

Status Survey and Conservation Action Plan 2000–2004

# Pheasants

Edited by Richard A. Fuller and Peter J. Garson  
on behalf of WPA/BirdLife/SSC Pheasant Specialist Group



Status Survey and Conservation Action Plan 2000–2004

# Pheasants

Edited by Richard A. Fuller and Peter J. Garson  
on behalf of WPA/BirdLife/SSC Pheasant 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. and Garson, P.J. (eds.). (2000). *Pheasants. Status Survey and Conservation Action Plan 2000–2004*. WPA/ BirdLife/SSC Pheasant Specialist Group. IUCN, Gland. Switzerland and Cambridge, UK and the World Pheasant Association, Reading, UK. vii + 76 pp.

ISBN: 2-8317-0539-8

Cover photo: Cabot's tragopan, *Tragopan caboti*. Illustration by Timothy Greenwood, © Keith Howman.

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

<b>Foreword</b> .....	v	Chinese monal ( <i>Lophophorus lhuysii</i> ) .....	29
<b>Acknowledgements</b> .....	vi	Sumatran pheasant ( <i>Lophura hoogerwerfi</i> ) .....	29
<b>Executive Summary</b> .....	vii	Salvadori's pheasant ( <i>Lophura inornata</i> ) .....	30
<b>1. The Conservation of Pheasants</b> .....	1	Crestless fireback ( <i>Lophura erythrophthalma</i> ) .....	31
1.1 Introduction .....	1	Bulwer's pheasant ( <i>Lophura bulweri</i> ) .....	31
1.2 Introduction to pheasants .....	1	Brown eared-pheasant ( <i>Crossoptilon mantchuricum</i> ) .....	32
Species included in this Action Plan .....	1	Cheer pheasant ( <i>Catreus wallichi</i> ) .....	33
Distribution and general biology .....	1	Elliot's pheasant ( <i>Syrmaticus ellioti</i> ) .....	33
1.3 Relationship with humans .....	2	Hume's pheasant ( <i>Syrmaticus humiae</i> ) .....	34
1.4 Other sources of information on pheasants .....	3	Reeves's pheasant ( <i>Syrmaticus reevesii</i> ) .....	34
1.5 Background to the Second Edition .....	4	Mountain peacock-pheasant ( <i>Polyplectron inopinatum</i> ) .....	35
Who are we? – the Pheasant Specialist Group .....	4	Germain's peacock-pheasant ( <i>Polyplectron germaini</i> ) .....	36
Updating the Action Plan .....	4	Malaysian peacock-pheasant ( <i>Polyplectron malacense</i> ) .....	36
1.6 Threats to the survival of pheasants .....	5	Palawan peacock-pheasant ( <i>Polyplectron emphanum</i> ) .....	37
Habitat loss and degradation .....	5	Crested argus ( <i>Rheinardia ocellata</i> ) .....	37
Hunting .....	6	Congo peafowl ( <i>Afropavo congensis</i> ) .....	38
Human disturbance .....	7	Green peafowl ( <i>Pavo muticus</i> ) .....	39
Hybridisation with released stock .....	7	3.4 Data Deficient species .....	39
Summary of the threat status of pheasants .....	7	Imperial pheasant ( <i>Lophura imperialis</i> ) .....	39
1.7 Actions for the conservation of pheasants .....	7	<b>4. Five-year Plan of Action (2000–04)</b> .....	41
Clarifying taxonomic units .....	7	4.1 Global projects .....	41
Gathering baseline information .....	8	Project 1. Increasing the effectiveness of the Pheasant Specialist Group (PSG) .....	41
Making strategic conservation recommendations .....	9	Project 2. Improving communication of research findings .....	42
Specific types of conservation action .....	10	Project 3. Maintaining an Asian Galliformes sites database .....	43
Monitoring effects of conservation action .....	14	Project 4. Assessing populations of Asian Galliformes within protected areas .....	43
Wider dissemination of conservation recommendations .....	15	4.2 Regional projects .....	44
Summary of conservation action .....	15	Project 5. Review of information on Indochinese pheasants .....	44
<b>2. Summary of Pheasant Conservation Status</b> .....	16	Project 6. Surveys for threatened pheasants in southwest China .....	44
2.1 Critically Endangered species .....	16	Project 7. Surveys for threatened pheasants in Sumatra .....	44
2.2 Endangered species .....	17	Project 8. Surveys for threatened pheasants in Borneo .....	45
2.3 Vulnerable species .....	19	4.3 Strategic projects .....	45
2.4 Lower Risk species .....	21	Project 9. Taxonomic re-assessment of pheasants .....	45
2.5 Data Deficient species .....	23	Project 10. Effective management of captive pheasant stocks .....	46
<b>3. Species Accounts</b> .....	24	Project 11. Developing methods for re-introduction of pheasants .....	46
3.1 Critically Endangered species .....	24		
3.2 Endangered species .....	24		
Edwards's pheasant ( <i>Lophura edwardsi</i> ) .....	24		
Vietnamese pheasant ( <i>Lophura hatinhensis</i> ) .....	25		
Bornean peacock-pheasant ( <i>Polyplectron schleiermacheri</i> ) .....	26		
3.3 Vulnerable species .....	26		
Western tragopan ( <i>Tragopan melanocephalus</i> ) .....	26		
Blyth's tragopan ( <i>Tragopan blythii</i> ) .....	27		
Cabot's tragopan ( <i>Tragopan caboti</i> ) .....	28		
Sclater's monal ( <i>Lophophorus sclateri</i> ) .....	28		

Project 12. Deriving and implementing habitat management strategies for better-known threatened pheasants .....	47	Project 19. Mountain peacock-pheasant ( <i>Polyplectron inopinatum</i> ) .....	50
4.4 Projects for Critically Endangered and Endangered species .....	47	Project 20. Germain's peacock-pheasant ( <i>Polyplectron germaini</i> ) .....	50
Project 13. Vietnamese lowland <i>Lophura</i> pheasants .....	47	Project 21. Malaysian peacock-pheasant ( <i>Polyplectron malacense</i> ) .....	51
Project 14. Bornean peacock-pheasant ( <i>Polyplectron schleiermacheri</i> ) .....	48	Project 22. Palawan peacock-pheasant ( <i>Polyplectron emphanum</i> ) .....	51
4.5 Projects for Vulnerable species .....	48	Project 23. Crested argus ( <i>Rheinardia ocellata</i> ) ....	52
Project 15. Brown eared-pheasant ( <i>Crossoptilon mantchuricum</i> ) .....	48	Project 24. Congo peafowl ( <i>Afropavo congensis</i> ) ..	52
Project 16. Elliot's pheasant ( <i>Syrmaticus ellioti</i> ) ..	48	Project 25. Green peafowl ( <i>Pavo muticus</i> ) .....	52
Project 17. Hume's pheasant ( <i>Syrmaticus humiae</i> ) .....	49	<b>References</b> .....	54
Project 18. Reeves's pheasant ( <i>Syrmaticus reevesii</i> ) .....	50	<b>Appendix 1. List of Pheasant Names</b> .....	61
		<b>Appendix 2. List of Key Contacts</b> .....	65
		<b>Appendix 3. Captive Populations of Pheasants</b> .....	66

# Foreword

It has proved worthwhile to produce this second edition of the Action Plan for pheasants for three main reasons. The first edition set out action to be taken during 1995–99, much of which has been initiated on schedule, so there was a need for a new set of targets for the next five-year period. We also take the opportunity to assess the role of the first edition as a catalyst for this action. Secondly, the *IUCN Red List Criteria* came into wide use just after preparation of the first edition and the Specialist Group is, therefore, mandated to re-assess the threat category of all pheasant species using this internationally accepted system. We have done this exercise in collaboration with BirdLife International, and adopt their transparent policy of detailing the reasons for applying certain identified criteria in reaching the decision to classify any particular species as we do. This has put up specific markers for amendment in view of new findings in the future: the criteria and category allocations are essentially hypotheses to be falsified by good scientific argument. Thirdly, the enormous volume of new work done since 1995 required us to produce a revised overview of the status of pheasants as a group of species, as well as to re-appraise the threats they face and the success of our collective attempts to improve their situation through research and conservation action.

The careful reader of both editions will realise that fewer pheasant species are now classified as threatened (24) than was the case in 1995 (33), but we would not be justified in claiming that there is a strong link between this fact and the work done in the intervening time. With species as poorly known and long-lived as the pheasants, conservation action takes time to produce positive effects even if it is well conceived and targeted. Surveys and research must be done to provide the scientific basis on which to propose action, which then needs to be advocated effectively before being put to the test through monitoring its usefulness. Progress

has been made in all these areas on different pheasant species, but those that can now be subjected to experimental management regimes designed to mitigate threats remain in a small minority. For the majority of species, there are still uncertain gaps in geographical distribution and a lack of precise knowledge of ecological requirements. Very little is known about their breeding biology and dispersal behaviour, two key areas of knowledge if Population Viability Analysis is to realise its potential as a strategic conservation tool for these species.

Nevertheless, the flavour of the work programme we outline for the next five years is much more strategic and action orientated than that proposed in the 1995 edition, so we are surely making some real progress towards preventing any more of these spectacular and useful bird species from reaching the brink of extinction. As things stand, of the three most threatened species, the Edwards's and Vietnamese pheasants are the subject of enormous research and conservation efforts by the BirdLife International Vietnam Programme and the World Pheasant Association, whilst the Bornean peacock-pheasant is a target for action by the Indonesia Programmes of both BirdLife International and the Wildlife Conservation Society. These cases exemplify conservation as a co-operative effort involving local people, decision-makers, special interest groups, and international agencies.

There still is much to be done, so let us keep up the momentum in proposing projects, raising funds, doing the work, and applying our findings to the key problems confronting pheasant species and their forested habitats everywhere. Then, in five years' time, we will have to carry out another review like this one.

Peter J. Garson  
Chairman, SSC/BirdLife/WPA Pheasant Specialist Group

# Acknowledgements

This Action Plan is based on information, expertise, and advice contributed by many members of the Pheasant Specialist Group and others interested in the conservation of pheasants. We are extremely grateful to BirdLife International for providing species accounts from their forthcoming landmark publications, *Threatened Birds of the World* and *Threatened Birds of Asia*, developed through an extensive review process involving the BirdLife Partnership, the Pheasant 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: Nigel Collar, Mike Crosby, Pete Davidson, James Lowen, Sue Shutes, 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. Despite a heavy workload, Philip McGowan provided guidance, insight, and co-ordination during the entire process of preparing the updated Action Plan, for which we are extremely grateful.

We are particularly thankful to the following for reviewing parts of the text: Nicholas Aebischer, Mike Cook, Steve Edwards, Gao Yu-ren, Han Lian-xian, Alain Hennache, Carol Inskipp, Salim Javed, Rajiv Kalsi, Rahul Kaul, Sarala Khaling, Suresh Kumar, Lu Xin, Stuart Marsden, Alexander Pack-Blumenau, K. Ramesh, Ettore Randi, Gary Robbins, S. Sathyakumar, Pratap Singh, and Zhang Zheng-wang.

As well as all those above, we extend our thanks for advice and information received during compilation and review to: Ashfaque Ahmed, Han Assink, Bas van Balen, Roland van Bockstaele, Cara Lin Bridgman, Lehr Brisbin, Don Bruning, Françoise Burhenne, Keith Chalmers-Watson, Carola von Conrad, Dang Gia Tung, Geoffrey Davison, Ding Chang-qing, Ding Ping, Jonathan Eames,

Susie Ellis, Dipankar Ghose, Mariano Gimenez-Dixon, He Fen-qi, Anne-Marie Gillesberg, Keith Howman, Linette Humphrey, Anni Lukács, Georgina Mace, Townsend Peterson, Ludo Pinceel, Michael Rank, David Rimlinger, Alison Rosser, Christine Sheppard, Pritpal Singh Soorae, Resit Sözer, Simon Tonge, Jack Tordoff, Rebecca Webb, Wen Xian-ji, Roger Wilkinson, Nurul Winarni, and Maureen Woodburn.

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*, edited by J. del Hoyo, A. Elliot, and J. Sargatal (1994), to accompany this document. Jean Howman, Mohammad Khan, and Timothy Greenwood provided other illustrations.

Western tragopan. This beautiful Himalayan species is threatened by continuing forest loss throughout its range.



Illustration: Timothy Greenwood

# Executive Summary

This Action Plan covers the pheasants, a group of one African species and 50 Asian ground-dwelling birds, found within Asia from the Caucasus in the west, through the Indian Subcontinent and the Himalayas to eastern China and Japan. They also occur through Southeast Asia to Flores, east of Java. They are largely dependent on forested habitats, making them highly vulnerable to deforestation and habitat degradation. As large, ground-dwelling birds they are also widely hunted for food, plumage, and the live bird trade. Consequently, many species are threatened. The first version of this Action Plan was published to cover 1995–99, and this second edition provides an update. It reviews the conservation status of pheasants and highlights recent conservation achievements (Chapter 1). It then documents the nature and extent of threats to all individual pheasant species (Chapters 2 and 3), and outlines a new set of priority tasks for implementation during 2000–04 (Chapter 4).

This Action Plan will be distributed to biologists, conservationists, decision-makers, government officials, educators, planners, grant-awarding bodies, and commercial concerns that are in a position to help. Much can be done at the local level, and projects outlined in this document should thus be considered by those with influence in the areas concerned. National and international support will also prove helpful in some cases.

Chapter 1 gives an overview of the pheasants, outlines the major threats they face, and reviews the different types of action that can be taken to protect them. This chapter is intended as a broad introduction and should be useful to those unfamiliar with both this group of birds in particular, and conservation issues in general. Chapter 2 gives the

threat category of each species, listing the criteria on which this decision was based and the principal actions that now need to be taken to improve the situation. The species identified as threatened are considered in more detail in Chapter 3, which provides information on distribution and populations, ecology, threats, action taken to date, and future conservation measures required for each species.

Chapter 4 is the most important part of this document. It 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 that might be carried out by university students as field expeditions, to more intensive and longer-term research projects requiring considerable financial and logistical resources. Government officials and other decision-makers can use these larger projects as a basis for high-profile conservation initiatives, either alone or in conjunction with other conservation projects in their region. This Action Plan is an appeal to anyone interested in undertaking these projects, and encourages the development of ideas in consultation with relevant local and national organisations and grant-awarding bodies, reporting all progress to the Pheasant Specialist Group.

The Pheasant Specialist Group is pleased to report a substantial increase in the amount and quality of conservation work done on behalf of the threatened pheasant species of the world since the production of the first edition of this Action Plan in 1995. Even so, many species remain threatened and are still little known in the wild. The Pheasant Specialist Group exists primarily to catalyse action on the new work set out in this Action Plan.



# The Conservation of Pheasants

## 1.1 Introduction

The first edition of the Action Plan for pheasants (McGowan and Garson 1995; henceforth ‘the first edition’) provided a comprehensive review of their status and outlined action for their conservation. During the five-year implementation period (1995–99) of that Action Plan, a large volume of work has been undertaken. This new edition was prepared during 1999 on the basis of the most recent information available, and is designed to replace the first edition, although some general information is repeated for new readers. It is deliberately limited in scope and the reader should not expect a full account of the biology of the pheasants. Briefly, the purposes of this update are:

- to provide a new overview statement on pheasant conservation worldwide (Chapter 1);
- to integrate all available material and produce revised threat assessments for all pheasant species (Chapter 2);
- to justify in detail why certain species are judged to be threatened with extinction, and give revised priorities for conservation action through updated species accounts (Chapter 3); and
- to suggest a new set of conservation projects with international priority for initiation during the period 2000–04 (Chapter 4).

## 1.2 Introduction to pheasants

### Species included in this Action Plan

This Action Plan covers all the pheasants of the world. These birds belong to the avian order Galliformes, which contains most of the species 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 partridges, quails, francolins, snowcocks, guineafowl, and turkeys (Fuller *et al.* in press), and the megapodes (Dekker *et al.* in press) are being prepared, whilst first editions for Cracids (Strahl and Brooks 2000) and grouse (Storch 2000) are already available. This means that all Galliformes species are currently covered by Action Plans.

Taxonomists have always considered the pheasants to be more closely related to the Old World partridge, quail, and francolin species than to any other group in the

Galliformes. Peters (1934), Johnsgard (1973), and Delacour (1977) placed all of these species in the subfamily Phasianinae within the family Phasianidae, which also included the grouse and New World quails. Johnsgard (1973, 1986, 1999) suggested that the Phasianinae should be split into two tribes: the pheasants in the Phasianini and the Old World partridge, quail, and francolin species in the Perdicini. On the basis of DNA hybridisation analysis, Sibley and Monroe (1990, 1993) classified the pheasants and the Old World partridge, quail, and francolin species (i.e., excluding grouse and New World quails) as the family Phasianidae. For fuller discussions of the higher levels of classification within the Galliformes and more detailed historical reviews, see Sibley and Ahlquist (1990), McGowan (1994a), and Johnsgard (1999).

There has been much less argument about which species of Galliformes are pheasants and which belong to other groups, although a recent study founded on molecular evidence has indicated that the pheasants and partridges may not be best represented as separate natural groupings (Kimball *et al.* 1999). With a few exceptions for the English names, the species taxonomy and names used in this Action Plan follow those given by Sibley and Monroe (1990, 1993) and adopted as the current standard (BirdLife International 2000, in prep.). There are still some details of this classification of 51 pheasant species that remain open to debate. These are discussed further below (see section on ‘Clarifying taxonomic units’); those involving threatened species are mentioned in the individual accounts in Chapter 3 and a project brief expands on cases particularly needing attention (see Project 9 under ‘Strategic Projects’).

A complete list of the species considered in this Action Plan is given in Chapter 2, to which the reader should refer for their scientific and preferred English names. The Pheasant Specialist Group also maintains an official list of names, including several English alternatives in some cases, for all supposed species and subspecies (see Appendix 1).

### Distribution and general biology

The pheasants are Asian in their native distributions, with the single exception of the Congo peafowl, which is endemic to the Democratic Republic of Congo in central Africa (Crowe *et al.* 1986). Several species have been introduced by humans into various parts of Europe and North America for sport-hunting purposes (e.g., Bump 1941, Pokorny and Pikula 1987, Hill and Robertson 1988a). Within Asia,

pheasants occur from Flores, east of Java at about 8°S (green junglefowl), through the equatorial forests of the Thai-Malay Peninsula, to northeastern China at about 50°N (koklass, ring-necked pheasant, Reeves's pheasant, blue eared-pheasant). The western limit of the group, excluding the Congo peafowl and all the introduced populations, is in the Caucasus at about 45°E (ring-necked pheasant). Pheasant taxa also occur all along the Himalayan chain, and extend as far east as Taiwan at 121°E (Mikado pheasant, Swinhoe's pheasant) and Japan at 145°E (copper pheasant, ring-necked pheasant).

Most pheasant species are dependent on heavily wooded habitats. These range from lowland tropical rainforest (e.g., crested fireback) and montane tropical forest (e.g., mountain peacock-pheasant) to temperate coniferous forests (e.g., western tragopan). Some species are found in more open habitats, such as subalpine scrub (e.g., blood pheasant), alpine meadows (e.g., Chinese monal), and grassland (e.g., cheer pheasant).

In general, our level of knowledge about individual pheasant taxa is poor. The ring-necked pheasant is a notable exception to this, however, as one of the most widely introduced of all bird species with considerable economic importance for sport hunting in Europe and North America. As a result, it has been the subject of a great deal of ecological research, leading to a sophisticated understanding of its behaviour and population biology, at least in temperate regions outside its native range (Hill and Robertson 1988a, Hudson and Rands 1988, Robertson *et al.* 1993a, 1993b, Woodburn 1993, Robertson 1997).

Sclater's monal is found in the remote eastern Himalayas, and little is known of its biology.



© Lynx Edicions

Over the five-year implementation period of the first edition of this Action Plan, much new work has been carried out on previously little known species in forms such as distribution surveys, intensive field research, taxonomy, and captive breeding. The content of this new edition reflects any new findings, but the Pheasant Specialist Group recognises the need to consolidate much of this material for publication in international journals (see Project 2 under 'Global Projects'). Meanwhile, some other species from particularly remote areas remain poorly known and, in some cases, there is still very little information on any aspect of their biology in the wild (e.g., Sclater's monal, Sumatran pheasant).

### 1.3 Relationship with humans

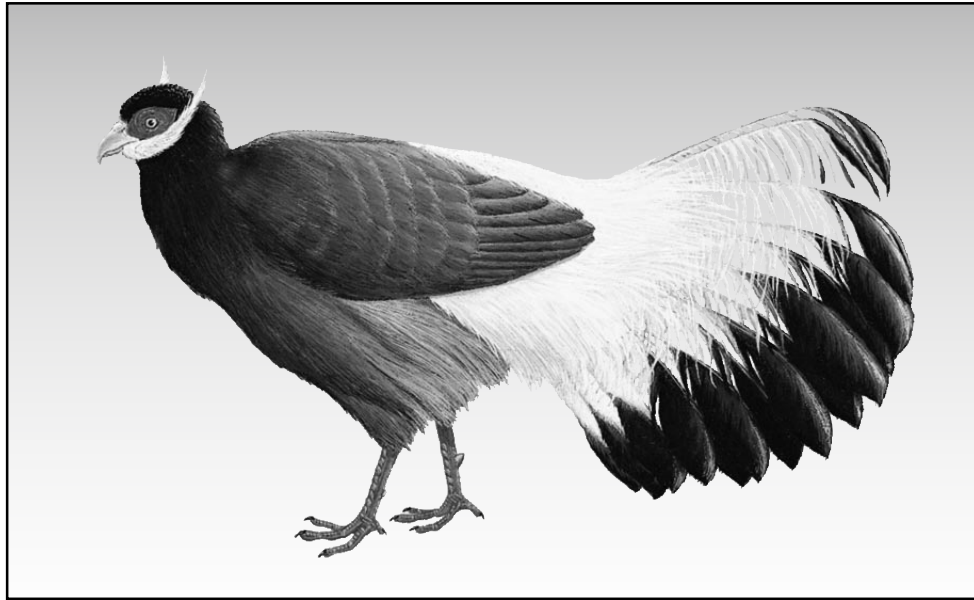
Pheasants and humans have long been closely associated. As large and mainly terrestrial birds, they are worthwhile and easy to trap or shoot, and their meat and eggs provide rich sources of protein. Sixteen species have been introduced to locations outside their natural range for purposes as diverse as enhancing ornamental collections, sport, and the production of eggs, meat, or feathers (Long 1981).

The ring-necked pheasant is the most widely introduced pheasant species. It was brought to Europe over 1,000 years ago from Asia Minor and later from China and Japan (Long 1981), and today is found throughout Europe and much of the USA. Although originally exploited mainly for food, it is now one of the most important gamebirds. In Europe, over 22 million birds are harvested annually, while in North America about 9.5 million are taken. The industry surrounding this sport hunting is of major importance in terms of revenue to landowners and employment for local people (Aebischer 1997a).

Nearly all pheasant species are exploited to some degree in their native ranges, usually to provide meat and eggs as food. The scale of this activity ranges from low-intensity, subsistence hunting up to levels needed to support local economies through sustainable use programmes (Simiyu 1998). The species experiencing the greatest pressure from hunting in its native range is the copper pheasant in Japan, which is reared in captivity to provide birds for sport (Brazil 1991, *in litt.*).

Pheasants, 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 pheasant populations in a sustainable manner, hunted populations of these species may be safeguarded in the long term.

Aside from the material benefits to be derived from pheasants, they have been absorbed into human cultural traditions over the centuries. Several species feature prominently in the art, religion, social customs, and folklore



The threatened brown eared-pheasant is closely associated with humans, and is under pressure from hunting.

© Lynx Edicions

of different ethnic groups in Asia. The red junglefowl has been associated with humans for centuries, and has (possibly) been in domestication as the progenitor of the domestic fowl for nearly 5,000 years (Wood-Gush 1959). It has now become of great economic importance and has influenced language, literature, religion, and medicine. The spectacular Indian peafowl is especially widespread in ornamental bird collections throughout the world and, because it enjoys sacred status under the Hindu religion, it remains ubiquitous in the wild throughout the lowlands of South Asia. Much folklore has become associated with this species, including its ability to hypnotise a snake and addle its eggs. The plumes of the brown eared-pheasant adorned Chinese military uniforms from the time of the Warring States to the end of the Qing Dynasty (475BC–1911AD). Their association with military bravery arises from the battles fought by the males during the mating season. For more examples of the strong cultural links between humans and pheasants, see McGowan (1994a).

The potential these non-material associations with pheasants have to provide incentives for conservation has scarcely been investigated. We suspect there may be much scope for harnessing and working with these links to further the conservation of these fascinating and beautiful birds, without which all our lives would be very much the poorer.

## 1.4 Other sources of information on pheasants

For readers requiring information on pheasant biology that is outside the scope of this Action Plan, a number of texts are recommended, such as those by Beebe (1918–22, 1936), Baker (1930), Delacour (1977), Howman (1979,

1993), and Johnsgard (1986, 1999). Details of pheasant taxonomy, morphology, geographical distribution, ecology, captive propagation, and behaviour can be found in all of these. In addition, McGowan (1994a) has provided a comprehensive account of the biology of all Galliformes species. Detailed regional or national accounts are available, including those by Cramp and Simmons (1980) for the western Palearctic, Crowe *et al.* (1986) for Africa, Ali and Ripley (1983) for South Asia, Grimmett *et al.* (1998) for the wider Indian Subcontinent, Cheng Tso-hsin (1987) for China, Lekagul and Round (1991) for Thailand, Wells (1999) for the Thai-Malay Peninsula, van Marle and Voous (1988) for Sumatra, Smythies (1981) for Borneo, and Smythies (1986) for Myanmar.

The World Pheasant Association has organised a long series of international symposia on the different groups of Galliformes, with those held in Nepal (1979), India (1982), Thailand (1986), China (1989), Pakistan (1992), and Malaysia (1997) being relevant to pheasants. Proceedings were published after each of these meetings, respectively, as Savage (1980), Savage and Ridley (1987), Ridley (1986), Hill *et al.* (1990), Jenkins (1993), and Carroll *et al.* (1998). The papers they contain provide much original material on many different aspects of pheasant biology, but especially their ecology and conservation status. The next symposium in this series is scheduled for September 2000 in Nepal and there should be another in 2003–04.

*Forktail* and *OBC Bulletin* (published by the Oriental Bird Club), and *Bird Conservation International* (published by BirdLife International) regularly carry papers with an Asian regional emphasis. Other accounts of recent work on pheasants can be found in the *Annual Review of the World Pheasant Association* (formerly the *Journal of the World Pheasant Association*), *WPA News*, and in *Tragopan*, the newsletter of the Pheasant Specialist Group.

## 1.5 Background to the Second Edition

### Who are we? – the Pheasant Specialist Group

The Pheasant Specialist Group was formed in 1993 with the initial purpose of producing the first edition of the Action Plan. Like most other Specialist Groups, it is concerned with gathering, collating, and summarising information on a small group of species to encourage individuals and organisations to implement priority conservation projects for threatened species. Promoting sustainable use through wise management is also part of its remit. The Specialist Group consists of a volunteer network of people with expertise in all aspects of pheasant biology and conservation. It acts under the joint authority of the Species Survival Commission (SSC) of the World Conservation Union (IUCN), BirdLife International, and the World Pheasant Association.

### Updating the Action Plan

The content of this Action Plan has been built on that assembled for the first edition and all the work done since. Every effort has been made to gather updated information and opinion from both published and unpublished literature, and from correspondence and discussions with people currently working on the biology and conservation of pheasants and their habitats worldwide. Wherever possible, statements of fact are supported with one or more references to the published literature. If such sources are not known, they are cited by reference to a named authority *in litt*. A large proportion of the text has been reviewed by those who provided original information, as well as others. The Pheasant Specialist Group is, therefore, confident that this new edition of its Action Plan has the full backing of its international membership.

The remainder of Chapter 1 provides an overview of the threats currently facing pheasant species and the types of action that are being taken in an effort to prevent any species from becoming extinct.

In Chapter 2, each of the 51 species of pheasants is assigned to a threat category using the criteria that define the *IUCN Red List Categories* (IUCN 1994a). This internationally accepted system for classifying threatened populations has been designed to provide a consistent and objective way of assessing extinction risk across widely differing taxonomic groups. This Action Plan is dedicated to providing a species-level status survey and plan for the pheasants, an objective that is consistent with the SSC's focus on this taxonomic level (as opposed to genera or subspecies). In any case, there still is too little information on most supposed subspecies of pheasants to make reliable

judgements on their taxonomic distinctiveness. A desire for rigour in applying the IUCN criteria to derive a robust threat categorisation for all the acknowledged species has not been without its difficulties, and thus any attempt to categorise any subspecies separately is hard to justify. However, there are some instances in which apparently distinct or isolated populations within currently accepted pheasant species are known to be under threat in their own right and, in some of these cases, current opinion is also divided on whether or not the forms involved represent full species. These are discussed further below (see section on 'Clarifying taxonomic units').

The individual accounts of each of the threatened species in Chapter 3 have been produced in close co-operation with BirdLife International in a standard format developed for *Threatened Birds of the World* (BirdLife International 2000), the latest global assessment of the status of all threatened birds. In all but two cases, these accounts were based on the draft texts for *Threatened Birds of Asia* (BirdLife International in prep.), a fully comprehensive assessment of the status and conservation requirements of all threatened Asian birds, although they also include other information received during the review process. The Palawan peacock-pheasant text was based on that in Collar *et al.* (1999). These accounts have been 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, identified threats, and inferred future changes. Any work in progress relating to conservation 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 (Chapter 4). Through an assessment of progress on all projects proposed in 1995, the effectiveness of the first edition has been investigated and the results are given at the start of Chapter 4 (see also McGowan *et al.* 1998a). Against the background of that analysis, outlines for a new set of priority projects have been provided for implementation within the period 2000–04. Projects are suggested that involve various combinations of status surveys in the wild, intensive research, population monitoring, habitat protection and management, taxonomic clarification, captive population management, and conservation awareness (i.e., education) programmes. The project briefs are presented in a standard format stressing the aims, justification, and means of implementation. Each one includes details of particular objectives, the methods to be employed, estimated timescales, and the resources required. They are written in a style designed to attract potential benefactors, conservationists, and researchers, and should be read in conjunction with the relevant threatened species accounts in Chapter 3.

During 2004, the contents of this Action Plan will be reviewed and updated, and a third edition drafted to cover the period 2005–09.

## 1.6 Threats to the survival of pheasants

This section provides background information on the major types of threat faced by pheasant species, gives an overview of their importance, and illustrates their effects with specific examples where possible.

### Habitat loss and degradation

Habitat loss, in its many forms, is suspected of being a contributing cause in the decline of most threatened pheasant species. Areas of forested habitat may be permanently or temporarily destroyed as a result of timber harvesting, or through deforestation for other purposes such as agricultural or urban encroachment, including road building. Alternatively, habitats may effectively be lost or rendered much less useful to wild species through degradation resulting from an excess of activities such as livestock foraging, or fodder and firewood collection.

Habitat destruction is characterised by complete removal of the existing vegetation structure. For species that are heavily dependent on forests, such as most pheasants, the complete removal of all trees in an area (deforestation) will inevitably cause a catastrophic decline. Timber extraction by logging operations is the primary reason for deforestation. Logging is especially common in areas with tropical forest on 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). Approximately 1.3 million hectares of land were deforested in Sumatra and Kalimantan between 1985 and 1997, representing 26% of the total. A disproportionate amount of this forest destruction has taken place in the level lowlands and current predictions are that all such forest will have been cleared by 2010 in these two places. Illegal logging is rampant, even within national parks (D.A. Holmes *in litt.*). It, therefore, seems certain that all the pheasant species that routinely inhabit lowland tropical rainforests in Sumatra and Borneo will be under serious threat from habitat destruction. The species likely to be the most adversely affected are the crested fireback, the crestless fireback, and Bulwer's pheasant.

