

Status Survey and Conservation Action Plan 1995-1999

Pheasants

Compiled by
Philip J.K. McGowan and Peter J. Garson
on behalf of the
WPA/BirdLife/SSC
Pheasant Specialist Group



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Status Survey and Conservation Action Plan 1995-1999 Pheasants was made possible through the generous support of:

BirdLife International
British Airways Assisting Conservation
Chicago Zoological Society
Deja Inc
National Wildlife Federation
Peter Scott IUCN/SSC Action Plan Fund (Sultanate of Oman)
Royal Zoological Society of Antwerp
Whitley Animal Protection Trust
World Pheasant Association
World Wide Fund for Nature

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ISBN 2-8317-0299-2

Published by IUCN, Gland, Switzerland

Camera-ready copy by the World Pheasant Association, Reading, UK.

Printed by National Conservation Bureau Ltd, Newbury, U.K.

Cover illustration: Bulwer's pheasant by Timothy Greenwood, from *Pheasant Jungles* by William Beebe, republished in 1995 by the World Pheasant Association, PO Box 5, Lower Basildon, Reading, Berkshire RG8 9PF, UK.

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Foreword

The publication of this Action Plan for the pheasants is the latest important step in the fight to conserve the many threatened species in this group of spectacular birds. The authors, and the Pheasant Specialist Group network as a whole, are to be congratulated for having distilled their enormous knowledge and experience into such a readable text.

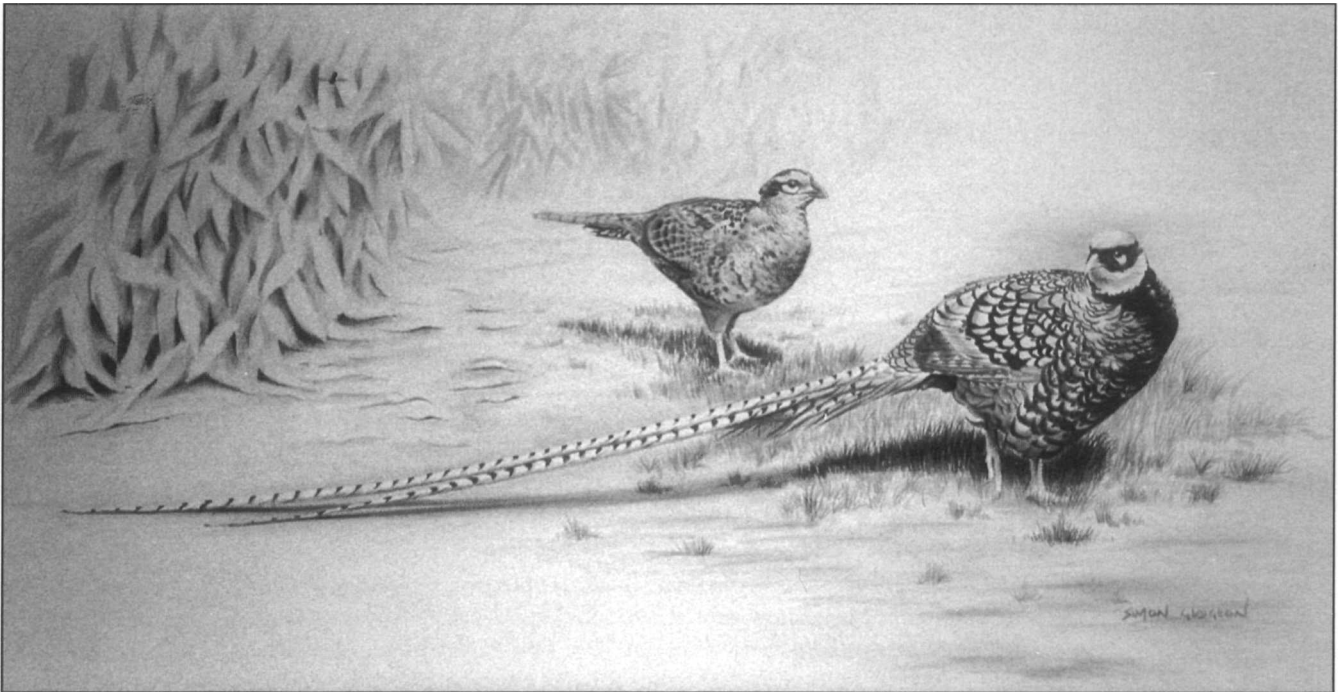
However, given that the Pheasant Specialist Group is just 2 years old, there can be no doubt that the quality of this publication owes much to the efforts of the World Pheasant Association over the past 20 years in promoting status surveys, field research projects, captive propagation schemes, international symposia, exchange programmes for young scientists, and grass-roots educational initiatives.

It is largely through this bank of past experience that the Pheasant Specialist Group has been able to set such an ambitious agenda of 25 projects in the final chapter of this Action Plan. And in consequence of a long history of international cooperation, its network of members and other biologists worldwide will hopefully more than achieve the stated objective of initiating all of them within the 5 year period that has just begun.

My own country, the People's Republic of China is, of course, very large, but it is also uniquely rich in pheasants, with more than half of the 51 currently recognised species occurring there. Many of these are seriously threatened with global extinction, and this Action Plan contains outlines of no fewer than nine projects scheduled for implementation within China. I strongly believe that the combination of our new breed of internationally trained biologists, continuing technical support through the Pheasant Specialist Group, and increasing access to both national and international sources of research funds, will allow us to undertake all these projects, and hopefully many others, before the end of the century.

I do hope that other nations that are home to threatened pheasants can do the same. If this now appears to be a very difficult task, then I have only one piece of advice: contact the Pheasant Specialist Group! Remember that the main reason for its existence is to help anyone wanting to contribute to the fight to save all the world's pheasants from extinction.

*Professor Zheng Guang-mei
Chairman, World Pheasant Association-China
President, China Ornithological Society*



Reeves's pheasant

Artist: S. Gudgeon

Acknowledgements

This Action Plan is based on information and advice contributed by many members of the Pheasant Specialist Group and others interested in the conservation of pheasants and their habitats. It is based on the outcome of a workshop held at Antwerp Zoo in February 1993, jointly organised by the World Pheasant Association, the Captive (now Conservation) Breeding Specialist Group and BirdLife International. The workshop was generously sponsored by the Koninklijke Maatschappij voor Dierkunde van Antwerpen V.Z.W. (the Royal Zoological Society of Antwerp), for which we thank the Director, Fred Daman. We are also very grateful to Rod Hall of British Airways Assisting Nature Conservation, for enabling participants from India, Indonesia and the United States to attend. Further thanks go to Keith Howman, Director General of the World Pheasant Association, and Christoph Imboden, Director General of BirdLife International, for assistance with funding most of the other participants.

The World Pheasant Association, BirdLife International and the Whitley Animal Protection Trust provided funds for the employment of Philip McGowan before and after the workshop, thereby making the production of this Action Plan possible. The Open University provided him with facilities over this period.

Our many correspondents, whose unpublished information is attributed to them by placing the words *in litt.* after their name in the text, are listed in Appendix A. They not only provided much of the information upon which the Antwerp workshop discussions were based, but also commented on our draft text for this Action Plan. We thank them all for their help and hope we have not mis-interpreted their comments.

We received many useful comments on the whole draft from the members of the Pheasant Specialist Group core committee (Michael Cook, Michael Crosby, Keith Howman, Carol Inskipp, Georgina Mace, Peter Robertson, Roger Wilkinson and Maureen Woodburn). A number of others (Bas van Balen, Geoffrey Davison, Edward Dickinson, Simon Dowell, He Fen-qi, Derek Holmes, Paul Jepson, Rahul Kaul, Philip Round, David Wells, Roland Wirth, Zhang Zheng-wang and Zheng Guang-mei) gave us their advice on large sections of text. We thank all these people most sincerely for giving us the benefit of their time and knowledge.

We must also thank the artists and photographers who have allowed us to use their material to illustrate this Action Plan, and in doing so have improved its appearance beyond measure: Timothy Greenwood, Simon Gudgeon, David Mead, R. David Digby, Esdaile Hudson, Mrs S. Phillips, Jean Howman, Kenneth Fink, Mohammed Khan, Gary Robbins, Keith Howman, Peter Garson, He Fen-qi, Ding Chang-qing, Matt Ridley, Jonathan Eames/BirdLife, Wu Zhi-kang, Philip McGowan, M. (Didi) Indrawan, Tony Gaston and Chris Redfern.

The maps were prepared by Tom Gardiner and the whole volume was typeset by Jane Clacey and Tom Gardiner in Keith Howman's office. We thank them for all their support, encouragement and hard work.

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Western tragopan
Artist: T. Greenwood

Executive Summary

This Action Plan is concerned with the world's 51 species of pheasant, all but one of which, the Congo peafowl from Zaïre, are native to Asia. Most pheasant species live in forest understorey, nesting on the ground, and being relatively large birds, they are widely hunted for food in their native habitats. A few species are used for sport hunting, whilst others are live-trapped for the bird trade or killed for their spectacular feathers. Many pheasants appear to depend on undisturbed primary habitats, so that their future prospects are closely linked to the conservation and sustainable management of forests, especially in Asia. Their exploitation by man, and their sensitivity to habitat disturbance, make them potentially useful as indicators of direct human impact and environmental quality in forest ecosystems. In addition, the bizarre plumages and displays of the males in many species make them good candidates as flagships in broadly based habitat and ecosystem conservation initiatives.

The Action Plan has been prepared on the basis of information compiled by the Pheasant Specialist Group, an international network of people with a knowledge of pheasants, their habitats and human impacts upon them. Its two main objectives are to place all the pheasant species into categories representing their current risk of extinction, and to specify the action that should be initiated during the period 1995-1999 to improve their long term prospects for survival.

The Pheasant Specialist Group itself does not have the capacity to implement the projects specified in its Action Plan. These will involve field surveys, intensive ecological research, taxonomic studies, protected area designation and management, captive breeding, and educational initiatives, in many different countries. This document is therefore being circulated internationally to research institutes, universities, relevant government departments, independent conservation organisations, zoos and other captive breeding organisations, environmental education centres, and funding bodies with interests in research and conservation action. Any reader who is interested in helping to implement any part of this plan is urged to communicate with the chairman and relevant local contacts (see Appendix A).

Chapter 1 gives an overview of the Action Plan and includes a review of the current status of pheasants, the threats that particularly affect them and their habitats, and an explanation of the types of action proposed for different species in the rest of the document. This chapter will provide a good background for anyone wishing to become more familiar with pheasants and the campaign for their conservation worldwide.

Chapter 2 is a tabular summary (see pp. 17-21) of information on the threat status (critical, endangered,

vulnerable, ?, safe) and geographical distributions of all the world's pheasants, indicating specific threats and actions required to improve the situation, in each case. Readers with international or national interests will find this chapter useful for rapid consultation.

Chapter 3 contains detailed Threatened Taxon Summaries for each of the 43 threatened species or subspecies. These are listed in order, from the most to the least threatened (see Table 3.1, p. 23). The summaries justify the threat status classification, indicate any research or conservation action already taken, and describe what more needs to be done in the near future to improve the prospects for long term survival. This chapter will be of most interest to field biologists wishing to carry out research relating to the conservation of pheasants in the wild, captive breeders wishing to prioritise their activities, environmental educators seeking urgent causes, and independent conservationists and government officials concerned with protected area designation and management.

Chapter 4 contains brief accounts of the aims, justification and probable structure of 25 projects, which the Pheasant Specialist Group believes can and should be initiated during 1995-1999. These Action Plan Project Briefs are written for people seeking high profile conservation projects: individual researchers, managers in research institutes or universities, officers of international agencies, governments or conservation organisations, and trustees of environmental charities. The countries in which each project might take place are indicated in Table 4.1 (pp.58-60).

The projects are of four types. There are two with a global perspective that are concerned with improving the function of the Pheasant Specialist Group. There are six regional surveys, in Borneo, Sumatra and parts of India and China, each covering a number of pheasant species, other birds and their habitats. There are 13 projects designed to improve our knowledge of, and ability to conserve, particular species or subspecies of pheasants in the future. Lastly there are four projects, described as strategic initiatives, which involve applying current research techniques in information technology, ecology, ethology, and genetics to topical problems in pheasant conservation: protected area coverage in Asia; assessing biodiversity and human impact in forests; translocation, restocking and re-introduction techniques; and the taxonomic distinctiveness of certain threatened pheasants.

Every effort has been made to distribute this Action Plan to those who might be able to further its implementation. Nevertheless, all readers are urged to bring it to the attention of others known to them who may be able to make use of it.

CHAPTER 1: Pheasants, their Conservation and the Action Plan

1.1: Introduction

This Action Plan gives an assessment of the status of the world's pheasants, together with an outline of the conservation action required for those threatened with extinction. It is based on current information available concerning the status of and threats to each species (or in some cases subspecies), and is for implementation during 1995-99.

This document therefore has limited scope, and the reader should not expect it to be a full account of the biology of this group of birds. Its purpose is only to provide an informed assessment of the current distribution and status of all the pheasants, to assign each one to a threat category representing the likelihood of its extinction, and to outline work that needs to be done to improve the survival prospects of those that are most threatened or little known.

Every effort has been made to gather information and opinion that is up-to-date, from published and unpublished literature, and from correspondence and discussions with people currently involved worldwide in the conservation of these birds and their habitats. A large amount of data gathered by individuals in the past has been systematically reviewed, and all the suggested plans for action have been checked by their originators and others. The Pheasant Specialist Group therefore feels confident that the finished product has the support of its international network, and that many, if not most, of the actions suggested will have been initiated by the end of the next five years.

During 1999, the contents of this Action Plan will be reviewed and a new edition drafted to cover 2000-2004.

1.2: Taxonomic definition of pheasants

This Action Plan covers the pheasants. These birds fall into one of the eight groups of species within the avian order Galliformes, which contains all the birds often referred to as 'gamebirds', including the megapodes, cracids, turkeys, grouse, guineafowl, partridges and New World quails, as well as the pheasants.

Taxonomists have always considered the pheasants to be more closely related to the Old World partridge, quail and francolin species than to any other galliform group. Peters (1934), Johnsgard (1973) and Delacour (1977) place all of these species in the subfamily Phasianinae, within the family Phasianidae, which also includes the grouse and New World quails. Johnsgard (1973, 1986) suggests 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. Most recently, Sibley and

Monroe (1990, 1993) classified the pheasants and the Old World partridge, quail and francolin species as the family Phasianidae (*i.e.* excluding grouse and New World quails). For fuller discussions of the higher levels of classification within the Galliformes, including an historical review and an analysis based on new DNA comparison techniques, see Johnsgard (1986, pp. 4-7) and Sibley and Ahlquist (1990, pp. 289-300).

There has been virtually no argument about which species of galliform are pheasants and which belong to the other groups. With a few exceptions for the English names, the species taxonomy and nomenclature used in this Action Plan follows that of Sibley and Monroe (1990, 1993), which has also been adopted as standard by BirdLife International (Collar *et al.* 1994). There are however several details of this classification of 51 pheasant species about which the Pheasant Specialist Group is concerned. These include the taxonomic status of particular species of eared-pheasant *Crossoptilon*, gallopheasant *Lophura* and peacock-pheasant *Polyplectron*, details of which are mentioned in the relevant sections of Chapter 3. The acceptance of the Vietnamese pheasant *Lophura hatinhensis* as a full species by some authors (*e.g.* Sibley and Monroe 1990, Collar *et al.* 1994), despite a lack of crucial information (Vuilleumier *et al.* 1992), is a particular problem on which we are seeking clarification through research (see Project 4.7.4).

Sibley and Monroe (1990) do not give a subspecific classification, so we follow Johnsgard's (1986) sequence and nomenclature for this, with further reference to Delacour (1977) where necessary. A complete list of the 69 separate 'types' of pheasant considered in this Action Plan is given in Chapter 2 (Table 2.2, pp.17-21). These types may be whole species, single subspecies, or subspecies groups, and are referred to generally as *taxa* (*taxon* in the singular) in the text that follows.



Palawan peacock-pheasant

Photo: J. Howman

1.3: Other sources of information on pheasants

For readers requiring information on pheasant biology that is outside the scope of this Action Plan, we can recommend a number of texts, such as those by Beebe (1918-22, 1936), Baker (1930), Delacour (1977), Johnsgard (1986) and Howman (1979, 1993). Information on their taxonomy, geographical distribution, ecology, captive breeding and behaviour can be found in all of these. Detailed regional or national accounts are also available, including those by Cramp and Simmons (1980) for the Western Palaearctic, Crowe *et al.* (1986) for Africa, Ali and Ripley (1983) for South Asia, Cheng Tso-hsin (1987) for China, Inskipp and Inskipp (1991) for Nepal, van Marie and Voous (1988) for Sumatra, and Smythies for Borneo (1981) and Burma (1986).

In addition, the World Pheasant Association has organised a series of five international symposia on pheasants in Asia, held in Nepal (1979), India (1982), Thailand (1986), China (1989) and Pakistan (1992). Proceedings have been produced following each of these, as Savage (1980), Savage and Ridley (1987), Ridley (1986), Hill *et al.* (1990), and Jenkins (1993). The papers they contain provide much original information on many different aspects of pheasant biology, and especially on their conservation status. Yet other accounts of recent work can be found in the *Journal of the World Pheasant Association*, published annually since 1976, and appearing as the *Annual Review of the World Pheasant Association* from 1995.

1.4: Pheasant biogeography and ecology

The pheasants are Asian in their native distributions, with the single exception of the Congo peafowl *Afropavo congensis* from Zaïre in central Africa (Crowe *et al.* 1986). However, several species have been introduced into various parts of Europe and North America for sport hunting purposes (*e.g.* Lowe 1933, Bump 1941, Pokorny and Pikula 1987, Moynihan 1995), and the globally distributed domestic fowl is believed to be derived from the red junglefowl *Gallus gallus* (Wood-Gush 1959). Within Asia, pheasants occur from Flores, east of Java in Indonesia at c.8°S (green junglefowl *Gallus varius*), through the equatorial forests of the Malay peninsula, to northeastern China at c. 50°N (koklass pheasant *Pucrasia macrolopha*, ring-necked pheasant *Phasianus colchicus*, Reeves's pheasant *Syrnaticus reevesii*, blue eared-pheasant *Crossoptilon auritum*). The western limit of the tribe, excluding the Congo peafowl and introduced populations, is in the Caucasus at c.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 *Syrnaticus mikado*, Swinhoe's pheasant *Lophura swinhoii*) and Japan at 145°E (copper pheasant *Syrnaticus soemmerringii*).

Different pheasant taxa are distributed in habitats as diverse as lowland tropical rainforest (*e.g.* crested fireback *Lophura ignita*), montane tropical forest (*e.g.* mountain peacock-pheasant *Polyplectron inopinatum*), temperate coniferous forests (*e.g.* western tragopan *Tragopan melanocephalus*), subalpine scrub (*e.g.* blood pheasant *Ithaginis cruentus*) and alpine meadows (*e.g.* Chinese monal *Lophophorus lhuysii*).

In general, our level of knowledge about individual pheasant taxa is poor. However the ring-necked pheasant is a notable exception to this, and is certainly one of the most widely introduced of all bird species, with considerable economic importance for sport hunting in the UK and USA. As a result it has been the subject of a great deal of research, leading to a sophisticated understanding of its behaviour and population biology, at least in temperate areas outside its native range (Hill and Robertson 1988a, Hudson and Rands 1988, Robertson *et al.* 1993a, 1993b, Woodburn 1993). Other species, and particularly those from remote mountain and tropical areas, are generally far less well known, and in some cases there is still virtually no information on any aspect of their biology in the wild (*e.g.* Slater's monal *Lophophorus slateri*, imperial pheasant *Lophura imperialis*).



Koklass pheasant

Photo: J. Howman

1.5: Production and structure of the Action Plan

1.5.1: Data collection and summary

The publication of this Action Plan is the result of an 18 month period of international consultation, discussion and review. This started with a worldwide appeal for up-to-date information on all the pheasants through the distribution of a standard questionnaire to a network of acknowledged regional experts in August 1992. Information was sought for each species, and from all its range countries whenever possible, on geographical range, population size (in the wild and in captivity), population trends, threats, status in protected areas, and priorities for future conservation action.

By the end of January 1993, many of our correspondents had returned completed forms, and more followed. Information from them and other published sources was then used to complete a summary table, in which each of the 69 pheasant taxa thought to be deserving of separate attention was given a separate line. This required provisional decisions to be made about which subspecies, or subspecies groups, should be considered separately. Island subspecies and other geographically isolated races, or clusters of them, were given this status, subject to later review.

1.5.2: Conservation Assessment Workshop

Over the past decade, the Conservation (previously Captive) Breeding Specialist Group of IUCN's Species Survival Commission has run some 15 Conservation Assessment and Management Plan (CAMP) workshops in collaboration with one or more of SSC taxon Specialist Groups. Bird groups recently covered have included pigeons, cranes, penguins, parrots and waterfowl. The object of these meetings is to review what is currently known about the status of, and threats to, all taxa in a particular group. As a result of this process, each taxon is then assigned to a threat category, representing the risk of its future extinction. Finally, specific conservation action is recommended with the objective of improving the chances that threatened taxa will be saved.

Such a meeting, which we call a Conservation Assessment Workshop as it did not involve making decisions specifically concerned with management, was held at Antwerp Zoo during 1-3 February 1993. It involved representatives of the Conservation Breeding Specialist Group, BirdLife International (previously the International Council for Bird Preservation), the World Pheasant Association, and three of the five galliform Specialist Groups: those for megapodes, for pheasants, and for partridges, quails, francolins and guineafowls. Discussions at the workshop were organised on a regional basis, with three groups of participants assessing pheasants and the

other galliform taxa native to Southeast Asia, China and South Asia, and Africa. A number of taxa occurred in two of these regions, and these were discussed jointly. The six main tasks undertaken during the workshop were:

(1) to compile information on the captive population sizes for each taxon from the 1992 World Pheasant Association census and the 1992 International Species Inventory System (ISIS) records;

(2) to review the information on each taxon in the summary table and assess its reliability, including the division of species into distinct subspecies or subspecies groups;

(3) to amalgamate or subdivide information (*e.g.* on population size) supplied by national authorities from different range countries for each taxon recognised in (2);

(4) to assign each taxon recognised in (2) to a threat category representing its risk of extinction (see Section 2.2, p. 13) unless a lack of information made this impossible.

(5) to make recommendations for future action for all taxa judged to be threatened with extinction (*i.e.* vulnerable, endangered or critical), and for some others, especially where there is a need for clarification of the taxonomic relationships between species or subspecies;

(6) to summarise all relevant information on each threatened taxon in the form of a Threatened Taxon Summary.

The completion of these tasks produced a near-definitive summary table, and a draft set of Threatened Taxon Summaries. After further review by the participants, this material was sent to the Conservation Breeding Specialist Group in May 1993 for inclusion in its report on this workshop (McGowan *et al.* 1994).

1.5.3: Drafting, reviewing and editing the Action Plan

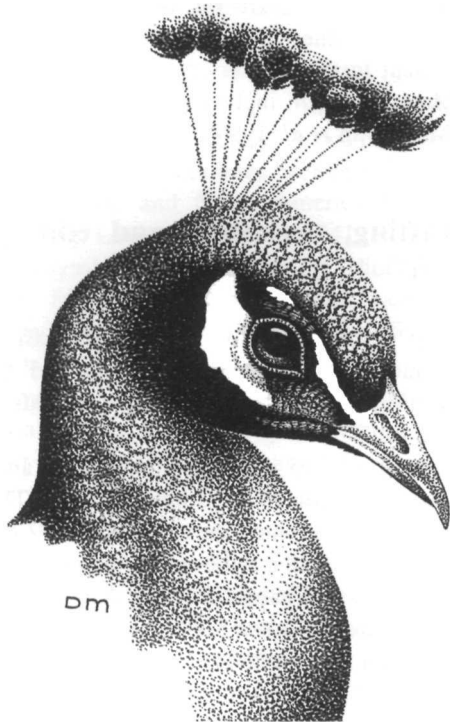
The workshop report, together with some draft project outlines produced in Antwerp on threatened taxa or important localities, provided the basis for drafting this Action Plan in full.

The next task was to produce a simplified and more easily understood version of the summary table. This new version still contains an entry for each of the 69 pheasant taxa, and is presented with a full explanation of its contents, codes and categories in Chapter 2 of this Action Plan.

The draft Threatened Taxon Summaries produced during the workshop have been extended and edited to form the body of Chapter 3. They are written in a standard format and are designed to explain our decision to place each threatened taxon in a particular threat category, by reference to

information on their past and present distributions, estimated population size and trend, and identified threats. They also give details of each threatened taxon's legal protection status, and of protected areas known to hold populations. Lastly, they outline required future action, in forms such as taxonomic clarification, extensive surveys, protected area designation, habitat protection and management, improved law enforcement, intensive research, captive management, and educational initiatives.

The final and most important part of the action planning process involved the preparation of a series of Action Plan Project Briefs, which appear in Chapter 4. The particular projects highlighted in this way have been selected on the basis of three criteria: urgency, feasibility and funding requirements. On the grounds of urgency, action is proposed for many of the most seriously threatened taxa. Feasibility included consideration of political and military instability or restrictions on movement within certain countries (*e.g.* Myanmar [Burma], Cambodia). In addition, great importance has been attached to the availability of people with relevant experience in the countries concerned, because this reduces many practical problems associated with running projects. Most of the projects selected are concerned with either single threatened taxa, or particular localities that contain several taxa in different threat categories. Whenever possible, they are related to BirdLife International's Conservation Programme, and in particular to its continuing work on the 221 Endemic Bird Areas identified through the Biodiversity Project (ICBP 1992), and its current efforts to identify a global set of Important Bird Areas. Thus projects that help to address several urgent conservation issues simultaneously should be possible.



Indian peafowl

Artist: D. Mead

The Action Plan Project Briefs are also written in a standard format stressing the aims, justification and means of implementation for each project. Each outline includes details of methods to be employed and an estimated timescale. They are written in a style designed to attract the attention of potential benefactors, conservationists and research workers, and are cross-referenced to the Threatened Taxon Summaries in Chapter 3.

An early draft of this Action Plan was reviewed by the core committee of the Pheasant Specialist Group in September 1993, as a result of which it was altered extensively. During November the parts of it concerned with Chinese taxa were reviewed and amended at a meeting of WPA-China in Beijing. In January 1994 it was distributed in whole or part to the Specialist Group's international network for comment. More feedback was then received until July, in the light of which the final draft was produced.

1.6: Project Proposal preparation

The project briefs in Chapter 4 provide no more than outlines of work that the Pheasant Specialist Group wishes to see initiated during 1995-99. They and any related Threatened Taxon Summaries are only designed to provide sufficient information so that other people can draft more detailed Project Proposals. The Pheasant Specialist Group encourages attempts by anyone to produce such proposals, if possible on a form available with guidelines from the chairman (see Appendix A).

Quite apart from the priorities set by this Action Plan, the Specialist Group will be glad to receive proposals for projects relating to the conservation of any of the pheasant taxa and their habitats. All proposals sent to the Specialist Group are reviewed by experts, and if sufficiently well developed, are then endorsed on behalf of the World Pheasant Association, BirdLife International and the Species Survival Commission. Providing assistance with the preparation of project proposals is one of the most important functions of the Specialist Group, so the review process usually develops into a constructive discussion about how to improve draft plans before they are endorsed, funded and implemented.

1.7: Summary of threat status of pheasants

As a result of the Conservation Assessment Workshop and subsequent revisions, the Pheasant Specialist Group has concluded that of the 69 taxa considered, four (6%) are critically threatened with extinction, 16 (23%) are endangered, and 24 (35%) are vulnerable. There is too little information available for a decision to be reached on the remaining six taxa (9%).

Three of the taxa now regarded as critical, namely imperial pheasant, Edwards's pheasant and Vietnamese pheasant, are all native to one small area of central Vietnam: the Annamese lowlands. Two of these were classified as endangered at the Conservation Assessment Workshop (McGowan *et al.* 1994), but information received since indicates that their populations may be so small and fragmented that they should be assigned to the critical category. The fourth critical taxon is the Bornean peacock-pheasant *Polyplectron schleiermacheri*. Accounts justifying the status given to all threatened taxa are given in their Threatened Taxon Summaries in Chapter 3.

There are 19 pheasant taxa (27%) which have been categorised as safe from extinction in this Action Plan, but even these are believed to be undergoing at least some range contraction caused by a variety of pressures. As the great majority of pheasants are strongly associated with forest in either tropical or temperate areas, by far the greatest cause for concern is the continued and widespread reduction in forest cover throughout Asia. Because of this, and the small native range sizes of many pheasant taxa, we are reluctant to state that any of them actually face no threats in the long term.

1.8: Threats to the survival of pheasants

This section expands on each type of threat mentioned in the Conservation Assessment Workshop summary table (Table 2.2, pp. 17-21), provides a summary of the importance of these threats to the pheasants as a whole, and gives specific examples to illustrate how they affect particular taxa whenever possible.

1.8.1: Habitat loss and fragmentation

The term habitat loss covers all forms of modification to habitat structure that lead to a reduction in the extent or quality of habitat available for a particular taxon. The causes of this vary from clear felling of large blocks of forest, through selective logging, to habitat degradation resulting from the excessive impact of domestic stock, and destructive encroachment caused by the expansion of areas under arable cultivation or urban development. Obviously more than one of these forms of habitat disturbance may affect an area simultaneously, or they may act one after the other. For example, land cleared of natural forest as a consequence of timber extraction is often replanted with crops of greater commercial value (*e.g.* fast growing exotic trees or arable crops).

Table 2.2 (pp. 17-21) indicates that 63 (91%) of the pheasant taxa considered in this Action Plan are known or suspected to be suffering a decline due to some form of habitat modification caused by human activity.

Deforestation: This refers to the removal of all trees in an area, usually as a consequence of timber extraction by logging operations. It is especially prevalent in areas where tropical forest lies over level ground, from which commercially valuable trees can be extracted on a large scale. The conversion of natural habitats to agricultural land is often bound up with clear-felling, as when forest cover was cleared to make way for tobacco and rubber and then palm-oil plantations during this century in parts of Indonesia and Malaysia (Wells 1985). 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 cleared of forest (van Balen and Holmes 1993).

In the Malay peninsula, the Malaysian peacock pheasant *Polyplectron malacense*, which once occurred throughout the lowland rainforests of southern Thailand, southern Myanmar and Peninsular Malaysia, has suffered from logging activities throughout its range (Davison 1986). The loss of most of the undisturbed habitat in many parts of its former range has undoubtedly resulted in many local extinctions. Indeed, its long-term survival may well depend on its conservation in a few protected areas, such as Taman Negara National Park and the Krau Wildlife Reserve in Peninsular Malaysia (McGowan 1993).

Habitat degradation: This is defined as a reduction in the quality of a habitat without the loss of all vegetation cover. It can be a result of activities such as selective logging and over-grazing by domestic animals. Selective logging refers to timber extraction that removes only some of the trees in an area. This can vary in impact from the removal of a small proportion of the standing trees, to the loss of all but a few trunks. Subsequent problems, such as damage to residual trunks and soil compaction, are discussed by Whitmore (1984), whilst Johns (1989) and Marshall and Swaine (1992) give fuller discussions of the effects of selective logging in tropical forest. The term selective logging is usually taken to mean that trees are harvested according to sustainable principles, and that alterations to forest structure are as limited as possible, but at its most extreme the resulting forest is severely degraded, with few trees left undamaged and a unnaturally patchy and irregular canopy.

Extensive grazing and browsing of the forest understorey by domestic animals is a widespread phenomenon, for example in the Western Himalayas of India (Gaston *et al.* 1981, Phillimore 1989). Domestic stock can also cause dramatic alterations to the patchwork of semi-natural habitats and production monocultures typical of most agricultural areas (Hill and Robertson 1988a).

Examples of pheasants threatened specifically by habitat degradation are the western tragopan *Tragopan melanocephalus* in the western Himalayas of India and Pakistan (Islam and Crawford 1986) and the Chinese monal (He Fen-qi *in litt.*).



Western tragopan

Artist: R. David Digby

Habitat loss to agriculture: This affects species from both open and forested habitats. Taxa regarded as being threatened as a specific result of this include cheer pheasant *Catreus wallichi* (Garson *et al.* 1992), and Germain's peacock-pheasant *Polyplectron germaini* (J. Eames *in litt.*). Intensive cultivation may also be a problem additional to that of forest loss for both the green junglefowl and green peafowl *Pavo m. muticus* on Java. No lowland forest pheasant taxa seem to survive there now and only 2-4% of the original forest cover remains along the island's south coast (van Balen 1992).

Habitat fragmentation: This is caused by the disruption of all but small blocks of suitable habitat, which become separated from each other by large expanses of uninhabitable ground. The resulting remnant populations are often both small and isolated, rendering them particularly prone to extinction though effects such as genetic drift, inbreeding depression and local ecological catastrophe. The problems apparently faced by such populations have received much theoretical attention (*e.g.* Frankel and Soulé 1981, Soulé 1987), but have not yet been the subject of rigorous field research on any vertebrate species. The lack of data relating to these problems must be put down to the difficulties imposed by the need to monitor populations over a long period, as well as the dispersal behaviour of individuals.

Pheasant taxa inhabiting both tropical and temperate forests are often considered to be threatened at least partly because of fragmentation of their habitats. However the sizes of populations that result, and their degree of isolation from each other, are generally unknown, making it impossible to assess the likely consequences of this in terms of long term population viability. It has been suggested that inbreeding depression may be a problem for the Javan

subspecies of the green peafowl and for the brown eared-pheasant *Crossoptilon mantchuricum* in China. In both cases, concern arises from the apparently complete isolation of small populations. van Balen *et al.* (1995) map a total of 28 localities for the former, and the latter is restricted to five widely separated areas (Zheng Guang-mei and Zhang Zheng-wang 1993).

Combined effects: The habitats of most pheasants are subject to a variety of pressures simultaneously. For instance, lowland tropical rain forest in Peninsular Malaysia is under pressure from clear-felling, degradation and loss of forest cover to agriculture (plantations), as well as to road and house building programmes (Salleh Mohd. Nor 1988). Indeed, Wells (1985) considers that the conservation crisis for the avifauna of the Sunda subregion (*i.e.* tropical wet Southeast Asia) is centred in the terrestrial lowlands. The scale of forest loss there puts pheasant species such as the critically threatened Bornean peacock-pheasant *Polyplectron schleiermacheri*, and the vulnerable and endangered subspecies of the crestless fireback *Lophura erythrophthalma* in serious danger.

The extent of forest loss and degradation in India has been measured using satellite image data (Centre for Science and Environment 1985). During 1972-1982, closed forest (*i.e.* that with more than 30% canopy cover) declined by more than 100,000 km², equivalent to about 3% of India's total land area. The effect was most dramatic in the western Himalayan states of Jammu and Kashmir, and Himachal Pradesh, which both lost more than 30% of their closed forest in that decade. The fragmentation of primary forest, understorey degradation and replacement of forest by scrub are all therefore greatly decreasing the amount of habitat available for pheasants such as western tragopan, koklass pheasant and Himalayan monal *Lophophorus impejanus* which live in the temperate montane forests of this region.

1.8.2: Hunting for food, sport and the bird trade

Fewer taxa appear to be threatened by the direct effects of over-exploitation by man than the various forms of habitat disruption discussed above. However the over-hunting of wild populations is a considerable problem in many cases. Overall, 44 taxa (64%) are currently considered to be suffering from over-hunting for food or sport.

A graphic illustration of this threat is provided by the Congo peafowl *A. fropavo congensis*. Described in 1936, it was given protection under Zairean law two years later, requiring permits to be issued for any specimens taken for zoos or museums. It is now believed to have been over-hunted locally to the extent that by the early 1960s it had disappeared from all ground within 25 km of villages (Collar and Stuart 1985).

The single species considered to be threatened by over-hunting for sport alone is the Japanese copper pheasant, the problem being most serious for the subspecies *S. s. soemmerringii* and *ijimae* native to southern island of Kyushu (Yamashina 1975, Brazil 1991).

Eight taxa (12%) are live-trapped for the bird trade on a scale which is currently considered to adversely affect their numbers. In addition, the green junglefowl, although considered safe from extinction at present, is trapped extensively throughout Java for hybridisation with domestic fowl. The resulting offspring are used in popular voice competitions (Holmes 1991, van Balen and Holmes 1993).

Not surprisingly, hunting is a problem in particular regions or countries, rather than for particular species. For example in Thailand, Round (1988) considers that most pheasants are as much at risk from over-hunting as they are from continuing habitat disruption. The over-hunting of pheasants, amongst many other large forest-dwelling bird and mammal species, is also seen as a general problem in northeast India (R. Kaul *in litt*), Vietnam (Nguyen Cu and Eames 1993) and China (Zheng Guang-mei and Zhang Zheng-wang 1993). This is also a serious threat for other galliforms, such as the cracids in the New World (Strahl and Grajal 1991, Silva and Strahl 1991).

1.8.3: Hybridisation with released stock

There is an obvious risk of introducing alien genetic traits into native populations in the wild when exotic species are introduced within the range of others with which they may interbreed (see Johnsgard 1986, pp. 9-11). Similar problems may arise for native populations that are subject to restocking with individuals of the same species but distinctly different origin (*e.g.* captive reared, other subspecies).

The release of captive birds is a problem for two taxa on Java. Domestic fowl pose a genetic threat to the endemic subspecies of the red junglefowl *Gallus g. bankiva*, with which it must surely associate and breed in the wild (D. Holmes *in litt.*). It has also been reported from Java that green peafowl confiscated from local bird dealers have been released into areas holding native wild birds (van Balen *et al.* 1995).

In southern England, the introduced ring-necked pheasant provides a model for the situation that may arise as a result of mixing birds differing in origin. Birds reared in captivity and then released for sport hunting purposes have been shown to perform poorly in the wild by comparison with wild birds. They survive less well (Robertson 1988), and both sexes breed less effectively (Hill and Robertson 1988b). There is also experimental evidence to suggest that captive-reared birds are behaviourally deficient (Dowell 1990) and may carry increased parasite burdens (Robertson and Dowell 1990) as a result of their unnatural early rearing conditions. Overall survival rates in the mixed populations

created by their release have also been shown to be reduced (Robertson 1990). Although the precise causes of all these effects are not yet clear, the results of this research certainly suggest that the deliberate restocking of threatened wild populations with birds of captive origin may often increase, rather than decrease, the risk of extinction.

There are at least two examples of this sort of circumstance arising within the native range of a threatened pheasant taxon, although its precise consequences remain unknown. Captive bred cheer pheasants *Catreus wallichi* of uncertain origins have escaped accidentally from aviaries within Chail Wildlife Sanctuary (V. Sharma *in litt.*), one of the best known sites for this species in the wild (Garson *et al.* 1992). In addition, populations of the Japanese green pheasant *Phasianus colchicus* sub spp. that are heavily exploited for sport hunting and are now reared in large numbers in captivity, have been crossed with *P. c. karpowi* from Korea on the adjacent Asian mainland (Maru 1980, Brazil 1991). There must now be some doubt about whether any pure green pheasant populations have survived these interventions.

1.8.4: Effects of pesticides

Agricultural pesticides are applied to reduce injurious invertebrate populations, or weed plant populations that are themselves a source of food for arthropods. Young chicks of the ring-necked pheasant feed almost exclusively on invertebrates for the first few weeks after hatching in the UK, and their growth and survival are significantly impaired if the supply of this kind of food is limited (Hill 1985, Hill and Robertson 1988a). On the basis of detailed studies of the grey partridge *Perdix perdix* populations on agricultural land in the UK, Potts (1986) suggests that the effect of pesticides on chick food supply is the principle way in which they reduce gamebird productivity and population density. Direct toxic effects resulting from contact with or ingestion of pesticides appear to be less important.

As far as native pheasant populations are concerned, pesticides are only considered to be a threat to various subspecies of the ring-necked pheasant in Asia (Zhang Zheng-wang *in litt.*). However, the non-lethal and secondary effects of pesticides are not necessarily obvious, and may well have been overlooked in many other taxa. As agricultural intensification continues throughout Asia, the consequences of pesticide use on wild pheasant populations seem certain to become more widespread and severe. The pheasant taxa most likely to be affected are those that inhabit scrub and forest on the margins of agricultural land, such as the ring-necked pheasant and the two ruffed pheasant *Chrysolophus* species in China, and the Indian peafowl *Pavo cristatus*. There is, however, evidence of DDT having been used deliberately to poison green peafowl in Java (van Balen *et al.* 1995).

1.8.5: Other threats

Apart from the obvious threat posed by warfare, there are additional forms of disturbance which are thought to be significant for three particular taxa. First, the widespread collection of medicinal herbs and fungi in spring from forests in which the western tragopan (*Gaston and Garson 1992*) and brown eared-pheasant in China (*Zhang Zheng-wang in litt.*) are nesting and rearing chicks at the same time, has the potential to greatly reduce breeding success.

Second, the copper pheasant is thought to suffer increased rates of mortality and breeding failure as a result of the attentions of feral populations of cats and dogs on the Japanese islands that it inhabits. It must be presumed that this is also a problem for the native green pheasant.

1.9: Future conservation action

This section outlines the different forms of conservation action proposed for particular taxa in this Action Plan. These fall into the three main categories of research, management and other activities.

1.9.1: Research

Intensive research: Intensive research with conservation objectives should be designed to provide detailed information on the biology of a threatened taxon, relating directly to such things as its essential ecological requirements, tolerance of habitat disturbance, impacts of other threats, and its use of secondary or marginal habitats. Collecting sufficient data of the type required on individuals or populations will almost always be physically demanding, labour intensive, and expensive by comparison with extensive survey projects. Thus, intensive research projects need to be designed carefully to tackle important but feasible objectives that are of immediate use in managing the conservation of the taxon concerned. This kind of work is recommended for 12 taxa (17% of the total).

Despite the inevitable difficulties of this kind of work, intensive research has produced results of immediate use in conservation management for several pheasant taxa. In the case of Cabot's tragopan *Tragopan caboti*, *Young et al. (1991)* followed several radio-tagged birds over three months in the winter. They found that individuals used areas containing more fallen nuts from particular tree species than were available in other parts of the forest. Areas containing the tree species *Daphniphyllum macropodium* were also used heavily, birds being seen to feed on its leaves and roost among its branches. It is quite easy to translate these results into forest management recommendations involving the greater provision of critical tree species of the correct age and size to favour this tragopan, at least within protected

areas where commercial timber production is not the primary concern.

