Threatened Birds of Asia:
The BirdLife International Red Data Book

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INTRODUCTION

Red Data Books: context and principles

Red Data Books are documented itemisations of animal and plant taxa formally assessed as being threatened with local or global extinction. The term "Red Data Book" came into existence in the early 1960s when IUCN–The World Conservation Union, in conjunction with ICBP (the International Council for Bird Preservation, now BirdLife International), initiated a programme for the identification and documentation of taxa at global risk of extinction, beginning with mammals and birds. Over the years the IUCN programme expanded to embrace other taxa, and the idea was steadily taken up by nations and regions interested in making similar reviews of taxa at risk of being lost from the areas in question. Today, countless Red Data Books and, in their abbreviated form, Red Lists have come into existence as conservation authorities around the world strive to bring perspective and order to the daunting task of preserving the biological diversity within their areas of responsibility.

With the arrival of *Threatened birds of Asia*, published and launched to coincide with World Environment Day, 5 June 2001, the most populous region of the earth finally receives the study that complements *Threatened birds of Africa and related islands* (Collar and Stuart 1985) and *Threatened birds of the Americas* (Collar *et al.* 1992). These three volumes form consecutive parts of what is the third edition of the international bird Red Data Book, compiled and published by BirdLife International, and follows the first edition dating from the mid-1960s (Vincent 1966–1971) and the second, dating from the late 1970s (King 1978–1979). These two earlier editions were single volumes for the entire planet; the third edition has proceeded on a regional basis, thereby allowing a much greater quantity of high-resolution data to be used, but also consuming a much greater quantity of time per volume.

To compensate for this time-lag, BirdLife has pioneered the "annotated checklist" approach to threatened species documentation, resulting in the two relatively small volumes *Birds to watch* (Collar and Andrew 1988) and *Birds to watch 2* (Collar *et al.* 1992). Even this process has increased in size and scale, however, and the third version of this annotated list, published last year, was the wholly new (and extremely large) concept volume entitled *Threatened birds of the world* (BirdLife International 2000), in which each species received a standard half-page entry, and in which all the entries for Asian birds, other than those for Philippine species—which were based on already published texts (see below)—were summarised from and attributed to the draft documentation in preparation for *Threatened birds of Asia*.

There are many benefits that flow from the production of Red Data Books (see Collar 1996a). Most importantly, if most obviously, they help in priority setting: Red Data Books are intended to identify those elements of biological diversity the planet is most likely to lose if no action is taken—in other words, they help *save species from extinction*. They represent a comprehensive coverage of particular taxa, and they ought in so doing to provide a comprehensive coverage of the sources (literature, museum specimens, people) concerning those taxa. They bring a global standard into play, acting as neutral and independent surveys of information and circumstance, and placing the evidence they muster in the public domain. As a consequence, they shape public policy, becoming a major source of conservation motivation, paving the way for strong advocacy at local, national and international levels, creating networks, forging cross-cultural links, arousing public support and serving as sourcebooks and education tools, particularly in the area of university studies relating to conservation biology. Finally, they provide a baseline for the measurement of conservation progress. This volume for Asia is intended to do all these things and, as a result, contribute not only to the preservation of Asia's biological diversity but also to the greater general welfare and quality of life of the peoples of Asia and indeed throughout the world.

For it is certainly the case that Red Data Books serve more than the cause of nature conservation. They are also a component of the global environmental databases that are needed in responsible (that is, ecologically sound) economic development. Such databases—whether electronic or hard-copy—are essential for long-term developmental planning: by providing key data on natural resources and by monitoring changes in the environment, they are of direct benefit to many different interests in government (including donor agencies) and the private sectors (both commercial and NGO). The securing of areas of high diversity with threatened or endemic species creates local employment and provides training, helps build national conservation infrastructures, and allows for the development of ecotourism. Moreover, the identification of key sites for biodiversity leads to exemplary conservation projects in them for the sustainable use of their natural resources, including such cardinal values as watershed protection, water regime management, traditional land-use maintenance, prevention of erosion, cultural continuity, local climate amelioration, local ecological education, and applied scientific investigation. Developing countries and their peoples therefore stand to gain substantially from the implementation of conservation based on threatened species documentation.

In their most compressed form Red Data Books simply consist of lists, and all BirdLife works have contributed to the avian component of IUCN's Red List programme (e.g. IUCN 1996, 2000). Red Lists have the advantage of brevity and simplicity, and serve a particular purpose in drawing attention to the sheer number of species in danger of extinction around the world. However, to justify any red-listing it is essential to provide referenced documentation at least to the standard of the abbreviated reviews in *Birds to watch 2* and *Threatened birds of the world*; but even these evaluations run the risk of significant error, since of necessity they depend on compilations of material ("secondary sources") which cannot be guaranteed to have involved the scrupulous assembly and critical examination of all the available evidence (although in the case of the two BirdLife publications mentioned above the work was greatly facilitated by the steadily expanding information resource base represented by the Red Data Book programme). Therefore to derive the maximum benefit from the red-listing process it is important to invest in full-scale documentation of the kind offered in this book. The provision of detailed reviews of all the information about a taxon that is relevant to its conservation is a cardinal responsibility of any organisation dedicated to the survival of species. BirdLife International takes this responsibility as central to its mission, committed as it is to a policy of zero tolerance towards species extinction.

A Red Data Book for Asian birds

The project to prepare a Red Data Book for Asian birds was initiated in 1994 by the Wild Bird Society of Japan (the BirdLife Partner in Japan), with the full support and financial backing of the Japanese Ministry of the Environment (formerly known as the Environment Agency of Japan). The main period of the project lasted five years, and was marked with the submission to the Ministry in 1999 of a full suite of species accounts. A further 18 months was added to the project to complete a critical review and standardisation of these accounts and, most importantly, to undertake the major mapping exercise that is the most distinctive and indeed unique feature of this book. Never before in the history of either zoology or conservation has a major segment of an entire fauna been mapped using fully referenced point localities.

Another unique aspect of this study has been the full participation of the BirdLife Asia Partnership in the project. As described below, the initial data-gathering and text compilation was conducted nationally for almost all Asian countries, which has greatly improved the completeness and relevance of the final product. It has also helped to develop a network of people and organisations with an interest in and commitment to the fate of the threatened birds in the region.

An advance output of the project was *Threatened birds of the Philippines* (Collar *et al.* 1999), published by Bookmark on behalf of the Haribon Foundation in association with

BirdLife International. This book was issued in recognition of the fact that, in *Birds to watch 2*, the Philippines had emerged as the country with the world's highest numbers of the most threatened species of bird, nearly all of them endemic. It was felt that advanced publication of the Philippine component of *Threatened birds of Asia* would represent a significant contribution to the intensifying efforts of both national and international NGOs to preserve biological diversity in that country. In this larger book, all the texts published in *Threatened birds of the Philippines* are republished almost exactly; with one exception, only the slightest changes have been made (see below).

Gurney's Pitta *Pitta gurneyi* is on the verge of extinction and classified as Critical, with a known population in 1997 of just 11 pairs confined to one locality, Khao Nor Chuchi, in peninsular Thailand. This site is designated a Wildlife Sanctuary, although most territories are outside protected-area boundaries, and forest degradation and loss remains a serious threat as economic incentives continue to govern land-use decisions. Gurney's Pitta typifies the fate of many lowland forest species in Asia, which have declined because of the continuing destruction of their lowland rainforest habitat.