On Hainan Island in China, destructive logging is putting pressure on the two distinct pheasant subspecies

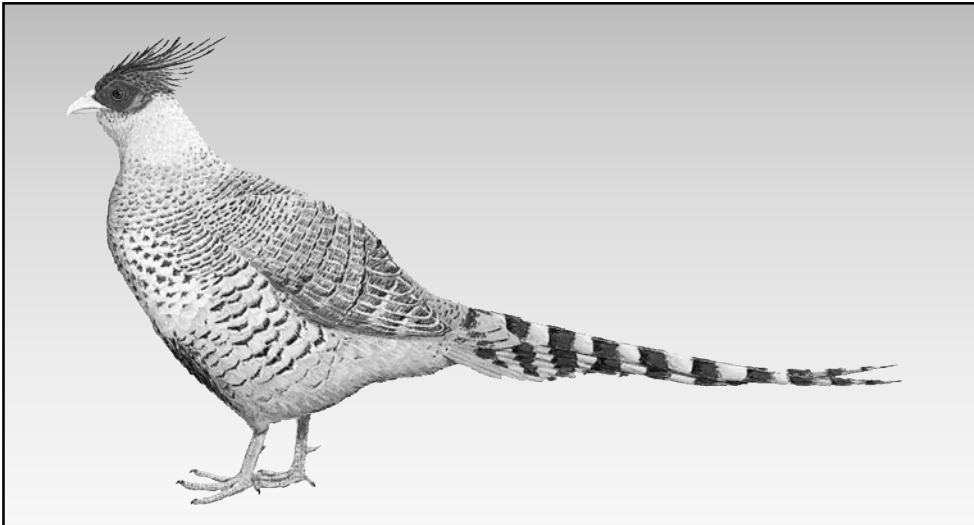
endemic to the island (silver pheasant *Lophura nycthemera whiteheadi* and grey peacock-pheasant *Polyplectron bicalcaratum katsumatae*). As a result of a ban on logging primary forest in January 1994, however, habitat loss is now less of a threat than it was previously (Gao Yu-ren 1998).

Forests may be cleared to make way 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 following habitat clearance, as vast tracts of land may become permanently inhospitable to many species of forest-dwelling animals. For example, shifting cultivation in northeast India has affected habitats of Blyth's tragopan and grey peacock-pheasant (Kaul *et al.* 1995). The probable disappearance of the green peafowl from lowland and riverine habitats in this region may also be attributed to such practices (S. Kumar *in litt.*).

Increasingly, forested habitats are being cleared to make room for urban settlements, or for road building and reservoir construction. For instance, near Darjeeling in India, habitats for satyr tragopan and koklass have been lost to urban expansion at Jorebunglow and Ghoom (S. Khaling *in litt.*). The restricted range of the mountain peacock-pheasant in Malaysia faces serious disruption if a proposed road-building project to link the Genting Highlands with Fraser's Hill and Cameron Highlands is allowed to proceed (Anon. 1998).

Whatever the reason for significant habitat destruction, an almost inevitable result is the increased fragmentation of any remaining habitat and, therefore, of the distribution of species using it. Eventually, this can lead to the disappearance 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 vulnerable to extinction through the combination of genetic, demographic, and environmental effects generally referred to as the 'extinction vortex' (Primack 1998). The extinction of several such populations over a short time may result in a major range contraction and population decrease for the species as a whole.

Habitat degradation, as opposed to its destruction, involves a reduction in quality without the loss of all the original vegetation components or structure. It can occur as a result of activities such as the selective removal of minor forest products (e.g., medicinal herbs, fungi) or foraging by domestic livestock. Selective logging, where only a proportion of trees (usually valuable species) is removed from the forest in a given area, may also be detrimental. The term 'selective logging' is often taken to imply that trees are harvested according to sustainable principles and alterations to forest structure are as limited as possible. At its most extreme, however, the remaining forest is severely degraded and exhibits an unnaturally



The cheer pheasant lives in small patches of successional grassland, and is under severe pressure from humans through hunting and changing land-use patterns.

© Lynx Edicions

patchy and irregular canopy. Associated problems, such as damage to residual trunks and soil compaction, are discussed by Whitmore (1984), while Marshall and Swaine (1992) offer a more complete review of the effects of selective logging on tropical forests in particular.

Survey work on the satyr tragopan in Singhalila National Park in India indicated that birds were avoiding areas near human habitation, presumably due to habitat disturbance or degradation. These areas were heavily grazed by cattle, trees were lopped for firewood, and bamboo was removed for construction (Khaling *et al.* 1998).

Whilst habitat degradation is generally considered to be the result of the removal of some part of the vegetation in rather stable climax communities, it is important to remember that lack of significant disturbance will render successional habitats less suitable for species that particularly thrive in such temporary or managed situations. For example, the cheer pheasant occupies localities in the western Himalayan foothills that are dominated by grassland and scrub habitats prevented from developing into pine and oak forests through a combination of stock grazing, hay harvesting, and stubble burning (Kaul 1989, Kalsi 1998). In the Margalla Hills National Park in Pakistan, where cheer pheasants occurred naturally until 1976 (Severinghaus *et al.* 1979), the abandonment of a management regime designed to produce grass has resulted in the invasion of formerly open slopes by a dense thorn scrub forest. This has rendered the site unsuitable for the re-introduction of the cheer pheasant, although it now supports a dense population of white-crested kalij pheasant (Garson *et al.* 1992).

## Hunting

Although, for many animal species, the effects of direct exploitation are considered relatively minor, pheasants

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). In practice, however, it can be very difficult to distinguish the effects of direct exploitation from those due to habitat loss, which is considered the primary cause for declines in several European bird species, despite the fact that they are also widely hunted (Aebischer 1997b). The impact of hunting is also hard to quantify because much of it is illegal and, therefore, covert. Nevertheless, direct exploitation appears to be having serious negative effects on populations of several pheasant species.

All three of the pheasant species classified as Endangered in this Action Plan appear greatly threatened by the activities of local hunters. Trappers were responsible for the recent rediscovery of the Edwards's pheasant (Eve 1997) and the captive population of the Vietnamese pheasant consists largely of confiscated birds (Dang Gia Tung *in litt.*). Through an interview survey of villagers in Kalimantan (Indonesia), O'Brien *et al.* (1998) found that snaring of the endangered Bornean peacock-pheasant for food was sufficiently widespread to be regarded as an important threat to this species.

Recent surveys have established that the green peafowl is now absent over much of its former range in Vietnam (Brickle *et al.* 1998) and Laos (Evans and Timmins 1996). In both places, the declines are too rapid and widespread to be solely the result of the forest fragmentation that has been so rampant in Indochina over the last 30 years and, thus, over-hunting is considered to be the major cause. Direct exploitation for its meat, feathers, and eggs is also thought to be the main reason for its decline in Java (van Balen *et al.* 1995). Its extirpation from Peninsular Malaysia was caused ultimately by hunting and, in many regions, green peafowl continue to avoid areas near human habitation (McGowan *et al.* 1998b). The situation of the Congo peafowl must also give cause for concern. Much of its

known range in the east of the Democratic Republic of Congo overlaps the area now inhabited by huge numbers of Rwandan refugees who fled into these forests following the start of ethnic conflict there in 1994 (Hart and Upoki 1997).

## Human disturbance

Harvesting activities other than hunting may have negative effects on pheasant populations, which are perhaps affected more than most other forest animals because of their predominantly ground-feeding and -nesting habits.

In western Himachal Pradesh (India), the western tragopan is absent from many of the wildlife sanctuaries, but, paradoxically, it is present in several unprotected areas nearby. Disturbance from human activities, particularly the harvesting of medicinal herbs and fungi during the spring breeding season, is considered to be the main reason for this unlikely distribution pattern (Katoch *et al.* 1997). The remoteness of protected areas and the high quality of their habitats attract a disproportionate level of morrel fungus *Morchella* collecting by local people and organised teams from further afield, all of whom bring their dogs (K. Ramesh *in litt.*). Migrant flocks of goats and sheep, accompanied by shepherds and dogs, are also moving up through these forests at this crucial time of year (Gaston and Garson 1992). Recent studies in China have shown high failure rates for brown eared-pheasant nests in two national nature reserves where morrel collecting is common in spring (Zhang Zheng-wang 1998).

The global growth of the ecotourism industry may present another threat of this kind. For instance, the crested argus is considered to be intolerant of human disturbance (Wells 1999). The spread of walking tours in and around Taman Negara National Park, then, represents a potential threat. In addition, over 1,000 trekkers climb the Gunung Tahan peak there each year, following the provision of several access routes (Mamat and Yasak 1998).

## Hybridisation with released stock

The red junglefowl has adapted well to human-made habitats and is often found in disturbed agricultural habitats around human settlements. This widespread proximity to people renders this junglefowl vulnerable to hybridisation with the domestic fowl, to which it gave rise (Wood-Gush 1959), potentially threatening the genetic purity of wild junglefowl populations in some areas (Wells 1999). Indeed, the male eclipse plumage, which is thought to be a reliable indicator of ancestral wild genotypes in red junglefowl, was not found in a small series of museum specimens collected in Asia during the 19<sup>th</sup> century (Peterson and Brisbin 1998). These authors consider that true red junglefowl may now be rare in the wild as a result. The

genetic integrity of populations of the other three junglefowl species (grey junglefowl, Sri Lankan junglefowl, and green junglefowl) is also potentially at risk through this effect (Holmes 1991, A.T. Petersen and I.L. Brisbin *in litt.*), as they are all known to produce fertile hybrids with red junglefowl (Johnsgard 1999).

Another case requiring investigation is that of the races of ring-necked pheasant native to Japan (*Phasianus colchicus versicolor/robustipes/tanensis*), which have been hybridised with the Korean race (*P. c. karpowi*) to raise more birds in captivity to release for hunting purposes (Maru 1980, Brazil 1991).

## Summary of the threat status of pheasants

Of the 51 species considered in this Action Plan, three are classified as Endangered (EN): Edwards's pheasant, Vietnamese pheasant, and Bornean peacock-pheasant. A further 21 species are classified as Vulnerable (VU) and the remaining 26 are considered to be in the Lower Risk (LR) category. The imperial pheasant is placed in the Data Deficient category because of current uncertainty about its taxonomy (see below).

## 1.7 Actions for the conservation of pheasants

Incorporating experience gained from work carried out during the implementation period of the first edition, this section outlines the different forms of conservation action that have proved effective. These actions are presented in the order in which they should ideally be undertaken to ensure the long-term conservation of any threatened species.

### Clarifying taxonomic units

In theory, only after populations or groups of populations have been identified as separate biological entities, sometimes referred to as Evolutionarily Significant Units (Vogler and Desalle 1994), can they be placed meaningfully into threat categories. In practice, because of a predominant ignorance of metapopulation structure and subspecific validity within threatened pheasant taxa, a species-level treatment has to be the basis for setting priorities concerning their conservation at present.

The taxonomic status of several pheasant taxa remains unclear. First and foremost, there is an urgent need for clarification of the taxonomic distinctiveness of three closely related and highly threatened central Vietnamese endemics: the imperial, Edwards's, and Vietnamese pheasants. The Vietnamese pheasant has already been

accepted as a full species by some authors (e.g., Sibley and Monroe 1990, Collar *et al.* 1994), despite a continuing lack of persuasive evidence (Vuilleumier *et al.* 1992) and considerable variability in distinguishing plumage characteristics (Davison 1996, Dang Gia Tung *in litt.*). On the basis of a comprehensive study of museum skins, Rasmussen (1998) has suggested that the imperial pheasant is a wild hybrid form resulting from crosses between local forms of silver pheasant and either Edwards's or Vietnamese pheasant. This is now being checked by conducting controlled crosses in captivity (A. Hennache *in litt.*). Mitochondrial DNA sequencing on a small number of samples suggests that these three forms only differ from each other by amounts usually regarded as sufficient to distinguish subspecies (Hennache *et al.* 1998), and is consistent with a hybrid origin for the imperial pheasant (E. Randi *in litt.*).

Another threatened species that merits taxonomic clarification is the Tibetan eared-pheasant. Often considered as a subspecies of the white eared-pheasant (e.g., Johnsgard 1999), this form differs markedly from the nominate race in several plumage characters, as well as in the structure of the tail feathers. In addition, an apparently isolated and remnant population of the distinct Dolan's eared-pheasant *Crossoptilon crossoptilon dolani* has recently been found (Pack-Blumenau and Lu Xin 1999). Future taxonomic investigations could, therefore, usefully compare the structure of both vocalisations and DNA sequences across the whole genus *Crossoptilon* (Cheng Tso-hsin 1997).

Further characterisation of the morphologically distinct Hainan race of grey peacock-pheasant *Polyplectron bicalcaratum katsumatae*, listed by some authors as a distinct species (e.g., Inskipp *et al.* 1996), is also required, as well as that of the endemic silver pheasant (*Lophura nycthemera whiteheadi*). The crestless fireback and crested fireback both exist in somewhat different forms in Peninsular Malaysia (*Lophura erythrophthalma erythrophthalma*, *L. ignita rufa*) and Borneo (*L. e. pyronota*, *L. i. ignita*), where they are generally more seriously threatened (Delacour 1977, Johnsgard 1986, 1999). This makes the species to which they are presently assigned rather difficult to categorise for extinction risk.

Similar situations exist for the crested argus in Indochina (*Rheinardia ocellata ocellata*) and Malaysia (*R. o. nigrescens*), and also perhaps for Blyth's tragopan in northeast India (*Tragopan blythii blythii*) and Bhutan (*T. b. molesworthi*) (see Project 9 under 'Taxonomic Re-assessment of Pheasants').

## Gathering baseline information

**Surveys:** these are the first steps toward understanding both a species' requirements and any potential threats to its survival. Extensive surveys involve the collection of

information on the presence or absence of a species at a series of sites, together with the distribution of major habitat types and the nature and extent of any human impacts, as has been done recently for Hainan's endemic Galliformes species (Gao Yu-ren 1998) and the cheer pheasant in northwestern India (Kalsi 1998). If possible, some data on relative abundance and population sizes should also be obtained. Additional survey work is proposed for many threatened species in Chapters 3 and 4 because recent information on distribution and abundance is lacking from at least parts of their ranges.

Conservation action cannot be properly planned without such basic knowledge. It is important that survey methods are clearly described, data collection protocols are standardised, and study areas are accurately located and mapped (preferably using a Global Positioning System). At least for the more vocal species, surveys of relative abundance are most easily done by counting the locations of calling birds in the pre-breeding season, as with satyr tragopan at Singhalila National Park in India (Khaling *et al.* 1998), the cheer pheasant at Chail Wildlife Sanctuary in India (Garson *et al.* 1992), and great argus in Taman Negara National Park in Malaysia (Davison 1981). Sometimes, as for western tragopan in northern Pakistan during winter, trained dogs may be useful in causing birds to flush from snow-covered ground, allowing counts to be made along fixed routes (Whale 1997). Papers on other techniques that have been used in surveys of pheasants and their habitats can be found in Hill *et al.* (1990).

**Ecological research:** research with conservation objectives should be designed to provide new information that relates directly to such things as habitat requirements, tolerance of disturbance, and use of secondary or degraded habitats by a threatened species. Collecting sufficient data of the type required on individuals or populations will always be physically demanding, labour intensive, and expensive by comparison with the 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 leading to specific conservation actions for the species concerned.

In India, comparisons between sites with cheer pheasants and nearby sites without has revealed that the birds only used a subset of the full range of microhabitats available. They tended to occur where there was more grass and low scrub cover, a situation that arose because of heavy grazing and annual scrub burning (Kalsi 1998). It is feasible to suggest that these forms of habitat management could be used elsewhere to create more habitat patches that are suitable for cheer pheasant populations.

In China, the Elliot's pheasant is suspected to have originally occurred mainly in broadleaf forest, but as these have been progressively replaced by conifer plantations it has become important to establish their habitat use patterns



within these areas. A detailed study of habitat use by four radio-tagged individuals revealed, for example, that the pheasants selected areas with heavier shrub cover and more shrub species in autumn, winter, and spring. In winter, they concentrated on places with plenty of ferns and certain tree fruits, all of which they were seen eating (Ding Ping *in litt.*). In another study of habitat requirements by Lu Xin (1997) on the Tibetan eared-pheasant, the protection of roosting sites in scrub was judged to be crucial to the well-being of populations at two sites near Lhasa in Tibet.

## **Making strategic conservation recommendations**

**Identifying priority areas for conservation:** once adequate data from surveys and research have been collected, the information needs to be synthesised and large-scale patterns described. It is at this stage that species can be allocated meaningfully to threat categories, thereby placing the need for conservation action in a global context. With the extremely limited resources available for conservation action, this is necessary before more specific local conservation actions can be recommended.

Wherever possible, conservation recommendations should be based on existing structures and frameworks (e.g., Dai Bo *et al.* 1998). One of the most obvious conservation actions is the declaration of protected areas, although the usefulness of creating more and more 'paper sanctuaries' that afford threatened species and habitats no real protection has often been called into question. Enforcement of regulations is often weak in these places, but they do at least have legal standing that should facilitate improvements in their protection and management in the future.

It is important to realise that there is a variety of reasons why protected areas were first designated (Pressey *et al.* 1994), many being set aside for reasons other than species or habitat conservation (e.g., hunting reserves, tourism areas). It is, therefore, necessary to assess how well existing protected areas are succeeding in conserving pheasant species. This involves identifying species that are poorly represented in, or even completely absent from, the current network. It is then possible to recommend how gaps in coverage can be filled, either in the form of extensions to reserves already in place or the designation of new ones. Such an analysis has been undertaken for the Galliformes species of eastern Asia, involving the collation of more than 5,000 historical and recent site records for over 100 species (McGowan *et al.* 1999). This identified 37 species, of which 20 were threatened, that were not recorded from at least three protected areas recognised by IUCN (IUCN 1994b).

This dataset has also been used to show how the scarce resources available could be best directed to protect and manage the smallest possible number of reserves most

effectively, whilst simultaneously catering to the greatest possible number of threatened Galliformes species. This analysis identified a minimum of 82 protected areas in Asia that provide each threatened species with potential refuge in at least three of them. Some species are not known from even one reserve and it is these that should now be given some special attention. They include the Tibetan eared-pheasant, the Bornean peacock-pheasant, and the copper pheasant. There is clearly great value in extending the analysis of these data further to aid in the strategic planning of Galliformes species conservation in Asia (see Project 4 under 'Assessing Populations of Asian Galliformes within Protected Areas').

**Population Viability Analysis:** one way of looking at the likely future prospects for a single species is to carry out a computer simulation exercise known as a Population Viability Analysis (PVA). These software programmes (e.g., Lacy 1993, Lindenmayer *et al.* 1995) are designed to use information on the life history, ecology, and subpopulation structure of a threatened species to assess how its overall population size might change in the future as a consequence of alternative management approaches, such as habitat improvement, the control of hunting, or captive propagation for supplementation or re-introduction. 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). A major limitation of this use of population modelling in planning conservation action is the adequacy and reliability of the real data available. Often it is necessary to borrow parameter values from abundant and better-known species to run models representing severely threatened species. Hence, there is a need for great caution when interpreting the outputs from such an exercise. Despite their limitations, however, models can provide strategic direction to the future conduct of research, which can be focused on obtaining realistic values for crucial parameters. For a review of the usefulness of PVA as a conservation tool, see Boyce (1992).

For many threatened species, even much of the existing information required for this type of analysis is not published, so a useful approach championed by the IUCN/SSC Conservation Breeding Specialist Group has been to hold international meetings within the geographical range of the target species. These are called Population and Habitat Viability Analyses (PHVAs) and gather together those most familiar with a particular species to exchange information and ideas while conducting the computer simulations. This allows discussions about the reliability of parameter values required by the modelling software and the feasibility of implementing management interventions that the model predicts to be useful. PHVAs are run with the aim of producing a consensus report detailing a comprehensive, but achievable set of conservation actions. These are predicted to improve the

status of a threatened species by a certain margin within a nominated time frame, giving a clear basis for auditing the conservation action taken.

Although no formal PHVA has been held for a pheasant species, it is a process that has the potential to benefit several species at some point in the future. Anyone considering holding a meeting of this type should arrange it in close consultation with the Pheasant Specialist Group and the Conservation Breeding Specialist Group. The latter now provides PHVA training courses around the world (see Appendix 2 for contact details).

## Specific types of conservation action

**Protecting habitat:** given that habitat loss and degradation, especially of forests, are major threats to many pheasant species, establishing and maintaining protected areas that include localities in which comparatively large populations of threatened species persist are generally going to be powerful ways of ensuring their long-term survival. It is desirable that the granting of reserve status to additional areas within a particular species' range is recommended in the context of a strategic analysis of any existing protected area network, and with due consideration of the effects of this on other threatened species. However, even when a paucity of data does not permit meaningful large-scale analysis or the consideration of other threatened taxa, such information as there is on distribution and habitat use can be a basis on which to recommend the designation or expansion of apparently crucial protected areas, as well as changes in their management policies. To have a high probability of prompting action by decision-makers, it is necessary that new recommendations concerning protected areas are based on sound science, allowing persuasive advocacy campaigns to be targeted at government departments, non-governmental organisations (NGOs), and local people.

Two examples from Vietnam illustrate how survey results can be followed by an appraisal of local habitat distribution and threats from rural human populations to produce feasible proposals for protected area designation and management. After the discovery of several sites holding the Vietnamese pheasant (Robson *et al.* 1991, 1993a), a management plan was developed for the Ke Go Nature Reserve (Le Trong Trai *et al.* 1999a), which has now been accepted (Nguyen Cu *in litt.*). In the same way, following the re-discovery of Edwards's pheasant (Eve 1997) further south in the Annamese lowlands, adjoining nature reserves that cover all the known localities have been proposed at Phong Dien and Dakrong (Le Trong Trai *et al.* 1999b).

**Regulating hunting:** most pheasant species are hunted for food by local people that share their habitats and some are

subject to substantial trade for their flesh, plumage, or as live birds. Most of this hunting, and especially that in protected areas, is illegal, so its regulation largely revolves around the issue of law enforcement. Almost all the range states for pheasants have well-developed legislation for wildlife protection, usually with a focus on threatened species. However, financial provision to government departments responsible for protecting and managing wildlife resources is generally poor. The usual result in protected areas is an inadequate staff complement, with very few people properly trained or sufficiently motivated to carry out their duties, and a far worse situation in areas that are unprotected by any law.

There should always be parts of protected areas set aside as hunting-free sanctuaries (i.e., core zones) to act as reservoirs for threatened species, but completely denying any harvesting rights to local people who have historically been accustomed to them will almost always be counter-productive. Generally, regulations will be ignored, precipitating ever-increasing competition amongst hunters for a share in a dwindling resource. This is the "tragedy of the commons" that so often results in the complete exhaustion of natural resources in the face of increasing and unregulated local human exploitation (Hardin 1968).

An alternative scheme involves giving local people more control over how natural resources are used, and is much more likely to produce a sustainable solution for threatened species and human populations alike. In the case of protected area management, this involves recruiting as many staff as possible from the immediate surrounds of the reserve. These people have a vested interest in protecting their local area from over-exploitation because it provides them with potentially permanent employment and sustenance. They are also uniquely well qualified to police the area as they can most easily recognise people who enter the area without rights or come from further afield.

In the specific case of pheasant populations as resources often hunted for food, the feasibility of having sustainable harvesting programmes within parts of protected areas (e.g., buffer zones) needs to be investigated. Allowing strictly monitored and locally franchised hunting within areas that are badly affected by illegal hunting may allow the overall level of harvesting to be more tightly controlled. To enjoy effective support, such schemes need to emerge from a process of wide consultation involving local people, NGOs, species experts, and government departments. Setting up such schemes might often require the adoption of special local bylaws or the passing of new pieces of legislation (see e.g., Simiyu 1998).

Because this will all take a significant period of time to complete, the Pheasant Specialist Group fully recognises that, in many circumstances, the only immediate solution to the plight of a threatened and hunted species will be a total and vigorously enforced hunting ban. But this cannot be regarded as a long-term solution because it demands

high input in terms of the recruitment, training, and remuneration of staff to police the area and monitor the effectiveness of their actions.

**Encouraging sustainable use:** it seems obvious that all hunting activities will reduce populations in the wild, but they will only do so significantly if the resulting harvest is substantial and consists of birds that would not have died in the wild from some other cause within an equivalent time period. Intensive research on native and introduced species of Galliformes that are hunted widely for sport in Europe and North America has now shown that, in these circumstances, many of them have the capacity to increase their reproductive output whilst suffering reduced levels of mortality from other causes, thereby compensating for the losses caused by hunting itself (Potts 1987, Aebischer 1997b).

The underlying processes involved are known to be density-dependent; that is, the lowering of population density by hunting reduces the effects of intraspecific competition and results in increased reproductive success and survival for the birds that remain. Under natural conditions, this mechanism allows populations to recover from catastrophic reductions, whilst also limiting their maximum densities to levels that match the capacity of the environment to support them. It is likely that most pheasant species and populations exhibit such density-dependent responses, although for species with comparatively low reproductive capacities and high annual survival rates (e.g., peacock-pheasants, great argus) it seems prudent to assume no strong density-dependence, and thus little or no real capacity to compensate for hunting (N.J. Aebischer *pers. comm.*).

What constitutes a sustainable level of harvesting in a particular case depends on many interacting factors and will generally not be predictable with much confidence in advance. It is, therefore, vital that any trials of sustainable use schemes are properly monitored through some programme of standard, repeated population counts. In this way, hunting quotas can be adjusted up or down according to the observed capacity of the population to persist with certain levels of offtake. Local people should be able to derive long-term sustenance, economic gain, and other benefits from the birds. In some circumstances, pheasant populations may actually benefit from sustainable harvesting because the potential economic benefits arising from this may provide the incentive for habitat improvement work designed to increase population levels and allow an even greater sustainable yield; this is the so called “paradox of wise use” (Aebischer 1997b, Simiyu 1998).

It should be stressed that habitat modification for this purpose is likely to have unpredictable effects on other species in the ecosystem. If other threatened species seem likely to be adversely affected, there may be a case for conducting a formal impact assessment before implementing

any habitat management changes. In any case, the detection of unpredictable side effects requires a comprehensive monitoring programme to be put in place prior to the implementation of any management innovations.

Both copper and ring-necked pheasants are native to Japan, where they are heavily hunted and bred in captivity for release. Relatively little seems to be known about the ecological requirements of these species in Japan, where capitalising on the paradox of wise use must be a real possibility. Such evidence as there is suggests that the copper pheasant has declined quite dramatically (Yamashina 1976, Maru 1980, Brazil 1991).

Sustainable use is very much part of the IUCN ethos and the SSC has, therefore, set up a Sustainable Use Initiative (SUI), which should be used as a source of advice in this area (see Appendix 2 for contacts).

**Maintaining *ex situ* populations:** the zoo community has always viewed its captive populations as having much broader utility than simply the means to provide captive-reared animals for re-introductions (Tonge and Wilkinson 1998). For instance, they offer material for physiological, genetic, and behavioural research that is not practical with wild individuals, but which may nevertheless be of benefit in the conservation of populations *in situ*. Zoo animals are no longer regarded as curiosities provided for public entertainment, but rather as part of well-informed and attractive exhibits designed to raise conservation awareness. This is particularly effective when they are sited within the geographical range of a threatened species. Good examples of this are the large, well-planted, and multi-lingual exhibits of Vietnamese and Edwards’s pheasants at Hanoi Zoo (H. Assink *pers. comm.*).

In recent years, WPA has begun to re-assess the roles of captive populations. Its private breeders started the first regional Galliformes studbooks in 1992, joining the European 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 conserve pheasants in captivity. 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. Zoo Malacca is now under the control of the Wildlife Department and open to the general public as an education and research centre. In some circumstances, it is also possible for a captive breeding centre to have a substantial role in preventing an international market from developing for live birds illegally taken from the wild (Tonge and Wilkinson 1998).

The proper management of captive populations for research and exhibit purposes is just as important as it is for those being maintained as insurance against extinction. Unusually, in the case of many pheasant species, the bulk of the *ex situ* population is in the hands of private individuals who keep the birds as a hobby. However, in all these situations there will be a need to keep birds in good condition and to breed them. With good overall breeding management through the use of banding and registers, many existing *ex situ* populations of pheasants have the potential to persist for long periods and serve the needs of conservation education, research, and as yet unforeseeable supplementation or re-introduction projects. It is particularly important that species of questionable validity and all supposed subspecies be managed separately, at least until disagreements over taxonomic rank are resolved (e.g., Edwards's and Vietnamese pheasants).

Much of the responsibility for managing captive populations lies with the GalliTAGs now operating in Europe, North America, and Southeast Asia. These organisations oversee the activities of both private and institutional breeders and assist with the maintenance of many local breeding registers, as well as regional or international studbooks. Currently, there are international studbooks for the following seven pheasant species (with the Studbook Keeper names in brackets):

- Blyth's tragopan (H. Assink)
- Cabot's tragopan (H. Assink)
- Edwards's pheasant (A. Hennache and H. Assink) (see Hennache 1997a)
- Vietnamese pheasant (Dang Gia Tung and H. Assink)
- Mountain peacock-pheasant (D. Bruning)
- Malaysian peacock-pheasant (D. Bruning)
- Congo peafowl (R. Van Bocxstaele)

An international studbook is used to keep track of matings in the captive population of the Blyth's tragopan, which has a highly fragmented range.



J. Howman

Other details on the size and management arrangements of *ex situ* populations for all threatened pheasants are given in Appendix 3.

**Supplementation and re-introduction:** the conservation value of captive animal populations in general, and many pheasant species in particular, has been the subject of a long and continuing debate. Traditionally, they have been viewed as the only means of ensuring that certain species never become completely extinct, even if they become temporarily extinct in the wild. The belief is that dwindling wild populations of any such species can be supplemented (i.e., re-stocked) or re-introduced after extinction from the species' native range by releasing individuals from *ex situ* populations back into the wild.

However, if a captive population is to offer these possibilities, techniques for its husbandry must provide the necessary conditions of hygiene, nutrition, and aviary habitat for highly successful reproduction, thus making mass production possible. There is abundant evidence to show that the success of translocations depends heavily on the numbers of individuals involved, with single releases of 80–120 generally proving to be much more effective than smaller batches (Griffith *et al.* 1989). Most species of pheasants are held in captivity in some numbers (see Appendix 3) and the techniques for their husbandry are well known (Howman 1979, 1993). So, as a group of species, they may seem to offer unusual scope for supplementation and re-introduction projects.

So far, however, there has been only one serious attempt at such a project with a pheasant. This ambitious, but ultimately unsuccessful, attempt to re-introduce the cheer pheasant to the Margalla Hills National Park in Pakistan showed that the behavioural quality of the released birds was crucial. The mass rearing of chicks largely or entirely in the absence of adult birds produced poults that roosted on the ground at night and were generally very prone to predation (Garson *et al.* 1992). Research on introduced and annually re-stocked ring-necked pheasant populations also showed this (Robertson 1980), and demonstrated that captive-reared birds of both sexes are much less effective at breeding than their wild-reared counterparts (Hill and Robertson 1988b). These examples indicate well the degree of technical difficulty involved in re-introduction projects with pheasants.

There are, perhaps, two species for which re-introductions might seem to have particular potential to alleviate their problems at some point in the future, but is this really so? The Edwards's and Vietnamese pheasants are two of the three most threatened species in this group of birds, and both are currently held in captivity. In their native ranges in the central lowlands of Vietnam, a combination of hunting and timber harvesting in the few large fragments of forest remaining is a serious threat to their continued survival. The captive population of

Vietnamese pheasant is of recent origin and managed through an international studbook; it stood at 65 individuals in December 1998 (A. Hennache *in litt.*). The Edwards's pheasant population originates from birds collected in the 1920s (Ciarpaglini and Hennache 1995) and has been hybridised with Swinhoe's pheasant (Delacour 1977, E. Randi *in litt.*). Its international studbook population stood at 902 individuals in December 1998, and every effort is now being made to identify and exclude any further Swinhoe's pheasant hybrids, as well as to outbreed from the pure lines (Hennache 1997b, A. Hennache *in litt.*).

Both these species are currently the subject of attempts to safeguard crucial remnant habitat patches in recognised nature reserves (Le Trong Trai *et al.* 1999a, Le Trong Trai *et al.* 1999b, Nguyen Cu *in litt.*). Within these areas, strenuous efforts will need to be made to prevent hunting, mainly by ensuring that local people do not have to consume forest wildlife in order to survive. It is important to stress that if these efforts fail and the wild populations are hunted out of existence, no attempt should be made to re-introduce them using birds from the *ex situ* populations, at least until such time as the threat of hunting has been substantially reduced. If all the remaining blocks of habitat are deforested, re-introductions will again be impractical until new forests of a similar type are established artificially. In the immediate future, therefore, all possible efforts must be made to save the wild populations and their native habitats, whilst their international studbook populations are managed through the co-operation of a number of breeding centres both within and outside Vietnam. Both strands of this strategy are being pursued energetically (J.C. Eames *pers. comm.*, A. Hennache *pers. comm.*), although no good case can be made for supplementation or re-introduction projects at present.

