Forest and Maquipucuna Reserve, Ecuador (N. Krabbe *in litt.*).

**Ecology:** This wet subtropical forest specialist occurs exclusively in undisturbed, closed-canopy forest at 1,100–1,900m. It is typically found in groups of 2–10 individuals, which are particularly vocal at dawn during the wet season. Recent hatchlings have been recorded in July and August. It feeds on terrestrial invertebrates and fruit (N. Krabbe *in litt.*).

**Threats:** Deforestation and hunting for food are the major threats to this species (McGowan *et al.* 1995). Unplanned colonisation, following the completion of roads and massive logging concessions, has been the primary cause of habitat loss. Deforestation rates are accelerating within its range primarily due to intensive logging, human settlement, and cattle grazing. Forests at these elevations are less threatened than those in the lowland Chocó region, but habitat loss is occurring below 2,000m, especially along new roads, and the Cali-Buenaventura and Pasto-Tumaco Highways (Salaman and Stiles 1996).

**Conservation:** It occurs in Río Nambí and La Planada Nature Reserves, Colombia, and Mindo-Nambillo Protected Forest, Los Cedros Biological Reserve, Las Tangaras and Maquipucuna Reserve, Ecuador (Best *et al.* 1996, P. Salaman *in litt.*). Both of the protected areas in Colombia suffer serious illegal logging within their boundaries and have significant unresolved land disputes, encompassing over one-third of La Planada and half of Río Nambí (R. Strewé *pers. comm.*).

### **Targets:**

- **Conduct a complete distributional survey to determine its range and numbers more accurately.**

- **Map remaining habitat and assess the extent and rate of habitat loss.**

## **Tacarcuna wood-quail (*Odontophorus dialeucos*)**

Vulnerable D2

**The very small occupied range of this species, combined with some potential threats, qualifies it as Vulnerable.**

**Range and population:** The Tacarcuna wood-quail was discovered in 1963 and is only known from Cerros Mali and Tacarcuna on the Tacarcuna Ridge in Darien, extreme east **Panama** and adjacent Chocó, northwest **Colombia** (Ridgely and Gwynne 1989, Wege 1996). Its area of occupancy is estimated at 100km<sup>2</sup> (Wege 1996). It is fairly common in suitable habitat in Panama (Ridgely and Gwynne 1989).

**Ecology:** This is a very poorly known terrestrial bird of humid forests, found at elevations of 1,050–1,450m (Ridgely and Gwynne 1989, Wege 1996).

**Threats:** Hunting for food, and habitat clearance and degradation resulting from mining, agriculture, and cultivation of coca affect birds in this region (Alvarez-Cordero *et al.* 1994). However, these threats are probably not yet factors within this species' altitudinal range. Completion of the Pan-American Highway link through Darién could lead to severe, long-term damage to the forest of the Tacarcuna Ridge (Alvarez-Cordero *et al.* 1994, Wege 1996).

**Conservation:** Darien National Park, Panama, protects all but the small Colombian part of its range (Wege 1996). However, legal protection has not halted habitat loss at lower altitudes (Wege 1996).

### **Targets:**

- **Conduct a complete distributional survey to assess status and habitat preferences.**
- **Map remaining habitat and assess the extent and rate of encroaching habitat loss.**

## **White-breasted guineafowl (*Agelastes meleagrides*)**

Vulnerable A1c,d; A2c,d

**This species is classified as Vulnerable because it is inferred to have suffered a rapid population decline over the last 10 years, based on the rate of forest destruction throughout its**

**range, which is now highly fragmented. It is also heavily persecuted in some parts of its range. The decline is likely to continue, and it is possible that the species will disappear from all but a few protected areas. Effective protection is essential for the maximum number of sites where it still occurs.**

**Range and population:** The white-breasted guineafowl occurs in **Sierra Leone** (Gola Forest region only, population estimated at 5,700–8,700: Allport *et al.* 1989), **Liberia** (population estimated at more than 10,000 in 1985: Gatter 1997), **Côte d’Ivoire** (notably Taï National Park, population estimated at 30,000–40,000 in 1990: Gartshore *et al.* 1995), and **Ghana** (population estimated at 1,000 birds, but these could be remnant populations that are not viable (Allport 1991), and the species may have already been extirpated from small logged forests (Holbech 1992, 1996) i.e., up to 100km<sup>2</sup>). In 1995, the world population was optimistically estimated at 85,000–115,000 (Gartshore *et al.* 1995).

**Ecology:** It inhabits the interior of primary rainforest with thin undergrowth (Urban *et al.* 1986), preferring dry, closed-canopy forest in Taï Forest (Gartshore *et al.* 1995). It has proved unable to adapt to the denser undergrowth of secondary forest (Urban *et al.* 1986), although it is reported to inhabit old secondary forest in Ghana (Holbech 1992, 1996). The species has been recorded in logged primary forest (Allport *et al.* 1989), but the presence of undisturbed primary forest seems essential (del Hoyo *et al.* 1994). It feeds on insects, small molluscs, berries, and fallen seeds of forest trees (Urban *et al.* 1986). The breeding

season is October–May, possibly year round (del Hoyo *et al.* 1994).

**Threats:** Its habitat is rapidly receding and, where it still occurs in large numbers, it is heavily poached. Increased hunting in logged areas may push the species beyond recovery at some sites (Allport *et al.* 1989, Holbech 1992, 1996). Interspecific competition with the larger crested guineafowl may be a problem in logged high forest (Gartshore *et al.* 1995, Gatter 1997).

**Conservation:** In Sierra Leone, the species is restricted to Gola Forest, which has little legal protection status (H. Thompson *in litt.*). In Côte d’Ivoire, Taï National Park is one of the largest and best-preserved areas of Upper Guinea forest (Stattersfield *et al.* 1998).

**Targets:**

- **Conduct surveys in Liberia and identify key sites.**
- **Carry out population surveys in Ghana to ascertain its status.**
- **Conduct education campaigns to address hunting pressure.**
- **Ensure *de facto* protection of reserves in the Taï and Gola Forests.**
- **Take measures in Taï National Park to mitigate the effects of rapid land use changes outside the park.**
- **Ensure that future studies in Taï National Park and Gola Forest include support for local people to contribute to research, management, and tourism in and around the park.**



## Five-year Plan of Action

The previous chapter provided a summary of information that is of conservation importance for all threatened species of partridge, quail, francolin, snowcock, guineafowl, and turkey, and outlined the conservation targets that, if achieved, should prevent the species from becoming extinct. This chapter builds upon these recommendations by outlining key projects that the PQF Specialist Group proposes should be started or continued during the period 2000–2004.

Before looking in detail at these projects, it is helpful to assess the results of projects suggested in the first edition. This assessment was made by sending out a questionnaire to everyone undertaking projects on partridges, quails, francolins, snowcocks, guineafowl, and turkeys relating to those suggested in the first edition. Of the 19 major projects suggested in 1995, 10 have been initiated, and nine have not yet been attempted. Where these are judged to be of continuing global priority, they are again recommended in this Action Plan. Of the 56 individual project objectives suggested in the 1995 Action Plan, 21 were achieved by the end of the implementation period, one was attempted but not achieved, and eight objectives are pending. Twenty-six objectives were not attempted during the implementation period. This shows that although the Action Plan has stimulated new conservation work, the plight of partridges, quails, francolins, snowcocks, guineafowl, and turkeys needs to be continually highlighted. This is one of the aims of the present document. Indeed, many principal investigators of projects on these species made reference to the 1995 Action Plan in funding proposals, and the Action Plan was frequently cited as one of the main reasons for undertaking the work.

These data indicate that a fair amount of the work suggested in the first edition of the Action Plan has been initiated. The projects suggested in this second edition are clear evidence of a new phase in the conservation of some of the species, moving on from conducting basic survey work to combining existing data with new biological information to generate well-informed threat assessments and construct management strategies at a variety of scales. Major components of some projects are conservation awareness programmes, which can now be attempted realistically, because much of the necessary baseline data has become available over the past five years. The same applies to providing and promoting scientifically based management recommendations to decision-makers. Another major focus is on population monitoring to assess the effectiveness of various management initiatives. Throughout, it is intended that local communities be involved wherever possible.

**Structure of project outlines:** Suggested projects are provided in four groups – global, regional, strategic, and species-specific. They are outlines of what needs to be done, as well as why and how. They are designed to be read as much by people who might then seek or donate funds allowing a project to be carried out, as by biologists wishing to conduct research that contributes to the conservation of partridges, quails, francolins, snowcocks, guineafowl, and turkeys and their habitats. Together with the species accounts given in Chapter 3 and the references cited therein, they could be used to develop full project proposals. Such proposals can be submitted to the PQF Specialist Group, which will be able to provide advice and contacts, and help with funding applications through their endorsement procedure and international network.

Each project outline includes entries under a standard set of sub-headings, as follows:

**Aims:** A brief statement of the project's major objectives.

**Justification:** Why the project is urgent and valuable.

**Project description:** Includes a description of how the aims might be achieved, often with some mention of study areas and methods.

**Timescale:** How long the project might last, including time travelling to and from the study area.

**Resources:** An indication of the approximate scale of the project, where possible, through a cost estimate in US\$. Estimated costs should be carefully itemised for inclusion in full project proposals. Totals may ultimately differ substantially from what is presented here, particularly if researchers work on a voluntary basis. Details of other important resource considerations are given where appropriate.

### 4.1 Global projects

#### Project 1. Increasing the effectiveness of the PQF Specialist Group

##### Project 1a. Increasing the effectiveness of the communications network.

**Aim:** To develop and expand the PQF Specialist Group communications network.

**Justification:** The PQF Specialist Group is charged by its three parent bodies, the IUCN Species Survival Commission, BirdLife International, and the World

Pheasant Association, with responsibility for overseeing activities concerned with the conservation and sustainable use of partridges, quails, francolins, snowcocks, guineafowl, and turkeys worldwide. This requires it to maintain communications with a large and increasing network of conservationists to assist with the development and support of project proposals, to evaluate project reports, and to provide advice for international organisations, government departments, NGOs, and individuals. The capacity for the Specialist Group to engage in assisting its members needs to be continually improved in the light of new information on the status and conservation of many threatened species.

**Project description:** The network requires development or expansion in many areas of the world, particularly in places where little-known species are found, such as West Africa. This should involve increasing contacts in government wildlife departments, universities, and conservation organisations.