The region and countries covered

For the purposes of this study, Asia is principally but not exclusively the Oriental or Indomalayan biogeographic region, which is contained within a line running approximately up the middle of Pakistan, along the summits of the Himalayas and east through central China along the Chang Jiang (Yangtze river) basin out into the Pacific as far as the subtropical islands off southern Japan, then south along Lydekker's Line between the Moluccas and the west Papuan islands (see, e.g., the map in Inskipp *et al.* 1996). However, because this is a study intended to be of maximum use at national levels, the region has in part also been defined by political boundaries. Thus it extends from and embraces all Pakistan in the west to all Indonesia in the east, taking in the Asian states and territories of the Indian and Pacific Oceans. It also extends northwards to include almost all land above this area in the eastern part of the Palearctic region, i.e. all China, all Japan and the Russian Far East, Mongolia and Korea. North of Pakistan the western border of the region follows the Chinese frontier to its junction with Russia and Mongolia, and then extends north through Russia along the valley of the Yenisey river to the Arctic Ocean (see Figure 1). Thus the book covers: eastern Russia, Mongolia, Japan, Korea (North and South), China (mainland, Hong Kong and Taiwan), Pakistan, India, Nepal, Bhutan, Bangladesh, the Maldives, Sri Lanka, Myanmar, Thailand, Laos, Cambodia, Vietnam, the Philippines, Malaysia, Singapore, Brunei, Indonesia and Timor Loro Sae (East Timor).

Birds, of course, do not observe man-made boundaries and there are, inevitably, certain blurred areas. In the west, a suite of Palearctic species—mainly raptors and waterbirds, but also (e.g.) the Great Bustard *Otis tarda* (the only threatened landbird in the world with populations that border both the Atlantic and Pacific Oceans)—overlap in varying degrees the Asian region. Their ranges, numbers, threats and conservation are treated fully within the region, with summarising sections for these elements elsewhere, and usually a mix of biological

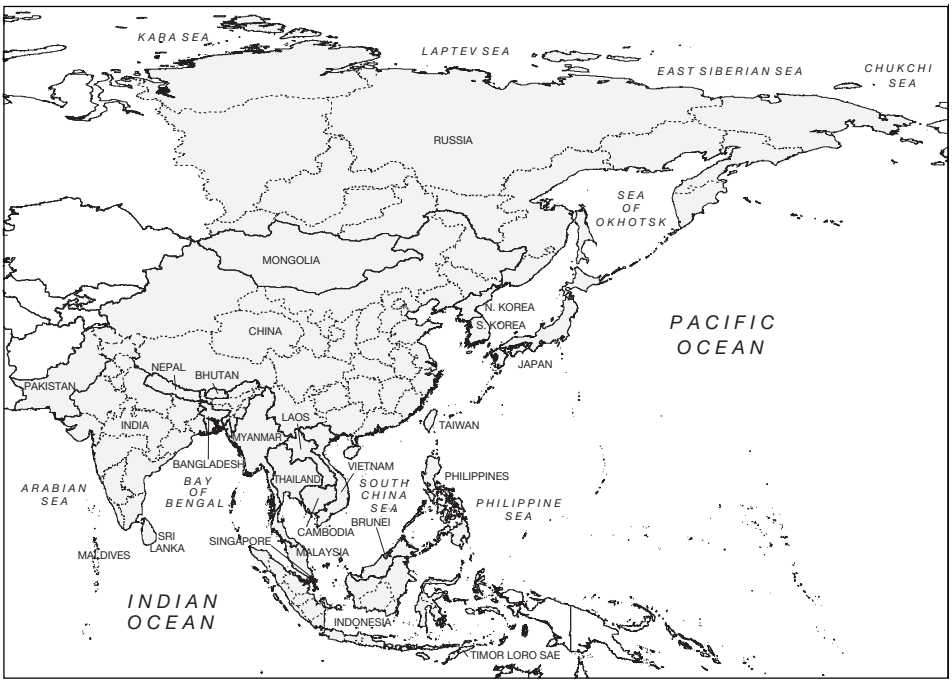


Figure 1. The region covered in detail by this book (shaded).

information, depending on availability; for a few species where only tiny extralimital ranges are involved, e.g. White-rumped Vulture *Gyps bengalensis*, Relict Gull *Larus relictus* and White-throated Bushchat *Saxicola insignis* (as well as, in part, Siberian Crane *Grus leucogeranus*), these extra countries and localities are documented in the normal way, and mapped. In the north-east there are a very few overlaps, although the Short-tailed Albatross *Phoebastria albatrus* and Matsudaira's Storm-petrel *Oceanodroma matsudairae* range widely in the oceans, the former at least to North America, so the relevant species accounts only include a summary of their pelagic ranges. Similarly, detailed coverage was not attempted for two seabirds that extend from North America into the north-east of the Asian region, Black-footed Albatross *P. nigripes* and Red-legged Kittiwake *Rissa brevirostris*, both of which were added to the list of threatened species at a very late stage in the project (see the section entitled "Asian marginal species"). In the south-east, Indonesia extends into the Australasian region, but a detailed coverage of species in the territories east of Maluku province (the Moluccas) was deemed inappropriate for both temporal and biogeographic reasons. Thus Indonesian birds—even those endemic to Indonesia—whose populations lie east of Wallacea (Lydekker's Line) are treated only in summarising paragraphs in "Asian marginal species". In the south, Christmas Island (Australia) is excluded, but one of its two endemic breeding seabird species, the Christmas Island Frigatebird *Fregata andrewsi*, is fully covered in its non-breeding range, since this extends so much into the region covered by this book.

The Slender-billed Curlew *Numenius tenuirostris* was recorded twice, evidently as a vagrant, in or before 1913 in Japan (Brazil 1991), but is not treated in this book. No other threatened birds whose ranges lie outside the area under review are known to have been recorded as vagrants within it, but such records can be easy to overlook; three seabirds, White-necked Petrel *Pterodroma cervicalis*, Barau's Petrel *P. baraui* and Buller's Shearwater *Puffinus bulleri*, just reach waters within the area under review (see BirdLife International 2000), but again are not treated here.

The data-gathering process

Threatened birds of Asia represents a huge collective effort on the part of ornithologists and conservationists both within and outside the Asian region. The principal participants in the project were the members of the BirdLife Asia Partnership, including BirdLife Partners, Partners Designate and Affiliates, the BirdLife Country Programmes in Indonesia and Vietnam, and key contacts in all other Asian countries, but with enormous collective help from many different quarters including international and national NGOs (see Acknowledgements). This network was mobilised to gather data on globally threatened birds at the national level through a series of national and subregional workshops, held in India (for all South Asian countries) and Malaysia (for all South-East Asian countries) in 1995, and the Philippines, eastern Russia and mainland China in the course of 1996 (see Figure 2).