Another example is provided by work on the cheer pheasant in India. The results of intensive observational work have been used to interpret data from extensive surveys and a population monitoring programme (*Young et al. 1987, Garson et al. 1992*). This analysis has confirmed that the cheer's hill grassland habitats are successional, and are only maintained as a result of continual disturbance through annual grazing, hay cutting and natural or deliberate burning. It is clear from this that the restriction of activities concerned with raising domestic stock within protected areas containing cheer populations is likely to increase, rather than decrease, the risk of local extinctions. A rather similar story has recently emerged from surveys of green peafowl on Java, where patchy forest and grassland habitats favoured by this bird are maintained by periodic fires and other interventions (*van Balen et al. 1995*).

Population monitoring: Systematic annual monitoring of populations is a useful tool for detecting changes in the status of a taxon at particular sites over long periods of time, and should normally be undertaken to assess the effectiveness of any *in situ* management initiatives (see Section 1.8.2, pp.6-7). Some form of population monitoring has been recommended for 11 taxa (16%).

For the ring-necked pheasant in UK, data from hunting records, and more recently on pheasant population density, have proved to be useful for assessing the effects of hunting and habitat change on populations managed for sport (*Hill and Robertson 1988a, Tapper 1992, Robertson et al. 1993a, 1993b, Woodburn 1993*).

In much of Asia, the usefulness of population monitoring as a conservation tool for pheasants is often limited by such things as access to remote study sites, and



Cabot's tragopan

Photo: J. Howman

the need to gather together a trained survey team of sufficient size on at least an annual basis. There are also practical difficulties relating to the detection of these secretive and sometimes rather silent birds in obscuring habitats. Even amongst the more vocal pheasants, there are strong seasonal fluctuations in the amount of calling (Gaston 1980). Consequently for many taxa, and especially for those inhabiting tropical forest, the repeated assessment of the extent of remaining suitable habitat is likely to be the most effective method of monitoring changes in population size within localities, at least until the reliability of other methods has been assessed through intensive research. One objective of McGowan's (1990) study of Malaysian peacock-pheasant *Polyplectron malacense* was to determine whether calling activity could be used as an index of population density. However, calling behaviour was found to be so unpredictable from month to month and between years, that standardised call counts, however carefully they are carried out, will not provide useful data for monitoring population densities of this species.

Many other taxa are well known for their regular dawn calling or noisy departure after disturbance, thus allowing standardised encounter rates to be used as density indices. Strictly speaking, such data should only be used for making comparisons between years at the same site. A case in point is provided by three calling surveys of the cheer pheasant at Chail Sanctuary in northern India during the past 15 years (Garson *et al.* 1992). Cabot's tragopan has been under study for about 10 years in Wuyanling Natural Reserve in southeastern China (Sun Yue-hua and Zheng Guang-mei 1992) and several assessments of relative numbers within the reserve have been made on the basis of the numbers of calling males located in different years (Zhang Jun-ping and Zheng Guang-mei 1990). A koklass pheasant population in Malkandi Forest in northern Pakistan has also been monitored periodically by counting calling males along transects at dawn in spring since 1975 (Howman and Howman 1976, Khan and Shah 1987, I.H. Shah *in litt.*).

Survey: Extensive surveys involve the collection of basic information on the presence or absence of a taxon, and if possible data on its relative abundance, at various sites. Such work is the first step towards determining the distribution and abundance of a taxon, as well as understanding its habitat requirements and the impact of various threats to its continued existence. Realistic conservation action cannot be proposed before this sort of information is available from at least a sample of sites. A total of 47 taxa (68%) lack even the most basic field information on current distribution and abundance. For some of these taxa there is no reliable information on past or present geographical distributions. For others, more information is still required on their distribution in relation to the siting of existing or proposed protected areas.

Many of the very poorly known taxa are from densely forested habitats in the tropics. For example in Indonesia,

we still lack basic information on the current distributions of all seven taxa inhabiting Sumatra, as well as the five native of Kalimantan (and Borneo as a whole). Other taxa are little known because of the inaccessibility of most or all of their native ranges. This is the main reason why so little is currently known about species inhabiting southern Tibet (Xizhang) and Yunnan in China, Bhutan, northeast India and Myanmar. This area contains parts of the historical ranges of at least 15 taxa in seven genera, making it the most important area of the world for pheasants.

In some instances, surveys are urgently required for critically threatened taxa. For example, the Bornean peacock-pheasant is very poorly known, and the continuing clearance of its forest habitats in Kalimantan for agriculture and the timber harvest (Holmes 1989, van Balen and Holmes 1993, D. Bruning *in litt.*) suggests that a survey to establish the continued existence this species is urgently required.

Another case is provided by Edwards's pheasant *Lophura edwardsi*, which is critically threatened and possibly extinct in the wild, with its known historical range in Vietnam almost completely deforested. Extensive recent field surveys in the Annamese lowlands have failed to find any evidence of this taxon (Robson *et al.* 1991, Eames *et al.* 1992).

Many other species remain poorly known for purely practical reasons. These include the difficulty of detecting shy, quiet birds in densely vegetated habitats in which neither walking nor observation are easy. We can refer those readers needing to know more about the best application of field techniques, to a number of key papers and books (*e.g.* Davison 1980, Gaston 1980, Karr 1981, Terborgh 1985, Krebs 1989, Bibby *et al.* 1992).

One particular method that has already proved to be useful in detecting pheasants involves broadcasting tape-recorded calls in an effort to stimulate responses from wild birds. Recordings of calls may be held by national wildlife authorities, or major archives such as the British Library of Wildlife Sounds (The National Sound Archive, 29 Exhibition Road, London SW7 2AS, UK). This technique has been used successfully to detect small surviving populations of the cheer pheasant in Pakistan (Young *et al.* 1987) and India (Sharma and Pandey 1989).

1.9.2: *In situ* management

Controlling hunting and the bird trade: Pheasants have been exploited for food throughout recorded history. The hunting of pheasants and other large birds and mammals that occurs in parts of Asia (*e.g.* Round 1988, van Balen and Holmes 1993, Zheng Guang-mei and Zhang Zheng-wang 1993), is carried out mainly to provide birds for immediate consumption or sale in local markets. However, some taxa are also trapped for the trade in live birds. As taking birds alive or dead from the wild is illegal in most countries, it is

not well documented and its scale and sustainability cannot be assessed objectively.

Hunting is generally considered to be unsustainable by conservationists, despite the fact that it must have been practiced widely at some level by local people in most places for centuries. The evidence for suggesting that such 'tribal' hunting is a destructive use of natural resources is largely circumstantial, and usually rests on no more than the fact that expanding human populations are supposedly making increasing demands on their natural surroundings.

Given these uncertainties, and the existence of a legal framework for wildlife protection in almost all countries, we have only made specific recommendations for the hunting of 15 taxa (22%) to be more effectively controlled, despite indicating that it is probably a threat to many others. The problem of effective law enforcement will, it seems, be best approached through local education initiatives, anti-hunting patrols and other measures in protected areas and the buffer zones around them.

Sometimes hunting for pheasants has apparently become a substantial commercial activity with the potential to threaten the continued existence of wild populations. A case in point is provided by the Himalayan monal in northwest India, where it used to be hunted more for the male's head feathers than for food. The green head-crest plumes were worn on the caps of men in the state of Himachal Pradesh until 1982, when this practice was made illegal. This had an immediate effect on the fashion, and the consequent reduction in hunting pressure seemed to result in marked increases in population densities of this and other pheasant taxa over a wide area monitored during the next decade (Garson and Gaston 1989, Gaston and Garson 1992).



Himalayan monal

Photo: J. Howman

The main threat to many taxa that are hunted may actually arise indirectly, through the effects of activities such as timber production and agriculture. These degrade or destroy natural habitats, thereby reducing and fragmenting their pheasant populations beyond the point at which even traditional low levels of use are sustainable.

In reviewing specific cases, we must stress the situation of two of the three seriously threatened taxa occurring in the central lowlands of Vietnam, the imperial and Vietnamese pheasants. Both were recently found in the wild near the Nam Bai Cat Tien National Park, but only after recovering specimens from trap-lines (Robson *et al.* 1993). Efforts to prevent trapping in all remaining fragments of forested habitat within the presumed former ranges of both these taxa, and that of the Edwards's pheasant nearby, must be regarded as one of the highest priorities in pheasant conservation. This will be best achieved through the effective management of existing and new protected areas (Lambert *et al.* 1994).

In Thailand, where the hunting of ground-dwelling birds for food is widespread (Round 1988), reducing its impact is considered to be vital for the long term survival of three taxa: Siamese fireback *Lophura diardi*, Burmese bar-tailed pheasant *Syrmaticus humiae burmanicus*, and Indo-chinese green peafowl *Pavo muticus imperator*. On Java in Indonesia, both hunting for food and trapping live birds for trade must be reduced in order to secure the survival of the endangered Javan green peafowl. It occurs on such a scale that it may soon threaten the endemic green junglefowl (van Balen and Holmes 1993, *in litt.*). In China, most pheasant taxa are at least locally over-hunted for food or trapped for the live bird trade, and reducing this threat is seen as a priority for many species there (Zheng Guang-mei and Zhang Zheng-wang 1993).

Habitat management: Establishing and maintaining a series of surviving blocks of habitat that are suitable for a threatened taxon is usually going to be the best way of ensuring its long term survival. Thus the designation of protected areas, often in addition to some already in existence, is considered to be an important next step for numerous threatened taxa, as is the protection and management of critical habitats within these areas. These kinds of actions are specified for 45 taxa (65%).

Such proposals are generally hard to implement, and not just because finding additional areas is often so difficult. For instance, taxa that undertake altitudinal migrations with the seasons, such as Himalayan monal (Gaston *et al.* 1981, 1983a), require large areas of continuous forest stretching over a wide altitude range (*e.g.* 2,000-3,800 m in this case) to provide adequate habitat throughout the year for a local population. This criterion is met by the Great Himalayan National Park in India (Garson and Gaston 1989).

The proposal of single localities, although hopefully extensive ones, as protected areas, may be the only option available in many cases. An example case is provided by

Swinhoe's pheasant in Taiwan, which is considered safe from extinction at present and simply in need of monitoring. However, this pheasant only inhabits undisturbed hardwood forests, the conservation of which is therefore judged to be crucial for its survival (Severinghaus 1979). The creation of the Yushan National Park has hopefully provided it with indefinite protection from the effects of both hunting and habitat loss which will most probably affect all other suitable areas in due course (L.L. Severinghaus *in litt.*).

We need to point out here that the term habitat management may imply very different kinds of activities in temperate and tropical contexts. MacKinnon *et al.* (1986) have stressed that management of protected areas in the tropics is severely limited by our lack of understanding about how complex tropical ecosystems function. By contrast, specific management prescriptions can be used to alter the conservation potential of simpler and better understood temperate habitats in a predictable way (Hudson and Rands 1988). Thus the management of temperate habitats in England for the benefit of the ring-necked pheasant involves a careful mix of predator control, marginal habitat manipulation and reduction in the use of pesticides (Hill and Robertson 1988a). In tropical forests, good conservation management may consist only of effective administration and law enforcement, in order to regulate the exploitation of all natural resources, including hunting activity (MacKinnon *et al.* 1986).

Sustainable use: In some countries, pheasants and other galliform species are hunted mainly for recreational purposes. Species which are suitable candidates for so called 'wise use' through sustainable sport hunting are typically those that inhabit open or lightly wooded habitats in countries where shooting birds for sport is culturally acceptable and economically feasible. In such cases the economic gains from the sale of hunting rights can be used to promote the careful management of both the taxa concerned and their habitats (Hill and Robertson 1988a).

Sport hunting is widely practiced in Europe and North America where the ring-necked pheasant has been introduced, and hunting rights are sold for large sums of money. As would be expected of an essentially commercial activity, data on annual harvests from particular places over periods of many decades are often available (Tapper 1992). Analysis of these long term datasets and the results of recent intensive research on the ring-necked pheasant in UK have been used as the basis for building models designed to prescribe hunting regimes that are both biologically and economically sustainable (Hill and Robertson 1988a, Hudson and Rands 1988).

The objective in these cases is to ensure that the commercial value of any exploited crop generates sufficient income to guarantee the long term existence of the hunted stock (Aebischer 1991). This general approach is being promoted energetically by the Species Survival Commission's Specialist Group on the Sustainable Use of

Wild Species, and is potentially relevant to many taxa covered by this Action Plan. The Pheasant Specialist Group feels that sustainable cropping might provide the economic incentives to conserve the ring-necked pheasant in some parts of its huge range from the Caucasus to the east Asian coast and Japan. The same could apply to the two ruffed pheasant species in central China and to the copper pheasant in Japan.

1.9.3: Other activities

Education: Conservation education is typically designed to raise the awareness of the general public to the plight of threatened native taxa and their habitats. Because of their large size, extravagant plumage and probable sensitivity to most kinds of human disturbance, many pheasants are useful as 'flagships' through which to promote the conservation of their habitats (*e.g.* Rands 1990). The Pheasant Specialist Group is keen to promote this type of educational initiative at every opportunity, especially if it has its emphasis at the local level.

Education programmes are proposed for six taxa (9%): three tragopans *Tragopan* spp. from the Himalayas, Reeves's pheasant from central China, the Palawan peacock-pheasant *Polyplectron emphanum* from the Philippines and the green peafowl in Southern China. In each case, the education campaign is one of a number of measures thought to be necessary for improving the conservation prospects of these birds. In the case of the Reeves's pheasant, conservation education for local people living its vicinity has been an integral part of recent fieldwork activity (Wu Zhi-kang 1993).

Management of captive populations: Many pheasant taxa have long been bred in captivity (Delacour 1977) and the husbandry techniques that allow these birds to flourish under such conditions are well known (*e.g.* Howman 1979, 1993). Consequently, most captive populations of pheasants are not a significant drain on their parent wild populations, and can instead be regarded as some kind of insurance against extinction. However, to fulfil this role properly, captive populations must be set up with an adequate number of founders and then managed in such a way as to minimise inbreeding, the loss of genetic diversity by drift (Frankel and Soulé 1981, Mace 1986), and the risk of hybridisation. If managed well, the number of individuals in captive populations can be increased rapidly, to avoid these problems affecting their long term viability and perhaps serving the requirements of a re-introduction project (Hussain 1990, Garson *et al.* 1992). An added benefit of having specimens in captivity is the opportunity they provide for research on behaviour and physiology at close quarters, which in turn may provide information that can be used in the conservation of wild populations.

Seventeen taxa (25%), all of which are already held in captivity, are currently considered to require particularly careful captive management. In future, captive breeding should only be undertaken as a means of conserving a threatened species which is not already in captivity, if a Population and Habitat Viability Assessment (see below) or its equivalent suggests that this is a proper course of action.

The taxa already in captivity which require special attention include some for which studbooks already exist, such as the mountain peacock-pheasant *Polyplectron inopinatum* (Bruning and Siti Hawa 1992) and the Congo peafowl (van Boxstaele 1988). There are others for which studbooks should be set up as a matter of urgency. Perhaps the most obvious case is that of the critically threatened Edwards's pheasant, which is widely kept in Europe and North America.

Population and Habitat Viability Assessment (PHVA):

This procedure, pioneered by the Conservation Breeding Specialist Group, aims to identify particular threats to the survival of a taxon in order to formulate a comprehensive recovery plan. It involves holding a workshop of experts within its native range, to discuss the size and structure of the remaining population (both in the wild and in captivity), and the threats facing it. This provides some of the information needed to investigate the likelihood of the taxon becoming extinct at some point in the future, through the use of specially developed VORTEX computer software (Lacy and Kreeger 1992). This indicates how the size, structure and genetic variation of the population will change over a long period of time, given estimates of rates of reproduction, juvenile survival, dispersal and death. It can also be used to predict the likely consequences of implementing different management tactics, such as habitat improvement, controlling hunting and captive breeding. This allows the identification of combinations of actions that reduce the risk of extinction to a minimum, at least in theory (Clark *et al.* 1991).

This option is proposed for Edwards's pheasant (together with Vietnamese pheasant), and for the green peafowl.

Taxonomic clarification: In order to promote the conservation of all pheasants, threatened taxa must be clearly defined. Once they have been identified as separate entities, practical conservation measures for any of them can be proposed. A good understanding of the taxonomic relationships within a group of species also allows data on the characteristics of well known species to be used to estimate those of related species for which there is little or no information (Brooks *et al.* 1992), as may be useful in VORTEX simulations during a PHVA.

Differences between the species lists for pheasants given by Delacour (1977), Johnsgard (1986) and Sibley and Monroe (1990) indicate changes made mainly on the basis of altered opinions about the significance of old data, rather than as a result of new research. The classification of pheasants is still based very largely on the morphological characteristics of specimens collected from widely separated localities. The description of trivial differences between these specimens has resulted in the proposal of numerous subspecies (McGowan and Panchen 1994), despite the fact that they are obviously very similar overall and may well intergrade geographically. Particular cases in point are the silver pheasant *Lophura nycthemera* and the ring-necked pheasant (Johnsgard 1986, Hill and Robertson 1988a).

This multitude of subspecies has the potential to confuse or dilute the objectives of conservation programmes for species, so we have highlighted 14 of the currently accepted 51 species (28%) for taxonomic clarification in this Action Plan. Many of the problems to be tackled are at the subspecific level, but two particular issues are of considerable importance now in determining what conservation action should be taken in the wild. These are the clarification of the relationships between Edwards's and Vietnamese pheasants endemic to the central lowlands of Vietnam, and the taxonomic status of the three subspecies of the green peafowl (see Project 4.7.4).

1.9.4: No action needed

Only 10 taxa (15%) are thought not to require any urgent conservation action at present. These are typically widely distributed taxa living in habitats other than tropical forest, and include the Indian peafowl and the Himalayan monal. Only one of these taxa, the blue eared-pheasant *Crossoptilon auritum* from northern central China, has an estimated geographical range of less than 500,000 km².

Although these pheasants cannot be given any priority for conservation action in a global context at present, action may already be needed locally to prevent them from becoming extinct in some parts of their range. As well as possibly requiring attention on a local scale, it must be stressed that all but a handful of the pheasant taxa are very poorly known in their native ranges. Hence, these widespread and common taxa provide good opportunities for research training. They may also be subjects for research into wise use through sustainable sport hunting which could provide an economic incentive to conserve both them and their habitats (Hill and Robertson 1988a, Hudson and Rands 1988, Aebischer 1991). Finally, they could provide opportunities for experimental work on re-introduction techniques (see Project 4.7.3).

CHAPTER 2: Conservation assessment

2.1: Introduction

This chapter summarises the results of the Conservation Assessment Workshop (see Section 1.5.2), the first step towards determining conservation priorities for all pheasant taxa, and the publication of this Action Plan. The procedure followed before and during the workshop to collect, summarise and assess information and advice, is detailed in Chapter 1 (Sections 1.5.1-3). The outcome presented here is derived from that already published as the workshop report (McGowan *et al.* 1994), but the reader should note that some details have been altered since, as a result of well-informed comments on the original version from members of the Pheasant Specialist Group's network.

2.2: Mace-Lande threat categories

The Mace-Lande system has been designed to allow any taxon to be assigned systematically to one of four categories representing different levels of risk of future extinction (Mace and Lande 1991). This procedure is an attempt to improve on the previous scheme adopted by IUCN for the preparation of its *Red Lists* and *Red Data Books* of threatened species. The original IUCN categories (Extinct, Endangered, Vulnerable, Rare and Indeterminate) are essentially subjective judgements. In contrast, the Mace-Lande system is founded on the current body of theory underlying population biology and genetics. It requires an objective analysis of the population status of any taxon before it can be given a level of threat (extinct, critical, endangered, vulnerable or safe). This scheme stresses overall population size and trend, numbers of populations or habitat fragments, population or habitat loss rates, and time

scale. Its four threat categories are defined in terms of criterion values for these variables (Table 2.1, p.14). It still allows for taxa that are insufficiently known for any meaningful decision to be made. It should be noted that the original Mace-Lande system (version 1.0) has been extensively revised since 1993, and that version 2.2 was adopted as the new IUCN system in late 1994 (Mace and Stuart 1994). As version 1.0 was used at the Conservation Assessment Workshop upon which this Action Plan is based, we have chosen not to attempt any revision of the threat categories assigned at that time, except in cases where significant new information has since come to light.

By considering what is known about each recognised pheasant taxon (section 1.5.1), and comparing its situation to the Mace-Lande criteria in Table 2.1, a threat category has been assigned to all but six in a total of 69 taxa. Table 2.2 (pp.17-21) contains a full listing of these taxa, with some of the supporting information used in coming to these decisions, and an indication of the future action required to reduce the risk of extinction. The threat category assigned is an important criterion by which to judge the urgency for future action. Every taxon allocated to a category other than safe is therefore the subject of more detailed attention in a Threatened Taxon Summary in Chapter 3, and the majority of them are included in an Action Plan Project Brief in Chapter 4.

The quality of information available on different pheasant taxa varies considerably. For instance, compare what is known about the widely distributed and much studied ring-necked pheasant with the critically threatened Edwards's pheasant. Despite such differences, following the same procedure for each taxon before assigning it to a threat category should have increased the reliability of the conclusions reached.

Table 2.1: Mace-Lande categories and their associated criteria (Mace & Lande 1991; CBSG 1992).

POPULATION TRAIT	CRITICAL	ENDANGERED	VULNERABLE
Probability of extinction	50% within 5 years or 2 generations, whichever is longer	20% within 20 years or 10 generations, whichever is longer	10% within 100 years
	OR	OR	OR
	Any 2 of the following criteria	Any 2 of the following criteria or any 1 CRITICAL criterion	Any 2 of the following criteria or any 1 ENDANGERED criterion
Effective population N_e corresponding to Total population N	<50 <250	<500 < 2,500	< 2,000 < 10,000
Subpopulations	f 2 with $N_e > 25$, $N > 125$ with immigration < 1/generation	f 5 with $N_e > 100$, $N > 500$ or f 2 with $N_e > 250$, $N > 1,250$ with immigration < 1/generation	f 5 with $N_e > 500$, $N > 2,500$ or f 2 with $N_e > 1,000$, $N > 5,000$ with immigration < 1/generation
Population decline	> 20%/year for last 2 years or > 50% in last generation	> 5%/year for last 5 years or > 10%/generation for last 2 years	> 1%/year for last 10 years or > 10%/generation for last 2 years
Catastrophe: rate and effect	> 50% decline/5-10 years or 2-4 generations; subpopulations highly correlated	> 20% decline/5-10 years or 2-4 generations; > 50% decline/10-20 years, 5-10 generations; subpopulations highly correlated	> 10% decline/5-10 years; > 20% decline/10-20 years; > 50% decline/50 years; subpopulations correlated
	OR		
Habitat change	resulting in above population effects	resulting in above population effects	resulting in above population effects
	OR		
Commercial exploitation or interactions with introduced taxa	resulting in above population effects	resulting in above population effects	resulting in above population effects

2.3: Format of Conservation Assessment table

The entry (row) for each taxon or group of taxa listed in Table 2.2 (pp.17-21) gives information under the following column headings:

Scientific name English name

Species order, taxonomy and naming conventions follow Sibley & Monroe (1990, 1993). Subspecies names are taken from Johnsgard (1986) and Delacour (1977). When the number of subspecies is large, they are listed as a footnote at the end of the table (p. 17-21).

Subsp.

The number of recognised subspecies in a species or subspecies-group is taken from Johnsgard (1986) with some alterations to allow for Sibley & Monroe's (1990) species listing.

Range area

The map area of the supposed historical range, making no allowances for topography, habitat distributions or introduced populations:

I = Island less than 50,000 km² (smaller than Costa Rica);

A = Continental range less than 50,000 km² (smaller than Costa Rica);

B = Continental range between 50,000 and 100,000 km² (between Costa Rica and Iceland);

C = Continental range between 100,000 and 500,000 km² (between Iceland and Thailand);

D = Continental range between 500,000 and 1,000,000 km² (between Thailand and Egypt);

E = Continental range greater than 1,000,000 km² (larger than Egypt).

Taxa coded 'A' and 'Is' are taken from the BirdLife International Biodiversity Project database (unpublished, but see ICBP 1992). Other taxon ranges are coded from published sources, such as the range maps in Delacour (1977), Johnsgard (1986) and Crowe *et al.* (1986), which have been compared with country area statistics given in the *Atlas of the World* (Collins 1991).

Range countries/regions/islands

The political geography of the native historical range (*i.e.* ranges of introduced populations are not included). This follows the description given in Sibley & Monroe (1990) for species, and Johnsgard (1986) for subspecies.

Popⁿ. trend

A qualitative assessment of the current direction of change in the global population size, coded as:

I = increasing;

S = stable;

D = decreasing.

Threats

Probable causes of the present status and trend for a taxon, based on published sources and information from correspondents.

The terms used are applied as follows:

Bird trade: catching live birds for sale is significant;

Fragmentation: of habitats, leading to the isolation of sub-populations on 'islands';

Habitat loss: through deforestation, clear- and selective-felling, agricultural and urban encroachment;

Hunting: for food, sport or feathers;

Hybridisation: with domestic poultry;

Inbreeding: populations are so small and isolated that inbreeding depression may be a cause of population decline;

Introduced predators: alien carnivores are causing extra mortality or breeding failures;

Pesticides: agricultural chemicals are accessible to birds.

M-L cat.

The Mace-Lande threat categories are coded as follows:

C = critical;

E = endangered;

V = vulnerable;

S = safe;

? = insufficient information.

Future actions

Specific measures proposed that would increase the taxon's survival prospects. The terms used imply some or all of the following activities in each case:

Captive management: taxonomic verification of all individuals, exclusion of hybrids from breeding programme, prevention of inbreeding, international cooperation to exchange blood lines, expansion of global captive population, international marking and registration, and keeping a breeding register or stud book;

Control bird trade: lobby for law enforcement and/or legislative change;

Control hunting: for food or sport;

Education: programme designed to reduce hunting or preserve habitats, using the taxon as a flagship;

Habitat management: control of negative human impact in forms such as timber harvesting, livestock foraging and hunting; establishment of new protected areas;

Intensive research: work on habitat requirements, feeding habits, social organisation, breeding ecology and population monitoring techniques;

Monitoring: annual or periodic surveys at particular sites designed to track long term changes in population density through index measures;

None needed: no action required at present;

Taxonomic clarification: research is required to establish the validity of a species, or of some or all of the subspecies listed;

Survey: extensive work to establish status over all or parts of the historical range, and to identify potential new protected areas;

Sustainable use: research into rates of harvesting and production, in order to specify sustainable cropping regimes.

Table 2.2 follows on pages 17-21.

SCIENTIFIC NAME ENGLISH NAME	SUB SPP	RANGE AREA	RANGE COUNTRIES/ REGIONS/ ISLANDS	POP^N TREND	THREATS	M-L CAT	FUTURE ACTIONS
<i>Ithaginis cruentus</i> Blood pheasant	13						Taxonomic clarification
<i>I. c. see</i> ¹	8	D	China, Myanmar	S/D		S	None needed
<i>I. c. kuseri/rocki/ marionae/holoptilus /clarkei</i>	5	B	China, India, Myanmar	D	Habitat loss, Hunting	V	Survey
<i>Tragopan melanocephalus</i> Western tragopan	-	A	India, Pakistan	D	Habitat loss	V	Education, Habitat management, Intensive research, Survey
<i>Tragopansatyra</i> Satyr tragopan	-	B	India, Nepal	D	Habitat loss, Hunting	V	Captive management, Control hunting, Education, Habitat management, Survey
<i>Tragopan blythii</i> Blyth's tragopan	2						Taxonomic clarification
<i>T. b. blythii</i>	-	A	India, Myanmar	D	Habitat loss, Hunting	E	Captive management, Education, Habitat management, Survey
<i>T. b. molesworthi</i>	-	A	Bhutan, China	?	?	?	Survey
<i>Tragopantemminckii</i> Temminck's tragopan	-	D	Bhutan, China, India, Vietnam, Myanmar	S/D	Habitat loss, Hunting	S	None needed
<i>Tragopancaboti</i> Cabot's tragopan	-	B	China	D	Habitat loss, Hunting	V	Captive management, Habitat management, Monitoring, Survey
<i>Pucrasia macrolopha</i> Koklass pheasant	9						Taxonomic clarification
<i>P. m. nipalensis/ macrolopha/castanea/ biddulphi</i>	4	C	Afghanistan, India, Nepal, Pakistan	D	Habitat loss	S	None needed
<i>P. m. joretiana/darwini</i>	2	A	China	D	Habitat loss, Hunting	V	Survey
<i>P. m. meyeri/ruficollis/ xanthospila</i>	3	C	China	D	Habitat loss, Hunting	V	Survey
<i>Lophophorus impejanus</i> Himalayan monal	-	D	Afghanistan, Bhutan, China, India, Nepal, Pakistan	S/D	Habitat loss, Hunting	S	None needed
<i>Lophophorus sclateri</i> Sclater's monal	2	B	China, India, Myanmar	S/D	Habitat loss, Hunting	E	Habitat management, Survey
<i>Lophophorus lhuysii</i> Chinese monal	-	C	China	D	Habitat loss, Hunting	V	Control hunting, Habitat management, Survey
<i>Gallus gallus</i> Red junglefowl	5	E	Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Peninsular Malaysia, Thailand, Vietnam	S/D	Habitat loss, Hybridisation	S	None needed

SCIENTIFIC NAME ENGLISH NAME	SUB SPP	RANGE AREA	RANGE COUNTRIES/ REGIONS/ ISLANDS	POP ^N TREND	THREATS	M-L CAT	FUTURE ACTIONS
<i>Gallussonneratii</i> Grey junglefowl	-	D/E	India	S/D	Habitat loss, Hunting	S	Habitat management, Survey
<i>Galluslafayetii</i> Ceylon junglefowl	-	B	Sri Lanka	S/D	Bird trade, Habitat loss	S	Control bird trade, Survey
<i>Gallusvarius</i> Green junglefowl	-	C	Java, Lesser Sundas (Indonesia)	D	Bird trade, Hybridisation	S	Control bird trade
<i>Lophuraleucomelanos</i> Kalij pheasant	9						Taxonomic clarification
<i>L. l. see</i> ²	5	E	India, Pakistan	S/D	Habitat loss	S	None needed
<i>L. l. moffiti</i>	-	A	Bhutan	?	?	?	Captive management, Survey
<i>L. l. oatesi/lineata/ crawfurdi</i>	3	B	Myanmar, Thailand	D	Habitat loss, Hunting	V	Habitat management, Survey
<i>Lophuranythemera</i> Silver pheasant	15						Taxonomic clarification
<i>L. n. see</i> ³	11	E	Cambodia, China, Laos, Myanmar, Thailand, Vietnam	D	Habitat loss	S	None needed
<i>L. n. annamensis</i>	-	A	Vietnam	D	Habitat loss, Hunting	E	Habitat management, Survey
<i>L. n. whiteheadi</i>	-	Is	Hainan Is. (China)	D	Habitat loss, Hunting	E	Habitat management, Survey
<i>L. n. engelbachi</i>	-	A	Laos	D	Habitat loss, Hunting	E	Habitat management, Survey
<i>L. n. lewisi</i>	-	A	Cambodia, Thailand	D	Bird trade, Habitat loss, Hunting	V	Habitat management, Monitoring, Survey
<i>Lophuraimperialis</i> Imperial pheasant	-	A	Vietnam	D	Habitat loss, Hunting	C	Control hunting, Habitat management, Survey
<i>Lophuraedwardsi</i> Edwards's pheasant	-	A	Vietnam	D	Habitat loss, Hunting	C	Captive management, Control hunting, Habitat management, PHVA, Survey, Taxonomic clarification
<i>Lophurahatinhensis</i> Vietnamese pheasant	-	A	Vietnam	D	Habitat loss, Hunting	C	Captive management, Control hunting, Habitat management, PHVA, Survey, Taxonomic clarification
<i>Lophuraswinhoii</i> Swinhoe's pheasant	-	Is	Taiwan	S/D	Habitat loss	S	Habitat management
<i>Lophurahoogerwerfi</i> Hoogerwerf's pheasant	-	A	Sumatra	S	Habitat loss	V	Habitat management, Survey, Taxonomic clarification
<i>Lophurainomata</i> Salvadori's pheasant	-	A	Sumatra	S/D	Habitat loss	V	Habitat management, Survey, Taxonomic clarification

SCIENTIFIC NAME ENGLISH NAME	SUB SPP	RANGE AREA	RANGE COUNTRIES/ REGIONS/ ISLANDS	POP^N TREND	THREATS	M-L CAT	FUTURE ACTIONS
<i>Lophuraerythrophthalma</i> Crestless fireback	2						Taxonomic clarification
<i>L. e. erythrophthalma</i>	-	C	Malay Peninsula (M), Sumatra (S)	D	Habitat loss	V(M) E(S)	Captive management, Habitat management, Intensive research, Survey
<i>L. e. pyronota</i>	-	B	Borneo	D	Habitat loss	E	Captive management, Habitat management, Intensive research, Survey
<i>Lophuraignita</i> Crested fireback	4	D	Borneo, Greater Sundas, Peninsular Malaysia, Sumatra, Thailand	D	Habitat loss, Hunting	V	Habitat management, Survey
<i>Lophuradiardi</i> Siamese fireback	-	D	Cambodia, Laos, Myanmar, Thailand, Vietnam	D	Habitat loss, Hunting	V	Control hunting, Habitat management, Survey
<i>Lophurabulweri</i> Bulwer's pheasant	-	B	Borneo	S/D	Habitat loss, Hunting	V	Habitat management, Survey
<i>Crossoptilonharmani</i> Tibetan eared-pheasant	-	A	China, India	D	Habitat loss, Hunting	E	Habitat management, Survey, Taxonomic clarification
<i>Crossoptiloncrossoptilon</i> White eared-pheasant	4	D	China	D	Habitat loss, Hunting	V	Control hunting, Habitat management, Survey
<i>Crossoptilon mantchuricum</i> Brown eared-pheasant	-	A	China	S	Habitat loss	E	Captive management, Habitat management, Intensive research
<i>Crossoptilonauritum</i> Blue eared-pheasant	-	C	China	S	Habitat loss	S	None needed
<i>Catreuswallichi</i> Cheer pheasant	-	B	India, Nepal, Pakistan	S/D	Habitat loss, Hunting	V	Control hunting, Education, Habitat management, Monitoring, Survey
<i>Syrmaticuselliotti</i> Elliot's pheasant	-	C	China	D	Habitat loss, Hunting	V	Captive management, Habitat management, Intensive research, Monitoring
<i>Syrmaticushutniae</i> Hume's pheasant	2						
<i>S.h.humiae</i>	-	C	India, Myanmar	D	Habitat loss, Hunting	E	Captive management, Habitat management, Intensive research, Survey
<i>S.h.burmanicus</i>	-	C	China, Myanmar, Thailand	D	Habitat loss, Hunting	V	Control hunting, Habitat management, Intensive research, Survey
<i>Syrmaticusmikado</i> Mikado pheasant	-	Is	Taiwan	S	Habitat loss	S	Monitoring
<i>Syrmaticussoemmerringii</i> Copper pheasant	5						Taxonomic clarification

SCIENTIFIC NAME ENGLISH NAME	SUB SPP	RANGE AREA	RANGE COUNTRIES/ REGIONS/ ISLANDS	POP^N TREND	THREATS	M-L CAT	FUTURE ACTIONS
<i>5.5.soemmerringii/ijimae</i>	2	Is	Kyushu Is. (Japan)	D	Hunting, Hybridisation, Introduced predators	?	Intensive research, Survey, Sustainable use
<i>S. s. scintillans/ intermedius/subrufus</i>	3	B	Honshu and Shikoku Is. (Japan)	D	Hunting, Introduced predators	?	Intensive research, Survey, Sustainable use
<i>Syrmaticusreevesii</i> Reeves's pheasant	-	C	China	D	Bird trade, Habitat loss, Hunting	E	Control bird trade, Education, Habitat management, Intensive research, Monitoring, Survey
<i>Phasianuscolchicus</i> Ring-necked pheasant	33						Taxonomic classification
<i>P. c. see</i> ⁴	30	E	Afghanistan, Caucasus, China, Iran, Mongolia, Russia, Vietnam	S/D	Habitat loss, Pesticides	S	Monitoring
<i>P. c. versicolor/ robustipes/tanensis</i>	3	C	Japan	D	Habitat loss, Introduced predators	S	Monitoring, Sustainable use
<i>Chrysolophuspictus</i> Golden pheasant	-	C	China	D	Habitat loss, Hunting	S	Monitoring, Sustainable use
<i>Chrysolophusamherstiae</i> Lady Amherst's pheasant	-	c	China, Myanmar	D	Habitat loss, Hunting	S	Monitoring, Sustainable use
<i>Polyplectronchalcurum</i> Bronze-tailed peacock- pheasant	2	B	Sumatra	S/D	Habitat loss, Hunting	V	Control hunting, Habitat management, Survey
<i>Polyplectroninopinatum</i> Mountain peacock- pheasant	-	A	Malaysia	D	Habitat loss	V	Captive management, Habitat management, Survey
<i>Polyplectrongermaini</i> Germain's peacock- pheasant	-	A	Vietnam	D	Habitat loss, Hunting	V	Habitat management, Survey
<i>Polyplectronbicalcaratum</i> Grey peacock-pheasant	5						
<i>Polyplectronb. bicalcaratum/bakeri/ bailyi/ghigii</i>	4	E	Bhutan, China, India, Laos, Myanmar, Thailand, Vietnam	D	Habitat loss	S	None needed
<i>P. b. katsumatae</i>	-	Is	Hainan Is. (China)	D	Habitat loss, Hunting	E	Habitat management, Intensive research, Monitoring, Survey
<i>Polyplectronmalacense</i> Malaysian peacock- pheasant	-	A	Peninsular Malaysia	D	Habitat loss	V	Captive management, Habitat management
<i>Polyplectron schleiermacheri</i> Bornean peacock-pheasant	-	B	Borneo	D	Habitat loss	C	Habitat management, Survey

SCIENTIFIC NAME ENGLISH NAME	SUB SPP	RANGE AREA	RANGE COUNTRIES/ REGIONS/ ISLANDS	POP ^N TREND	THREATS	M-L CAT	FUTURE ACTIONS
<i>Polyplectronemphanum</i> Palawan peacock-pheasant	-	Is	Philippines	D	Bird trade, Habitat loss, Hunting	E	Captive management, Control bird trade, Control hunting, Education, Habitat management, Survey
<i>Rheinardiaocellata</i> Crested argus	2						
<i>R. o. ocellata</i>	-	A	Laos, Vietnam	D	Habitat loss, Hunting	V	Control hunting, Habitat management, Survey
<i>R. o. nigrescens</i>	-	A	Peninsular Malaysia	D	Habitat loss	E	Habitat management, Survey
<i>Argusianusargus</i> Great argus	2	E	Borneo, Peninsular Malaysia, Sumatra, Thailand	D	Bird trade, Habitat loss, Hunting	V	Captive management, Control hunting, Habitat management
<i>Afropavocongensis</i> Congo peafowl	-	C	Zaire	D	Habitat loss, Hunting	?	Captive management, Habitat management, Intensive research, Survey
<i>Pavocristatus</i> Indian peafowl	-	E	Bangladesh, India, Nepal, Pakistan, Sri Lanka	S/D	Habitat loss, Hunting	S	None needed
<i>Pavomuticus</i> Green peafowl	3						Captive management, Taxonomic clarification
<i>P.m.muticus</i>	-	B	Java	D	Bird trade, Habitat loss, Hunting, Hybridisation	E	Control bird trade, Control hunting, Habitat management, Intensive research, PHVA
<i>P.m.imperator</i>	-	D	China, Laos, Myanmar, Thailand, Vietnam	D	Bird trade, Habitat loss, Hunting	E	Control hunting, Education, Habitat management, Survey
<i>P.m.spicifer</i>	-	C	Bangladesh, India, Myanmar	D	Habitat loss, Hunting	?	Habitat management, Survey

1 = *cruentus, affinis, tibetanus, geoffroyi, berezowski, beicki, michaelis, sinensis, annae*

2 = *hamiltoni, leucomelana, melanota, lathami, williamsi*

3 = *beli, berliozii, rufipes, ripponi, jonesi, rongjiangensis, omeiensis, occidentalis, beaulieui, fokiensis, nycthermera*

4 = *colchicus, septentrionalis, talischensis, persicus, shawi, chrysomelas, bianchii, zerafschanicus, zarudnyi, principalis, mongolicus, turcestanicus, tarimensis, vlangalii, elegans, rothschildi, sohokotensis, kiangsuensis, alaschanicus, suechschanensis, decollatus, strauchii, satscheuensis, edzinensis, formosanus, torquatus, takatsukasae, pallasi, hagenbecki, karpowi*

CHAPTER 3: Threatened Taxon Summaries

3.1: Introduction

Chapter 2 of this Action Plan summarises information of importance for the conservation of all the species, as well as of a number of subspecies, of pheasant (Table 2.2, pp.17-21). Any taxon listed there as not being safe from extinction is the subject of a Threatened Taxon Summary in this chapter. According to the Mace-Lande threat criteria we have used (Table 2.1, p.14) this means that all the taxa with a summary here are believed to have populations of less than 10,000 individuals in the wild, to have highly fragmented distributions, to be declining rapidly, or to be so poorly known that it is not possible to assign them to a threat category. Some of the summaries that follow were first drafted in outline at the Conservation Assessment Workshop in early 1993 (Section 1.5.2), but these and others written since have been extensively revised in the light of comments from the Pheasant Specialist Group's worldwide network. Their contributions are indicated by name, followed by *in litt.*, and they are all listed with their current addresses in Appendix A.

Each Threatened Taxon Summary briefly presents the information used to justify the threat category assigned, outlines any conservation measures already taken, and indicates what future action is required.

3.2: Format of Threatened Taxon Summaries

Each of these summaries includes entries under a standard set of sub-headings, as follows:

Conservation status: The Mace-Lande threat category is that given by the Pheasant Specialist Group. The Appendix listing under the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) is taken from the list valid from 16 February 1995. CITES Appendix I taxa are defined as being threatened with extinction and affected by trade, which must therefore be strictly regulated; Appendix II taxa are not necessarily threatened, but may become so unless trade is regulated (*i.e.* reduced); Appendix III taxa are identified by certain countries as being in need of protection from trade there and elsewhere (Brautigam 1994). Any category of protected status under the laws of individual range countries is also given where known, but this information is not comprehensive.

Taxonomic status: This gives an indication of the distinctness of the taxon, by stating whether it is in a species with no, few or many subspecies, taking Johnsgard (1986) as the authority. Relevant literature is cited if there is some uncertainty about the taxonomy.

Current distribution: Current information on geographical distribution, habitat and altitude ranges are given. Historical information taken from Delacour (1977) or Johnsgard (1986) is sometimes used to indicate the extent of change. In the case of Restricted Range Species (*i.e.* those with a geographical range less than 50,000 km²), the Endemic Bird Areas in which they occur are specified (ICBP 1992).