**Timescale:** As an ongoing project, this work should continue throughout the five-year implementation period of this Action Plan.

**Resources:** The main cost will be the time to administer the work.

### **Project 1b. Increasing the effectiveness of project monitoring and evaluation.**

**Aims:** To develop and implement a system for monitoring progress of projects and evaluating their outcomes; to develop a suitable database structure in which to store this information.

**Justification:** In order for the PQF Specialist Group to provide the most effective assistance and advice to principal investigators involved in conservation projects, it is essential to monitor progress. This will allow the PQF Specialist Group and other organisations, including funding bodies, to assess how projects endorsed by the Specialist Group have led to concrete conservation actions in the field. It will also enable the group to better coordinate communication between researchers, acting as a central repository for advice on funding bodies, field methodology, etc.

**Project description:** The material contained within this revised Action Plan has contributed to the evaluation and assessment of research on, and the conservation of, partridges, quails, francolins, snowcocks, guineafowl, and turkeys over the past five years. Building on this foundation, the PQF Specialist Group should aim to develop a suitable framework for assessing the effectiveness

of future projects on an individual basis. It is important that this system is streamlined and does not generate excessive bureaucracy for project and PQF Specialist Group personnel. Methods and species proving difficult to work on can be highlighted, and the capacity of the global network can be utilised in deriving solutions. Project information should be stored in a database so that it is rapidly and easily available.

**Timescale:** As an ongoing project, this work should continue throughout the five-year implementation period of this Action Plan, but the system could be set up within a year.

**Resources:** The main cost will be the administration of the programme. There is clearly overlap with similar work suggested by other Galliformes Specialist Groups (e.g., Fuller and Garson 2000).

## **Project 2. Improving communication of research findings**

### **Project 2a. Converting project outputs into conservation action.**

**Aim:** To facilitate the production of reports and publications based on research and other conservation activities, and designed to prompt new action for conservation.

**Justification:** Over the last 25 years, a great deal of information has been collected on the distribution, abundance, and ecology of many threatened partridges, quails, francolins, snowcocks, guineafowl, and turkeys. There is an increasing need for presentation of key findings in a way that will influence conservation policy.

**Project description:** Project reports written for sponsors should be used as a basis for shorter documents designed specifically for the attention of government and NGO officers. They should draw clear lessons from completed research projects for the future conservation of species and their habitats by suggesting feasible changes to current management practices. There should also be advice on how to monitor outcomes of such changes once they are implemented. The Specialist Group should facilitate contacts between members requiring help with these tasks and those with relevant experience. Particular species for which this approach is urgent and feasible include swamp francolin, Nahan's francolin, and Sichuan hill-partridge (see Sections 4.4 and 4.5).

**Timescale:** As an ongoing project, this work should continue throughout the five-year implementation period of this Action Plan.

**Resources:** Assuming that most advice could be offered electronically, the main costs will be limited to the production of special publications.

### **Project 2b. Improving international exposure of research findings.**

**Aim:** To increase the publication of research findings in international peer-reviewed journals.

**Justification:** The international scientific community does not become aware of research findings unless papers are published in quality journals. A project to publish and disseminate much needed information would help ensure that conservation action is based on sound scientific evidence. If major agencies involved in global conservation are to advocate action relating to conservation, it is necessary for them to have access to such material. In addition, authorship of papers in international peer-reviewed journals can do a great deal for the career prospects of researchers, which will in turn improve their prospects of permanent employment in the conservation sector and increase their capacity to raise project funds at home and abroad.

**Project description:** Specialist Group members with the most experience in this area should be asked to assist others on a one-to-one basis. This would probably involve visits in one or both directions to facilitate data presentation, statistical analysis, interpretation of findings, access to existing literature, and manuscript preparation.

**Timescale:** As an ongoing project, this work should continue throughout the five-year implementation period of this Action Plan.

**Resources:** The costs of travel, accommodation, and subsistence would usually need to be covered for visitors.

## **4.2 Regional projects**

### **Project 3. Maintaining the WPA Asian Galliformes sites database**

**Aim:** To update and maintain a database of localities and associated information for Asian Galliformes.

**Justification:** Reliable information regarding where species occur is the cornerstone of many conservation activities, including conservation assessments of the type undertaken in this Action Plan, and the identification of important areas for groups of species and areas where surveys or similar action are required. This information can be used in combination with other data sets, such as habitat types and protected areas, to carry out a variety of strategic analyses.

**Project description:** A database has been compiled for Asian Galliformes (see McGowan *et al.* 1999 for an example of its use), but as new fieldwork is carried out, new sites are documented. There is a need, therefore, to update the database and establish it in such a way that it can readily be used for conservation. The existing database contains localities on all Galliformes in Asia (except the megapodes) and it seems sensible to maintain this structure. As many Galliformes inhabit the same areas and are studied or surveyed by the same people, it will also maximise the efficiency with which data are compiled, assessed, stored, and then retrieved. The World Pheasant Association provides the logical place for such a database to be housed. Once established, updating procedures should be finalised.

**Timescale:** As an ongoing project, this work should continue through the five-year implementation of this Action Plan, although the database should be fully established as soon as possible.

**Resources:** The main resource requirement is the time to administer the database.

### **Project 4. Assessing the taxonomic and conservation status of the Andean wood-quails *Odontophorus***

**Aims:** To revise the species-level taxonomy of the Andean wood-quails; to examine how habitat loss is affecting these species; to assess the efficacy of the protected area network covering these species, particularly in terms of altitudinal distribution.

**Justification:** There is a large number of little-known Andean wood-quails, and most species have small distributions and specialise in habitats that are rapidly disappearing. The taxonomic status of several of the forms is unclear, and it is important that limited resources for conservation are used where they are most needed to safeguard biological diversity. Habitat loss is accelerating across much of the region and, as this may affect different species in different ways, an assessment of status in relation to habitat distribution is urgently required.

**Project description:** Various taxonomic methods should be employed to examine the degree of distinctiveness of several Andean wood-quail populations, with the aim of identifying units most appropriate for species-level recognition. This is important, as some species have subpopulations and subspecies that are highly threatened, while the species as a whole may be considered Lower Risk (e.g., chestnut wood-quail). It is essential to look at how habitat loss is affecting Andean wood-quail species, and this may be accomplished by characterising each species' precise habitat

requirements in terms of forest type and altitudinal range. Some species occupy a relatively narrow altitudinal band and deforestation affects different altitudes in different ways. For example, the gorgeted wood-quail is found only in the oak band, which has been lost over much of its range in Colombia. Reserves tend to be restricted to high elevations, and there is a need to assess how well these protected areas are covering the range of these species. Recommendations for protected area improvement should be made as a result of this study.

**Timescale:** A long-term programme of work, although individual surveys of any length could contribute useful information.

**Resources:** Funding for this work could be sought in the form of small grants for surveys to the large grants needed to sustain a substantial research programme.

### **Project 5. Assessing the conservation status of Neotropical quails in northern Central America**

**Aims:** To adequately survey the distribution of the quail species inhabiting southern Mexico, Belize, Guatemala, and Honduras; to use this information to generate large-scale conservation assessments of these species.

**Justification:** Although the species within this region are largely considered to be at Lower Risk, much of this is based on indirect evidence regarding amounts of available habitat. It remains the case since the last Action Plan was published that very little is known about these species. Survey work is urgently required to adequately map their distributions and populations so that informed and explicit judgements on their conservation status can be made. This will also enable future judgements on trends in distribution and population sizes to be made, allowing declining species to be identified and appropriate action to be taken before it becomes too late.

**Project description:** Large-scale mapping of probable species ranges may pinpoint areas where additional survey work may find populations of these species. Particular attention should focus on protected areas to establish whether there are viable populations within such areas in the region. This will also clear the way for more detailed habitat use studies to understand why some areas are better than others for these species. This, in turn, will help identify which species are likely to be threatened in the future from human actions, and enable the formulation of management plans to prevent their demise.

**Timescale:** Such work could be completed within two years, although there would be plenty of opportunities for

short-term fieldwork projects within the context of the overall programme.

**Resources:** \$15,000–25,000.

### **Project 6. Assessing populations of Asian Galliformes within protected areas**

**Aim:** To assess whether each of the 82 protected areas identified in a recent study contains viable populations of threatened Galliformes

**Justification:** Recent work has identified a set of 82 protected areas within Asia, approximately half of which are irreplaceable in the context of Galliformes conservation (McGowan *et al.* 1999). However, the study was only able to use species lists from protected areas and was not able to assess whether each species recorded was actually present in viable numbers. Such an assessment is vital to make sure that the most efficient protected area network is identified, leading to the most effective use of scarce resources for the conservation of Asian Galliformes. Therefore, what is needed is a list of species that have viable populations in each protected area.

**Project description:** Ideally, each protected area would be surveyed to assess whether there are viable populations of Galliformes species present. This is, however, extremely difficult as many areas are hard to survey, most of the species are not easy to detect, and many areas remain to be surveyed to gain a complete understanding of the entire network that has been proposed. Therefore, a few key areas should be surveyed and the results extrapolated to habitat maps from as many areas as possible. For the most part, the broad habitat relations of the target species are sufficiently well known to make assessments of the amount of habitat available to each species. Ground surveys should concentrate on understanding levels of habitat disturbance and the effect different levels may have on species distributions.

**Timescale:** Surveys of any length within protected areas (from a few weeks to several months) will contribute useful information to this work.

**Resources:** Needs will vary depending on the length and scope of the particular project.

### **Project 7. Review of information on IndoChinese partridges**

**Aim:** To review the status of species in Laos, Vietnam, and Cambodia from information in unpublished reports to make an assessment of their conservation needs.

**Justification:** There has been a considerable amount of ornithological survey work in parts of Vietnam since the late 1980s (Robson *et al.* 1989), and general faunal surveys in Laos since the early 1990s (Thewlis *et al.* 1996, Duckworth *et al.* 1998). In contrast, Cambodia has only recently received survey attention after a sustained period of unrest (Edwards 1998). While some of this work has been documented and is available internationally, much remains in unpublished reports to government agencies and donors. The amount and quality of suitable habitat appears to vary across these countries. As there are many species and habitats common to these three countries, there is clear merit in assessing the status of species and their habitats across this biogeographic area.