The workshops were designed to introduce the aims and methodology of the project to the national Red Data Book compilers, and to develop plans for the data-gathering phase. The (then very) new IUCN criteria for assessing threat status (IUCN/SSC 1994) were introduced, and the project methodology outlined. There was discussion of the candidate list of species to be included as threatened in the book, initially based on the list published in *Birds to watch 2*, but extensively revised on the basis of workshop input (and of course new information emerging over the course of the project). The potential sources of information on threatened birds and their conservation were identified, and plans were laid to tap these sources at the national level through review of the national literature, visits to national museums, correspondence with key contacts, and possibly national workshops. National workplans were developed for each country, and responsibility for the coordination of the work was delegated to one or (in the larger countries) a team of compilers.

Figure 2. Participants at the Red Data Book Workshop for South Asia, held in Coimbatore, India, in February 1995.

These national compilers gathered information on each threatened species on two standard *data forms*, one for information relating to the *species* and one for details of each *locality* which was believed to be important for its conservation. These forms included all the key subjects needed for the standard RDB text: distribution, population, ecology, threats, conservation measures taken and conservation measures proposed. In some cases, national compilers drafted the RDB texts for the threatened birds, notably for nationally endemic species. They corresponded with the ornithologists and conservationists who are studying and protecting the threatened species and their habitats in the field, and reviewed national literature and museum material. This process generated a wealth of information on these birds that would have been impossible to obtain by any other means, much of it never before published outside its country of origin or in the English language. In the course of the project, data were submitted from virtually every country in the Asian region. Once national data-gathering was completed, the forms and texts were submitted to the RDB editorial team, which was responsible for gathering data from international sources (see "Sources of information" below). The resulting datasets from all range states were combined and edited into complete, coherent draft species texts. These texts were circulated widely for review, to the national compilers and other experts on the birds in question and their conservation, resulting in a further major input of data and ideas to be incorporated to produce the final texts for publication. (It is perhaps worth noting that the arrangement of Distribution texts in sequences which match the maps, so that the reader can easily trace a locality to the map and *vice versa*, the amalgamation of localities and records where appropriate, and the distinguishing of lookalike references by means of "a" and "b", etc., were tasks in the final phase of the project requiring very considerable effort and time, which may in part explain, if not excuse, the extension of the project somewhat beyond its anticipated conclusion.)

No explicit cut-off date for the data-gathering phase was established. However, as the project drew to a close in late 2000 and material had to be finalised for mapping and layout, inevitably only the more significant new items of information—the rediscovery of Chinese Crested-tern *Sterna bernsteini*, for instance—could be included, although extra evidence was being added even at proof stage in March 2001. In some cases material came to hand very late: for example, although the fourth edition of *Birds of Borneo* is dated 1999 (Smythies and Davison 1999), copies did not reach the UK until autumn 2000, and although it was used in the threatened texts there was no time to refer to it for the Near Threatened list. Similarly, the important *Birds of Assam* (Choudhury 2000c) only reached the UK in late January 2001, at a stage when only parts of it could be used (and when many new localities could be mentioned

in the text but not mapped, e.g. in Pallas's Fish-eagle *Haliaeetus leucoryphus*). In some cases it was the species themselves which emerged only very late as candidates for inclusion. The most obvious evidence of this problem is the fact that the three *Gyps* vultures possess no maps. The conservation crisis affecting these species only became apparent as the final project deadline had been identified and agreed, and in the event only a rapid evaluation of the literature (undertaken by S. H. M. Butchart in December 2000) was possible; but there was still no time to trace the localities and map them. This crisis came hard on the heels of the emerging evidence of the seriousness of the plight of level lowland "dryland" forest in the Sundaic region, which towards the end of 1999 forced the inclusion of some 10 additional (wide-ranging and therefore relatively data-rich) species, again at a time when every attempt was being made to bring the data-gathering process to a conclusion. Here, too, it was not possible to undertake as thorough a survey of sources as was made for species whose candidacy was known much earlier; for example, the visits made to European museums (except RMNH) could not be repeated. Finally, apart from the ever-changing biological dataset to cope with, there is the problem of status changes in political and protected areas, such as the very recent divisions of Uttar Pradesh, India, into two states and Java, Indonesia, into five provinces (neither reflected here), and the redesignation of several national parks as "natural parks" in the Philippines.

Indeed, the most important circumstance concerning cut-off dates and completeness concerns the Philippine component of the book. When *Threatened birds of the Philippines* was in the process of being prepared and published, it was not decided whether *Threatened birds of Asia* would include or exclude the Philippines (or perhaps have summarising paragraphs). It was acknowledged that the Asia volume would be incomplete without but possibly too large with the Philippines material. In the event, two factors tipped the scales for the inclusion of the material. First, the Asia volume proved to be so large that the question of the extra Philippine texts became insignificant; and second, the Philippine book had so small a print-run, with such limited international availability, that it was necessary to republish it in a way that would bring it to a wider readership. However, it *is* merely a matter of republication: although the texts were finalised in mid-1998, the book only appeared in December 1999 and there was no opportunity to update its contents. The single exception is the Cebu Flowerpecker *Dicaeum quadricolor*, since a significant discovery of a second population occurred just as *Threatened birds of the Philippines* went to press; this new information was included in *Threatened birds of the world*, and could not be left aside in the current volume.

Sources of data

The three key sources of information in this analysis have been (1) published and, to a much smaller extent, unpublished ("grey") literature, (2) museum specimen label data, and (3) personal testimony.

Literature As complete a review as possible was undertaken of the literature on Asian birds. The project had the great advantage of access to the magnificent collection of Oriental papers amassed and documented in several bibliographies over many years by T. P. Inskipp, chiefly on his own initiative but also more recently in his unofficial role as keeper of the Oriental Bird Club library. Access was also fortunately available to the University Library (and Map Room) and Zoology Department Library in the University of Cambridge; to the Library at the Natural History Museum (formerly British Museum of Natural History), Tring, UK; and to the Alexander Library of the Edward Grey Institute, University of Oxford; in Japan SC, project coordinator and co-editor, made use of the libraries of the Wild Bird Society of Japan and the Yamashina Institute for Ornithology, and in the Philippines project coordinators NADM and BRT had access to the Dr Dioscoro S. Rabor Wildlife Laboratory at the University of the Philippines in Los Baños. The reference list, which contains over 7,000 citations, is testimony to the value of the libraries and collections which are mentioned here.

Grey literature used included consultancy studies, expedition accounts, birdwatchers' trip reports and so on, but naturally the patchiness in availability of this material, and the patchiness simply in knowledge of its existence, means that no comprehensive review can ever be made. Some of it came to light as a consequence of the appeal for information put out by the Oriental Bird Club (see below). Moreover, in Japan and Taiwan, SC was able to access records stored on a variety of birdwatchers' databases. In Japan and Taiwan a great deal of bird information was contributed from the databases (whether hard copy or electronic) of chapters of the Wild Bird Society of Japan and other institutes, and of the Chinese Wild Bird Federation. In Hong Kong, the database developed by the Hong Kong Birdwatching Society, based upon the records published over the years in the *Hong Kong Bird Report*, was the principle source of the locality records published in this book.