The example of these two Vietnamese species and that of the cheer pheasant re-introduction attempt in Pakistan indicate how complex the planning and execution of re-introduction projects will usually be, even when captive populations are already in existence. Indeed, such projects have the potential to consume enormous resources whilst still having a negligible chance of success measured in the shape of re-established and self-sustaining populations in the wild. In an effort to reduce the likelihood of poorly conceived projects being undertaken, a comprehensive set of guidelines has been produced by the IUCN/SSC Re-introduction Specialist Group (IUCN 1998, see Appendix 2 for contacts). The Pheasant Specialist Group fully recognises that these guidelines cannot be used under the prevailing circumstances in Vietnam to justify supplementation or re-introduction projects for the Edwards's or Vietnamese pheasants. Specifically, the major threats to their survival *in situ* have not been reduced sufficiently for such projects to have any likelihood of success. The IUCN guidelines should be studied closely

when considering similar projects for any other threatened pheasant species.

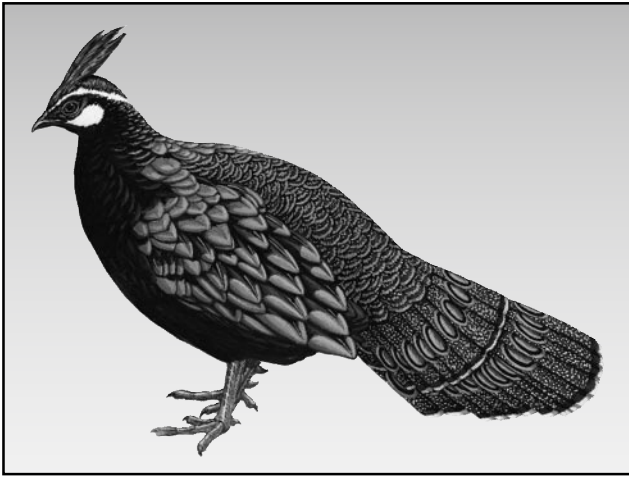
**Conducting conservation awareness programmes:** because of the close relationship between humans and many pheasant species in the wild, there is great potential for conservation awareness programmes to highlight the plight of individual species, and raise awareness of general principles of environmental stewardship and sustainable use. Direct conservation measures are unlikely to be effective unless they are accompanied by a vigorous and well-targeted conservation awareness programme that is designed to win the co-operation of local communities, especially when direct human causes, such as over-hunting or forest degradation, have been implicated in the decline of a species.

Two examples of this dual approach involving a pheasant species are concerned with the conservation of western tragopan populations and their temperate forest habitats in the western Himalayas. The Himalayan Jungle Project in Pakistan is focused on the Palas Valley, where village-level consultations form the basis of all initiatives designed to reduce human impact on surrounding forests (Duke 1993). The Great Himalayan National Park in India was set up with similar aspirations (Garson and Gaston 1989) and an eco-development project focused on the park's buffer zone villages has recently been completed (S. Pandey *pers. comm.*). A further example of this approach is provided by the participatory management of Ke Go Nature Reserve, the only protected area for the Vietnamese pheasant (Vo Quy 1998).

At present, rather few project proposals involving a significant educational component are received by the Pheasant Specialist Group. However, it is obvious that as our knowledge of threatened pheasants' ecological requirements increases, the scope for translating this into specific conservation action is also expanding, making it ever more important that such projects are developed. In the hope of stimulating activity in this vital area of conservation action, a framework for such projects is set out here (C. Inskipp *pers. comm.*).

Conservation awareness programmes are most appropriately targeted at the local community level in areas where a species of concern occurs. Initiatives may include workshops involving stakeholders to discuss problems and possible solutions, and the establishment of mechanisms for distributing knowledge in communities through such means as leaflets or posters, an information centre, a nature trail, nature clubs at local schools with regular events (e.g., slide/video shows, field trips, talks), or a field camp for schoolchildren or teachers.

On a larger scale, awareness programmes could involve funding publications, visual education materials, or exhibitions (travelling or static), all giving information on pheasants, the threats to their survival, their habitat requirements, why their conservation is important, and



© Lynx Editions

A conservation awareness programme is recommended for the threatened Palawan peacock-pheasant to try to reduce pressure from hunting.

what people can contribute as individuals and as members of their communities. All such materials need to be designed carefully for the intended audience, paying particular attention to local languages, levels of literacy, and the sex and age of the main target audience.

Conservation awareness programmes, just like other types of projects, should be evaluated (i.e., audited) to reveal how people benefited from the initiative and what conservation goals have been achieved. The latter may be measurable in terms of reductions in levels of hunting, or the adoption of alternative subsistence-level or income-generating activities that have reduced environmental impact. Benefits to people in participating communities can be tested using questionnaires and feedback workshops. Such evaluation exercises must be carefully planned and their details should be included in any project proposal.

Exhibits featuring captive pheasants can be made to be very eye-catching simply because so many pheasants are spectacular to look at. When well presented, the birds themselves become ideal vehicles through which to raise awareness amongst the general public of both specific and general conservation issues. For this to work well, however, it is again essential that any such programme be carefully thought through so that tangible conservation benefits can be expected to result. For instance, the type of visitor will affect the expected conservation awareness outcomes. Will visitors be local people, tourists, school children, teachers, or government officials? Different kinds of people assimilate information in different ways. School children need well-prepared activity sheets and thoughtfully laid out exhibits, whilst government officials probably react best to professionally produced posters or short pamphlets. How will information on the birds be presented? In general, details of distribution, ecology, threats, and conservation action should be provided in a clear and simple format, and samples of labelling should be included in proposals sent out to attract funding.

Conservation awareness programmes should not be added to ecologically orientated projects simply because this might increase the prospects of funding overall. It may often be highly effective in terms of achieving specific conservation outcomes to concentrate entirely on an awareness-raising project. But neither approach is fully effective in isolation. Ecological projects provide knowledge for use in awareness programmes, as well as one means of auditing their effectiveness. Effective conservation action will usually depend on obtaining the full co-operation and active involvement of local people, almost always involving some kind of education programme. The World Pheasant Association's long-running project at Pipar in western Nepal provides a model of this holistic concept for achieving conservation outcomes that benefit wildlife and local people alike. It has combined the provision of facilities and staff in local schools with recruitment of wildlife guards and monitoring of satyr tragopan and koklass populations in the nearby pheasant reserve (Kaul 1995, Shakya and Kaul 1999).

## 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 be used routinely to assess the effectiveness of conservation actions. Careful thought must be given to the design of monitoring programmes, including assessments of the reliability (i.e., precision and accuracy) of any potential indexing methods to be used through correlation with absolute counts. As a result of an intensive study of the social organisation and calling behaviour of the cheer pheasant in India, it is possible to use the number of calling sites detected at dawn during late May and early June as a means of determining how many breeding females there are in the area surveyed (Young *et al.* 1987).

Call counts have proved to be an effective means for deriving abundance indices of other vocal pheasant species (e.g., tragopans: Duke 1990, Kaul 1995, Khaling *et al.* 1998). Line transects have sometimes been used successfully to obtain estimates of abundance (e.g., Siamese fireback pheasant; Nguyen Tran Vy and Ngo Van Tri 1998). These are difficult to use in the heavily forested and hilly terrain inhabited by many pheasants because several assumptions of line transect theory are then likely to be violated. In such situations, the simple determination of encounter rates per unit of survey effort (e.g., distance covered, time spent) has been used to determine an index of abundance (e.g., Gaston *et al.* 1983a). Counts at regular intervals have provided data needed to monitor changes in satyr tragopan and koklass populations at the Pipar Reserve in Nepal, but it is suspected that lack of a consistent counting methodology, variation in the time of year at which counts

were done, and observer bias produced by different individuals participating in successive surveys may all have reduced the reliability of the data (Kaul 1995, Shakya and Kaul 1999).

The practical problems encountered in these studies illustrate how difficult and labour intensive such work can be, but the potential benefits of long-term and well-designed monitoring programmes are immense. Such monitoring exercises could cover most or all of the vocal species, such as the cheer pheasant, koklass, the tragopans, crested argus, great argus, and the peafowls.

## Wider dissemination of conservation recommendations

In order to make full use of species information and conservation recommendations arising from the various types of action suggested above, there is a need to place them in a wider context. In the past, this has usually been done at the national governmental level, but, increasingly, conservation problems are being tackled at even larger scales. There are now many global, regional, and national conservation initiatives that deal with much bigger issues than any single species (or species group) covered by this Action Plan. These programmes involve the incorporation of additional conservation policy into many governments' agendas simultaneously through international treaties, and centre largely on the issue of limiting the damaging impacts of development programmes on a dwindling global natural resource base. The overall objective of these

conventions is to maintain and, where possible, enhance biodiversity. Information and recommendations contained in Action Plans, like this one, should have some impact on larger scale conservation policy formulation. There is also a need to ensure that reliable data on threatened species are used when planning development projects; in particular, making sure that they are available to those charged with carrying out related environmental impact assessments.

The prime example of a global initiative that is having an 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 this Convention are to ensure the conservation of biodiversity, its sustainable use, and the equal sharing of benefits from its use. Four key articles outline how this should be achieved (see Box 1.1).

The global importance of this convention is now being demonstrated in several ways. One way is the degree to which many countries rich in biodiversity are developing 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 the country. There is a clear need to ensure that comprehensive and updated information on pheasants is made available for such national biodiversity assessments. The production and wide distribution of this Action Plan by the SSC is an attempt to ensure that this happens. Subsequently, the Pheasant Specialist Group must strive to bring its collective expertise to bear on any national conservation or development plans insofar as they are likely to affect threatened pheasant species.

### 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.

## Summary of conservation action

The Pheasant Specialist Group has concluded that of the different conservation actions considered, the most urgent in terms of assisting threatened species conservation are surveys (all of the 24 threatened species), habitat protection (21 species), basic biological research (14 species), conservation awareness programmes (14 species), taxonomic clarification (eight species, including the Data Deficient imperial pheasant), and monitoring programmes (seven species).

Although, at present, the remaining 26 species are not considered in need of conservation action on a global scale, action may already be needed locally to prevent them from becoming threatened or even extinct in certain parts of their ranges. In addition, it must be stressed that the vast majority of pheasant species are very poorly known in the wild. Hence, species at lower risk present an ideal opportunity for research training. Such studies may also lead to the development of techniques beneficial in the context of threatened pheasant conservation.

# Summary of Pheasant Conservation Status

To prioritise species for conservation, it is desirable to categorise them according to 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 either a global or regional context.

In November 1994, the IUCN Council approved a new set of such threatened species categories (IUCN 1994a). Designed to be an objective system that can be applied consistently by different people and across different groups of organisms, it only became widely available in 1996. The new system 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 immediate threat are placed in the category Lower Risk, which is subdivided into Conservation Dependent, Near Threatened, and Least Concern. Species for which information is insufficient to make an adequate assessment of its risk of extinction are classified as Data Deficient.

Certain criteria must be met to qualify a species for inclusion in a particular threat category. For example, a species represented by fewer than 2,500 mature individuals and with an estimated rate of decline of at least 20% within five years qualifies as Endangered (under criterion C1), while one with fewer than 250 mature individuals and a 25% rate of decline within three years is considered Critically Endangered (also under criterion C1). The IUCN

system demands that these criteria are stated clearly and justified whenever a new or revised threat categorisation is published.

In this chapter, we present the results of an assessment conducted by experts using all relevant information available on each species of pheasant, a process coordinated by the BirdLife International Secretariat. Criteria for each threat category are reproduced from IUCN (1994a) and presented together with the diagnosis for each species. Full justifications as to why species have been placed in particular threat categories are given in the species accounts in Chapter 3.

## NOTE

In the previous Pheasant Action Plan (McGowan and Garson 1995), the conservation status of each species was assessed using the criteria proposed by Mace and Lande (1991). These were widely known as the Mace-Lande criteria and have now been given the version number 1.0 in the process of revising the IUCN Red List categories and criteria (IUCN 1994a). *Because criteria for assigning species to the categories have been changed, the present classifications cannot be compared directly with those given in the first edition of the Action Plan.*

## 2.1 Critically Endangered species

No pheasant species currently meets criteria sufficient for classification as Critically Endangered.

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

#### 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.

#### Data Deficient (DD)

A taxon is Data Deficient when there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.



### 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)
  - 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.

## 2.2 Endangered species

Three pheasant species meet criteria sufficient for classification as Endangered (see Section 3.2 for detailed species accounts):

### Edwards's pheasant (*Lophura edwardsi*)

**Distribution:** central Vietnam

**Threat status/criteria:** ENDANGERED/B1+2b–e; C1; C2a

**Priority conservation actions:** clarify taxonomy, surveys, conservation awareness programme, protect habitat, manage captive population.

### Vietnamese pheasant (*Lophura hatinhensis*)

**Distribution:** central Vietnam

**Threat status/criteria:** ENDANGERED/B1+2b–e; C1; C2a

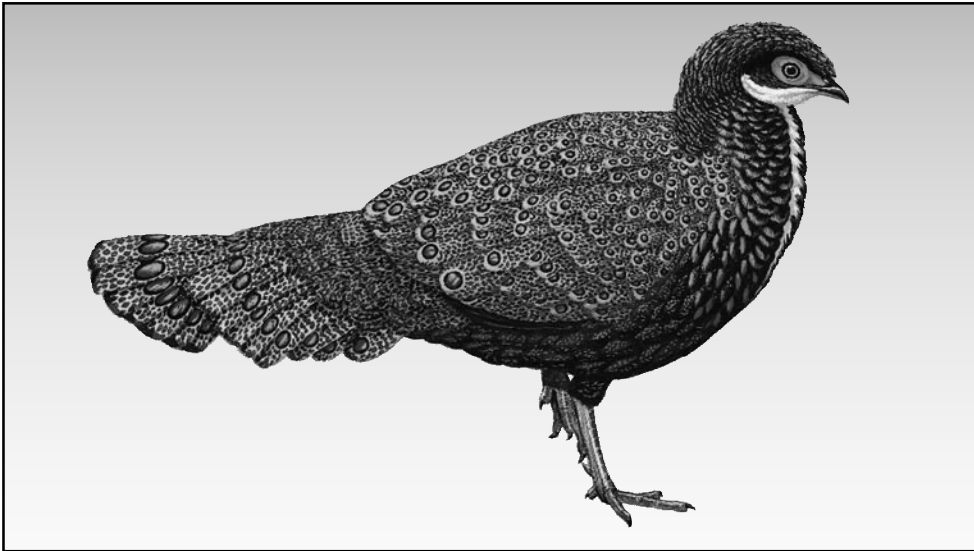
**Priority conservation actions:** clarify taxonomic units, surveys, conservation awareness programme, protect habitat, manage captive population.

### Bornean peacock-pheasant (*Polyplectron schleiermacheri*)

**Distribution:** Borneo

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

**Priority conservation actions:** surveys, protect habitat, regulate hunting.



© Lynx Edicions

Very little direct evidence exists on the Endangered Bornean peacock-pheasant, the subject of a recent questionnaire survey.

**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)
  - 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.**

## 2.3 Vulnerable species

The following 21 pheasant species meet criteria sufficient for classification as Vulnerable (see Section 3.3 for detailed species accounts):

### **Western tragopan (*Tragopan melanocephalus*)**

**Distribution:** northern Pakistan and northwestern India  
**Threat status/criteria:** VULNERABLE/C1; C2a  
**Priority conservation actions:** surveys, research, protect habitat, conservation awareness programme

### **Blyth's tragopan (*Tragopan blythii*)**

**Distribution:** Bhutan, India, Myanmar, China  
**Threat status/criteria:** VULNERABLE/C1; C2a  
**Priority conservation actions:** surveys, large-scale assessment of conservation status, protect habitat, population monitoring programme, conservation awareness programme

### **Cabot's tragopan (*Tragopan caboti*)**

**Distribution:** southeastern China  
**Threat status/criteria:** VULNERABLE/C1; C2a  
**Priority conservation actions:** surveys, large-scale assessment of conservation status, promote effective habitat management, population monitoring programme

### **Sclater's monal (*Lophophorus sclateri*)**

**Distribution:** India, Myanmar, China  
**Threat status/criteria:** VULNERABLE/C1; C2a  
**Priority conservation actions:** clarify taxonomy, surveys, research, protect habitat

### **Chinese monal (*Lophophorus lhuysii*)**

**Distribution:** southwestern China  
**Threat status/criteria:** VULNERABLE/C2a  
**Priority conservation actions:** surveys, protect habitat, research, regulate hunting

### **Sumatran pheasant (*Lophura hoogerwerfi*)**

**Distribution:** northern Sumatra  
**Threat status/criteria:** VULNERABLE/C2b  
**Priority conservation actions:** clarify taxonomy, surveys, protect habitat

### **Salvadori's pheasant (*Lophura inornata*)**

**Distribution:** south-central Sumatra  
**Threat status/criteria:** VULNERABLE/C1; C2a

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

### **Crestless fireback (*Lophura erythrophthalma*)**

**Distribution:** Peninsular Malaysia, Borneo  
**Threat status/criteria:** VULNERABLE/A1c,d; A2c,d  
**Priority conservation actions:** surveys, research, large-scale assessment of conservation status, protect habitat

### **Bulwer's pheasant (*Lophura bulweri*)**

**Distribution:** Borneo  
**Threat status/criteria:** VULNERABLE/A1c,d; A2c,d; C1; C2a  
**Priority conservation actions:** surveys, protect habitat, promote effective habitat management, regulate hunting

### **Brown eared-pheasant (*Crossoptilon mantchuricum*)**

**Distribution:** northern China  
**Threat status/criteria:** VULNERABLE/C1  
**Priority conservation actions:** surveys, protect habitat, promote effective habitat management, population monitoring programme

### **Cheer pheasant (*Catreus wallichii*)**

**Distribution:** Pakistan, India, Nepal  
**Threat status/criteria:** VULNERABLE/C1; C2a  
**Priority conservation actions:** surveys, research, population monitoring programme, regulate hunting, promote effective habitat management

### **Elliot's pheasant (*Syrnaticus ellioti*)**

**Distribution:** southeastern China  
**Threat status/criteria:** VULNERABLE/A1c,d; A2c,d  
**Priority conservation actions:** surveys, research, promote effective habitat management, regulate hunting, conservation awareness programme

### **Hume's pheasant (*Syrnaticus humiae*)**

**Distribution:** India, Myanmar, China, Thailand  
**Threat status/criteria:** VULNERABLE/C1; C2a  
**Priority conservation actions:** surveys, research, protect habitat, regulate hunting

### **Reeves's pheasant (*Syrnaticus reevesii*)**

**Distribution:** east-central China  
**Threat status/criteria:** VULNERABLE/A1c,d; A2c,d; C1; C2a

### 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)
  - 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.

**Priority conservation actions:** surveys, research, large-scale assessment of conservation status, promote effective habitat management, regulate hunting, conservation awareness programme

#### Mountain peacock-pheasant (*Polyplectron inopinatum*)

**Distribution:** Peninsular Malaysia

**Threat status/criteria:** VULNERABLE/B1+2b–e; C1; C2a

**Priority conservation actions:** surveys, population monitoring programme, protect habitat

#### Germain's peacock-pheasant (*Polyplectron germaini*)

**Distribution:** Vietnam, Cambodia(?)

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

**Priority conservation actions:** surveys, protect habitat, regulate hunting

#### Malaysian peacock-pheasant (*Polyplectron malacense*)

**Distribution:** Thai-Malay Peninsula

**Threat status/criteria:** VULNERABLE/A1c; A2c; C1

**Priority conservation actions:** surveys, research, protect habitat, population monitoring programme

#### Palawan peacock-pheasant (*Polyplectron emphanum*)

**Distribution:** Palawan Island, Philippines

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

**Priority conservation actions:** surveys, protect habitat, regulate hunting, conservation awareness programme

**Crested argus**  
**(*Rheinardia ocellata*)**

**Distribution:** Vietnam, Laos, Peninsular Malaysia

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

**Priority conservation actions:** clarify taxonomy, surveys, population monitoring programme, regulate hunting, conservation awareness programme

**Congo peafowl**  
**(*Afropavo congensis*)**

**Distribution:** eastern Democratic Republic of Congo

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

**Priority conservation actions:** surveys, population monitoring programme, large-scale assessment of conservation status

**Green peafowl**  
**(*Pavo muticus*)**

**Distribution:** southern China, Thailand, Laos, Vietnam, Cambodia, Myanmar, Java (Indonesia)

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

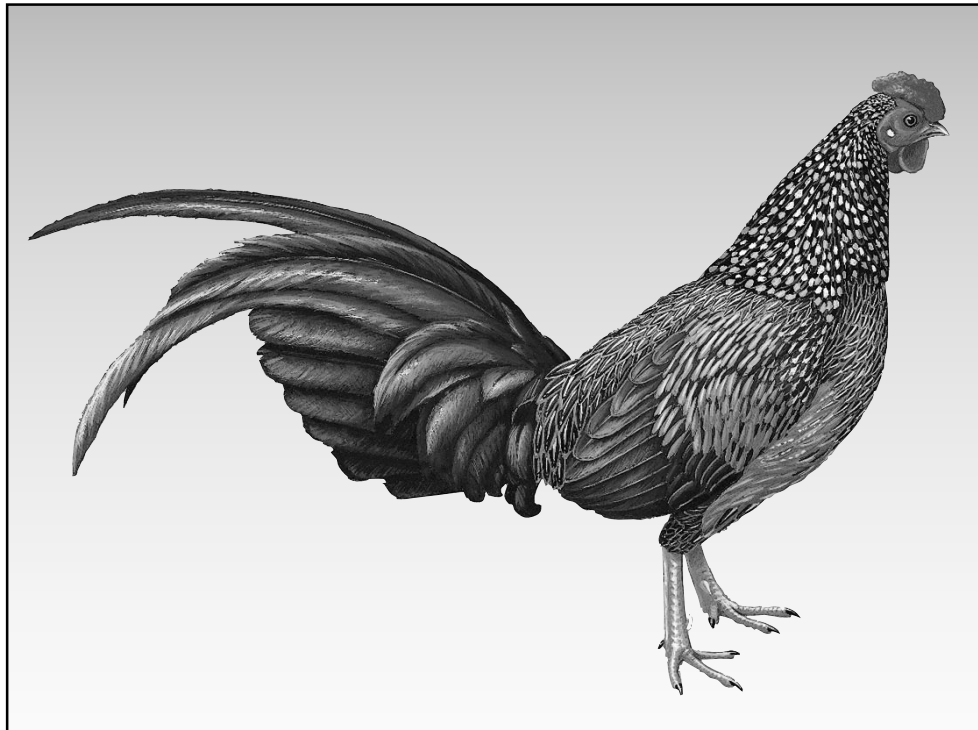
**Priority conservation actions:** surveys, research, protect habitat, regulate hunting and trade, conservation awareness programme



© Lynx Edicions

Congo peafowl. The only African pheasant species has a very fragmented range and is under pressure from hunting.

## 2.4 Lower Risk species



© Lynx Edicions

One of the species considered near-threatened, the grey junglefowl of India, has a fragmented global range.

Twenty-six species of pheasant are categorised as Lower Risk. There are no species assigned to the Conservation

Dependent (cd) subcategory, so the following are classified as either Near Threatened (nt) or Least Concern (lc):

<b>Species</b>	<b>Distribution</b>	<b>Justification (subcategory)</b>
Blood pheasant <i>Ithaginis cruentus</i>	Nepal to China	global range of over 500,000km <sup>2</sup> , although populations are fragmented <b>(lc)</b>
Satyr tragopan <i>Tragopan satyra</i>	India, Bhutan, Nepal	global range may be under 100,000km <sup>2</sup> and possibly declining, so status should be monitored <b>(lc)</b>
Temminck's tragopan <i>Tragopan temminckii</i>	China, India, Vietnam, Myanmar	large global range and probably over 100,000 individuals <b>(nt)</b>
Koklass <i>Pucrasia macrolopha</i>	Afghanistan to China	large global range, although some populations are fragmented <b>(lc)</b>
Himalayan monal <i>Lophophorus impejanus</i>	Himalayas	large global range and generally common <b>(lc)</b>
Red junglefowl <i>Gallus gallus</i>	India to Java (Indonesia)	very large global range, although hybridisation with domestic fowl may be widespread so situation should be researched <b>(lc)</b>
Grey junglefowl <i>Gallus sonneratii</i>	India	large global range, although may be becoming fragmented so situation should be monitored <b>(nt)</b>
Sri Lankan junglefowl <i>Gallus lafayetii</i>	Sri Lanka	restricted global range and although able to tolerate some human impact, status should be monitored <b>(lc)</b>
Green junglefowl <i>Gallus varius</i>	Java, Lesser Sundas (Indonesia)	widespread through range, but hybridisation with domestic fowl may be a problem <b>(lc)</b>
Kalij pheasant <i>Lophura leucomelanos</i>	Pakistan to Thailand	large global range and occurs in a variety of habitats <b>(lc)</b>
Silver pheasant <i>Lophura nycthemera</i>	China, Indochina	large global range and generally common <b>(lc)</b>
Swinhoe's pheasant <i>Lophura swinhoii</i>	Taiwan	generally common, although restricted range suggests that status should be monitored <b>(nt)</b>
Crested fireback <i>Lophura ignita</i>	Peninsular Malaysia, Sumatra, Borneo	fairly large range and population, and apparently persists in degraded habitat, although declining so status should be monitored <b>(nt)</b>
Siamese fireback pheasant <i>Lophura diardi</i>	Myanmar, Thailand, Indochina	large global range, but population may be as low as 10,000 so status should be monitored <b>(nt)</b>
Tibetan eared-pheasant <i>Crossoptilon harmani</i>	China, India	locally common, but population may be as low as 10,000 so status should be monitored <b>(nt)</b>
White eared-pheasant <i>Crossoptilon crossoptilon</i>	China	large global range, but fragmented and may be as few as 20,000 birds remaining so situation should be monitored <b>(nt)</b>
Blue eared-pheasant <i>Crossoptilon auritum</i>	China	large global range and probably hundreds of thousands remaining <b>(nt)</b>
Mikado pheasant <i>Syrnaticus mikado</i>	Taiwan	restricted range, but numbers seem stable, although possibly declining outside protected areas so status should be monitored <b>(nt)</b>
Copper pheasant <i>Syrnaticus soemmerringii</i>	Japan	fairly large range, but population has declined sharply through over-hunting so status should be monitored <b>(nt)</b>
Ring-necked pheasant <i>Phasianus colchicus</i>	Caucasus to Japan	very large native global range and widely introduced <b>(lc)</b>
Golden pheasant <i>Chrysolophus pictus</i>	China	large global range and hundreds of thousands remaining <b>(nt)</b>
Lady Amherst's pheasant <i>Chrysolophus amherstiae</i>	China, Myanmar	fairly large global range, although estimated to be only tens of thousands remaining <b>(nt)</b>
Bronze-tailed peacock-pheasant <i>Polyplectron chalcurum</i>	Sumatra	fairly small global range, but found in montane habitats largely safe from logging so far <b>(lc)</b>
Grey peacock-pheasant <i>Polyplectron bicalcaratum</i>	India to China and Indochina	large global range and tolerant of some human impact <b>(lc)</b>
Great argus <i>Argusianus argus</i>	Thailand to Sumatra, Borneo	large global range and probably over 100,000 birds remaining <b>(nt)</b>
Indian peafowl <i>Pavo cristatus</i>	Pakistan, India, Bhutan, Nepal, Pakistan, Sri Lanka	very large global range and generally common <b>(lc)</b>

### 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.

## 2.5 Data Deficient species

One pheasant species meets criteria sufficient for classification as Data Deficient, owing to increasing uncertainty over its taxonomic status.

### Imperial pheasant (*Lophura imperialis*)

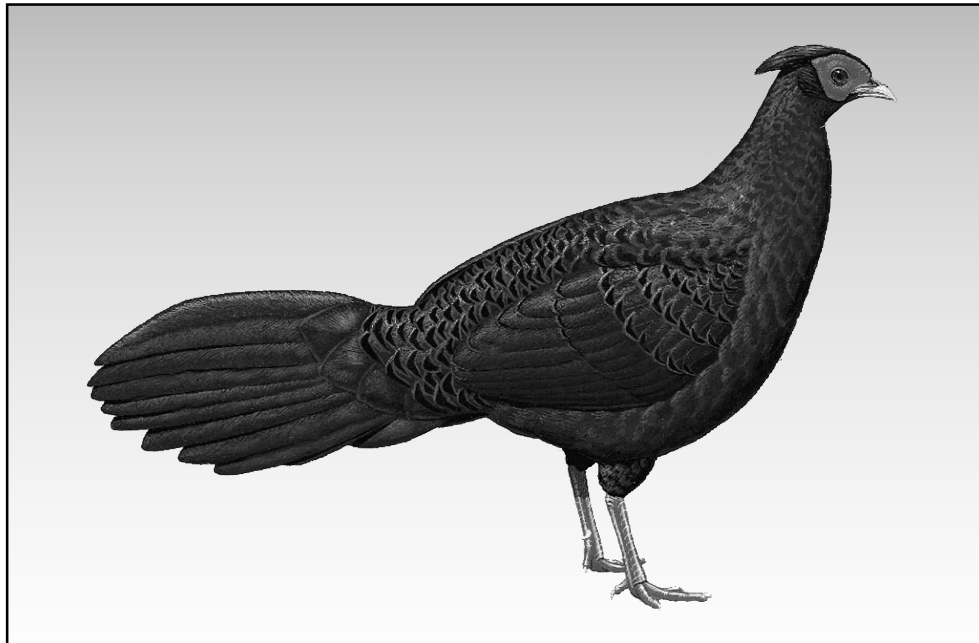
**Distribution:** central Vietnam

**Threat status/criteria:** Data Deficient

**Priority conservation action:** urgent investigation of taxonomic status

### Box 2.6 Criteria for Data Deficient (DD)

A taxon is Data Deficient when there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is, therefore, not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases, great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, or if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.



There is uncertainty over the taxonomic status of the Imperial pheasant. It is under extreme pressure from habitat loss, and is now known only from one site in Vietnam.

© Lynx Edicions

# Species Accounts

Chapter 2 of this Action Plan presented an overview of the conservation status of all pheasants and assigned a threat category to each one. This chapter expands on this information and provides a detailed justification as to why (i.e. based on precisely which criteria) each threatened species has been placed in a particular category. Species considered at Lower Risk are not treated in detail, as our aim is to draw attention to the species in need of immediate research and conservation action. These species accounts have been developed through an extensive review process involving the BirdLife International Partnership, the Pheasant Specialist Group, the World Pheasant Association, and a worldwide network of ornithologists, co-ordinated by the BirdLife International Secretariat. This means that the information presented here has been supplied, developed, and reviewed by a large number of active pheasant researchers and conservationists.

Each species is treated in a standard way. After listing the criteria used to support inclusion in one of the three categories of threat and giving a summary justification, the following information is provided:

**Taxonomy:** details are given where dispute exists over the treatment of subspecies or species.

**Range and population:** the known geographical distribution of the species is provided, together with any available partial or complete estimates of population numbers or density. If any inferences can be made, or if 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, altitude range, seasonal movements, and other details relevant to assessing the conservation status of the species are given in this section.

**Threats:** the major known threats facing the species are given, 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 includes details of recent conservation research and action that has been undertaken.

**Targets:** these are the recommendations supplied by various experts on each species, and endorsed by BirdLife International and the Pheasant 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

No pheasant species currently meets the criteria for classification as Critically Endangered.

## 3.2 Endangered species

### Edwards's pheasant (*Lophura edwardsi*)

Endangered B1+2b–e; C1; C2a

**This pheasant is classified as Endangered because it has a very small, severely fragmented range and population that are both continuing to decline, primarily owing to lowland deforestation. However, if habitat loss and hunting continue to operate, it may meet the threshold for Critically Endangered in the very near future.**

**Taxonomy:** DNA sequence analyses on samples from the Annamese lowland endemic *Lophura* pheasants have revealed only minute differences on a scale normally associated with subspecies, thus indicating that the Edwards's pheasant may be conspecific with the Vietnamese pheasant (Scott 1997, Hennache *et al.* 1998, E. Randi *in litt.*).