Population status: Intensive field research from which population densities can be derived has been carried out on very few pheasants. Thus our estimate of global population size in the wild is usually given only to an order of magnitude (*e.g.* 1,000, 10,000, *etc.*). Unless otherwise stated, this is based on indicators of density (*e.g.* call or encounter rates), and the supposed extent of suitable habitat. If the threat category (version 2.2; Mace and Stuart 1994) assigned by BirdLife International (Collar *et al.* 1994) differs from the Mace-Lande (version 1.0; Mace and Lande 1991) category assigned by the Pheasant Specialist Group in this Action Plan, this is noted here.

Captive population: Information is given on the numbers of specimens of the taxon known to be in captivity. The primary information sources are the International Species Identification System (ISIS) register on 31 December 1992 and the World Pheasant Association's (WPA) international census of captive Galliformes of 31 December 1991 (Hewitt 1992). Neither of these schemes claim to be comprehensive, and there is an unknown amount of overlap between them because some keepers of captive pheasants are registered with both ISIS and WPA. It must also be presumed that large numbers of captive individuals do not appear in either register, so a further estimated total figure is given, as agreed at the Conservation Assessment Workshop (G. Robbins *in litt.*).

Threats: These include identified threats to a particular taxon, as well as threats only implied from a general knowledge of such things as widespread habitat degradation or hunting within the taxon's range.

Protected areas: Any protected areas in which the taxon has been recorded are listed by name, with their designation (*e.g.* National Park, Wildlife Reserve, *etc.*) and map area in km² if known.

Future action: These are the recommendations of the Conservation Assessment Workshop participants, based on published literature and proposals made by national and regional authorities who provided us with written advice. Subsequent consultations with these and other people have resulted in the revision and expansion of these recommendations in some cases.

3.3: Ranking of Threatened Taxon Summaries

The Threatened Taxon Summaries are presented below in an order that reflects the degree of threat and thus the urgency of future action. Species that are regarded as critical therefore appear first, followed by those thought to be endangered, then those classified as vulnerable, and finally

those that are insufficiently known to categorise. For species in which all subspecies are threatened, there is a single summary. Threatened subspecies or subspecies groups, within species that are not believed to be threatened as a whole, are listed last. Within each of these categories, species order follows that given by Sibley and Monroe (1990). Table 3.1 gives the overall order that results and the page reference for each summary.

Table 3.1. Threatened and insufficiently known pheasant taxa. Mace-Lande categories: C=critical; E=endangered; V=vulnerable; ?=insufficiently known (Mace and Lande 1991).

ENGLISH NAME	SCIENTIFIC NAME	M-L CAT	PAGE NO
Imperial pheasant	<i>Lophura imperialis</i>	C	24
Edwards's pheasant	<i>Lophura edwardsi</i>	C	24
Vietnamese pheasant	<i>Lophura hatinhensis</i>	C	25
Bornean peacock-pheasant	<i>Polyplectron schleiermachersi</i>	C	26
Blyth's tragopan	<i>Tragopan blythii</i>	E	26
Sclater's monal	<i>Lophophorus sclateri</i>	E	28
Crestless fireback	<i>Lophura erythrophthalma</i>	E	28
Tibetan eared-pheasant	<i>Crossoptilon harmani</i>	E	29
Brown eared-pheasant	<i>Crossoptilon mantchuricum</i>	E	30
Hume's pheasant	<i>Syrnaticus humiae</i>	E	31
Reeves's pheasant	<i>Syrnaticus reevesii</i>	E	32
Palawan peacock-pheasant	<i>Polyplectron emphanum</i>	E	33
Crested argus	<i>Rheinardia ocellata</i>	E	33
Green peafowl	<i>Pavo muticus</i>	E	35
Western tragopan	<i>Tragopan melanocephalus</i>	V	37
Satyr tragopan	<i>Tragopan satyra</i>	V	37
Cabot's tragopan	<i>Tragopan caboti</i>	V	38
Chinese monal	<i>Lophophorus lhuysii</i>	V	39
Hoogerwerf's pheasant	<i>Lophura hoogerwerfti</i>	V	40
Salvadori's pheasant	<i>Lophura inornata</i>	V	40
Crested fireback	<i>Lophura ignita</i>	V	41
Siamese fireback	<i>Lophura diardi</i>	V	42
Bulwer's pheasant	<i>Lophura bulweri</i>	V	43
White eared-pheasant	<i>Crossoptilon crossoptilon</i>	V	43
Cheer pheasant	<i>Catreus wallichi</i>	V	44
Elliot's pheasant	<i>Syrnaticus ellioti</i>	V	45
Bronze-tailed peacock-pheasant	<i>Polyplectron chalcurum</i>	V	46
Mountain peacock-pheasant	<i>Polyplectron inopinatum</i>	V	47
Germain's peacock-pheasant	<i>Polyplectron germaini</i>	V	47
Malaysian peacock-pheasant	<i>Polyplectron malacense</i>	V	48
Great argus	<i>Argusianus argus</i>	V	49
Copper pheasant	<i>Syrnaticus soemmerringii</i>	?	50
Congo peafowl	<i>Afropavo congensis</i>	?	50
Clark's/Kuser's/Rock's/Mrs Vernay's blood pheasant	<i>Ithaginis cruentus clarkei/kuseri/rocki/holoptilus/marionae</i>	V	51
Joret's/Darwin's koklass pheasant	<i>Pucrasia macrolopha joretiana/darwini</i>	V	52
Meyer's/orange-collared/yellow-necked koklass pheasant	<i>Pucrasia macrolopha meyeri/ruficollis/xanthospila</i>	V	52
Mack kalij pheasant	<i>Lophura leucomelanos moffiti</i>	?	53
Oates's/lineated/Crawford's kalij pheasant	<i>Lophura leucomelanos oatesi/lineata/crawfordi</i>	V	53
Annamese silver pheasant	<i>Lophura nycthemera annamensis</i>	E	54
Hainan silver pheasant	<i>Lophura nycthemera whiteheadi</i>	E	54
Bolovens silver pheasant	<i>Lophura nycthemera engelbachi</i>	E	54
Lewis's silver pheasant	<i>Lophura nycthemera lewisi</i>	V	55
Hainan grey peacock-pheasant	<i>Polyplectron bicalcaratum katsumatae</i>	E	55

3.4: Critical species

3.4.1: Imperial pheasant

Lophura imperialis

Conservation status: Mace-Lande - Critical; CITES: - Appendix I; National protection status - Group 1 (Vietnam).

Taxonomic status: There are no subspecies.

Current distribution: It is known only from central Vietnam, the one recent record is of a live bird trapped by rattan collectors 12km west of Cat Bin in 1991 in secondary lowland forest at 50-100m (Robson *et al.* 1993). This is approximately 200 km north of Dong Hoi, where Delacour claims to have obtained a live pair in 1923 (J. Eames and Nguyen Cu *in litt.*). Although the claim by David-Beaulieu (1949) that the species occurs in central Laos has been questioned (Robson *et al.* 1993), recent fieldwork there has yielded local reports which may be of this species (Cambridge Survey Team *per* T. Evans and R. Timmins *in litt.*). This is a Restricted Range Species occurring in Endemic Bird Area D19 (Annamese Lowlands; ICBP 1992).

Population status: Based on the extent of what is believed to be suitable habitat, the population is now thought likely to be below 2,500 (J. Eames and Nguyen Cu *in litt.*). As habitat loss is continuing, the population is assumed to be declining.

Captive population: There are none in captivity. Following the loss of the original pure line in the 1940's, a captive stock was 'reconstructed' by crossing hybrids with closely related species to produce birds that closely resemble the imperial pheasant (Delacour 1977, Johnsgard 1986). Given their known hybrid origin, however, these individuals have no conservation value.



Imperial pheasant

Artist: E. Hudson

Threats: As the species is so little known in the wild, it is not possible to assess the extent of habitat loss that it has suffered. The only site at which the species is known to occur is threatened by continued loss of forest as logging progresses. The Government logging at Cam Ky has stopped, but illegal logging continues around Ke Go Lake (J. Eames and Nguyen Cu *in litt.*). Hunting may also be a major problem now.

Protected areas: It is recorded from Ho Ke Go proposed protected area in Ha Tinh Province, but it may also occur in Vu Quang Nature Reserve (J. Eames and Nguyen Cu *in litt.*).

Future action: Further extensive surveys are urgently required in all areas of suitable habitat which may contain the species. Initially these should concentrate on Ha Tinh, Quang Binh and Nghe An Provinces (J. Eames and Nguyen Cu *in litt.*). Appropriate management recommendations should be developed with the Ministry of Forestry for any suitable areas found, and Ho Ke Go should be fully established as a protected area as soon as possible.

3.4.2: Edwards's pheasant

Lophura edwardsi

Conservation status: Mace-Lande - Critical; CITES - Appendix I; National protection status - Not protected (Vietnam).

Taxonomic status: It is currently viewed as having no subspecies, but the Vietnamese pheasant *L. hatinhensis* may well be a subspecies of *L. edwardsi* (Vuilluermier *et al.* 1992).

Current distribution: It was only ever known from a small area in the level lowlands of Annam in central Vietnam. Recent fieldwork in its historical range has failed to find the species and revealed the area to be almost completely deforested (Eames *et al.* 1992). This is a Restricted Range Species occurring in Endemic Bird Area D19 (Annamese Lowlands; ICBP 1992).

Population status: Recent surveys have failed to find this species at its historic collecting localities, all of which have been completely deforested (Eames *et al.* 1992). It could still exist in small numbers (*i.e.* less than 1,000).

Captive population: ISIS records 133 individuals in captivity and WPA 418. A studbook was re-initiated in 1995 by A.Hennache and Dang Gia Tung on behalf of WPA. G. Robbins (*in litt.*) estimates that there about 1,000 in captivity worldwide. Ciarpaglini and Hennache (1995) conclude that originally about 30 birds taken from at least three different localities, but that some of these did not



Edwards's pheasant

Photo: J. Howman

survive for long enough to become founders of today's captive population.

Threats: Commercial logging and the use of chemical defoliants have destroyed most of the forest in its presumed former range. The forests of the level lowlands have now been almost entirely replaced by agriculture, mainly of wet rice (J. Eames and Nguyen Cu *in litt.*).

Protected areas: It is not known to occur in any protected area.

Future action: Further surveys are needed in southern Thua Thien and Quang Tri Provinces to determine the presence of any suitable remaining forest patches and whether they contain this species. If it persists, protected areas should be established immediately. Taxonomic clarification is urgently required, given that *L. hatinhensis* is known from the wild and may be of the same species. A Population and Habitat Viability Assessment should be conducted to simulate the consequences of various management options on the survival prospects of the species (Clark *et al.* 1991). The captive population should be managed carefully to minimise the loss of genetic diversity.

3.4.3: Vietnamese pheasant *Lophura hatinhensis*

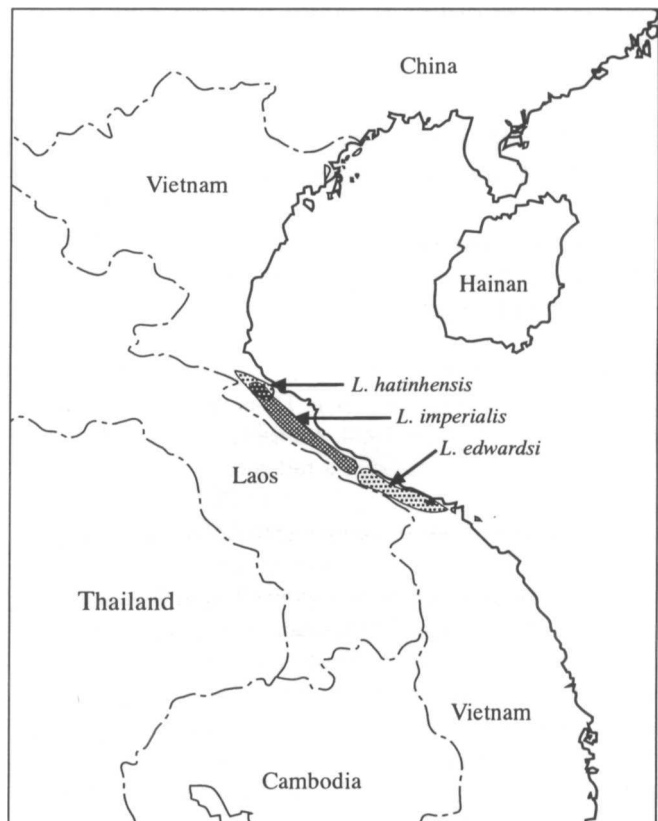
Conservation status: Mace-Lande - Critical; CITES - Appendix I (if included within *L. edwardsi*); National protection status - Not protected (Vietnam).

Taxonomic status: It is first mentioned by Vo Quy in 1964 (in Russian), but his book *Chim Viet Nam* (Vo Quy 1975) is usually taken as the first citation. This taxon is too poorly known to be sure that it is distinct from *L. edwardsi* at the species level (Vuilluermier *et al.* 1992).

Current distribution: It is only known from secondary lowland forest at an altitude of about 50-300 m in Vietnam (Robson *et al.* 1993), around Ke Go Lake in Ky Anh and Cam Xuyen districts of Ha Tinh Province in north central Annam (J. Eames and Nguyen Cu *in litt.*). It was found at Cat Bin on level or gently sloping terrain covered by secondary lowland evergreen forest with a well developed understorey of palms and rattan interspersed with patches of bamboo (Eames *et al.* 1992, Nguyen Cu and Eames 1993). Further surveys in 1994 indicate that there may be a significant population in the Net River watershed (Lambert *et al.* 1994), and it may also occur in Minh Boa district in Quang Binh Province (J. Eames and Nguyen Cu *in litt.*). This is a Restricted Range Species, occurring in Endemic Bird Area D19 (Annamese Lowlands; ICBP 1992).

Population status: Based on the amount of forested habitat remaining and the outcome of recent surveys, the population is now thought likely to be less than 2,500 (J. Eames and Nguyen Cu *in litt.*). As forest is still being lost, the population is thought to be declining. BirdLife International classifies this species as endangered (Collar *et al.* 1994).

Captive population: ISIS and WPA do not record any individuals in captivity. A breeding programme was started at Hanoi Zoo in 1990 (Dang Gia Tung 1993), and there were about 20 individuals, half of which were captive bred, in early 1995 (G. Stewart *in litt.*).



Supposed ranges of imperial, Edwards's and Vietnamese pheasants (after C. Robson)

Threats: It is threatened by the continuing loss of all remaining lowland forest within its known range. Government logging at Cam Ky has stopped, but illegal logging continues around Ke Go Lake (J. Eames and Nguyen Cu *in litt.*). The distillation of oils from timber in the forest is a major cause of disturbance and understorey removal in the Net River watershed (Lambert *et al.* 1994). Hunting also remains a major problem at all known or suspected sites.

Protected areas: It is recorded from Ho Ke Go proposed protected area in Ha Tinh Province, but it may also occur in Vu Quang Nature Reserve (J. Eames and Nguyen Cu *in litt.*).

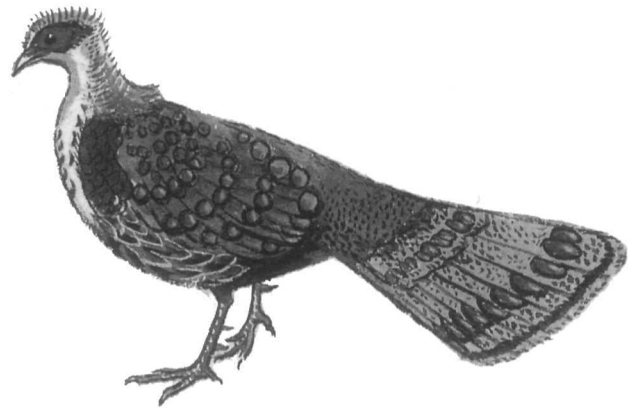
Future action: Further extensive surveys are urgently required in all areas of suitable habitat within its supposed range. Initially these should concentrate on Ha Tinh, Quang Binh and Nghe An Provinces (J. Eames and Nguyen Cu *in litt.*). Subsequently, appropriate management recommendations should be developed with the Ministry of Forestry for any suitable areas found. Support should be given to the establishment of Ho Ke Go and the Net River watershed as protected areas. Taxonomic clarification is needed to determine its relationship with *L. edwardsi* but it should be included for consideration in the Population and Habitat Viability Analysis for that taxon (Clark *et al.* 1991). The captive population should be managed carefully, and separately from that of *L. edwardsi*, to minimise loss of genetic diversity.

3.4.4: Bornean peacock-pheasant *Polyplectron schleiermacheri*

Conservation status: Mace-Lande - Critical; CITES - Appendix II; National protection status - Protected as *P. malacense* (Indonesia), Protected (Sarawak, Malaysia).

Taxonomic status: It has been regarded both as a subspecies of *P. malacense* (e.g. Delacour 1977) and as a separate species (Peters 1934, Johnsgard 1986, Sibley and Monroe 1990). It is treated as a full species here.

Current distribution: It is endemic to Borneo, and has only been recorded from a few sites in the west, north and southeast. There is no recent evidence from Muara Teweh in Central Kalimantan, Balikpapan in East Kalimantan or Paitan in Sabah, East Malaysia. There are recent unconfirmed reports from four sites: Nangatayap in west Kalimantan (an unconfirmed voice record), at Muarakarum in central Kalimantan, and in steep slope forest near Kapit and near Bario in Sawarak (B. van Balen and D. Holmes *in litt.*, D. Wells *in litt.*).



Bornean peacock-pheasant

Artist: E. Hudson

Population status: The species is presumed to have always been very difficult to detect, possibly because it occurs naturally at low densities. Based on this, lost sites and habitat remaining, the population is estimated at no more than 1,000.

Captive population: There are none known in captivity.

Threats: Habitat degradation and loss are the main threats, but hunting is likely to be a problem if the expert and persistent hunters on Borneo can still find the species (G. Davison *in litt.*).

Protected areas: It is not recorded from any protected area either in Kalimantan (B. van Balen and D. Holmes *in litt.*) or East Malaysia (G. Davison *in litt.*).

Future action: Attempts to determine its distribution should begin with surveys of hunters' knowledge, perhaps starting with Gunung Palung Nature Reserve and Danu Sentorum in West Kalimantan, and the Danum Valley Conservation Area and Tabin Reserve in Sabah. In addition, the reports from Kapit and Bario in Sarawak should be investigated further. Once any populations have been found, their habitat should be protected and hunting controlled effectively.

3.5: Endangered species

3.5.1: Blyth's tragopan *Tragopan blythii*

Conservation status: Mace-Lande - *T. b. blythii* Endangered, *T. b. molesworthi* ? (insufficient information); CITES - Appendix I; National protection status - 1st Class (China), Schedule 1 (India).



Blyth's tragopan

Photo: J. Howman

Taxonomic status: The two subspecies are treated separately here.

Current distribution: For *blythii*, all but one recent record come from Nagaland in northeast India (Zeliang 1980, 1987), but historically it occurred in the adjacent Manipur state, as well as in northwest Myanmar. A single Chinese record comes from the northwestern tip of Yunnan (He Fen-qi and Lu Tai-chun 1991, Zheng Guang-mei and Zhang Zheng-wang 1993). Historical accounts (*e.g.* Baker 1928) record this subspecies as inhabiting densely forested valleys and hillsides between 1,800 m in winter and 3,000 m in summer. Subspecies *molesworthi* is known from three skins (Ali and Ripley 1983), a few sightings in 1973 (Ali *et al.* in press), all from eastern Bhutan, and from southeastern Tibet (Cheng Tso-hsin 1987). The records from Bhutan are from localities at 2,400-2,600 m in rhododendron forest with ringal bamboo and a dense understorey of ferns. Partial remains of males of unknown subspecies have recently been found in the Mehao and Dibang Valley Wildlife Sanctuaries in eastern Arunachal Pradesh in India, well outside the supposed historical range of either subspecies (Kaul *et al.* 1995, P. Singh *in litt.*). This is a Restricted Range Species, occurring in Endemic Bird Area D08 (Eastern Himalayas; ICBP 1992).

Population status: For *blythii*, its very restricted and fragmented range in India suggest it may number only 500-5,000 and be declining. No estimate can be made for *molesworthi*. BirdLife International classifies the whole species as vulnerable (Collar *et al.* 1994).

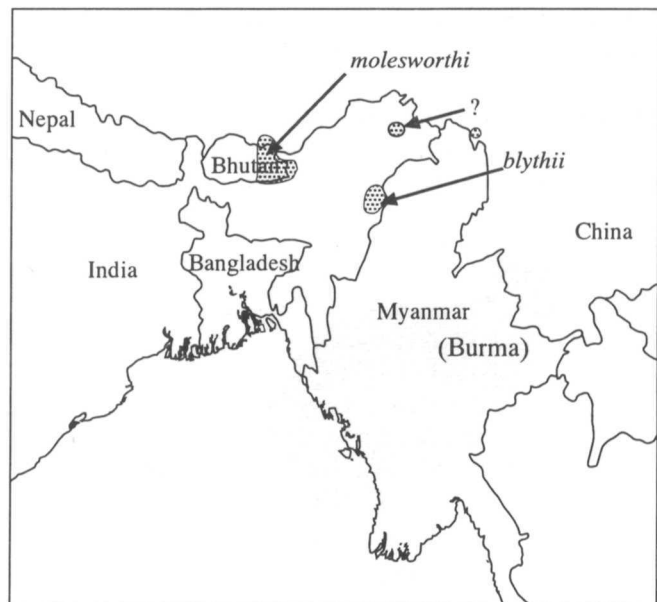
Captive population: Subspecies *blythii* has been kept and bred at Kohima Zoo since 1973 (R. Kaul *in litt.*). In 1983, two pairs were brought to U.K. under a breeding loan agreement between WPA and the Government of Nagaland (Howman 1983). An international studbook is now being maintained. The captive population stood at 32 individuals in 8 collections in November 1989, but all these individuals

are descended from one of the two imported pairs (Assink and Coles 1989). ISIS records 10 individuals and WPA 31. G. Robbins (*in litt.*) estimates that there are about 50 in captivity worldwide. Subspecies *molesworthi* has never been kept (Delacour 1977).

Threats: For *blythii*, there is continuing loss of habitat through deforestation and land conversion for agriculture. It is also hunted for food in Nagaland (Zeliang 1987) and Arunachal Pradesh. Subspecies *molesworthi* should be under no serious threat within Bhutan or Tibet for cultural reasons.

Protected areas: Subspecies *blythii* occurs in the Fakim Range (6 km²), Intanki (56 km²) and Pulicbadze (9 km²) Wildlife Sanctuaries in Nagaland (Zeliang 1987; R. Kaul *in litt.*). For *molesworthi*, none of the records fall within protected areas in Bhutan, but it may occur within Mount Jumulang Ma National Nature Reserve in Tibet (Zheng Guang-mei *in litt.*). The subspecies present in Mehao and Dibang Valley (4,149 km²) Wildlife Sanctuaries in Arunachal Pradesh remains to be determined.

Future action: For *blythii*, extensive surveys are required to establish its true distribution and status. An education programme, designed primarily to reduce hunting pressure, should be mounted in Nagaland. Known populations in protected areas should be given more effective sanctuary. The studbook should be maintained and additional founder stock obtained so that the captive population can better represent the genetic diversity of this form. For *molesworthi*, extensive surveys are required in east and southeast Bhutan, the northern fringe of Arunachal Pradesh and bordering areas of Yunnan and Tibet, to determine its present range and status.



Supposed range of Blyth's tragopan

3.5.2: Sclater's monal *Lophophorus sclateri*

Conservation status: Mace-Lande - Endangered; CITES - Appendix I; National protection status - 1st Class (China), Schedule 1 (India)

Taxonomic status: Two subspecies have been proposed on the basis of small differences in the tail band (Davison 1974), but they are treated together here.

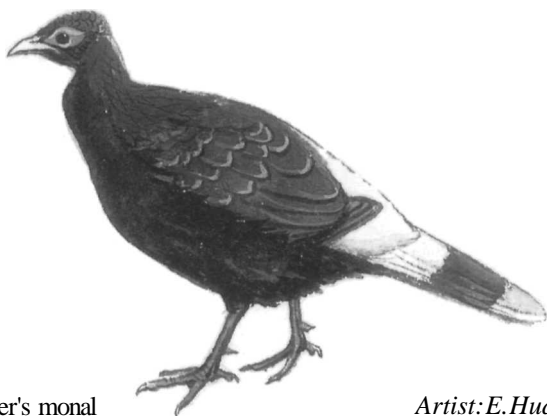
Current distribution: It has been recorded recently at a total of seven sites in Yunnan and Tibet (He Fen-qi and Lu Tai-chun 1991, Zheng Guang-mei and Zhang Zheng-wang 1993, He Fen-qi *in litt.*). There is also evidence of its presence along the northern fringe of Arunachal Pradesh in India (Kaul *et al.* 1995, P. Singh *in litt.*). There is no information from Myanmar. It lives at 2,500-4,200 m in coniferous forest with bamboo understorey, and in subalpine rhododendron scrub. This is a Restricted Range Species, occurring in Endemic Bird Area D08 (Eastern Himalayas; ICBP 1992).

Population status: Surveys over part of its range, and the extent of its distribution suggest that it may number around 10,000, and could be stable in China (He Fen-qi *in litt.*). BirdLife International classifies this species as vulnerable (Collar *et al.* 1994).

Captive population: There is no record of it ever having been kept (Delacour 1977, He Fen-qi *in litt.*).

Threats: In China, localised forest loss and hunting for food occurs (He Fen-qi *in litt.*), and hunting appears to be a problem in India (P. Singh and R. Kaul *in litt.*).

Protected areas: There are recent records from Gaoligong Shan (1,200 km²) and Lujiang (2,376 km²) Natural Reserves in Yunnan (Zheng Guang-mei and Zhang Zheng-wang 1993, He Fen-qi *in litt.*, Han Lian-xian *in litt.*), and it is reliably reported from Dibang Valley Wildlife Sanctuary (4,149 km²) in India (Kaul *et al.* 1995).



Sclater's monal

Artist: E. Hudson



Supposed range of Sclater's monal

Future action: Extensive surveys are required throughout its supposed historical range, to assess threats and with a view to designating more protected areas. These should be managed to control hunting and prevent habitat degradation.

3.5.3: Crestless fireback *Lophura erythrophthalma*

Conservation status: Mace-Lande - *L. e. erythrophthalma* Vulnerable (Malaysia) and Endangered (Sumatra), *L. e. pyronota* Endangered; CITES - Appendix III (Malaysia); National protection status - Not protected (Indonesia), Protected (Peninsular Malaysia and Sarawak).

Taxonomic status: There are two subspecies, which are considered separately here.

Current distribution: Subspecies *erythrophthalma* occurs in Peninsular Malaysia and Sumatra. It is found from near sea level to about 300 m in Peninsular Malaysia where it seems to tolerate logged forest conditions (Davison and Scriven 1987, Holmes 1989). It is also believed to be a lowland forest specialist in Sumatra although there are no recent records (B. van Balen and D. Holmes *in litt.*), other than one from Way Kambas (D. Yong and D. Wall *per* D. Holmes *in litt.*). Subspecies *pyronota* is restricted to Borneo. It is also found from near sea level to about 300 m in East Malaysia (G. Davison *in litt.*), and it is probably widespread in Kalimantan although there are only two recent records (Holmes 1989).

Population status: Subspecies *erythrophthalma* is sparsely distributed in Peninsular Malaysia and presumably declining through loss of its lowland forest habitat. Based on the extent of this, the population is estimated at 1,000-10,000. Subspecies *pyronota* is thought to be sparsely distributed in East Malaysia and is also presumed to be



Crestless fireback

Photo: K. Fink

declining through loss habitat (B. van Balen and D. Holmes *in litt.*). The estimated population, based on the extent of available habitat, is put at 1,000-10,000. In contrast to *erythroptialma* in Peninsular Malaysia, *pyronota* seems to occur at low densities in Kalimantan. The whole species may best be treated as endangered as it may turn out to be dependent upon valley bottom forest, a habitat which will only be contained as discontinuous blocks within protected areas (D. Wells *in litt.*). BirdLife International classifies the whole species as vulnerable (Collar *et al.* 1994).

Captive population: For *erythroptialma* ISIS records 18 and WPA 115. For *pyronota* ISIS records zero and WPA 33. G. Robbins (*in litt.*) estimates that there are, respectively, about 250 and 50 in captivity worldwide.

Threats: Habitat degradation, logging and loss of land to agriculture are all resulting in reductions in the area of plains level forest (D. Wells *in litt.*).



Supposed range of crestless fireback in Peninsular Malaysia

Protected areas: In Peninsular Malaysia *erythroptialma* is present in Krau Wildlife Reserve (530 km²), Endau-Rompin proposed State Park (c. 800 km² in Johore and Pahang states) and probably in Taman Negara National Park (4,343 km²) (G. Davison *in litt.*). It is also known from Pasoh (10 km² of suitable habitat) and Ampang Forest Reserves, and from Templer Park (1-2 km² of habitat continuous with extensive tracts of forest in the low hills outside the park boundary) in Selangor (D. Wells *in litt.*). In Indonesia it is known from Way Kambas National Park (1,300 km²) (Holmes 1989, van Balen and Holmes 1993), Subspecies *pyronota* is present in Gunung Mulu National Park (528 km²) in Sarawak, but there are no records from existing protected areas in Kalimantan.

Future action: Extensive surveys are needed to determine the present distribution of both subspecies. In particular the ranges of both altitudes and habitats over which the species occurs must be determined, so that the amount of suitable habitat within existing protected areas can be assessed properly. Any new sites found should be considered for protection. The captive populations of both subspecies should be managed carefully and completely separately.

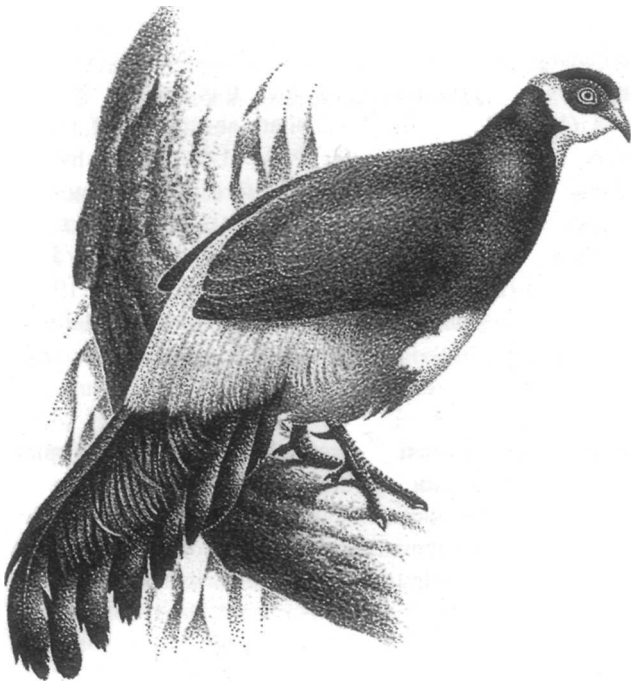
3.5.4: Tibetan eared-pheasant *Crossoptilon harmani*

Conservation status: Mace-Lande - Endangered; CITES - Appendix I; National protection status - 2nd Class within *C. crossoptilon* (China), Schedule 1 (India).

Taxonomic status: This form is treated as a full species by Sibley & Monroe (1990), but has also been listed as a one of five subspecies within *C. crossoptilon* (Delacour 1977, Johnsgard 1986).

Current distribution: Several recent sites assigned to *C. crossoptilon* in southeast Tibet (Zheng Guang-mei and Zhang Zheng-wang 1993) fall within the supposed range of this species, but only Robson (1986) specifically lists this taxon. Baker's (1914) report of this form from Arunachal Pradesh in northeast India is disputed by Ludlow (1944), but there is recent evidence of its occurrence at Towang (P. Singh *in litt.*). It inhabits patchy subalpine birch and rhododendron scrub and alpine meadows at up to 4,600 m in summer, descending into the subalpine spruce and pine forests in winter, sometimes going as low as 2,800 m (Zhang Zheng-wang *in litt.*). This is a Restricted Range Species, occurring in Endemic Bird Area D07 (South Tibet; ICBP 1992).

Population status: Given its restricted range, it is estimated to number less than 10,000, and is probably declining (Zhang Zheng-wang *in litt.*).



Tibetan eared-pheasant

Artist: D. Mead

Reproduced from *Pheasants, Partridges and Grouse* by kind permission of Christopher Helm (Publishers) Ltd.

Captive population: This taxon has only rarely been kept in the past (Delacour 1977) and is not thought to be in captivity at present (R. Wirth *in litt.*, He Fen-qi *in litt.*). It is not listed separately from *C. crossoptilon* by either ISIS or WPA.

Threats: Deforestation and hunting for food are both thought to be having some impacts in Tibet (Zhang Zheng-wang *in litt.*).



Supposed range of Tibetan eared- and brown eared-pheasant

Protected areas: It is not known to occur in any protected area (Zhang Zheng-wang *in litt.*).

Future action: Further taxonomic work is needed to establish whether this taxon warrants full species status. Extensive surveys are required to determine whether it is present in any existing protected areas and to designate additional ones if necessary. These should then be managed effectively for its protection.

3.5.5: Brown eared-pheasant *Crossoptilon manchuricum*

Conservation status: Mace-Lande - Endangered; CITES - Appendix I; National protection status - 1st Class (China).

Taxonomic status: There are no subspecies.

Current distribution: Up to the 1930s it was widespread in Shanxi and Henan in northeast China (He Fen-qi and Lu Tai-chun 1991), but it is now only found in six small and isolated areas in Shanxi, Hebei and Beijing (Zheng Guang-mei and Zhang Zheng-wang 1993, Li Xiang-tao and Liu Ru-sun 1993, Li Xiang-tao 1995). It inhabits mixed coniferous and deciduous forests with a shrub understorey at 1,300-3,500 m. This is a Restricted Range Species, occurring in Endemic Bird Area D23 (Shanxi Mountains; ICBP 1992).



Brown eared-pheasant

Photo: K. Fink

Population status: It is estimated to number only 1,000-5,000 individuals, but populations in protected areas are probably stable. BirdLife International classifies it as vulnerable (Collar *et al.* 1994).

Captive population: ISIS records 67 and WPA 399. An additional captive population of about 20 individuals has been established for research purposes within Pangquangou Natural Reserve (Zhang Zheng-wang *in litt.*). G. Robbins (*in litt.*) estimates that there are about 1,000 in captivity worldwide.

Threats: Remaining fragmented populations outside protected areas are subject to agricultural and urban encroachment, habitat degradation due to logging and livestock grazing. Taking eggs for food by mushroom collectors is a serious problem in the protected areas (Zhang Zheng-wang *in litt.*).

Protected areas: Recorded in Luyiashan (215 km²; only 68 km² forested) and Wulushan (144 km²; only 36 km² forested) Natural Reserves, and Pangquangou National Nature Reserve (105 km²) in Shanxi, and in Xiaowutaishan Natural Reserve (333 km²) in Hebei.

Future action: There is an urgent need to protect the one population of this species not in a protected areas: that at Dongling Mountain near Beijing (Li Xiang-tao 1993,1995). Those within protected areas require continuous monitoring, and intensive research is needed to determine their ecological requirements more precisely. The captive population should be managed carefully to minimise loss of genetic diversity. Appropriate avicultural assistance should be offered to the Pangquangou captive breeding centre.

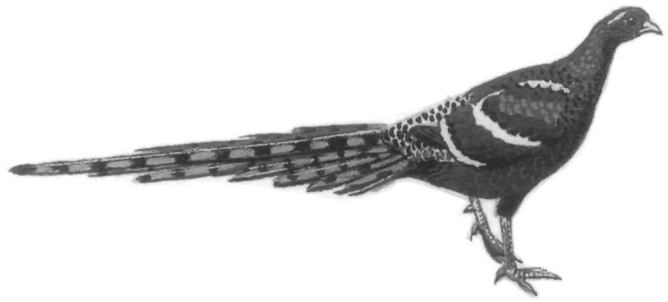
3.5.6: Hume's pheasant *Syrmaticus humiae*

Conservation status: Mace-Lande - 5. *h. humiae* Endangered, 5. *h. burmanicus* Vulnerable; CITES - Appendix I; National protection status - 1st Class (China), Schedule 1 (India), Category 1 (Thailand).

Taxonomic status: The two subspecies are treated separately here.

Current distribution: For subspecies *humiae*, the supposed historical range covers northern Myanmar probably west of the River Irrawaddy, and neighbouring parts of northeast India, but it is currently suspected to occur at only two sites in Mizoram (S.N. Ramanujam *in litt.*). Subspecies *burmanicus* has an historical range covering southern China, northern Myanmar and northern Thailand. It has been recorded recently from at least 20 sites in Guangxi and southwestern Yunnan in China (Zhang Zheng-wang, Liu Xiao-hua, Han Lian-xian *in litt.*), and there are two sites in northern Thailand (CCB Mahidol University *in litt.*). It typically inhabits open oak and pine forests with scattered clearings of grass, bracken and scrub at 1,200-3,000 m, but has also been found in conifer plantations (Liu Xiao-hua *et al.* 1990).

Population status: Subspecies *humiae* may number as few as 1,000 individuals. In Thailand, subspecies *burmanicus* is estimated to number only 200-500 (CCB Mahidol University *in litt.*). Overall its population is thought to be



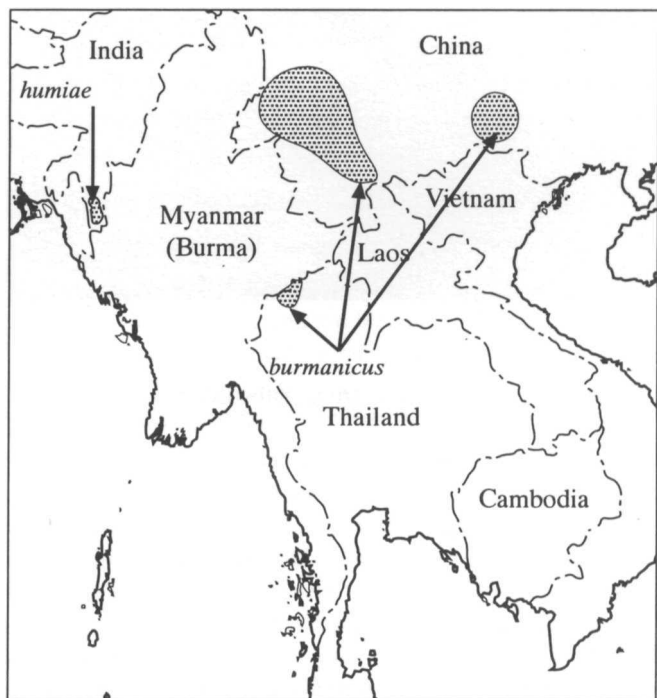
Hume's pheasant

Artist: E. Hudson

1,000-10,000 and declining. BirdLife International classify the whole species as vulnerable (Collar *et al.* 1994).

Captive population: For subspecies *humiae* ISIS records 39 and WPA 340, and ISIS records an additional 81 birds of unknown subspecies. There is no record of subspecies *burmanicus* ever having been kept outside China (Delacour 1977), and in 1994 there were two pairs at the Guilin Environmental Conservation Institute in Guangxi (Zheng Guang-mei *in litt.*). For the whole species, G. Robbins (*in litt.*) estimates that there are about 1,000 in captivity worldwide.

Threats: Habitat loss and degradation, and hunting for food in some places are problems in China (Liu Xiao-hua *in litt.*). Annual burning of open wooded slopes, re-forestation with dense conifer plantations, and agricultural intensification are all seen as problems in Thailand (CCB Mahidol University *in litt.*).



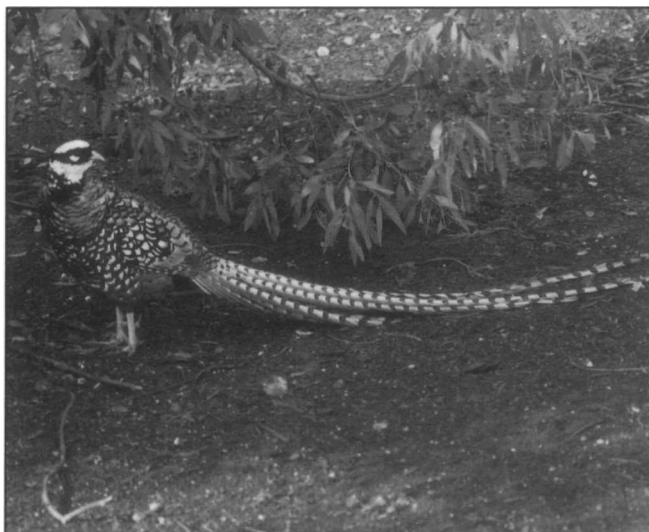
Supposed range of Hume's pheasant subspecies

Protected areas: Subspecies *humiae* is suspected to occur in Murlen (200 km²) and Blue Mountain/ Phawngpuii (50 km²) National Parks in Mizoram, India (S.N. Ramanujam *in litt.*). Subspecies *burmanicus* occurs in Doi Chiang Dao Wildlife Sanctuary, and possibly in Doi Inthanon National Park in Thailand (CCB Mahidol University *in litt.*), and in Tongbiguang, Ailaoshan and Wuliangshan Natural Reserves in Yunnan (Han Lian-xian *in litt.*).

Future action: Further extensive surveys are required, especially in northern Thailand and northeast India. Additional protected areas should be designated if possible. It requires protection from hunting, and the species' habitat requirements need to be determined more precisely before any management of its successional habitats is undertaken. The captive population should be managed carefully to minimise loss of genetic diversity, and the two subspecies should not be hybridised.

3.5.7: Reeves's pheasant *Syrnaticus reevesii*

Conservation status: Mace-Lande - Endangered; CITES Not listed; National protection status - 2nd Class (China).



Reeves's pheasant

Photo: J. Howman

Taxonomic status: There are no subspecies.

Current distribution: It has disappeared from the lowlands in the centre and north of its supposed historical range in China, representing a c.50% range contraction (He Fen-qi and Lu Tai-chun 1991), and it has not been recorded from Hebei or Shanxi for 10-20 years (Zheng Guang-mei and Zhang Zheng-wang 1993). It still occurs in Guizhou, northeast Yunnan, Sichuan, southern Gansu, Hunan, Shaanxi, Jiangxi, Henan, Hubei and Anhui, (Zheng Guang-mei and Zhang Zheng-wang 1993, Wu Zhi-kang *et al.* 1993,



Supposed range of Reeves's pheasant

1995). Oak-dominated forests are its preferred habitat, but it also inhabits coniferous forests and scrub (Hsu Wei-shu *in litt.*), at 200-2,600 m.