Museum data The labels of specimens in museums provide a record of the species in question that is almost always as good as, and in some respects better than, a sight record. In most cases the precise locality is indicated, as is the date of collection; and some collectors provide further data, for example on gonad condition, habitat, elevation, stomach contents and behaviour. The specimen is also a solid means of record verification, although of course accidental or deliberate mislabelling can occur. At any rate, it is obvious from a glance at the species accounts in this volume how important the previously unpublished evidence provided by museum specimens has been in this study, particularly with regard to distribution. Almost every text includes some specimen data, and in some instances the majority of the localities identified stem from this source (Collar and Rudyanto in prep.).

It often transpires, however, that the museum specimen records have already been published; this is a common circumstance in the early literature, when areas and islands were being explored for the first time, and museum scientists were anxious to document new records and possibly new taxa as they sorted through material newly arrived from the field. In cases where the literature also gives the record, the specimen receives mention only if the information on its label supplements the published one (most usually by adding or improving a date). However, in such a work as this, in which museum data were commonly made available to colleagues and co-workers without this working principle being expressed or recalled, there are likely to be cases where the museum record has been used redundantly.

Problem specimens of course exist, so even this most concrete of data sources has its risks. Indeed, it was this project that first called for the full investigation of the specimen material of R. Meinertzhagen, whose frauds were exposed just as it was about to start (Knox 1993), and whose extensive collection of Asian material, on which the project had expected to draw, was thereby cast in doubt. The investigation, carried out by Dr P. C. Rasmussen (Smithsonian Institution) and Dr R. P. Prys-Jones (Natural History Museum), with one piece of work being done jointly with this project (Rasmussen and Collar 1999b), found (almost literally) a catalogue of theft and fraud, and spared this project from innocently repeating many falsehoods. Even so, reference is occasionally made in the texts to dubious but not provenly fraudulent Meinertzhagen specimens. With respect to the Philippines, labels on material collected in the nineteenth century by J. B. Steere frequently bear a month but no year, although the species accounts do not reveal the collector of the museum material whose data are used, it is worth placing on record here that in some cases the years of Steere specimens have been added by reference to documentation of Steere's itineraries kindly provided by Dr R. B. Payne at UMMZ.

Museum data were gathered by visits and, where available, by catalogue printouts and from the internet. NJC (all initials are glossed below) extracted data at BMNH (with JAT and SS), OUMNH, NMS and UMZC in the UK, and AMNH, ANSP, FMNH, USNM in the USA, but staff at these museums also answered specific inquiries for further information; in Europe NJC also visited IRSNB, MNHN, RMNH, SNMB, SNMS, SMF, UMB, ZMA, ZMB, ZMH and ZSM. SC visited YIO in Japan and ASCN, SCICN and KIZCN in China.

Information was also collected from other Chinese museums and collection with the help from Chinese colleagues. Several collections have their data now posted on the internet.

Personal testimony BirdLife's Red Data Book programme has always sought to make maximum use of ornithologists, holidaymakers and environmental consultants who visit remoter parts of countries and can report on the birds or the conditions they find. Particularly through the publications of the Oriental Bird Club it has been this project's policy to track and contact such people for their information, and the response has been uniformly positive. A mailshot to Oriental Bird Club members generated responses from over 200 people, and resulted in the inclusion of many previously unpublished records in the RDB species accounts (see *Acknowledgements* for evidence of this). Information from mainland China was received after questionnaires were sent to nature reserves and ornithologists. All personal contributions itemised as "*in litt.*" (i.e. in letters) are stored in the BirdLife International library, with the exception that information on species in Japan involving *in litt.* contributions were almost invariably sent to and are stored with WBSJ, and similar contributions in Russia are stored by AVA.

Of course, sight records, whether transmitted in a personal communication or documented in a trip report or database, are often open to question. In particular, records of species whose identification is problematic are always difficult to treat, especially when the observer may not have been aware of the alternative possibilities. Nevertheless, policy in this project has generally been to include all records provided by correspondents and uncovered by review of trip reports, on the principle that published records in this volume can be subject to scrutiny while unpublished ones cannot. Moreover, there is a kind of "testability" that comes from setting sight records in the bigger context, and in the vast majority of cases it transpires that such records ("merely" but very helpfully) fill out the anticipated map. However, sight records (including published ones) have occasionally been left aside (normally with an acknowledgement of the fact, so as to indicate awareness of their existence) where they would represent important range extensions and where the identification required better evidence, on the principle that otherwise there is indeed a serious chance of polluting the published record (see, e.g., the second paragraph under Distribution for Greater Adjutant *Leptoptilos dubius*). In a few cases a record has been treated as confirmed but still indicated as needing some further independent verification.

It has also been a general policy *not* to treat as certain (mappable) records any that were provided as secondhand reports taken from local people, however reliable. In some cases paragraphs have been added to Distribution sections in order to admit the extra information, but the proviso exists that these must remain *reports*, not *records*, until confirmed by a field worker with some trackable identity. This rule was not, however, applied to the account for the Philippine Eagle *Pithecophaga jefferyi*, for which every reported locality has been accepted as certain, and mapped accordingly; and for a few other species where misidentification seems wholly implausible a certain number of such records were also accepted.

Referencing Every attempt has been made to provide a complete audit trail on the facts assembled in the species accounts in this book. No sentence containing one or more reported facts should lack a source for that or those facts; in order to avoid too much repetition, semi-colons and colons are frequently used to provide sentences with two main clauses, but the source should in all cases still be clear, in almost all cases placed immediately before the full stop. In some cases the reference is to an anonymous entry in a journal or magazine, so that just the publication is given along with issue number and, depending on the source, month/year and/or page number(s); in Japan and Taiwan reference is frequently made to institution databases from which information was contributed. Sentences which contain no source either clearly serve as a summary summary of information that follows or precedes it, or expresses an opinion of the editors, authors and compilers. Sentences of the latter type are particularly common in the *Measures Proposed* section, for obvious reasons.

Spelling of names of Russian and Chinese scientists and observers has been standardised as far as possible, but significant difficulties were encountered owing to the different systems that have been used over the years for the transliteration of these names in abstracts and reference lists; in Russian these are compounded by frequently very different renditions—and even alphabetical placement—where the abstract is in German (e.g. "Schibajew" for what is here called Shibaev, "Worobjew" for Vorob'ev, etc.), and variant spellings of the name of the great naturalist-explorer Przheval'skiy appear to be unlimited. When accounts cite references cited by other sources, and those sources use a different spelling, the names are usually enclosed in inverted commas or slightly adjusted to present usage. Chinese names are given in full (e.g. Cheng Tso-hsin, Zheng Guangmei) in references, to minimise the confusion caused by many authors sharing the same surnames (and often also initials).