**Range and population:** The Edwards's pheasant is endemic to central Vietnam. Known historically from at least eight localities in Quang Tri and Thua Thien Provinces, it was described locally as "fairly common" (Delacour 1977). The first recent records were of birds trapped by local hunters in 1996, in Hoang Hoa District (Quang Tri Province) and in Phong My District (Thua Thien Province) (Eve 1997). In 1997, at least four specimens were trapped in Ba Long Commune, Quang Tri Province, and there is a 1999 record from Bao Ninh District, Quang Binh Province (J.C. Eames *in litt.*). Based on the extent of remaining habitat in 1994, its population was estimated at <1,000 individuals (McGowan and Garson 1995). The captive population numbered 902 individuals in December 1998 (Hennache *in litt.*), including some Swinhoe's pheasant hybrids (Delacour 1977).



**Ecology:** It was said to inhabit exceedingly damp forests up to an estimated 600m, favouring thick underbrush and lianas (Delacour 1977). However, all the early collecting localities were in the forested level lowlands and there is no evidence that it can live above 300m (Eames *et al.* 1992, Lambert *et al.* 1994).

**Threats:** This species' historical range is now almost completely denuded of primary forest through a combination of herbicide spraying during the Vietnam War, subsequent logging, and clearance for agriculture (Eames *et al.* 1992). The last forest areas known to support the species are subject to continuing degradation by woodcutters (Eames and Robson 1991). Hunting pressure from various forest product collectors poses an additional threat (Eames *et al.* 1992).

**Conservation:** CITES Appendix I. Surveys for the species were conducted in 1988 and 1991 (Eames and Robson 1991, Eames *et al.* 1992). The localities from which recent records derive have been incorporated within two proposed nature reserves, Phong Dien and Dakrong, for which a management feasibility study has been completed (Le Trong Trai *et al.* 1999b). Bach Ma National Park lies within the historical range of the species and a poster campaign to obtain local information was conducted there in 1996 (Eve 1997), although as yet there have been no confirmed records from this park. Hybrid lines are now being excluded from the captive breeding programme (A. Hennache *in litt.*).

**Targets:**

- **Conduct further surveys of remaining forest fragments within its historical range.**
- **Continue research into the taxonomic relationships of *Lophura* pheasants in Vietnam.**
- **Establish the proposed Phong Dien and Dakrong Nature Reserves.**
- **Initiate a local poster campaign to increase conservation awareness of Annamese lowland *Lophura* pheasants.**

## **Vietnamese pheasant (*Lophura hatinhensis*)**

**Endangered** B1+2b-e; C1; C2a

**This pheasant has a very small and severely fragmented range and population that are continuing to decline owing to destruction of its specialised lowland forest habitat and high levels of hunting. These factors currently combine to qualify it for Endangered status. If habitat loss and hunting continue to operate, it may be upgraded to Critically Endangered in the very near future.**

**Taxonomy:** DNA sequence analyses on samples from the Annamese lowland endemic *Lophura* pheasants have revealed only minute differences on a scale normally associated with subspecies, thus indicating that the Vietnamese pheasant may be conspecific with the Edwards's pheasant (Scott 1997, Hennache *et al.* 1998, E. Randi *in litt.*).

**Range and population:** The Vietnamese pheasant is endemic to central Vietnam, where it was discovered in 1964 (Vo Quy 1975). There are recent records from localities in Ha Tinh and Quang Binh Provinces, most of which are within the Ke Go Nature Reserve (Robson *et al.* 1991, 1993a). The continued existence of a population in the Net River watershed, where several birds were seen in 1994 (Lambert *et al.* 1994), may be in doubt because of extensive logging and other degradation of suitable habitat there (J. Eames *in litt.*). Its global population has been estimated at <2,500 individuals (McGowan and Garson 1995). In October 1999, the known captive population numbered 65 individuals, of which 19 were in Vietnam (A. Hennache *in litt.*).

**Ecology:** It inhabits primary and secondary (including logged) evergreen forest in lowlands and hills from sea-level (at least historically) to about 300m (Lambert *et al.* 1994). It may tolerate habitat degradation, but is apparently far more common in closed-canopy forest (Eames *et al.* 1994) and has been trapped in dense streamside vegetation (Robson *et al.* 1991).

**Threats:** Most of the coastal lowlands of Ha Tinh and Quang Binh Provinces have been completely deforested by expanding human populations clearing land for wet-rice cultivation (Eames *et al.* 1994). Pressure from hunting may still be significant within Ke Go Nature Reserve, particularly from illegal loggers and various forest product collectors. Shortfalls in household rice production render certain local communities seasonally dependent on forest products to generate income (J.C. Eames *in litt.*).

**Conservation:** Recent surveys for the species between 1988 and 1994, in part, led to the drafting of a management plan for the Ke Go Nature Reserve (Le Trong Trai *et al.* 1999a), which was gazetted in 1996 (Nguyen Cu *in litt.*). The launch of a major conservation project is planned there during 2000 (J.C. Eames *in litt.*). The captive population at the Hanoi Zoo has now provided individuals to several European collections (H. Assink and Dang Gia Tung *in litt.*).

**Targets:**

- **Conduct further surveys to clarify its population status and habitat requirements.**
- **Continue research into the taxonomic relationships of *Lophura* pheasants in Vietnam.**

- Establish a protected area in the Net River watershed.
- Support full establishment of Ke Go Nature Reserve.
- Promote food security projects in the communes within Ke Go Nature Reserve that are most dependent on natural resources.
- Initiate a local poster campaign to increase conservation awareness of Annamese lowland *Lophura* pheasants.
- Manage the captive population to the highest standards.

### **Bornean peacock-pheasant** **(*Polyplectron schleiermacheri*)**

Endangered C1; C2a

This elusive species' threat status is difficult to judge, but recent anecdotal evidence regarding its status and habitat indicates that it has a very small, fragmented, and declining population, justifying its classification as Endangered.

**Range and population:** The Bornean peacock-pheasant is endemic to Borneo, where it is known from Sabah (Gore 1968) and Sarawak (Fogden 1965, Harrison 1965), Malaysia and Kalimantan, Indonesia. A 1996 questionnaire survey of 97 villages across central Kalimantan found that two-thirds of these communities described it as rare or very rare, whilst one-third considered that it was fairly common, with feathers of the species produced at four locations. Eighty-five percent of all interviewees felt that it had declined (O'Brien *et al.* 1998). There are single recent reports from Danum Valley and Ulu Tongod (Sabah), Nangatayap (near Gunung Palung National Park, west Kalimantan) (Holmes 1989), Muarakarum/Palangkaraya, central Kalimantan (van Balen and Holmes 1993), and local reports from Sukau (Sabah) (J.G. Corder *in litt.*).

**Ecology:** Geographic Information Systems (GIS) analyses indicate that it inhabits lowland plain and lowland dipterocarp forest on moderately fertile soils, probably avoiding wetter substrates in swamp forest or near waterbodies (O'Brien *et al.* 1998). Local people in the Danum–Linau area report that the species occurs between 300m and 1,000m (Fogden 1965).

**Threats:** Habitat loss, degradation, fragmentation as a result of large-scale commercial logging (even within protected areas) and widespread clearance for plantations of rubber and oil palm, as well as hunting with snares are the main threats in central Kalimantan (O'Brien *et al.* 1998). The full impact of the major fires of 1997–98 has still to be assessed, but drought fires appear to be increasing in frequency and severity. Together with logging, they could destroy all dryland lowland forest by 2010 (D.A. Holmes *in litt.*). In central Kalimantan, most remaining

lowland forest is granted to logging concessions, with a mere one percent currently afforded any protected status (O'Brien *et al.* 1998).

**Conservation:** CITES Appendix II. In central Kalimantan, a questionnaire was distributed to 97 villages in 1996. An increase in the area of protected lowland forest encompassed by the Bukit Raya National Park has also been proposed (O'Brien *et al.* 1998).

**Targets:**

- Conduct field surveys to determine habitat and major population centres for the species.
- Recommend protected area status for any sites found to support substantial populations.
- Support the proposed extension of Bukit Raya National Park, central Kalimantan.
- Promote the concept of Forest Management Units in Sabah (99-year concessions of great size).
- Assist forest managers in habitat identification and zoning of concession areas.
- Promote prohibition of hunting by logging company employees.

## **3.3 Vulnerable species**

### **Western tragopan** **(*Tragopan melanocephalus*)**

Vulnerable C1; C2a

This species is classified as Vulnerable because its sparsely distributed small population is declining and becoming increasingly fragmented in the face of continuing forest loss and degradation throughout its restricted range.

**Range and population:** The western tragopan is endemic to the western Himalayas, occurring from Kohistan district, northern Pakistan, east through Kashmir (Rath 1999) into Himachal Pradesh (Gaston *et al.* 1981) and possibly Uttar Pradesh, northwest India. Although historically described as scarce and local, it has undoubtedly declined. A mid-1980s population estimate of 1,600–4,800 birds (Gaston *et al.* 1983b) was revised in the mid-1990s to about 5,000 birds (McGowan and Garson 1995) following the discovery of several significant populations in northern Pakistan, the largest of which (tentatively estimated at 325 pairs) is in Palas Valley (Bean *et al.* 1994).

**Ecology:** During the breeding season (April–June), it inhabits little-disturbed, temperate coniferous and deciduous forests, from 2,400–3,600m (Gaston *et al.* 1981, Islam and Crawford 1986). In winter, it makes very local altitudinal or lateral movements to grassy or shrubby

gulleys with less snow cover, between 1,750m and 2,500m (Whale 1997, Nawaz 1999).

**Threats:** Habitat degradation and fragmentation through commercial timber extraction, browsing of understorey shrubs by livestock, tree lopping for animal fodder, and fuelwood collection are the main threats (Gaston *et al.* 1983a, Jandrotia *et al.* 1995). Disturbance by graziers, and particularly collectors of edible fungi and medicinal plants, may seriously interfere with nesting (Gaston and Garson 1992, Pandey 1993). Hunting and trapping for its meat (especially in winter) (Chauhan and Sharma 1991) and its decorative plumage pose additional threats, particularly in Kaghan (Pakistan) and adjacent Kashmir (Islam 1987).

**Conservation:** CITES Appendix I. It is afforded legal protection in both India and Pakistan. It occurs in three national parks: Machiara (Pakistan), Kishtwar, and the Great Himalayan (India), and also 10 wildlife sanctuaries. Discovery of the large Palas population triggered a major conservation initiative in the region for which this bird is the flagship species. Surveys for the species have been conducted recently across most of its presumed range in Pakistan and in Himachal Pradesh (S. Bashir *in litt.*). It is currently the subject of an experimental attempt to establish a captive population in Pakistan (Anon. 1999).

**Targets:**

- **Conduct further surveys, particularly in Chamba (Himachal Pradesh), and westwards into Jammu and Kashmir along the Pir Panjal range.**
- **Monitor selected key populations regularly.**
- **Conduct ecological studies of the effects of human disturbance and forest product collection (especially fungi).**
- **Campaign for more protected areas, especially in the Chamba region of Himachal Pradesh and at lower altitudes where it winters across its range.**
- **Improve management in key protected areas.**
- **Initiate public awareness campaigns in and around known sites.**

## **Blyth's tragopan (*Tragopan blythii*)**

Vulnerable C1; C2a

This species is considered Vulnerable because its total population is believed to be small and declining, and is scattered in small subpopulations within a severely fragmented range. Widespread high levels of hunting and continuing habitat destruction will inevitably exacerbate this situation.

**Range and population:** Blyth's tragopan occurs from **Bhutan** (R. Pradhan *in litt.*) through Arunachal Pradesh, Nagaland, Mizoram, and Manipur in northeast **India** (Kaul *et al.* 1995, Choudhury 1997), northern **Myanmar**, and southeast Tibet, and northwest Yunnan, **China** (He Fen-qi and Lu Tai-chun 1991, Zheng Guang-mei and Zhang Zheng-wang 1993). Recent information suggests it is locally distributed in Nagaland and Arunachal Pradesh, and uncommon or rare in the Chin Hills/Mount Victoria region of western Myanmar, where it has apparently declined (King *et al.* 1996, Robson *et al.* 1998). Call counts detected 14 pairs in the 50km<sup>2</sup> Blue Mountain National Park, Mizoram (Ghose 1997).

**Ecology:** It inhabits subtropical and temperate evergreen oak and rhododendron forests, generally preferring a dense understorey, often dominated by bamboos or ferns, in steep or rocky terrain (Robson *et al.* 1998, R. Pradhan *in litt.*). Its documented altitudinal range is from 1,400m (winter) up to 3,300m (summer), but the majority of records comes from a rather narrow band (1,800–2,400m).

**Threats:** In northeast India, deforestation is a significant threat, primarily as a result of shifting cultivation (Katju 1996). Fuelwood collection and commercial timber extraction have also contributed to the rapid fragmentation of suitable habitat, even within protected areas, where enforcement of regulations is often either absent or impossible. Hunting for food poses another major problem, particularly in Nagaland, and parts of Myanmar and Arunachal Pradesh, where large-scale snaring of pheasants and partridges by local people is increasing (Choudhury 1997, Mishra *et al.* 1998). Even in Bhutan, high levels of grazing and slash-and-burn agriculture are potentially significant threats (Sherpa 1994).

**Conservation:** CITES Appendix I. The species is afforded legal protection in all range countries. It occurs in several protected areas, including three small wildlife sanctuaries in Nagaland, the Blue Mountain National Park in Mizoram, Mehao and Dibang Valley Wildlife Sanctuaries in Arunachal Pradesh, Thrumsing La National Park, Bhutan and Natma Taung National Park, Myanmar. Surveys for the species have been conducted in many areas in northeast India.

**Targets:**

- **Conduct further extensive surveys in Myanmar, Arunachal Pradesh, Bhutan, Yunnan, and southeast Tibet.**
- **Design and implement monitoring projects in Nagaland and Manipur.**
- **Review the adequacy of the current protected areas system, with a view to establishing further protected areas in Myanmar, northeast India, and southeast Tibet.**

- **Initiate a conservation awareness programme with communities in range areas, focusing on the effects of over-exploitation.**

### **Cabot's tragopan (*Tragopan caboti*)**

Vulnerable C1; C2a

**This species is listed as Vulnerable because it has a small population that is continuing to decline and become increasingly fragmented, owing to the continuing conversion of natural mixed forests to conifer plantations.**

**Range and population:** Cabot's tragopan is endemic to southeast **China**, where it is known from many widely scattered localities in the mountain ranges in Zhejiang, Fujian, Jiangxi, Hunan, Guangxi, and Guangdong, with an unconfirmed report from Anhui. A survey in 1985–86 estimated about 4,000 individuals in the core of its range in Guangdong, Fujian, Zhejiang, and Guangxi (Zheng Guang-mei and Wang Qishan 1998). Numbers are believed to be relatively stable inside protected areas but generally declining elsewhere (Zhang Zheng-wang *in litt.*).

**Ecology:** It inhabits subtropical, evergreen broadleaf forest and mixed deciduous-coniferous forest at 600–1,800m (Young *et al.* 1991, Lewthwaite 1996, Zheng Guang-mei and Wang Qishan 1998), and open areas above the treeline (Caldwell and Caldwell 1931). Its distribution is closely associated with the tree *Daphniphyllum macropodum*, which is often used for roosting and favoured for its leaves and fruits (Young *et al.* 1991, Sun Yue-hua 1995, Zheng Guang-mei and Wang Qishan 1998).

**Threats:** The main threat to this species is habitat loss and modification. Most natural forest has been cleared or modified as a result of the demands for agricultural land and timber. The progressive replacement of natural evergreen broadleaf forests with conifer plantations is now a major problem for this species. Illegal hunting for food still occurs in some places, especially outside protected areas (Zheng Guang-mei and Wang Qishan 1998).

**Conservation:** CITES Appendix I. It is a nationally protected species (first class) in China, and its biology and conservation will be intensively studied during a forthcoming four-year project (Zhang Zheng-wang 1999). There are many protected areas in or near its range, but these reserves tend to be relatively small and isolated, and it is not clear how many of them contain large enough areas of suitable forest to support viable populations. Still, there is evidence that the establishment of protected areas

has been effective in preventing forest clearance and hunting within its range (Yan Li 1984).

**Targets:**

- **Conduct surveys in protected areas throughout its range to determine which of them support significant populations and whether additional protected areas are required.**
- **Prepare management plans for key protected areas, which are sympathetic to the conservation of this species and its habitats.**
- **Monitor populations annually in selected protected areas.**
- **Promote habitat management in degraded areas, such as replanting of conifer areas with appropriate deciduous tree species (e.g. *Daphniphyllum macropodum*).**

### **Sclater's monal (*Lophophorus sclateri*)**

Vulnerable C1; C2a

**This striking pheasant is poorly known across almost all of its remote, inaccessible, and relatively restricted range. It is classified as Vulnerable because it probably has a small population that is naturally fragmented and subject to a significant decline.**

**Taxonomy:** A potential new taxon, currently thought to be a subspecies of Sclater's monal has recently been discovered in Arunachal Pradesh (Kumar and Singh 1999). Further research is required to assess the validity of this form, as well as two other proposed subspecies (Davison 1978a).

**Range and population:** Sclater's monal is endemic to the eastern Himalayas, from Arunachal Pradesh, **India**, east through northern **Myanmar** and southeast Tibet to western Yunnan, **China**. There are recent records from Arunachal Pradesh, where it is locally fairly common (Kumar and Singh 1999) and Yunnan, where numbers are thought to be stable (Han Lian-xian *in litt.*). In Myanmar, it was historically described as local and uncommon (Smythies 1986), but there are no recent records.

**Ecology:** It inhabits coniferous forest with a bamboo understorey, subalpine rhododendron scrub, azalea forest, areas of juniper, cotoneaster, open grass, and rocky precipitous slopes from 3,000–4,200m, descending to 2,000m in winter (Ludlow and Kinnear 1944). It apparently occurs at higher altitudes, where its range overlaps with the Himalayan monal (Kaul *et al.* 1995). It is solitary during the breeding season (spring), but gregarious in winter.

**Threats:** Hunting for food is the single main threat across the species' range. In addition, hunting for feathers (to

make ornaments and fans) is a localised problem in India. In the Mishmi Hills, India, hunting intensity has significantly reduced population densities (Katti *et al.* 1990). Habitat degradation, as a result of logging, is a more localised threat (S. Kumar and P. Singh *in litt.*). The habitats of the newly discovered taxon in Arunachal Pradesh appear to be little threatened, owing to their inaccessibility.

**Conservation:** CITES Appendix I. It occurs in the Gaoligong Shan National Nature Reserve in Yunnan, China, where it is locally common. The creation of Dibang Valley Wildlife Sanctuary in Arunachal Pradesh offers further protection. To an extent, the remote nature of its habitats and range lessen the level of threat it faces from hunting.

**Targets:**

- **Conduct further research into the distribution and taxonomic status of the probable new subspecies in Arunachal Pradesh.**
- **Conduct further surveys in Yunnan, southeast Tibet, and Arunachal Pradesh to determine its population status and range.**
- **Carry out detailed ecological studies on habitat use, feeding ecology, and threats.**
- **Campaign for protected areas in Towang, West Kameng, East Kameng, and Lower Subansiri Districts, Arunachal Pradesh.**

### **Chinese monal (*Lophophorus lhuysii*)**

Vulnerable C2a

This species is listed as **Vulnerable** because it has a small population, which is continuing to decline because of ongoing habitat degradation and hunting within an already fragmented range.

**Range and population:** The Chinese monal is endemic to southwest China, where it is recorded from the mountains of western Sichuan and adjacent parts of eastern Tibet, southeast Qinghai, southern Gansu, and northwest Yunnan. Its total population has been estimated at 10,000–20,000 individuals, and is believed to be declining, but not rapidly (McGowan and Garson 1995).

**Ecology:** It inhabits subalpine rhododendron scrub, and subalpine and alpine meadows with exposed cliffs and crags above the treeline, but sometimes moves down into subalpine coniferous forest. It has been recorded between 2,800 and 4,900m, but is normally found between 3,300 and 4,500m. Surveys at Baoxing in Sichuan suggested that

this species may take several years to reach maturity and may not breed every year (He Fen-qi *et al.* 1988).

**Threats:** Its subalpine and alpine meadow habitats have been degraded in some areas by an increase in the grazing of wild yaks (Lu Tai-chun *et al.* 1986, He Fen-qi *et al.* 1988). The large-scale collection of *Fritillaria* spp., a known food of this species (Bell 1995), and other herbs for Chinese medicine causes local disturbance, and nests are sometimes destroyed by these activities (Lu Tai-chun *et al.* 1986, He Fen-qi *et al.* 1988). Illegal hunting is also considered to be a localised threat and appeared to be the cause of a substantial decline at Baoxing, where this species was surveyed in 1983–86 and again in 1988 (He Fen-qi *in litt.*). The forests in western Sichuan have been rapidly exploited in recent decades, which has directly affected its subalpine habitats. In addition, logging roads have improved access to alpine habitats for local people (D. Rimlinger *in litt.*).

**Conservation:** CITES Appendix I. It is a nationally protected species (first class) in China. It has been recorded in several nature reserves in the Qionglai Shan and Min Shan ranges, most of which were established for the conservation of giant panda *Ailuropoda melanoleuca*, including Baihe, Tangjiahe, Wanglang, Wolong, Jiuzhaigou, and Fengtongzhai in Sichuan, and Baishuijiang in Gansu. However, the areas of suitable habitat within some of these reserves are probably relatively limited and there are no protected areas in the western part of its range.

**Targets:**

- **Promote measures to control hunting, herb collection, and the increased grazing of yak.**
- **Conduct further extensive surveys, with the aim of establishing more protected areas in the west of its range.**
- **Conduct intensive ecological studies, particularly to determine the impacts of human exploitation (including yak grazing) on its subalpine and alpine habitats.**

### **Sumatran pheasant (*Lophura hoogerwerfi*)**

Vulnerable C2b

This species is judged as **Vulnerable** because it has a single, small population that is presumed to be declining, owing to current rates of clearance of mid-altitude forests combined with hunting pressure.

**Taxonomy:** The Sumatran pheasant is sometimes considered conspecific with the Salvadori's pheasant (Delacour 1977). The males are apparently morphologically

indistinguishable (R. Sözer *in litt.*), but females show distinct morphological differences (Chasen and Hoogerwerf 1941).

**Range and population:** The Sumatran pheasant is endemic to northern Sumatra, **Indonesia**, where it is known historically by two females (both collected) and one male (glimpsed) in the Gayo Highlands, Aceh Province, within what is now the Gunung Leuser National Park (Chasen and Hoogerwerf 1941). In 1979, there were several sightings of family parties in the Mamas Valley of this park (van Marle and Voous 1988) and, in 1998, a female was observed above the River Jagong in the Beutong region just north of the Leuser ecosystem (B. Long *in litt.*). In 1998–99, five individuals of each sex were recovered from a bird market in Medan, north Sumatra. All are said to have originated from Gunung Leuser (R. Sözer *in litt.*). There are no published population estimates, but an ongoing contraction of suitable forest habitat must be having an adverse effect. There are currently three pairs (of wild origin) in captivity on Java.

**Ecology:** The first specimen was shot in the forest (reasonably assumed to be tropical, lower montane rainforest) adjacent to the mountain lake Telaga Meluwak at 1,200–1,400m, the general area being described as “hilly ground covered with heavy primary jungle, but with little undergrowth”. The other female was collected at 600m (Meyer de Schauensee and Ripley 1940). The observations in the Mamas Valley were of birds feeding on the rather bare, open forest floor on relatively dry mountain slopes at 1,200–2,000m (van Marle and Voous 1988).

**Threats:** Apparently, suitable habitat within its putative range has been reduced and fragmented below about 1,000–1,500m, owing to agricultural encroachment, large-scale timber extraction, and the attendant risk of wildfires, even within Gunung Leuser National Park (D.A. Holmes *in litt.*). Hunting, presumably, also poses a threat, given the recent discovery of the species in an urban market in north Sumatra.

**Conservation:** All the known localities fall within the Gunung Leuser National Park, which embraces 9,460km<sup>2</sup> of habitat from sea-level to almost 3,500m.

**Targets:**

- **Conduct extensive surveys in Gunung Leuser National Park and adjacent regions (e.g., the Batak Highlands) to establish the species’ range, altitudinal distribution, and habitat requirements.**
- **Press for the control of illegal tree-felling in Gunung Leuser National Park, in particular.**
- **Clarify its taxonomic relationship with the Salvadori’s pheasant using DNA sequencing techniques.**

- **Advocate full protection for the species under Indonesian law.**

**Salvadori’s pheasant  
(*Lophura inornata*)**

**Vulnerable** C1; C2a

**This pheasant qualifies as Vulnerable. There are few records, indicating that it has a small population, which is declining and becoming fragmented owing to clearance of mid-altitude forests.**

**Taxonomy:** The Salvadori’s pheasant is sometimes considered conspecific with the Sumatran pheasant (Delacour 1977). The males are apparently morphologically indistinguishable (R. Sözer *in litt.*). However, females show distinct morphological differences (Chasen and Hoogerwerf 1941).

**Range and population:** The Salvadori’s pheasant is endemic to Sumatra, **Indonesia**, where it is known from at least 10 localities in the central and southern Barisan mountain ranges. There are recent records from at least two of these sites, Gunung Kaba and Gunung Kerinci, both within Kerinci-Seblat National Park (Holmes 1989, 1996). It was described as fairly common around Kerinci in the early 1900s (Lambert and Howes 1989, Holden 1997).

**Ecology:** It is a resident of lower (and possibly upper) montane rainforest from about 800–2,200m, with most observations coming from above 1,000m. It appears to prefer primary, unlogged forest, but also frequents disturbed and degraded habitats in close proximity to primary forest (Lambert and Howes 1989, Holden 1997).

**Threats:** In Kerinci-Seblat National Park, the species is declining due to heavy trapping by local people for food (Holden 1997). Much of the forest within the lower part of the species’ altitudinal range around Kerinci has already been cleared for shifting cultivation, and is vulnerable to further illegal agricultural encroachment and increasingly frequent drought fires (D.A. Holmes *in litt.*).

**Conservation:** The species is known to occur in at least one large protected area, the Kerinci-Seblat National Park, plus two other areas currently designated as protection forest, but proposed for upgrading to wildlife reserves, Gunung Singgalang and Bukit Dingin/Gunung Dempu.

**Targets:**

- **Conduct surveys to establish its range, distribution, and habitat requirements, particularly within Kerinci-Seblat National Park.**

- **Review the effectiveness of the protected areas system, following surveys, for conserving populations and advocate establishment of new or gazette-proposed protected areas, accordingly.**
- **Clarify its taxonomic relationship with the Sumatran pheasant using DNA sequencing techniques.**
- **Advocate full protection under Indonesian law.**

### **Crestless fireback (*Lophura erythrophthalma*)**

Vulnerable A1c,d; A2c,d

**The continuing rapid reduction in extent and quality of this pheasant's lowland rainforest habitat across most of its known range implies a similar reduction in the population and justifies its classification as Vulnerable.**

**Range and population:** The crestless fireback occurs in Peninsular and east **Malaysia**, Sumatra and Kalimantan, **Indonesia**, and **Brunei**. There are few recent records from Borneo, where it appears to be scarce and localised, mainly in the south and west (Holmes 1989, Wilkinson *et al.* 1991a, 1991b). There are just a handful of recent records from Sumatra, all from Riau and Jambi Provinces (Danielsen and Heegaard 1995). However, it has been described as the commonest *Lophura* pheasant in Malaysia, with densities of up to six birds per km<sup>2</sup> (Davison and Scriven 1987). Continuing forest clearance throughout the Indonesian lowlands must be causing a rapid decline, which is also likely to be the case outside well-protected areas in Peninsular Malaysia (Holmes 1989).

**Ecology:** It is an extreme lowland specialist, inhabiting primary and well-regenerated, closed-canopy evergreen forest (Wells 1999). Birds in Malaysia are tolerant of logged forest, and it has been recorded in lightly logged forest on Sumatra (Danielsen and Heegaard 1995). However, precise details of its habitat preferences and ecological interactions with its congener, the crested fireback *Lophura ignita*, are lacking. Where the crested fireback is present, the crestless fireback appears to avoid valley-bottom habitats (Wells 1999).

**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 (D.A. Holmes *in litt.*). In Indonesia, the impact of the major fires of 1997–98 has still to be fully assessed, but drought fires appear to be increasing in frequency and severity on Sumatra and Borneo. At current rates of habitat loss, given no change in forest management policy, dryland lowland rainforest could disappear completely by

2005 on Sumatra, and 2010 in Kalimantan (D.A. Holmes *in litt.*). Hunting for food may pose an additional, more localised threat (O'Brien *et al.* 1998).

**Conservation:** It occurs in several protected areas, including Taman Negara National Park and Krau Wildlife Reserve (Malaysia), Gunung Mulu National Park (Sarawak) and Tanjung Puting National Park (Kalimantan).

#### **Targets:**

- **Conduct field surveys to establish its distribution and population status.**
- **Conduct research into its ecological requirements, including its relationship with the crested fireback.**
- **Review whether key populations are adequately represented within the existing protected area network following surveys, and advocate protection of further areas if necessary.**
- **Promote the concept of Forest Management Units in Sabah (99-year concessions of great size).**
- **Assist forest managers in habitat identification and zoning of concession areas.**
- **Advocate full protection under Indonesian and Malaysian law.**

### **Bulwer's pheasant (*Lophura bulweri*)**

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

**This pheasant is classified as Vulnerable because it is inferred to be declining rapidly, owing to extensive ongoing habitat loss compounded by hunting. It is also assumed to have a small population, which is likely to be experiencing increasingly severe fragmentation, particularly as it may be dependent on nomadic visits to lowland areas.**

**Range and population:** Bulwer's pheasant is endemic to Borneo, where it is known from Sabah and Sarawak, east **Malaysia**, Kalimantan, **Indonesia** and **Brunei** (Smythies 1981, Mann 1987, Dutson 1990, Davison 1997). It was once described as very common in undisturbed parts of interior Borneo (Smythies 1981), but appears to be rather patchily distributed. In 1995, it was estimated to number fewer than 10,000 individuals (McGowan and Garson 1995). Despite there being no reason to believe that the species was threatened a decade ago (Holmes 1989), the paucity of recent records, combined with anecdotal information regarding its habits (R. Sözer *in litt.*) and alarming current rates of habitat loss (D.A. Holmes *in litt.*), indicate that it could now be declining significantly.

**Ecology:** It inhabits primary hill and lower montane forest from about 300m up to at least 1,500m (Smythies 1981,

Mann 1987, Wilkinson *et al.* 1991b, Lambert 1993), and at least occasionally down to about 150m. Limited field evidence suggests that the species is nomadic. It may rely on lowland forest masting events, resulting in feeding concentrations, after which it breeds and moves back up into the hills. The species may not appear again in the same area for years (Lambert 1993, R. Sözer *in litt.*).

**Threats:** Forest loss, degradation, and fragmentation through large-scale logging, widespread forest clearance for plantations of rubber and oil palm, and the extensive recent fires pose the primary threats, compounded locally by hunting for food (Rice 1989, O'Brien *et al.* 1998, D.A. Holmes, G.W.H. Davison, R. Sözer *in litt.*). If, as suggested, it is dependent on lowland masting events, highways and clearings through mountains and across the lowlands may have cut off potential access routes to important feeding areas, which, in turn, may be undermining its breeding capacity (R. Sözer *in litt.*).

**Conservation:** It is afforded protection under Indonesian law and has been recorded in at least three protected areas: Bukit Raya National Park (Kalimantan), Gunung Mulu and Lanjak-Entimau National Parks (Sarawak), and the Danum Valley Conservation Area (Sabah) (McGowan and Garson 1995).