**Project description:** Collate information on distribution and habitat use from the 'grey literature'. This should then be related to information on the distribution and quality of various habitat types to improve our understanding of the status of each species and what its conservation requirements are in these countries. The work could conclude with a strategy for ensuring these requirements are met. This project should also consider the threatened pheasants found within this region.

**Timescale:** A report could be produced in about four months.

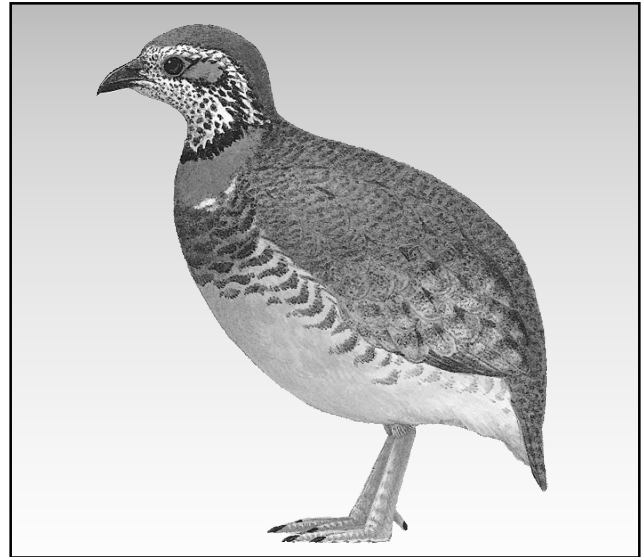
**Resources:** About \$12,000 should cover the cost of employing a researcher to visit Vientiane, Hanoi, and Phnom Penh during these four months.

### **Project 8. Surveys for threatened partridges in Sumatra**

**Aims:** To conduct extensive distribution surveys of threatened partridges in Sumatra; to assess the adequacy of the protected area network identified in a recent study.

**Justification:** Knowledge of Indonesian partridges is poor (Holmes 1989). The country has the longest list of birds believed to be threatened with extinction but, in many cases, this reflects problems presumed to have arisen as a result of habitat loss or degradation, rather than direct evidence of declines in numbers. The threats facing Indonesia's biodiversity are very real, but the continuing lack of baseline information on partridges prevents any objective assessment through which to propose the most appropriate conservation action. A protected area network was identified in a recent study of Asian Galliformes (McGowan *et al.* 1999).

**Project description:** The island of Sumatra covers 476,000km<sup>2</sup>, and establishing the distribution and status



© Lynx Edicions

The Sumatran subspecies of the chestnut-necklaced hill-partridge is possibly confined to the north of the island, and has declined drastically as a result of habitat destruction.

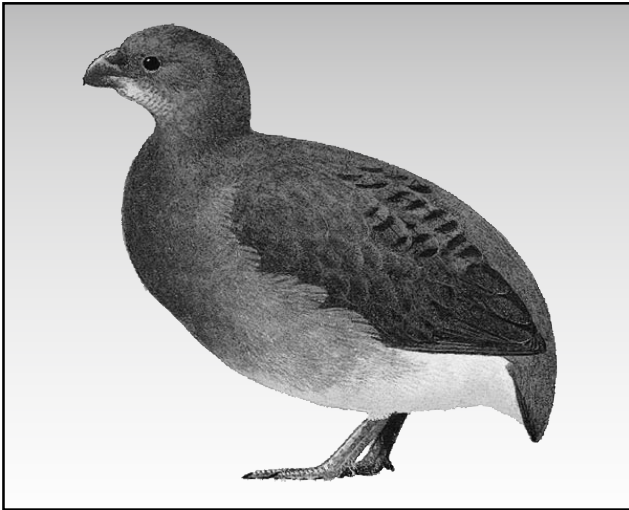
of the little-known species and subspecies occurring there (e.g., black wood-partridge, long-billed wood-partridge, red-billed wood-partridge, ferruginous wood-partridge, subspecies *atjenensis* of the chestnut-necklaced hill-partridge) will not be an easy task. However, there is much scope for survey teams from within or outside Indonesia to survey parts of the island at various times of year. Through networking with other Specialist Groups, the PQF Specialist Group will attempt to collate any other site records for species in Sumatra, as well as their apparent absence from localities within their known areas of occurrence. At a minimum, information on exact locality, altitude, date, and habitat type should be collected. Information on other Galliformes species should also be collected and provided to the relevant SSC Specialist Group. All information should be made available to the WPA Asian Galliformes Sites Database and BirdLife International's World Bird Database.

**Timescale:** Projects of any duration can contribute useful information.

**Resources:** Needs will depend on the length and scope of individual projects.

### **Project 9. Surveys for threatened partridges in Borneo**

**Aims:** To conduct extensive distributional surveys of threatened partridges in Borneo; to collate and assess existing and new information; to assess the adequacy of the protected area network identified in a recent study.



© Lynx Edicions

Although known from Peninsular Malaysia, Sumatra, and Borneo, the black wood-partridge (female shown here) is threatened by severe and continuing habitat destruction.

**Justification:** Knowledge of Indonesian partridges is poor (Holmes 1989). The country has the longest list of birds believed to be threatened with extinction, but in many cases this reflects problems presumed to have arisen as a result of habitat loss or degradation, rather than direct evidence of declines in numbers. The threats facing Indonesia's biodiversity are very real, but the continuing lack of baseline information on partridges prevents any objective assessment through which to propose the most appropriate conservation action. New information on the threatened partridges known to occur on the island is needed, but existing information must be collated and assessed. A protected area network was identified in a recent study of Asian Galliformes (McGowan *et al.* 1999).

**Project description:** The island of Borneo covers 755,000km<sup>2</sup> and comprises three countries. This means that establishing the distribution and status of all its Galliformes will not be an easy task, but there is much scope for survey teams from within or outside Indonesia, Malaysia, and Brunei to survey parts of the island at various times of year. Through networking with other Specialist Groups, the PQF Specialist Group will attempt to collate any other site records for species in Borneo, as well as their apparent absence from localities within their known areas of occurrence. At a minimum, information on exact locality, altitude, date, and habitat type should be collected. Information on other species should also be collected and provided to the relevant SSC Specialist Group. All information should be made available to the WPA Asian Galliformes Sites Database and BirdLife International's World Bird Database.

**Timescale:** Projects of any duration can contribute useful information.

**Resources:** Needs will depend on the length and scope of individual projects.

### 4.3 Strategic project

#### Project 10. Taxonomic reassessment of some partridges and New World quails

**Aim:** To revise species-level taxonomy in some of the partridges and New World quails.

**Justification:** Conservation, fundamentally, is based on the management and protection of natural resources, and the species remains the most practical level at which to direct conservation action. Such action, therefore, relies on identifying and defining species limits. However, recent advances in taxonomic thinking (e.g., species concepts, Evolutionarily Significant Units) and phylogenetic analysis have thrown significant doubt on whether current systematic treatments, in particular the presently accepted species boundaries within the hill-partridges *Arborophila* and wood-quails *Odontophorus*, are correctly reflecting biological diversity in these genera. There is an urgent need for a revision of these species' taxonomy, as there is dispute over the several forms that have variously been treated as subspecies and full species.

**Project description:** A variety of taxonomic methods should be used to examine the question of species limits in partridges and wood-quails, and look at possible implications for conservation. Further species-level taxonomic investigation should focus particularly on some of the *Arborophila* species of Asia, where there is much doubt over treatment of the various subspecies (e.g., the two subspecies of the chestnut-headed hill-partridge and

The threatened Annamese subspecies *merlini* of the chestnut-necklaced hill-partridge has been treated by some as a full species.



© Lynx Edicions

race *merlini* of the chestnut-necklaced hill-partridge). The same applies to the various forms of *Odontophorus* in Latin America. The outcome of such work may have profound implications for the conservation of these birds.

**Timescale:** A long-term project, likely to require three to five years for execution.

**Resources:** Given the specialist techniques and apparatus required, this project may cost in excess of \$25,000.

## 4.4 Projects for Critically Endangered and Endangered species

### Project 11. Djibouti Francolin (*Fringilla ochropectus*)

**Aims:** To clarify distribution and population size of this species, linking this information with more detailed ecological study; to develop and implement long-term habitat management and conservation awareness programmes.

**Justification:** The Djibouti francolin is one of the most threatened of all species considered in this Action Plan. It is restricted to a tiny area involving two sites in Djibouti, and only one of those is thought to contain a viable population capable of long-term survival. Although some work has been carried out on the species, much remains to be discovered and several threats associated with disturbance from humans and livestock are probably affecting this species adversely, as is the poor condition of much of the remaining forest in its range.

**Project description:** Given that the Djibouti francolin appears to be dependent on juniper forest, surveys should

Known only from two sites, and subject to continuing habitat loss, the Djibouti francolin is one of the most endangered Galliformes.



© Lynx Edicions

be undertaken to map the remaining habitat available, and investigate why much of the forest appears to be dying. It may be necessary to collect further ecological data on habitat use and tolerance of disturbed and degraded habitat before this can be attempted realistically. Ideally, two things will emerge from these efforts: a long-term recovery strategy, focusing on conservation awareness by local communities, and a feasible and achievable set of habitat management recommendations, where francolin populations are monitored regularly to assess the effectiveness of this approach. In the longer term, more detailed ecological study will enable fine tuning of the management strategy, but basic data can and should be used at the earliest opportunity to assist the recovery of this species.

**Timescale:** Survey work could be carried out for varying intervals, but the long-term nature of the work suggested here implies a project spanning several years.

**Resources:** Small-scale surveys could be conducted relatively cheaply, but larger sums will be required for ecological study, conservation awareness programmes, and the development and promotion of a management plan.

### Project 12. Nahan's francolin (*Fringilla nahani*)

**Aims:** To continue collation and publication of existing information on the conservation status of this species; to produce and promote a comprehensive recovery plan.

**Justification:** Nahan's francolin is a forest specialist, and is restricted to a few surviving forest fragments in western Uganda and eastern Democratic Republic of Congo. The species has been studied in some detail in the past few years (Dranzoa *et al.* 1999, Sande in press), and there is now a need to collate all information relevant to the species' conservation status and ensure publication of this material in peer-reviewed journals. This will enable the development of a long-term recovery and management plan for this species.

**Project description:** Particular management recommendations should be assembled into a recovery plan for Nahan's francolin, and this promoted to appropriate authorities and local people through community partnerships. Long-term monitoring of populations should be put in place to assess the effectiveness of management strategies and suggest ways in which they can be improved. The emphasis should be on concrete conservation action based on sound science and monitoring the progress made to allow continued refinement of the management tools used.