Localities, maps and gazetteers

Since the third edition "began" in 1981, BirdLife Red Data Books have increasingly sought to identify the precise localities of records. *Threatened birds of Africa* listed all localities from which species were known, but not necessarily in a smooth geographical sequence. Point-locality maps for a few selected threatened species were published in the *Threatened birds of the Americas*, and coordinates were sought for as many localities as possible which were too small to appear on the *Times atlas of the world*, so that a clear geographical sequence could be provided and the relation of localities to each other understood. A database of locality records was compiled on over 2,600 restricted-range bird species for BirdLife's analysis of Endemic Bird Areas (ICBP 1992, Stattersfield *et al.* 1998; see Crosby 1994), although the data were not as complete as those included in the Red Data Books and the species maps have never been published. *Threatened birds of Asia* is therefore the first such book (other of

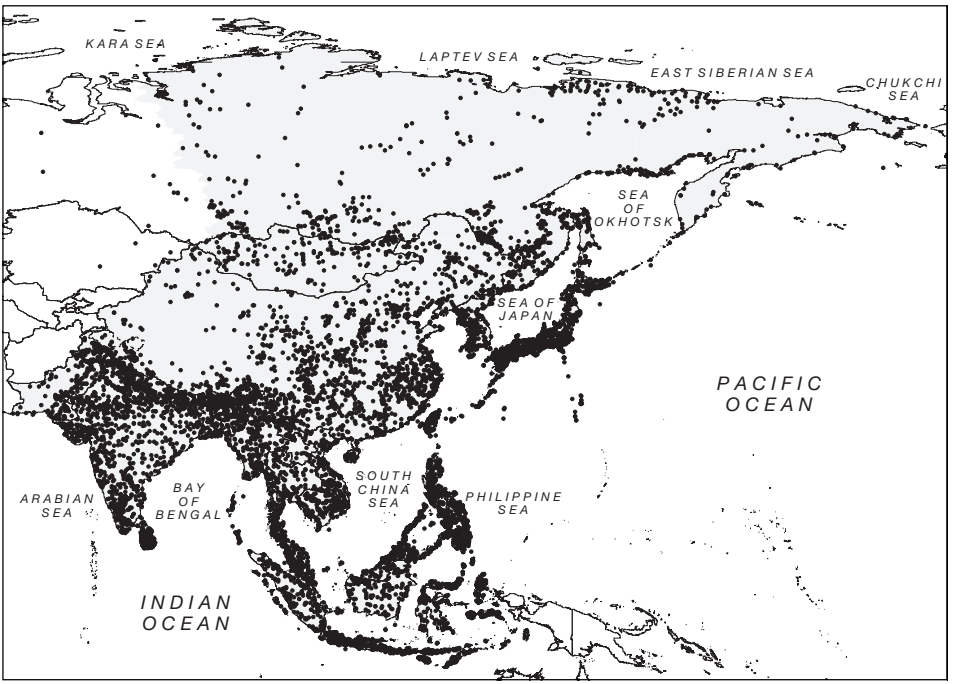


Figure 3. The distribution of all localities (c.10,400) identified by this project.

course than *Threatened birds of the Philippines*) to provide maps of all threatened species in a large region of the world.

The mapping element of this book was undertaken to provide a graphic illustration of the distribution, and hence conservation status, of the threatened birds of Asia, and to identify the key areas that need to be conserved. Mapping ranges is an extremely effective means of communicating the circumstance of threatened species to a wide audience (irrespective of their language capabilities), reducing often complex messages and issues to powerful images. Moreover, such mapping has turned a heavyweight book into a database that helps in the study, explanation and prediction of species decline, since overlays can be made to determine protected-area efficiency, habitat usage and loss, land use, demographic pressures and the location of threatened ecosystems. Thus the mapping resource will facilitate rapid, effective explanation to and involvement of experts and decision-makers in achieving consensus and understanding, and accelerate the process of developing a coherent suite of environmental projects and programmes at the regional, national and subnational levels.

To render these maps as accurate as possible, every effort has been made to trace each locality mentioned in the species accounts. In this book, the maps are designed to illustrate the overall distribution of each species and to show the position of the individual localities. A total in the region of 10,400 localities have been traced, representing at least 18,000 bird records (see Figure 3). Maps show point localities coded for three time-frames: historical–1949 open circle (○); 1950–1979 shaded circle (◍); 1980–present black circle (●); undated (▭) (but note that when a source that fails to provide a date is itself pre-1950 the symbol automatically converts to an open circle). There is no particular theory behind these time-frames, but on many maps they help to show how a species's range has declined during the past century, or regions where ornithological fieldwork has been limited or lacking in recent decades. There is also no intention to imply that older records are *necessarily* less worthy of attention—indeed, a major point in mapping them is to reveal sites that may have been forgotten by modern research studies—but it was felt that discrimination of records less than 20 years old and less than 50 years old from those more than 50 years old would generally assist perceptions about where major surviving concentrations of the species in question might prove to be. A different system is used for one species only, Maleo *Macrocephalon maleo*. Where contours were readily available in digital form, they have been shaded on the relevant maps to help illustrate the relation of range to elevation.

A word of caution is necessary with respect to the interpretation of the maps. This particularly but not exclusively concerns migratory species. It has not been possible in this exercise to make a distinction between breeding and non-breeding ranges (e.g. by fitting a line demarcating the two), and one of the effects of this is that a species commonly *appears* much more widespread (and therefore secure) than is actually the case. Moreover, particularly with larger species, whether migratory or not, a locality (and hence a dot) may represent the record of a single bird (and a few cases—see in particular Distribution: Mongolia under Imperial Eagle *Aquila heliaca*—a *succession* of black dots represents a single bird, being satellite-tracked while on migration), whereas with smaller species an equivalent dot can represent its entire range. Some maps show relentless numbers of black dots, which might create an impression of considerable numbers and security. It is therefore important to stress that distribution does not correlate either with abundance or with conservation status. However attractive and innovative the maps may be judged to be, it would be unwise to assume that they can retain their full value independent of the texts from which they were constructed.

In addition to the preparation of the maps for this book, the database of locality records of threatened Asian birds has the potential to produce more sophisticated visual analyses of the conservation status of selected species. Records could be coded, for example, to show changes over finer time-scales than those described above, e.g. 10 years, 25 years, 50 years, 100 years. Key sites could be highlighted on the maps, breeding localities could be differentiated from

passage and wintering sites, important gaps in knowledge of a species's range (and therefore priorities for new survey work) could be shown, etc. The impact of new development projects and of particular land-use issues could be graphically illustrated, or the reasons why a new protected area is needed for an individual or several threatened species. This database is an important input into the BirdLife Asia Partnership's continuing Important Bird Area (IBA) Programme, as it provides comprehensive lists of known localities for all threatened species in the region, and hence forms the basis for selecting the most appropriate network of sites for their conservation. Users of this book are therefore requested to inform BirdLife about new records of threatened birds or records that have been missed, and any errors which they find in the locality data, so that this database can be further developed for the benefit of the region's birds.

The format of the *Distribution* section of the species accounts is detailed below (in "Textual organisation of data"). The consistent structure followed in this section means that word-processor macros could be run on each species account to convert this section into a database of locality records. These were then combined for all species, and a major exercise undertaken to trace the geographical coordinates of as many localities as possible. The key sources used were the United States Board of Geographical Names gazetteers (NIMA 1998, 2000; posted on the internet and held in Cambridge University Library Map Room) and a standard series of maps which cover the world at a 1:1 million scale, the Operational Navigational Charts (DMAAC 1962–present). However, many additional sources were used, and the sources of all coordinates found were recorded in the database and are given in the Gazetteer section of this book. The records in the database were also coded for the three time-frames described above. Once coordinates had been found for as many localities as possible (within the time constraints imposed by the project deadline), the localities were ordered (and numbered) geographically within the database, and the species accounts edited to follow the same order. The system used was to order countries, and the provinces, states, etc. of larger countries, in a standard sequence, with records arranged from north to south within each political subdivision. Checks were also made of the database records against the species accounts to ensure that the sites mapped are those which appear in bold in the *Distribution* sections. When this process had been completed, the species maps were generated using a Geographical Information System (GIS), and fed into a graphics package to be laid out for inclusion in the book.