Population status: Recent surveys suggest that it may number less than 5,000 and be declining in a highly fragmented distribution (Hsu Wei-shu *et al.* 1990, Wu Zhi-kang *in litt.*). BirdLife International classifies this species as vulnerable (Collar *et al.* 1994).

Captive population: ISIS records 286 and WPA 740, and there were an additional 54 at Dongzhai Natural Reserve in 1994 (Wu Zhi-kang *in litt.*). G. Robbins (*in litt.*) estimates that there are about 3,000 in captivity worldwide. There are feral populations in France (Moynihan 1995) and the Czech Republic (Pokorny and Pikula 1986), where they are hunted for sport.

Threats: Continuing deforestation in the mountains of central China is reducing and fragmenting its habitat. It is also being hunted for food, and for its tail feathers which are still used in head dresses for local operas in some places (Xu Yan-gong *in litt.*) although plastic feathers are increasingly being used in Peking Opera costumes.

Protected areas: There are eight National Nature Reserves holding this species: Fanjingshan (410 km²) in Guizhou; Baotianman (42 km²) and Jigongshan (30 km²) in Henan; Badagongshan (200 km²) in Hunan, Taibaishan (560 km²); Foping (300 km²) and Zhouzhi (540 km²) in Shaanxi; and Shenongjia (730 km²) in Hubei. Tuoda Forest Natural Reserve (20 km²) was set up in 1992 specifically to protect this pheasant (Wu Zhi-kang *et al.* 1993).

Future action: Populations both inside and outside protected areas need to be monitored annually. Intensive studies of its ecological requirements are needed so that protected areas can be managed to benefit this species. An education programme concerned with forest conservation should adopt this species as a flagship.

3.5.8: Palawan peacock-pheasant *Polyplectron emphanum*

Conservation status: Mace-Lande - Endangered; CITES - Appendix I; National protection status - Protected (Philippines).

Taxonomic status: There are no accepted subspecies, although there are claims of differences in the extent of the white eye-brow in males.

Current distribution: It is endemic to the island of Palawan in the Philippines and traditionally reported to be restricted to the coastal lowland forest (e.g. King 1979). Little if any forest remains in the level lowlands, certainly on the east coast, and several sites are now known in the mountain range, from the limits of disturbed forest up to about 600 m (McGowan *et al.* 1989). It occurs from the south of the island through the central mountains and reportedly at least as far north as Danlig (Lambert 1993). This is a Restricted Range Species, occurring in Endemic Bird Area E06 (Palawan Island; ICBP 1992).



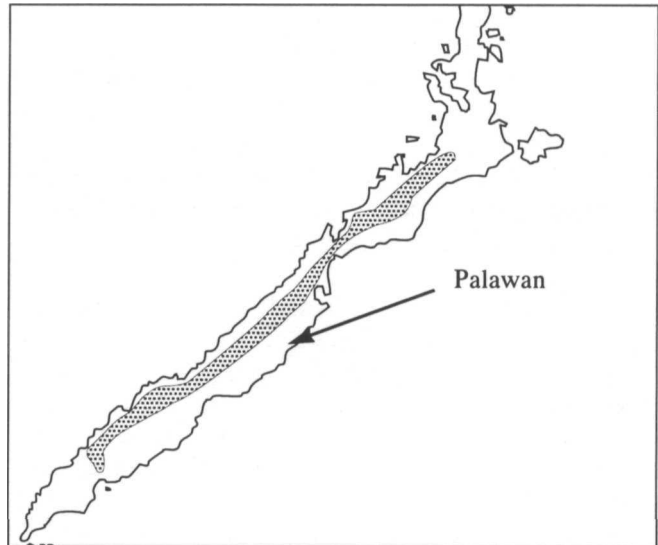
Palawan peacock-pheasant

Photo: J. Howman

Population status: Given the extent of remaining habitat, the population is estimated at less than 10,000, and is thought to be declining, as habitat loss and trapping continue at a rate suggesting that this species is endangered.

Captive population: ISIS records 439 and WPA 429. A captive breeding centre at Santa Monica outside Puerto Princesa City has been abandoned (R. Girdler *in litt.*, W. Oliver *in litt.*). It is also kept by private aviculturalists in the Philippines, especially in Manila, but there is little breeding (W. Oliver *in litt.*). G. Robbins (*in litt.*) estimates that there are about 1,000 in captivity worldwide.

Threats: Habitat loss and degradation appear to have eliminated virtually all forest from the level lowlands (R.



Supposed range of Palawan peacock-pheasant

Girdler *in litt.*) and illegal logging continues. In 1984 the Palawan Integrated Area Development Project proposed to maintain only 5,000 ha of lowland forest as heritage preservation sites, implying that a considerable proportion of the species preferred habitat will be lost (M. Caleda *in litt.*). Hunting for food and trapping for the bird trade also continue (McGowan *et al.* 1989, R. Girdler *in litt.*).

Protected areas: It occurs in St. Paul's Subterranean River National Park (39 km²) (Caleda *et al.* 1986). Although about 30% of this is covered by limestone outcrops which support unsuitable habitat, there are also plans to increase the size of the park (P. Adriano *per* W. Oliver *in litt.*).

Future action: Extensive surveys are required, especially in the south of the island. If suitable sites are found, they should be proposed for protected area status: one such area may be the Penal Colony at Iwahig. Phase II of the Palawan Integrated Area Development Project, a key part of which is to demarcate new boundaries for a variety of classes of reserve forest (M. Caleda *in litt.*), should be initiated as soon as possible. All of these surveys should also address the status of other Palawan endemic species. Efforts should be made to control hunting and the bird trade more effectively. Educational initiatives should be initiated in collaboration with the government. The captive population should be managed carefully to minimise loss of genetic diversity.

3.5.9: Crested argus *Rheinardia ocellata*

Conservation status: Mace-Lande - *R. o. ocellata* Vulnerable, *R. o. nigrescens* Endangered; CITES - Appendix I; National protection status - Group 1 (Vietnam), Category 1 (Laos), Totally Protected (Peninsular Malaysia).



Crested argus

Photo: M. Khan

Taxonomic status: There are two subspecies which are treated separately here.

Current distribution: Subspecies *ocellata* is found in Vietnam and Laos. In Vietnam it is quite common where it occurs in primary, logged and secondary evergreen forests at 100-700 m (Robson *et al.* 1993) and it has recently been found at 1,700-1,900 m on the Da Lat Plateau (Robson *et al.* 1994), making it slightly more widespread than was previously thought. The range within Laos is poorly known, with only two historical records near the Vietnam border. In 1994, it was found to be quite common at Nape in southern Laos and may be restricted to wetter parts of Annamitic Mountains in the south of the country (Cambridge Survey Team *per* T. Evans and R. Timmins *in litt.*). Subspecies *nigrescens* is found in Peninsular Malaysia around the transition zone between lowland and montane forest at 790-1,080 m on Gunung Rabong, Gunung Tulang Rabong, Gunung Tahan and Gunung Gagau and presumably other adjacent peaks, but there is no reliable evidence that it ever occurred on Gunung Benom, or the Main Range to the west (Davison 1977). This is a Restricted Range Species: *ocellata* occurs in Endemic Bird Areas D19 (Annamese Lowlands), D21 (Da Lat Plateau), D22 (Cochinchina; ICBP 1992), and d18 (BirdLife International *in litt.*); *nigrescens* occurs in Endemic Bird Area E11 (Sumatra and Peninsular Malaysia [above 600m]; ICBP 1992).

Population status: Based on a density of less than one calling male per km² (Eames *et al.* 1992) and the extent of available habitat, *ocellata* may number fewer than 10,000 individuals and be declining. For *nigrescens*, the population on each mountain is likely to be small but they are probably secure at present. Field surveys have indicated a population

density of eight calling birds per km² (Davison *in litt.*) in 125-250 km² of suitable habitat, suggesting a total population of about 2,000 individuals. The degree of fragmentation and the potential for rapid habitat loss throughout the small ranges of these two subspecies are sufficient for both of them to be considered threatened. BirdLife International classifies the whole species as vulnerable (Collar *et al.* 1994).

Captive population: In 1994 there were four *nigrescens* in captivity in Peninsular Malaysia (Siti Hawa Yatim *in litt.*) and five *ocellata* in Saigon Zoo (J. Eames and Nguyen Cu *in litt.*). A private breeder in Bangkok had obtained two male *ocellata* from Vietnam in 1993 (A. Lee *in litt.*).

Threats: Subspecies *ocellata* is threatened in Vietnam and Laos by hunting, and loss and degradation of habitat resulting from logging and forest clearance for agriculture. Most of the known populations of *nigrescens* are within Taman Negara National Park and are therefore relatively secure. However there is some habitat destruction and degradation by logging at the periphery of the park. If a proposed road is built to provide access to hilly areas, tourism activity may subsequently degrade its particular mountain top habitats.

Protected areas: Subspecies *ocellata* occurs in Bach Ma National Park (189 km²), Kon Cha Rang (149 km²) and Ron Kai Kinh (280 km²) (Eames *et al.* 1992), Thuong Da Nhim, Vu Quang (160 km²) and Ho Ke Go Nature Reserves (J. Eames and Nguyen Cu *in litt.*, C. Robson *in litt.*) in Vietnam. In Laos, it occurs within Nakai-Nam Theun Biodiversity Conservation Area (3,500 km²) (Cambridge Survey Team *per* T. Evans and R. Timmins *in litt.*). For *nigrescens*, most of the known population and suspected suitable habitat lies within Taman Negara National Park (4,343 km²) (G. Davison *in litt.*).



Supposed range of crested argus (after C. Robson and G. Davison)

Future action: Subspecies *ocellata* requires extensive surveys throughout the remainder of the available habitat, especially in Laos, and the establishment of proposed protected areas in Vietnam. Hunting should be more effectively controlled in Laos. Subspecies *nigrescens* requires the continued careful protection of its habitat in its known range in Malaysia, and the East Coast Range should be surveyed for additional sites. It would also be valuable to know the sizes and the extent of isolation of its known sub-populations.

3.5.10: Green peafowl

Pavo muticus

Conservation status: Mace-Lande - *muticus* Endangered, *imperator* Endangered, *spicifer* ? (insufficient information); CITES - Appendix II; National protection status - 1st Class (China), Protected (Indonesia), Category 1 (Laos), Protected (Peninsular Malaysia), Category 1 (Thailand), Group 1 (Vietnam).

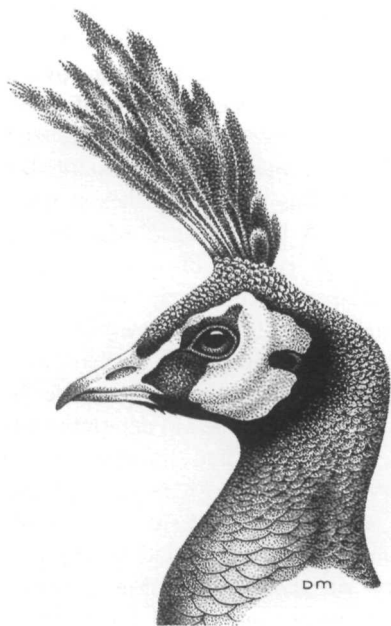
Taxonomic status: There are three subspecies, which may intergrade (Johnsgard 1986), but they are treated separately here.

Current distribution: Subspecies *muticus* was historically distributed throughout the Malay Peninsula and on Java. It is now presumed to be extinct in Thailand (Round 1988; B. Stewart-Cox *in litt.*) and the last record from Peninsular Malaysia was in the mid 1960s (Medway and Wells 1976). It is now confined to Java, where it has recently been recorded from 28 sites (van Balen *et al.* 1995). It occurs in open woodland and at the forest edge, but not inside rain forest, from sea level to 3,000 m. It is not known from steep

hillsides, but may occur on montane grassland plateaux above 2,000m. It also occurs in teak plantations, although probably at low densities. Subspecies *imperator* was formerly distributed throughout eastern Myanmar, Thailand, southern China, Laos, Vietnam and Cambodia. It is reported from four sites in Thailand (CCB Mahidol University *in litt.*), but could not be confirmed at three of these recently. It is therefore believed to survive at a single site, Huai Kha Khaeng Wildlife Sanctuary in west Thailand (Stewart-Cox and Quinnell 1990). In China, it is reported from numerous sites in Yunnan (Zheng Guang-mei and Zhang Zheng-wang 1993, Yang Xiao-jun *in litt.*) although others in southeast Tibet are now doubted (Li Zhu-mei *in litt.*). In Laos, widely separated populations are known in Xe Pian and Dong Hua Sao, and are reported from Phou Khou Khouay, Nakai Plateau/Narn Theun, Phou Xiang Thong and Xe Bang Nouan, and elsewhere (Cambridge Survey Team *per* T. Evans and R. Timmins *in litt.*). In Vietnam, it is believed to occur at localities in Lai Chau, Nghe An, Dak Lak, Thua-Thien Hue, Gia Lai, Kon Turn, Dong Nai Lam Dong and Song Be Provinces (Eames *et al.* 1992, Robson *et al.* 1994, J. Eames and Nguyen Cu *in litt.*). It is likely that the population of this subspecies is highly fragmented throughout its range and thus its situation may be less secure than its substantial distribution suggests. Subspecies *spicifer* is reported as a rare resident in southeast Bangladesh (Harvey 1990), but is now thought to be extinct there (P. Thompson *in litt.*), although it might persist in adjacent parts of northeast India (S.N. Ramanujam *in litt.*). There is no recent information from Myanmar.

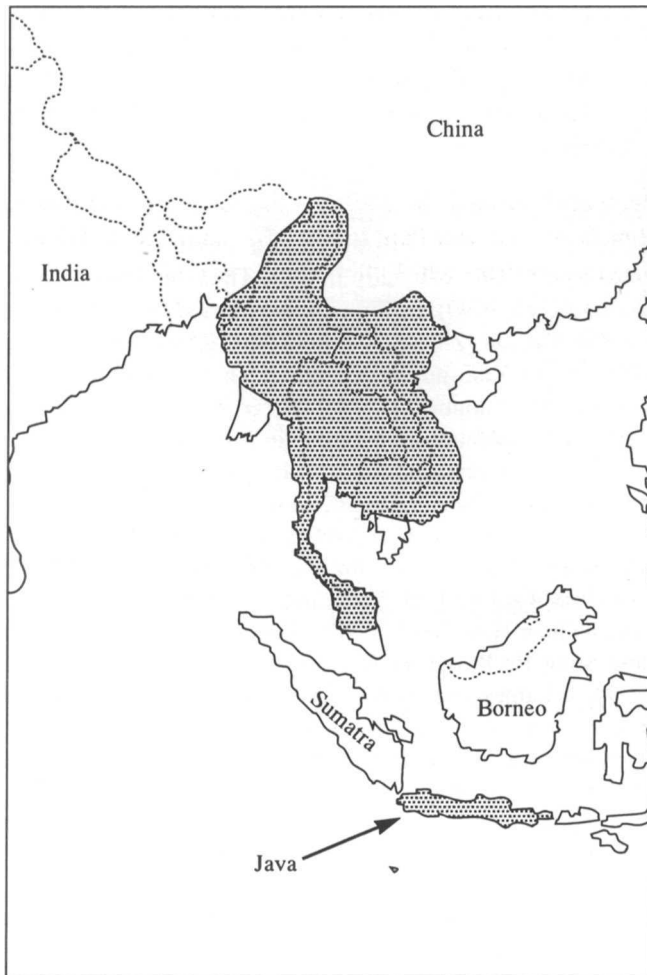
Population status: A recent survey of *muticus* in Java suggests a minimum population of 915-1,150 birds, which is likely to be declining in most places. The population is highly fragmented and may be secure only in Baluran and Ujung Kulon National Parks (van Balen *et al.* 1995). For *imperator* the single Thai population is estimated at about 300 (B. Stewart-Cox *in litt.*). There is evidence of a recent and very marked decline in Laos (Cambridge Survey Team *per* T. Evans and R. Timmins *in litt.*), and it was recently not found on the Nakai Plateau, where all suitable riverine habitat is very heavily disturbed and settled (B. Bleisch *per* P. Round *in litt.*). Most villages surveyed and many of 17 protected areas have reported local extinctions in the last few decades (Salter 1993). No survey data is available from other regions, although there are believed to be less than 1,000 in Yunnan (Wei Tian-hao *in litt.*). For the species as a whole, the population is estimated at 5,000 - 10,000.

Captive population: ISIS records 43 and WPA zero individuals of unknown subspecies. For *muticus*, ISIS records 25 and WPA 802, whilst for *imperator*, ISIS records 2 and WPA 59. G. Robbins (*in litt.*) estimates that there are about 100 and 10 of these two subspecies, as well as about 500 of *spicifer*, in captivity worldwide.



Green peafowl

Artist: D. Mead



Former supposed range of green peafowl

Threats: This species has suffered a massive range contraction during this century as a result of human activity. As an inhabitant of river valley and adjacent flatlands, the habitat of this species is always the first to be cleared and settled by man. For *muticus* subspecies on Java hunting for food, sport and the bird trade are all problems. There has also been at least one instance of subspecific hybridisation with released stock, when 21 birds of unknown origin were released into Baluran National Park in 1991 (van Balen *et al.* 1995). The train feathers are still traded for traditional dance costumes (van Balen and Holmes 1993), and there is good evidence of peafowls raiding crops being poisoned with DDT (van Balen *et al.* 1995). Subspecies *imperator* is threatened by hunting for food and the bird trade, as well as habitat loss and degradation resulting from the use of chemical defoliants, clearance of land for agriculture and logging. All these problems are considered to be extremely severe in Laos. In Thailand bundles of feathers are still sold on the roadside, whilst forest burning, human settlement and the construction of hydro-electric dams all threaten remaining habitats. There is no information for *spicifer*. The conservation value of the captive population has been reduced by mixing the supposed subspecies.

Protected areas: Subspecies *muticus* is present in National Parks on Java at Ujung Kulon (761 km², and including Pencil Island and Honje), Baluran (250 km²), Meru Betiri (500 km²) and Alas Purwo (620 km²), and in Nature Reserves at Leuweung Sancang (22 km²), Yang (15 km²), Ijen (26 km²) and that proposed at Ciogong (142 km²) (B. van Balen and D. Holmes *in litt.*). Subspecies *imperator* is known from Huai Kha Khaeng Wildlife Sanctuary (2,575 km²) in western Thailand, and in Vietnam from Nam Bai Cat Tien (350 km²) and just outside Bach Ma National Parks, as well within Yok Don Reserve (Eames *et al.* 1992), but it is thought to have become extinct recently from Nam Ca Nature Reserve (J. Eames and Nguyen Cu *in litt.*). In Laos it is known from Xe Pian proposed protected area and Dong Hua Sao Protected Area, and reported from Phou Khou Khouay, Nakai Plateau/Narn Theun, Phou Xiang Thong and Xe Bang Nouan Protected Areas (Cambridge Survey Team *per* T. Evans and R. Timmins *in litt.*). There is no information on *spicifer*.

Future action: The threats to this species are considerable, as it is now restricted to isolated pockets throughout its former range, and there is an urgent need to establish the status of all remaining populations of this species. For *muticus* hunting and trapping for the bird trade should be controlled more effectively. Some success has been gained in making local hunters aware of the conservation value of peafowl in their area (van Balen *et al.* 1995), and this approach might be extended to other places. Habitats also need to be protected and managed at all possible localities. Other management options, such as translocations between populations, might be explored via a Population and Habitat Viability Assessment (Clark *et al.* 1991). Intensive research should aim to determine habitat requirements and the species' responses to disturbance. For *imperator* extensive surveys are needed in potentially suitable habitat to try and find other populations and to determine their size. In particular, the persistence of a population in Xishuangbanna Natural Reserve in Yunnan needs to be confirmed. In Laos surveys should concentrate on Champasak and Attapu Provinces and new protected areas established where necessary, whilst habitats at existing sites should be given effective protection. A locally-based education campaign should focus on the control of hunting, and existing legislation should be enforced to prevent the sale of feathers from hunted birds. For *spicifer*, extensive surveys are needed throughout its former range, so that any surviving populations can be identified for immediate protection. Taxonomic clarification is needed to determine whether the three subspecies are valid and therefore require some separate conservation action. Meanwhile, if the captive population is to have any value, pure subspecific populations should be established and managed separately. The possibility of using plantation estates for the re-introduction of *muticus* into the Malay Peninsula should also be investigated.

3.6: Vulnerable species

3.6.1: Western tragopan

Tragopan melanocephalus

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix I; National protection status - Schedule 1 (India).

Taxonomic status: There are no subspecies.

Current distribution: It has probably disappeared from the southern fringe of its historical range along the Himalayan front-ranges (V. Sharma *in litt.*), but there are recent records from North West Frontier Province in Pakistan, and from Kashmir and Himachal Pradesh within India (Gaston *et al.* 1983b). It inhabits climax, transitional moist/dry temperate forest with dense understorey (Islam and Crawford 1987, Duke 1990) between about 2,000 m in winter and 3,600 m in summer (Gaston *et al.* 1981, 1983b, R. Kaul *in litt.*). This is a Restricted Range Species, occurring in Endemic Bird Area D02 (Western Himalayas; ICBP 1992).

Population status: An informed population estimate for Pakistan of about 900 (Duke 1990, G. Duke *in litt.*), and the extent of its range and habitat in India suggest that it numbers around 5,000 in total, and is declining.

Captive population: It is not listed by ISIS or WPA, but there have been captive birds at the Sarahan Pheasantry in Himachal Pradesh since 1990 (V. Sharma and S. Pandey *in litt.*), successful breeding being achieved in 1993 (Gupta 1993).

Threats: Habitat degradation results from excessive livestock grazing, and fodder and firewood collection in the forest understorey. Timber harvesting, and subsequent conversion of land for agriculture, has fragmented its



Western tragopan

Artist: E. Hudson

habitat, especially in lower altitude wintering areas (Gaston *et al.* 1983a, G. Duke *in litt.*, S.N. Prasad *in litt.*). Widespread harvesting of fungi and herbs during the breeding season may also have a significant impact (Gaston and Garson 1992).

Protected Areas: In India, it is found in the Great Himalayan National Park (620 km²), and in eight Wildlife Sanctuaries between Limber (55 km²) in Jammu and Kashmir and Daranghati (42 km²) in Himachal Pradesh (Gaston *et al.* 1981, Sharma and Pandey 1989; Sharma *et al.* 1990, R. Kaul and S. Pandey *in litt.*). In Pakistan, it occurs in Machiara National Park (70 km²) in Azad Jammu and Kashmir (Islam and Crawford 1987).

Future action: Known concentrations in both Pakistan and India, including those in the disputed border areas of Kashmir, require effective protection from habitat disturbance and hunting. Extensive surveys are needed in the east of its supposed historical range in eastern Himachal Pradesh and western Uttar Pradesh. Intensive research is required to establish how tolerant it is of habitat and other disturbance. It should be used as a flagship species in educational campaigns for the conservation of primary forests throughout its range.



Supposed range of western tragopan

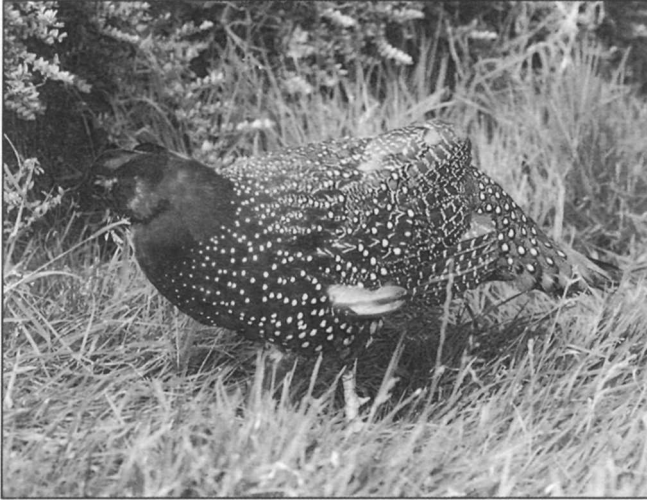
3.6.2: Satyr tragopan

Tragopan satyra

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix III (Nepal); National protection status - 1st Class (China); Schedule 1 (India), Fully Protected (Nepal).

Taxonomic status: There are no subspecies.

Current distribution: It is still present throughout the full length of its historical range along the narrow temperate forest strip of the central and eastern Himalayas from Uttar



Satyr tragopan

Photo: J. Howman

Pradesh in India (R. Kaul *in litt.*), through Nepal (Inskipp and Inskipp 1991), Sikkim (U.G. Lachungpa *in litt.*), Bhutan (Inskipp and Inskipp 1993a, 1993b, Ali *et al.* in press), and into Arunachal Pradesh in northeast India (R. Kaul and P. Singh *in litt.*). The one confirmed Chinese record is from Tibet (Cheng Tso-hsin 1987). In India, it inhabits primary forest at 2,400-4,250 m, with a higher upper altitude limit in the east reflecting the elevated tree-line. In Nepal, it occurs in damp oak and rhododendron forests with dense undergrowth and bamboo, at 2,600-3,800 m in summer but down to 2,100 m in winter, and in Bhutan at 2,100-3,400 m in mixed coniferous/broadleaved forests.

Population status: Given the extent and fragmentation of its habitat, it is estimated to number less than 20,000 individuals. It is common and stable in Bhutan (C. Inskipp *in litt.*), but is thought to be declining elsewhere. BirdLife International classifies it as near-threatened (Collar *et al.* 1994).



Supposed range of satyr tragopan

Captive population: ISIS records 175 and WPA 583. G. Robbins (*in litt.*) estimates that there are about 1,000 in captivity worldwide.

Threats: Timber harvesting and habitat degradation resulting from fuelwood and fodder collection, as well as livestock grazing, are continuing to reduce the amount of suitable forest habitat available. It is also hunted for food.

Protected areas: In India, it is recorded from Kedarnath Wildlife Sanctuary (967 km²) in Uttar Pradesh and Singalila National Park (109 km²) in Darjeeling (R. Kaul *in litt.*). In Nepal, it is reported from Khaptad (225 km²), Langtang (1,710 km²), Sagarmatha (1,148 km²) and Malaku Barun (512 km²) National Parks, as well as in the Annapurna Conservation Area (2,660 km²) and Dhorpatan Hunting Reserve (1,325 km²) (Inskipp 1989). It occurs in Jigme Dorji (3,900 km²) and Black Mountains (1,300 km²) National Parks in Bhutan (C. Inskipp *in litt.*). Its single locality in Tibet is within the Mount Jumulang Ma (=Qomolangma) National Nature Reserve.

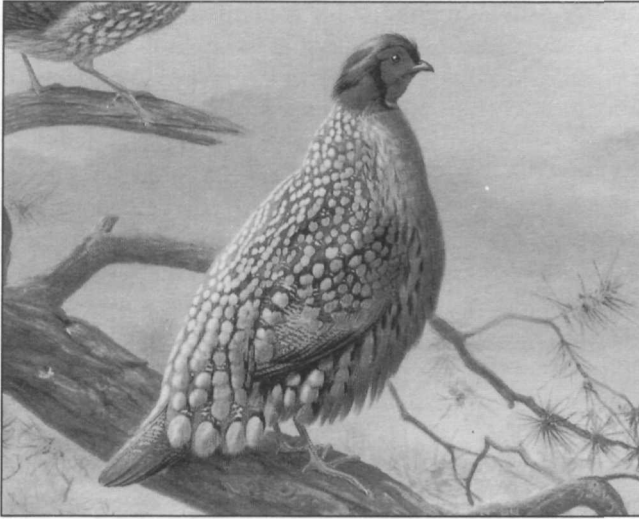
Future action: Further extensive surveys are required at both the western and eastern extremes of its historical range in India. Efforts should be made to improve its level of protection in Langtang National Park and the Annapurna Conservation Area (C. Inskipp *in litt.*). Hunting needs to be controlled more effectively throughout its range. It should be used as a flagship in forest conservation education campaigns in appropriate parts of Nepal and India. The captive population should be managed carefully to minimise loss of genetic diversity, and effective steps should be taken to prevent hybridisation with *T. temminckii* in particular (R. Wirth *in litt.*).

3.6.3: Cabot's tragopan *Tragopan caboti*

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix I; National protection status - 1st Class (China).

Taxonomic status: The two supposed subspecies (Cheng Tso-hsin 1980, Johnsgard 1986) are treated together here, because specimens collected recently from throughout the species range revealed no consistent regional differences (Zheng Guang-mei *in litt.*).

Current distribution: It is still found over much of its historical range across Zhejiang, Jiangxi, Guangxi and Guangdong in eastern China, has only recently been discovered in Hunan, and has disappeared from several counties in Fujian during the last 15 years (Zheng Guang-mei and Zhang Zheng-wang 1993, Zhang Zheng-wang *in litt.*). It inhabits evergreen broadleaved forest and mixed



Cabot's tragopan

Artist: R. David Digby

deciduous-coniferous forests at 800-1,400 m (Young *et al.* 1991). This is Restricted Range Species, occurring in Endemic Bird Area D24 (Fujian Mountains; ICBP 1992).

Population status: Given its reduced and fragmented range, it is estimated to number about 5,000 individuals and to be declining (Zhang Zheng-wang *in litt.*).

Captive population: ISIS records 11 and WPA 126. There are about 30 individuals in China (Zhang Zheng-wang *in litt.*). G. Robbins (*in litt.*) estimates that there are about 250 in captivity worldwide.

Threats: Suitable forest habitat is being lost and fragmented through timber harvesting and land conversion for agriculture. It is hunted for food outside protected areas (Zhang Zheng-wang *in litt.*) and was observed for sale in Hong Kong in 1991 (L. Young *in litt.*).

Protected areas: Recorded from Natural Reserves at Wuyanling (15 km²) in Zhejiang, Jingangshan (159 km²) in Jiangxi, Wuyishan (573 km²) in Fujian, and Mangshan in



Supposed range of Cabot's tragopan

Hunan. It may also occur in Haiyang Shan Natural Reserve in northeast Guangxi (Liu Xiao-hua *in litt.*).

Future action: Further extensive surveys should be conducted throughout the range, with the objective of designating additional protected areas. Published research findings (Young *et al.* 1991, Sun Yue-hua and Zheng Guang-mei 1992, Ding Chang-qing and Zheng Guang-mei 1993) should be used to manage forests appropriately in existing protected areas, where populations should also be monitored. The captive population should be managed carefully to minimise loss of genetic diversity, and prevent hybridisation with other *Tragopan* species.

3.6.4: Chinese monal *Lophophorus lhuysii*

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix I; National protection status - 1st Class (China).

Taxonomic status: There are no subspecies.

Current distribution: There are recent sites for this species in Sichuan, Gansu and Yunnan in central China (He Fen-qi and Lu Tai-chun 1991, Zheng Guang-mei and Zhang Zheng-wang 1993, He Fen-qi *in litt.*). Its present distribution extends south of its supposed historical range, but there are no recent records from Qinghai, northwest Sichuan, or Tibet. It lives at 3,300-4,500 m in conifer forest, subalpine rhododendron scrub and alpine meadows and rocky areas, staying above tree line throughout the year (He Fen-qi *et al.* 1988, Bell 1995). This is a Restricted Range Species, occurring in Endemic Bird Area D13 (West Sichuan Mountains; ICBP 1992).

Population status: It is estimated to number 5,000-20,000 and to be declining slightly (He Fen-qi *in litt.*).



Chinese monal

Photo: K. Fink

Captive population: ISIS records two and WPA zero. A breeding programme has been initiated by the Beijing Centre for Breeding Endangered Animals and San Diego Zoo in USA. There are about 30 individuals in all, of which all but two are in China (Cheng Cai-yun 1993, D. Rimlinger *in litt.*).

Threats: Grazing by yak herds and herb collection cause habitat degradation (Zheng Guang-mei *in litt.*), and hunting for food is significant in some places (Collar and Andrew 1988, He Fen-qi *in litt.*).

Protected areas: Recorded in Natural Reserves at Baihe (200 km²), Tang Jiahe (400 km²), Wang Lang (270 km²), Wolong (2,000 km²), Xiao Zhai Zigou (67 km²) and Feng Tong Zhai (400 km²) in Sichuan, and in Bai Shui Jang Natural Reserve in Gansu. Several of 14 new Giant Panda Reserves may benefit this species (*e.g.* Baiyang in northern Sichuan; D. Rimlinger *in litt.*).

Future action: Further extensive surveys are required in western Sichuan and eastern Tibet. Hunting and herb collection should be controlled more effectively in all protected areas.



Supposed range of Chinese monal

3.6.5: Hoogerwerf's pheasant *Lophura hoogerwerfi*

Conservation status: Mace-Lande - Vulnerable; CITES - Not listed; National protection status - Not protected (Indonesia).

Taxonomic status: It is only known from the skins of two females (van Marie and Voous 1988). The validity of this taxon as a species is dubious, and it may be better to regard it as a subspecies of *L. inornata*, *L.i. hoogerwerfi* (Delacour 1977, Johnsgard 1986, van Balen and Holmes 1993).

Current distribution: It occurs in northern Sumatra, where it is known only from Gunung Leuser in Aceh province at 600-2,000 m. There are no confirmed records since the two skins were collected in 1937 and 1939 (van Marie and Voous 1988), apart from photographs taken by N. van Strien in 1976/77 (G. Davison *in litt.*). This is a Restricted Range Species, occurring in Endemic Bird Area E11 (Sumatra and Peninsular Malaysia [above 600 m]; ICBP 1992).

Population status: Its population appears to be confined to Gunung Leuser National Park. Based on available habitat, the population is estimated at 100-10,000 and is probably stable.

Captive population: There are none in captivity.

Threats: Agricultural encroachment (Collar *et al.* 1994) and the potential for expansion of logging activities into its habitat are sufficient for it to be considered threatened.

Protected areas: It is present in Gunung Leuser National Park (7,927 km²).

Future action: Extensive surveys are required to determine its true range and in an effort to observe and describe the male. Habitat in the known locality should be protected. Taxonomic clarification is required to determine its relationship to *L. inornata*.

3.6.6: Salvadori's pheasant *Lophura inornata*

Conservation status: Mace-Lande - Vulnerable; CITES - Not listed; National protection status - Not protected (Indonesia).

Taxonomic status: Although considered to have no subspecies by Sibley and Monroe (1990), this taxon should probably include *L. hoogerwerfi* as one of two subspecies, in which case this form should be regarded as *L.i. inornata*.

Current distribution: It is endemic to central and southern Sumatra (van Marie and Voous 1988), where it occurs in montane forest at 1,000-2,200 m. It is definitely known from Mount Kerinci in west Sumatra and Mount Kaba, Bengkulu (Holmes 1989), but there is no recent information from Mount Dempu in the south (van Balen and Holmes 1993). This is a Restricted Range Species, occurring in Endemic Bird Area E11 (Sumatra and Peninsular Malaysia [above 600m]; ICBP 1992).

Population status: Based on the extent of available habitat, the population is estimated to be 1,000-10,000, and to be stable or declining slightly.



Salvadori's pheasant

Photo: K. Fink

Captive population: ISIS records 50 and WPA zero. There are some individuals in Taman Mini Bird Park. G. Robbins (*in litt.*) estimates that there are about 100 in captivity worldwide.

Threats: The potential for expansion of logging activities into its habitat is sufficient cause for it to be considered threatened.

Protected areas: It is recorded from Kerinci/Seblat National Park (c. 15,000 km²).

Future action: Extensive surveys should aim to determine the exact range of this taxon, so that its habitat can then be protected effectively. Taxonomic clarification is needed to determine its relationship with *L. hoogerwerfi*.

3.6.7: Crested fireback

Lophura ignita

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix III (Malaysia); National protection status - Not protected (Indonesia), Protected (Malaysia), Category 1 (Thailand).

Taxonomic status: The four recognised subspecies are treated together here.

Current distribution: In Thailand, where it is probably restricted to the extreme lowland margins of the mainly mountainous protected areas in south, but its upper altitude limit is unknown. It is extinct from Phuket Island (CCB Mahidol University *in litt.*). In Peninsular and East Malaysia it is sparsely distributed from near sea level up to 1,000 m

or more, depending on locality (G. Davison *in litt.*). In Indonesia it is found on Sumatra and in Kalimantan where it is also regarded as a lowland forest specialist. It has been recorded from logged and secondary forest, but the limits of its tolerance to habitat alteration are not known (D. Holmes and B. van Balen *in litt.*). Most records are from areas near to rivers and it may be dependent upon valley bottom forest for survival. It is not known from swamp forest, and it has probably been lost from areas where lowland forest has been degraded or removed.

Population status: Based on the extent of available habitat and its distribution, the total population is estimated to be more than 100,000 individuals. Because plains-level forest is disappearing so rapidly everywhere within its range, it may soon be restricted to the upper parts of valleys contained within protected areas (D. Wells *in litt.*). These constitute isolated fragments at the fringes of what was once a vast continuous range. Thus its population is thought to be declining and being fragmented at such a rate that it should be considered vulnerable.

Captive population: ISIS records 6 and WPA zero. G. Robbins (*in litt.*) estimates that there are about 100 in captivity worldwide.

Threats: Habitat destruction for agriculture, resulting in the loss of plains-level forest, may not be leaving sufficient habitat to maintain viable populations. Construction of a hydro-electric dam during 1986 flooded the only substantial block of lowland forest included in any sanctuary in southern Thailand. There it is also considered especially vulnerable to hunting by snaring and night shooting at roosts (CCB Mahidol University *in litt.*).

Protected areas: In Malaysia it is known from Taman Negara National Park (4,343 km²), Krau Wildlife Reserve (530 km²) and Pasoh Forest Reserve (c.25 km²) (G. Davison *in litt.*) in the Peninsula, and also from Gunung Mulu



Malay crested fireback

Photo: J. Howman

National Park (528 km²) in Sarawak and Danum Valley Conservation Area (438 km²) in Sabah. In Indonesia it is found in Way Kambas National Park (1,300 km²) on Sumatra and Tanjung Puting National Park (3,050 km²) in Kalimantan (D. Holmes and B. van Balen *in litt.*). In Thailand there are recent reports from Khao Luang National Park, Khlong Nakha Wildlife Sanctuary and Khao Pra Bang Khram. Although there are none from the last site since 1991 (CCB Mahidol University *in litt.*), it probably still occurs in the adjoining Khao Sok National Park and Khlong Saeng Wildlife Sanctuary, despite their common boundary being flooded behind a hydro-electric dam in 1986.

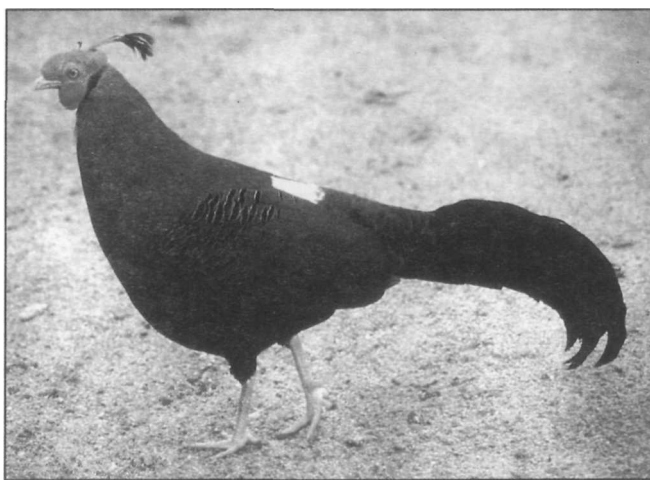
Future action: Habitat protection is needed in and around the protected areas in which it occurs. Further extensive surveys are also required throughout Sumatra and the Malay Peninsula.

3.6.8: Siamese fireback *Lophura diardi*

Conservation status: Mace-Lande - Vulnerable; CITES - Not listed; National protection status - Group 1 (Vietnam), Category II (Laos), Category 1 (Thailand).

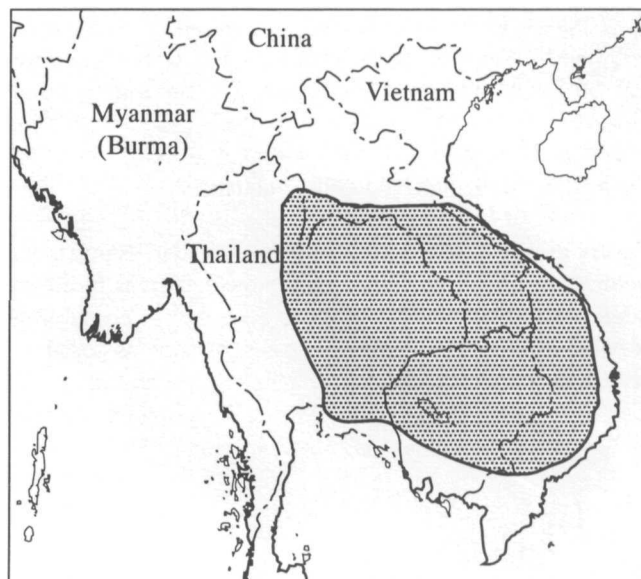
Taxonomic status: There are no subspecies.

Current distribution: In Thailand it inhabits both primary and secondary evergreen forests from the plains to about 800 m and is probably still fairly widespread within protected areas in the northeast and southeast (CCB Mahidol University *in litt.*). There is no recent information from Cambodia where it is considered to be a lowland resident (King *et al.* 1975). In Vietnam it was formerly widespread in open and secondary forests up to 900 m, and has recently been recorded at Buon Luo in central Annam,



Siamese fireback

Photo: J. Howman



Supposed range of Siamese fireback

Son Tung and Vu Quang Reserve in north Annam, Kon Cha Rang, Gia Lai and Nam Bai Cat Tien National Park, Dong Nai (Robson *et al.* 1989, 1993). In Laos it may be widespread in suitable habitat up to 600 m, particularly in semi-evergreen forest. It is often seen for sale along the road from Vientiane to the far south (Cambridge Survey Team *per* T. Evans and R. Timmins *in litt.*).

Population status: Based on a recent population estimate for Thailand of about 5,000 (CCB Mahidol University *in litt.*) and the amount of habitat estimated to remain in Laos and Vietnam, the population may be as low as 10,000, and is thought to be declining.

Captive population: ISIS records 88 and WPA 650. G. Robbins (*in litt.*) estimates that there are about 1,000 in captivity worldwide.

Threats: There is a continuing loss of habitat to agriculture and logging in both Vietnam and Laos. The commercial value of its lowland forest habitat clearly places it at risk, especially in Laos where forest clearance is increasing in line with rapid economic change. It is also under heavy pressure in both these countries from snaring, for both local consumption and domestic trade. In Thailand, hunting for food and habitat loss resulting from forest burning and conversion for agriculture are both posing threats, and a road is currently under construction through Pang Sida National Park which contains this species.