**Targets:**

- **Identify and record its vocalisations to aid field surveys.**
- **Conduct field surveys to assess its distribution and population status, and research its ecological and habitat requirements to determine if it is nomadic and dependent on masting events.**
- **Support the proposed extension of Bukit Raya National Park and establishment of further protected areas found to hold populations.**
- **Promote the concept of Forest Management Units in Sabah (99-year concessions of great size).**
- **Assist forest managers in habitat identification and zoning of concession areas.**
- **Promote prohibition of hunting by logging company employees.**
- **Advocate full protection for the species under Malaysian law.**

**Brown eared-pheasant  
(*Crossoptilon mantchuricum*)**

Vulnerable C1

This species qualifies as Vulnerable because it may have a small population. Although the populations within protected areas appear to be stable, remaining unprotected and isolated

**populations are declining (potentially rapidly) through ongoing habitat loss and hunting.**

**Range and population:** The brown eared-pheasant is endemic to northern China, where it is now confined to scattered localities in the Luliang Shan of western Shaanxi, and the mountains of northwestern Hebei, western Beijing, and central Shaanxi (Li Xiang-tao 1996, Zhang Zheng-wang 1998). Its population within protected areas was recently estimated at about 5,000 birds, but on the basis of potential habitat available for this species both inside and outside protected areas, and assuming the mean population density within protected areas is twice that in unprotected areas, it has been tentatively estimated to number up to about 17,000 birds (Zhang Zheng-wang *in litt.*).

**Ecology:** In spring and summer, it breeds in coniferous forest or mixed conifer-broadleaf forest at elevations up to 2,600m. In winter, it moves down to lower altitudes (minimum 1,100m) in scrub at the forest edge on south-facing slopes (Li Xiang-tao and Liu Rusun 1993).

**Threats:** Its range has been highly fragmented by habitat loss over many centuries, and the scattered, isolated populations are at risk from further forest loss and other pressures (Zhang Zheng-wang 1998). Outside nature reserves, the threats include deforestation for agriculture and urban development, and habitat degradation due to logging and livestock grazing (Li Xiang-tao and Liu Rusun 1993). Local people collecting fungi may be the cause of high nest failure rates at Pangquangou National Nature Reserve (Zhang Zheng-wang 1995).

**Conservation:** CITES Appendix I. It is a nationally protected species (first class) in China. Its biology and conservation will be intensively studied during a forthcoming four-year project. Four nature reserves (Luyashan, Pangquangou, Wulushan, and Xiaowutai Shan) are crucial for the protection of this species and its habitats, and there is evidence that numbers have increased in Luyashan and Pangquangou since the reserves were established (Collar *et al.* 1994). The tree-planting and forest management programmes initiated by the Chinese government since the 1980s are likely to have benefited this species in some other areas.

**Targets:**

- **Promote measures to prevent further deforestation within its range.**
- **Conduct additional surveys in Shaanxi and elsewhere in its range, with the aim of identifying sites for the designation of new protected areas.**
- **Develop management plans and population monitoring programmes in the four critical reserves holding this species.**



- **Promote better protection and monitoring of the population at Dongling Shan.**
- **Reduce human disturbance during the breeding season.**
- **Conduct a feasibility study for translocation into Taiyue Shan (Shanxi), where its habitat has been restored.**

### **Cheer pheasant (*Catreus wallichii*)**

Vulnerable C1; C2a

**This pheasant's small population is naturally fragmented because it lives in small patches of successional grassland. Human population pressure, hunting, and changing patterns of land use are resulting in its decline, thus qualifying it for classification as Vulnerable.**

**Range and population:** The cheer pheasant occurs in the western Himalayas from northern **Pakistan** through Kashmir into Himachal Pradesh, Uttar Pradesh, **India**, and east to central **Nepal** (Garson *et al.* 1992). It has always been reported as uncommon with a patchy distribution, owing to its specialised habitat requirements. Many subpopulations are thought to number fewer than 10 individuals living in small pockets of suitable habitat (Gaston *et al.* 1981). In Pakistan, it may now only persist in the Jhelum Valley (Islam and Crawford 1986, Young *et al.* 1987) and it has declined in India, with most known populations now confined to Himachal Pradesh (Sharma and Pandey 1989). In Nepal, it appears to be localised, with few recent records and generally declining (H.S. Baral *in litt.*).

**Ecology:** It is resident in precipitous, rocky terrain dominated by scrub, tall grass, and scattered clumps of trees, most frequently occurring from 1,200 to 3,250m. Occupied sites are characterised by a combination of low shrubs, subject to regular browsing and cutting, with tall, dense grass in spring (Kalsi 1998). Its preference for early successional habitats, often created by traditional grass cutting and burning regimes, has led to an association with human settlements (Garson *et al.* 1992).

**Threats:** Having been widely shot for sport in the early twentieth century, it is still hunted for food today and its eggs are collected for local consumption (Young *et al.* 1987). The patchy nature of its specialised habitat may render the smallest, isolated populations vulnerable to extinction, and higher levels of disturbance (e.g. grazing and felling of wooded ravines) now pose a substantial threat (Kalsi 1998). Conversion of grassland to permanent arable terraces is also reducing available habitat, as are schemes to reafforest mid-altitude grasslands (R. Kaul *in litt.*).

**Conservation:** The species is legally protected in Nepal and India. It occurs in at least 12 protected areas in Himachal Pradesh, three in Uttar Pradesh, and three in Nepal. Many status surveys have now been conducted in Himachal and Uttar Pradesh, along with research into population ecology and habitat preferences (Kaul 1989, Kalsi 1998). Re-introduction in Pakistan has been unsuccessful (Garson *et al.* 1992).

#### **Targets:**

- **Conduct surveys to assess distribution and status in west Nepal and northeast Pakistan.**
- **Monitor populations at as many key sites as possible.**
- **Conduct research into the causes of breeding success and dispersal.**
- **Study burning and grazing regimes at known sites to monitor their impact.**
- **Use it as a flagship species in producing and promoting habitat management recommendations based on these studies.**
- **Promote improved enforcement of existing hunting bans.**

### **Elliot's pheasant (*Syrmaticus ellioti*)**

Vulnerable A1c,d; A2c,d

**This species is listed as Vulnerable because it occupies easily exploited forest isolates in low-lying and heavily populated areas, and is probably rapidly declining because of ongoing habitat loss and hunting.**

**Range and population:** Elliot's pheasant is endemic to southeast **China**, where it is recorded from Guizhou, Hubei, Anhui, Zhejiang, Fujian, Jiangxi, Hunan, Guangxi, and Guangdong. In recent years, its known range has been greatly extended to the west and there have been reports that it is locally common, but it is believed to be declining within its highly fragmented habitat (Ding Ping 1998).

**Ecology:** It occurs in a wide variety of subtropical forest types and sometimes in scrub vegetation between 200 and 1,900m. The most important habitats are broadleaf forest (both evergreen and deciduous) and mixed coniferous and broadleaf forest. Its preferred breeding habitat is forest with tree cover of more than 90% (Ding Ping and Zhuje Yang 1990, Ding Ping 1998).

**Threats:** Most of the natural forest within its range has been cleared or modified as a result of the demands for agricultural land and timber. Current threats include the further clearance of natural forest and its replacement with conifer plantations, the burning of forest by human-made hill fires, and the collection of firewood (Wang

Qishan *in litt.*). Hunting for food and the collection of medicinal tree bark and herbs are known to be significant problems in Leigong Shan Nature Reserve (Ding Ping *et al.* 1996, Liang Wei *et al.* 1996).

**Conservation:** CITES Appendix I. It is a nationally protected species (first class) in China, and its biology and conservation will be intensively studied during a forthcoming four-year project (Zhang Zheng-wang 1999). There are many protected areas in or near 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. Guanshan Nature Reserve in Jiangxi appears to support a significant population (Stevens *et al.* 1993). Other protected areas where it has been recorded include Fanjing Shan, Leigong Shan, Qingliangfeng, Wuyanling, Wuyishan, Gutian Shan, and Jinggangshan Nature Reserves.

**Targets:**

- **Conduct status surveys in protected areas throughout its range to determine the adequacy of the network.**
- **Conduct further ecological studies to determine its habitat requirements in various forest types.**
- **Prepare management plans for key protected areas designed to enhance the conservation of this species and its habitats.**
- **Promote conservation education and better law enforcement to prevent poaching and illegal logging in protected areas.**

### **Hume's pheasant (*Syrmaticus humiae*)**

Vulnerable C1; C2a

This species qualifies as Vulnerable because it appears to have been reduced to a small population, which has become increasingly fragmented. Although its status remains virtually unknown across a substantial proportion of its historical range in Myanmar, habitat loss and hunting continue to operate as major threats throughout.

**Range and population:** The Hume's pheasant occurs from Manipur, Mizoram, (and perhaps eastern Arunachal Pradesh (Robson 1999) and Nagaland) in northeast India through west, north, and east Myanmar to Yunnan and Guangxi in south China, and northwest Thailand. It appears to be rare in India (Choudhury 1991, Katju 1996, R. Kaul *in litt.*) and may have declined dramatically in the few areas recently visited in Myanmar (King *et al.* 1996). In China, populations are apparently relatively stable inside protected areas, but declining rapidly elsewhere (Han

Lian-xian 1997, Zheng Guang-mei and Wang Qishan 1998). The population in Thailand is currently estimated at just 200–500 individuals and is probably declining slowly (Robson 1990, P.D. Round *in litt.*).

**Ecology:** It inhabits open, dry, subtropical evergreen (mainly oak), coniferous (chiefly pine) or mixed coniferous-broadleaf forests on steep, often rocky hillsides interrupted by scrub and grassy clearings. It appears to favour broken or successional habitats, but sometimes occurs in adjacent patches of dense forest (Davison 1980).

**Threats:** The ease with which it can be trapped has been a major cause of its continuing decline across much of its range, including populations within protected areas (Mishra *et al.* 1998). Extensive shifting cultivation and uncontrolled annual burning has resulted in substantial fragmentation and loss of suitable habitat in Myanmar, China, and India (Choudhury 1991, Katju 1996, R. Kaul *in litt.*). In north Thailand, it has suffered from agricultural intensification and habitat fragmentation resulting from development projects. Replacement of large areas with dense conifer plantations in Thailand may also pose a threat (P.D. Round *in litt.*).

**Conservation:** CITES Appendix I. The species has legal protected status in India, Thailand, Myanmar, and China. Populations persist in several protected areas, including Tongbiguan, Ailaoshan, and Wuliangshan Nature Reserves (China), Murlen and Blue Mountain National Parks and Namdapha Wildlife Sanctuary (India), and Doi Chang Dao Wildlife Sanctuary (Thailand).

**Targets:**

- **Survey sites in eastern Yunnan (China), Myanmar, and the Border States of northeast India for additional populations.**
- **Conduct research into its habitat use and tolerance of habitat degradation.**
- **Campaign for improved protected status for sites supporting populations, particularly in northwest Thailand, Myanmar, and northeast India.**
- **Promote stricter control over hunting and habitat encroachment in protected areas supporting significant populations.**

### **Reeves's pheasant (*Syrmaticus reevesii*)**

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

This species is listed as Vulnerable because its unprotected and severely fragmented small population is declining rapidly in the face of continuing habitat loss and over-hunting.

**Range and population:** Reeves's pheasant is endemic to central and east **China**, where it is recorded from Gansu, Sichuan, Yunnan, Guizhou, Shaanxi, Shanxi, Hebei, Henan, Hubei, Anhui, Hunan, and possibly Jiangsu. It was formerly reported to be very common, but its range is now highly fragmented and it has apparently been lost from northern Shanxi and Hebei (Wu Zhikang *et al.* 1994, Lu Xin *in litt.*). More recent evidence indicates that its population must be declining further because of habitat loss (Wu Zhikang and Xu Weishu 1986). It has been introduced to Hawaii (USA) (Cramp and Simmons 1980) and various parts of Europe (Pokorný and Pikula 1987, Moynihan 1995).

**Ecology:** It is found in a variety of forests types in the zone where the temperate forests of northeast China intergrade with the subtropical forests of south China. It is found chiefly in broadleaf forests dominated by oaks, usually with a dense canopy and sparse undergrowth (Wu Zhikang *et al.* 1992, Xu Weishu *et al.* 1990), but also in coniferous forest and scrub (Liu Naifa *in litt.*). It also utilises farmland adjacent to the forest edge (Wu Zhikang and Xu Weishu 1986).

**Threats:** The main threat to this species is the continuing deforestation within its range, which is reducing and fragmenting its habitat. Hunting for food is believed to be an important threat and their eggs are also collected (Xu Weishu *et al.* 1990). It was hunted in the past for its long tail feathers, which were used as a decoration in the Peking Opera costumes, but plastic feathers are increasingly being used for this purpose (Zhang Zheng-wang *in litt.*).

**Conservation:** It is a nationally protected species (second class) in China, and its biology and conservation requirements will be intensively studied during a forthcoming four-year project (Zhang Zheng-wang 1999). It occurs in several nature reserves, including Fanjingshan in Guizhou, Baotianman and Jigongshan in Henan, Badagongshan in Hunan, Taibaishan, Foping, and Zhouzhi in Shaanxi, and Shennongjia in Hubei. In 1992, Tuoda Forest in Guizhou was established as a local nature reserve specifically for this species (Wu Zhikang *et al.* 1993), but illegal felling has since occurred (Liang Wei 1998).

**Targets:**

- **Conduct surveys in protected areas throughout its range to determine which of them support significant populations and whether extensions or additional reserves are required.**
- **Conduct intensive studies of its habitat requirements, from which appropriate habitat management practices in protected areas can be developed.**
- **Promote balanced forest management, with logging**

**prohibited in parts of its range and artificial plantations promoted where they can provide additional habitat.**

- **Conduct an education programme concerned with forest conservation, adopting this species as a flagship and promoting the control of hunting.**

## **Mountain peacock-pheasant (*Polyplectron inopinatum*)**

**Vulnerable** B1+2b-e; C1; C2a

**This species is classified as Vulnerable because it has a small, fragmented range and population that will suffer a severe decline and further fragmentation should a proposed road development project go ahead.**

**Range and population:** The mountain peacock-pheasant is endemic to central Peninsular **Malaysia**, where it is found in the Main Range from the Cameron Highlands south to the Genting Highlands, in the Larut Range to the northwest, and on the eastern outlying peaks of Gunung Tahan and Gunung Benom (Medway and Wells 1976). There are recent records from at least 12 localities (Yatim 1993), at two of which it has been described as common (Davison and Scriven 1987). Total numbers are likely to be small, owing to its highly restricted range and general relative scarcity. At present, the population is believed to be stable or, at worst, declining slightly.

**Ecology:** It is sedentary in lower and upper montane evergreen forest (including elfin forest) from about 820m to at least 1,600m, and was once found at 1,800m. It is usually found in steep areas or along ridges with exposed corestones, some bamboo, and climbing palms (Davison and Scriven 1987). It is less vocal than other members of the genus and, hence, less easily detectable.

**Threats:** There is a considerable danger that a proposed north-south road linking the hill stations of Genting Highlands, Fraser's Hill, and Cameron Highlands will result in the further fragmentation and degradation of a substantial part of its montane habitat (Anon. 1998).

**Conservation:** It occurs in at least three protected areas: Taman Negara (which encompasses Gunung Tahan and various other peaks where it could occur), Krau Wildlife Reserve (which incorporates one-third of the flanks of Gunung Benom), and the very small Fraser's Hill Wildlife Sanctuary.

**Targets:**

- **Conduct surveys to clarify its distribution and population status within its known range, and to establish whether it occurs to the north of this range.**

- **Monitor populations periodically at known sites.**
- **Use it as a flagship species in lobbying for a substantial new protected area in the Main Range.**
- **Advocate re-establishment of a secure protected area in the Cameron Highlands.**
- **Lobby against the Main Range road development plans.**

### **Germain's peacock-pheasant (*Polyplectron germaini*)**

**Vulnerable** C1; C2a

This pheasant is classified as **Vulnerable** because it has a small population that is declining and subject to severe fragmentation, a trend that is projected to continue as clearance of its habitat continues unabated.

**Range and population:** Germain's peacock-pheasant is endemic to southern Indochina, where it is known only from southern Annam and Cochinchina, **Vietnam**, and possibly east Cambodia. There are recent records from numerous localities, including Cat Tien National Park (Robson *et al.* 1993a, Hornbuckle 1998, Atkins and Tentij 1999), Cat Loc Nature Reserve, where it is fairly common (Atkins and Tentij 1999, G. Polet *in litt.*), and the lower slopes of the Da Lat and Di Linh Plateaux (Robson *et al.* 1991). It was also frequently heard and seen at six sites in Dak Lak Province during surveys in 1998 (Brickle *et al.* 1998). A specimen in the museum at Phnom Penh Zoo apparently originated from Mondulhiri Province (east Cambodia), where a male peacock-pheasant was recently heard at Dak Dam (C.M. Poole *in litt.*).

**Ecology:** It is resident in dipterocarp-dominated, evergreen and semi-evergreen forest, from sea-level up to at least 1,400m, including secondary, logged, and thorny bamboo forest (Robson *et al.* 1991).

**Threats:** It has suffered major declines due to forest loss and fragmentation resulting from commercial logging and resettlement programmes. These activities have exacerbated clearance of land for subsistence cultivation (Nguyen Cu and Eames 1993) and localised commercial cropping of coffee and cashew nuts (J.C. Eames *in litt.*). Hunting with guns and snares, even within protected areas, represents a lesser threat to the species (Nguyen Cu *in litt.*). Shortages of staff and resources in protected areas result in ineffective control of illegal activities, especially hunting, disturbance, and small-scale logging (Robson *et al.* 1991).

**Conservation:** CITES Appendix II. Populations survive in at least four protected areas: Cat Tien and Yok Don National Parks, and Cat Loc and Chu Yang Sin Nature

Reserves. In May 1998, a five-year project began in Cat Loc Nature Reserve and Cat Tien National Park (the two areas are now administratively integrated), focusing on research with the aim of developing a conservation management plan and encouraging capacity building, community development, and conservation education (G. Polet *in litt.*).

**Targets:**

- **Conduct surveys in remaining suitable habitat blocks in Vietnam, including Bui Gia Map Nature Reserve.**
- **Conduct further searches for the species in eastern Cambodia to verify its distribution and status there, establishing a protected area, if possible.**
- **Determine its tolerance of forest degradation and secondary habitats.**
- **Establish a protected area in southwest Lam Dong Province, where the species occurs in good numbers.**
- **Promote more effective control of encroachment and hunting in protected areas supporting populations.**

### **Malaysian peacock-pheasant (*Polyplectron malacense*)**

**Vulnerable** A1c; A2c; C1

This species qualifies as **Vulnerable** because it has undergone a rapid population decline, and its small population is becoming increasingly fragmented with progressive erosion of its specialised lowland forest habitat.

**Range and population:** The Malaysian peacock-pheasant is endemic to Peninsular **Malaysia** and southern Peninsular **Thailand**. Reports of its occurrence in Sumatra have been refuted (van Marle and Voous 1988) and evidence for its occurrence in Myanmar is flawed (Wells 1999). It is possibly already extinct in Thailand (P.D. Round *in litt.*) and its range in Malaysia has contracted dramatically. In 1997, for example, it remained in just 54% of localities known before 1970. Remaining subpopulations are now restricted to a few forest blocks in which they are unevenly distributed, although it is apparently still common at Taman Negara, Krau, and Pasoh (McGowan and Gillman 1997).

**Ecology:** This species is an extreme lowland specialist, resident in tall, primary and secondary (including lightly logged) lowland dipterocarp forest, usually from just 15 to 80m and never above about 300m, on level or gently sloping ground (Davison and Scriven 1987, McGowan 1994b). Studies have found increased calling levels and numbers of display scrapes in mast fruiting years, when there are also higher invertebrate densities, suggesting that distribution and reproductive output may be limited by food supply (Davison 1983, McGowan 1994b).

**Threats:** Lowland forest clearance and modification for cultivation remain the major threats. Only 25% of suitable habitat that was available for the species prior to 1970 remains today (McGowan and Gillman 1997). Hunting for food, sport, and the live bird trade presumably contributed to its probable extinction in Thailand. Whilst it is susceptible to snaring targeted at all ground-foraging animals, there is no evidence to indicate it is particularly sought after in Malaysia.

**Conservation:** CITES Appendix II. Important wild populations occur in at least two protected areas, Taman Negara National Park and Krau Wildlife Reserve, and further populations have been reported at Sungai Dusun Wildlife Reserve (Selangor) and a number of forest reserves that do not qualify as protected areas under wildlife legislation, including Pasoh (Negeri Sembilan). A management study to heighten status and improve protection measures at Krau Wildlife Reserve is currently being undertaken (P.J.K. McGowan *in litt.*).

**Targets:**

- **Conduct surveys to clarify current distribution patterns and status for all known populations, particularly in Taman Negara and Krau.**
- **Determine its precise habitat requirements and response to habitat alterations.**
- **Support proposals for heightened status, and stricter management guidelines and protection measures at Krau Wildlife Reserve.**

### **Palawan peacock-pheasant (*Polyplectron emphanum*)**

Vulnerable A1c,d; A2c,d; B1+2b-e; C1

This species qualifies as **Vulnerable** because it has a small, severely fragmented range and a small population that is undergoing a rapid decline as a result of habitat destruction, hunting, and trade.

**Range and population:** The Palawan peacock-pheasant is endemic to the **Philippines**, where it occurs on Palawan. It is known from about 20 localities throughout the island, with records from at least 11 since 1980 (McGowan *et al.* 1989, Girdler 1996), and local reports suggest it has a wider distribution (Lambert 1993). In the early 1970s, despite local extinctions, it was not considered particularly rare (Grimwood 1974). In 1995, its fragmented population was estimated to number less than 10,000 (McGowan and Garson 1995). It is evidently still declining.

**Ecology:** This species mainly inhabits primary and secondary forest on flat and rolling terrain up to about

800m elevation, and occasionally occurs in mossy forest and in *Casuarina*-dominated “dwarf forest” on serpentine rock (Collar *et al.* 1999).

**Threats:** Deforestation in lowland Palawan has been extensive, and logging and mining concessions have been granted for almost all remaining forests on the island (Lambert 1993). Illegal logging is thought to persist in the remaining extensive forest of the south. Forest at Iwahig Penal Colony, regarded as a key site, may be threatened by plans to mine chromite (Girdler 1996). By the late 1960s, the species was being extensively hunted and trapped in large numbers for live trade (Gonzales and Alcala 1969), but exports were much reduced by the late 1980s (Gonzales and Rees 1988, McGowan *et al.* 1989). In the mid-1990s, it was heavily hunted adjacent to St Paul’s Subterranean River National Park (R.P. Girdler *in litt.*).

**Conservation:** CITES Appendix I. The whole of Palawan is classed as a game reserve, where hunting is illegal. In 1990, the island was designated in its entirety as a Biosphere Reserve, although the legislation controlling habitat alteration and hunting is extremely difficult to enforce effectively. The species occurs in two protected areas: El Nido Marine Reserve and St Paul’s Subterranean River National Park. The latter may soon be significantly extended to the east (Lambert 1994), where the species is known to occur (Girdler 1996). It was also recently featured on a bilingual environmental awareness poster in the “Only in the Philippines” series (W.L.R. Oliver *in litt.*).

**Targets:**

- **Conduct surveys to assess distribution, status, and habitat requirements in remaining lowland forests and secondary habitats, particularly south of Brooke’s Point, on the slopes of Mount Victoria, and in remaining forests in the north.**
- **Support the proposed extension of St Paul’s Subterranean River National Park.**
- **Seek formal protection for forests at Iwahig.**
- **Allocate greater resources towards more effective control of hunting and initiate conservation awareness campaigns amongst forest product collectors.**

### **Crested argus (*Rheinardia ocellata*)**

Vulnerable A1c,d; A2c,d

This magnificent pheasant qualifies as **Vulnerable** because it is undergoing rapid population decline as a result of exploitation and reduction in the extent and quality of its evergreen forest habitat. This trend is projected to continue.

**Taxonomy:** The crested argus is represented by two subspecies that occupy widely separated geographical ranges. These two forms are morphologically distinct (Delacour 1977), and their specific taxonomic status and validity requires assessment using other criteria (e.g. DNA sequence comparisons).

**Range and population:** The crested argus is endemic to Southeast Asia. The nominate subspecies *ocellata* occurs along the Annamite Mountain chain in central and southern Vietnam and neighbouring eastern Laos (Duckworth *et al.* 1999), south to the Da Lat Plateau in southern Vietnam (Robson *et al.* 1993b). The subspecies *nigrescens* is restricted to seven sites within or very close to Taman Negara in central Peninsular Malaysia (Mamat and Yasak 1998). Although its range and habitat have been reduced and fragmented in Laos and Vietnam, and a substantial population decline has occurred there, the nominate subspecies is still relatively widespread and locally common (Robson *et al.* 1991, Tobias *et al.* 1998, Duckworth *et al.* 1999).

**Ecology:** In Laos and Vietnam, it is resident in primary, logged, and secondary evergreen forest from sea-level up to 1,500m, and from 1,700m–1,900m on the Da Lat Plateau (Robson *et al.* 1991, 1993b). It occurs at highest densities in moist primary forest in lowlands, up to about 900m (Tobias 1997, Thewlis *et al.* 1998, Duckworth *et al.* 1999). In Malaysia, it inhabits tall hill dipterocarp/lower montane transitional forest, generally from about 800–1,100m (Davison 1977, 1978b, 1979).

**Threats:** The Indochinese population is probably most at risk from continuing forest loss and degradation, both within and outside protected areas. The greatest problems stem from commercial logging, various forms of illegal timber extraction, clearance for agricultural plantations and shifting cultivation (Nguyen Cu and Eames 1993, Robson *et al.* 1991, Lambert *et al.* 1994), and road building (Tobias 1997, Tobias *et al.* 1998). Disturbance and snaring (primarily for food) at display arenas pose more significant threats than deforestation in some areas (Lambert *et al.* 1994, Timmins and Evans 1996, Thewlis *et al.* 1998, Duckworth *et al.* 1999). The Malaysian population is less threatened, being almost entirely encompassed within Taman Negara where the main threat is limited habitat loss on the periphery of the park (e.g., Gunung Rabung) (P.J.K. McGowan *in litt.*).

**Conservation:** CITES Appendix I. It occurs in numerous protected areas, including Bach Ma National Park, at least 10 nature reserves in Vietnam, and at least two designated and two proposed national biodiversity conservation areas in Laos. The Malaysian population's range falls almost entirely within Taman Negara National Park.

**Targets:**

- Survey suitable habitat in Laos and Vietnam to clarify its current distribution and assess relative abundance in relation to habitat degradation.
- Monitor the Malaysian population and selected populations in Laos and Vietnam regularly.
- Promote strict enforcement of hunting regulations in protected areas supporting populations in Indochina, in combination with locally targeted conservation awareness initiatives.
- Conduct taxonomic research into the relationship between the Malaysian and Indochinese populations.

**Congo peafowl  
(*Afropavo congensis*)**

**Vulnerable C2a**

**This species is assumed to have a small population. Recent surveys suggest that large areas within its range are unoccupied implying that the population is severely fragmented. Hunting and habitat loss continue unabated and the population is, therefore, inferred to be declining. These circumstances lead to its classification as Vulnerable.**

**Taxonomy:** This is the only pheasant species native to Africa.

**Range and population:** The Congo peafowl occurs in the eastern Democratic Republic of Congo (DRC). Research in 1993–95 confirmed its presence in 13 of the 20 survey areas, though it did not find the species abundant in any. This work also identified new sites that significantly extend the species' range northeast into the Ituri Forest (Hart and Upoki 1997). Subsequently, it was also located north of the Lomako River and along the Yekokora River (Dupain and van Krunkelsven 1996), as well as further south between the Lukenie and Sankuru Rivers (Thompson 1996). Forest between the Lomami and Congo Rivers may also hold significant concentrations, but information from this area remains limited (Hart and Upoki 1997).

**Ecology:** It occurs in many different forest types, but is often associated with slopes between watersheds with shallow soils supporting dry forest and an open understorey. Its sparse and irregular distribution may correspond, in part, to the limited availability of this habitat type. It does not appear to have a specialised diet, and has been recorded eating fruit from common tree species throughout the region (Hart and Upoki 1997), as well as aquatic insects and termites. The breeding season may depend on local rainfall conditions (McGowan 1994a).

**Threats:** Habitat is being lost to mining, subsistence agriculture, and logging at several locations. Mining and associated human settlement result in the opening up of remote areas, with a corresponding increase in subsistence and commercial hunting. Capture in snares set for small mammals and antelope is probably widespread. The presence of huge numbers of Rwandan refugees in the eastern DRC since 1994 must also pose a significant threat because of increased hunting and habitat loss (Hart and Upoki 1997).

**Conservation:** The conservation of this species may depend on populations in protected areas where there is some possibility that hunting can be limited or banned. Currently, an important population exists in the Maiko National Park, and the potential exists for long-term conservation. It also occurs in the Okapi Wildlife Reserve and the Kahuzi-Biega National Park.

**Targets:**

- **Conduct further fieldwork in the lesser-known western and southern parts of the species' range.**
- **Assess habitat requirements in key protected areas by documenting distribution in detail and monitoring some sites.**
- **Evaluate its occurrence and the potential for conservation in the Salonga National Park.**

### **Green peafowl (*Pavo muticus*)**

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

This majestic species has undergone a rapid population decline, primarily owing to high hunting levels, although, more locally, it has suffered a reduction in the extent and quality of its habitat. Rapid decline and further fragmentation are projected to continue, qualifying it for classification as **Vulnerable**.

**Range and population:** The green peafowl has a large ancestral range, across which it was once common and widespread (Delacour 1977). Now it only survives in a few scattered remnant populations in Yunnan, **China** (Wen Xian-ji *et al.* 1997), west **Thailand** (P.D. Round *in litt.*), **Laos** (Evans and Timmins 1996, Evans 1997, Duckworth *et al.* 1999), southern **Vietnam** (Brickle *et al.* 1998, Atkins and Tentij 1999), **Cambodia** (Sun Hean *in litt.*, C.M. Poole *in litt.*), **Myanmar** (Smythies 1986), and on Java, **Indonesia** (van Balen *et al.* 1995). It may be extinct in northeast **India** (Choudhury 1991) and **Bangladesh** (P. Thompson *in litt.*), and is extinct in Malaysia and Peninsular Thailand (McGowan *et al.* 1998b). The world population is currently estimated at 5,000–10,000 individuals (McGowan and Garson 1995).

**Ecology:** It occurs in a wide variety of habitats, including a range of primary and secondary, tropical and subtropical, evergreen and deciduous forest types (van Balen *et al.* 1995), mixed coniferous forest, swamp forest, open woodland, forest edge, bamboo, grasslands, savannas, scrub, and farmland edge, from sea-level to at least 2,100m.

**Threats:** Widespread hunting for meat and feathers, and the collection of eggs and chicks, combined with habitat modification and human disturbance, have caused this species' catastrophic decline (Evans and Timmins 1996, Le Trong Trai 1997, Evans 1997, Duckworth *et al.* 1999, Yang Lan *in litt.*). Fragmentation has isolated many small populations, increasing their susceptibility to local extinction. In addition, there is a very significant trade in the male's spectacular train feathers, especially in Java and China (van Balen *et al.* 1995, McGowan *et al.* 1998b). It is also regarded as a crop pest by farmers in China and, consequently, is poisoned (Yang Lan *in litt.*).

**Conservation:** CITES Appendix II. Many protected areas support populations, the most important being Huai Kha Kheng Wildlife Sanctuary (Thailand), and Ujung Kulon and Baluran National Parks (Indonesia). Extensive public awareness campaigns have been carried out in China and Laos.

**Targets:**

- **Conduct distribution and status surveys, and initiate conservation awareness campaigns in Myanmar and Cambodia.**
- **Clarify its status in India, particularly in Buxa Tiger Reserve (West Bengal).**
- **Conduct further research into habitat requirements and interactions with people to increase effectiveness of management plan design in protected areas supporting populations.**
- **Establish protected areas for important populations in Yunnan (China) and southeast Gia Lai Province (Vietnam), and campaign for the extension of Yok Don National Park (Vietnam).**
- **Promote strict enforcement of hunting regulations in protected areas supporting populations in Indochina.**
- **Encourage a total ban on trade in live birds and train feathers in all range countries.**

## **3.4 Data Deficient species**

### **Imperial pheasant (*Lophura imperialis*)**

The imperial pheasant was described from a pair of live birds obtained during the 1920s in central **Vietnam**

(Delacour 1977). In 1990 an immature male was recovered from local hunters 12km west of Cat Bin, within what is now the Ke Go Nature Reserve (Robson *et al.* 1993a, Le Trong Trai *et al.* 1999). A further immature male was recovered alive from Dakrong District (Quang Tri Province) in early 2000 (Dang Gia Tung *in litt.*). Its extreme rarity is enigmatic, even by comparison with the Edwards's pheasant and the Vietnamese pheasant, which

occur elsewhere in the fragmented forest remnants on the level lowlands of Annam. There is mounting evidence from museum studies (Rasmussen 1998), deliberate cross-breeding in captivity (A. Hennache *in litt.*), and mtDNA sequencing (E. Randi *in litt.*) that it may be a hybrid of the silver pheasant and either the Edwards's pheasant or the Vietnamese pheasant. If it proves not to be a hybrid form, it will qualify as Critically Endangered.