Some important issues had to be addressed in the course of preparing the maps. There are several ongoing boundary disputes between Asian countries, and it could cause difficulties for national conservation NGOs using this book (including of course some members of the BirdLife Asia Partnership) if such boundaries were to be illustrated in a way that was not acceptable to their national authorities. In particular, in the Western Himalayas there are disputed boundaries between India and Pakistan and between India and China, which have been shown as dashed lines (following the system used in the *Times atlas of the world*) on the relevant species maps in this book (rather than the solid lines normally used to represent national borders). There are therefore dashed lines showing: the boundary between India and Pakistan as published on the official Survey of India map, which includes all of Kashmir and the "Northern areas" within India; the "Line of control", which shows the boundary between the regions currently administered by Pakistan and India; and the boundaries of Aksai Chin. It must be stressed that the presentation of material in this book and the geographical designations employed do not imply the expression of any opinion whatsoever on the part of BirdLife International concerning the legal status of any country, territory or area, or concerning the delimitation of its frontiers or boundaries.

Spellings of site names can be highly variable between maps, between papers and between eras, and inevitably choices were forced on the project according to appropriate sources. When alternative spellings (or indeed names) are available and it is clearly helpful to indicate that the two are identical, this has been done by use of parentheses for a second or third

rendition. However, trivial differences have not usually been indicated. Future researchers therefore need to be aware that the adoption here of one particular spelling may give the impression that a slightly different name on a specimen label, on a computer printout or in a given paper is a different site when it is not. Where spellings are such that several localities contend for the correct identity, an effort has been made to indicate that the choice is an editorial presumption made on best assessment of evidence. Localities in India with the name "Fategarh", "Futtegurh" and many other permutations appear to exist many times over in most states, for example, so an accurate location of the intended site has often depended on compilers' knowledge of the geography of the original observer's activities. The relevant USBGN gazetteer lists 54 Rampurs or Rampuras for India, and 70 mountains called Kyauktaw, Kyauktaung or Kyauktan (spellings largely interchangeable) in Myanmar; often the only thing to be done is to set down any record linked to such a name as untraced.

There is a further problem of names, which is that different researchers transcribe certain words in such a way that it is difficult to impose a standard. In the account for White-throated Bushchat *Saxicola insignis* a Mongolian word (apparently for mountain range) appears four times, as *khaïrkhan*, *khairchan*, *chajrchan* and *hayrhan*, and it is fairly difficult simply to spot that these are all transcriptions of a single word. Likewise, the Russian reserve of Khinganskiy can be written Chinganski, Hinganskii, Hingan, Khingan and so on; the Russian compiler (AVA) provided standardised material from Russian sources, but where additional material from non-Russian sources was added, an attempt at a consistent orthography was made by M. G. Wilson. Similarly, Korean names have no official transliteration system to Roman alphabets, and in this case the most commonly used modern name has been used. At different eras in China (including Taiwan), two different transliteration systems (Wade-Giles and Pinyin) have commonly been used. Worse, many names used in early western literatures were transliterations of Chinese dialects, which can be as different as French is to Italian—thus the island called Jinmen in Pinyin is called Quemoy in Fujian dialect. Moreover, some Chinese names originated from non-Chinese languages (e.g. Mongol, Tibetan), and although an official transliteration system of non-Chinese names exists in China almost all Chinese literature transcribes locality names from the Chinese characters that simply imitate the way they sound—thus Zoigê becomes Ruo'ergai, Qammê becomes Xiaman, Alxa becomes Alashan, etc. In this book an attempt has been made to use the original name as it appears in the *Gazetteer of China*. Site names on museum labels carry the particular problem of deciphering manuscript, and some localities listed in the Distribution section as untraced may simply have been misread from labels. In some cases this problem emerges at one remove, where data came from computerised museum records transcribed from labels by others: prior knowledge of certain site names reveals significant errors of transcription into the databases accessed, making the acceptance of entirely new localities from such sources as much a matter of hope as of confidence.

Most countries in the region are broken down into many different levels of political subdivision, and often in museum specimens the labels provide various itemisations of these elements. However, it is not always possible to know which is the most precise qualifier, and in any case sometimes only one of several qualifiers can be traced. There is also the complicated situation in which one record will simply be from a general locality, e.g., "Mt Malindang" and another will be from a precise one within that general locality, e.g. "Gandawan, Mt Malindang". Since in some cases there are good grounds for believing that the less qualified record "Mt Malindang" was *also* in fact made at Gandawan, the general policy has been adopted of only marking mountains, protected areas, etc. as single sites, and not adding more precise localities, which would have the effect of creating two points on a map where in reality there should only be one. However, if the area in question is relatively large, individual localities have been itemised and mapped. There are variations in the ways that locality data have been published in different regions and in different eras. For example, in mainland China

many bird records are currently published by county, whereas historical records were often from specific localities (but sometimes using names that have not proved possible to relate to a modern equivalent). In the Black-necked Crane *Grus nigricollis* account, for example, there are records from counties *and* records from sites within counties, usually from different time periods, and in this particular case at least it was felt better to present (and map) both types of information.

A gazetteer is included in the back of this book, subdivided by territory, including all localities shown on the species maps. For each locality it gives the following information: (1) site name (corresponding to that in bold in the species account[s]), qualified by the highest level of political subdivision (in eastern Russia, Mongolia, Japan, Korea, mainland China, Pakistan, India and Malaysia) or island name (in the Philippines and Indonesia), (2) geographical coordinates, and (3) the source(s) used to trace the coordinates.

Textual organisation of data

The classic Red Data Book species account layout consists of six main parts: *Distribution*, *Population*, *Ecology*, *Threats*, *Measures Taken* and *Measures Proposed*. There is an optional final section, *Remarks*, used to accommodate what are essentially footnotes from the main text. Ideally the publication of the references used in the account should be appended to the account itself, so that the text is self-contained (as was achieved in *Threatened birds of Africa*); but this entails a high degree of replication of citations, and in a book of this magnitude several hundred pages have been saved using a single reference list. The species account is headed with the bird's names, its image, its IUCN category and the criteria it triggers (for this see the separate section *The IUCN categories and criteria* below), and a simple textual justification of the IUCN status allocation (this is taken, occasionally with minor modifications, from that provided in BirdLife International 2000).

Distribution This section is organised as far as possible in a systematic geographic sequence, following a standard order of countries and subdivisions of countries, as described in the

The Great Indian Bustard *Ardeotis nigriceps* is endemic to India where and is classified as Endangered because of its small, declining population (perhaps fewer than 1,000 individuals). It has declined as a result of hunting, both for sport and for food, and continuing agricultural development of its arid and semi-arid grassland habitat, particularly conversion of large areas to intensive crop cultivation, irrigation schemes, increased pesticide usage and livestock-grazing, and high levels of disturbance. It is also legally protected, with severe penalties for killing individuals. Nevertheless, it grows rarer by the year. Numerous protected areas have been specifically established for the species, and rehabilitation of grasslands has also benefited it in some areas.