**Timescale:** As a long-term project, this work is likely to take several years.

**Resources:** Substantial funding will be required to ensure collation and publication of relevant information and recommendations.

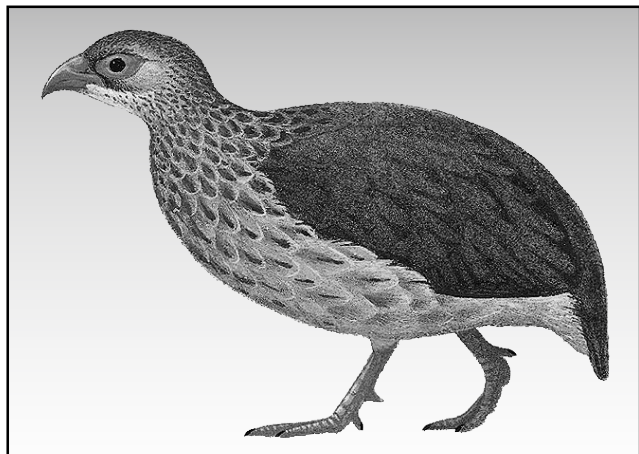
### **Project 13. Mount Cameroon francolin (*Francolinus camerunensis*)**

**Aims:** To conduct intensive surveys of remaining populations; to assess the conservation status of the species based on the amount of available habitat; to produce, promote, and monitor the effects of a habitat management plan.

**Justification:** The Mount Cameroon francolin has a global range of less than 200km<sup>2</sup> on Mount Cameroon. This makes it extremely vulnerable to habitat loss and degradation, and unfortunately, logging is proceeding rapidly around its last remaining population. Burning of grasslands by hunters is another severe threat to the species. Although its habitat is normally subjected to periodic fire and regeneration, the frequency of grassland burning combined with substantial forest habitat loss is believed to be greater than the population can withstand.

**Project description:** Thorough surveys of the remaining population should be undertaken, paying particular attention to the habitats used by the species. When data are complete, the degree of fragmentation should be assessed, and the amount and distribution of remaining suitable habitat mapped. If grassland burning turns out to be a major threat, ways of alleviating it must be sought by incorporating it in the production and promotion of a habitat management plan. In the longer term, population indexing and monitoring techniques should be developed so that the progress of management actions can be assessed.

Habitat within the tiny range of the Mount Cameroon francolin is being lost through grass burning and logging.



© Lynx Edicions

**Timescale:** Survey work could be conducted on a variety of timescales, but monitoring should continue on a regular basis for the foreseeable future.

**Resources:** These will depend on the length and scope of individual surveys, although long-term funding for the monitoring work and production of the management plan should be sought.

### **Project 14. Sichuan hill-partridge (*Arborophila rufipectus*)**

**Aims:** To ensure adequate protection of existing populations; to survey suitable habitat for as yet undiscovered populations; to undertake a long-term ecological study of habitat requirements and breeding biology; to use existing research results to produce feasible habitat management recommendations published in peer-reviewed journals.

**Justification:** This species is known only from south-central Sichuan, with some probable records from Yunnan. It exists in small populations that are highly fragmented. This makes the species highly vulnerable to local extinction through stochastic events. Habitat loss within its range is continuing, and urgent action is required to protect the areas in which it is found. Further study into the ecology of the species will enable the production of a specific habitat management plan, leading to sensible proposals that can best help safeguard the future of the Sichuan hill-partridge.

**Project description:** The overwhelming requirement is the establishment of a protected area network capable of sustaining the species in the long term. This will involve an extension to the Dafengding Nature Reserve. Lobbying for such an extension can be combined with the promotion of better forestry practices, which will greatly assist populations of the hill-partridge without introducing undue costs for logging operators. An ecological study focusing on habitat use and breeding biology should be carried out. Because the species has such a fragmented range, it is likely that further populations exist. Survey work should examine areas of suitable habitat outside the current known range and attempt to locate new populations. Particular management recommendations should be assembled into a recovery plan for the species, and this promoted to appropriate authorities and local people through community partnerships. Long-term monitoring of populations should be put in place to assess the effectiveness of management strategies, and suggest ways in which they can be improved. The emphasis here is on getting concrete conservation action based on sound science, and monitoring its progress to allow continued refining of the management tools used.





© Lynx Edicions

Proposals have been made to improve the level of protection for areas supporting the Sichuan hill-partridge.

**Timescale:** Survey work could require from a few weeks to a few months; habitat protection lobbying should be ongoing and the implementation of an ecological research programme will take three years at a minimum.

**Resources:** Needs will vary depending on length and scope of survey work, although substantial long-term funding will be required for the ecological research.

### **Project 15. Orange-necked hill-partridge (*Arborophila davidi*)**

**Aims:** To survey for additional populations of this species; to monitor known populations; to promote better management of protected areas in which the species is known to occur.

**Justification:** Found in only three sites in central Vietnam, the orange-necked hill-partridge began its severe decline owing to extensive deforestation, particularly as a result of herbicide spraying, during the Vietnam war. Commercial logging continues to remove habitat at an alarming rate, and hunting compounds the problems faced by this species. There is a strong case for improving habitat management and enforcement of regulations in Cat Tien National Park and Cat Loc Nature Reserve, and further work should focus on finding additional populations outside these areas.

**Project description:** Survey for this species outside its existing known range, based on identifying fragments of suitable forest. Work on the development of a management plan within Cat Loc is urgently required, and a WWF project is underway on proposals for management at Cat Tien. Ways of indexing the abundance of remaining

populations and quality of remaining habitat should be developed and used to monitor the species' conservation status at regular intervals. Long-term monitoring stations could be set up. Some form of monitoring is extremely important, as it is the only way of assessing the effectiveness of improved management within the protected areas.

**Timescale:** Survey work could last from a few weeks to months, although development of monitoring protocols and the habitat management plans will take one to two years.

**Resources:** Variable, depending on length and scope of survey work, although substantial long-term funding should be sought for population monitoring work.

### **Project 16. Chestnut-headed hill-partridge (*Arborophila cambodiana*)**

**Aims:** To survey for remaining populations of this species outside known areas; to campaign for better habitat protection in known sites; to monitor the population at Khao Soi Dao Wildlife Sanctuary, Thailand.

**Justification:** What is currently known of the distribution and status of this species, found in two populations in Thailand and Cambodia, indicates that it has undergone a severe decline in terms of geographic range and population size over past decades. The total global population is estimated at less than 1,000 individuals. Logging on a massive scale is the primary threat to the species in Cambodia, for example over 80% of Bokor National Park has already been logged. In Thailand, logging is on a smaller scale, but the population there is thought to number less than 200 birds. Further surveys are urgently required to establish whether any other populations exist, and known populations must be monitored so that further declines can be detected quickly and action taken to alleviate threats.

**Project description:** Extensive surveys are required in forested habitat suitable for this species, as is an idea of how much of its favoured habitat remains. Particular attention could focus on the Cardamom Mountains north of Bokor in Cambodia. Also urgent is a campaign for greater protection of habitat within protected areas. This could best be achieved by lobbying for a moratorium on logging in Bokor and Kirirom National Parks in Cambodia. A monitoring programme of the population in the Khao Soi Dao Wildlife Sanctuary should be established to ensure baseline data are available against which to measure future changes in the Thai population of this species.

**Timescale:** Survey work could last from a few weeks to months, although development of monitoring protocols

and the habitat protection lobbying will take one to two years.

**Resources:** Variable, depending on length and scope of survey work, although substantial long-term funding should be sought for population monitoring work.

### **Project 17. Himalayan quail (*Ophrysia superciliosa*)**

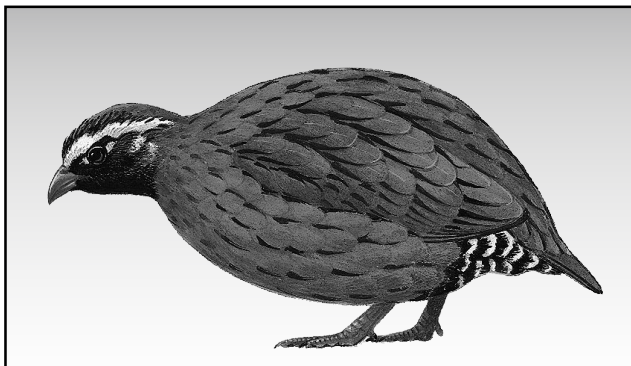
**Aim:** To search for this species in suitable habitat.

**Justification:** There have been no confirmed sightings of the Himalayan quail for many years, and indeed the species may already be extinct. There clearly is an urgent need to mount an intensive search for this species to ascertain whether it still survives in the Lower Himalayas of Uttar Pradesh. If the species can be found, protection for its habitat will be a major priority.

**Project description:** Work is underway to look for this species. WPA-South Asia Regional Office in collaboration with WWF-India has launched a multi-phased project. The first phase produced a booklet to highlight the need for funding for further searches involving the forest department network. It is hoped that survey work will commence early in 2000. As the Himalayan quail may prefer habitats similar to those used by cheer pheasants *Catreus wallichii*, areas where the pheasant is found should also be visited. When identified, potential areas should be visited on the ground by survey teams, and a variety of methods used to attempt to locate birds. This work must be carried out through different times of year, as there is some debate as to whether the species is sedentary or migratory.

**Timescale:** A long-term approach of approximately two years should be taken, so that all suitable habitat can be surveyed at different times of year.

There have been no records of the Himalayan quail for over a century.



© Lynx Edicions

**Resources:** Substantial funding will be required for this project; the high profile of the search can be harnessed to help secure funds.

### **Project 18. Gorgeted wood-quail (*Odontophorus strophium*)**

**Aims:** To identify and survey areas of remnant forest outside the current range and arrange protection if more populations are found; to monitor the population within the Cachalu Wildlife Sanctuary.

**Justification:** In recent years, the gorgeted wood-quail has only been recorded from a single area in Colombia – the Cachalu Wildlife Sanctuary, near Virofín, Santander. Its known population must be very small, and is feared to be declining. Forest is being cleared around the edge of Cachalu, although the reserve itself has been protected since 1993, and its terrain is such that logging inside the reserve is unlikely to be widespread.