## Five-year Plan of Action (2000–04)

Chapter 3 of this Action Plan provided a summary of information that is of conservation importance for all the threatened species of pheasant, and outlined the conservation targets that should help to prevent them from becoming more threatened or even extinct. This chapter builds upon these recommendations by outlining key projects that the Pheasant Specialist Group proposes should be started or continued during the period 2000–04.

Before looking in detail at these projects, it is helpful to assess progress on projects outlined in the first edition. Although McGowan *et al.* (1998a) have done this informally, a more complete assessment was made by distributing a questionnaire to everyone who had undertaken work relating to any of the Action Plan projects specified for 1995–99. Of the 25 projects originally suggested, 19 have received some attention and six have not yet been attempted. Of the 73 individual project objectives specified, 35 had been achieved by the end of 1999, and 10 are the subject of continuing work. The remaining 28 objectives were not attempted during the implementation period. Respondents were asked to list reasons for undertaking their work; the fact that it was suggested in the Action Plan was the most frequently cited reason overall and ranked highest in the case of six projects.

These data indicate that a great deal of the work suggested in the first edition has been either initiated or completed. Indeed, the projects suggested in this edition are clear evidence of a new phase in pheasant conservation, moving on from conducting basic survey work to combining existing data with new biological information to generate well-informed threat assessments and construct research and 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. Throughout, it is intended that local communities be involved wherever possible. Other tasks involve providing and promoting scientifically based management recommendations to decision-makers. In these cases, sufficient fundamental work has already been done to allow the formulation of plans with a high probability of producing positive results. Another major focus is on population monitoring to assess the effectiveness of management initiatives once they are implemented.

The projects suggested in this chapter are divided into four groups: global, regional, strategic, and species-specific. They are outlines of what needs to be done, as well as why and how, and are designed to be read as much by people

who might then seek or donate funds in support of a particular project, as by those wishing to carry out research and other activities. Together with the species accounts given in Chapter 3 and the references cited therein, they can each be used as a means of developing a full project proposal. Such proposals, for which a form and guidelines in several languages have been produced, can be submitted at any time to the Chair of the Pheasant Specialist Group. A major function of the Specialist Group is to provide advice, using its worldwide membership, on project design, methods, and ways of achieving the desired outcomes. The Chair can also assist with finding project funds by issuing a letter of endorsement and providing information on potential funding agencies (see Appendix 2 for contacts).

Each account in this chapter includes entries under a standard set of subheadings, as follows:

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

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

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

**Timescale:** how long the project should last.

**Resources:** an indication of the approximate scale of project components in terms of resources required.

### 4.1 Global projects

#### Project 1. Increasing the effectiveness of the Pheasant Specialist Group (PSG)

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

**Aim:** to develop and expand the PSG communications network.

**Justification:** the PSG 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 pheasant species worldwide. This requires it to maintain communications with a large and increasing network of pheasant enthusiasts, researchers, and conservationists, to assist with the development and support of project proposals, to evaluate project outputs, and to provide advice for international organisations, government departments, NGOs, and individuals. The capacity for the Specialist Group to assist

its members needs to be continually improved so that it can increase its effectiveness in prioritising and catalysing conservation work designed for the benefit of pheasants and their largely forested habitats.

**Project description:** the network particularly requires development or expansion in Thailand, Malaysia, Laos, Cambodia, Myanmar, and Nepal. This should involve increasing contacts in government wildlife departments, universities, and NGOs with a conservation remit.

**Timescale:** as an ongoing project, this work should be continuous.

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

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

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

**Justification:** in order for the PSG to provide the most effective assistance and advice to principal investigators (i.e. project leaders) involved in conservation work, it is essential to monitor the progress of projects concerned with pheasants. This will allow the PSG and other organisations, including funding bodies, to assess how effective projects endorsed by the PSG have been in leading to identifiable conservation action or outcomes. It will also mean that the PSG is in a better position to co-ordinate communication between researchers, acting as a central repository for information on funding bodies, methodologies, and research findings.

**Project description:** the material contained within this revised Action Plan has contributed towards evaluating and assessing pheasant conservation work over the past five years. Building on this foundation, the PSG 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 PSG personnel. Particular methods and species proving difficult to work with can be highlighted and the global membership can be consulted to seek solutions. Thus, project information should be stored in a database so that it is rapidly and easily available, and reports and publications should be archived.

**Timescale:** as an ongoing project, this work should be continuous, but the system should be set up within a year.

**Resources:** the main cost will be in administering the programme. There is clearly overlap with similar work suggested by the other Specialist Groups for Galliformes.

## **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, with the objective of prompting new conservation action.

**Justification:** over the last 25 years, a great deal of information has been collected on the distribution, abundance, and ecology of many threatened pheasant species. There is an increasing need to present key findings in a way that will influence conservation policy from local to international levels.

**Project description:** project reports written for sponsors should be used as a basis for shorter documents designed specifically for the attention of government officials and officers of NGOs who are in a position to implement or advocate new initiatives. 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 both before and after they are implemented. The PSG should facilitate contacts between members requiring help with these tasks and those with relevant experience.

**Timescale:** as an ongoing project, this work should be continuous.

**Resources:** assuming that most advice could be offered electronically, the main costs will be concerned with 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 global scientific community does not become aware of research findings unless papers are published in recognised journals. At present, too many of the findings from research work, field surveys, and aviary observations on pheasants remain confined to technical reports, and university theses and dissertations. These are not accessible to most researchers, students, breeders,

and people involved in management. If the major agencies involved in global conservation are to advocate action relating to pheasant conservation, it is necessary for them to have easy 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, as well as increase their capacity to raise project funds at home and abroad to undertake further work. Sponsors will also receive publicity through acknowledgements for funding in publications.

**Project description:** PSG 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 work on data presentation, statistical analysis, interpretation of findings, access to existing literature, and journal manuscript preparation.

**Timescale:** as an ongoing project, this work should be continuous.

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

### **Project 3. Maintaining an Asian Galliformes sites database**

**Aim:** to update and maintain a database of localities and associated information for all Galliformes species in Asia.

**Justification:** reliable information on where species occur is a cornerstone of many conservation activities. These include global conservation assessments of the type undertaken in this Action Plan, the identification of key areas for groups of threatened species (perhaps in several different taxa), and the highlighting of areas where distribution surveys are still required. In combination with other data sets, such as those mapping habitat types and protected areas, these data can be used to conduct a variety of strategic analyses. The basic requirement is the compilation of data on where species have occurred in the past and still persist today.

**Project description:** a database has been compiled for Asian Galliformes, but as new fieldwork is carried out, new sites are documented. There is a need to update the database continuously and to establish it in such a way that it can readily be used for conservation. As the existing database contains localities on all Galliformes species (except the megapodes) in Asia, it seems sensible to maintain this structure. Many of these species inhabit the same areas and are studied or surveyed by the

same people, so this will also maximise the efficiency with which the data are compiled, assessed, stored, and then retrieved.

**Timescale:** as an ongoing project, this work should be continuous, although the database should be institutionalised as soon as possible.

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

### **Project 4. 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: whether or not each listed species was actually present in these areas in viable populations remains in question. Such an assessment is vital to ensuring that the most effective protected area network is identified, leading to the best use of scarce resources for the conservation of all Asian Galliformes and many other species besides. A list of species that have viable populations in each protected area is, therefore, required.

**Project description:** ideally, each protected area would be surveyed to assess whether there are viable populations of each Galliformes species present. This is, however, extremely difficult as many areas are physically hard to survey on the ground, most of the species are not easy to detect, and there are many areas to be surveyed. The work should, therefore, concentrate on surveying a few key areas and then extrapolating the results by using detailed habitat maps for as many other areas as possible. The broad habitat relations of most threatened pheasant species are sufficiently well known to allow assessments of the amount of habitat available to be made. Ground surveys should concentrate on understanding levels of habitat disturbance and the effect this may have on species distribution and abundance.

**Timescale:** surveys of any length within protected areas will contribute useful information to this work, which should be continuous.

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

## 4.2 Regional projects

### Project 5. Review of information on Indochinese pheasants

**Aims:** 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, and general faunal surveys in Laos since the early 1990s. In contrast, Cambodia has only recently received survey attention after a sustained period of unrest. Whilst some of this work has been written up 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 three countries. As they have many species and habitats in common, it will be useful to assess the status of species and their habitats across the whole of this biogeographical area.

**Project description:** this will involve the collation of information on species distributions and habitat use from the unpublished literature. This should then be related to information on the distribution and quality of various habitat types, which will, in turn, lead to an improved understanding of the status and conservation requirements of each species in these countries. The work could conclude with a strategy for ensuring the most crucial needs are met. This project should also consider the threatened partridges found within this region.

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

**Resources:** these would be needed to cover the cost of employing a researcher to visit Vientiane, Hanoi, and Phnom Penh.

### Project 6. Surveys for threatened pheasants in southwest China

**Aims:** to conduct extensive distribution surveys of threatened Galliformes in southwest China; to re-assess the adequacy of the protected area network.

**Justification:** the part of China adjacent to eastern Nepal, Bhutan, and northeast India is the world's most important region for pheasant diversity, and contains parts of several Endemic Bird Areas. No less than 14 pheasant species have been recorded from the region and, although some work has been done recently, large areas remain little

visited by ornithologists in recent decades. Distribution data are required to make future assessments of the adequacy of protected area coverage in the region.

**Project description:** there is much scope for teams to conduct ground surveys in this area at various times of year. The PSG will attempt to collate any site records for other species in this region, as well as any unexpected absences. These data will be sent to relevant SSC Specialist Groups. At a minimum, information on exact locality, altitude, date, and habitat type should be collected. All information on Galliformes species should be made available to the Asian Galliformes Sites Database (Project 3).

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

**Resources:** needs will vary depending on the length and scope of individual surveys.

### Project 7. Surveys for threatened pheasants in Sumatra

**Aims:** to conduct extensive distribution surveys of threatened pheasants in Sumatra; to assess the adequacy of the protected area network.

**Justification:** knowledge of most Indonesian pheasant species remains poor. The country has the longest list of birds believed to be threatened with extinction. In many cases, however, 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 pheasants prevents any objective assessment through which to propose appropriate conservation actions.

**Project description:** the island of Sumatra covers 476,000km<sup>2</sup>, and establishing the distribution and status of the threatened species occurring there (Salvadori's and Sumatran pheasant, and crestless fireback) will not be an easy task. There is a need to survey many different parts of the island at various times of year. The PSG will attempt to collate any site records for other species in Sumatra, as well as unexpected absences. These data will be sent to relevant SSC Specialist Groups. At a minimum, information on exact locality, altitude, date, and habitat type should be collected. All information on Galliformes species should be made available to the Asian Galliformes Sites Database (Project 3).

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

**Resources:** needs will vary depending on the length and scope of individual surveys.

### Project 8. Surveys for threatened pheasants in Borneo

**Aims:** to conduct extensive distribution surveys of threatened pheasants in Borneo; to collate and assess existing and new information.

**Justification:** knowledge of Indonesian pheasants remains poor. The country has the longest list of birds believed to be threatened with extinction. In many cases, however, 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 pheasants prevents any objective assessment through which to propose appropriate conservation actions. New information on the threatened species of pheasant known to occur on the island (Bornean peacock-pheasant, Bulwer's pheasant, and crestless fireback) is needed, but there is an urgent requirement for all existing information to be collated and assessed.

**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 easy, but there is much scope for surveys in many parts of the island at various times of year. The PSG will attempt

to collate any site records for other species in Borneo, as well as any unexpected absences. These data will be sent to relevant SSC Specialist Groups. At a minimum, information on exact locality, altitude, date, and habitat type should be collected. All information on Galliformes species should be made available to the Asian Galliformes Sites Database (Project 3).

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

**Resources:** needs will vary depending on the length and scope of individual surveys.

## 4.3 Strategic projects

### Project 9. Taxonomic re-assessment of pheasants

**Aim:** to develop a stable nomenclature and taxonomy for the pheasants.

**Justification:** the species remains the most practical level at which to direct conservation action. Such action, therefore, relies on the correct identification of species and the robust definition of species limits. However, recent advances in taxonomic thinking (e.g., species concepts, Evolutionarily Significant Units), and especially phylogenetic analyses based on DNA sequences, have thrown into some doubt the validity of certain pheasant



Research is required on the Bulwer's pheasant of Borneo to assess more accurately its conservation status.

© Lynx Edicions



Edwards's pheasant. The taxonomic status of the Vietnamese lowland *Lophura* pheasants is currently under investigation.

J. Howman

taxa. There is now a need for a comprehensive re-assessment of pheasant taxonomy, focusing, in particular, on the distinctness of several forms that have variously been treated as subspecies and full species in the past.

**Project description:** a variety of taxonomic methods should be used to examine the question of species limits in pheasants, as well as to construct phylogenies within the pheasants and to understand their position within the family Phasianidae, which includes the Old World partridge species. Particular taxa in need of further attention are: the imperial, Edwards's, and Vietnamese pheasants; the silver and kalij pheasant complex; the green peafowl subspecies; putative subspecies of Sclater's monal; Salvadori's and Sumatran pheasants; crested and crestless firebacks; the eared-pheasants; crested argus; and great argus.

**Timescale:** this will require three to five years' work.

**Resources:** this project requires at least one full-time, experienced researcher with access to a range of specimens and a well-equipped molecular genetics laboratory.

### Project 10. Effective management of captive pheasant stocks

**Aims:** to create studbooks for additional species; to purge captive populations of hybrid lines; to design optimal breeding programmes.

**Justification:** some captive populations can be viewed as insurance against the extinction of species in the wild. For

this reason, the effective management of captive populations to minimise inbreeding and interpopulation hybridisation, whilst maintaining genetic diversity, have become widely recognised objectives of *ex situ* breeding programmes. Re-introduction or supplementation programmes may be needed in the future, for which vigorous captive stocks must be available. Healthy captive populations are also important for providing material for morphological, genetic, phylogenetic, and behavioural research, as well as raising conservation awareness through attractive zoo exhibits, particularly when these are within the native ranges of threatened species. Circumstantial evidence for the introgression of domestic fowl genes into junglefowl species' gene pools also requires further investigation.

**Project description:** the existing set of international and regional studbooks should be maintained. Additional candidate species for *ex situ* management to this high standard include Elliot's pheasant, bronze-tailed peacock-pheasant, Germain's peacock-pheasant, and Palawan peacock-pheasant. Work using DNA samples to identify and purge hybrid lines within captive populations should be expanded to include additional species, and the same techniques applied to investigate the true level of mixing between domestic fowl and wild junglefowl throughout their common range. Use of established software packages for designing captive breeding programmes should be standard practice.

**Timescale:** this work needs to be continuous.

**Resources:** funding is required to maintain studbooks and conduct any necessary genetic screening.

## Project 11. Developing methods for re-introduction of pheasants

**Aims:** to investigate and test different methods for re-introducing pheasants; to evaluate the use of such techniques in pheasant conservation.

**Justification:** when a species or subspecies disappears from all or part of its range, saving it from extinction may depend on the successful re-introduction into the wild of birds bred in captivity or translocated from elsewhere in the species' range. For future re-introductions to succeed, it is essential that breeding, trapping, and translocation techniques are adapted to suit local conditions and particular species.

**Project description:** ideally, non-threatened pheasant species should be chosen as test subjects for this project (e.g., silver pheasant, kalij pheasant, red junglefowl). Areas containing suitable habitats, but lacking pheasant populations, should be identified as release sites, with founder birds or eggs being taken from local wild populations, as well as from captive birds in different experiments. Survival and reproduction of the re-introduced birds should be monitored in comparison to wild ones at control sites, or in the same places in the case of supplementation (i.e. re-stocking) experiments.

**Timescale:** this project is expected to require at least three years to collect basic data on the survival and breeding success of released birds, but a longer-term monitoring programme should be established.

**Resources:** each project requires an experienced ecologist and a team of field assistants, plus radio-tracking equipment.

## Project 12. Deriving and implementing habitat management strategies for better-known threatened pheasants

**Aims:** to use existing research results to produce feasible habitat management recommendations; to implement these and monitor their impact.

**Justification:** recent research on a number of threatened species (e.g., Cabot's tragopan, cheer pheasant, Elliot's pheasant) has produced results that can now be translated into management action for their conservation. Such recommendations should be made explicit, be implemented on the ground, and be monitored for their effectiveness.

**Project description:** in the case of Cabot's tragopan, plans should be developed with provincial forestry departments enabling replacement of some conifer plantations, after felling, with native broadleaf woodland including

*Daphniphyllum macropodum*, a tree species known to be used for food by this species. For cheer pheasant, the grass and scrub management regimes that produce conditions favouring population persistence need to be reproduced in new areas. For Elliot's pheasant, management of conifer plantations should be focused on encouraging the vigorous growth of the understorey vegetation and assessing the effects of this on abundance. In all cases, these management regimes should be monitored over the long term to assess the effectiveness of the strategies adopted, with a view to improving them further and applying them on a larger scale.

**Timescale:** projects need to be of at least five years' duration, with even longer-term monitoring recommended.

**Resources:** these projects would necessarily involve local forestry and wildlife protection agency staff working at study sites, as well as an experienced ecologist and a team of field assistants in each case.

## 4.4 Projects for Critically Endangered and Endangered species

### Project 13. Vietnamese lowland *Lophura* pheasants

**Aims:** to clarify the taxonomic status of the imperial, Edwards's, and Vietnamese pheasants; to conduct further distribution surveys and research into habitat use; to continue improving the management of captive populations.

**Justification:** there is confusion over whether these three forms of lowland *Lophura* pheasant in Vietnam represent one, two, or three species. As they currently include two of the three most severely threatened pheasants in the world, the outcome of taxonomic research could have profound effects on the future direction of conservation work for them. Extremely little is known in detail about the habits and habitat requirements of these birds in the wild, so additional distribution and habitat use data are required. Existing and planned protected areas can then be better managed for their conservation. The populations of Edwards's and Vietnamese pheasants in captivity may nevertheless represent a real insurance against their total extinction.

**Project description:** taxonomic investigations are underway, but more data are required before a stable consensus can be reached. Information on populations that comes to light from survey work and poster campaigns directed at local people, data on habitat use, and particularly findings on their tolerance of secondary and degraded forest, will be extremely valuable. There is an immediate need for the protection of the Net River watershed for Vietnamese

pheasant, and full declaration of the Phong Dien and Dakrong Nature Reserves for Edwards's pheasant. Initiatives to reduce the reliance of local people on forest resources in these areas need to be expanded and monitored for their ecological impacts. The Edwards's pheasant population in captivity has been subject to hybridisation with Swinhoe's pheasant in the past, and is in need of further screening and decontamination.

**Timescale:** work on these species should be continuous.

**Resources:** several different things are required: an experienced molecular taxonomist with access to a well-equipped laboratory; ecologists to do year-round surveys; educators for environmental awareness campaigns; and the resources of the forestry and wildlife protection agencies in the key protected areas.

#### **Project 14. Bornean peacock-pheasant (*Polyplectron schleiermacheri*)**

**Aims:** to conduct extensive surveys to determine distribution; to recommend additional protected areas as necessary.

**Justification:** this species is extremely elusive and there are very few confirmed sightings, but a recent questionnaire survey in central Kalimantan revealed that it may be more widespread than was previously thought. Thus, there is now an urgent need to conduct field surveys to locate wild populations, protect them, and study habitat use.

**Project description:** highly targeted field surveys of this species should be conducted to confirm in which habitats it is found and to locate the main centres of abundance. In particular, the Paitan River region in Sabah should receive attention as there are several records from this area. A large-scale assessment of the degree of fragmentation of populations is then required, so that areas supporting viable populations can be identified. These should then become the focus for protected area designation and management. Immediate attention should be given to supporting the proposed Bukit Raya National Park extension, a measure that will safeguard potential important habitat for this species in Kalimantan.

**Timescale:** surveys of any duration will provide useful information about the range and abundance of this species, but a long-term approach will be needed for advocacy work and habitat utilisation studies.

**Resources:** needs will vary depending on the length and scope of individual projects, but individual surveys of great value could be conducted relatively cheaply.

## **4.5 Projects for Vulnerable species**

### **Project 15. Brown eared-pheasant (*Crossoptilon mantchuricum*)**

**Aims:** to identify gaps in the existing protected area network covering this species; to conduct surveys in Shaanxi to identify additional viable populations; to develop management plans for four crucial protected areas.

**Justification:** habitat loss over several centuries has led to increasing fragmentation in the range of this species, and the remaining small subpopulations are vulnerable to further decline, owing to continuing habitat loss and other threats (e.g. collection of fungi in spring). There is an urgent need to limit further habitat loss and to identify habitat fragments in which new protected areas should be established. Management proposals are also required for the four protected areas (Luyashan, Pangquangou, Wulushan, and Xiaowutai Shan) originally set up to protect this species.

**Project description:** the first step should be a large-scale assessment of how well populations of this species are represented in the existing protected area network. Gaps in the network need to be identified and recommendations made for new and extended protected areas where these are likely to improve the survival prospects of some populations. Further survey work in Shaanxi is necessary to define the distribution of populations there. Proposals for more effective management within the existing protected areas need to be developed and promoted to the appropriate authorities. There is an immediate opportunity to evaluate the effects of one specific management recommendation, namely reducing predation on nests by collectors of forest fungi, as this has recently been implemented in the light of research findings at Pangquangou.

**Timescale:** this work is ongoing and should be continued, although individual elements such as surveys and protected area network assessment could be conducted independently.

**Resources:** a field survey team is required for Shaanxi. In addition, an experienced ecologist for assessment of the fungus-collecting ban at Pangquangou, access to expertise on large-scale conservation assessment, and the resources of the forestry and wildlife protection agencies at the key protected areas are needed.

### **Project 16. Elliot's pheasant (*Syrmaticus ellioti*)**

**Aims:** to assess the adequacy of the existing protected area network through surveys and a large-scale review; to conduct ecological studies, particularly focused on habitat



use in broadleaf woodland habitats; to produce management plans for key protected areas.

**Justification:** although this pheasant occurs in several protected areas, there is a need for an assessment of whether viable populations exist in these places, leading to protected area extensions or new designations. Ecological work has concentrated on its marginal conifer plantation habitats so far, with less emphasis on its original and more threatened broadleaf and mixed forest habitats. Existing and future research results need to be translated into management action in protected areas.

**Project description:** survey work should be conducted in protected areas known to contain populations of this species to assess the likely long-term viability of both the pheasant populations, and the habitat within and surrounding each reserve. This will require the development of a reliable census technique. These data can then be assembled into a large-scale assessment of the efficacy of the protected area network for this species. Further studies of habitat use in evergreen and deciduous broadleaf and mixed conifer forest are required on a year-round basis. These might be combined with detailed population monitoring of some populations to assess spatial trends in relation to various habitat types used by this species.

**Timescale:** surveys of any duration will provide useful information, but a long-term approach should be adopted for the ecological studies.

**Resources:** needs will vary depending on the length and scope of individual projects, but individual surveys and protected area assessments could be conducted relatively easily.

## Project 17. Hume's pheasant (*Syrmaticus humiae*)

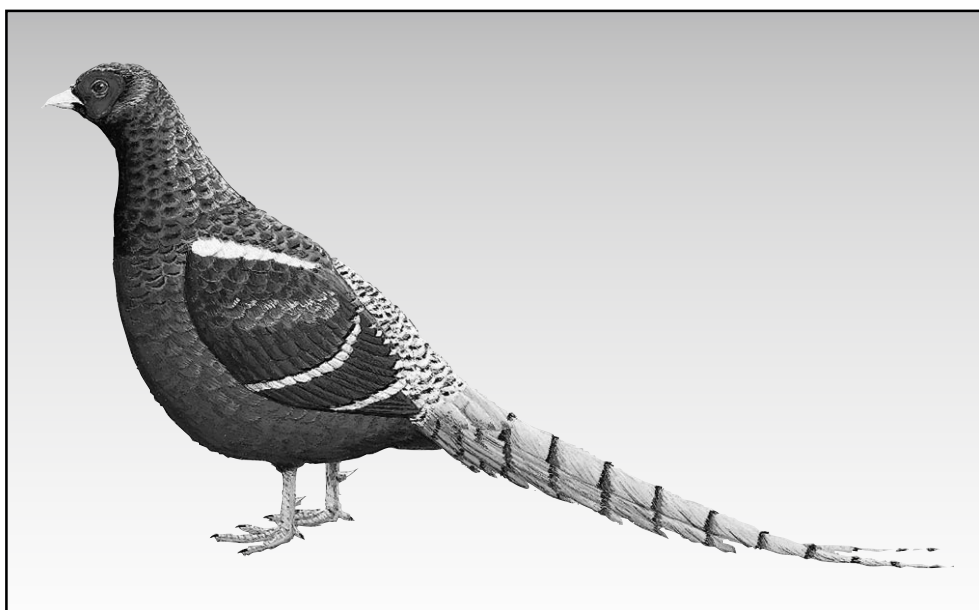
**Aims:** to conduct surveys in eastern Yunnan and northern Myanmar; to collate status and habitat information from Thailand; to investigate the utility of secondary and successional habitats for this species.

**Justification:** a large segment of the historical range of this species lies within Myanmar, where there have been few recent field survey opportunities. Until this area and eastern Yunnan are surveyed for this species, it is difficult to judge its threat status with much confidence. It is also important to carry out research to determine how dependent this species is on open or sparsely forested habitat patches, and to establish its tolerance of secondary habitats (e.g. conifer areas in Thailand).

**Project description:** surveys should be conducted in northern Myanmar and eastern Yunnan to establish the current distribution and, if possible, relative population densities in different habitat types. Information on its remnant status in relation to human impacts in Thailand should be collated, and ecological research should focus on its use of secondary and successional habitats.

**Timescale:** surveys of any length can provide useful information about some of the lesser-known areas of this species' range. Ecological studies will require a long-term approach.

**Resources:** individual surveys could be brief, but substantial funding would be required for the study in Thailand.



Little is known of the subspecies *burmanicus* of the Hume's pheasant, because most of its supposed historical range lies in Myanmar.

© Lynx Editions

## **Project 18. Reeves's pheasant (*Syrmaticus reevesii*)**

**Aims:** to conduct an intensive ecological study of habitat requirements in different kinds of forest; to assess the adequacy of the existing protected area network in supporting viable populations of this species; to conduct a conservation awareness programme with the aim of reducing illegal hunting and egg collection.

**Justification:** the Reeves's pheasant was formerly a common and widespread species, but its range is now severely fragmented and it has already disappeared from many previously forested areas. It occurs in several reserves, but there is a need to assess whether viable populations exist in these places. In addition, more sympathetic management strategies are required to halt further declines and fragmentation of this species' habitat. Ways should also be found to reduce the levels of illegal hunting.

**Project description:** survey work should be conducted in the various protected areas known to contain populations of this species to determine the viability of both the pheasant populations, and the habitat within and surrounding each reserve. These data can be assembled into a large-scale assessment of the efficacy of the protected area network for this species, and further designations recommended if necessary. To help improve management within protected areas, further ecological study of habitat use in different kinds of forest (temperate, subtropical, and conifer) at all seasons of the year is required. This can be combined with detailed monitoring of some populations to look at trends in relation to various habitat management approaches. This species would make a suitable flagship for raising public awareness of conservation, with the aim of reducing the amount of illegal hunting and egg collecting.

**Timescale:** surveys of any duration will provide useful information about the range and abundance of this species, but a long-term approach should be developed for management recommendation work, ecological studies, and the conservation awareness programme.

**Resources:** needs will vary depending on the length and scope of the component projects, but individual surveys and the protected area assessment could be conducted relatively easily.

## **Project 19. Mountain peacock-pheasant (*Polyplectron inopinatum*)**

**Aims:** to conduct further distribution surveys to clarify the full range of this species; to monitor populations where the

species is known to occur; to support the re-establishment of one protected area and the designation of another.

**Justification:** the mountain peacock-pheasant is endemic to central Peninsular Malaysia, where there are recent records from just 12 localities. Its extremely small global range makes it vulnerable to habitat loss and fragmentation. Conversion of land to agriculture is a potential threat to this species, as is a proposed road-building project to link the hill stations of Genting Highlands, Fraser's Hill and Cameron Highlands. The main priority is to monitor populations of this species within protected areas to ensure that any declines can be noted quickly, and action can be taken to identify and correct their causes. This high profile species could be used as a flagship in a public awareness programme for promotion of the protected area concept in Malaysia.

**Project description:** surveys should be conducted to document its distribution and status, especially in the area just to the north of its present known range. At sites where it has already been recorded, monitoring programmes should be established after developing census techniques appropriate to the species. Any changes in status should trigger a process to identify the threats contributing to the decline. A campaign should be mounted for the establishment of a protected area in the Main Range and the re-establishment of the one at Cameron Highlands. The value of a large-scale conservation awareness programme for this and other threatened forest-dwelling species in Peninsular Malaysia should be investigated.

**Timescale:** surveys of any duration will provide useful information, but a long-term approach should be developed for the monitoring and public awareness work.

**Resources:** needs will vary depending on the length and scope of the component projects, but individual surveys could be conducted relatively easily.

## **Project 20. Germain's peacock-pheasant (*Polyplectron germaini*)**

**Aims:** to survey remaining suitable areas in Vietnam and eastern Cambodia; to conduct research into the use of secondary and degraded habitats; to encourage better management of protected areas containing populations of this species.

**Justification:** this species is only known from southern Vietnam, but may still occur in eastern Cambodia. Its range has been severely reduced and fragmented through commercial logging activity and the resettlement of human

populations, which have increased the levels of hunting and habitat disturbance. There is, therefore, an urgent need to survey all remaining blocks of suitable forest within its presumed historical range, as well as to measure the species' tolerance of various forms of habitat degradation and disturbance. It would clearly benefit from the designation of additional protected areas.

**Project description:** areas of remaining suitable habitat should be identified and survey work conducted to assess whether further populations of this species exist. Particular attention should be focused on Bui Gia Map Nature Reserve in Vietnam. More intensive research into its use of secondary habitats, and tolerance to human disturbance should be undertaken. The results of this work can be used to formulate sympathetic management policies for protected areas. Advocacy for these should be combined with finding ways to reduce the level of hunting.

**Timescale:** surveys of any length will help provide useful data, but a longer-term approach will be needed for studies of habitat use and the implementation of protected area management policies.

**Resources:** needs will vary depending on the length and scope of individual projects, but individual surveys could be conducted relatively easily.

### **Project 21. Malaysian peacock-pheasant (*Polyplectron malacense*)**

**Aims:** to conduct surveys and document habitat preferences; to translate this information into habitat management proposals for protected areas.

**Justification:** this species is found only in the Thai-Malay Peninsula. It is virtually extirpated from Thailand and has suffered a 75% reduction in available habitat in Malaysia over the past 30 years. Because it is dependent on level, lowland forest, it is highly vulnerable to habitat destruction through logging and clearance of habitat for agriculture. Further information on its precise habitat requirements is needed, and monitoring programmes must be established for existing populations so that future declines are identified and remedial action taken rapidly.

**Project description:** further survey work should be conducted to measure population sizes and precise distributions of known populations, particularly within the protected areas of Taman Negara National Park and Krau Wildlife Reserve. This will form a basis for future monitoring work, as well as allowing a detailed analysis of habitat preferences to be made. All this information should be translated into specific management

recommendations for protected areas. Known populations should be monitored at regular intervals, with parallel measurement of habitat degradation and disturbance, in an attempt to identify the causes of any significant declines.

**Timescale:** surveys of any length will help provide useful data, but a long-term approach will be needed for studies of habitat preferences and the development of protected area management proposals.

**Resources:** needs will vary depending on the length and scope of individual projects, but individual surveys could be conducted relatively easily.

### **Project 22. Palawan peacock-pheasant (*Polyplectron emphanum*)**

**Aims:** to conduct surveys in remaining areas of lowland forest on Palawan; to conduct a wide-ranging conservation awareness programme to reduce the levels of illegal hunting and trapping.