Gazetteer. Within these subdivisions, the locality records are generally ordered from north to south (or occasionally west to east). Each mapped locality is given in **bold**, together with any "qualifier" that could affect the coordinates assigned to it, e.g. "20 km north of", or "upper" in the case of rivers. There is often some additional geographical information, such as the county name or the name of a nearby town, river, etc., and the altitude of the recording locality. This is followed by the details of the record, including the date, and often the number of individuals seen or collected, together with the source reference(s) of the data presented. In order to give equal weight to records and to re-arrange them geographically and, secondarily, chronologically, long sentences have been used which link ranges into distinct entities, sometimes in their entirety, sometimes by country. In all but around 20 cases—all species in the Philippines (one of them Data Deficient) whose maps were first prepared on slightly different organisational principles and could not easily be altered (these disparities are indicated at the head of the map keys)—the localities in the text are in the same sequence as the localities on the map, greatly facilitating cross-reference between the two.

For convenience, the larger countries or those with large numbers of records have been broken down in full or in part by the next lower subdivision: thus China, India, Japan and Russia are consistently presented by such subdivisions (be they states, provinces, prefectures or autonomous regions), and this happens in Indonesia for Kalimantan, Sumatra, Java and Sulawesi. Malaysia is broken down by its three main states. Ranges on Luzon and Mindanao in the Philippines are broken down into general areas: on Luzon the area west of the Cagayan and Pampanga valleys is "western", the area to the east as far south as Bulacan is "eastern", the area south to Tayabas bay is "central" and the area south of that is "southern"; on Mindanao land east of the Agusan and Tagum valleys is "eastern", that to the west as far as the Zamboanga isthmus at Panquil Bay is "central", and that further west is "western". Other countries are generally treated without regard to subdivisions (they may be mentioned, but they are not used as independent areas for groups of records). An explanation of usage and spelling of place-names is given in the country introductions in the Gazetteer. The rationale behind the mapping appears below.

Population The section on Population is often dependent on a few "snapshot" notions of abundance from which a general impression of status can be formulated; the vagueness and uncertainty of such impressions is particularly frustrating given that this is critical information to set against the new IUCN criteria, for which a great deal of inference and assumption is needed. Table 2, in the *Population* section for the Philippine Eagle *Pithecophaga jefferyi* illustrates the difficulty of arriving at a single estimate by showing the variables to be taken into account. There is therefore a great deal of quotation in this section, done deliberately in order to indicate that the qualitative words used stem from the original work being cited, not from an interpretation of other evidence.

Ecology There are standard subsections on Habitat, Food and Breeding. There is often a subsection on Movements, but as so many tropical species are highly sedentary it was felt unnecessary to retain this as a permanent one. Descriptions of habitat are to some extent conflated where several sources all provide qualitative accounts with small differences. Sometimes very precise descriptions exist, although these are not necessarily (and probably not often) descriptions of "obligate" habitat. However, in order to leave open this possibility, such accounts are usually rendered separately. The food and breeding subsections generally omit information gained from captive birds, unless something both notable and probably applicable in the wild is involved.

The three anthropogenic sections on *Threats*, *Measures Taken* and *Measures Proposed* are often shorter than the three biological ones. One reason for this is that, since there is commonly a great deal of repetition when species share the same ranges, problems and (actual or potential) solutions, there is a great deal of cross-reference to other species accounts (and also, in the case of Philippine species, to the Appendix). Another is that threats and

counteractions are much less easy to assert as constants (what was a threat or a measure of protection in the 1960s may be so entirely superseded by later events that by the late 1990s it no longer even merits mention). A third, relating particularly to *Threats*, is dealt with below. In all these sections, particularly where the wider-ranging species are involved, it was often difficult to judge whether to break the information down by country then by issue, or by issue then by country; in the end the decision was pragmatic, often dictated by the need to avoid persistent repetition of the same basic information. It is also worth stressing here that writing prescriptions for appropriate actions often requires a period of reflection on the evidence, and that the circumstances of completing this book have not always been conducive to such contemplation: the important point to make is that the evidence mustered in the first five sections of each species account is for *everyone* to consider and for *everyone* to judge with respect to appropriate actions—thus, just because (for example) the text makes no reference to a particular piece of research that a reader might immediately see as important should not be taken to imply that this research is regarded as unimportant.

A major feature of this book, much less prominent in *Threatened birds of Africa* and *Threatened birds of the Americas*, is the presence of very wide-ranging species—chiefly large waterbirds (cranes, storks, pelicans, ducks, etc.) and large birds of open dry country (raptors and bustards)—whose fragmented remnant populations are in urgent need of assistance. It must, however, be obvious that the larger the range a species has, the more difficult it becomes to make detailed prescriptions for its conservation. Proposals for species with very restricted ranges are usually relatively straightforward, but increases in range appear to bring exponential increases in complexity. It has been impossible to cover all the relevant issues in all the areas and sites for these birds. Consequently, in spite the length to which the book has gone to address these species, the measures proposed for their preservation often remain relatively stylised, and need to be regarded as examples of the types of actions required. In many cases, especially for migratory species, perhaps the best recommendation would be for an international action plan which can itself elaborate on the measures that the species needs at global, national and local levels.

Even so, whether a species has a large range or small, many recommendations, such as "establish a protected area here", "enforce anti-hunting legislation there" and "initiate local education programmes", are of a type which, taken alone with no further regard to context, may appear a little simplistic and unaware, even when they come from experts who know the situation at first hand. The issue here is about where to stop making recommendations. For conservation to work it must be seen to be equitable; but equitability brings its own legal, political and economic needs into the situation. It is therefore important to stress at the outset that for conservation efforts to be successful they must be linked to processes of economic self-improvement of communities as a whole. Unless very basic problems of welfare and self-determination are addressed, many Asian people cannot be expected to understand the need for conservation, and hunting, overexploitation of resources and deforestation will continue irrespective of attempts at enforcement or the gazettement of protected areas. In most cases, the execution of well planned conservation projects hinges on cooperation between governments, conservation agencies and the private sector, with consistent and active education programmes to enhance local, national and regional awareness of and appreciation for nature. Moreover, in the long term nothing will be salvageable from the present crisis in under-planned development unless the institutions of conservation, in both the government and NGO sectors, are rapidly expanded and reinforced.