**Project description:** As this species is so rare, any small populations existing outside the protected area should be identified through survey work in apparently suitable remaining forest fragments. If populations are found, a case should be made for immediate gazettelement of these areas. Within the Cachalu Wildlife Sanctuary itself, the population size should be measured and monitored at regular intervals, as it is imperative that any declines are identified very quickly so remedial action can be taken.

**Timescale:** Survey work could be conducted on a variety of timescales, but monitoring should continue on a regular basis for the foreseeable future.

**Resources:** These will depend on the length and scope of individual survey expeditions, although long-term funding for the monitoring work should be sought.

## **4.5 Projects for Vulnerable species**

### **Project 19. Swamp francolin (*Francolinus gularis*)**

**Aims:** To collate and publish existing information on the biology and conservation status of this species; to produce and promote a comprehensive recovery plan.

**Justification:** The swamp francolin is restricted to tall, wet, natural grasslands, a habitat that has undergone rapid decline in both extent and quality in the Indian Subcontinent. The species has been studied in some detail in the past few years (Javed 1993, Javed *et al.* 1999, Peet *et*

al. 1999), and there is now a need to collate all information on the species' ecology, distribution, and conservation status and ensure publication of this material in peer-reviewed journals. This will enable the development of a long-term recovery and management plan for this species.

**Project description:** Particular management recommendations should be assembled into a recovery plan for the swamp francolin, and this promoted to appropriate authorities and local people through community partnerships. Long-term monitoring of populations should be put in place to assess the effectiveness of management strategies, and suggest ways in which they can be improved. The emphasis here is on getting concrete conservation action based on sound science, and monitoring its progress to allow continued refining of the management tools used.

**Timescale:** As a long-term project, this work is likely to take several years.

**Resources:** Funding of around \$10,000 will be required to ensure collation and publication of relevant information and recommendations.

### **Project 20. Manipur bush-quail (*Perdica manipurensis*)**

**Aims:** To re-survey the known range of this species; to afford protected area status to any localities found to support viable populations.

**Justification:** There are no recent confirmed records of this species, which appears to have undergone a massive decline in range and population size since the beginning of the century. The main problem for this species is the destruction and flooding of its tall grassland habitat, to support the growing human populations of Manipur and Bangladesh. In addition, it has been subject to high levels of hunting and trapping. The Manipur bush-quail is not known to occur in any protected areas.

**Project description:** Survey work should be conducted in the historical localities of the eastern hills of Manipur, the south Manipur Basin, and areas around Phalel, Imphal, and Goalpara in Assam. Fortunately, the species has a relatively distinctive call, so reasonably large areas can be surveyed. As this species is not yet known from any protected area, strong recommendations should be made to gazette localities found to support viable populations as soon as possible, and existing protected areas within its known range should be searched.

**Timescale:** There is scope for survey work on a variety of scales.



There have been no confirmed sightings of the Manipur bush-quail since 1932.

© Lynx Edicions

**Resources:** This will vary depending on the scope and intensity of survey work.

### **Project 21. Hainan hill-partridge (*Arborophila ardens*)**

**Aims:** To survey remaining habitat for this species; to study further its habitat requirements and the distribution of remaining habitat; to assess how well the range is covered by protected areas, and whether any extensions or links are required; to conduct a conservation awareness programme with the aim of reducing illegal hunting for food.

**Justification:** The Hainan hill-partridge is found only on the island of Hainan, off the south coast of China. It is restricted to primary tropical evergreen forest. This habitat has undergone a substantial decline on the island in the second half of this century, as forest has been cleared for commercial reasons and to make way for agriculture and development. The species' precise habitat requirements remain unknown, as does the best way of ensuring protected area coverage for the partridge. In addition, there are two distinct subspecies of pheasant on the island which merit attention (Hainan silver pheasant *Lophura nycthemera whiteheadi* and Hainan grey peacock-pheasant *Polyplectron bicalcaratum katsumatae*).

**Project description:** There is a need to survey the island fully to locate all remaining populations. Further study should be conducted into its habitat requirements, and this information can be used together with the survey data to investigate how well the species is covered by protected areas. Specific recommendations, such as the formation of new reserves or linking together existing protected areas,

may arise from this work, but for now, the upgrading of Nanwei Ling from county to provincial level nature reserve is recommended. A public awareness programme could be a productive way of reducing illegal hunting for food.

**Timescale:** Initial surveys of any length could provide useful data. Protected areas analysis would take several months, and the conservation awareness programme would be longer term still.

**Resources:** There is a variety of funding possibilities, and there is the possibility of using the Hainan hill-partridge as a flagship for conservation on the island.

## **Project 22. Bearded wood-partridge (*Dendrortyx barbatus*)**

**Aims:** To collate and publish existing information on the biology and conservation status of this species; to produce and promote a comprehensive recovery plan.

**Justification:** The bearded wood-partridge is restricted to a few tiny fragments of forest and has undergone serious declines. Its habitats are subject to intensive commercial logging and forest clearance, and the remaining small and fragmented populations are vulnerable to local extinction

through stochastic and local processes. The species has been studied in some detail in the past few years (Montejo and Tejada 1996, Eitniear *et al.* in press). There is now a need to collate all information on the species' ecology, distribution, and conservation status and ensure publication of this material in peer-reviewed journals. This will enable the development of a long-term recovery and management plan for this species.

**Project description:** Particular management recommendations should be assembled into a recovery plan for the bearded wood-partridge, and this promoted to appropriate authorities and local people through community partnerships. Long-term monitoring of populations should be put in place to assess the effectiveness of management strategies, and suggest ways in which they can be improved. The emphasis here is on getting concrete conservation action based on sound science, and monitoring its progress to allow continued refining of the management tools used.

**Timescale:** As a long-term project, this work is likely to take several years.

**Resources:** Substantial funding will be required to ensure collation and publication of relevant information and recommendations.

# References

- Adams, J. 1989. Bhutan: Right from the start. *WWF Letter* 6:1–8.
- Aebischer, N.J. 1991. Sustainable yields: Gamebirds as a harvestable resource. *Gibier Faune Sauvage* 8: 335–351.
- Aebischer, N.J. 1997a. Fowl-like birds (Galliformes). Pp. 143–154 In: Roth, H. H. and Merz, G. (eds.). *Wildlife Resources: A global account of economic use*. Springer-Verlag, Berlin.
- Aebischer, N.J. 1997b. Impact of hunting on the population dynamics of wild birds. *Gibier Faune Sauvage* 14:183–200.
- Ali, S. 1977a. President's letter: "Mystery" birds of India: mountain quail. *Hornbill* 1977:3–5.
- Ali, S. 1977b. Another crack at the mountain quail. *Newsletter for Birdwatchers* 17:1–2.
- Ali, S. and Ripley, S.D. 1983. *Handbook of the birds of India and Pakistan*. Compact edition. Oxford University Press, Delhi.
- Allen, D. 1998. *Report to the Indian Forestry Service concerning the Amarpur area of the Dibru-Saikhowa Biosphere Reserve*. Unpublished.
- Allport, G. 1991. The status and conservation of threatened birds in the Upper Guinea Forest. *Bird Conservation International* 1:53–74.
- Allport, G.A., Ausden, M., Hayman, P.V., Robertson, P., and Wood, P. 1989. *The conservation of the birds of the Gola Forest, Sierra Leone*. International Council for Bird Preservation (Study Report 38), Cambridge.
- Alvarez-Cordero, E., de Samudio, J., Marquez Reyes, C., and Ellis, S. 1994. *Conservation assessment and management plan workshop for bird and mammal species endemic to Panama*. International Union for Nature Conservation and Natural Resources, Apple Valley, MN.
- Andrade, G.I. and Repizzo, A. 1994. Guanentá Alto Fonce Fauna and Flora Sanctuary: A new protected area in the Colombian East Andes. *Cotinga* 2:42–44.
- AOU 1998. *Check-list of North American birds*. Seventh edition. American Ornithologists' Union, Washington D.C.
- Aquilar Rodríguez, S. 1999. New record of the Endangered bearded wood-partridge in Oaxaca, Mexico. *La Tangara*.
- Atkins, R.A. and Tentij, M. 1999. The orange-necked partridge and five other galliformes in two protected areas in southern Vietnam. *Annual Review of the World Pheasant Association* 1998/99:49–52.
- Baker, E.C.S. 1921–1930. *The game-birds of India, Burma and Ceylon*. 3 vols. John Bale & Son, London.
- Belize Biodiversity Information system website. 1998. <http://fwie.fw.vt.edu/wcs/>.
- BirdLife International (in prep.). *Threatened birds of Asia: the BirdLife International/IUCN Red Data Book*. BirdLife International, Cambridge.
- BirdLife International (in press). *Threatened birds of the world*. BirdLife International, BirdLife Conservation Series, Cambridge.
- Blake, E.R. 1977. *A manual of Neotropical birds*. University of Chicago Press, Chicago.
- Bloomer, P. and Crowe, T.M. 1998. Francolin phylogenetics: Molecular, morphobehavioral, and combined evidence. *Molecular Phylogenetics and Evolution* 9:236–254.
- Blyth, E. 1867. Remarks on an Indian quail *Rollulus superciliosus*. *Proceedings of the Zoological Society of London* 1867:474–475.
- Caldwell, H.R. and Caldwell, J.C. 1931. *South China birds*. Hester May Vanderburgh, Shanghai.
- Carroll, J.P., Garson, P.J., and McGowan, P.J.K. 1998. *International Galliformes Symposium, Melaka, Malaysia, 1997*. Bird Conservation International 8 (special issue).
- Cheng Tso-hsin 1987. *A synopsis of the avifauna of China*. Paul Parey Scientific Publications, Hamburg and Berlin.
- Church, K.E. and Taylor, J.S. 1992. Management and research of northern bobwhite (*Colinus virginianus*) in North America: An overview. *Gibier Faune Sauvage* 9:787–796.
- Clark, T.W., Backhouse, G.N., and Lacy, R.C. 1991. The population viability assessment workshop: A tool for threatened species management. *Endangered Species Update* 8:1–5.
- Collar, N.J. 1998. Monotypy of *Francolinus griseostriatus*. *Bulletin of the British Ornithologists' Club* 118:124–126.
- Comber, E. 1905. A rare Indian game-bird, the mountain quail (*Ophrysia superciliosa*, Gray). *Journal of the Bombay Natural History Society* 16:361–362.
- Connor, F.P. 1908. Notes on the Manipur bush-quail *Microperdix manipurensis* in captivity. *Journal of the Bombay Natural History Society* 18:496–498.
- Cramp, S. and Simmons, K.E.L. (eds.). 1980. *The birds of the western Palearctic, Volume 2*. Oxford University Press, Oxford.
- Crowe, T.M., Harley, E.H., Jakutowicz, M.B., Komen, J., and Crowe, A.A. 1992. Phylogenetic, taxonomic and biogeographical implications of genetic, morphological, and behavioral variation in francolins. *Auk* 109:24–42.
- Cyprus Homepage Website. 1999. <http://www.kypros.org/Cyprus/environment.html>.