Protected areas: In Vietnam it is known from Nam Bai Cat Tien National Park (350 km²), Vu Quang, Mom Ray, Kon Cha Rang and Kon Ka Kinh Nature Reserves, and that proposed at Ho Ke Go. In Laos it is recorded from the Xe Pian proposed protected area, and suspected at Phou Xang, Nakai Plateau/Man Theun, Phou Khao Khouay, Xe Bang

Nouan, and Phou Xiang Thong Protected Areas in Laos. In Thailand there are records from Sakaerat Biosphere Reserve, Khao Yai, Nam Nao, Thung Salaeng Luang, Pang Sida and Phu Jong Na Yoi National Parks, and Phu Khieo, Khao Soi Dao, Khao Khieo, Khao Ang Ru Nai, Doi Pha Chang and Sap Langka Wildlife Sanctuaries.

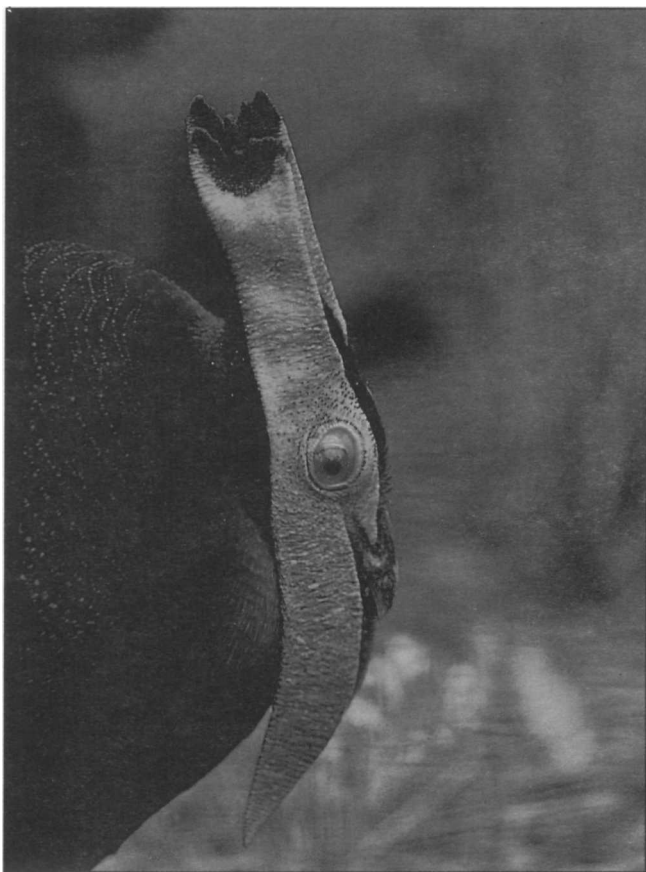
Future action: Surveys should be conducted to establish its status and habitat requirements in protected areas in all its range countries. Proposed protected areas containing populations should be fully established as soon as possible, and then managed effectively. Hunting should be more effectively controlled wherever it is major problem, such as in Xe Pian proposed protected area in Laos.

3.6.9: Bulwer's pheasant *Lophura bulweri*

Conservation status: Mace-Lande - Vulnerable; CITES - Not listed; National protection status - Not known.

Taxonomic status: There are no subspecies.

Current distribution: It is endemic to Borneo, and is recorded in submontane forest (van Balen and Holmes 1993) up to 1,500 m (B. van Balen and D. Holmes *in litt.*) in



Bulwer's pheasant

Photo: K. Fink

Kalimantan. A recent record from Ulu Barito at 150-250 m (Dutson 1990) extends the previously known range south from the main spinal ranges. In East Malaysia it is mainly found in primary hill forest and montane forest at 300-1,500 m (G. Davison *in litt.*).

Population status: The population is estimated at 1,000-10,000, and is likely to be declining due to loss and degradation of primary forest.

Captive population: ISIS records 54 and WPA 11. G. Robbins (*in litt.*) estimates that there are about 100 in captivity worldwide.

Threats: Hunting for food is widespread and in some places the feathers are used as decorative brushes. Further threats are posed by habitat loss through forest removal for agriculture and urban settlements, and habitat degradation through logging in steep and high altitude locations.

Protected areas: It is recorded from Bukit Raya Nature Reserve (c.8,000 km²) in Kalimantan (B. van Balen and D. Holmes *in litt.*). In East Malaysia it is known from Gunung Mulu (528 km²) and Lanjak-Entimau (1,688 km²) National Parks in Sarawak, and was recently recorded from the Danum Valley Conservation Area (438 km²) in Sabah (Lambert 1993).

Future action: Extensive surveys might be concentrated at the Danum Valley Conservation Area where the species has recently been found. This area seems to have suffered less from the effects of hunting than forests in Sarawak and much of Kalimantan (D. Wells *in litt.*). Elsewhere surveys of hunters could yield information about levels of hunting and identify sites for further fieldwork. The proposed national parks at Pulong Tua, Usun Apau and Hose Mountains, and a proposed wildlife sanctuary at Batu Laga, all in Sarawak should be fully established as soon as possible. Maintaining parts of selectively logged sites as untouched habitat islands on steep slopes should also be encouraged so that they can act as reservoirs containing the species in otherwise uninhabitable areas.

3.6.10: White eared-pheasant *Crossoptilon crossoptilon*

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix I; National protection status - 2nd Class (China), Schedule 1 (India).

Taxonomic status: This species is taken to include four subspecies, given that Sibley and Monroe (1990) treat *C. harmani* (see Section 3.5.4) as a separate species.



White eared-pheasant

Artist: E. Hudson

Current distribution: It has been reported recently from over 20 sites in Qinghai, Sichuan, Yunnan and Tibet (Cheng Tso-hsin 1987, Zhang Zheng-wang *in litt.*). It inhabits subalpine birch and rhododendron scrub up to 4,000 m in summer, descending into subalpine spruce and pine forests in winter, sometimes going as low as 2,800 m (Zhang Zheng-wang *in litt.*).

Population status: Given the extent of its range, it may number only 10,000-50,000 and be declining (He Fen-qi *in litt.*).

Captive population: ISIS records 163 and WPA 355, although their subspecific affinities are not known. There are a large number of individuals breeding well in Chinese zoos (Zheng Guang-mei *in litt.*). G. Robbins (*in litt.*) estimates that there are about 1,000 in captivity worldwide.

Threats: Deforestation and hunting for food have a serious impact in some places (Zhang Zheng-wang *in litt.*).

Protected areas: It occurs in several Natural Reserves in Qinghai, Sichuan (including Wolong), Yunnan and Tibet (Zheng Guang-mei and He Fen-qi *in litt.*).



Supposed range of white eared-pheasant

Future action: Extensive surveys are needed to establish the status of this species in any existing protected areas, and in order to select some additional ones for protection. Hunting should be strictly controlled in such places.

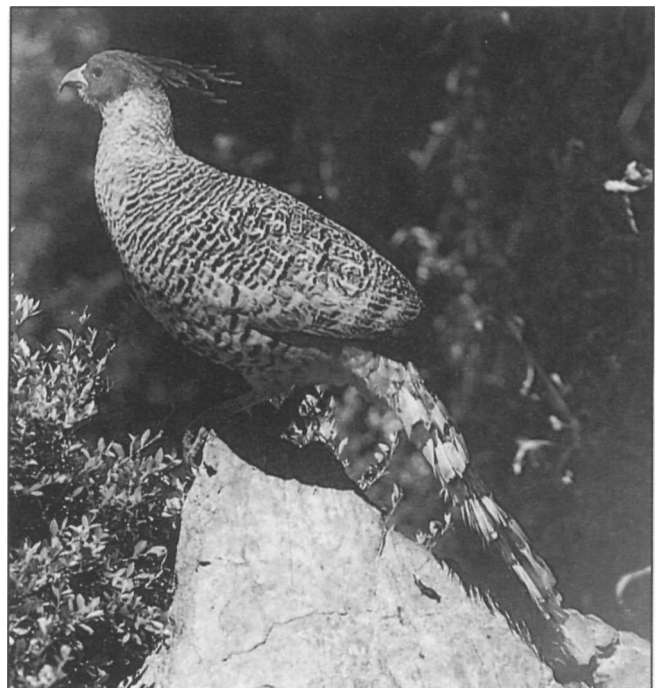
3.6.11: Cheer pheasant

Catreus wallichi

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix I; National protection status - Schedule 1 (India), Fully Protected (Nepal).

Taxonomic status: There are no subspecies, and there are no other species in the genus.

Current distribution: Historically it occurred along the Himalayan foothills from Hazara in northern Pakistan to the Kali-Gandaki River in Nepal. There is only one definite recent records from Pakistan (Young *et al.* 1987), but it may persist in the upper Neelum valley near Salkala (Roberts 1991) and in the Jhelum valley close to the disputed India-Pakistan border (R. Kaul *in litt.*). In India, it has been found at numerous small sites across Himachal Pradesh (Sharma and Pandey 1989, Sharma *et al.* 1990, M.L. Narang *in litt.*), but it appears to be rarer in Uttar Pradesh (Young and Kaul 1987, Sathyakumar *et al.* 1992). There are recent records from only a few localities in western Nepal (Inskipp and Inskipp 1991). It occurs in patchy hill grasslands dissected by scrub and wooded ravines, and in open secondary scrub (Lelliott 1987) at 1,200-3,250 m, and appears to have a strong affinity for early successional habitats maintained by frequent disturbance (Garson *et al.* 1992).



Cheer pheasant

Photo: K. Howman

Population status: It is usually found as small populations in isolated pockets of suitable habitat. An intensive study of this bird in India has documented the relationship between the number of groups heard calling at dawn and the adult population in a known area at various times of year (Young *et al.* 1987). On this basis, population densities can be estimated at 5-10 breeding females per km² at several sites surveyed recently, where populations appear to be persistent and fairly stable (Lelliott 1981, Garson 1983, Garson *et al.* 1992). However, it has declined in the area near Ghassa in the Annapurna Conservation Area over the last ten years (C. Inskipp *in litt.*). Given its patchy distribution and specialised habitat requirements, it is estimated to number less than 10,000. A re-introduction project, instigated in 1978 by WPA in the Margalla Hills National Park in Pakistan, has failed to re-establish this species there (Severinghaus *et al.* 1979, Garson *et al.* 1992).

Captive population: ISIS records 170 and WPA 363. Every year since 1978 eggs laid by captive birds in Europe have been sent, usually in hundreds, to supply the re-introduction project in Pakistan (Hussain 1990, 1993). G. Robbins (*in litt.*) estimates that there are about 1,000 in captivity worldwide.

Threats: Its sedentary and vocal habits, together with its open habitat, make it unusually susceptible to hunting pressure (Roberts 1991). The hill grasslands it frequents are also subject to agricultural encroachment and soil erosion.

Protected areas: In India, it has been recorded from the fringes of the Great Himalayan National Park (620 km²) and 12 Wildlife Sanctuaries in Himachal Pradesh. In Uttar Pradesh it is reported from the Kedarnath Wildlife Sanctuary (967 km²) (Sathyakumar *et al.* 1992). In Nepal it occurs in two small areas within the Annapurna Conservation Area, as well as in Rara Lake National Park (106 km²), and Dhorpatan Hunting Reserve (1,325 km²) (Inskipp 1989).



Supposed range of cheer pheasant

Future action: Existing hunting bans need to be enforced more effectively if small populations are to persist in many unprotected sites. At least some of the grassland it occupies within protected areas should be managed by cutting, grazing or burning to prevent succession to scrub. Further extensive surveys are required to establish its status in western Nepal. Population monitoring activity should be expanded to include new sites, and repeated annually (Young *et al.* 1987). This much hunted, open country pheasant can be used as an example through which to illustrate the need for active habitat management in conservation.

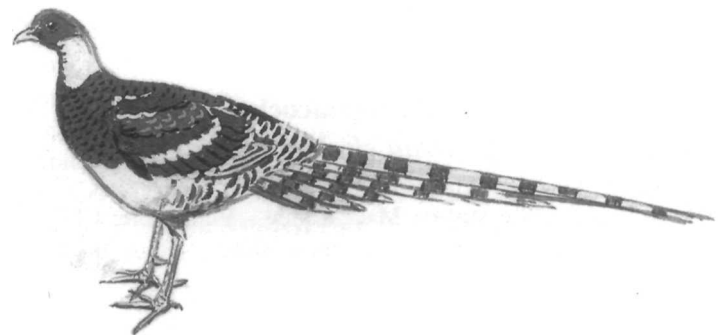
3.6.12: Elliot's pheasant *Syrmaticus ellioti*

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix I; National protection status - 1st Class (China).

Taxonomic status: There are no subspecies.

Current distribution: Restricted to densely populated areas of eastern China, its present distribution extends into northwest Hunan and northeast Guizhou (He Fen-qi and Lu Tai-chun 1991), well to the west of its supposed historical range. During the last decade it has also been recorded at sites in Jiangxi, Zhejiang, Hunan, Guangxi and Guizhou (Zheng Guang-mei and Zhang Zheng-wang 1993, Ding Ping *in litt.*). It occurs at 300-1,500 m in evergreen broadleaved and conifer forests, and in bamboo scrub (Ding Ping and Zhuje Yang 1990, Ding Ping *in litt.*). This is a Restricted Range Species, occurring in Endemic Bird Area D24 (Fujian Mountains; ICBP 1992).

Population status: Its distribution appears to be highly fragmented and it is estimated to number 10,000-50,000 and to be declining (He Fen-qi *in litt.*).



Elliot's pheasant

Artist: E. Hudson



Supposed range of Elliot's pheasant

Captive population: ISIS records 217 and WPA 482. A few individuals are kept in many zoos in China (He Fen-qi *in litt.*). G. Robbins (*in litt.*) estimates that there are about 1,000 in captivity worldwide.

Threats: Deforestation and agricultural encroachment have already rendered much of its range uninhabitable, and fragmented the population. Hunting for food is also a serious problem.

Protected areas: It is recorded recently in the Jinggangshan National Nature Reserve (159 km²) in Jiangxi, Fanjingshan (380 km²) and Leigongshan (470 km²) Natural Reserves in Guizhou (Zheng Guang-mei and Zhang Zheng-wang 1993), and Wuyanling Natural Reserve (15 km²) in Zhejiang (Zheng Guang-mei *in litt.*).

Future action: More of the sites at which this bird occurs should be given protected area status, and known populations should be monitored annually in future. An intensive study is required to determine the ecological requirements of this species in various types of forest. The captive population should be managed carefully to minimise loss of genetic diversity.

3.6.13: Bronze-tailed peacock-pheasant *Polyplectron chalcuroides*

Conservation status: Mace-Lande - Vulnerable; CITES - Not listed; National protection status - Not protected (Indonesia).

Taxonomic status: Two subspecies are currently recognised and are treated together here. It should be noted that van Marie and Voous (1988) accept the two subspecies, but state that variations between individuals at the same locality is considerable.



Bronze-tailed peacock-pheasant

Photo: J. Howman

Current distribution: It is endemic to Sumatra, and inhabits a variety of montane forest habitats at 800-1,700 m throughout the central mountains (B. van Balen and D. Holmes *in litt.*). This is a Restricted Range Species, occurring in Endemic Bird Area E11 (Sumatra and Peninsular Malaysia [above 600 m]; ICBP 1992).

Population status: There are recent records at several sites between Brestagi and Mount Kerinci (Holmes 1989) in montane forest habitat which is still widespread and fairly secure. Based on the habitat available the population is estimated at 10,000-100,000, and is thought to be declining in some areas (*e.g.* Brestagi) due to hunting (Holmes 1989), although it may be stable overall (van Balen and Holmes 1993). The potential for expansion of logging activities into its montane habitat is sufficient cause for it to be considered threatened. Should exploitation of this habitat, which is largely untouched at present, become commercially viable, then a rapid decline in numbers is likely. BirdLife International classify it as near-threatened (Collar *et al.* 1994).

Captive population: ISIS records 14 and WPA 71.

Threats: It is exploited for sport at Brestagi, and is probably hunted elsewhere (G. Davison *in litt.*). It is also threatened by habitat degradation and loss (Holmes 1989) caused by small scale logging and forest clearance operations (D. Holmes *in litt.*).

Protected areas: It occurs in the two large National Parks at Kerinci-Seblat (15,000 km²) and Gunung Leuser (7,927 km²), although there are no recent reports from the latter (B. van Balen and D. Holmes *in litt.*). Up to 50% of what is believed to be suitable habitat is already under some form of protected status.

Future action: Existing protected areas should be surveyed to determine the extent of the species' distribution within them, and to define its habitat requirements more precisely. This should be done as part of an overall assessment of forest avifaunas within protected areas which should then be protected and managed more effectively. Hunting should be effectively controlled.

3.6.14: Mountain peacock-pheasant *Polyplectron inopinatum*

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix III (Malaysia); National protection status - Protected (Malaysia).

Taxonomic status: There are no subspecies.

Current distribution: It is endemic to Peninsular Malaysia, where it is distributed throughout unlogged upper dipterocarp, lower montane and upper montane forest at 900-2,000 m in the Main Range (G. Davison *in litt.*). This is a Restricted Range Species, occurring in Endemic Bird Area E11 (Sumatra and Peninsular Malaysia [above 600m]; ICBP 1992).

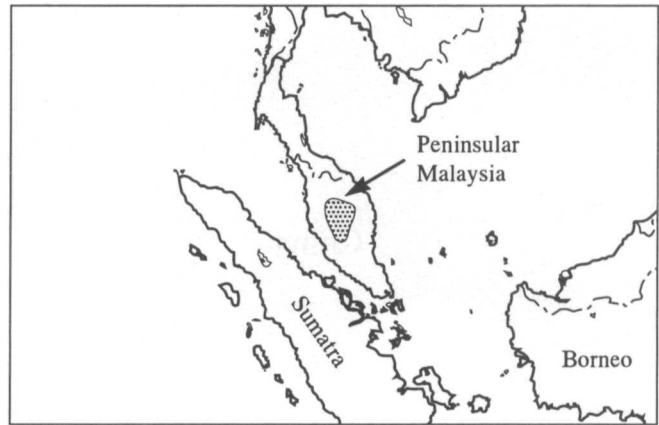
Population status: Based on the extent of habitat available, the population is estimated to be 1,000-10,000, possibly declining slightly. It is considered vulnerable because of the real possibility that forested areas in the mountains of Peninsular Malaysia may be cleared up and developed in future as the human population expands off the plains.

Captive population: An international studbook and breeding consortium was initiated during 1992, and is co-ordinated by D. Bruning (Wildlife Conservation Society/New York Zoological Society) and Siti Hawa Yatim (Department of Wildlife and National Parks, Peninsular Malaysia). The captive population stood at 111 individuals in November 1993.



Mountain peacock-pheasant

Photo: G. Robbins



Supposed range of mountain peacock-pheasant (after G. Davison)

Threats: Habitat destruction continues as more agricultural land is required, and urban development may become important in future. An immediate threat is posed by the proposal to build a road linking the hill stations of Genting Highlands, Fraser's Hill and Cameron Highlands.

Protected areas: It is present in Fraser's Hill (30 km²) and Cameron Highlands (649 km²) Wildlife Sanctuaries, the Krau Wildlife Reserve (530 km²) and Taman Negara National Park (4,343 km²) (G. Davison *in litt.*).

Future action: Surveys are required to determine its distribution and altitude limits in the Main Range, especially within protected areas. A case should then be made for the establishment of additional protected areas there, including a National Park. The studbook should be maintained so that the consortium can manage the captive population carefully.

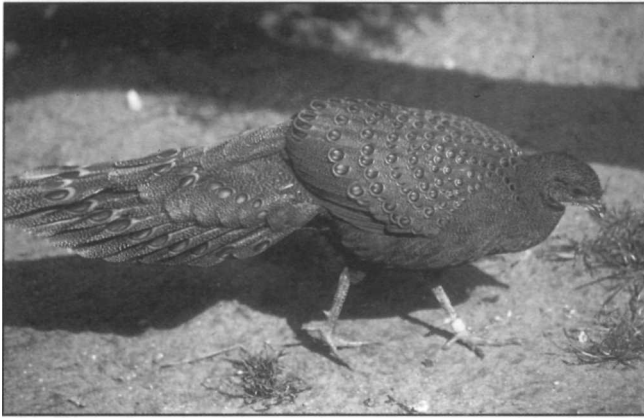
3.6.15: Germain's peacock-pheasant *Polyplectron germaini*

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix II; National protection status - Group 1 (Vietnam).

Taxonomic status: There are no subspecies.

Current distribution: Restricted to southern Vietnam, it is found in lowland and sub-montane forest and appears to tolerate some habitat disturbance (Robson *et al.* 1991, Eames *et al.* 1992). The only two recent records come from Nam Bai Cat Tien National Park (Robson *et al.* 1993) and the proposed Cat Loc Nature Reserve (J. Eames and Nguyen Cu *in litt.*). This is a Restricted Range Species, occurring in Endemic Bird Area D22 (Cochinchina; ICBP 1992).

Population status: Based on the extent of what is believed to be suitable habitat within its supposed range, the population is estimated to be less than 10,000, and continuing forest loss in the area suggests that it is declining.



Germain's peacock-pheasant

Photo: K. Fink



Malaysian peacock-pheasant

© New York Zoological Society

Captive population: ISIS records 23 and WPA 194. G. Robbins (*in litt.*) estimates that there are about 500 in captivity worldwide.

Threats: It is hunted for food, and habitat destruction continues with the expansion of agriculture.

Protected areas: It occurs in Nam Bai Cat Tien National Park (350 km²) and Cat Loc proposed nature reserve.

Future action: Extensive surveys are required in an effort to find further localities for consideration as protected areas. The proposed Cat Loc Nature Reserve should be established and protection measures should be improved at Nam Bai Cat Tien National Park.

3.6.16: Malaysian peacock-pheasant *Polyplectron malacense*

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix II; National protection status - Totally Protected (Malaysia), Category 1 (Thailand).

Taxonomic status: The Bornean form *P. schleiermacheri* is considered by some authors to be one of two subspecies within this taxon (*e.g.* Delacour 1977). The Peninsular Malaysian form is treated as a separate species here.

Current distribution: It is restricted to the Malay Peninsula, and reports of its occurrence on Sumatra have been rejected (van Marie and Voous 1988). It may well be extinct in Peninsular Thailand, the only recent record coming from 1-2 km² of completely isolated forest with some doubt about the identification (CCB Mahidol University *in litt.*). The situation in Myanmar is unknown. It is probably now restricted to primary forests below 300 m (or maybe even 150 m) in Malaysia (McGowan 1993). This is a Restricted Range Species, occurring in Endemic Bird Area e08 (BirdLife International *in litt.*).

Population status: Based on recent fieldwork (McGowan 1993, 1994) and the extent of habitat remaining, the population is estimated at 1,000-10,000. It is vulnerable because of the rate of forest loss in the level lowlands, which may even be sufficient for it to be considered endangered.

Captive population: An international studbook of captive individuals is maintained by D. Bruning (Wildlife Conservation Society/New York Zoological Society). This recorded 189 individuals at 35 institutions in October 1993.

Threats: Its decline has been caused mainly by the destruction of lowland forest to the extent that there are no patches of suitable habitat remaining in Peninsular Thailand (CCB Mahidol University *in litt.*). In Peninsular Malaysia its habitat is continuing to fragment as forest is converted to agricultural land, and the species will probably be confined to five protected areas, three of which are small, in the near future (McGowan 1993). Hunting for food, sport and the bird trade also contributed to its probable extinction from Thailand (Round 1988).



Supposed range of Malaysian peacock-pheasant

Protected areas: It is recorded from Taman Negara National Park (4,343 km²), Krau (530 km²), Sungai Dusun (c.45 km²), Sungkai (c.25 km²) Wildlife Reserves, and Pasoh Forest Reserve (c.25 km²). It seems likely that at most 50-70% of the area contained within these reserves supports habitat within the species' altitude limits (McGowan 1993). It is not recorded from apparently suitable habitat in the Kinchin Valley, which lies within its historical range and is in Endau-Rompin State Park (D. Wells *in litt.*).

Future action: Its exact distribution within the crucial five protected areas should be assessed, so that they can be better managed to ensure its long term survival. Reasons for the absence of the species from the Kinchin Valley in the Endau-Rompin State Park should be sought. The studbook should be maintained so that the captive population can be managed carefully to minimise loss of genetic diversity, and in case re-introductions become feasible in future.

3.6.17: Great argus

Argusianus argus

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix II; National protection status - Protected (Malaysia).

Taxonomic status: There are two subspecies, one of which is endemic to Borneo, but they are treated together here.

Current distribution: This species was once widespread throughout the lowland forests of Southeast Asia. In Thailand, it has been confirmed at 13 sites since 1980 in the south, with additional single sites in Chumphon and Yala Provinces. As all lowland forest has been cleared, it is now restricted to submontane slopes up to about 900 m (CCB



Great argus

Photo: K. Fink



Supposed range of great argus in Peninsular Malaysia (after G. Davison)

Mahidol University *in litt.*). In Malaysia it inhabits tall logged and unlogged primary forest at many sites from sea level up to a maximum of 1,000m, although its upper limit varies with the location (G. Davison *in litt.*). It is currently still widespread in Indonesia, occurring in lowland forest up to 500 m in Sumatra and 1,500 m in Kalimantan (B. van Balen and D. Holmes *in litt.*).

Population status: Estimates of the density of calling birds range up to four per km² (G. Davison *in litt.*), but may well be less than one per km² in southern Thai forests (CCB Mahidol University *in litt.*). These density estimates and the extent of available habitat suggest that the population may number more than 100,000. However, the rapid rate of forest clearance, leading to loss and fragmentation of previously continuous lowland forest throughout its range, but most particularly in Sumatra, suggests that a marked decline in numbers may have occurred recently and be continuing. Populations may be becoming confined to forest on hill slopes, which is probably sub-optimal habitat. In Thailand it is typically found on broad ridges in gently sloping areas, the availability of which is thought to be a major constraint on the size and distribution of populations (CCB Mahidol University *in litt.*). Thus this species is regarded as being vulnerable. BirdLife International classifies it as near-threatened (Collar *et al.* 1994).

Captive population: ISIS records 136 and WPA 172. G. Robbins (*in litt.*) estimates that there are about 500 in captivity worldwide.

Threats: Habitat degradation and loss, hunting for food and sport, and capture for the bird trade are all significant problems. In Thailand, forests on submontane slopes are being converted to rubber plantations.

Protected areas: It is currently found in 17 protected areas in Malaysia (G. Davison *in litt.*), although some are very small for a bird of such large size. It is assumed to be present in most protected areas in Sumatra and Kalimantan (B. van Balen and D. Holmes *in litt.*). It is probably still present in the majority, if not all of Peninsular Thailand's protected areas, where it is recorded from 13 National Parks and Wildlife Sanctuaries. However it is close to being lost from Khao Pra-Bang Kram Wildlife Sanctuary (CCB Mahidol University *in litt.*).

Future action: Hunting should be controlled more effectively, and other steps should be taken to protect and manage habitats which support populations. Determination of its upper altitude limit in Sumatra is important, as this will indicate whether it is likely to occur in sufficient numbers in protected areas above the level at which logging is commercially viable. Individuals in captivity that can be assigned to the Bornean subspecies *A.a. grayi* should be identified and bred separately.

3.7: Species with insufficient information

3.7.1: Copper pheasant

Syrmaticus soemmerringii

Conservation status: Mace-Lande - ? (insufficient information); CITES - Not listed; National protection status - Protected (subspecies *ijimae* only, Japan).

Taxonomic status: Five subspecies are recognised, but they are variable and intergrade with each other.

Current distribution: Subspecies *soemmerringii* and *ijimae* are restricted to Kyushu Island in the south of Japan. They occur mainly in shady and densely vegetated gullies in broadleaved forest. The other three subspecies occur on the main Japanese island of Honshu, whilst *intermedius* and *subrufus* are also found on Shikoku Island. These northern subspecies occur mainly in dense deciduous or *Cryptomeria* and cypress forests. They occur from sea level to 1,800 m, and are also found in adjoining mixed forest with dense undergrowth, mainly in mountainous areas (Yamashina 1976, Brazil 1991).

Population status: The species as a whole was previously very common, with about 500,000 being shot each year during 1925-1975 (Mann 1980). It is now much sought after by hunters and ornithologists alike, but is hard to find (Brazil 1991).

Captive population: ISIS records 23 individuals of unknown subspecies in captivity, whilst WPA records 26



Scintillating copper pheasant

Photo: K. Howman

soemmerringii, 76 *ijimae* and 106 *scintillans*. There is some rearing in captivity to supplement the ailing wild population for sport hunting (Yamashina 1976, Brazil 1991).

Threats: Over-hunting for sport and habitat destruction are the main causes of its recent scarcity. Feral cats and dogs are numerous and widespread, causing low breeding success. Hybridisation between wild and captive reared stock may also be damaging (H. Higuchi *in litt.*).

Protected areas: Throughout Japan there are many Protected Areas, within which hunting is prohibited.

Future action: There is an urgent need to establish the status of all the subspecies in the face of continuing habitat destruction and severe hunting pressure. Sport hunting should be regulated more effectively, and steps taken through detailed research into its population dynamics, to make it sustainable. More Wildlife Protected Areas are required in some of the best areas of montane forest habitat, but these can only be managed for its benefit if intensive research is carried out into its habitat requirements.

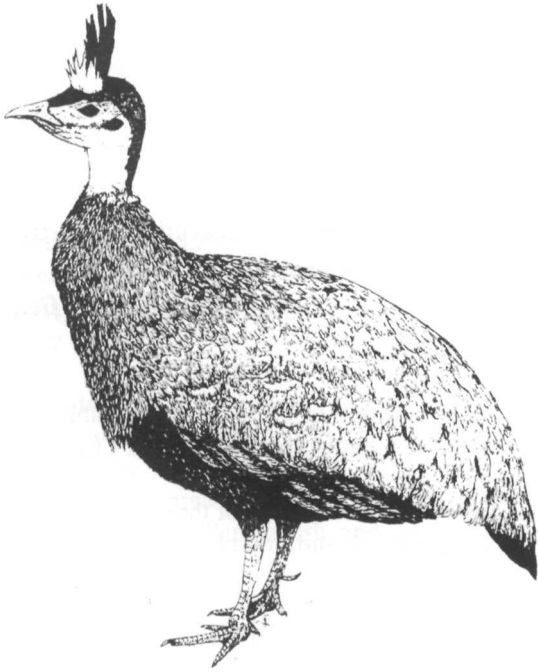
3.7.2: Congo peafowl

Afropavo congensis

Conservation status: Mace-Lande - (insufficient information); CITES - Not listed; National protection status - Protected (Zaire).

Taxonomic status: This is the only pheasant native to Africa. There are no subspecies and no other species in the genus.

Current distribution: It is restricted to the Congo River basin in eastern Zaire, where it inhabits primary lowland rainforest below 1,200 m. When first discovered in the 1930s, it was known from the Ituri Forest, eastwards to



Congo peafowl

Artist: Mrs S. Phillips

Monkoto, Lofima and Yahuma. The southern boundary of its range is presumed to be the edge of the tropical forest. The northern limit seemed then to be the Aruwimi River to the east and perhaps the Lopori River in the west, near the site of a recent record at Botewa, south of Bongandanga in 1982 (R. van Bockstaele *in litt.*). Another probable sighting was obtained in the Kahuzi-Biega National Park extension in the early 1980s (G. Allport *in litt.*). During 1989-92, 13 sites were found in and around Maiko National Park further north (Hart 1995).

Population status: This species has rarely been seen in the wild, and the only area that seems likely to contain a persistent population is centred on Maiko National Park. Collar and Stuart (1985) report it to be uncommon but secure, and BirdLife International classifies it as vulnerable (Collar *et al.* 1994).

Captive population: ISIS records 108 and WPA 47. An international studbook is maintained by R. van Bockstaele (1988) of Antwerp Zoo. There were 64 males, 30 females and 3 unsexed chicks in captivity in December 1991.

Threats: Its presumed historical range is under great pressure from deforestation and habitat degradation, as well as losses of habitat to agriculture and urbanisation. Where it survives it seems certain to be hunted for food.

Protected areas: It occurs in Maiko National Park, and may still survive in the Irangi area of the Kahuzi-Biega National Park extension (G. Allport *in litt.*). The Ituri Forest has now also been designated as a National Park.

Future action: Extensive surveys are required to establish its distribution and population status throughout the presumed former range. Any appreciable populations that are discovered should be given immediate protection, and studies of ecological requirements undertaken. The Wildlife Conservation Society (New York Zoological Society) started a field project on this species in January 1994 (Hart 1995). The studbook should be maintained in order to minimise loss of genetic diversity in the captive population.

3.8: Threatened subspecies within safe species

3.8.1: Clark's/Kuser's/Rock's/Mrs Vernay's blood pheasant

Ithaginis cruentus clarkei/ kuseri/ rockil holoptilus marionae

Conservation status: Mace-Lande - Vulnerable; CITES - Appendix II (whole species); National protection status - 2nd Class (China), Schedule 1 (India).

Taxonomic status: Johnsgard (1986) includes *holoptilus* within *rocki* and lists 13 subspecies in all. These four form a tight geographical group.

Current distribution: Historically these subspecies are described as occurring in Yunnan in southern China, Sikkim and Arunachal Pradesh in northeast India, and northeast Myanmar. There are recent records of *kuseri* from northeastern Arunachal Pradesh (Singh 1992, Kaul *et al.* 1995, M. Katti *in litt.*). Subspecies *holoptilus* has been identified on the Mekong-Salween divide in Yunnan (He Fen-qi *et al.* 1990, He Fen-qi and Lu Tai-chun 1991) and southeastern Tibet (Zheng Guang-mei *in litt.*). It occurs in fir forests, and patchy sub-alpine bamboo and rhododendron scrub (He Fen-qi *in litt.*). In India, *kuseri* has been found at 2,750-4,500 m in similar habitats (R. Kaul *in litt.*). There is no recent information from Myanmar.

Population status: Given the extent and fragmentation of suitable habitat, these subspecies are estimated to number more than 10,000 when combined, but they are probably declining everywhere except in Bhutan.

Captive population: Neither ISIS nor WPA record these subspecies. None of them are known to be in captivity.

Threats: Hunting for food is widespread in India, but deforestation is thought to be having a greater impact in some places in China (He Fen-qi *in litt.*).

Protected Areas: Subspecies *holoptilus* is recorded from Goaligong Shan Natural Reserve (1,200 km²) in Yunnan (Zheng Guang-mei *in litt.*), and *kuseri* is found in Dibang Valley Wildlife Sanctuary (4,149 km²) in Arunachal Pradesh (P. Singh *in litt.*).

Future action: Taxonomic work is required to determine the validity of all the subspecies currently proposed. This group of subspecies requires extensive surveys to determine their present distribution and representation in protected areas.

3.8.2: Joret's/Darwin's koklass pheasant

Pucrasia macrolopha joretiana/darwini

Conservation status: Mace-Lande - Vulnerable; CITES - Not listed; National protection status - 2nd Class (China).

Taxonomic status: This pair of subspecies are separated both geographically and morphologically from the other seven recognised within this species.

Current distribution: There have been two recent records for the species within the supposed range of *joretiana* in Anhui (Zheng Guang-mei and Zhang Zheng-wang 1993). Other recent records imply that the ranges of *darwini* (Han Demin *in litt.*) and *P. m. ruficollis* may merge. This species typically inhabits coniferous and mixed forests in steep terrain, coming as low as 2,000 m in winter and moving towards the tree-line at 3,000-4,000 m in spring for breeding (*e.g.* Severinghaus *et al.* 1979, Gaston *et al.* 1981).

Population status: Given the extent and fragmentation of suitable habitat, these two subspecies together are estimated to number less than 10,000 and to be declining.

Captive population: Neither ISIS nor WPA record these subspecies. There are wild caught specimens of *darwini*, which do not breed successfully, in many zoos in China (He Fen-qi *in litt.*).

Threats: Hunting for food, deforestation and encroachment for agriculture appear to be inevitable human impacts in this densely populated area of eastern China.

Protected areas: Subspecies *joretiana* is present in Mazong Natural Reserve in Anhui, whilst *darwini* occurs in Fanjingshan Natural Reserve (410 km²) in Guizhou, Wuyanling Natural Reserve (15 km²) in Zhejiang, and Wuyishan National Nature Reserve in Fujian (He Fen-qi *in litt.*, Wu Zhi-kang *in litt.*).

Future action: Further work on the taxonomy and biogeography of this species is required, so that records can be allocated reliably to particular subspecies in future. Extensive surveys should be undertaken to verify their status in protected areas.

3.8.3: Meyer's/orange-collared/yellow-necked koklass pheasant

Pucrasia macrolopha meyeril ruficollis/xanthospila

Conservation status: Mace-Lande - Vulnerable; CITES - Not listed; National protection status - 2nd Class (China).

Taxonomic status: This cluster of three subspecies forms a discrete geographical and morphological group separate from the other six subspecies.

Current distribution: Recent records for the species in China are not assigned to subspecies (Zheng Guang-mei and Zhang Zheng-wang 1993), but their spread covers the supposed historical ranges of these three. Some records suggest that the ranges of *ruficollis* and *darwini* may merge. Subspecies *ruficollis* occurs in mixed and coniferous forest at 1,200-4,000 m (He Fen-qi *in litt.*).

Population status: Given the extent and fragmentation of its forested habitats, these subspecies together are estimated to number less than 50,000, but to be declining relatively rapidly.

Captive population: Neither ISIS nor WPA record these subspecies. No captive specimens of these subspecies are known in China (He Fen-qi *in litt.*).

Threats: Given the attachment of this species to forests with heavy understorey in India (*e.g.* Gaston *et al.* 1981, 1983a), deforestation, agricultural encroachment, and excessive livestock grazing may all have impacts. They are also hunted for food.

Protected areas: Subspecies *ruficollis* occurs in a number of Natural Reserves in southern Shaanxi (Wu Zhi-kang *in litt.*)

Future action: Further work on the taxonomy and biogeography of this species is required, so that records can be allocated reliably to particular subspecies in future. The extremes of northeast India and northern Myanmar should be searched for *meyeri*.

3.8.4: Black kalij pheasant

Lophura leucomelanos moffiti

Conservation status: Mace-Lande - ? (insufficient information); CITES - Not listed; National protection status - None known.

Taxonomic status: One of nine subspecies, this form was first described from captive birds, which were imported from India to USA in 1934 and have since bred true, the male being completely black.

Current distribution: There is no original locality for this bird, but the male plumage suggests that it comes from the area between the known ranges of *L. l. melanota* and *lathami*, in the lower areas of Bhutan (Ali *et al.* in press), the northern hill tracts of Bangladesh and adjacent areas of India. Males seen recently in northern Bangladesh are not completely black (P. Thompson *in litt.*), but a family party including an all-black male was seen in moist semi-evergreen broadleaved forest at 1,280 m in central Bhutan in 1993 (Inskipp and Inskipp 1993b). There is no information from India. Other Himalayan subspecies live in dense undergrowth, often associated with damp ravines at 750-3,000 m, and seem well able to survive in secondary scrub or forest (Gaston *et al.* 1981, Chandola Saklani *et al.* 1990).

Population status: It appears that this race only occurs in the lower altitude areas of Bhutan, implying a small total population size.

Captive population: ISIS records 2 and WPA 34, of which 32 are in Europe.

Threats: None would be anticipated in Bhutan, but if it occurs to the south in India or Bangladesh, its habitats will be under the severest pressure, and it will be hunted for food.

Protected areas: The single record from Ada in Bhutan comes from within the proposed Black Mountains National Park (1,300 km²).

Future action: The taxonomy of this whole species and the closely related *L. nycthemera* requires further research (McGowan and Panchen 1994). Additional survey work in Bhutan, and a thorough search for this form in remaining habitat fragments nearby in India and Bangladesh are also needed to establish its true range and status. The captive population requires careful management to minimise loss of genetic diversity.

3.8.5: Oates's/lineated/Crawfurd's kalij pheasant

Lophura leucomelanos oatesi/lineata/crawfurdii

Conservation status: Mace-Lande - Vulnerable; CITES - Not listed; National protection status - Category 1 (Thailand).

Taxonomic status: This group of three subspecies is currently accepted within *L. leucomelanos* (e.g. Delacour 1977, Johnsgard 1986), but they may well be more closely related to *L. nycthemera* (McGowan and Panchen 1994).

Current distribution: These subspecies are distributed along the border between southern Myanmar and Thailand from the plains and foothills up to about 1,500m in evergreen and mixed deciduous forest, as well as bamboo and secondary growth (CCB Mahidol University *in litt.*).

Population status: Based on the amount of habitat available, the population is estimated at 10,000-100,000 and possibly declining. Taken together, these three subspecies are considered vulnerable, but individually they may be endangered.

Captive population: ISIS records ten and WPA 238 for *lineata*. G. Robbins (*in litt.*) estimates that there are about 500 *lineata* and 50 *crawfurdii* in captivity worldwide.

Threats: Hunting and snaring for food are still a problem in Thailand, as is the burning of dry forest understorey in the nesting season. Its habitat is also lost to agriculture which continues to encroach on some protected areas (e.g. Sai Yok National Park).

Protected areas: In Thailand, it is reported from Kaeng Krachen, Khao Laem, Khao Sam Roi Yot National Parks, and Salak Phra, Huai Kha Khaeng, Thung Yai, Om Koi, and Umphang Wildlife Sanctuaries (CCB Mahidol University *in litt.*).

Future action: Extensive surveys should be designed to assess the subspecies' distribution, especially in protected areas, and to determine the extent to which they can use secondary forest and scrub habitats. Taxonomic clarification is needed to decide whether this group should be merged into one subspecies and/or whether they are more correctly placed within *L. nycthemera*.

3.8.6: Annamese silver pheasant *Lophuranythemeraannamensis*

Conservation status: Mace-Lande - Endangered; CITES - Not listed; National protection status - Not protected (Vietnam).

Taxonomic status: This is a morphologically distinct and geographically isolated subspecies among the 15 currently accepted.

Current distribution: The range of this subspecies, which is endemic to Vietnam, is not fully known, but it has recently been recorded from hill districts in Dong Nai, Lam Dong and Ninh Thuan Provinces (Eames *et al.* 1992, J. Eames and Nguyen Cu *in litt.*).

Population status: Based on the extent of habitat within its supposed range, the population is estimated at 500 - 5,000, and to be declining.

Captive population: Neither ISIS nor WPA records this subspecies. There was one individual in Saigon Zoo in 1994 (J.Eames and Nguyen Cu *in litt.*).