**Justification:** this species is found only on the island of Palawan in the Philippines. It has been recorded from 20 sites and has a fragmented distribution along the length of the island. Extensive deforestation, much of it illegal, has led to drastic reduction and fragmentation of the habitat available, and over-hunting has probably caused a marked decline in numbers in places. There is an urgent need for the protection of areas where viable populations of this species still exist, and a conservation awareness programme may help reduce hunting pressure everywhere.

**Project description:** initially, further survey work should be conducted, concentrating on remaining tracts of lowland forest, particularly south of Brooke's Point, on the slopes of Mount Victoria, and in the north of the island. Ways should be sought to enforce the hunting restrictions that cover the whole of Palawan. This may require the combination of a conservation awareness campaign with more detailed proposals on the management of protected areas. The proposal for a large extension to St Paul's Subterranean River National Park should be supported.

**Timescale:** surveys of any length will help provide useful data, but a long-term approach will be needed for the conservation awareness programme and protected area management innovations.

**Resources:** the conservation awareness programme will require substantial funding, but individual surveys could be conducted relatively easily.

### **Project 23. Crested argus (*Rheinardia ocellata*)**

**Aims:** to conduct further surveys of this species in Laos and Vietnam; to monitor known populations in Malaysia; to investigate the taxonomic relationship between the two subspecies.

**Justification:** this species occurs in two disjunct populations (one in Vietnam and Laos, and the other in Taman Negara National Park in Peninsular Malaysia) and the taxonomic relationship between the two populations has not yet been established. There has been a severe decline in this species, and its populations have become fragmented as a result of long-term loss of habitat from deforestation inside and outside protected areas, as well as hunting and trapping in Indochina. Monitoring programmes are urgently required to detect future population trends and the reasons for any further declines.

**Project description:** further surveys are required in the range of the nominate subspecies in Vietnam and Laos to clarify the extent of its distribution. In Malaysia, all subpopulations of subspecies *nigrescens* should be monitored at regular intervals, as should habitat loss from areas surrounding the national park. Proposals should be developed to enforce bans on hunting in protected areas containing this species in Indochina. These should form part of a wide-ranging conservation awareness programme to highlight the plight of this species and ways in which its future can be safeguarded. Taxonomic research should be conducted to assess the distinctiveness of the two subspecies.

The crested argus is found in two widely separated populations, which are becoming fragmented.



M. Khan

**Timescale:** surveys of any duration will provide useful information, but a long-term approach should be developed for the monitoring and conservation awareness work.

**Resources:** needs will vary depending on the length and scope of the component projects, with the molecular taxonomy requiring an experienced researcher and access to a well-equipped laboratory. Individual surveys, however, could be conducted relatively easily.

### **Project 24. Congo peafowl (*Afropavo congensis*)**

**Aims:** to survey lesser-known parts of this species' range; to monitor populations within three protected areas.

**Justification:** Congo peafowl is the only pheasant species native to Africa and, as such, is extremely important from a conservation point of view. Survey work has shown that its populations are highly fragmented, and ever more threatened by the presence of large numbers of mining and refugee settlements. The western parts of its range still remain unexplored in recent times. There is an urgent need to ensure that some viable populations are safeguarded within protected areas.

**Project description:** survey work should now concentrate on the lesser-known southern and western parts of this species' range. Known populations within protected areas (Maiko National Park, Okapi Wildlife Reserve, and Kahuzi-Biega National Park) should be monitored at regular intervals. In addition, Salonga National Park should be explored for its potential role in the conservation of this species.

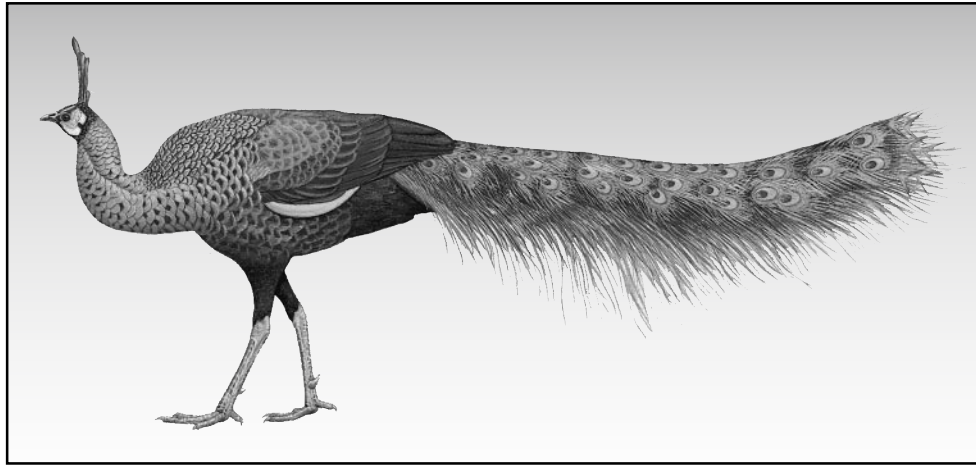
**Timescale:** surveys of any duration will provide useful additional information, but a long-term approach should be developed for the monitoring work.

**Resources:** needs will vary depending on the length and scope of individual projects, but individual surveys could be conducted relatively cheaply.

### **Project 25. Green peafowl (*Pavo muticus*)**

**Aims:** to conduct surveys in Myanmar and Cambodia; to advocate the establishment of additional protected areas in Yunnan and Vietnam; to conduct wide-ranging public awareness programmes to highlight the vulnerability of this species to hunting pressure and trade in its train feathers.

**Justification:** although formerly very widespread and common, the green peafowl has undergone a massive



Once a widespread and common species, the green peafowl has undergone a dramatic decline, and is now considered Vulnerable to extinction.

© Lynx Edicions

reduction in range and is now found only in scattered populations. There is every reason to believe that the decline has not yet been halted, and the global population is now believed to be between 5,000 and 10,000 individuals. Hunting and, perhaps, poisoning as a crop pest in China, are thought to be the main reasons for its decline, but its riverine habitats are also especially prone to degradation and encroachment.

**Project description:** the size of this species' geographical range makes prescribing a single approach difficult, and work will have to be modified to suit the circumstances in each range state. Further studies on habitat requirements are important, as much remains to be discovered about this species' tolerance of habitat change. Extensive conservation awareness projects should be initiated across its range, but particularly in Cambodia. Such projects should focus on how the green peafowl's relationship with humans can be harnessed to further the conservation of this species. Efforts should be made to link work to ongoing conservation initiatives such as the Phou Khao Khouay National Biodiversity Conservation

Area in Laos. Further surveys should be carried out in Myanmar and Cambodia to assess the distribution of remaining populations, and surveys in India should ascertain whether any birds remain (e.g. in Buxa Tiger Reserve, West Bengal). There should be advocacy for further protected areas in Yunnan and southeast Gia Lai Province (Vietnam), where important populations are in need of protection. In addition, populations within Indochinese protected areas that are subject to high levels of hunting need to be safeguarded through the development of effective reserve management and law enforcement policies.

**Timescale:** some of this work takes the form of short-term surveys, whilst other aspects such as conservation awareness projects, research into census methods and habitat use, and lobbying for protected areas must be longer term or continuous.

**Resources:** a wide range of options for funding exist to help in the overall conservation effort for this ideal flagship species.

# References

- 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. and Ripley, S.D. 1983. *Handbook of the birds of India and Pakistan*. Compact edition. Oxford University Press, Delhi.
- Anon. 1998. Around the Orient: Malaysia. *Oriental Bird Club Bulletin* 27:18–19.
- Anon. 1999. Project round-up: Western tragopan *Tragopan melanocephalus*. *Tragopan* 11:3.
- 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. 1930. *Game-birds of India, Burma and Ceylon*. John Bale and Son, London.
- Bean, N.J., Benstead, P.J., Showler, D., and Whittington, P.A. 1994. *Survey of western tragopan in the Palas Valley*. Unpublished report. HJP, Islamabad.
- Beebe, W. 1918–22. *A monograph of the pheasants*. Four volumes. Witherby, London.
- Beebe, W. 1936. *Pheasants, their lives and homes*. Second edition. Doubleday, Doran and Co., New York.
- Bell, C. 1995. Tracking the elusive monal. *Zoonoos* 68: 8–13.
- BirdLife International. in prep. *Threatened birds of Asia: The BirdLife International/IUCN Red Data Book*. BirdLife International, Cambridge.
- BirdLife International. 2000. *Threatened birds of the world*. Lynx Editions, Barcelona and BirdLife International, BirdLife Conservation Series, Cambridge.
- Boyce, M.S. 1992. Population viability analysis. *Annual Review of Ecology and Systematics* 23:481–506.
- Brazil, M.A. 1991. *The birds of Japan*. Christopher Helm, London.
- Brickle, N.W., Nguyen Cu, Ha Quy Quynh, Nguyen Thai Tu Cuong, and Hoang Van San. 1998. *The status and distribution of green peafowl Pavo muticus in Dak Lak Province, Vietnam*. BirdLife International Vietnam Programme, Hanoi.
- Bump, G. 1941. The introduction and transplantation of gamebirds and mammals into the state of New York. *Transactions of the North American Wildlife Conference* 5:409–420.
- 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):315–416.
- Chasen, F.N. and Hoogerwerf, A. 1941. The birds of the Netherlands Indian Mt Leuser Expedition 1937 to North Sumatra. *Treubia* 18 (suppl.).
- Chauhan, B.S. and Sharma, V. 1991. Status of western tragopan in Himachal Pradesh, India. *WPA News* 34:25–28.
- Cheng Tso-hsin. 1987. *A synopsis of the avifauna of China*. Paul Parey Scientific Publications, Hamburg and Berlin.
- Cheng Tso-hsin. 1997. On the systematic status of *Crossoptilon harmani*. *Annual Review of the World Pheasant Association 1996/97*:31–32.
- Choudhury, A. 1991. Wildlife in Manipur – a preliminary survey. *Tiger Paper* 19:20–28.
- Choudhury, A. 1997. New localities for Blyth's tragopan from Nagaland, India. *Tragopan* 6:11–12.
- Ciarpaglini, P. and Hennache, A. 1995. Delacour's expeditions to Vietnam from which the captive stock of Edwards's pheasant originated. *Annual Review of the World Pheasant Association 1994/95*:113–119.
- 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., Crosby, M.J., and Stattersfield, A.J. 1994. *Birds to watch 2: The world list of threatened birds*. BirdLife International, BirdLife Conservation Series No. 4, Cambridge.
- Collar, N.J., Mallari, N.A.D., and Tabaranza, B.R. Jr. 1999. *Threatened birds of the Philippines: The Haribon Foundation/BirdLife International Red Data Book*. Bookmark Inc., Makati City.
- Cramp, S. and Simmons, K.E.L. (eds.). 1980. *The birds of the western Palearctic*, Volume 2. Oxford University Press, Oxford.
- Crowe, T.M., Keith, G.S., and Brown, L.H. 1986. Galliformes. Pp. 1–75 In: Urban, E.K., Fry, C.H. and Keith, S. (eds.). *The Birds of Africa*, volume II, pp. 1–75. Academic Press, London.
- 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.
- Danielsen, F. and Heegaard, M. 1995. The birds of Bukit Tigapuluh, southern Riau, Sumatra. *Kukila* 7:99–120.
- Davison, G.W.H. 1977. Studies of the crested argus I: History and problems associated with the species in Malaysia. *Journal of the World Pheasant Association* 2:46–50.

- Davison, G.W.H. 1978a. Further notes on *Lophophorus slateri*. *Bulletin of British Ornithologists' Club* 98:116–118.
- Davison, G.W.H. 1978b. Studies of the crested argus II: Gunong Rabong 1976. *Journal of the World Pheasant Association* 3:46–53.
- Davison, G.W.H. 1979. Studies of the crested argus III: Gunong Rabong 1977. *Journal of the World Pheasant Association* 4:76–80.
- Davison, G.W.H. 1980. The type locality of *Rheinartia ocellata nigrescens* Rothschild. *Bulletin of British Ornithologists' Club* 100:141–143.
- Davison, G.W.H. 1981. Diet and dispersion of the great argus *Argusianus argus*. *Ibis* 123:485–494.
- Davison, G.W.H. 1983. Behaviour of Malay peacock-pheasant *Polyplectron malacense* (Aves: Phasianidae). *Journal of Zoology* 201:57–65.
- Davison, G. 1996. Why are *Lophura* pheasants so variable? *Annual Review of the World Pheasant Association 1995/96*:34–38.
- Davison, G.W.H. 1997. Bird observations in the Muratus Mountains, Kalimantan Selatan. *Kukila* 9:114–121.
- Davison, G.W.H. and Scriven, K.W. 1987. Recent pheasant surveys in Peninsular Malaysia. Pp. 90–101 *In*: Savage, C.D.W. and Ridley, M.W. (eds.). *Pheasants in Asia 1982*. World Pheasant Association, Reading.
- Dekker, R.W.R.J., Fuller, R.A., and Baker, G.C. (eds.). in press. *Megapodes – Status survey and conservation action plan 2000–2004*. IUCN, Gland and Cambridge.
- Del Hoyo, J., Elliot, A., and Sargatal J. (eds.). 1994. *Handbook of the birds of the world*. Lynx Edicions, Barcelona.
- Delacour, J. 1977. *The pheasants of the world*. Second edition. Spur Publications, Hindhead.
- Ding Ping. 1998. Studies on the ecology and conservation of Elliot's pheasant. *Newsletter of the China Ornithological Society* 7:38–39.
- Ding Ping and Zhuje Yang. 1990. The ecology of Elliot's pheasant in the wild. Pp. 65–68 *In*: Hill, D.A., Garson, P.J., and Jenkins, D. (eds.). *Pheasants in Asia 1989*. World Pheasant Association, Reading.
- Ding Ping, Yang Yuewei, Liang Wei, Jiang Shiren, and Zhuge Yang. 1996. The habitats of Elliot's pheasant in Leigong Mountain Nature Reserve. *Acta Zoologica Sinica* 42 (Suppl.):62–68.
- Duckworth, J.W., Salter, R.E. and Khounbolin, K. (compilers). 1999. *Wildlife in Lao PDR: 1999 Status Report*. IUCN – The World Conservation Union/ Wildlife Conservation Society/Centre for Protected Areas and Watershed Management, Vientiane.
- Duke, G. 1990. Using call counts to compare western tragopan populations in Pakistan's Himalaya. Pp. 116–123 *In*: Hill, D.A., Garson, P.J., and Jenkins, D. (eds.). *Pheasants in Asia 1989*. World Pheasant Association, Reading.
- Duke, G. 1993. A participatory approach to conservation in Pakistan: Safeguarding the tragopans and forests of the Palas Valley, Indus Kohistan. Pp.ii–vi *In*: Jenkins, D. (ed.). *Pheasants in Asia 1992*. World Pheasant Association, Reading.
- Dupain, J. and van Krunkelsven, E. 1996. Recent observations of the Congo peacock *Afropavo congensis* in the Equateur Province, Zaire. *Ostrich* 67:94–95.
- Dutson, G. 1990. Birds of Barito Ulu in Borneo. *Oriental Bird Club Bulletin* 12:16–20.
- Eames, J.C. and Robson, C.R. 1991. *Forest bird surveys in Vietnam, preliminary report*. International Council for Bird Conservation, Cambridge.
- 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.
- Evans, T. 1997. The green peafowl *Pavo muticus* in Laos. *Tragopan* 6:9–10.
- Evans, T.D. and Timmins, R.J. 1996. The status of the green peafowl *Pavo muticus* in Laos. *Forktail* 11:11–32 (as amended by errata in *Forktail* volume 12).
- Eve, R. 1997. Edwards's pheasants, naturalists and the history of its rediscovery. Pp. 65–67 *In*: Hennache, A. (coord.). *The International Studbook for Edwards's Pheasant and its Conservation*. Museum National d'Histoire Naturelle, Service des publications scientifiques, Paris.
- Fogden, M.P.L. 1965. Borneo bird notes, 1963–65 (from various hands). *Sarawak Museum Journal* 12:395–413.
- Fuller, R.A., Carroll, J.P., and McGowan, P.J.K. (eds.). in press. *Partridges, quails and francolins – Status survey and conservation action plan 2000–2004*. IUCN, Gland and Cambridge.
- Gao Yu-ren. 1998. Conservation status of endemic Galliformes on Hainan Island, China. *Bird Conservation International* 8:411–416.
- Garson, P.J. and Gaston, A.J. 1989. The conservation of forests and wildlife in Himachal Pradesh. Pp.39–54 *In*: Allchin, N.B., Allchin, F.R., and Thapar, B.K. (eds.). *Conservation of the Indian Heritage*. Cosmo Publications, New Delhi.
- Garson, P.J., Young, L., and Kaul, R. 1992. Ecology and conservation of the cheer pheasant *Catreus wallichii*, studies in the wild and the progress of a reintroduction project. *Biological Conservation* 59:25–35.
- Gaston, A.J. and Garson, P.J. 1992. *Himachal wildlife project – III. A re-appraisal of the Great Himalayan National Park*. Unpublished report to Himachal Pradesh Department of Forest Farming & Conservation, International Trust for Conservation, WorldWide Fund for Nature – India, and the Oriental Bird Club.

- Gaston, A.J., Garson, P.J., and Hunter, M.L. 1981. Present distribution and status of pheasants in Himachal Pradesh, western Himalayas. *Journal of the World Pheasant Association* 6:10–30.
- Gaston, A.J., Garson, P.J., and Hunter, M.L. 1983a. The status and conservation of forest wildlife in Himachal Pradesh, western Himalayas. *Biological Conservation* 27:291–314.
- Gaston, A.J., Islam, K., and Crawford, A.J. 1983b. The current status of the western tragopan. *Journal of the World Pheasant Association* 8:40–49.
- Ghose, D. 1997. *Report of the Blyth's project study conducted between February and May 1997*. Unpublished interim report to the World Pheasant Association, South Asia Regional Office.
- Girdler, R. 1996. Surveys for the Palawan peacock-pheasant. *Tragopan* 5:3.
- Gore, M.E.J. 1968. A check-list of the birds of Sabah, Borneo. *Ibis* 110:165–196.
- Gonzales, R.B. and Alcalá, A.C. 1969. Rare and threatened Philippine vertebrates. *Philippines Biota* 4:6–13.
- Gonzales, R.B. and Rees, C.P. 1988. *Birds of the Philippines*. Haribon Foundation for the Conservation of Natural Resources, Manila.
- Griffith, B., Scott, J.M., Carpenter, J.W., and Reed, C. 1989. Translocation as a species conservation tool: Status and strategy. *Science* 245:477–480.
- Grimmett, R., Inskipp, C., and Inskipp, T. 1998. *Birds of the Indian Subcontinent*. Christopher Helm, London.
- Grimwood, T. 1974. The present status of the Palawan peacock-pheasant. *Pheasant Trust Annual Report 1974*:9–10.
- Han Lian-xian. 1997. Study on distribution and habitat of *Syrnaticus humiae* in Yunnan. *Chinese Journal on Biodiversity* [official English name unknown] 5(3):185–189.
- Hardin, G. 1968. The tragedy of the commons. *Science* 162:1243–1248.
- Harrison, T. 1965. A future for Borneo's wildlife? *Oryx* 8:99–104.
- Hart, J.A. and Upoki, A. 1997. Distribution and conservation status of Congo peafowl *Afropavo congensis* in eastern Zaire. *Bird Conservation International* 7:295–316.
- He Fen-qi and Lu Tai-chun. 1991. Changes in status and distribution of Chinese pheasants. *WPA News* 31:19–24.
- He Fen-qi, Lu Tai-chun, and Cui Xue-zheng. 1988. Ecology of the Chinese monal (*Lophophorus lhuysii*). *Journal of the World Pheasant Association* 13:42–49.
- Hennache, A. (coord.) 1997a. *The international studbook for Edwards's pheasant and its conservation*. Museum National d'Histoire Naturelle, Service des publications scientifiques, Paris.
- Hennache, A. 1997b. Demographic characteristics of the captive population of the Edwards's pheasant. Pp. 127–133 In: Hennache, A. (coord.). *The International Studbook for Edwards's Pheasant and its Conservation*. Museum National d'Histoire Naturelle, Service des publications scientifiques, Paris.
- Hennache, A., Randi, E., and Lucchini, V. 1998. Genetic diversity, phylogenetic relationships and conservation of Edwards's pheasant *Lophura edwardsi*. *Bird Conservation International* 8:395–410.
- Hill, D.A. and Robertson, P.A. 1988a. *The pheasant: Ecology, management and conservation*. BSP Professional Books, Oxford.
- Hill, D.A. and Robertson, P.A. 1988b. The comparative breeding success of wild and hand-reared pheasants *Phasianus colchicus*. *Journal of Wildlife Management* 52:446–450.
- Hill, D.A., Garson, P.J., and Jenkins, D.J. (eds.). 1990. *Pheasants in Asia 1989*. World Pheasant Association, Reading.
- Holden, J. 1997. *Bird list, Kerinci Seblat National Park, Sumatra and adjoining areas*. Fauna and Flora International, unpublished.
- Holmes, D.A. 1989. Status report on Indonesian Galliformes. *Kukila* 4:133–143.
- Holmes, D.A. 1991. A new threat to the green junglefowl. *WPA News* 34:3–6.
- Holmes, D.A. 1996. Sumatra bird report. *Kukila* 8: 9–56.
- Hornbuckle, J. 1998. *Northeast India: 20 February – 13 March 1998*. Unpublished report.
- Howman, K.C.R. 1979. *Pheasants. Their breeding and management*. K and R Books, Edlington.
- Howman, K.C.R. 1993. *Pheasants of the world. Their breeding and management*. Hancock House Publishers, Surrey.
- Hudson, P.J. and Rands, M.R.W. (eds.). 1988. *Ecology and management of gamebirds*. Blackwell Scientific Publications, Oxford.
- Inskipp, T., Lindsey, N., and Duckworth, W. 1996. *An annotated checklist of the birds of the Oriental region*. Oriental Bird Club.
- Islam, K. 1987. Status and distribution of the western tragopan in northeastern Pakistan. In: Savage, C.D.W. and Ridley M.W. (eds.). *Pheasants in Asia 1982*. World Pheasant Association, Reading.
- Islam, K. and Crawford, J.A. 1986. Summary of western tragopan project in Pakistan with recommendations for conservation of the species. In: Ridley, M. (ed.). *Pheasants in Asia 1986*. World Pheasant Association, Reading.
- IUCN. 1994a. *IUCN Red List Categories*. IUCN, Gland.
- IUCN. 1994b. *1993 United Nations list of national parks and protected areas*. IUCN, Gland.



- IUCN. 1998. *IUCN guidelines for re-introductions*. Prepared by the IUCN/SSC Re-introduction Specialist Group. IUCN, Gland and Cambridge. Also accessible in English, French and Spanish at <http://www.iucn.org/themes/ssc/programs/rsg.htm>.
- Jandrotia, J.S., Sharma, V., and Katoch, S.S. 1995. A pheasant survey in the Ravi Catchment of Chamba District, Himachal Pradesh, India. *Annual Review of the World Pheasant Association 1994/95*:67–74.
- 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. 1986. *The pheasants of the world*. Oxford University Press, Oxford.
- Johnsgard, P.A. 1999. *The pheasants of the world*. Second edition. Smithsonian Institution Press, Washington D.C.
- Kalsi, R.S. 1998. *Density index and habitat associations of the cheer pheasant* *Catreus wallichii*. Final report, submitted to Oriental Bird Club and World Pheasant Association South Asia Regional Office, New Delhi.
- Katju, D. 1996. Pheasants in Mizoram, India; an impression. *Tragopan* 5:9–10.
- Katoch, S.S., Jandrotia, J.S., and Seth, M.K. 1997. Distribution of western tragopan in Chamba District of Himachal Pradesh, India. *Annual Review of the World Pheasant Association 1996/97*:33–39.
- Katti, M., Manjrekar, N., Mukherjee, S., and Sharma, D. 1990. *A report on wildlife surveys in Arunachal Pradesh with special reference to Takin*. Unpublished report to the Wildlife Institute of India.
- Kaul, R. 1989. *Ecology of the cheer pheasant* *Catreus wallichii* in *Kumaon Himalaya*. Unpublished Ph.D. dissertation, University of Kashmir, Srinagar.
- Kaul, R. 1995. Report on visit to Nepal 9–23 October 1995. *Annual Review of the World Pheasant Association 1994/95*:35–38.
- 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 1993/94*. World Pheasant Association, Reading.
- Khaling, S., Kaul, R., and Saha, G.K. 1998. Surveys of satyr tragopan *Tragopan satyra* in the Singhalila National Park, Darjeeling, India using spring call counts. *Bird Conservation International* 8:361–371.
- 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., Farrow, D., Robson, C.R., Buck, H., and Fisher, T. 1996. Recent rare pheasant observations in Chin Hills, Myanmar. *Annual Review of the World Pheasant Association 1995/96*:39–40.
- Kumar, R.S. and Singh, P. 1999. Discovery of a new monal from Arunachal Pradesh. *Oriental Bird Club Bulletin* 30:35–37.
- Lacy, R.C. 1993. VORTEX: A computer simulation model for population viability analysis. *Wildlife Research* 20:45–65.
- Lambert, F.R. 1993. Some key sites and significant records of birds in the Philippines and Sabah. *Bird Conservation International* 3:281–297.
- Lambert, F.R. 1994. *The status of the Philippine cockatoo* *Cacatua haematuropygia* in *Palawan and the Sulu Islands, Philippines*. IUCN Species Survival Commission, Gland and Cambridge.
- Lambert, F.R. and Howes, J.R. 1989. A recent sighting of Salvadori's pheasant. *Kukila* 4:56–58.
- Lambert, F.R., Eames, J.C., and Nguyen Cu. 1994. *Surveys for endemic pheasants in the Annamese Lowlands of Vietnam June–July 1994: Status of and conservation recommendations for Vietnamese pheasant* *Lophura hatinhensis* and *imperial pheasant* *L. imperialis*. IUCN Species Survival Commission, Gland and Cambridge.
- Le Trong Trai 1997. Green peafowl *Pavo muticus* in Vietnam. *Tragopan* 7:16–18.
- Le Trong Trai, Nguyen Huy Dung, Nguyen Cu, Le Van Cham, Eames J.C., and Chicoine, G. 1999a. *An investment plan for Ke Go Nature Reserve, Ha Tinh Province, Vietnam: A contribution to the management plan*. BirdLife International Vietnam Programme (Conservation Report No. 9), Hanoi.
- Le Trong Trai, Richardson, W.J., Le Van Cham, Tran Hieu Minh, Tran Quang Ngoc, Nguyen Van Sang, Monastyrskii, A.L., and Eames, J.C. 1999b. *A feasibility study for the establishment of Phong Dien (Thua Thien Province) and Dakrong (Quang Tri Province) Nature Reserves, Vietnam*. BirdLife International Vietnam Programme, Hanoi.
- Lekagul, B. and Round, P.D. 1991. *A guide to the birds of Thailand*. Saha Karn Bhaet, Bangkok.
- Lewthwaite, R.W. 1996. Forest birds of southeast China: Observations during 1984–1996. *Hong Kong Bird Report 1995*:150–203.
- Li Xiang-tao. 1996. *The gamebirds of China: Their distribution and status*. International Academic Publishers, Beijing.
- Li Xiang-tao and Liu Rusun. 1993. *The brown eared pheasant*. International Academic Publishers, Beijing.
- Liang Wei, Hou Changlong, and Hou Xingfa. 1996. Investigation on distribution and winter diets of pheasants in Leigong Mountain. Pp. 253–260 *In*: Zheng Guangmei, Zhang Zheng-wang, Yan Chongwei and Zeng Meili (eds.). *Studies on Chinese Ornithology*. China Forestry Publishing House, Shanghai.
- Liang Wei. 1998. Current state of Tuoda Reeves's Pheasant Nature Reserve, Guizhou, China. *Tragopan* 9:16

- Lindenmayer, D.B., Burgman, M.A., Akçakaya, H.R., Lacy, R.C. and Possingham, H.P. 1995. A review of the generic computer programs ALEX, RAMAS/space and VORTEX for modelling the viability of wildlife metapopulations. *Ecological Modelling* 82:161–174.
- Long, J.L. 1981. *Introduced birds of the world*. David and Charles, London.
- Lu Tai-chun, He Fen-qi, and Lui Ru-sun. 1986. The Chinese monal: Studies of its ecology and biology. In: Ridley, M. (ed.). *Pheasants of Asia 1986*. World Pheasant Association, Reading.
- Ludlow, F. and Kinneer, N.B. 1944. The birds of southeastern Tibet. *Ibis* 86:43–86, 176–208, 348–389.
- Lu Xin. 1997. Harman's eared-pheasant in remote eastern Tibet. *WPA News* 54:29–33.
- Mace, G.M. and Lande, R. 1991. Assessing extinction threats: Towards a re-evaluation of IUCN threatened species categories. *Conservation Biology* 5:148–157.
- Mamat, I.H.J. and Yasak, M.N. 1998. The status and current distribution of crested argus *Rheinardia ocellata nigrescens* in Peninsular Malaysia. *Bird Conservation International* 8:325–330.
- Mann, C.F. 1987. A checklist of the birds of Brunei Darussalam. *Brunei Museum Journal* 6:170–212.
- Marshall, A.G. and Swaine, M.D. (eds.). 1992. *Tropical rain forest: Disturbance and recovery*. Royal Society, London.
- Maru, N. 1980. Hunting and release of pheasants in Japan. Pp. 96–97 In: Savage, C.D.W. (ed.). *Pheasants in Asia 1979*. World Pheasant Association, Reading.
- McGowan, P. 1994a. Family Phasianidae. Pp. 434–552 In: del Hoyo, J., Elliott, A., and Sargatal, J. (eds.). *Handbook of the Birds of the World, Volume 2. New World Vultures to Guineafowl*. Lynx Edicions, Barcelona.
- McGowan, P.J.K. 1994b. Display dispersion and microhabitat use by the Malaysian peacock-pheasant *Polyplectron malacense* in Peninsular Malaysia. *Journal of Tropical Ecology* 10:229–244.
- McGowan, P.J.K. and Garson, P.J. 1995. *Pheasants — Status survey and conservation action plan*. IUCN, Gland.
- McGowan, P.J.K. and Gillman, M. 1997. Assessment of the conservation status of partridges and pheasants in South East Asia. *Biodiversity and Conservation* 6:1321–1337.
- McGowan, P.J.K., Hartley, I.R., and Girdler, R.P. 1989. The Palawan peacock pheasant: Habitat and pressures. *Journal of the World Pheasant Association* 14:80–99.
- McGowan, P.J.K., Garson, P.J., and Carroll, J.P. 1998a. Action plans: Do they help conservation? *Bird Conservation International* 8:317–323.
- McGowan, P.J.K., Duckworth, J.W., Xianji, W., van Balen, B., Xiaojun, Y., Mohd, Khan, K.M., Yatim, S.H., Thanga, L., Setiawan, I., and Kaul, R. 1998b. A review of the status of the green peafowl *Pavo muticus* and recommendations for future action. *Bird Conservation International* 8:331–348.
- 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.
- Medway, L. and Wells, D.R. 1976. *The birds of the Malay Peninsula. A general account of the birds inhabiting the region from the Isthmus of Kra to Singapore with the adjacent islands. Volume V: Conclusion, and survey of every species*. H. F. and G. Witherby in association with Penerbit Universiti Malaya, London and Kuala Lumpur.
- Meyer de Schauensee, R. and Ripley, S.D. 1940. Zoological results of the George Vanderbilt Sumatran Expedition, 1936–1939. Part I. Birds from Atjeh. *Proceedings of the Academy of Natural Sciences Philadelphia* 91:311–368.
- Mishra, C., Shankar Raman, T.R., and Johnsingh, A.J.T. 1998. Habitat, hunting and conservation of Rupicaprines in Mizoram, northeast India. *Journal of the Bombay Natural History Society* 95:215–220.
- Moynihan, M. 1995. Social structures and behavior patterns of captive and feral Reeve's pheasants *Syrnaticus reevesi* in France. *Alauda* 63:213–228.
- Nawaz, R. 1999. Pheasant surveys in Pakistan and filming the western tragopan. *Annual Review of the World Pheasant Association 1998/99*:38–41.
- Nguyen Cu and Eames, J.C. 1993. The distribution and status of pheasants in Vietnam. Pp. 20–27 In: Jenkins, D. (ed.). *Pheasants in Asia 1992*. World Pheasant Association, Reading.
- Nguyen Tran Vy and Ngo Van Tri. 1998. Survey of Siamese fireback population at Binh Chau-Phuoc Buu Nature Reserve, southern Vietnam. *Tragopan* 8:11.
- O'Brien, T.G., Winarni, N.L., Saanin, F.M., Kinnaird, M.F., and Jepson, P. 1998. Distribution and conservation status of Bornean peacock-pheasant *Polyplectron schleiermacheri* in central Kalimantan, Indonesia. *Bird Conservation International* 8:373–385.
- Pack-Blumenau, A. and Lu Xin 1999. Survey of Dolan's eared pheasant *Crossoptilon crossoptilon dolani* in Qinghai, China. *Tragopan* 10:9–12.
- Pandey, S. 1993. Pheasant surveys and the conservation of protected areas in the Upper Beas Valley, Himachal Pradesh, India. Pp. 58–61 In: Jenkins, D. (ed.). *Pheasants in Asia 1992*. World Pheasant Association, Reading.
- Peters, J.L. 1934. *Check-list of birds of the world*. Volume 2. Harvard University Press, Cambridge.
- Peterson, A.T. and Brisbin, I.R. 1998. Genetic endangerment of wild red junglefowl *Gallus gallus*? *Bird Conservation International* 8:387–394.
- Pokorny, F. and Pikula, J. 1987. Artificial breeding, rearing and release of Reeves pheasant (*Syrnaticus reevesi*) (Gray 1929) in Czechoslovakia. *Journal of the World Pheasant Association* 12:75–80.