- Dai Bo, Dowell, S.D., Martins, R.P., and Williams, R.S.R. 1998. Conservation status of the Sichuan hill-partridge *Arborophila rufipectus* in China. *Bird Conservation International* 8:349–359.
- Davison, G.W. 1982. Systematics within the genus *Arborophila* Hodgson. *Federal Museum Journal* 27:125–134.
- Dean, W.R. in prep. Important Bird Areas in Angola. In: Fishpool, L.D.C. (ed.). *Important Bird Areas in Africa*. BirdLife International, Cambridge.
- Dean, W.R.J. in press. *Birds of Angola*. British Ornithologists' Union, Tring.
- Dekker, R.W.R.J., Fuller, R.A., and Baker, G.C. (eds.). 2000. *Megapodes. Status survey and conservation action plan 2000–2004*. IUCN, Gland, Switzerland and Cambridge, UK.
- del Hoyo, J., Elliott, A., and Sargatal, J. (eds.). 1994. Pp. 412–567 In: *Handbook of the birds of the world, Volume 2. New World Vultures to Guinea-fowl*, Lynx Edicions, Barcelona.
- Delacour, J. 1928. Quatrième expédition en Indo-chine. *L'Oiseau* 9: 257–269, 301–308.
- Dinerstein, E., Olson, D.M., Graham, D.J., Webster, A.L., Primm, S.A., Bookbinder, M.P., and Ledec, G. 1995. *A conservation assessment of the terrestrial ecoregions of Latin America and the Caribbean*. World Bank, Washington, D.C. (English and Spanish)
- Dinesen, L., Lehmberg, T., Svendsen, J.O., and Hansen, L.A. 1993. Range extensions and other notes on some restricted range forest birds from West Kilombero in the Udzungwa Mountains. *Scopus* 17:48–58.
- Dinesen, L., Lehmberg, T., Svendsen, J.O., Hansen, L.A., and Fjeldså, J. 1994. A new genus and species of perdicine bird (Phasianidae, Perdiciini) from Tanzania – a relict form with Indo-Malayan affinities. *Ibis* 136: 2–11.
- Dowell, S.D., Dai Bo, Martins, R.P., and Williams, S.R. 1997. *Sichuan hill-partridge forest conservation report: Report on the 1997 field season*. Unpublished report to World Pheasant Association and the Sichuan Forest Department.
- Dranzoa, C. 1998. A survey of Nahan's francolin in three tropical rainforests of Uganda. *WPA News* 57:28–32.
- Dranzoa, C., Nkwasi, J., and Sande, E. 1999. Additional surveys of Nahan's francolin, *Francolinus nahani*, in the tropical rainforests of Uganda. *Bulletin of the African Bird Club* 6: 52–55.
- Duckworth, J.W., Tizard, R.J., Timmins, R.M., Thewlis, W.B., Robichaud, W.B., and Evans, T.D. 1998. Bird records from Laos, October 1994–August 1995. *Forktail* 13:33–68.
- Dutson, G. 1990. Birds of Barito Ulu in Borneo. *Oriental Bird Club Bulletin* 12:16–20.
- Eames, J.C., Robson, C.R., Nguyễn Cu, and Truong Van Lã 1992. *Forest bird surveys in Vietnam 1991*. ICBP study report No. 51.
- Eames, J.C., Lambert, F.R., and Nguyen Cu 1994. A survey of the Annamese Lowlands, Vietnam, and its implications for the conservation of Vietnamese and Imperial pheasants *Lophura hatinhensis* and *L. imperialis*. *Bird Conservation International* 4:343–382.
- Edwards, P.J. 1998. Conservation in Cambodia. *Oriental Bird Club Bulletin* 27:29–33.
- Eitniear, J.C., Aquilar, R.S., Gonzalez, V., and Pedraza, R. in press. New records of bearded wood-partridge *Dendrotyx barbatus* (Aves: Phasianidae) in Mexico. *South-western Naturalist*.
- Engelbach, P. 1938. Note sur quelques oiseaux du Cambodge. *L'Oiseau et R.f.O.* 8:384–394.
- EWNHS 1996. *The conservation of key biodiversity sites and the Important Bird Areas (IBAs) project in Ethiopia*. Ethiopian Wildlife and Natural History Society.
- Fjeldså, J. and Krabbe, N. 1990. *Birds of the High Andes: A manual to the birds of the temperate zone of the Andes and Patagonia, South America*. University of Copenhagen, Copenhagen.
- Forero, E. 1989. Colombia. Pp.355–361 In: Campbell, D.G. and Hammond, H.D. (eds.). *Floristic inventory of tropical countries*. New York Botanical Garden, New York.
- Fuller, R.A. and Garson, P.J. (eds.). 2000. *Pheasants. Status survey and conservation action Plan 2000–2004*. IUCN, Gland, Switzerland and Cambridge, UK.
- Gao Yu-ren. 1998. Conservation status of endemic Galliformes on Hainan Island, China. *Bird Conservation International* 8:411–416.
- Gartshore, M.E., Taylor, P.D., and Francis, I.S. 1995. *Forest birds in Côte d'Ivoire*. BirdLife International (Study Report 58), Cambridge.
- Gatter, W. 1997. *Birds of Liberia*. Pica Press, Robertsbridge, East Sussex.
- Gibbons, D.W., Reid, J.B., and Chapman, R.A. 1993. *The new atlas of breeding birds in Britain and Ireland: 1988–1991*. T & A D Poyser, London.
- Godwin-Austen, H.H. 1870. A list of birds obtained in the Khasi and North Cachar Hills. *Journal of the Asiatic Society Bengal* 39:91–112.
- Gómez de Silva Garza, H. and Aguilar Rodríguez, S. 1994. The bearded wood-partridge in central Veracruz and suggestions for finding and conserving the species. *Euphonia* 3:8–12.
- Gonzalez, M.J., Quigley, H.B., and Taylor, C.I. 1996. Habitat use, reproductive behaviour, and survival of ocellated turkeys in Tikal National Park. Pp.193–199 In: Dickson, J.G. (ed.). *Proceedings of the Seventh National Wild Turkey Symposium*. Rapid City, South Dakota.
- Gonzalez, M.J., Quigley, H.B., and Taylor, C.I. 1998. Habitat use and reproductive ecology of the ocellated Turkey in Tikal National Park, Guatemala. *Wilson Bulletin* 110:505–510.
- Grimmett, R., Inskipp, C., and Inskipp, T. 1998. *Birds of the Indian Subcontinent*. Christopher Helm, London.

- Hennache, A., Randi, E., and Lucchini, V. 1998. Genetic diversity, phylogenetic relationships and conservation of Edwards' pheasant *Lophura edwardsi*. *Bird Conservation International* 8(4):395–410.
- Higgins, J.C. 1933–1934. The game birds and animals of Manipur State, with notes on their numbers, migration and habits. *Journal of the Bombay Natural History Society* 36:406–422, 591–606, 845–854; 37:81–95, 298–309.
- Hilty, S.L. and Brown, W.L. 1986. *A guide to the birds of Colombia*. Princeton University Press, New Jersey.
- Holmes, D.A. 1989. Status report on Indonesian Galliformes. *Kukila* 4:133–143.
- Howman, S. and Garson, P.J. 1993. Pheasant surveys at Pipar, Nepal (1979–1991). In: Jenkins, D. (ed.). *Pheasants in Asia 1992*. World Pheasant Association, Reading.
- Howell, S.N.G. and Webb, S. 1995. *A guide to the birds of Mexico and northern Central America*. Oxford University Press, Oxford.
- Hudson, P.J. and Rands, M.R.W. (eds.). 1988. *Ecology and management of gamebirds*. Blackwell Scientific Publications, Oxford.
- Hume, A.O. and Marshall, C.H.T. 1879–1881. *The game birds of India, Burmah, and Ceylon*. 3 vols. Published by the authors, Calcutta.
- Huntley, B.J. 1974a. Outlines of wildlife conservation in Angola. *Journal of the South African Wildlife Management Association* 4:157–166.
- Huntley, B.J. 1974b. *Ecosystem conservation priorities in Angola*. Unpublished report.
- Huntley, B.J. and Matos, E.M. 1994. Botanical diversity and its conservation in Angola. *Strelitzia* 1:53–74.
- IUCN. 1994. *IUCN Red List Categories*. IUCN, Gland, Switzerland.
- IUCN. 1998a. *IUCN Guidelines for Re-introductions*. Prepared by the IUCN/SSC Re-introduction Specialist Group. IUCN, Gland, Switzerland, and Cambridge, U.K. Also accessible in English, French and Spanish at <http://www.iucn.org/themes/ssc/programs/rsg.htm>.
- IUCN. 1998b. *1997 United Nations list of protected areas*. IUCN, Gland, Switzerland.
- Javed, S. 1993. Swamp Francolin: Conservation prospects. *World Pheasant Association, India, News* 1(2):5–6.
- Javed, S. 1999. *Current status and conservation problems for Swamp Francolin*. Unpublished report.
- Javed, S. and Rahmani, A.R. 1998. Conservation of the avifauna of Dudwa National Park, India. *Forktail* 14:55–64.
- Javed, S., Qureishi, Q., and Rahmani, A.R. 1999. Conservation, status, and distribution of Swamp francolin in India. *Journal of the Bombay Natural History Society* 96:16–23.
- Jenkins, D. (ed.). 1993. *Pheasants in Asia 1992*. World Pheasant Association, Reading.
- Johnsgard, P.A. 1973. *Grouse and quails of North America*. University of Nebraska Press, Nebraska.
- Johnsgard, P.A. 1988. *The quails, partridges and francolins of the world*. Oxford University Press, London.
- Karim. 1982. Pheasants and quails in Bangladesh. In: C.D.W. Savage and M.W. Ridley, eds. *Pheasants in Asia 1982*. World Pheasant Association, Reading.
- Kaul, R. 1994. The Mishmi Hills. *Tragopan* 1:6–7.
- Kaul, R. and Howman, S. 1992. Distribution and habitat requirements of the northern painted francolin *Francolinus pictus pallidus* in Jamnagar, India. *Gibier Faune Sauvage* 9:483–492.
- Kaul, R., Raza, R., and Kalsi, R. 1995. Pheasant surveys in Arunachal Pradesh. Pp. 28–34. In: Jenkins, D. (ed.). *Annual review of the World Pheasant Association 1993/1994*. World Pheasant Association, Reading.
- Khaling, S., Kaul, R., and Saha, G.K. 1998. Survey of the Satyr Tragopan *Tragopan satyra* in the Singhalila National Park, Darjeeling, India using spring call counts. *Bird Conservation International* 8:361–371.
- Khan, M.A.R. 1982. *Wildlife of Bangladesh – a checklist*, Dhaka University.
- Khan, R.A. and Chaudhry, A.A. 1999. *Ecology of black (Francolinus francolinus) and grey francolins (Francolinus pondericianus) in relation to agriculture in Punjab, Pakistan*. Final report to WWF-India on Project No. 50016401.
- Kimball, R.T., Braun, E.L., Zwartjes, P.W., Crowe, T.M., and Ligon, J.D. 1999. A molecular phylogeny of the pheasants and partridges suggests that these lineages are not monophyletic. *Molecular Phylogenetics and Evolution* 11:38–54.
- King, B. 1987. Wild sighting of brown eared pheasant. *WPA News* 15:14.
- King, B. 1989. Birds observed at Huang Nian Shan, Mabian County, southern Sichuan, China. *Forktail* 4:63–68.
- King, B. and Liao, W. 1989. Hainan Island bird notes. *Hong Kong Bird Report 1988*:88–101.
- Lacy, R.C. 1993. VORTEX: A computer simulation model for population viability analysis. *Wildlife Research* 20:45–65.
- Legg, C.A. and Laumonier, Y. 1999. Fires in Indonesia, 1997: A remote sensing perspective. *Ambio* 28: 479–485.
- Lekagul, B. and Round, P.D. 1991. *A guide to the birds of Thailand*. Saha Karn Bhaet, Bangkok.
- Leopard, A.S. 1948. The wild turkeys of Mexico. *Transactions of the 135th North American Wildlife Conference*:393–400.
- Lewthwaite, R.W. 1995. Forest birds of southeast China: observations during 1984–1996. *Hong Kong Bird Report 1995*:150–203.
- Li Xiangtao 1996. *The gamebirds of China: Their distribution and status*. International Academic Publishers, Beijing.