Threats: There is continuing destruction of its forest habitats resulting from logging and clearance for agriculture. It is also hunted for food by local people.

Protected areas: It is known from Thuong Da Nhim proposed Nature Reserve and Nam Bai Cat Tien National Park. It probably also occurs in Nam Ca, Cat Loc, Mom Ray, Kon Cha Rang and Kon Ka Kinh Nature Reserves (J. Eames and Nguyen Cu *in litt.*).

Future action: Thuong Da Nhim Nature Reserve should be fully established as soon as possible and improved protection measures should be adopted at Nam Bai Cat Tien National Park. Further surveys are required to establish whether populations occur in the other Nature Reserves in the highlands of south Vietnam.

3.8.7: Hainan silver pheasant *Lophura nycthemera whiteheadi*

Conservation status: Mace-Lande - Endangered; CITES - Not listed; National protection status - 2nd Class (China).

Taxonomic status: One of 15 currently accepted subspecies, this island form is a morphologically distinct endemic.

Current distribution: It has only been recorded at three localities on Hainan since 1977 (Zheng Guang-mei & Zhang Zheng-wang 1993, Gao Yu-ren *in litt.*), where it occurs in mountain and monsoon evergreen and deciduous forests.

Population status: It is estimated to number less than 10,000, and there is evidence of a marked decline during 1987-92 in Ba Wang Ling Natural Reserve (Gao Yu-ren *in litt.*).

Captive population: Neither ISIS or WPA record this subspecies. There appear to be none in captivity anywhere in China (Gao Yu-ren *in litt.*).

Threats: It is subject to habitat degradation, deforestation and hunting for food throughout its range.

Protected areas It is recorded from Ba Wang Ling (40 km²), Jian Feng Ling (16 km²) and Bai Shui Ling (31 km²) Natural Reserves.

Future action: Further surveys of all remaining forest blocks on Hainan are required, as well as year-round studies of habitat use. Protection offered in existing reserves should be improved, despite all primary forest habitats on Hainan Island being totally protected since January 1994 (Gao Yu-ren *in litt.*).

3.8.8: Bolovens silver pheasant *Lophura nycthemera engelbachi*

Conservation status: Mace-Lande - Endangered; CITES - Not listed; National protection status - Category 1 (Laos).

Taxonomic status: One of 15 subspecies, but morphologically distinct and geographically isolated from others.

Current distribution: Restricted to the Bolovens Plateau in southern Laos, it has recently been recorded from lower montane forest at 1,100 m and in forest in a steep rocky area at 950 m. It is assumed to be fairly widespread above about 800 m wherever it is not hunted (Cambridge Survey Team *per* T. Evans and R. Timmins *in litt.*)

Population status: Its habitat is now believed to lie in about six blocks, some of which are linked. Two of these (100 km² and 66 km²) lie within the Dong Hua Soa Protected Area at the southwest corner of the plateau. Four other areas remained in 1981, ranging in size from 68 to 360 km² (Cambridge Survey Team *per* Tom Evans and R. Timmins *in litt.*). Based on the extent of the habitat, the population is estimated at 500 - 5,000 and is thought to be declining.

Captive population: Neither ISIS nor WPA records this subspecies. None are known in captivity.

Threats: It is presumed to be suffering from habitat loss and hunting for food. Some forest has been cleared for coffee plantations in the southwest corner of the plateau. It is estimated that about 500 km² of suitable habitat may now remain outside Dong Hua Soa Protected Area, and clearance continues both inside and outside that reserve. Other parts of its range contain areas cleared for coffee plantations and habitation, so that there is hunting deep inside the forest (Cambridge Survey Team *per* Tom Evans and R. Timmins *in litt.*).

Protected areas: It was recently recorded in Dong Hua Soa Protected Area (Cambridge Survey Team *per* Tom Evans and R. Timmins *in litt.*).

Future action: All remaining habitat should be protected if possible by setting up new protected areas, and efforts should be made to control the clearance of new areas for coffee plantations. The other forest blocks on the plateau should be surveyed for the subspecies.

3.8.9: Lewis's silver pheasant *Lophura nycthemera lewisi*

Conservation status: Mace-Lande - Vulnerable; CITES - Not listed; National protection status - Category 1 (Thailand).

Taxonomic status: One of 15 subspecies, it is morphologically distinct and geographically isolated from all others.

Current distribution: It has a very restricted range in southwest Cambodia and southeast Thailand, where it occurs in submontane and montane evergreen forest from about 600-700 m up to the ridge tops (1,690 m in Thailand) (CCB Mahidol University *in litt.*).

Population status: Based on the extent of suitable habitat, the population is estimated at less than 10,000 and is thought to be declining. If there are fewer than 2,000 in Thailand, as is possible, then this estimate may be too high.

Captive population: Neither ISIS nor WPA record this subspecies. The only pure captive population of this subspecies is believed to be in Thailand.

Threats: Hunting and snaring for food, and capture for the bird trade are problems for this subspecies. In Thailand habitat loss through the burning and increased fragmentation of montane forest patches, especially for the cultivation of cardamoms, is an additional threat (CCB

Mahidol University *in litt.*). In southwest Cambodia logging may be a major threat, although there is no recent information.

Protected areas: It is recorded from Khao Sapab Namtok Phliu National Park and Khao Soi Dao Wildlife Sanctuary in Thailand (CCB Mahidol University *in litt.*). A report of this subspecies from Khao Chamao-Khao Wong National Park requires confirmation.

Future action: All suitable areas in Cambodia require surveying, and efforts should be made to establish the subspecies' status at Khao Chamao-Khao Wong National Park and other protected areas in Thailand. Known populations in Thailand should be monitored and any protected area in which it occurs should be managed effectively.

3.8.10: Hainan grey peacock-pheasant *Polyplectron bicalcaratum katsumatae*

Conservation status: Mace-Lande - Endangered; CITES - Appendix II (for the species); National protection status - 1st Class (China).

Taxonomic status: There are five subspecies, of which this one is a distinct island endemic.

Current distribution: This subspecies is restricted to forested areas on Hainan Island in China (Gao Yu-ren 1992). There are recent records from ten sites, but it is known to have disappeared from four others (Gao Yu-ren *in litt.*).

Population status: It is thought to number less than 1,000 and to be declining rapidly.

Captive population: Neither ISIS nor WPA record this subspecies, but there are some individuals breeding successfully at the South China Institute for Endangered Species in Guangzhou (Gao Yu-ren *in litt.*).

Threats: Deforestation is continuing to reduce and fragment its habitats, and it is also hunted for food.

Protected areas: There are records from Ba Wang Ling (20 km²), Bai Shui Ling (40 km²), Jian Feng Ling (16 km²) Natural Reserves (Gao Yuren *in litt.*).

Future action: Extensive surveys are required to establish its current distribution in remaining forest blocks. Population monitoring should be undertaken in the protected areas, which should be managed more effectively. Intensive research is needed to determine its habitat requirements.

CHAPTER 4: Five year plan of action (1995-99)

4.1: Introduction

Chapter 3 of this Action Plan provides a summary of information relating to the status and conservation of all pheasant taxa identified as threatened in Chapter 2 (Table 2.2, p. 17-21). The Threatened Taxon Summaries given in Chapter 3 include an outline of the action thought to be necessary to reduce the risk of extinction for each threatened taxon. This chapter builds on some of those recommendations for most threatened taxa by outlining a set of key projects that the Pheasant Specialist Group considers can and should be started during the period 1995-1999.

In an ideal world, all the actions listed against all the threatened taxa in Chapter 2 would be implemented immediately. Obviously, constraints imposed by limits on expertise, funds and access to certain countries and regions, make such a comprehensive programme completely unrealistic. Thus, the overall plan of action presented here is considered to represent a statement of goals that the Pheasant Specialist Group can really expect to see being met during the next five years. This programme of work is certainly ambitious, but this just stresses the danger of extinction that so many pheasant taxa now face.

This chapter consists of 25 Action Plan Project Briefs, selected and designed according to three criteria: urgency, practical feasibility and funding requirements. The urgency of a project is judged by the Mace-Lande threat categories (see Section 2.2) of the taxa involved. Thus all taxa classified in Chapter 2 as being critical, endangered, vulnerable or insufficiently known, were at least considered for inclusion in projects. The other two criteria were used to indicate how likely it is that a project can be carried out in the near future. They include consideration of factors such as political or military restrictions on access to potential study areas, and the availability of local personnel to carry out the work required.

The resulting exclusion of a few threatened taxa from the Project Briefs should not be taken as an indication of lack of interest in them on the part of the Pheasant Specialist Group. It is only a consequence of some species or localities being judged as more urgently in need of work than others, and/or that the work required is unlikely to be started in the next five years. Attempts by anyone to plan and undertake projects on any threatened taxa will be given as much support as possible by the Pheasant Specialist Group (see Section 1.6).

The 25 Project Briefs have been divided into four categories, according to their scope and objectives. There are two projects that have global scope and involve the whole Pheasant Specialist Group network. There are six regional projects focused on pheasant status and distribution. A further 13 are concerned with the conservation of particular taxa. Lastly, there are four projects, described as strategic initiatives, that are concerned with the application of research on taxonomy, ecology or ethology to conservation problems.

The Project Briefs are only outlines of what needs to be done, as well as why and how. They are designed to be read as much by people who might then seek or donate funds allowing a project to be carried out, as by biologists wishing to carry out research that should contribute to the conservation of pheasants and their habitats. Together with the relevant Threatened Taxon Summaries in Chapter 3, they can be used as a means of developing a full Project Proposal (see Section 1.6), which anyone may prepare and which the Pheasant Specialist Group will be pleased to review, and hopefully endorse on behalf of the Species Survival Commission, BirdLife International and the World Pheasant Association.

4.2: Format of Action Plan Project Briefs

Each Action Plan Project Brief includes entries under a standard set of sub-headings, as follows:

Title: This includes the target species' English names and/or a locality;

Mace-Lande threat status: The names of all threatened pheasants to be studied are given, with their threat category, taken from Table 4.1 (see below);

Aim: This is a brief statement of the project's major objectives;

Justification: This indicates why the project is urgent and valuable;

Project description: This gives an indication of how the project objectives might be achieved, often including some mention of study areas and methods;

Timescale: This indicates how long the project might last, and in some cases which months should be used for fieldwork;

Contacts: This lists the names of people who should be able to assist with the project's development and implementation (they are listed with their addresses in Appendix A);

Further reading: These references give more information on the background to the project, and will be helpful in the preparation a full proposal;

See also: This makes cross-references to Threatened Taxon Summaries in Chapter 3, and to other Project Briefs.

4.3: Threatened taxa covered

Table 4.1 lists all the pheasant taxa considered to be threatened, with an indication of the future actions proposed for each of them in Chapters 2 and 3, potential national locations for some of this work and a reference to any Action Plan Project Brief in which they are included.

Table 4.1. A list of the threatened pheasant taxa in taxonomic order (Sibley and Monroe 1990) with their threat category, suggested future actions, potential project locations, and reference to Action Plan Project Briefs in which they feature. Key to Mace-Lande threat categories (M-L CAT): C=critical; E=endangered; V=vulnerable; ?=insufficient information.

SCIENTIFIC NAME ENGLISH NAME	M-L CAT	FUTURE ACTIONS	SUGGESTED PROJECT LOCATIONS	PROJ. REF. NO.
<i>Ithaginis cruentus kuseri/rocki/ marionae/holoptilus /clarkei</i> Blood pheasant	V	Survey	China, India	4.5.1 4.5.3
<i>Tragopanmelanocephalus</i> Western tragopan	V	Education, Habitat management, Intensive research, Survey	Pakistan	4.6.1 4.7.2
<i>Tragopansatyra</i> Satyr tragopan	V	Captive management, Control hunting, Education, Habitat management, Survey	India	4.5.1 4.5.3
<i>Tragopan b.blythii</i> Blyth's tragopan	E	Captive management, Education, Habitat management, Survey	India	4.5.4

SCIENTIFIC NAME ENGLISH NAME	M-L CAT	FUTURE ACTIONS	SUGGESTED PROJECT LOCATIONS	PROJ. REF. NO.
<i>T.b.molesworthi</i> Molesworth's tragopan	?	Survey	China, India	4.5.1 4.5.3
<i>Tragopancaboti</i> Cabot's tragopan	V	Captive management, Habitat management, Monitoring, Survey	China	4.6.2 4.6.7 4.7.2
<i>Pucrasiamacrolopha joretiana/danvini</i> Joret's/Darwin's koklass pheasant	V	Survey	China	4.5.1 4.7.2
<i>P. m. meyeri/ruficollis/ xanthospila</i> Meyer's/orange-collared/yellow- necked koklass pheasant	V	Survey	China	4.7.2
<i>Lophophorus sclateri</i> Sclater's monal	E	Habitat management, Survey	China, India	4.5.1 4.5.3
<i>Lophophorus lhuysii</i> Chinese monal	V	Control hunting, Habitat management, Survey	China	4.5.1 4.6.3
<i>Lophura leucomelanos moffiti</i> Black kalij pheasant	?	Captive management, Survey	India	4.5.3
<i>L. l. oatesi/lineata/crawfurdi</i> Oates's/lineated/Crawfurd's kalij pheasant	V	Habitat management, Survey	None suggested	None
<i>Lophura nycthemera annamensis</i> Annamese silver pheasant	E	Habitat management, Survey	Vietnam	4.6.4
<i>L. n. whiteheadi</i> Hainan silver pheasant	E	Habitat management, Survey	Hainan Is. (China)	4.6.13
<i>L. n. engelbachi</i> Bolovens silver pheasant	E	Habitat management, Survey	None suggested	None
<i>L. n. lewisi</i> Lewis's silver pheasant	V	Habitat management, Monitoring, Survey	None suggested	None
<i>Lophura imperialis</i> Imperial pheasant	C	Control hunting, Habitat management, Survey	Vietnam	4.6.4
<i>Lophura edwardsi</i> Edwards's pheasant	C	Captive management, Control hunting, Habitat management, PHVA, Survey, Taxonomic clarification	Vietnam	4.6.4 4.7.4
<i>Lophura hatinhensis</i> Vietnamese pheasant	C	Captive management, Control hunting, Habitat management, PHVA, Survey, Taxonomic clarification	Vietnam	4.6.4 4.7.4
<i>Lophura hoogerwerft</i> Hoogerwerf's pheasant	V	Habitat management, Survey, Taxonomic clarification	Sumatra	4.5.5
<i>Lophura inornata</i> Salvadori's pheasant	V	Habitat management, Survey, Taxonomic clarification	Sumatra	4.5.5
<i>Lophura e. erythrothalma</i> Malay crestless fireback	E	Captive management, Habitat management, Intensive research, Survey	Sumatra	4.5.5
<i>L. e. pyronota</i> Bornean crestless fireback	E	Captive management, Habitat management, Intensive research, Survey	Borneo	4.5.6
<i>Lophura ignita</i> Crested fireback	V	Habitat management, Survey	Borneo, Sumatra	4.5.5 4.5.6
<i>Lophuradiardi</i> Siamese fireback	V	Control hunting, Habitat management, Survey	Vietnam	4.6.4
<i>Lophurabulweri</i> Bulwer's pheasant	V	Habitat management, Survey	Borneo	4.5.6
<i>Crossoptilon harmani</i> Tibetan eared-pheasant	E	Habitat management, Survey, Taxonomic clarification	China, India	4.5.1 4.5.3
<i>Crossoptilon crossoptilon</i> White eared-pheasant	V	Control hunting, Habitat management, Survey	China	4.5.1 4.5.3
<i>Crossoptilon mantchuricum</i> Brown eared-pheasant	E	Captive management, Habitat management, Intensive research	China	4.6.5

SCIENTIFIC NAME ENGLISH NAME	M-L CAT	FUTURE ACTIONS	SUGGESTED PROJECT LOCATIONS	PROJ. REF. NO.
<i>Catreus wallichi</i> Cheer pheasant	V	Control hunting, Education, Habitat management, Monitoring, Survey	India	4.6.6
<i>Syrmaticus ellioti</i> Elliot's pheasant	V	Captive management, Habitat management, Intensive research, Monitoring	China	4.6.2 4.6.7 4.6.9
<i>Syrmaticus h.humiae</i> Hume's pheasant	E	Captive management, Habitat management, Intensive research, Survey	India	4.5.4
<i>S.h.burmanicus</i> Burmese bar-tailed pheasant	V	Control hunting, Habitat management, Intensive research, Survey	China	4.6.12
<i>Syrmaticus s. soemmerringii/ijimae</i> Soemmerring's/Ijima's copper pheasant	?	Intensive research, Survey, Sustainable use	Kyushu Is. (Japan)	4.6.8
<i>S. s. scintillans/ intermedius/subrufus</i> Scintillating/Shikoko/ Pacific copper pheasant	?	Intensive research, Survey, Sustainable use	Honshu and Shikoku Is. (Japan)	4.6.8
<i>Syrmaticus reevesii</i> Reeves's pheasant	E	Control bird trade, Education, Habitat management, Intensive research, Monitoring, Survey	China	4.6.7 4.6.9
<i>Polyplectron chalcurum</i> Bronze-tailed peacock-pheasant	V	Control hunting, Habitat management, Survey	Sumatra	4.5.5
<i>Polyplectron inopinatum</i> Mountain peacock-pheasant	V	Captive management, Habitat management, Survey	None suggested	None
<i>Polyplectron germaini</i> Germain's peacock-pheasant	V	Habitat management, Survey	None suggested	None
<i>P. b. katsumatae</i> Hainan grey peacock- pheasant	E	Habitat management, Intensive research, Monitoring, Survey	Hainan Is. (China)	4.6.13
<i>Polyplectron malacense</i> Malaysian peacock-pheasant	V	Captive management, Habitat management	None suggested	None
<i>Polyplectron schleiermacheri</i> Bornean peacock-pheasant	C	Habitat management, Survey	Borneo	4.5.6
<i>Polyplectron emphanum</i> Palawan peacock-pheasant	E	Captive management, Control bird trade, Control hunting, Education, Habitat management, Survey	Philippines	4.6.10
<i>Rheinardia o. ocellata</i> Crested argus	V	Control hunting, Habitat management, Survey	Vietnam	4.6.4
<i>R. o. nigrescens</i> Malay crested argus	E	Habitat management, Survey	None suggested	None
<i>Argusianus argus</i> Great argus	V	Captive management, Control hunting Habitat management	Borneo, Indonesia (Sumatra)	4.5.5 4.5.6
<i>Afropavo congensis</i> Congo peafowl	?	Captive management, Habitat management, Intensive research, Survey	Zaire	4.6.11
<i>Pavo muticus muticus</i> Javan green peafowl	E	Control bird trade, Control hunting, Habitat management, Intensive research, PHVA	Java	4.6.12 4.7.4
<i>P.m.imperator</i> Indo-Chinese green peafowl	E	Control hunting, Education, Habitat management, Survey	China, Vietnam	4.6.12 4.7.4
<i>P.m.spicifer</i> Burmese green peafowl	?	Habitat management, Survey	India	4.5.4 4.6.12 4.7.4

Increasing the effectiveness of the Pheasant Specialist Group

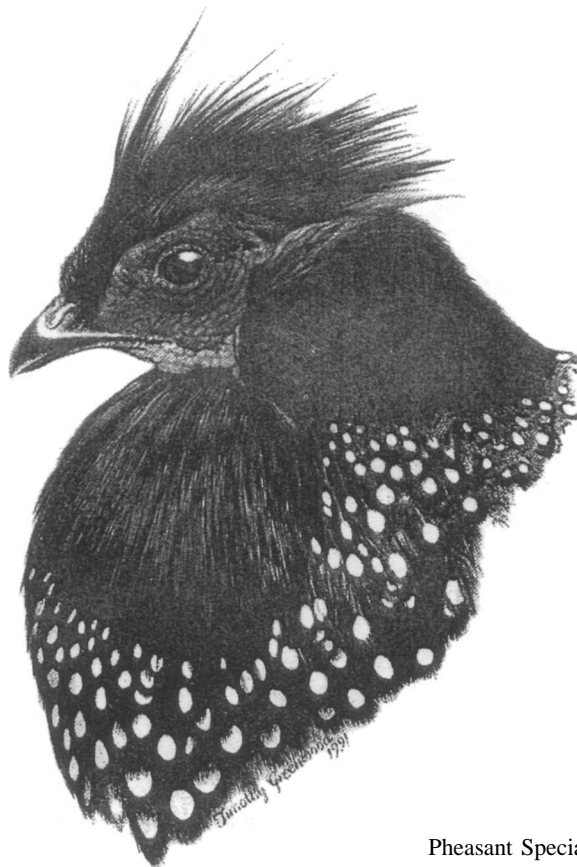
Aim: To improve the information gathering and distribution capabilities of the Pheasant Specialist Group.

Justification: The Pheasant Specialist Group is charged by its three parent bodies, the Species Survival Commission, BirdLife International and the World Pheasant Association, with responsibility for overseeing any 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 conservationists, to assist with the development and support of project proposals, to evaluate project reports, and to provide advice for international organisations, government departments, non-government organisations and individuals.

Project description: The network particularly requires development or expansion in Thailand, Malaysia, Laos, Cambodia, Myanmar and Nepal, through increasing contacts in government wildlife and forestry departments, universities and conservation organisations. A membership database is required and a newsletter is already being produced twice each year. Effective coordination of the Pheasant Specialist Group's core committee in U.K., and efficient communication with the membership network worldwide, require substantial routine expenditure on photocopying, postage, telephone and fax.

Timescale: Five years

Contacts: P. Garson, K. Howman



Pheasant Specialist Group logo
Artist: T. Greenwood

International symposium on Asian Galliformes

Aim: To hold a meeting which functions as an information exchange, a project review workshop, an educational forum, and a stimulus to all aspects of wildlife conservation in the host country. This is planned as a joint project with the World Pheasant Association and the Partridge, Quail and Francolin Specialist Group.

Justification: Prior to the formation of the Pheasant Specialist Group, the World Pheasant Association organised International Pheasant Symposia in Nepal (1979), India (1982), Thailand (1986), China (1989) and Pakistan (1992), and proceedings were published after each one. These symposia have developed into conventional but informal scientific meetings consisting of plenary lectures, poster sessions, instructional workshops and round-table discussions. They have attracted increasing amounts of interest amongst university and research institute scientists from Asian countries, as well as from conservation organisations and government departments with responsibilities for wildlife protection and environmental management in the host countries. Particularly for Asian graduate students undertaking field projects on pheasants, they have become the principle means of reviewing progress and obtaining expert advice on fieldwork techniques, data analysis procedures and publication. The proceedings often provide them with their first opportunity to publish internationally.

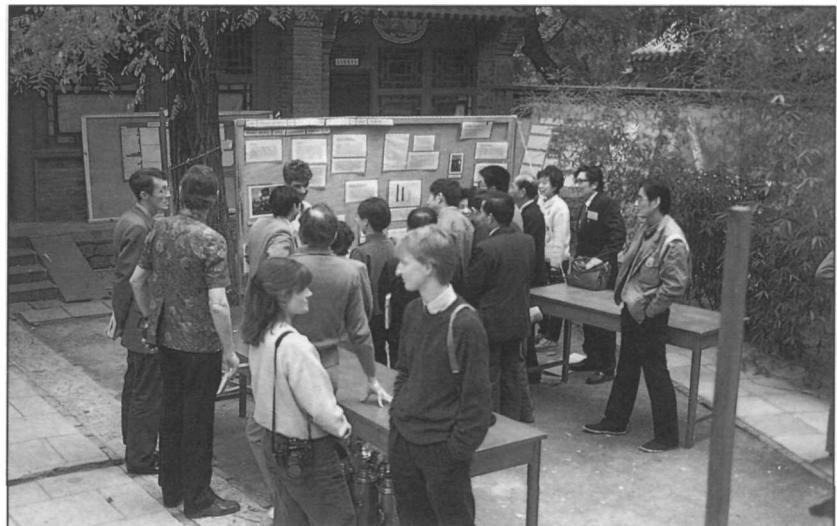
Project description: The next meeting in this series is to be organised as a symposium centred on the conservation of all Asian Galliformes except the megapodes. It is provisionally scheduled to take place in Peninsular Malaysia in September 1997. The main scientific meeting should last for three days and include a few keynote spoken papers, but in order to stimulate as much interaction as possible, poster sessions, workshops and round-tables discussions will take up most of the programme. A further three days are being planned for informal reviews of the planning and progress of Asian projects, discussions of techniques for fieldwork and aviculture, demonstrations of data analysis software, and the revision of manuscripts for the proceedings.

Timescale: Two years (1996/97)

Contacts: P. Garson, K. Howman

Further reading:

Jenkins, D. (ed.). 1993. *Pheasants in Asia 1992*. Proceedings of the Fifth International Symposium on Pheasants in Asia. World Pheasant Association, Reading, U.K.



Poster session at the 4th International Pheasant Symposium

Photo: P. Garson

Developing a sites database for Chinese Galliformes

Aim: To establish a computer database for historical and recent records of all Galliformes in China.

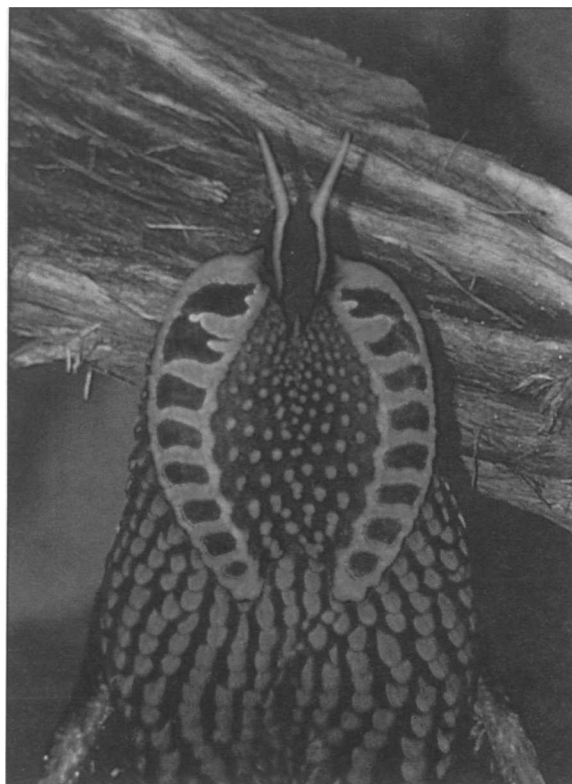
Justification: WPA-China has a large network of professional biologists carrying out projects and collecting distribution data on Galliformes species throughout the country. Historical information on the geographical and habitat distributions of these species is obscure, whilst recent records for particular taxa are often held by several different people, and at different scales (*e.g.* exact sites, protected areas, counties). There is an urgent need to standardise and collate this information, so that range contractions and population fragmentation can be measured, and unsurveyed areas identified. This should lead to the more effective use of limited resources in conducting extensive surveys, population monitoring and intensive ecological research, as well as indicating whether additional protected areas are required for the long term conservation of China's wealth of Galliformes species.

Project description: The membership of WPA-China, and anyone else working on Galliformes (including grouse, partridges, quails and francolins) in China, should be asked to verify lists of supposedly known sites, and to provide details of new ones, including in every case a site name, its size, habitat types, protected area status, latitude and longitude coordinates, and a date for the record. These details should be entered onto a computer database, in a format making them fully compatible with an all-Asia database to be developed for the same reasons in U.K.

Timeline: Two years

Contacts: P. McGowan,
Zheng Guang-mei

See also: Project 4.7.1



Male Temminck's tragopan displaying

Photo: K. Fink

Surveys of threatened pheasants in southwest China

Mace-Lande threat status:

Sclater's monal, Tibetan eared-pheasant (Endangered); blood pheasant [5 subsp.], satyr tragopan, koklass pheasant [2 subspecies], Chinese monal, white eared-pheasant (Vulnerable); Molesworth's tragopan (? insufficient information)

Aim: To determine the status and distribution of threatened pheasants in relation to hunting, human impacts on their habitats, and the distribution of protected areas in western Sichuan, northwest Yunnan and southeast Tibet.



Pheasant habitat in northwest Yunnan
Photo: He Fen-qi

Justification: The part of China adjacent to eastern Nepal, Bhutan and northeast India is the one of the world's most important regions in terms of numbers of Galliformes species, and contains parts of four Endemic Bird Areas (D07, South Tibet; D08, Eastern Himalayas; D13, West Sichuan Mountains; D15, Yunnan Mountains; ICBP 1992). It encompasses parts of the supposed historical distributions of at least 14 pheasant species in various altitude ranges and habitats (He Fen-qi and Lu Tai-chun 1991, Zheng Guang-mei and Zhang Zheng-wang 1993). The most threatened and/or least known of these are Sclater's monal *Lophophorus sclateri*, Tibetan and white eared-pheasants *Crossoptilon harmani* and *C. crossoptilon*, Chinese monal *Lophophorus lhuysii* and Molesworth's tragopan *Tragopan blythii molesworthi*. Despite recent surveys (*e.g.* Robson 1986) and research projects (He Fen-qi *et al.* 1988), huge areas remain unvisited by ornithologists recently, no doubt partly because of their extreme remoteness, altitude and climate. Comprehensive surveys in areas rich in coniferous forest and subalpine scrub may reveal important populations of several of these threatened species at single localities. Given the sensitivity of pheasants to human disturbance, exceptional areas for them are likely to be rich in other animal and plant species, possibly for cultural or historical reasons (*e.g.* Buddhism in Tibet).

Project description: The least known of these three areas is western Sichuan, between the Jinsha River and the mountains west of the Sichuan Basin, and including parts of Ganzi, Liangshan and A'ba Autonomous Regions. The Changdu region of eastern Tibet, from the Yaluzhangbu (Brahmaputra) River in the west to the Jinsha River in the east, and south towards the border with India, also requires surveys. The best known area, although even here large parts still remain unvisited recently, includes parts of the Nu Jiang, Zhongdian, Lijiang, Dali and Baoshan Autonomous Regions in northwestern Yunnan. Here one survey party should explore both banks of the Nu (Salween) valley, whilst another

Surveys of threatened pheasants in southwest China

should visit the other areas. In general, a large team that can be split into small parties for surveys in different parts of an area is required for this work. Because of heavy winter snowfall, surveys above 2,000 m can only be done in these regions of China from mid-May to August. Vocal species such as the monals and tragopans should be assessed by dawn call counts until late June, but encounter rates with all Galliformes can be obtained by walking trails and disturbing them in forest. Direct observation from vantage points near the treeline allows areas several kilometres across to be surveyed in July (He Fen-qi *et al.* 1988). As a start, these three large areas should be visited in turn for one spring survey each, in order to describe habitat distributions, the state of their protected areas, levels and types of human impact, and to list the flora and fauna. The results should be translated into rational proposals for existing and new protected areas, designed to safeguard pheasants and many other species in their native habitats.

Timescale: Four months (May-August) for three years.

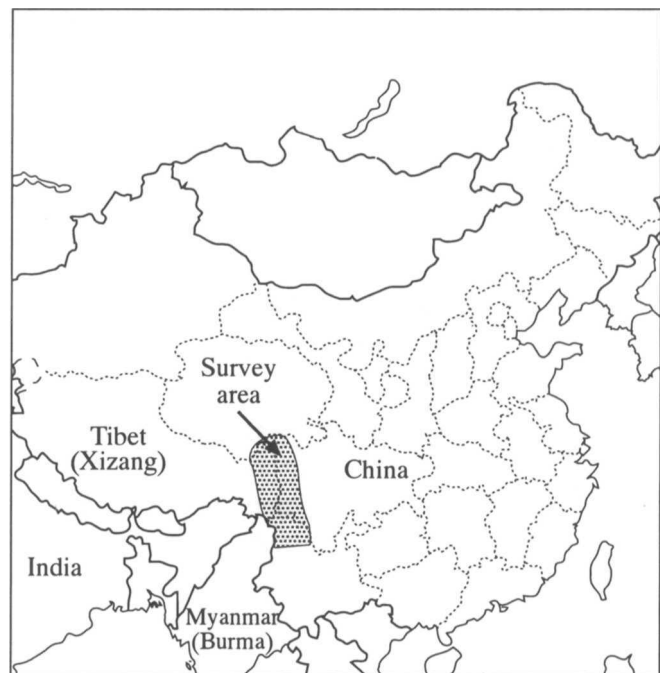
Further reading:

- He Fen-qi, Gao Ying-xing and Zheng Yang-zhi 1990. Pheasant and partridge species of the Nu River Autonomous Region, Northwestern Yunnan, China. In: Hill, D.A., Garson, P.J. and Jenkins, D. (eds.), *Pheasants in Asia* 1989, p. 27. World Pheasant Association, Reading, U.K.
- 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.
- He Fen-qi and Lu Tai-chun 1991. Changes in status and distribution of China's pheasants since 1978. *WPA News* 31: 19-24.
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- Robson, CR. 1986. Recent observations of birds in Xizang and Qinghai provinces, China. *Forktail* 2: 67-82.
- Zheng Guang-mei and Zhang Zheng-wang 1993. The distribution and status of pheasants in China. In: Jenkins, D. (ed.), *Pheasants in Asia* 1992, pp. 15-19. World Pheasant Association, Reading, U.K.

Contacts: Han Lian-xian, He Fen-qi

See also:

Sections 3.5.1/2/4, 3.6.2/4/10, 3.8.1/2;
Projects 4.5.3, 4.6.3



Proposed survey area in southwest China

Pheasant surveys in northeast India:

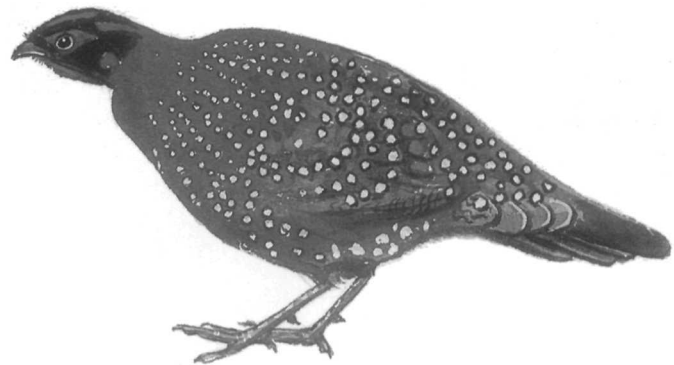
I. Northern Arunachal Pradesh

Mace-Lande threat status: Sclater's monal, Tibetan eared-pheasant (Endangered); satyr tragopan, white eared-pheasant, Kuser's blood pheasant (Vulnerable); Molesworth's tragopan, black kalij (? - insufficient information)

Aim: To establish the status and distribution of threatened pheasant species and their habitats in the Eastern Himalayas of India.

Justification: The northern fringes of the Indian state of Arunachal Pradesh harbour threatened pheasants that are primarily Himalayan in distribution

and have therefore been reported only occasionally from China (e.g. satyr tragopan *Tragopan satyra*, Kuser's blood pheasant *Ithaginis cruentus kuseri*; Zheng Guang-mei and Zhang Zheng-wang 1993). It also contains some that are mainly distributed in adjacent parts of China (Sclater's monal *Lophophorus sclateri*, Tibetan eared-pheasant *Crossoptilon harmani*, white eared-pheasant *C. crossoptilon*; Kaul *et al.* 1995). In the extreme west of the state, Molesworth's tragopan *T. blythii molesworthi* and black kalij *Lophura leucomelanos moffiti*, both only found so far in adjacent Bhutan, may also be present. Some of these areas have only just been revisited by ornithologists (e.g. Katti *et al.* 1992, Singh 1994, Kaul *et al.* 1995) after a gap of nearly 50 years, and several protected areas and other promising localities still require surveys. The area relevant to this project is within Endemic Bird Area D08 (Eastern Himalayas (ICBP 1992) and is being highlighted as a 'biodiversity hotspot' in northeast India by Worldwide Fund for Nature-India (R. Kaul *in litt.*).



Satyr tragopan
Artist: E. Hudson

Project description: Following local consultation, particular protected areas and other places known to contain undisturbed forest habitats should be targeted for surveys. For reasons of climate and access these might best be conducted initially during December-March. This is also the time of year at which the species that breed at higher altitudes descend and come into most frequent contact with the local human population, allowing the impact of hunting and agricultural encroachment to be studied. The results should allow assessment of the adequacy of the existing protected areas in Arunachal Pradesh for the conservation of these pheasants and their habitats, both in terms of biogeographical distribution and effectiveness of management. Surveys elsewhere may highlight other localities, containing pristine habitats and good pheasant populations, that may then be proposed for protected area status.

Timescale: Three months each year for five years.

Pheasant surveys in northeast India: I. Northern Arunachal Pradesh

Contacts: R. Kaul, P. Singh

Further reading:

Katti, M., Singh, P., Manjrekar, N., Sharma, D. and Mukherjee, S. 1992. An ornithological survey in eastern Arunachal Pradesh, India. *Forktail* 7: 75-89.

Kaul, R., Raza, R. and Kalsi, R. 1995. Pheasant surveys in Arunachal Pradesh. In: Jenkins, D. (ed.), *Annual Review of the World Pheasant Association 1993/94*, pp. 28-34. World Pheasant Association, Reading, U.K.

ICBP 1992. *Putting Biodiversity on the Map: Priority Areas for Global Conservation*. International Council for Bird Preservation [BirdLife International], Cambridge, U.K.

Singh, P. 1994. Recent bird records from Arunachal Pradesh, India. *Forktail* 10: 65-104.

Zheng Guang-mei and Zhang Zheng-wang 1993. The distribution and status of pheasants in China. In: Jenkins, D. (ed.), *Pheasants in Asia 1992*, pp. 15-19. World Pheasant Association, Reading, U.K.

See also: Sections 3.5.1/2/4, 3.6.2/10, 3.8.1/4; Project 4.5.2



Proposed survey area in Arunachal Pradesh

Pheasant Surveys in northeast India: II. Eastern Arunachal Pradesh, Nagaland, Manipur, Mizoram and Tripura

Threat status: Blyth's tragopan, Hume's pheasant (Endangered); Burmese green peafowl (? - insufficient information)

Aim: To establish the status and distribution of three threatened pheasants and their habitats in India's eastern-most border regions.

Justification: The five states of India bordering Myanmar and Bangladesh, in a region including Endemic Bird Area D10 (Tirap Frontier; ICBP 1992), have remained virtually unvisited by ornithologists for the last 50 years.



Blyth's tragopan Photo: J. Howman

Blyth's tragopan *Tragopan b. blythii* occurs in the montane forests in Nagaland (Zeliang 1980, 1987), but nothing is known for Manipur just to the south. Hume's pheasant *Syrmaticus h. humiae* has only been reported recently from two protected areas in Mizoram (S.N. Ramanujam *in litt.*), and the Burmese green peafowl *Pavo muticus spicifer* has a supposed historical distribution that included the low altitude areas of Manipur, Mizoram and Tripura. There is an urgent need to survey likely areas for remaining populations of these three threatened pheasants, all of which may otherwise only survive in northern Myanmar.



Forest and agricultural habitat in Nagaland
Photo: J. Howman

Project description: Following local consultation, particular protected areas and other places known to contain undisturbed forest habitats should be targeted for surveys. For reasons of climate and access, these should be conducted initially during December-March, which is also the time of year at which Blyth's tragopan descends and comes into most intimate contact with the local human population, allowing the impacts of hunting and slash-and-burn agriculture to be studied directly. A conservation education programme should be started amongst the Naga hill people, concentrating on the sustainable use of all

Pheasant Surveys in northeast India: II. Eastern Arunachal Pradesh, Nagaland, Manipur, Mizoram and Tripura

forest resources and making use of Blyth's tragopan as a 'flagship' species. In the case of Hume's pheasant, survey results will indicate the extent to which secondary scrub and forest developing as part of the slash-and-burn agricultural rotation is a useful habitat. This would have implications for the management of existing and prospective protected areas harbouring this species. The search for green peafowl sites should be combined with attempts to find the endangered Manipur bush-quail *Perdicula manipurensis* (McGowan *et al.* 1995). The results of all these surveys will allow the conservation status of these three pheasants to be properly assessed in India, and for additional protected areas and intensive research to be proposed as may be necessary.

Timescale: Three months per year for three years.

Contacts: T. Angami, R. Kaul, S. Ramanujam

Further reading:

ICBP 1992. Putting Biodiversity on the Map: Priority Areas for Global

Conservation. International Council for Bird Preservation [BirdLife International], Cambridge, U.K.

McGowan, P.J.K., Dowell, S.D., Carroll, J.P. and Aebischer, N.J. 1995. Status Survey and Conservation Action Plan 1995-1999. Partridges, Quails, Francolins, Snowcocks and Guineafowl. IUCN, Gland, Switzerland.

Zeliang, D.K. 1980. Blyth's tragopan breeding centre, Kohima, Nagaland. In: Savage, C.D.W. (ed.), Pheasants in Asia 1979, pp. 88-91. World Pheasant Association, Reading, U.K.

Zeliang, D.K. 1987. New measures to protect the pheasants of Nagaland. In: Savage, C.D.W. and Ridley, M.W. (eds.), Pheasants in Asia 1982, pp. 87-89. World Pheasant Association, Reading, U.K.

See also: Sections 3.5.1/6/10; Project 4.6.2



Proposed survey area in northeast India

Establishing conservation priorities for Galliformes on Sumatra, Indonesia

Mace-Lande threat status: Malay crestless fireback (Endangered); Delacour's crested fireback, Hoogerwerf's pheasant, Salvadori's pheasant, bronze-tailed peacock pheasant, Malay great argus (Vulnerable)

Aim: To promote the conservation of Sumatran Galliformes by determining what conservation and research initiatives are currently underway so that beneficial links can be established, and then carrying out surveys in areas not already covered. This project has been planned jointly with the Partridge, Quail and Francolin Specialist Group (McGowan *et al.* 1995).

Justification: Knowledge of the status of Indonesian Galliformes is poor (Holmes 1989). The country has the longest list of birds believed to be threatened with extinction (Collar *et al.* 1994, p. 24), but in many cases this reflects problems presumed to have arisen as a result of habitat loss or degradation, rather than direct evidence of declines in numbers. The threats facing Indonesia's biodiversity are evidently very real, but the present lack of baseline information on the pheasants prevents any objective assessment through which to propose the most appropriate conservation action. The island of Sumatra covers 476,000 km², and establishing the distribution and status of all its Galliformes will be no easy task. Areas above 600 m form part of Endemic Bird Area E11 (Sumatra and Peninsular Malaysia; ICBP 1992).

Project description: First, all existing information relating to the the distribution and status of Galliformes on Sumatra should be collated. The relevance of any current conservation projects to them also requires assessment. Several areas have already been identified as potentially important for the long term survival of Sumatra's Galliformes, and some of these are believed to be the sites of conservation projects at present. The relative merits of each site need to be considered, so that priorities can be established and additional conservation measures proposed if possible. Where there is an existing conservation effort, it may be appropriate to promote more consideration for the Galliformes. Where there are no such programmes, the first step is likely to be the completion of baseline surveys.