- Potts, G.R. 1987. Conservation of pheasant habitat in Asia and a possible role for hunters and aviculturists. Pp. 109–114 *In*: Savage, C.D.W. and Ridley, M.W. (eds.). *Pheasants in Asia 1982*. World Pheasant Association, Reading.
- 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.
- Rasmussen, P. 1998. Is the imperial pheasant *Lophura imperialis* a hybrid? Work in progress and a call for information. *Tragopan* 9:9–10.
- Rath, F.A. 1999. Pheasants and other wildlife in Kashmir: Letters from Francis Rath. *Tragopan* 10:18–19.
- Rice, C.G. 1989. A further range extension of the black-breasted thrush *Chlamydochaera jefferyi* in Kalimantan. *Kukila* 4:47–48.
- Ridley, M. (ed.). 1986. *Pheasants in Asia 1986*. World Pheasant Association, Reading.
- Robertson, P.A. 1980. Survival of pheasants, *Phasianus colchicus*, in Ireland. *Journal of Zoology* 214:683–695.
- Robertson, P.A. 1997. *A natural history of the pheasant*. Swann Hill Press, Shrewsbury.
- Robertson, P.A., Woodburn, M.I.A., and Hill, D.A. 1993a. Factors affecting winter pheasant density in British woodlands. *Journal of Applied Ecology* 30:459–464.
- Robertson, P.A., Woodburn, M.I.A., Neutel, W., and Beeley, C.E. 1993b. Effects of land use on breeding pheasant density. *Journal of Applied Ecology* 30:465–477.
- Robson, C.R. 1990. Recent Reports. *Oriental Bird Club Bulletin* 12:40.
- Robson, C.R. 1999. From the Field. *Oriental Bird Club Bulletin* 29:52.
- Robson, C.R., Eames, J.C., Newman, M., Nguyễn Cu, and Truong Van Lã. 1991. *Forest birds surveys in Vietnam 1989/90: Final report*. Unpublished report to the International Council for Bird Preservation.
- 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.
- Robson, C.R., Buck, H., Farrow, D.S., Fisher, T., and King, B.F. 1998. A birdwatching visit to the Chin Hills, West Burma, with notes from nearby areas. *Forktail* 13:109–120.
- Savage, C.D.W. (ed.). 1980. *Pheasants in Asia 1979*. World Pheasant Association, Reading.
- Savage, C.D.W. and Ridley, M.W. (eds.). 1987. *Pheasants in Asia 1982*. World Pheasant Association, Reading.
- Scott, E.A. 1997. Systematic relationships of endemic Vietnamese pheasants. Pp. 26–30 *In*: Hennache, A. (coord.) *The International Studbook for Edwards's Pheasant and its Conservation*. Museum National d'Histoire Naturelle, Service des publications scientifiques, Paris.
- Severinghaus, S.R., Asgar, M., and Mirza, Z.B. 1979. Selection of a release site for the reintroduction of cheer pheasants in Pakistan. *Journal of the World Pheasant Association* 4:100–115.
- Shakya, S. and Kaul, R. 1999. Pipar pheasant survey, Nepal. *WPA News* 58:8–9.
- Sharma, V. and Pandey, S. 1989. Pheasant surveys in the Shimla Hills of Himachal Pradesh, India. *Journal of the World Pheasant Association* 14:64–78.
- Sherpa, M.N. 1994. Biodiversity conservation in Bhutan: A revised system of parks and reserves. *Tigerpaper* 21(4):1–8.
- 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.
- Simiyu, A. 1998. *Gamebird hunting: Development of management systems in Kenya and its promotion in wildlife utilization*. Unpublished final technical report for the Biodiversity Support Programme.
- 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.
- Stevens, P., Smith, S., and Edge, J. 1993. *Guan Shan Nature Reserve Area and approaches, Yifeng County, Jiangxi Province, China*. Unpublished report.
- Storch, I. 2000. *Grouse: Status survey and conservation action plan 2000–2004*. IUCN, Gland and Cambridge.
- Strahl, S.D. and Brooks, D.M. 2000. *Curassows, guans and chachalacas: Status survey and action plan (2000–2004)*. IUCN, Gland and Cambridge.
- Sun Yue-hua. 1995. Discovering the winter food of Cabot's tragopan. *WPA News* 47:10–12.
- Thewlis, R.M., Timmins, R.J., Evans, T.D., and Duckworth, J.W. 1998. The conservation status of birds in Laos: A review of key species. *Bird Conservation International* 8(suppl.):1–159.
- Thompson, J.A.M. 1996. New information about the presence of the Congo peafowl. *WPA News* 50:3–8.
- Timmins, R.J. and Evans, T.D. 1996. *A wildlife and habitat survey of Nakai-Nam Theun National Biodiversity Conservation Area, Khammouan and Bolikhamsai Provinces, Lao PDR*. CPAWM/WCS, Vientiane.

- Tobias, J. 1997. *Environmental and social action plan for the Nakai-Nam Theun Catchment and Corridor Areas: Report of the wildlife survey*. WCS report to IUCN, Vientiane.
- Tobias, J., Davidson, P.J., and Robichaud, W.G. 1998. Nakai-Nam Theun: Can development save one of South East Asia's last wildernesses? *Oriental Bird Club Bulletin* 28:24–29.
- Tonge, S. and Wilkinson, R. 1998. Captive breeding, conservation and science – a report on the workshop held at the WPA Galliformes Symposium, Kuala Tahan, Malaysia on 12 September, 1997. *WPA News* 55:13–17.
- van Balen, S. and Holmes, D.A. 1993. Status and conservation of pheasants in the Greater and Lesser Sundas, Indonesia. Pp. 40–49 *In*: Jenkins, D. (ed.). *Pheasants in Asia 1992*. World Pheasant Association, Reading.
- van Balen, S., Prawiradilaga, D. M., and Indrawan, M. 1995. The distribution and status of green peafowl *Pavo muticus* in Java. *Biological Conservation* 71:289–297.
- van Marle, J.G and Voous, K.H. 1988. *The birds of Sumatra: An annotated checklist*. British Ornithologists' Union, Tring.
- Vo Quy. 1975. *Birds of Vietnam, Vol. I*. Nha Xuat Ban Khoa Hoc Va Ky Thuat, Hanoi (in Vietnamese).
- Vo Quy. 1998. Participation of local people in the management of protected areas in Vietnam. *Tragopan* 8:12–13.
- Vogler, A.P. and Desalle, R. 1994. Diagnosing units of conservation management. *Conservation Biology* 8:354–363.
- Vuilleumier, F., LeCroy, M., and Mayr, E. 1992. New species of birds described from 1981 to 1990. *Bulletin of the British Ornithologists' Club* 112A:267–309.
- Wells, D.R. 1999. *The birds of the Thai-Malay Peninsula*. Volume 1. Academic Press, London.
- Wen Xian-ji, Yang Xiao-jun, Yang Lan, and Shi Wenying 1997. *Current range and status of green peafowl in southeastern and northwestern Yunnan, China*. Unpublished report to Oriental Bird Club.
- Whale, R. 1997. Western tragopan winter survey, Palas Valley, December 1996. *WPA News* 53:2–6.
- Whitmore, T.C. 1984. *Tropical rainforests of the Far East*. Second edition. Oxford University Press, Oxford.
- Wilkinson, R., Dutson, G., and Sheldon, B. 1991a. *The avifauna of Barito Ulu, central Borneo*. International Council for Bird Preservation (Study Report 48), Cambridge.
- Wilkinson, R., Dutson, G., Sheldon, B., Darjono, and Noor, Y.R. 1991b. The avifauna of the Barito Ulu region, Central Kalimantan. *Kukila* 5:99–116.
- Woodburn, M.I.A. 1993. Monitoring pheasant populations. Pp. 122–127 *In*: Jenkins, D. (ed.). *Pheasants in Asia 1992*. World Pheasant Association, Reading.
- Wood-Gush, D.G.M. 1959. A history of the domestic chicken from antiquity to the 19<sup>th</sup> century. *Poultry Science* 38:321–326.
- Wu Zhikang and Xu Weishu. 1986. The distributions and abundances of white-crowned long-tailed pheasants (*Syrmaticus reevesi*) in Guizhou Province, China. *In*: Ridley, M. (ed.). *Pheasants in Asia 1986*. World Pheasant Association, Reading.
- Wu Zhikang, Li Zhumei, Yu Zhigang, and Jang Hong. 1992. *Study of Reeves's pheasant in Tuoda Forest, Guizhou, China*. Survey report to Oriental Bird Club and Wildlife and Forest Department of Guizhou, Guizhou Institute of Biology, Guiyang.
- Wu Zhikang, Li Zhumei, Yu Zhigang, and Jang Hong. 1993. Study of the Reeves's pheasant in Tuoda Forest Guizhou, China. *WPA News* 39:7–11.
- Wu Zhikang, Li Xhumei, and Wang Jihai. 1994. Progress in research on Reeves's pheasant in China. *Annual Review of the World Pheasant Association 1993/94*:39–43.
- Xu Weishu, Wu Zhikang, and Li Zhumei. 1990. Current status of the Reeves or white-crowned long-tailed pheasant in China. Pp. 31–31 *In*: Hill, D.A., Garson, P.J., and Jenkins, D. (eds.). *Pheasants in Asia 1989*. World Pheasant Association, Reading.
- Yamashina, Y. 1976. Notes on the Japanese copper pheasant *Syrmaticus soemmerringii*. *Journal of the World Pheasant Association* 1:23–42.
- Yan Li. 1984. Distribution of *Tragopan caboti* in Jinggangshan. *Chinese Wildlife* 4:24–25 (in Chinese).
- Yatim, S.H. 1993. The status and distribution of pheasants in Peninsular Malaysia. Pp. 28–39 *In*: Jenkins, D. (ed.). *Pheasants in Asia 1992*. World Pheasant Association, Reading.
- Young, L., Garson, P.J., and Kaul, R. 1987. Calling behaviour and social organization in the cheer pheasant: Implications for survey technique. *Journal of the World Pheasant Association* 12:30–43.
- Young, L., Zhang Zheng-wang, and Zheng Guang-mei. 1991. Winter movements and habitat use by Cabot's tragopan *Tragopan caboti* in southeastern China. *Ibis* 133:121–126.
- Zhang Zheng-wang. 1995. Brown eared pheasant project report. *WPA News* 49:14–16.
- Zhang Zheng-wang. 1998. *Studies on habitat selection and breeding ecology of brown eared pheasant*. Unpublished Ph.D. dissertation, Beijing Normal University, Beijing.
- Zhang Zheng-wang. 1999. Major research project on Chinese rare and endangered pheasants. *Tragopan* 11:6.
- Zheng Guang-mei and Wang Qishan. 1998. *China Red Data Book of endangered animals: Aves*. Science Press, Beijing.
- Zheng Guang-mei and Zhang Zheng-wang. 1993. The distribution and status of pheasants in China. Pp. 15–19 *In*: Jenkins, D. (ed.). *Pheasants in Asia 1992*. World Pheasant Association, Reading.

## Appendix 1

# List of Pheasant Names

The following list of names has been checked and approved by all members of the Pheasant Specialist Group during 1999. The preferred English name for each species is in **bold type**, with any alternatives and the commonly used names for any subspecies following in each case. The inclusion of a subspecies name in this list does *not* necessarily imply that the Pheasant Specialist Group regards it as a valid taxon. The list of species is based on that of Sibley and Monroe

(1990, 1993), adopted as a standard by BirdLife International (BirdLife International 2000, in prep.). Some of the English names of species and subspecies are taken from Delacour (1977), Johnsgard (1986, 1999), Inskipp *et al.* (1996), and correspondence with individuals in range states. Again, the inclusion of a taxon as a species should *not* automatically be taken to imply that the Pheasant Specialist Group regards it as valid.

Genus	Species	Subspecies	English name(s)
<i>Ithaginis</i>	<i>cruentus</i>	<i>cruentus</i> <i>affinis</i> <i>tibetanus</i> <i>geoffroyi</i> <i>berezowskii</i> <i>beicki</i> <i>michaelis</i> <i>sinensis</i> <i>annae</i> <i>kuseri</i> <i>rocki</i> <i>marionae</i> <i>holoptilus</i> <i>clarkei</i>	<b>blood pheasant</b> Himalayan blood pheasant Sikkim blood pheasant Tibetan blood pheasant Geoffroy's blood pheasant Berezowki's blood pheasant Beick's blood pheasant Bianchi's blood pheasant David's blood pheasant Mrs. Sage's blood pheasant Kuser's blood pheasant Rock's blood pheasant Mrs. Vernay's blood pheasant Greenway's blood pheasant Clarke's blood pheasant
<i>Tragopan</i>	<i>melanocephalus</i>		<b>western tragopan</b> western horned tragopan black-headed tragopan
<i>Tragopan</i>	<i>satyra</i>		<b>satyr tragopan</b> crimson tragopan crimson horned pheasant
<i>Tragopan</i>	<i>blythii</i>	<i>blythii</i> <i>molesworthi</i>	<b>Blyth's tragopan</b> grey-bellied tragopan eastern Blyth's tragopan Molesworth's tragopan
<i>Tragopan</i>	<i>temminckii</i>		<b>Temminck's tragopan</b> crimson-bellied tragopan
<i>Tragopan</i>	<i>caboti</i>		<b>Cabot's tragopan</b> Chinese tragopan yellow-bellied tragopan
<i>Pucrasia</i>	<i>macrolopha</i>	<i>macrolopha</i> <i>nipalensis</i> <i>castanea</i> <i>biddulphi</i> <i>joretiana</i> <i>darwinii</i> <i>meyeri</i> <i>ruficollis</i> <i>xanthospila</i>	<b>koklass</b> koklass pheasant koklas pheasant common koklass Nepal koklass western koklass Kashmir koklass Joret's koklass Darwin's koklass Meyer's koklass orange-collared koklass yellow-necked koklass
<i>Lophophorus</i>	<i>impejanus</i>		<b>Himalayan monal</b> Impeyan pheasant Himalayan monal pheasant Impeian monal

Genus	Species	Subspecies	English name(s)
<b>Lophophorus</b>	<b>sclateri</b>	<i>sclateri</i> <i>orientalis</i>	<b>Sclater's monal</b> Sclater's monal pheasant western Sclater's monal eastern Sclater's monal
<b>Lophophorus</b>	<b>lhuysii</b>		<b>Chinese monal</b> Chinese monal pheasant
<b>Gallus</b>	<b>gallus</b>	<i>gallus</i> <i>spadiceus</i> <i>jabouillei</i> <i>murghi</i> <i>bankiva</i>	<b>red junglefowl</b> Cochin-Chinese red junglefowl Burmese red junglefowl Tonkinese red junglefowl Indian red junglefowl Javan red junglefowl
<b>Gallus</b>	<b>sonneratii</b>		<b>grey junglefowl</b> Sonnerat's junglefowl
<b>Gallus</b>	<b>lafayetii</b>		<b>Sri Lanka junglefowl</b> Ceylon junglefowl Lafayette's junglefowl
<b>Gallus</b>	<b>varius</b>		<b>green junglefowl</b> Javan junglefowl
<b>Lophura</b>	<b>leucomelanos</b>	<i>leucomelanos</i> <i>hamiltoni</i> <i>melanota</i> <i>lathamii</i> <i>williamsi</i> <i>moffitti</i> <i>oatesi</i> <i>lineata</i> <i>crawfurdi</i>	<b>kalij pheasant</b> Nepal kalij pheasant white-crested kalij pheasant black-backed kalij pheasant black-breasted kalij pheasant Williams's kalij pheasant black kalij pheasant Oates's kalij pheasant lineated kalij pheasant Crawfurd's kalij pheasant
<b>Lophura</b>	<b>nycthemera</b>	<i>nycthemera</i> <i>beli</i> <i>berliozii</i> <i>rufipes</i> <i>ripponi</i> <i>jonesi</i> <i>rongjiangensis</i> <i>omelensis</i> <i>occidentalis</i> <i>beaulieui</i> <i>fokiensis</i> <i>annamensis</i> <i>whiteheadi</i> <i>engelbachi</i> <i>lewisi</i>	<b>silver pheasant</b> true silver pheasant Bel's silver pheasant Berlioz's silver pheasant Ruby Mines silver pheasant Rippon's silver pheasant Jones's silver pheasant Rang Jiang silver pheasant Sichuan silver pheasant western silver pheasant Lao silver pheasant Fokien silver pheasant Annamese silver pheasant Hainan silver pheasant Boloven silver pheasant Lewis's silver pheasant
<b>Lophura</b>	<b>imperialis</b>		<b>imperial pheasant</b>
<b>Lophura</b>	<b>edwardsi</b>		<b>Edwards's pheasant</b>
<b>Lophura</b>	<b>hatinhensis</b>		<b>Vietnamese pheasant</b> Vo Quy's pheasant Vietnamese fireback
<b>Lophura</b>	<b>swinhoii</b>		<b>Swinhoe's pheasant</b> Taiwan blue pheasant
<b>Lophura</b>	<b>hoogerwerfi</b>		<b>Sumatran pheasant</b> Hoogerwerf's pheasant
<b>Lophura</b>	<b>inornata</b>		<b>Salvadori's pheasant</b>
<b>Lophura</b>	<b>erythrophthalma</b>	<i>erythrophthalma</i> <i>pyronota</i>	<b>crestless fireback</b> crestless fireback pheasant Malaysian crestless fireback Bornean crestless fireback
<b>Lophura</b>	<b>ignita</b>	<i>ignita</i> <i>nobilis</i> <i>rufa</i> <i>macartneyi</i>	<b>crested fireback</b> crested fireback pheasant lesser Bornean crested fireback greater Bornean crested fireback Viellot's crested fireback Delacour's crested fireback

Genus	Species	Subspecies	English name(s)
<i>Lophura</i>	<i>diardi</i>		<b>Siamese fireback</b> Siamese fireback pheasant
<i>Lophura</i>	<i>bulweri</i>		<b>Bulwer's pheasant</b> Bulwer's wattled pheasant
<i>Crossoptilon</i>	<i>harmani</i>		<b>Tibetan eared-pheasant</b> Harman's eared-pheasant Elwes's eared-pheasant
<i>Crossoptilon</i>	<i>crossoptilon</i>	<i>crossoptilon</i> <i>lichiangense</i> <i>drouyni</i> <i>dolani</i>	<b>white eared-pheasant</b> Sichuan white eared-pheasant Yunnan white eared-pheasant Tibetan white eared-pheasant Dolan's white eared-pheasant
<i>Crossoptilon</i>	<i>mantchuricum</i>		<b>brown eared-pheasant</b>
<i>Crossoptilon</i>	<i>auritum</i>		<b>blue eared-pheasant</b>
<i>Catreus</i>	<i>wallichii</i>		<b>cheer pheasant</b> chir pheasant Wallich's pheasant
<i>Syrmaticus</i>	<i>elliotti</i>		<b>Elliot's pheasant</b> white-necked long-tailed pheasant
<i>Syrmaticus</i>	<i>humiae</i>	<i>humiae</i> <i>burmanicus</i>	<b>Hume's pheasant</b> Mrs. Hume's barred-back pheasant Mrs. Hume's pheasant bar-tailed pheasant black-necked bar-tailed pheasant western Hume's pheasant eastern Hume's pheasant
<i>Syrmaticus</i>	<i>mikado</i>		<b>Mikado pheasant</b> Taiwan long-tailed pheasant black long-tailed pheasant
<i>Syrmaticus</i>	<i>soemmerringii</i>	<i>soemmerringii</i> <i>ijimae</i> <i>scintillans</i> <i>intermedius</i> <i>subrufus</i>	<b>copper pheasant</b> Soemmerring's copper pheasant Ijima's copper pheasant scintillating copper pheasant Shikoku copper pheasant Pacific copper pheasant
<i>Syrmaticus</i>	<i>reevesii</i>		<b>Reeves's pheasant</b> white-crowned long-tailed pheasant
<i>Phasianus</i>	<i>colchicus</i>	<i>colchicus</i> <i>septentrionalis</i> <i>talischensis</i> <i>persicus</i> <i>shawii</i> <i>chrysomelas</i> <i>bianchii</i> <i>zerafschanicus</i> <i>zarudnyi</i> <i>principalis</i> <i>mongolicus</i> <i>turcestanicus</i> <i>tarimensis</i> <i>vlangalii</i> <i>elegans</i> <i>rothschildi</i> <i>sohokotensis</i> <i>kiangsuensis</i> <i>alaschanicus</i> <i>suechschanensis</i> <i>decollatus</i> <i>strauchi</i> <i>satscheuensis</i> <i>edzinensis</i>	<b>ring-necked pheasant</b> common pheasant southern Caucasian ring-necked pheasant northern Caucasian ring-necked pheasant Talisch Caucasian ring-necked pheasant Persian ring-necked pheasant Yarkand ring-necked pheasant Khivan ring-necked pheasant Bianchi's ring-necked pheasant Zerafshan ring-necked pheasant Zarudny's ring-necked pheasant Prince of Wales's ring-necked pheasant Kirghiz ring-necked pheasant Syr Daria ring-necked pheasant Tarim ring-necked pheasant Zaidan ring-necked pheasant Stone's ring-necked pheasant Rothschild's ring-necked pheasant Sohokhoto ring-necked pheasant Shansi ring-necked pheasant Alashan ring-necked pheasant Sungpan ring-necked pheasant Kweichow ring-necked pheasant Strauch's ring-necked pheasant Satchu ring-necked pheasant Gobi ring-necked pheasant

Genus	Species	Subspecies	English name(s)
<i>Phasianus colchicus</i> ... continued		<i>formosanus</i> <i>torquatus</i> <i>takatsukasae</i> <i>pallasi</i> <i>hagenbecki</i> <i>karpowi</i> <i>versicolor</i> <i>robustipes</i> <i>tanensis</i>	Taiwan ring-necked pheasant Chinese ring-necked pheasant Tonkinese ring-necked pheasant Manchurian ring-necked pheasant Kobdo ring-necked pheasant Korean ring-necked pheasant southern green pheasant northern green pheasant Pacific green pheasant
<i>Chrysolophus</i>	<i>pictus</i>		<b>golden pheasant</b>
<i>Chrysolophus</i>	<i>amherstiae</i>		<b>Lady Amherst's pheasant</b> Lady Amherst pheasant Chinese copper pheasant
<i>Polyplectron</i>	<i>chalcurum</i>	<i>chalcurum</i> <i>scutulatum</i>	<b>bronze-tailed peacock-pheasant</b> Sumatran peacock-pheasant bronze-tailed pheasant south Sumatran bronze-tailed peacock-pheasant north Sumatran bronze-tailed peacock-pheasant
<i>Polyplectron</i>	<i>inopinatum</i>		<b>mountain peacock-pheasant</b> Rothschild's peacock pheasant
<i>Polyplectron</i>	<i>germaini</i>		<b>Germain's peacock-pheasant</b>
<i>Polyplectron</i>	<i>bicalcaratum</i>	<i>bicalcaratum</i> <i>bakeri</i> <i>bailyi</i> <i>ghigii</i> <i>katsumatae</i>	<b>grey peacock-pheasant</b> Burmese grey peacock-pheasant Himalayan grey peacock-pheasant Lowe's grey peacock-pheasant Ghigi's grey peacock-pheasant Hainan grey peacock-pheasant
<i>Polyplectron</i>	<i>malacense</i>		<b>Malaysian peacock-pheasant</b> Malayan peacock-pheasant Malay peacock-pheasant
<i>Polyplectron</i>	<i>schleiermacheri</i>		<b>Bornean peacock-pheasant</b>
<i>Polyplectron</i>	<i>emphanum</i>		<b>Palawan peacock-pheasant</b> Napoleon's peacock-pheasant
<i>Rheinardia</i>	<i>ocellata</i>	<i>ocellata</i> <i>nigrescens</i>	<b>crested argus</b> ocellated argus Rheinard's crested argus Malaysian crested argus
<i>Argusianus</i>	<i>argus</i>	<i>argus</i> <i>grayi</i>	<b>great argus</b> great argus pheasant Malaysian great argus Bornean great argus
<i>Afropavo</i>	<i>congensis</i>		<b>Congo peafowl</b>
<i>Pavo</i>	<i>cristatus</i>		<b>Indian peafowl</b> common peafowl blue peafowl
<i>Pavo</i>	<i>muticus</i>	<i>muticus</i> <i>imperator</i> <i>spicifer</i>	<b>green peafowl</b> Javanese green peafowl Indo-Chinese green peafowl Burmese green peafowl



## Appendix 2

# List of Key Contacts

Please note that contact details for any individual named in the text of this Action Plan are obtainable from the PSG Chairman or the BirdLife International Secretariat. Project

proposal forms and guidelines (in English, Chinese, German, French, Russian, and Spanish) are also available from the PSG Chairman.

### Contributing Organisations

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: [wpa@gn.apc.org](mailto:wpa@gn.apc.org)  
Website: <http://www.gn.apc.org/worldpheasant/>

BirdLife International  
Wellbrook Court  
Girton Road  
Cambridge CB3 0NA  
United Kingdom  
Tel: +41 22 999 0001  
Fax: +41 22 999 0025  
E-mail: [birdlife@birdlife.org.uk](mailto:birdlife@birdlife.org.uk)  
Website: <http://www.birdlife.net>

Pheasant Specialist Group  
Peter J. Garson (Chairman)  
Department of Agricultural and  
Environmental Science  
University of Newcastle  
Newcastle upon Tyne NE1 7RU  
United Kingdom  
Tel: +44 374 3350  
E-mail: [peter.garson@newcastle.ac.uk](mailto:peter.garson@newcastle.ac.uk)

IUCN/SSC Sustainable Use Initiative  
Steve Edwards  
IUCN-US  
1400 16<sup>th</sup> Steet NW  
Washington D.C. 20036  
United States  
Tel: +1 202 939 3416  
Fax: +1 202 797 5461  
E-mail: [sedwards@iucnus.org](mailto:sedwards@iucnus.org)

### 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)  
Website: <http://www.cbsg.org/>

Re-introduction Specialist Group  
Pritpal S. Soorae (Senior Technical  
Project Officer)  
c/o African Wildlife Foundation  
P.O. Box 48177  
Nairobi  
Kenya  
Tel: +254 2 710367  
Fax: +254 2 710372  
E-mail: [Psoorae@awfke.org](mailto:Psoorae@awfke.org)

### Editors

Richard A. Fuller  
Department of Biological Sciences  
University of Durham  
South Road, Durham, DH1 3LE  
United Kingdom  
Tel: +44 191 374 3350  
Fax: +44 191 374 2417  
E-mail: [r.a.fuller@durham.ac.uk](mailto:r.a.fuller@durham.ac.uk)

Peter J. Garson  
Department of Agricultural and  
Environmental Science  
University of Newcastle  
Newcastle upon Tyne NE1 7RU  
United Kingdom  
Tel: +44 191 222 6674  
Fax: +44 191 222 5228  
E-mail: [peter.garson@newcastle.ac.uk](mailto:peter.garson@newcastle.ac.uk)

### Studbook Keepers

Mr. Han Assink  
De Vogelhof  
Boerenweg 66, 5944 EL Arcen  
The Netherlands  
Tel: +31 77 473 1272  
Fax: +31 77 473 2884  
E-mail: [vogelhof@worldonline.nl](mailto:vogelhof@worldonline.nl)

Dr. Donald M. Bruning  
Wildlife Conservation Society  
Bronx Zoo  
185th Street/Southern Boulevard  
New York, NY 10460-1099  
United States  
Tel: +1 718 220 5100  
Fax: +1 718 220 7114  
E-mail: [dbruning.wcs@mcimail.com](mailto:dbruning.wcs@mcimail.com)

Mr. Alain Hennache  
Director Parc Zoologique de Cleres  
76690 – Cleres  
France  
Tel: +33 35 332308  
Fax: +33 35 335604  
E-mail: [zoo.cleres@wanadoo.fr](mailto:zoo.cleres@wanadoo.fr)

Mr. Roland van Bockstaele  
Deputy Director  
Antwerp Zoo  
Koningen  
Astridplein 26, B-2018 Antwerp  
Belgium  
Tel: +31 3 202 4551  
Fax: +31 3 202 4547  
E-mail: [zoolzoo@uia.ua.ac.be](mailto:zoolzoo@uia.ua.ac.be)

Mr. Dang Gia Tung  
Deputy Director  
Hanoi Zoological Gardens  
Vietnammes Park Thule  
Badinh – Hanoi  
Vietnam  
Tel/Fax: +84 4 834 3439  
E-mail: [hanoizoo@netnam.org.vn](mailto:hanoizoo@netnam.org.vn)

## Appendix 3

# Captive Populations of Pheasants

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 both

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 (notes)
<b>Critically Endangered</b>	
Imperial pheasant <i>Lophura imperialis</i>	0
<b>Endangered</b>	
Edwards's pheasant <i>Lophura edwardsi</i>	902 (International Studbook 1998)
Vietnamese pheasant <i>Lophura hatinhensis</i>	65 (International Studbook 1998)
Bornean peacock-pheasant <i>Polyplectron schleiermacheri</i>	25–30
<b>Vulnerable</b>	
Western tragopan <i>Tragopan melanocephalus</i>	5–10 (?)
Blyth's tragopan <i>Tragopan blythii</i>	50–100 (International Studbook)
Cabot's tragopan <i>Tragopan caboti</i>	50–150 pure birds (International Studbook)
Sclater's monal <i>Lophophorus sclateri</i>	4–6
Chinese monal <i>Lophophorus lhuysii</i>	15–20
Sumatran pheasant <i>Lophura hoogerwerfi</i>	6 (R. Sözer <i>in litt.</i> )
Salvadori's pheasant <i>Lophura inornata</i>	150
Crestless fireback <i>Lophura erythrophthalma</i>	260
Crested fireback <i>Lophura ignita</i>	270
Bulwer's pheasant <i>Lophura bulweri</i>	70–90
Brown eared-pheasant <i>Crossoptilon mantchuricum</i>	<500
Cheer pheasant <i>Catreus wallichi</i>	300+
Elliot's pheasant <i>Syrmaticus ellioti</i>	500–600 (AZA Regional Studbook)
Hume's pheasant <i>Syrmaticus humiae</i>	200–600
Reeves's pheasant <i>Syrmaticus reevesi</i>	1,000–2,000
Mountain peacock-pheasant <i>Polyplectron inopinatum</i>	450+ (International Studbook)
Germain's peacock-pheasant <i>Polyplectron germaini</i>	100–300
Malaysian peacock-pheasant <i>Polyplectron malacense</i>	350+ (International Studbook)
Palawan peacock-pheasant <i>Polyplectron emphanum</i>	375–1,075 (AZA recommend setting up a Population Management Programme for this species (Sheppard and Bruning 1999))
Crested argus <i>Rheinardia ocellata</i>	10–35
Congo peafowl <i>Afropavo congensis</i>	118 (International Studbook 1998)
Green peafowl <i>Pavo muticus</i>	200–1,000