- Li Xiao-liu, Tan Hong-zhi, Cheng Cai-an, and Zhang Ali-li 1990. Ecological studies on the White-browed Hill Partridge. Pp.84 In: Hill, D.A., Garson, P.J., and Jenkins, D. (eds.). *Pheasants in Asia 1989*. World Pheasant Association, Reading.
- Long, J.L. 1981. *Introduced birds of the world*. David & Charles, Newton Abbot and London.
- Mace, G.M. and Lande, R. 1991. Assessing extinction threats: Towards a re-evaluation of IUCN threatened species categories. *Conservation Biology* 5:148–157.
- Magin, G. in prep. Important Bird Areas in Djibouti. In: Fishpool, L.D.C. (ed.). *Important Bird Areas in Africa and associated islands*. BirdLife Conservation Series, BirdLife International, Cambridge.
- Marchant, S. and Higgins, P.J. 1993. *Handbook of Australian, New Zealand and Antarctic birds. Volume 2, Raptors to Lapwings*. Oxford University Press, Melbourne.
- Marshall, A.G. and Swaine, M.D. (eds.). 1992. *Tropical rain forest: Disturbance and recovery*. Royal Society, London.
- McGowan, P. 1992. Re-discovery of the orange-necked partridge in Vietnam. *PQF News* 1:10.
- McGowan, P.J.K., Carroll, J., and Ellis, S. 1994. *Galliform conservation assessment*. Apple Valley, Minnesota, IUCN/SSC.
- McGowan, P.J.K., Dowell, S.D., Carroll, J.P., and Aebischer, N.J. 1995. *Partridges, quails, francolins, snowcocks and guineafowl: Status survey and conservation action plan 1995–1999*. IUCN, Gland.
- McGowan, P.J.K., Dekker, R.W.R.J., Dowell, S., and Garson, P. 1998. The making of conservation Action Plans for the Galliformes. *Bird Conservation International* 8:173–184.
- McGowan, P., Ding Chang-qing, and Kaul, R. 1999. Protected areas and the conservation of grouse, partridges and pheasants in East Asia. *Animal Conservation* 2:93–102.
- Mell, R. 1922. Beitrage zur fauna Sinica. *Arch. Naturgerch. Abt. A*. 10 Helf.
- Montejo, D. and Tedeja, C.C. 1996. *Registro de Dendrortyx barbatus en la region del Pico de Orizaba, Veracruz. Final report. Distribucion y abundancias de las aves migratorias y endemicas de las subcuencas del Rio Metlac*. Pronatura Veracruz and U.S. Fish and Wildlife Service.
- Naifa, L. 1995. Ecological investigations of chukar partridge in northwest China. *Annual Review of the World Pheasant Association* 1994/1995:44–48.
- Peet, N.B., Watkinson, A.R., Bell, D.J., and Kattel, B.J. 1999. Plant diversity in the threatened sub-tropical grasslands of Nepal. *Biological Conservation* 88:193–206.
- Peters, J.L. 1934. *Check-list of the birds of the world, Volume II*. Harvard University Press, Cambridge, Massachusetts.
- Plumptre, A.J. 1996. Two nests of Nahan's francolin in the Budongo Forest Reserve, Uganda. *Bulletin of the African Bird Club* 3:37–38.
- Poole, C. 1999. Little known Oriental bird: Chestnut-headed Partridge *Arborophila cambodiana*. *Oriental Bird Club Bulletin* 30:46–50.
- Potts, G.R. 1986. *The partridge: Pesticides, predation and conservation*. Collins, London.
- Pressey, R.L., Johnson, I.R., and Wilson, P.D. 1994. Shades of irreplaceability: Towards a measure of the contribution of sites to a reservation goal. *Biodiversity and Conservation* 3:242–262.
- Primack, R.B. 1998. *Essentials of conservation biology*. Second edition. Sinauer Associates, Sunderland, Massachusetts.
- Rickett, C.B. 1900. Additional notes on the birds of Fohkien. *Ibis* 6:52–60.
- Ridgely, R.S. and Gwynne, J.A. 1989. *A guide to the birds of Panama with Costa Rica, Nicaragua, and Honduras*. Second edition. Princeton University Press, New Jersey.
- Ridgely, R.S., Greenfield, P.J., and Guerrero, G.M. 1998. *An annotated list of the birds of mainland Ecuador*. Fundación Ornitológica del Ecuador, CECIA, Quito.
- Rieger, I. and Walzthony, D. 1990. Searching for mountain quails, *Ophrysia superciliosa*. Unpublished.
- Rietkerk, F., Smits, S., Brouwer, K., and Kurtz, M. 1999. *EEP Yearbook 1997/98 including the Proceedings of the 1998 EAZA Conference, Berlin*. EAZA Executive Office, Amsterdam.
- Ripley, S.D. 1982. *A synopsis of the birds of India and Pakistan*. Second edition. Bombay Natural History Society, Bombay.
- Robertson, P.A., Dellelegn, Y., Dejene, S., Shimelis, A., Alemayehu, T.W., Alemayehu, M., and Alemayehu, M. 1997. Harwood's francolin *Francolinus harwoodi*: recent observations on its status, distribution, habitat requirements, behaviour and threats. *Bird Conservation International* 7:275–282.
- Robinson, P.T. and Suter, J. 1999. *Survey and Preparation of a preliminary conservation plan for the Cestos-Senkwehn Riversheds of south-eastern Liberia*. Report on the World Bank-World Wildlife Fund Global Forest Alliance – WildInvest Project: January–March 1999.
- Robson, C.R. 1996. From the field. Cambodia, Laos, Vietnam. *Oriental Bird Club Bulletin* 24:60–65.
- Robson, C.R. 1997. From the field. Cambodia, Laos, Vietnam. *Oriental Bird Club Bulletin* 25:61–69.
- Robson, C.R. 2000. *An identification guide to the birds of South-east Asia*. New Holland, London.
- Robson, C.R., Eames, J.C., Wolstencroft, J.A., Nguyen Cu, and Troung Van La. 1989. Recent records of birds from Viet Nam. *Forktail* 5:71–98.
- Robson, C.R., Eames, J.C., Nguyễn Cu, and Truong Van Lã 1993a. Further records of birds from Vietnam. *Forktail* 8:25–52.