As the distribution and habitat requirements of Sumatra's birds are still so poorly known, a list of priority sites for surveys will need to be compiled so that initially one or two key areas are investigated. Such surveys should be broad-based, covering the whole spectrum of the forest avifauna, although focusing on the Galliformes and other threatened species (e.g. raptors, hornbills and some pigeons). A critically threatened subspecies of scaly-breasted hill-partridge *Arboriphila charltonii atjenensis* is also endemic to Sumatra (McGowan *et al.* 1995). Apparent tolerance of habitat degradation by the target species should be evaluated whenever possible. The areas for which further information on both distributions and conservation initiatives is required include:

1. Gunung Leuser National Park (7,927 km²). This National Park contains both lowland and montane forest. Lowland forest is present in both the north east corner, at the western end, and at Singkil Barot. Two species of highland pheasant (Hoogerwerf's pheasant *Lophura hoogerwerfi* and bronze-tailed peacock-pheasant *Polyplectron chalcurum*), but no lowland ones, have been recorded from this Park. This is the only known locality for Hoogerwerf's pheasant.

Establishing conservation priorities for Galliformes on Sumatra, Indonesia

2. Kerinci-Seblat (>16,000 km²)/Sumatra Selatan (3,568 km²). This is a complex of protected areas including Rawas/Ulu Lakitan, Bukit Dingin/Gunung Dempo and Bukit Balai Rejang. There are records from Kerinci-Seblat of Salvadori's pheasant *Lophura inornata* and bronze-tailed peacock-pheasant. This montane forest is the only known locality for Salvadori's pheasant. These southern reserves have not been surveyed recently, and Sumatra Selatan is especially worthy of attention. This reserve is part lowland and part hilly and may still be rich in bird species.
3. Siberida proposed reserve (1,200 km²). This is probably a very important area in the lowlands/low hills.
4. Berbak Nature Reserve (1,900 km²). This area has been surveyed, but not thoroughly. Berbak and Kerumutan (1,200 km²) both contain swamp forest and may not be suitable habitat for lowland pheasants.
5. Benteugan (193 km²) is a forest on poor soils that has not yet been surveyed.
6. Way Kambas National Park (1,300 km²). This is a severely degraded forest, which has already been surveyed to some extent. Red junglefowl *Gallus gallus*, Delacour's crested fireback *Lophura ignita macartneyi*, Malay crestless fireback *Lophura e. erythrophthalma* and Malay great argus *Argusianus a. argus* are all reported from this Park, but their conservation requirements are not known.

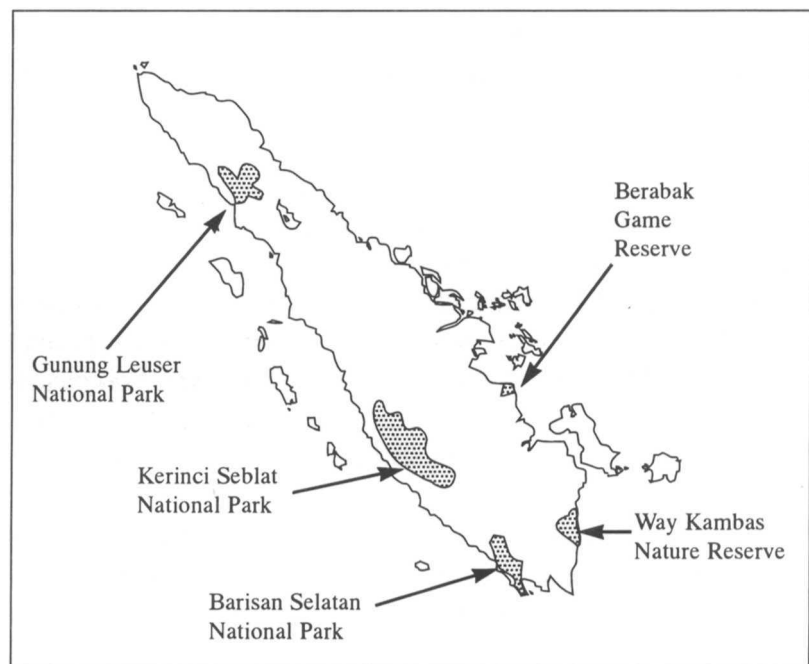
Timescale: Six months for data compilation; one year each for two survey projects.

Contacts: B. van Balen, G. Davison, D. Holmes, P. McGowan, D. Wells

Further reading:

- van Balen, B. and Holmes, D.A. 1993. Status and conservation of pheasants in the Greater and Lesser Sundas, Indonesia. In: Jenkins, D. (ed.), Pheasants in Asia 1992, pp. 40-49. World Pheasant Association, Reading, U.K.
- Collar, N.J., Crosby, M.J. and Stattersfield, A.J. 1994) Birds to Watch 2. The World List of Threatened Birds. BirdLife Conservation Series No. 4. BirdLife International, Cambridge, U.K.
- Holmes, D.A. 1989. Status report on Indonesian Galliformes. Kukila 4: 133-143 [re-published as Journal of the World Pheasant Association 15/16: 30-44 (1992)].
- ICBP 1992. Putting Biodiversity on the Map: Priority Areas for Global Conservation. International Council for Bird Preservation [BirdLife International], Cambridge, U.K.
- McGowan, P.J.K., Dowell, S.D., Carroll, J.P. and Aebischer, N.J. 1995. Status Survey and Conservation Action Plan. Partridges, Quails, Francolins, Snowcocks and Guineafowl. IUCN, Gland, Switzerland.

See also: Sections 3.5.3, 3.6.5/6/7/13/17



National parks and reserves on Sumatra

Assessing conservation priorities for forest Galliformes on Borneo

Mace-Lande threat status: Bornean peacock-pheasant (Critical); Bornean crestless fireback (Endangered); greater and lesser Bornean crested firebacks, Bulwer's pheasant, Bornean great argus (Vulnerable).

Aim: To promote the conservation of Bornean Galliformes by determining what conservation research initiatives are currently underway, so that beneficial links can be established, and by proposing and carrying out surveys to complement these initiatives in areas not already covered. This project has been planned jointly with the Partridge, Quail and Francolin Specialist Group (McGowan *et al.* 1995).



Primary forest on Borneo
Photo: Sarah Fowler

Justification: Knowledge of the status of Indonesian Galliformes is poor (Holmes 1989). The country has the longest list of birds believed to be threatened with extinction (Collar *et al.* 1994, p. 24), but in many cases this reflects problems presumed to have arisen as a result of habitat loss or degradation, rather than direct evidence of declines in numbers. The threats facing Indonesia's biodiversity are evidently very real, but the present lack of baseline information on pheasants prevents any objective assessment through which to propose the most appropriate conservation action. Whilst new information on the status and distribution of species is urgently required, the first requirement is for all existing information to be collated and assessed. The island of Borneo covers 755,000 km² and includes three countries: Indonesia (Kalimantan), Malaysia (Sabah and Sarawak) and Brunei. In addition to the six threatened pheasants, there are six threatened partridges endemic to Borneo (McGowan *et al.* 1995), parts of which comprise Endemic Bird Area E10 (Bornean Mountains; ICBP 1992). Establishing the conservation status and requirements of all these birds over such a vast area is no easy task. The critically threatened Bornean peacock-pheasant *Polyplectron schleiermacheri* remains very little known (Holmes 1989, B. van Balen and D. Holmes *in litt.*), and special efforts are now required to establish whether this species still survives.

Project description: First, all existing information relating to the the distribution and status of Galliformes on Borneo should be collated. The relevance of any current conservation projects to them also requires assessment. Several areas have already been identified as potentially important for the long term survival of Borneo's Galliformes, and some of these are believed to be the sites of conservation projects at present. The relative merits of each site need to be considered, so that priorities

Assessing conservation priorities for forest Galliformes on Borneo

can be established and additional conservation measures proposed if possible. Where there is an existing conservation effort, it may be appropriate to promote more consideration for the Galliformes. Where there are no such programmes, the first step is likely to be the completion of baseline surveys.

As the distribution and habitat requirements of Borneo's birds are still so poorly known, a list of priority sites for surveys will need to be compiled so that initially one or two key areas are investigated. Such surveys should be broad-based, covering the whole spectrum of the forest avifauna, although focusing on the Galliformes and other threatened species (*e.g.* raptors, hornbills and some pigeons). Apparent tolerance of habitat degradation by the target species should be evaluated whenever possible. As the Bornean peacock pheasant is clearly very rare and difficult to detect (Holmes 1989), surveys for it need to be carefully targeted. Surveys should involve the playback of recorded calls from the closely related Malaysian *P. malacense* and Palawan *P. emphanum* peacock-pheasants. The areas for which further information on both distributions and conservation initiatives is required include:

1. Tanjung Puting National Park (3,050 km²). This swamp forest in Kalimantan has been surveyed before (Nash and Nash 1988), but more work is required.
2. Gunung Palung Nature Reserve (1,000 km²). This area of west Kalimantan contains swamp and hill forest that has been surveyed recently but the results are not yet published.
3. Gunung Betuang/Karimun (6,000 km²). This hill forest in west Kalimantan, along its border with Sarawak, has not yet been surveyed.
4. Bukit Raya/Baka Reserves (6,900 km²). These adjoining reserves in central Kalimantan contain about 2,000 km² of hill and submontane forest, which has been little explored (van Balen and Holmes 1993), although Rice (1989) conducted a brief reconnaissance survey.
5. Ulu Barito. Part of this area has been surveyed by Wilkinson *et al* (1991). It is close to the type locality of the Bornean peacock-pheasant and is not a protected area.
6. Kutai National Park (2,000 km²). This lowland area lies on the east coast of Kalimantan, contains forests suffering various levels of disturbance (van Balen and Holmes 1993), and has been severely damaged by fire. The area was surveyed by Pearson (1975).
7. Sungei Kayan-Mentarang Nature Reserve (16,000 km²) and proposed Sembakung extension (5,000 km²). Reconnaissance surveys of this hill forest on the Kalimantan side of its border with Sarawak are underway (van Balen *in litt.*). The forest is expected to contain many Bornean montane endemics.
8. Long Bangun. This site in Kalimantan contains both lowland and hill forest which is presumed to be heavily logged. Nothing is known of the area.
9. Hutan Kapur/Sang Kulirang (2,000 km²). This area consists of a series of limestone karst blocks and has been proposed as a protected area. The area could be particularly important for Galliformes of adjacent footslope forest.

Assessing conservation priorities for forest Galliformes on Borneo

10. Kapit. This area in the Rajang watershed of Sarawak contains lowland forest that may be inhabited by the Bornean peacock-pheasant, but this requires confirmation.

11. Bario/Baram. The Bornean peacock pheasant is reported to occur in forest between the Baram River and Bario, but this requires confirmation.

12. Danum Valley Conservation Area. North Kalimantan and eastern Sabah may well contain the richest avifauna on Borneo. Both Danum Valley and the core of the Tabin Reserve should be surveyed for Galliformes, especially the Bornean peacock-pheasant.

Timescale: Six months for data compilation; one year each for two survey projects

Contacts: B. van Balen, G. Davison, D. Holmes, P. McGowan, D. Wells

Further reading:

van Balen, B. 1992. Distribution, status and conservation of the forest partridges in the Greater Sundas (Indonesia). In: Perdix VI, First International Symposium on Partridges, Quails and Francolins, Fordingbridge, U.K., Gibier Faune Sauvage 9: 561-569.

van Balen, B. and Holmes, D.A. 1993. Status and conservation of pheasants in the Greater and Lesser Sundas, Indonesia. In: Jenkins, D. (ed.), Pheasants in Asia 1992, pp. 40-49. World Pheasant Association, Reading, U.K.

Collar, N.J., Crosby, M.J. and Stattersfield, A.J. 1994. Birds to Watch 2. The World List of Threatened Birds. BirdLife Conservation Series No. 4. BirdLife International, Cambridge, U.K.

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Nash, S.V. and Nash, A.D. 1988. An annotated checklist of the birds of Tanjung Puting National Park, central Kalimantan. Kukila 3: 93-116.

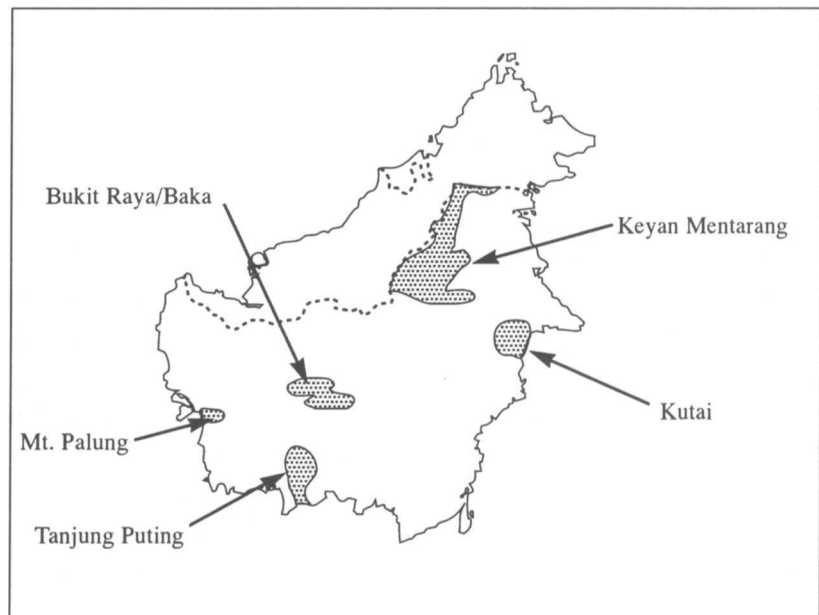
Pearson, D.L. 1975. A preliminary survey of the birds of the Kutai Reserve, Kalimantan Timur, Indonesia. Treubia 28: 157-162.

Rice, C.G. 1989. A further range extension of the black-breasted thrush *Chlamydochaera jeffreyi*. Kukila 4: 47-48.

Smythies, B.E. 1957. An annotated checklist of the birds of Borneo. Sarawak Museum Journal VII, 9: 523-818.

Wilkinson, R., Dutson, G. and Sheldon, B. 1991. The Avifauna of Barito Ulu, Central Borneo. ICBP Study report No. 48. International Council Bird Preservation [BirdLife International], Cambridge, U.K.

See also: Sections 3.4.4, 3.5.3, 3.6.7/9/17



Protected areas on Borneo

Impact of forest exploitation on western tragopan

Mace-Lande threat status: Vulnerable

Aim: To determine how forest exploitation by local people affects the status of the western tragopan and other pheasants.

Justification: The western tragopan *Tragopan melanocephalus* seems only to inhabit temperate coniferous forest with dense understorey cover (Islam and Crawford 1986,1987, Gaston *et al.* 1983, Duke 1990). These have been subject to exploitation for fuel wood, construction timber, bamboo, medicinal plants and fungi for centuries, but over the past 150 years clear-felling for commercial timber production has completely destroyed vast tracts of its habitat (Garson and Gaston 1989, V. Sharma *in litt.*). Recent surveys indicate that the harvesting of fungi and livestock grazing take place particularly during the breeding period for this species, other pheasants (*e.g.* Himalayan monal *Lophophorus impejanus*, koklass *Pucrasia macrolopha*), and large mammals (*e.g.* musk deer *Moschus chrysogaster*) with which they share the forest floor. The effects of these activities on the western tragopan and other sensitive species in its habitat require proper study. As the human population in remote hill areas continues to rise, it is unlikely that substantial areas of primary habitat will be given



Western tragopan

Artist: T. Greenwood



Western Himalayan temperate forest

Photo: P. Garson

total protection from human impact. The way ahead is to manage the use of natural resources by local people in harmony with the requirements of sensitive species of wildlife such as the pheasants.

Project description: The Palas valley in North West Frontier Province, Pakistan contains the largest known population of the western tragopan, and is the site of the Himalayan Jungle Project (1991-95), a major sustainable development programme being

Impact of forest exploitation on western tragopan

undertaken with the active cooperation of the local people (Duke 1993). Uniquely in this area, therefore, it should be possible to study the western tragopan and other pheasants effectively, whilst simultaneously monitoring a pattern of local forest resource use. During April-June, western tragopan males call often, and counting their calling points can be used as a population indexing method (Duke 1990). Breeding success by tragopans should be measurable by searching for family parties with trained dogs in order to count mature chicks in early autumn. More data could be collected at the same time on Himalayan monal and koklass pheasant. To broaden the scope of this study, other areas nearby that are experiencing more disruptive exploitation of their forest habitats should be monitored in the same way. All the results will be of direct use in indicating how forest resources can be managed in ways that will both sustain the local human population and maintain pheasant and other wildlife populations.

Timescale: Three years

Contacts: G. Duke, P. Garson

Further reading:

- Duke, G. 1990. Using call counts to compare western tragopan populations in Pakistan's Himalaya. In: Hill, D.A., Garson, P.J. and Jenkins, D. (eds.) Pheasants in Asia 1989, pp. 116-123. World Pheasant Association, Reading, U.K.
- Duke, G. 1993. A participatory approach to conservation in Pakistan. Safeguarding the tragopans and forests of the Palas valley, Indus Kohistan. In: Jenkins, D. (ed.) Pheasants in Asia 1992, pp. ii-vi. World Pheasant Association, Reading, U.K.
- Garson, P.J. and Gaston, A.J. 1989. The conservation of forests and wildlife in Himachal Pradesh. In: Allchin, B., Allchin, F.R. and Thapar, B.K. (eds.), Conservation of the Indian Heritage, pp. 39-54. Cosmo Publications, New Delhi, India.
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- Islam, K. and Crawford, J.A. 1987. Habitat use by western tragopans *Tragopan melanocephalus* (Gray) in northeastern Pakistan. *Biological Conservation* 40: 101-115.

See also:

Section 3.6.1; Project 4.7.2



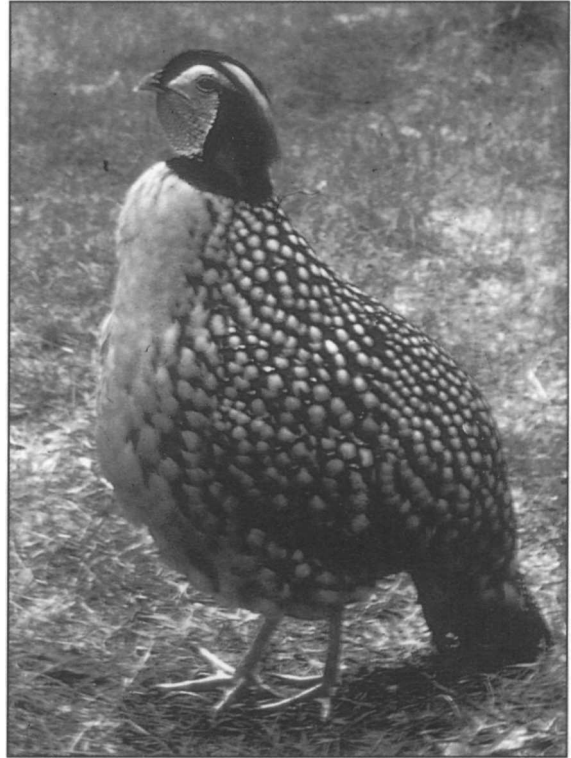
Location of the Palas Valley in Pakistan

Ecology and conservation of Cabot's tragopan

Mace-Lande threat status: Vulnerable

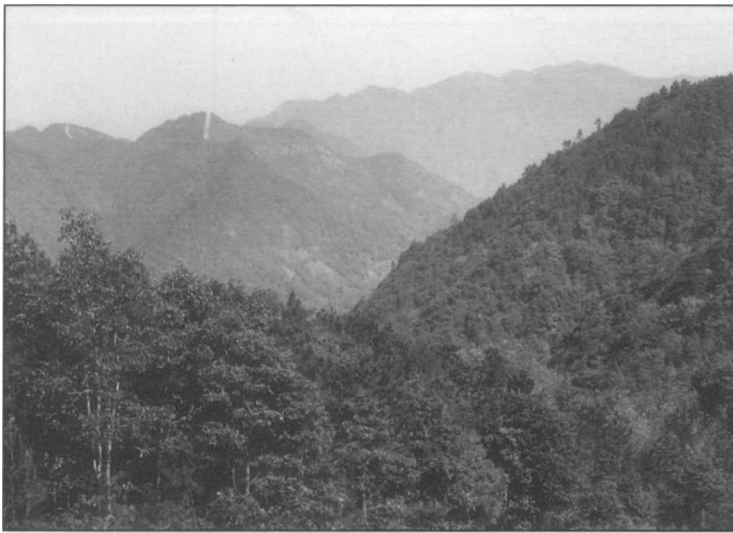
Aim: To determine the distribution of populations of Cabot's tragopan, and to monitor its ecological requirements throughout the year, in order to provide sufficient protected areas and to manage them for its survival.

Justification: There is evidence of a dramatic contraction in the range of Cabot's tragopan *Tragopan caboti* over the past 15 years, especially in Fujian province (Zheng Guang-mei and Zhang Zheng-wang 1993), as deforestation and agricultural expansion continue to remove its low altitude (800-1,400 m) woodland habitats. This pheasant currently occurs in a few small and isolated protected areas in Jiangxi, Zhejiang, Hunan and Guangxi provinces in eastern China. These need to be managed carefully if the species is to be saved from extinction. However, more needs to be known about how this species uses its habitats throughout the year before sound management recommendations can be made.



Cabot's tragopan
Photo: J. Howman

Project description: Further surveys are required, particularly in Guangxi and Fujian, where its forest habitats are under the greatest threat. Populations of this species living in protected areas should be monitored annually by repeatedly counting the dawn calling sites of males from fixed points in March and April (Duke 1990), and by driving strips of forest with the aid of dogs in October and November. Following pilot studies of a few radio-tagged birds in Wuyanling Natural Reserve (Young *et al.* 1991, Sun Yue-hua and Zheng Guang-mei 1992, Ding Chang-qing and Zheng Guang-mei 1993), further intensive research should be carried out at other sites, in order to produce management recommendations for the protected areas holding significant populations, and to Calibrate estimates of



Cabot's tragopan habitat at Wuyanling, Zhejiang
Photo: Ding Chang-qing

Ecology and conservation of Cabot's tragopan

density based on counts of calling males in spring. Efforts should also be made to assess the ability of this bird to live in secondary forest habitats. Whenever possible, study sites should be chosen where the threatened Elliot's pheasant *Syrmaticus ellioti* and Darwin's koklass *Pucrasia macrolopha darwini* also occur. Any management recommendations should be broadened to include the needs of all three pheasant species, as well as other species of large ground-based wildlife.

Timescale: Five years

Contact: Liu Xiao-hua, Zheng Guang-mei

Further reading:

Ding Chang-qing and Zheng Guang-mei 1993. A radio-tracking study of habitat selection and movements by Cabot's tragopan in the 1991 breeding season. In: Jenkins, D. (ed.), Pheasants in Asia 1992, pp.76-79. World Pheasant Association, Reading, U.K.

Duke, G. 1990. Using call count surveys to compare western tragopan populations in Pakistan's Himalaya. In: Hill, D.A., Garson, P.J. and Jenkins, D. (eds.), Pheasants in Asia 1989, pp. 116-123. World Pheasant Association, Reading, U.K.

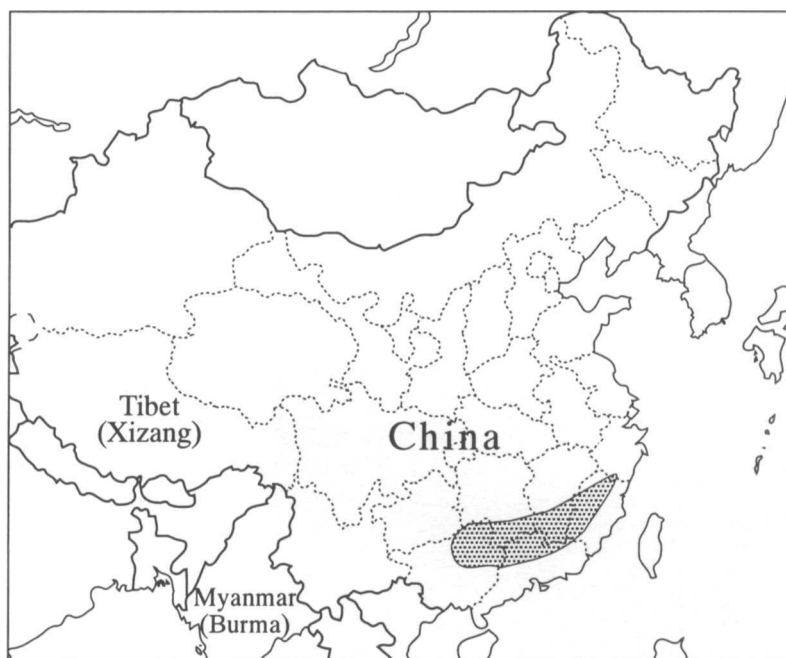
Sun Yue-hua and Zheng Guang-mei 1992. A radio-tracking study of home range characteristics and behaviour of Cabot's tragopan. In: Priede, I.G. and Swift, S.M. (eds.), Wildlife Telemetry: Remote Monitoring and Tracking of Animals, pp. 622-627. Ellis Horwood, Chichester, U.K.

Young, L. Zheng Guang-mei, and Zhang Zheng-wang 1991. Winter movements and habitat use by Cabot's tragopan in southeastern China. *Ibis* 133: 121-126.

Zheng Guang-mei and Zhang Zheng-wang 1993. Distribution and status of pheasants in China. In: Jenkins, D. (ed.), Pheasants in Asia 1992, pp. 15-19. World Pheasant Association, Reading, U.K.

See also:

Sections 3.6.3/12, 3.8.2; Projects 4.6.7, 4.7.2



Proposed survey area for Cabot's tragopan

Ecology and conservation of Chinese monal

Mace-Lande threat status: Vulnerable

Aim: To conduct surveys of distribution and habitat use by the Chinese monal and assess the nature and extent of hunting and habitat disturbance, with a view to suggesting how to provide better conditions for this species both inside and outside protected areas.

Justification: The Chinese monal *Lophophorus lhuysii* lives near the tree line in the mountains of south central China (He Fen-qi *et al.* 1988), often in areas also holding the vulnerable white eared-pheasant *Crossoptilon crossoptilon* and orange-collared koklass *Pucrasia macrolopha ruficollis*. The high altitude conifer forests and subalpine scrub that these pheasants inhabit at different times of the year are being degraded by grazing herds of yak, with hunting and herb collecting causing more disturbance in some places (He Fen-qi *in litt.*, D. Rimlinger *in litt.*). The effects of these activities need to be measured, in order to determine how human activity might be better regulated, especially inside protected areas containing populations of this pheasant.



Chinese monal
Artist: E. Hudson

Project description: Extensive surveys should be carried out in the area to the north of its present known range (Zheng Guang-mei and Zhang Zheng-wang 1993) where it is supposed to have occurred in the past. At all sites visited, index measures of pheasant abundance should be obtained from call counts and encounter rates with birds on walked trails, and observations made on the type and intensity

of human impacts, including hunting if possible. If new and relatively undisturbed areas can be found, they should be recommended as protected areas for this species. Comparisons between areas with different densities of birds and various levels of disturbance should enable some recommendations to be made about how to reduce the impact of human activities.



Chinese monal habitat, Sichuan
Photo: He Fen-qi

Ecology and conservation of Chinese monal

Timescale: June-August for five years

Contacts: He Fen-qi

Further reading:

Bell, C. 1995. Tracking the elusive monal. *ZooNooz* 68(4): 8-13 [published by the Zoological Society of San Diego, U.S.A.].

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.

Zheng Guang-mei and Zhang Zheng-wang 1993. The distribution and status of pheasants in China. In: Jenkins, D. (ed.), *Pheasants in Asia* 1992, pp. 15-19. World Pheasant association, Reading, U.K.

See also:

Sections 3.6.4/10, 3.8.3; Project 4.5.2

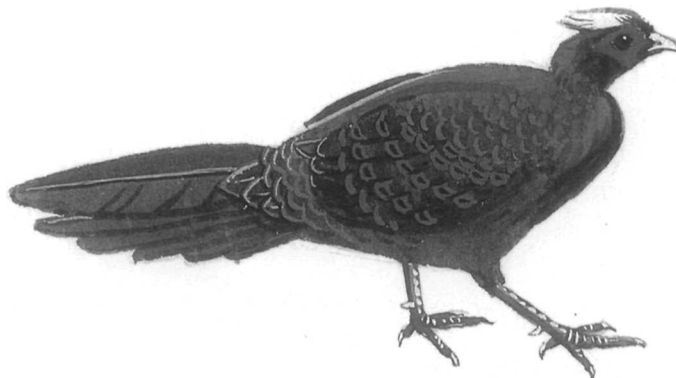


Proposed survey area for Chinese monal

Conservation of imperial, Edwards's and Vietnamese pheasants

Mace-Lande threat status: All critical

Aim: To identify and develop protected areas containing the three critically threatened pheasants and other Galliformes species native of the Annamese lowlands of Vietnam.



Edwards's pheasant Artist: E. Hudson

Justification: The imperial *Lophura imperialis*, Edwards's *L. edwardsi* and Vietnamese *L. hatinhensis* pheasants are all endemic to a small area of central Vietnam, within Endemic Bird Area D19 (Annamese Lowlands; ICBP 1992). Recently all previously known localities have been mapped and many areas re-visited (Eames *et al.* 1992, Robson *et al.* 1993, Lambert *et al.* 1994). These surveys indicate that the imperial and Vietnamese pheasants still occur in the wild, but they produced no evidence of Edwards's pheasant. Three other threatened pheasants (Siamese fireback *L. diardi*, Annamese silver pheasant *L. nycthemera annamensis*, and crested argus *Rheinardia ocellata*) are also known to occur in this area (Nguyen Cu and Eames 1993), together with the endangered Annamese hill-partridge *Arborophila merlini* (McGowan *et al.* 1995). There are still a number of areas containing remnant forest fragments that need to be surveyed in this area.



Vietnamese pheasant habitat
Photo: J. Eames/BirdLife

Project description: This project should seek to build upon work already initiated by the the Forest Inventory and Planning Institute in Hanoi with BirdLife International. The project has three main objectives:

1. To evaluate sites and establish protected areas within the Annamese Lowlands Endemic Bird Area. Protected areas exist or are proposed at Vu Quang and Bach Ma National Park in Ha Tinh Province, and at Phong Nha in Quang Binh and Thua Thien Hue Provinces, but further work is required in Ha Tinh, Quang Binh and Nghe An Provinces. There are

Conservation of imperial, Edwards's and Vietnamese pheasants

also areas of forest remaining in southern Thua Thien Hue and southern Quang Tri Provinces, in which there is some chance of still finding Edwards's pheasant in the wild.

2. To prepare management plans for the Net River watershed in Quang Binh Province, and the forests near Ke Go Lake in Ha Tinh Province, where both the imperial and Vietnamese pheasants still seem to occur together, although under serious threat from trapping and habitat loss. These management plans should focus on promoting the wise use of forest resources and agricultural practices that are sympathetic to wildlife.

3. To initiate an education programme designed to raise conservation awareness of local people in and around these crucial areas.

Meanwhile the captive populations of Edwards's and Vietnamese pheasants should be subject to the highest possible standards of management in order to minimise loss of genetic diversity, the effects of unintentional artificial selection, and the involvement of birds suspected of having hybrid *Lophura* parentage.

Timescale: Five years for an initial phase

Contacts: J. Eames, Nguyen Cu

Further reading:

Eames, J.C., Robson, C.R., Nguyen Cu and Truong Van La 1992. Forest bird

surveys in Vietnam. ICBP Study Report No. 51. International Council for Bird Preservation [BirdLife International], Cambridge, U.K.

ICBP 1992. Putting Biodiversity on the Map: Priority Areas for Global Conservation. International Council for Bird Preservation [BirdLife International], Cambridge, U.K.

Lambert, F.R., Eames, J. and Nguyen Cu 1994. Surveys for Endemic Pheasants in the Annamese Lowlands of Vietnam, June-July 1994: Status and Conservation Recommendations for Vietnamese Pheasant *Lophura hatinhensis* and Imperial Pheasant *L. imperialis*. IUCN Species Survival Commission, Gland, Switzerland and Cambridge, U.K.

McGowan, P.J.K., Dowell, S.D., Carroll, J.P. and Aebischer, N.J. 1995. Status Survey and Conservation Action Plan 1995-99. Partridges, Quails, Francolins, Snowcocks and Guinea-fowl. IUCN, Gland, Switzerland.

Nguyen Cu and J.C. Eames. 1993. The distribution and status of pheasants in Vietnam. In: Jenkins, D. (ed.), Pheasants in Asia 1992, pp. 20-27. World Pheasant Association, Reading, U.K.

Robson, C.R., Eames, J.C., Nguyen Cu and Truong Van La 1993. Further records of birds from Viet Nam. Forktail 8: 25-52

See also:

Sections 3.4.1/2/3, 3.5.9, 3.6.8, 3.8.6; Project 4.7.4



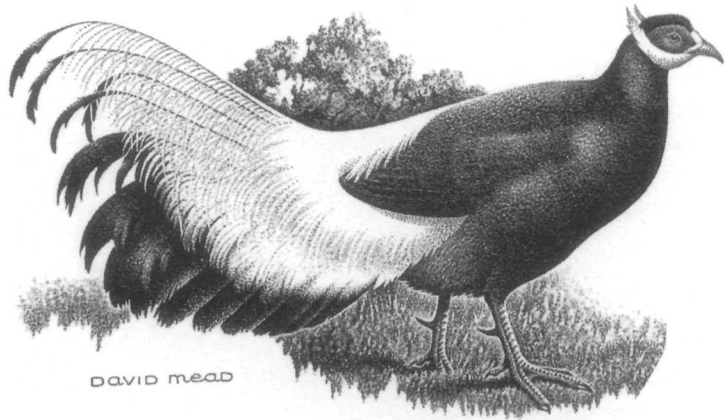
Vietnam, showing the area covered by the Annamese Lowlands Endemic Bird Area

Ecology and conservation of brown eared-pheasant

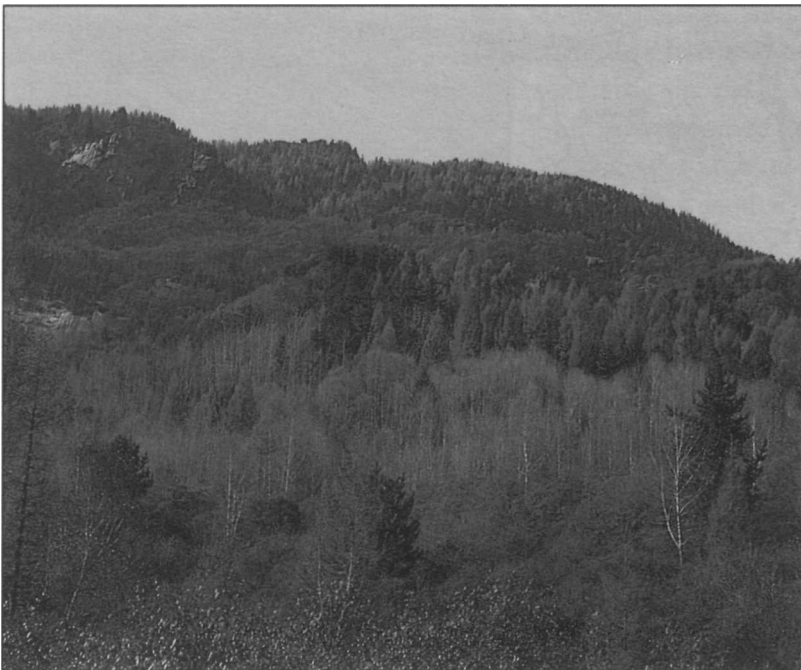
Mace-Lande threat status: Endangered

Aim: To monitor changes in existing populations, and to describe the ecological requirements of this species throughout the year, so that protected areas can be better managed for its benefit.

Justification: The brown eared-pheasant *Crossoptilon mantchuricum* now only occurs in six small and separate localities, four of which are protected areas (Zheng Guang-mei and Zhang Zheng-wang 1993). There are no reliable estimates of numbers in these places, but the whole wild population could be as small as 1,000 individuals. At present there is no established technique for assessing differences in population density between localities or through time, and there has been little detailed study of the ecological requirements of this species (Ren Jian-qiang and Hu Yue 1990, Li Xiang-tao and Liu Ru-sun 1993, Li Xiang-tao 1995). Detailed research into both is required in order to produce reliable management guidelines for its future conservation.



Brown eared-pheasant Artist: D. Mead
Reproduced from *Pheasants, Partridges and Grouse* by kind permission of Christopher Helm (Publishers) Ltd.



Forest at Pangquangou, Shanxi Photo: P. Garson

Project description: Annual population surveys should be carried out at all the known sites. Counts of calling males should be made in early spring (April-May) when they are at their most vocal, and flocks should be located and counted in autumn (November-December), to provide relative density measurements for various habitat types. A live-trapping and banding programme should be undertaken at one site in order to calibrate these index measures against actual population density. Some banded birds of both sexes should also be radio-tagged in order to obtain detailed information on habitat use patterns and the causes of breeding failure.

Ecology and conservation of brown eared-pheasant

Timescale: Three years

Contacts: Li Xiang-tao, Zhang Zheng-wang

Further reading:

Li Xiang-tao 1995. Recent research on brown eared-pheasants at Dongling Mountain, Beijing. In: Jenkins, D. (ed.), Annual Review of the World Pheasant Association 1993/94, pp. 35-38. World Pheasant Association, Reading, U.K.

Li Xiang-tao and Liu Ru-sun 1993. The Brown Eared Pheasant. International Academic Publishers, Beijing, China.

Ren Jiang-qiang and Hu Yue 1990. Habitat selection and feeding behaviour of the brown eared pheasant. In: Hill, D.A., Garson, P.J. and Jenkins, D. (eds.), Pheasants in Asia 1989, p. 78. World Pheasant Association, Reading, U.K.

Zheng Guang-mei and Zhang Zheng-wang 1993. The distribution and status of pheasants in China. In: Jenkins, D. (ed.), Pheasants in Asia 1992, pp. 15-19. World Pheasant Association, Reading, U.K.

See also:

Section 3.5.5



Location of brown eared-pheasant study areas

Habitat management for cheer pheasant

Mace-Lande threat status: Vulnerable

Aim: To determine how best to manage hill grasslands as permanent habitats for the cheer pheasant.

Justification:

The cheer *Catreus wallichi* is unusual as a pheasant: rather than inhabiting forest like most of its relatives, it lives mainly in hill grasslands well below the tree line. These grasslands are successional, and numerous areas recently found to hold small populations are regularly disturbed by grass cutting, livestock grazing and stubble burning (Garson *et al.* 1992). There is also a suggestion that the cheer



Male cheer pheasant and chick
Photo: M. Ridley

cannot occupy ground that has been planted with the fire-resistant chir pine (*V. Sharma in litt.*), a widespread practice of the forestry authorities in the Indian states of Himachal Pradesh and Uttar Pradesh, which hold most of the known sites for this species at present. The sedentary, social and noisy habits of this bird, combined with its open habitats, make it exceptionally vulnerable to shooting. Most known populations are very small (<10 birds) and isolated, living in restricted patches of suitable habitat. Continuing agricultural encroachment, re-forestation and soil erosion from steep slopes seem set to reduce the amount of suitable habitat available for this bird in future.



Cheer pheasant habitat northern India
Photo: P. Garson

Project description: More than 30 recent sites for this species (Sharma and Pandey 1989, Sharma *et al.* 1990) will be revisited to assess cheer status, and collect data on the current management regime operated by the forestry authorities and the local people. Cheer can be detected efficiently by assessing their responses to broadcast calls, and May/June the density of breeding females can be assessed quite accurately (Young *et al.* 1987). Floristic and vegetation structure surveys will be carried out at each known cheer site, and at a number of other randomly chosen locations not holding a population. Every opportunity should be taken to search for the Indian mountain quail

Habitat management for cheer pheasant

Ophrysia superciliosa, which is only known from old specimens collected from similar habitats in the centre of the cheer pheasant's range (McGowan *et al.* 1995). The results of these surveys should allow the identification of particular habitat types and management practices that are associated with the long term presence of cheer populations. The results should be relatively easy to turn into management recommendations to benefit cheer in protected areas and on village lands, but their implementation will depend on a local education campaign, and the integration of necessary conservation management into local agricultural practices. Initially, management regimes that are introduced should be regarded as trials, the results of which need to be monitored carefully.

Timescale: Three years

Contacts: R. Kaul, V. Sharma

Further reading:

- 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.
- McGowan, P.J.K., Dowell, S.D., Carroll, J.P. and Aebischer, N.J. 1995. Status Survey and Conservation Plan 1995-1999. Partridges, Quails, Francolins, Snowcocks and Guineafowl. IUCN, Gland, Switzerland.
- 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.
- Sharma, V., Garson, P.J. and Khera, S. 1990. Status surveys of cheer and western tragopan in Shimla Hills of Himachal Pradesh. In: Hill, D.A., Garson, P.J. and Jenkins, D. (eds.), *Pheasants in Asia* 1989, pp. 139-141. World Pheasant Association, Reading, U.K.
- Young, L., Garson, P.J. and Kaul, R. 1987. Calling behaviour and social organisation in the cheer pheasant: implications for survey technique. *Journal of the World Pheasant Association* 12:30-43.

See also:

Section 3.6.11



Cheer pheasant survey area in northern India

Ecology and conservation of Elliot's pheasant

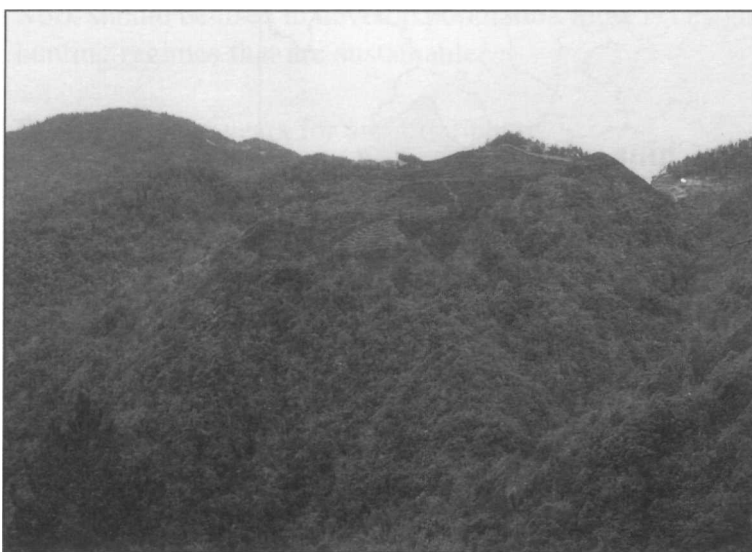
Mace-Lande threat status: Vulnerable

Aim: To establish the current distribution of Elliot's pheasant and determine its ecological requirements, so that a series of protected areas can then be managed for its conservation.

Justification: Elliot's pheasant *Syrnaticus ellioti* occurs in low altitude evergreen broadleaved and mixed forest, in the densely populated provinces of eastern China (Ding Ping and Zhuge Yang 1990). Deforestation and agricultural expansion have removed much of its habitat below 800 m, and it is hunted widely (Ding Ping *in litt.*). Although it is currently believed to occur throughout its supposed historical range, as well as to the west of it (Zheng Guang-mei and Zhang Zheng-wang 1993), these impacts, if not controlled, are expected to remove it from a large proportion of this area in the next decade. Thus there is a need to manage existing protected areas holding this species, and to set up more reserves if suitable areas can be found. Intensive research into its ecological requirements is also needed so that management recommendations can be made for these and other areas in an effort to secure the future of this species.



Elliot's pheasant Photo: J. Howman



Elliot's pheasant habitat, Wuyanling, Zhejiang
Photo: Ding Chang-qing

Project description: All existing sites should be mapped, so allowing any additional forested areas that might hold significant populations of this species to be identified. Surveys should then be carried out in these places, for this species and three other vulnerable pheasants with which it shares its range and habitats (Cabot's tragopan *Tragopan caboti*, Darwin's koklass pheasant *Pucrasia macrolopha darwini* and Reeves's pheasant *S. reevesii*). Several key populations of Elliot's pheasant should be monitored annually by walking fixed transects. Intensive research should be undertaken

Ecology and conservation of Elliot's pheasant

throughout the year in at least one site thought to be typical for the species, in order to discover which habitats are used in the different seasons and to determine the circumstances in which successful breeding can take place.

Timescale: Three years

Contacts: Ding Ping

Further reading:

Ding Ping and Zhuge Yang 1990. The ecology of Elliot's pheasant in the wild. In: Hill, D.A., Garson, P.J. and Jenkins, D. (eds.), Pheasants in Asia 1989, pp. 65-68. World Pheasant Association, Reading, U.K.

Zheng Guang-mei and Zhang Zheng-wang 1993. The distribution and status of pheasants in China. In: Jenkins, D. (ed.), Pheasants in Asia 1992, pp. 15-19. World Pheasant Association, Reading, U.K.

See also:

Sections 3.5.7, 3.6.3/12, 3.8.2;

Projects 4.6.2/9



Areas for surveys of Elliot's pheasant

Ecology and sustainable use of copper pheasant

Mace-Lande threat status: ? (insufficient information)

Aim: To assess variations in population density and productivity in copper pheasant populations in Japan, in order to make recommendations for their sustainable management for hunting.

Justification: The five copper pheasant *Syrmaticus soemmerringii* subspecies are widely shot for sport on the three main islands in the south of Japan (Yamashina 1976, Maru 1980). This has evidently had a very dramatic effect on their numbers, and they are now hard to find (Brazil 1991). Little is known about the habitat preferences or ecological requirements of this species, which lives in mainly coniferous forests in the north of Honshu, but in broadleaved woodlands on the southern island of Kyushu. Intensive research resembling that conducted over the last 15 years on the ring-necked pheasant *Phasianus colchicus* as a quarry species in U.K. (Hill and Robertson 1988, Hudson and Rands 1988), needs to be replicated with the copper pheasants if they are to survive over large areas in Japan.



Scintillating copper pheasant

Photo: J. Howman

Project description: Quantitative surveys of abundance in relation to habitat variation and hunting pressure, together with research on past hunting records, should be used to indicate the conditions under which populations increase, remain stable or decrease. Intensive studies should then be undertaken to identify the causes of variations in population density and productivity between sites and over time. The effectiveness of artificial rearing for restocking populations also requires investigation. This should involve large trapping, banding or wing-tagging, and radio-tagging programmes. The results of this work should be used to develop population models designed to specify sets of management options and hunting regimes that are sustainable.

Duration: Five years for an initial phase

Contacts: M. Brazil, H. Higuchi, P. Robertson

Further reading:

Brazil, M.A. 1991. *The Birds of Japan*. Christopher Helm, London, U.K.

Hill, D.A. and Robertson, P.A. 1988. *The Pheasant. Ecology, Management and Conservation*. BSP Professional Books, Oxford, U.K.

Hudson, P.J. and Rands, M.R.W. (eds.) 1988. *Ecology and Management of Gamebirds*. BSP Professional Books, Oxford, U.K.

Maru, N. 1980. Hunting and release of pheasants in Japan. In: Savage, C.D.W. (ed.), *Pheasants in Asia 1979*, pp. 96-97. World Pheasant association, Reading, U.K.

Yamashina, Y. 1976. Notes on the Japanese copper pheasant *Phasianus soemmerringii*. *Journal of the World Pheasant Association* 1: 23-42.

See also: Section 3.7.1

Status surveys and habitat requirements of Reeves's pheasant

Mace-Lande threat status: Endangered

Aim: To confirm the distribution of, and study habitat use by, Reeves's pheasant, so that protected areas can be managed more effectively for it.

Justification: Reeves's pheasant *Syrmaticus reevesii* lives at 200-2,600 m in oak and pine forests (Wu Zhi-kang *et al.* 1995) that are being steadily fragmented and removed throughout its range in northern central China and Jiangsu Province. In some places, it shares its habitat with the vulnerable Joret's koklass pheasant *Pucrasia macrolopha joretiana* and Elliot's pheasant *Syrmaticus ellioti*. The habitat requirements of this pheasant in different localities and at different times of year still need to be described in detail, so that the protected areas in which it now survives can be better managed for its conservation.



Reeves's pheasant

Photo: J. Howman



Reeves's pheasant habitat, Tuoda Forest, Guizhou

Photo: Wu Zhi-kang

Project description: Status surveys should be initiated along the northern fringe of its contracting range, and at Dongzhai Natural Reserve and northern Henan in particular, in order to reveal whether there are still additional places that could become protected areas for this pheasant. Systematic population surveys should be used to monitor populations repeatedly at a selection of contrasting sites, in order to describe shifts in habitat preference through the seasons. Intensive studies using radio-transmitters should be undertaken to calibrate survey and monitoring techniques, and to study feeding and breeding ecology in more detail. All relevant research findings should be translated into management recommendations for protected areas.

Status surveys and habitat requirements of Reeves's pheasant

Timescale: Three years

Contacts: Wu Zhi-kang, Li Zhu-mei

Further reading:

Hsu Wei-shu, Wu Zhi-kang and Li Zhu-mei 1990. Current status of the Reeves's or white-crowned long-tailed pheasant in China. In: Hill, D.A., Garson, P.J. and Jenkins, D. (eds.), Pheasants in Asia 1989, pp. 31-32. World Pheasant Association, Reading, U.K.

Wu Zhi-kang, Li Zhu-mei, Yu Zhi-gang and Jang Hong 1993. Studies of Reeves's pheasant in Tuoda Forest, Guizhou, China. WPA News 39: 7-11.

Wu Zhi-kang, Li Zhu-mei and Wang Ji-huai 1995. Progress in research on Reeves's pheasant in China. In: Jenkins, D. (ed.), Annual Review of the World Pheasant Association 1993/94, pp. 39-43. World Pheasant Association, Reading, U.K.

See also:

Section 3.5.7, 3.6.12, 3.8.2;

Project 4.6.7



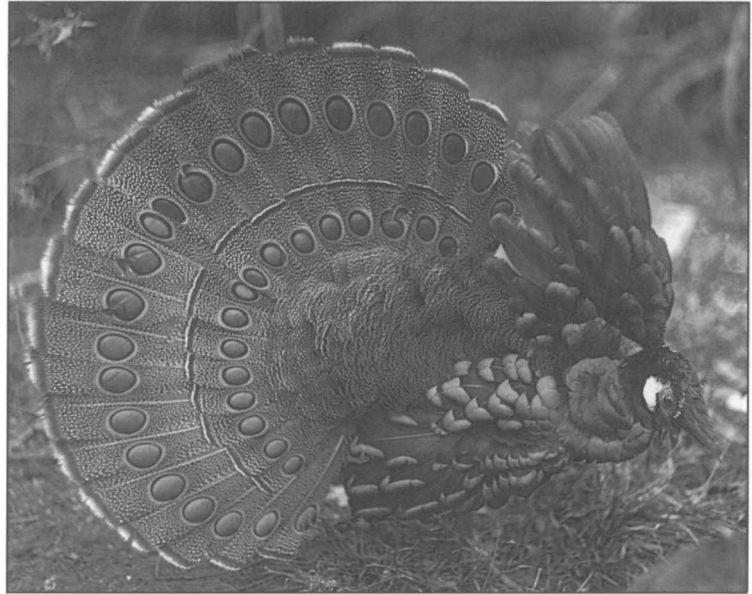
Areas for surveys of Reeves's pheasant

Conservation initiative for Palawan peacock-pheasant

Mace-Lande threat status: Endangered

Aim: To ensure the conservation of the Palawan peacock-pheasant by identifying new localities, promoting the effective protection of all remaining key areas, and raising public awareness.

Justification: Along with other islands in the Philippines, Palawan has lost much of its natural forest (Quinnell and Balmford 1988). As forest clearance continues to proceed rapidly inland from the coastal lowlands, the endemic Palawan peacock-pheasant *Polyplectron emphanum* is becoming increasingly restricted to the island's mountains (McGowan *et al.* 1989). Whilst coastal forest cover in the south of the island is still fairly extensive (W. Oliver *in litt.*), it is likely that, in areas still not affected by logging, other forms of human disturbance (*e.g.* rattan collecting) will be affecting this bird. There are few effectively protected areas of forest on the island, and no systematic survey work has been done since 1987. There are plans to begin granite mining at Iwahig (R. Girdler *in litt.*), an area of undisturbed forest which still held a population in 1987.



Palawan peacock-pheasant
Photo: P. McGowan



Forest habitat on Palawan, Philippines
Photo: P. McGowan

Project description: A comprehensive effort to conserve this species should include the following three approaches:

1. Further surveys. These should cover any forested areas throughout the whole Province (*i.e.* including the islands of Balabac and the Calamians). Priority areas on the main island are the mountains south of Brookes' Point, the western slopes of Mount Victoria, the area behind the Tabon Caves in Quezon, and the whole northern end of the island. Surveys in the south should be conducted in collaboration with staff from the National Museum in Manila, who are

Conservation initiative for Palawan peacock-pheasant

concerned at the lack of any biological work in that area. The history of all sites visited should be documented as there is uncertainty about the suitability of selectively logged and secondary forest for this pheasant.

2. Protected areas. The whole of St Paul's Subterranean River National Park should be searched for the peacock-pheasant. Despite the presence of karst limestone outcrops over 30% of its area, there appear to be areas of good forest that have still not been surveyed recently (R. Girdler *in litt.*). Proposals to mine granite in the Iwahig Penal Colony area should be investigated urgently, and formal protection measures recommended for the forests in this area. If surveys elsewhere in the discovery of other significant populations, consideration should be given to promoting the declaration of further protected areas.

3. Education. An educational initiative, perhaps including the painting of motorised trishaws in Puerto Princesa City, Quezon and Brookes' Point, should be launched in collaboration with the provincial government, with the aim of saving more primary forest, and reducing hunting and the trade in live birds.

Timescale: January-May for two years

Contacts: M. Caleda, R. Girdler, P. McGowan, W. Oliver

Further reading:

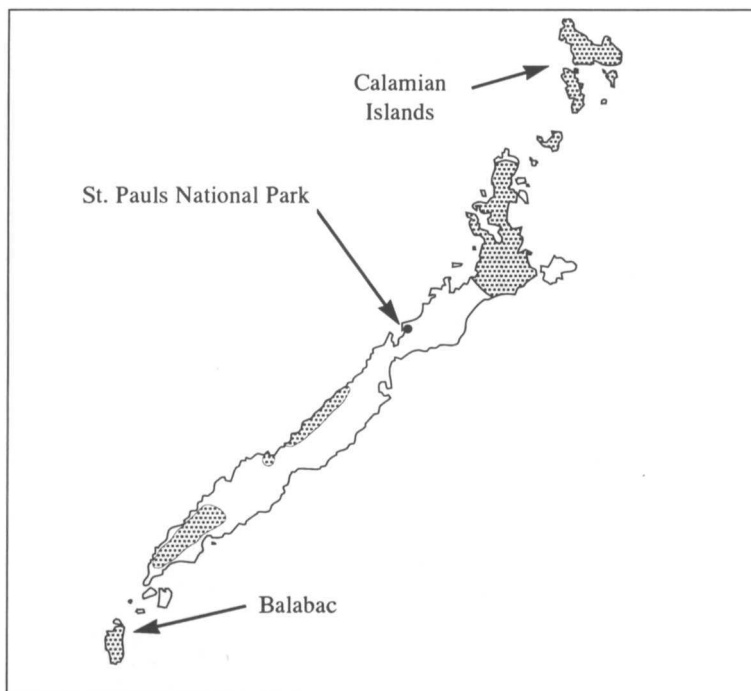
Caleda, M., Lanante, R. and Vilorio, E. 1986. Preliminary studies of the Palawan peacock pheasant. In: Ridley, M. (ed.), Pheasants in Asia 1986. World Pheasant Association, Reading, U.K.

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.

Quinnell, R. and Balmford, A. 1988. A future for Palawan's forests? *Oryx* 22: 30-35.

See also:

Section 3.5.8



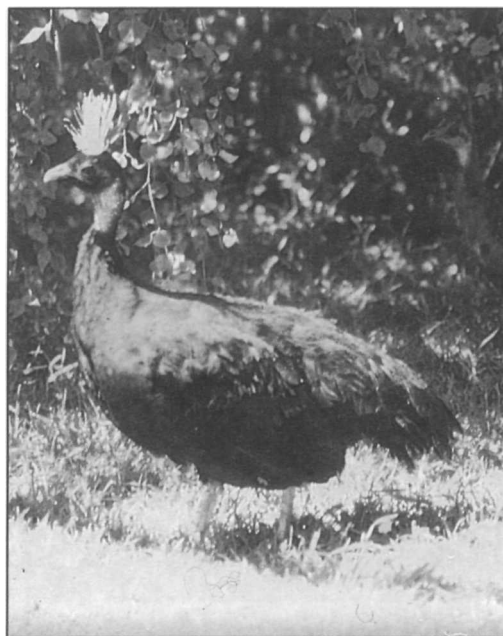
Survey areas for Palawan peacock-pheasant

Status and conservation of Congo peafowl in Zaïre

Mace-Lande threat status: ? (insufficient information)

Aims: To establish the status, distribution and habitat requirements of the Congo peafowl in Zaïre, in order to safeguard its remaining wild populations.

Justification: The Congo peafowl *Afropavo congensis* is the only pheasant native to Africa, and is considered to be quite different from the two peafowls native to Asia and the African francolins and guineafowls (Lovel 1976). First described in 1936, this bird was then only rarely recorded until 13 sites were found during 1989-92 (Hart 1995). The boundary of the lowland tropical rainforest in eastern Zaïre where it is said to have occurred is being pushed northwards, and human exploitation of all accessible parts of this habitat is excessive, not least because of recent refugee problems caused by civil strife in neighbouring Rwanda. The ecological requirements of this species need to be determined as soon as possible, so that appropriate management proposals can be made for protected areas.



Congo peafowl

Photo: J. Howman

Project description: The following specific activities are required initially:

1. A comprehensive survey of local knowledge to find areas in which the species is most likely to survive.
2. Ground surveys of these areas, making full use of the skills of local trackers and hunters.
3. Surveys of the floristics and structure of the forest in places where the bird is present and absent, in a provisional attempt to characterise its preferred habitats.
4. Studies of the nature and extent of different types of human impact that may affect habitat suitability for this species.
5. Selection of specially protected areas to safeguard remaining viable populations, particularly from hunting.

Timescale: Two years initially

Contacts: G. Allport, R. van Bockstaele, D. Bruning

Further reading: Collar, N.J. and Stuart, S.N. 1985. Threatened Birds of Africa and Related Islands: the ICBP/IUCN Red Data Book, Part 1, 3rd Edition. International Council for Bird Preservation [BirdLife International]/IUCN, Cambridge, U.K.

Hart, J.A. 1995. Survey and status of Congo peafowl in eastern Zaïre - progress report (March-June 1994). In: Jenkins, D. (ed.), Annual Review of the World Pheasant Association 1993/94, pp. 44-48. World Pheasant Association, Reading, U.K.

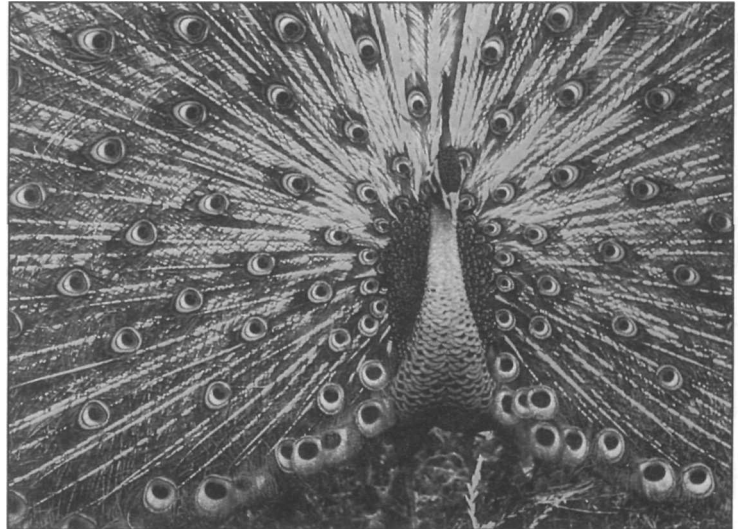
Lovel, T.W.I. 1976. The present status of the Congo peacock. Journal of the World Pheasant Association 1: 48-57.

See also: Section 3.7.2

Conservation of green peafowl

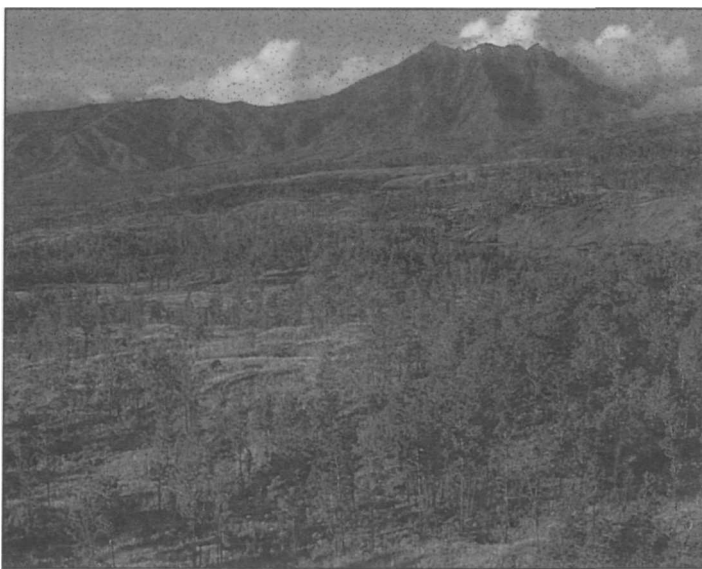
Mace-Lande threat status: Endangered

Aim: To ensure the long term survival of the green peafowl by continuing to search for new sites, assessing relative population densities at key localities, promoting effective conservation measures throughout its range, and initiating the studbook management of captive populations.



Green peacock displaying Photo: J. Howman

Justification: The green peafowl *Pavo muticus* was once widespread throughout Southeast Asia (Hillgarth *et al.* 1986), from northeast India and Yunnan in China, through Thailand and the Malay Peninsula, to Java in Indonesia. It is now presumed to be extinct in Peninsular Malaysia (Davison and Scriven 1987), and the only site left in Thailand is the Hua Kha Khaeng Wildlife Sanctuary in the northwest, where a population of about 300 birds survives (Stewart-Cox and Quinnell 1990). Elsewhere, this species occurs in many small and isolated populations in Java (van Balen *et al.* 1995), and has been found at a few sites in Vietnam (Nguyen Cu and Eames 1993), Laos (Cambridge Survey Team *per* T. Evans and R. Timmins *in litt.*), and several in Yunnan Province in China (Yang Xiao-jun *in litt.*). It might also still survive in Mizoram in India (S.N. Ramanujam *in litt.*).



Green peafowl habitat, Krepevan, Java
Photo: M. Indrawan

Project description: The following activities should be initiated to improve future prospects for this species:

1. Further survey work is required, especially in northeast India and Yunnan, where sites for Burmese bar-tailed pheasant *Syrnaticus humiae burmanicus* should also be sought at the same time.
2. Immediate steps should be taken to reduce the level of hunting to which the species is subjected throughout its range.
3. The potential of captive breeding farms to supply the need for train feathers in

Conservation of green peafowl

traditional Javanese dance costumes, needs to be investigated (van Balen and Holmes 1993).

4. The taxonomic status of the three supposed subspecies needs to be assessed, in order to determine the extent to which independent conservation action is required for each.

5. Intensive studies of marked individuals are required to calibrate call and roost counts against absolute population estimates, to obtain information on the effects of habitat fragmentation on dispersal, and to assess the utility of secondary habitats, such as teak plantations on Java (van Balen *et al.* 1995), to this species.

6. All data should be pooled so that a Population and Habitat Viability Analysis can be carried out to explore the probable outcomes of various forms of conservation management in order to specify the best courses of action for the future (Clark *et al.* 1991).

Timescale: Five years

Contacts: B. van Balen, Nguyen Cu, P. Round, Yang Xiao-jun

Further reading:

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See also:

Sections 3.5.6/10, map page 36; Projects 4.5.4, 4.7.4;

Habitat use and conservation of Hainan silver pheasant and grey peacock-pheasant

Mace-Lande threat status: Both Endangered

Aim: To survey Hainan's remaining forested areas for its two endemic pheasant subspecies, and to monitor their use of different habitats, in order to produce management recommendations for key protected areas.

Justification: The Hainan silver pheasant *Lophura nycthemera whiteheadi* and grey peacock-pheasant *Polyplectron bicalcaratum katsumatae* are distinct endemic subspecies that occur in the island's threatened montane and monsoon forests (Gao Yu-ren 1992, *in litt.*), together with the endangered and endemic white-eared hill-partridge *Arborophila ardens* (McGowan *et al.* 1995). They all depend for their future existence in the wild on the proper management of forested habitats and protection from hunting within four small protected areas. Before management recommendations can be made, there is a need to determine which habitats these birds prefer to use at various times of year at different sites. This project has been planned jointly with the Partridge, Quail and Francolin Specialist Group.

Project description: Surveys to determine the status of these species in all remaining montane and monsoon forest blocks should be undertaken immediately. As neither species is very vocal, population density indices will probably have to be based on flushing birds, possibly using dogs. Work of this kind at selected study plots should provide information on habitat use throughout the year by all three of Hainan's endemic subspecies of Galliformes. It should also allow the habitat mixtures that harbour the densest populations of one or all of them to be identified, leading to habitat management recommendations for key protected areas.

Timescale: Two years

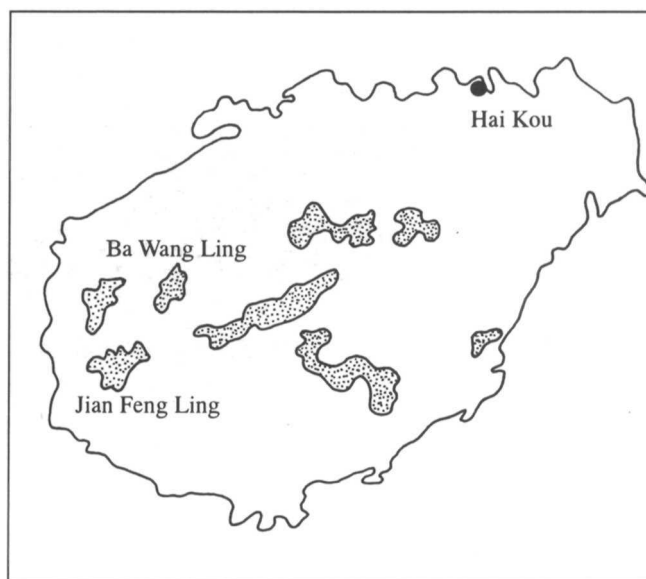
Contacts: Gao Yu-ren

Further reading:

Gao Yu-ren 1992. Present status of the grey peacock pheasant on Hainan Island. *Journal of the World Pheasant Association* 15/16: 104-106.

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See also: Sections 3.8.7, 3.8.10



Areas of forest on for surveys on Hainan Island.

Identification of key areas for the conservation of Asian Galliformes

Aim: To identify systematically the most important areas for the conservation of Galliformes species in Asia, and promote their protection.

Justification: ICBP (1992) has mapped areas throughout the world that are rich in endemic bird species. This analysis is based on the uniqueness of regional bird communities, measured in terms of the number of restricted range (<50,000 km²) bird species occurring at any location. The most important areas of avian endemism, called Endemic Bird Areas, that emerge can be very extensive and may include the whole of a known vegetation type in a particular region, making proposals for their protection unrealistic. For example, the Western Himalayas Endemic Bird Area covers 33,000 km², and the Yunnan Mountains Endemic Bird Area extends to 26,000 km². A pilot study covering Columbia and Ecuador shows that centres of avian endemism overlap very little with existing protected areas (Terborgh and Winter 1983). For conservation on the ground to be effective, therefore, particular sites within the Endemic Bird Areas need to be identified for both survey work and protection measures. Taking this kind of analysis a stage further, Eames and Rands (1993) report that conservation action for 82% of Asia's threatened Galliformes species would also meet the conservation requirements of all the region's other restricted range bird species and many other threatened taxa. Thus using the relatively well known Galliformes species to identify key blocks of habitat within the Endemic Bird Areas will be a powerful way of targeting particular localities for biodiversity conservation initiatives.

Project description: A system should be developed for relating data on the localities from which individual species have been recorded, to information on the distribution of vegetation types, and the location of protected areas, all held by the World Conservation Monitoring Centre (Cambridge, UK). Historical and recent information on the distribution of all Asian Galliformes will be used to assist in both short- and long-term conservation planning for these species and their habitats, with two main objectives:

1. To identify existing protected areas that are important for Galliformes, as well as species not properly covered by the protected area network. Key areas where groups of species occur together will be revealed, and unsurveyed areas at particular altitudes with appropriate habitats, which may hold threatened species, will also be indicated. Thus areas in which immediate action is required will be highlighted.
2. To identify the biological characteristics of species which are prone to extinction. These might include species' range size, vegetation types inhabited, and altitude limits. This might highlight groups of Galliformes species and regions of Asia that will particularly benefit from long-term conservation planning.

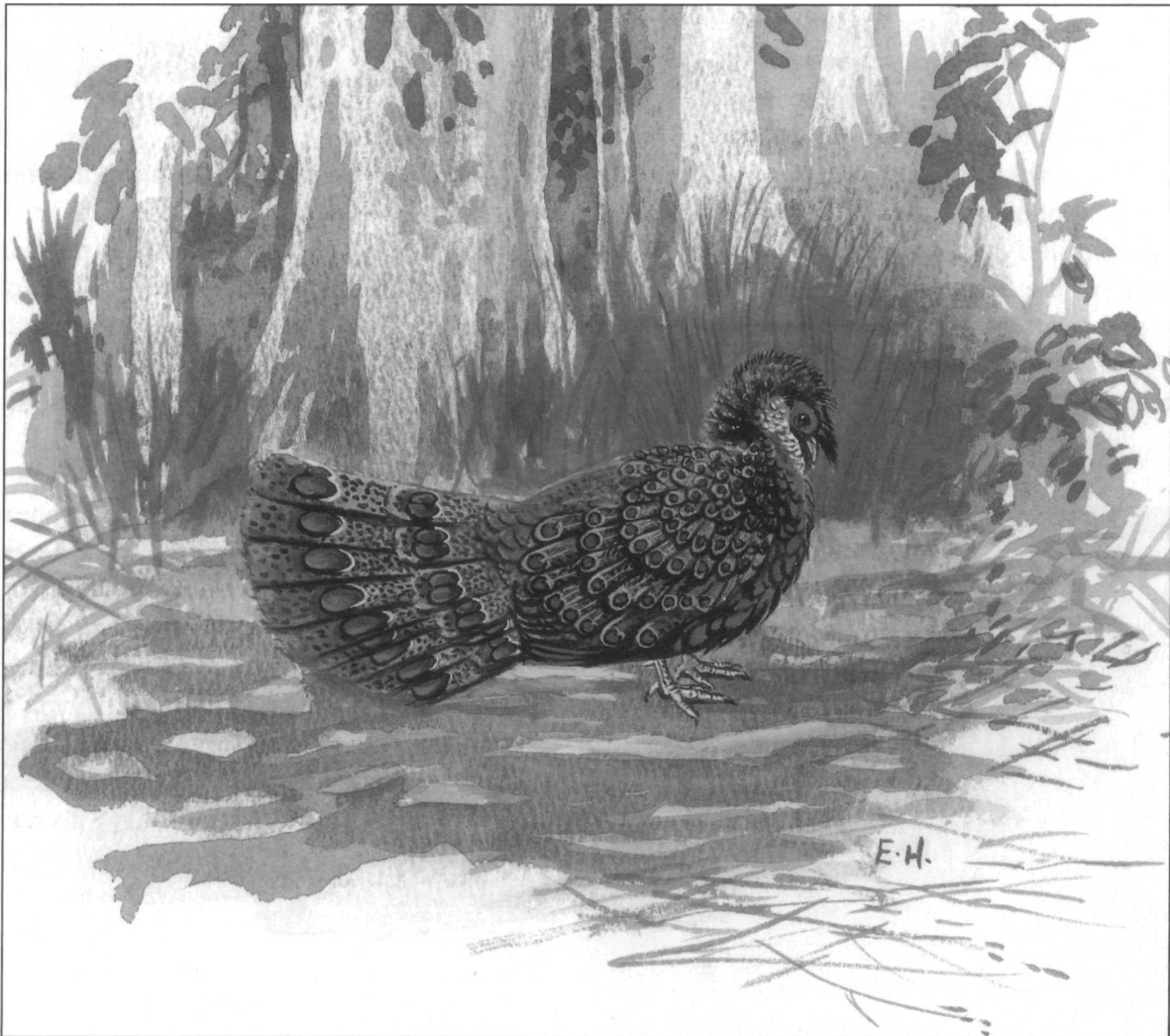
Timescale: Three years

Contacts: P. McGowan

Identification of key areas for the conservation of Asian Galliformes

Further reading:

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Malay peacock-pheasant

Artist *E. Hudson*

Developing methods for using pheasants as forest biodiversity indicators

Aim: To develop precise population indexing techniques for vocal forest pheasants, and to assess their use as indicators of species richness in forested habitats.

Justification: As pheasants are large, ground-based and relatively easy to hunt, they have long been regarded as sensitive indicators of the health of their ecosystems, and of the impact of various forms of forest resource use (e.g. fuelwood, fodder, medicinal plant collection; browsing by domestic livestock; timber extraction). However, most methods used for assessing the relative abundance of pheasants at different times or in different places, remain basic and are of unknown precision. Similarly, it is not known whether these indices of pheasant population density provide any indication of the biological richness of the habitats in which they are measured. Much of the biodiversity contained in forest ecosystems resides in the understorey and leaf litter, but these layers cannot be assessed using satellite imagery because of the obscuring effects of the tree canopy. For the same reason image analysis cannot yield comprehensive information on human impact within such forests.



Koklass pheasant pair Photo: J. Howman



Morrel fungi collected from Western Himalayan forest Photo: P. Garson

Project description: Two types of pheasants that are both vocal and apparently dependent on the presence of dense and undisturbed forest understorey are the five tragopans *Tragopan* spp. and the nine subspecies of koklass pheasant *Pucrasia macrolopha*, which often occur together and have a collective range covering the Himalayas and much of China. This project should aim to develop standard techniques for obtaining abundance indices of known precision, probably from repeated call counts during spring and autumn at a series of sites that have recently experienced different levels of human impact. Species inventories and population counts should be obtained for other taxonomic groups (e.g. higher plants, fungi, soil invertebrates,

Developing methods for using pheasants as forest biodiversity indicators

insects, mammals and other birds) at the same sites, by repeated surveys or collections at different times of year. During the analysis of these data, the objective should be to find ways of predicting overall biodiversity, and objectively measuring levels of human impact, from the pheasant abundance indices. If some predictors can be found, this project will provide new techniques that could be employed quickly and economically to assess the conservation importance of forests over large areas of Asia.

Timescale: Three years

Contacts: G. Duke, P. Garson, Han Lian-xian, He Fen-qi, R. Kaul, V. Sharma, Zheng Guang-mei

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See also: Sections 3.5.1, 3.6.1/2/3, 3.8.2/3; Projects 4.6.1/2



Domestic goats in Western Himalayan forest

Photo: A. Gaston

Trialing different methods of restocking and re-introducing pheasants

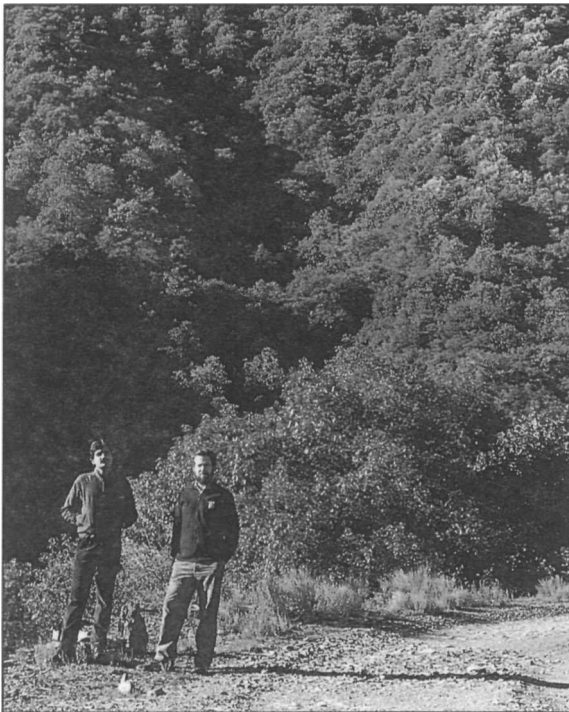
Aim: To investigate the effectiveness of different methods for restocking or re-introducing pheasant populations as techniques for conserving threatened species.

Justification: The successful re-establishment of a threatened species within its native habitat (*i.e.* re-introduction), has proved to be extremely difficult to achieve with any large animals, particularly if the founding individuals are from a captive bred population (Griffith *et al.* 1989). The only substantial attempt so far with a pheasant species, involving eggs laid by captive cheer pheasants *Catreus wallichi* in



White-crested kalij Photo: J. Howman

Europe being sent for hatching, rearing and release in the Margalla Hills National Park in Pakistan, has resulted in only very limited survival and breeding in the wild, despite many years of work (Garson *et al.* 1992). Research on the ring-necked pheasant *Phasianus colchicus* in U.K. has revealed that the rearing conditions imposed on captive bred birds have significant effects on their ability to survive and reproduce successfully after release (Hill and Robertson 1988a, Robertson and Dowell 1990). Although pheasants appear to be good subjects for translocation programmes (Ounsted 1991, IUCN 1995), there is still a great deal of experimental work to be done in order to increase the likelihood of translocations being successful. To be most useful, these trials should be done under the difficult conditions typical of the Asian countries in which projects of this kind may be required to save threatened pheasant species from extinction in future.



Kalij and junglefowl habitat near Shimla, India
Photo: P. Garson

Project description: This work should be carried out using a common and non-threatened species (*e.g.* red junglefowl *Gallus gallus*, kalij pheasant *Lophura leucomelanos*, silver pheasant *L. nycthemera*) in an area of fragmented forest or scrub. Areas containing suitable

Trialing different methods of restocking and re-introducing pheasants

habitats, but lacking pheasant populations, should be found to use as release sites, with founder birds or eggs being taken from local wild populations, as well as from captive collections. Nearby natural populations should be used as controls, against which to measure the performance of restocked or re-introduced populations. The effectiveness of restocking (*Le.* adding individuals to a wild population) as well as re-introduction should be assessed in relation to the different origins of the translocated birds. These trials should also provide an opportunity to test the effectiveness of alternative translocation methods, including the exact method of initial release and the intensity of any post-release management (Beck *et al.* 1994). To allow monitoring of survival and reproduction in both experimental and control sites, translocated and resident birds should be banded or wing-tagged, and some radio-tagged.

Timescale: Three years initially

Contacts: CBSG, P. Garson, G. Mace, RSG

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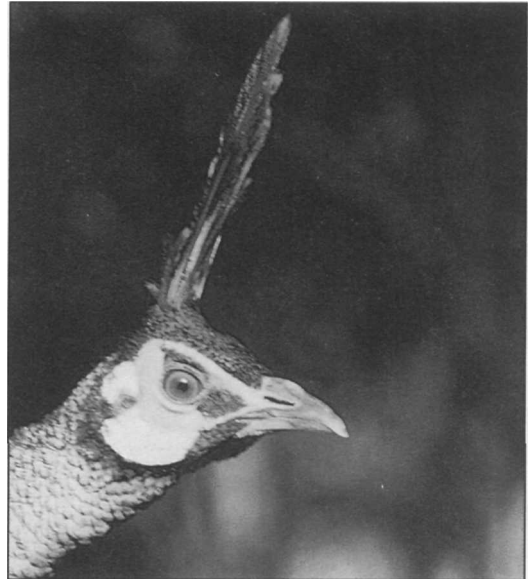
Investigating taxonomic relationships of pheasants using DNA sequence analysis: Vietnamese pheasant and green peafowl

Aim: To assess the validity of the Vietnamese pheasant as a full species, and of the three supposed subspecies of green peafowl.

Justification: Uncertainty about the genetic distinctiveness of taxa at or below the species level complicates conservation planning. Some related subspecies may be as different from each other as other supposed species are, implying that a species conservation approach may not always be appropriate. Among the pheasants there are currently two cases where such uncertainty is important and can be resolved using new techniques for comparing DNA samples (Awise, 1989, Wayne *et al.* 1994, Moritz 1995).

The critically threatened Vietnamese pheasant *Lophura hatinhensis* is widely presumed to be a full species (e.g. Collar *et al.* 1994), despite the male's two central white tail feathers being the only major plumage characteristic distinguishing it from Edwards's pheasant *L. edwardsi*. Recent surveys in the central Annamese lowlands of Vietnam, where Edwards's pheasant was collected in the 1920's (Ciarpaglini and Hennache 1995), have only revealed evidence of Vietnamese pheasant (Robson *et al.* 1993, Lambert *et al.* 1994). However it is believed that there are currently about 1,000 Edwards's pheasants in captivity worldwide (G. Robbins *in litt.*). It is clearly important to establish that these two pheasants are sufficiently different to deserve separate conservation action.

The green peafowl *Pavo muticus* is traditionally regarded as having three subspecies: the Javan *P. m. muticus* of Java (van Balen *et al.* 1995) and Peninsular Malaysia, the Indo-Chinese *P. m. imperator* of southern China, Vietnam, Laos and Thailand, and the Burmese *P. m. spicifer* of Myanmar, Bangladesh and northeast India. The Javan subspecies is the brightest and greenest, whilst the Burmese form is darker and bluer, but this variation is thought to be continuous (Johnsgard 1986). The Javan subspecies is extinct from Malaysia, whilst the Indo-Chinese form only survives at one site in Thailand, and is declining elsewhere. There is no recent information on the Burmese form. Again, it is important to know how distinct these three types are when planning for their long term conservation.



Green peafowl

Photo: K. Howman



Indian peafowl

Photo: J. Howman

Investigating taxonomic relationships of pheasants using DNA sequence analysis: Vietnamese pheasant and green peafowl

Project description: Comparisons of the base-pair sequences in the rapidly evolving parts of mitochondrial DNA provide an objective way of comparing degrees of genetic difference between populations within the same species, by reference to another recognised species that is closely related (*Le.* the control or 'outgroup'). Swinhoe's pheasant *L. swinhoii* from Taiwan and imperial pheasant *L. imperialis*, which is also only recorded from Annam, are suitable outgroups against which to compare sequence differences between Edwards's and Vietnamese pheasants. In the case of the green peafowl subspecies, the Indian peafowl *P. cristatus* is the useful outgroup. Ideally, blood or other fresh tissue samples from numerous individuals in each group are required to provide a sufficient sample from their populations for these DNA tests. To achieve this in these cases it will probably also be necessary to amplify minute and degraded DNA samples from moulted feather shafts collected in the wild, and museum skins.

Timescale: Three years

Contacts: G. Mace, E. Malone

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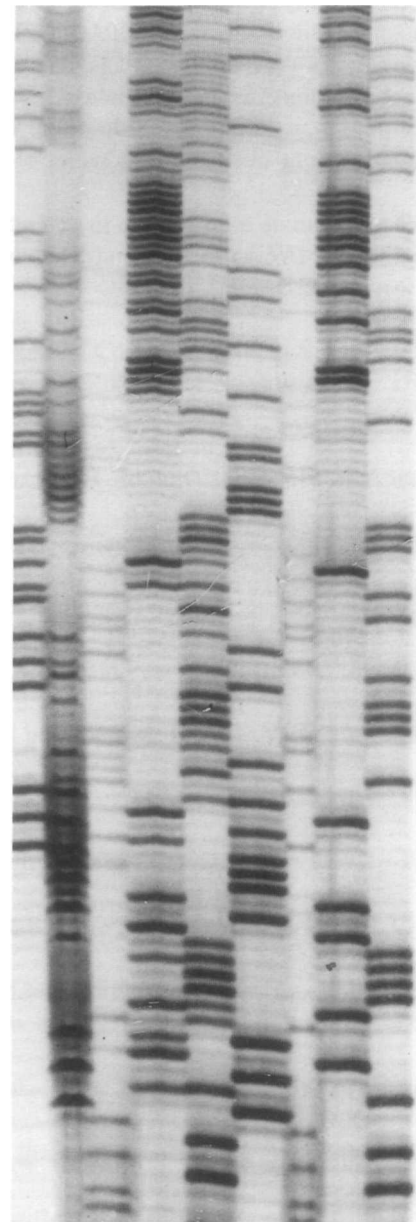
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See also: Sections 3.4.1/2/3, 3.5.10; Projects 4.6.4/12



DNA sequencing gel

Photo: C. Redfern

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