- Robson, C.R., Eames, J.C., Nguyễn Cu and Truong Van Lã 1993b. Birds recorded during the third BirdLife/Forest Birds Working Group expedition in Vietnam. *Forktail* 9:89–119.
- Round, P.D. 1988. *Resident forest birds in Thailand*. International Council for Bird Preservation (Monograph 2), Cambridge.
- Round, P.D. 1999. *Avifaunal surveys of the Pu Mat Nature Reserve, Nghe An Province, Vietnam 1998–1999. Social forestry and nature conservation in Nghe An Province*. ALA/VIE/94/24. Ministry of Agriculture and Rural Development and European Commission.
- Salaman, P. and Strewe, R. in prep. *New distributional records and other noteworthy bird observations for Colombia from Narino, south-west Colombia*.
- Sande, E. (in press). Ph.D. Thesis. Makerere University, Uganda.
- Sankaran, R. 1990. Mountain quail—a preliminary survey. Pp. 135–137 In: Anon. *Status and ecology of the Lesser and Bengal Floricans with reports on Jerdon's Courser and mountain quail*. Bombay Natural History Society, Bombay.
- Sheppard, C. and Bruning, D. 1999. *AZA Galliformes/Tinamiformes Taxon Advisory Group regional collection plan*. World Conservation Society/Bronx Zoo, New York.
- Sibley, C.G. and Ahlquist, J.E. 1990. *Phylogeny and classification of birds: A study in molecular evolution*. Yale University Press, New Haven and London.
- Sibley, C.G. and Monroe, B.L. Jr. 1990. *Distribution and taxonomy of birds of the world*. Yale University Press, New Haven and London.
- Sibley, C.G. and Monroe, B.L. Jr. 1993. *A supplement to distribution and taxonomy of birds of the world*. Yale University Press, New Haven and London.
- Simiyu, A. 1998. *Gamebird hunting: Development of management systems in Kenya and its promotion in wildlife utilization*. Final technical report for the Biodiversity Support Programme, Nairobi.
- Smil, V. 1984. *China's environmental crisis*. M.E. Sharpe, New York.
- Smythies, B.E. 1981. *The birds of Borneo*. Third edition. Sabah Society and Malayan Nature Society, Malaysia.
- Smythies, B.E. 1986. *The birds of Burma*. Nimrod Press, Liss and Silvio Mattacchione and Co., Pickering, Canada.
- Stattersfield, A.J., Crosby, M.J., Long, A.J., and Wege, D.C. 1998. *Endemic Bird Areas of the World: Priorities for biodiversity conservation*. BirdLife Conservation Series No.7. BirdLife International, Cambridge.
- Storch, I. 2000. *Grouse. Status survey and conservation action plan 2000–2004*. IUCN, Gland, Switzerland and Cambridge, UK.
- Stotz, D.F., Fitzpatrick, J.W., Parker, T.A., and Moskovits, D.K. 1996. *Neotropical birds: Ecology and conservation*. University of Chicago Press, Chicago.
- Strahl, S.D. and Brooks, D.M. 2000. *Curassows, guans, and chachalacas. Status survey and conservation action plan 2000–2004*. IUCN, Gland, Switzerland and Cambridge, UK.
- Talwar, R. 1995. The mountain quail (*Ophrysia superciliosa*). *Newsletter for Birdwatchers* 35:32–33.
- Thewlis, R.M., Duckworth, J.W., Anderson, G.Q.A., Dvorak, M., Evans, T.D., Nemeth, E., Timmins, R.J., and Wilkinson, R.J. 1996. Ornithological records from Laos, 1992–1993. *Forktail* 11:47–100.
- Timmins, R.J. 1999. *An assessment of the conservation importance of the Huong Son (Annamite) Forest, Ha Tinh Province, Vietnam based on the results of a field survey for large mammals and birds*. Center for Biodiversity and Conservation at the American Museum of Natural History, New York.
- Tonge, S. and Wilkinson, R. 1998. Captive breeding, conservation and science – a report on the workshop held at the WPA Galliforme Symposium, Kuala Tahan, Malaysia on 12 September, 1997. *WPA News* 55:13–17.
- Turner, H.H. 1899. On a collection of birds from Manipur. *Journal of the Asiatic Society Bengal* 68:235–245.
- Urban, E.K., Fry, C.H., and Keith, S. (eds.). 1986. *The birds of Africa, Volume II*, Academic Press, London.
- van Balen, B. and Holmes, D.A. 1993. Status and conservation of pheasants in the Greater and Lesser Sundas (Indonesia) with special reference to the chestnut-bellied partridge (*Arborophila javanica*). *Gibier Faune Sauvage* 9:539–552.
- van Marle, J.G and Voous, K.H. 1988. *The birds of Sumatra: An annotated checklist*. British Ornithologists' Union, Tring.
- Wege, D.C. 1996. Threatened birds of the Darién Highland, Panama: A reassessment. *Bird Conservation International* 6:191–195.
- Wege, D.C. and Long, A.J. 1995. *Key Areas for threatened birds in the Neotropics*. BirdLife International (BirdLife Conservation Series no. 5), Cambridge.
- Wells, D.R. 1999. *The birds of the Thai-Malay Peninsula. Volume 1*. Academic Press, London.
- Weyer, D. 1983. The other wild turkey. *AFA Watchbird* 10:26–29.
- Whitmore, T.C. 1984. *Tropical rain forests of the Far East*. Second edition. Oxford University Press, Oxford.
- Wilkinson, R., Dutson, G., Sheldon, B., Darjono, and Noor, Y.R. 1991. The avifauna of the Barito Ulu region, Central Kalimantan. *Kukila* 5:99–116.
- Williams, R.S.R., Best, B.J., and Heijnen, T. 1997. *A guide to birdwatching in Ecuador and the Galápagos Islands*. Biosphere Publications, Leeds.

- Wondafrash, M. 1998. *Assessment of Harwood's francolin* *Francolinus harwoodi*. Progress Report for Norwegian Ornithological Society (NOF). April–June 1998. Unpublished report.
- Wood, H.S. 1899. Note on Hume's bush-quail (*Microperdix manipurensis*). *Journal of the Asiatic Society Bengal* 68:110.
- Zheng Guangmei and Wang Qishan 1998. *China Red Data Book of endangered animals: Aves*. Science Press, Beijing.
- Zhou Guang-yi 1994. Influence of tropical forest changes on environmental quality in Hainan province, P.R. of China. *Ecological Engineering* 4:223–229.

## Appendix 1

# List of Contacts

World Pheasant Association  
P.O. Box 5  
Lower Basildon  
Reading, Berkshire  
RG8 9PF  
United Kingdom  
Tel: +44 118 984 5140  
Fax: +44 118 984 3369  
E-mail: [admin@pheasant.org.uk](mailto:admin@pheasant.org.uk)  
<http://www.pheasant.org.uk>

WPA-South Asia Regional Office  
Rahul Kaul  
c/o WWF-India Secretariat  
172-B Lodi Estate  
New Delhi 110 003  
India  
Tel.: +91 11 4693744, 4627586  
Fax: +91 11 4626837  
Email: [r\\_kaul@hotmail.com](mailto:r_kaul@hotmail.com)

BirdLife International  
Wellbrook Court  
Girton Road, Cambridge  
CB3 0NA  
United Kingdom  
Tel: +44 1223 277318  
Fax: +44 1223 277200  
E-mail: [birdlife@birdlife.org.uk](mailto:birdlife@birdlife.org.uk)  
Website: <http://www.birdlife.net>

PQF Specialist Group  
John P. Carroll (Chairman)  
Daniel B. Warnell School of Forest Resources  
University of Georgia  
Athens, GA 30602  
United States  
Tel: +1 706 542 5815  
E-mail: [jcarroll@smokey.forestry.uga.edu](mailto:jcarroll@smokey.forestry.uga.edu)

Conservation Breeding Specialist Group  
U.S. Seal (Chairman)  
12101 Johnny Cake Ridge Road  
Apple Valley, MN 55124-8151  
United States  
Tel: +1 612 431 9325  
Fax: +1 612 432 2757  
E-mail: [office@cbsg.org](mailto:office@cbsg.org)  
<http://www.cbsg.org/>

Richard A. Fuller  
Department of Biological Sciences  
University of Durham  
South Road  
Durham DH1 3LE  
United Kingdom  
Tel: +44 191 374 3350  
E-mail: [r.a.fuller@durham.ac.uk](mailto:r.a.fuller@durham.ac.uk)

John P. Carroll  
Daniel B. Warnell School of Forest Resources  
University of Georgia  
Athens, GA 30602  
United States  
Tel: +1 706 542 5815  
E-mail: [jcarroll@smokey.forestry.uga.edu](mailto:jcarroll@smokey.forestry.uga.edu)

Philip J.K. McGowan  
c/o World Pheasant Association  
P.O. Box 5  
Lower Basildon  
Reading, Berkshire  
RG8 9PF  
United Kingdom  
Tel: +44 118 984 5140  
Fax: +44 118 984 3369  
E-mail: [conservation@pheasant.org.uk](mailto:conservation@pheasant.org.uk)

Roberto Pedraza Muñoz (President)  
Grupo Ecológico Sierra Gorda  
Juarez No. 9, Centro, C.P. 76340  
Jalpan de Serra, Queretaro  
Mexico  
Tel/Fax: (429) 6 02 42  
Email: [sierrago@ciateq.mx](mailto:sierrago@ciateq.mx)  
<http://www.woodrising.com/gesg/homepage.htm>

## Appendix 2

# Captive Populations of Partridges, Quails, Francolins, Snowcocks, Guineafowl, and Turkeys

Although records of captive populations are maintained through several sources, the figures below represent current best estimates of global captive populations, including collections in public and private ownership, from published

and unpublished sources. They were compiled by Han Assink, Alain Hennache, Gary Robbins, Simon Tonge, and Roger Wilkinson. See also Sheppard and Bruning (1999).

Species	Number in captivity
<b>Critically Endangered</b>	
Djibouti francolin <i>Francolinus ochropectus</i>	0
Himalayan quail <i>Ophrysia superciliosa</i>	0
Gorgeted wood-quail <i>Francolinus ochropectus</i>	0
<b>Endangered</b>	
Nahan's francolin <i>Francolinus nahani</i>	0
Mount Cameroon francolin <i>Francolinus camerunensis</i>	0
Sichuan hill-partridge <i>Arborophila rufipectus</i>	0
Orange-necked hill-partridge <i>Arborophila davidi</i>	0
Chestnut-headed hill-partridge <i>Arborophila cambodiana</i>	5–10
<b>Vulnerable</b>	
Swamp francolin <i>Francolinus gularis</i>	20
Harwood's francolin <i>Francolinus harwoodi</i>	0
Grey-striped francolin <i>Francolinus griseostriatus</i>	0
Swierstra's francolin <i>Francolinus swierstrai</i>	0
Black wood-partridge <i>Melanoperdix nigra</i>	10–20
Manipur bush-quail <i>Perdicula manipurensis</i>	0
Udzungwa forest-partridge <i>Xenoperdix udzungensis</i>	0
Chestnut-breasted hill-partridge <i>Arborophila mandellii</i>	0
White-necklaced hill-partridge <i>Arborophila gingica</i>	25–30
Hainan hill-partridge <i>Arborophila ardens</i>	10–15
White-faced hill-partridge <i>Arborophila orientalis</i>	0
Bearded wood-partridge <i>Dendrortyx barbatus</i>	20
Black-fronted wood-quail <i>Odontophorus atrifrons</i>	0
Dark-backed wood-quail <i>Odontophorus melanonotus</i>	0
Tacarcuna wood-quail <i>Odontophorus dialeucos</i>	0
White-breasted guineafowl <i>Agelastes meleagrides</i>	0