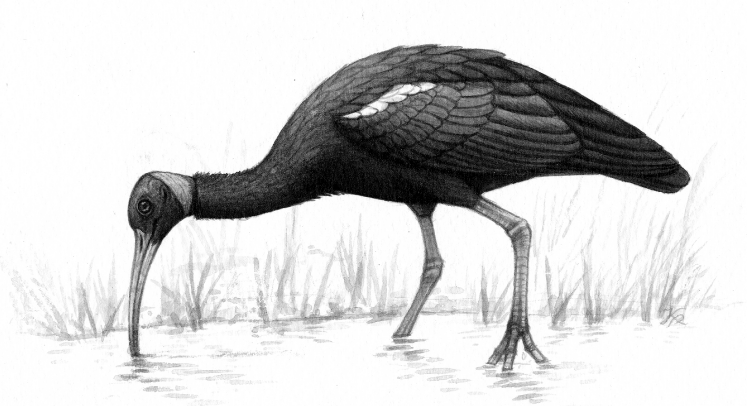
Remarks This optional section gathers one or more footnotes to the account, items that merit commentary but which would obstruct the flow of the species narrative. Most commonly, the first item in this section deals with some aspect of the taxonomy of the form in question.

Taxonomy

No established taxonomy has been followed in this book; a degree of freedom has been reserved to make certain choices in response to the available evidence, much of which is in the form of personal communications from both field and museum experts. However, as with all recent BirdLife International data-gathering projects, the world list of Sibley and Monroe (1990, 1993) stands as the first point of reference for species status (but not sequence), albeit with heavy cross-reference to Inskipp *et al.* (1996) and with due regard to the arrangements of IUCN/BirdLife specialist groups (notably that for the megapodes). The entire endemic avifauna of the Asian region was scrutinised over a period of about eight years for the eligibility of individual species for inclusion in the BirdLife Biodiversity Project (ICBP 1992, Stattersfield *et al.* 1998), and the great majority of taxonomic decisions on species limits taken for that study have been followed in the current review.

However, the definition of avian species limits remains a major issue in conservation today. It is acute in Asia, which has experienced relative taxonomic neglect in the past half-century, and it is particularly acute in the case of Indonesia, the Philippines, Hainan, Taiwan and various Indian Ocean islands. If the test of a biological species is whether its constituent populations will interbreed with one another, decisions about populations which cannot come into contact, owing to unbridgeable geographic isolation, must remain essentially arbitrary. There is a view that *any* morphologically identifiable population merits species status under a "phylogenetic species concept" (Cracraft 1983, McKitrick and Zink 1988, Hazevoet 1996, Zink 1997), and there is an opposing view that sees such "splitting"—which can be based on characters so small as to be undetectable except in biochemical analysis—as inherently unstable and uncontrollable (Collar 1997b, Haffer 1997, Snow 1997, AOU 1998). The resolution of this problem is unlikely to be rapid; but what seems certain is that some sort of convergence by the two camps is likely, with many distinct insular or montane representatives of some polytypic species in Asia, not all of them on islands, being raised to species level in due course even by taxonomists adhering to the biological species concept.

Nevertheless, for the even-handed conservationist wishing to treat all species equally, one of the key considerations in taxonomic revisions must be consistency. If it is appropriate to split a species with two subspecies into two species, then the criteria used in doing so need to



The White-shouldered Ibis *Pseudibis davisoni* has an extremely small, rapidly declining, severely fragmented population and it is therefore classified as Critical. Like many Asian species, it has declined as a result of habitat loss, through drainage of wetlands for agriculture (most of the Mekong floodplain in southern Laos has been converted to rice-paddy), livestock-grazing, grass harvesting, and development, and as a result of logging of lowland forest. These have been compounded by hunting for food and disturbance, leading to the loss of secure feeding, roosting and nesting areas. Nowadays, these are probably the greatest threats to the survival of this and several other large waterbird species in Asia.

be applied fairly and equally to other taxa in similar circumstances (otherwise these other, unsplit taxa are disadvantaged in conservation terms through their lack of recognition). This, however, is full of practical difficulties: to begin with, the taxonomic reviser—who is unlikely to be a conservationist *by profession*—may only be focusing on one group of birds (as of course happens with specialist groups), and therefore remain entirely oblivious of (or even indifferent to) the implications of his or her criteria for other groups; moreover, the analogies between one splitting and another may not be exact. For example, Lambert's (1996) splitting of Visayan and Mindanao Broadbills *Eurylaimus samarensis* and *E. steerii* could be used as a precedent for the splitting of the Silvery Kingfisher *Alcedo argentatus*, which separates on at least three fairly distinctive characters into two forms with identical ranges to the broadbills: the issue revolves simply on whether the characters in question are sufficiently distinctive that, in combination, they are judged to constitute species-level differences. If the answer is yes (and Lambert's broadbill decision *tends* to promote this answer), one is *then* compelled to consider the cases of Blue-banded Kingfisher *A. cyanopecta* (black-and-red bill and double breast-band in the north, black bill and single breast-band in the south) and Philippine Dwarf Kingfisher *Ceyx melanurus* (black wing-coverts and blue-and-white neck-spot in the north, rufous wing-coverts and white neck-spot in the south), and these of course will in turn breed analogous or semi-analogous situations of their own, so that quite rapidly the queue of forms inviting taxonomic revision begins to stretch to the horizon.

Although the Philippine Eagle *Pithecophaga jefferyi* is a flagship species for conservation, it is threatened with impending extinction and qualifies as Critical. Perhaps fewer than 250 mature individuals survive. Its fate is typical of many threatened species in the Philippines where forest destruction and fragmentation continue apace Most remaining lowland forest is leased to logging concessions, and mining applications and uncontrolled hunting pose additional threats. Unless urgent conservation action is taken, such as extending the protected areas system, implementing habitat management schemes for the benefit of wildlife and local people, integrating eagle-friendly practices into forestry policy and launching a campaign to engender national pride and respect for the eagle, the extinction of the Philippines's national bird seems inevitable.

The editorial team has been mindful of this need for consistency, and of the problem of precedent inherent in decisions taken to split species; but it needs to be recognised that existing world lists are already full of inconsistencies which, because they have persisted for years without being challenged, tend to be thought of as widely endorsed stable states. Such lists have for years been content to accept birds such as Aceh Pheasant *Lophura hoogerwerfi*, Carunculated Fruit-dove *Ptilinopus granulifrons* and Luzon Water-redstart *Rhyacornis bicolor* as specifically distinct from their counterparts Sumatran Pheasant *L. inornata*, Grey-headed Fruit-dove *P. hyogaster* and Plumbeous Water-redstart *R. fuliginosus*, yet they have done nothing so generous with taxa such as Hainan Silver Pheasant *Lophura (nycthemera) whiteheadi*, Taiwan White-throated Laughingthrush *Garrulax (albogularis) ruficeps* or South Annam Grey-headed Parrotbill *Paradoxornis (gularis) margaritae*, all of which are arguably more distinct from their "parent" species than the three species just mentioned (and the first and third of which would almost certainly end up being treated as threatened). This book itself accepts species status of birds as indistinct as Amami Thrush *Zoothera major*, Manchurian Reed-warbler *Acrocephalus tangorum* and Broad-tailed Grassbird *Schoenicola platyura*, while necessarily avoiding the claims of often highly differentiated birds which global, regional or national lists continue to maintain as subspecies, as for example the remarkably diverse assemblage of woodpeckers united under the name Greater Goldenback *Chrysocolaptes lucidus*, some of which—notably in the Philippines—are so distinctive that separation would be immediate and unquestioned if there were (as with Lambert's broadbills) only two forms to split. However, as Collar (1997b) pointed out, this is a case where a redefinition of species limits is likely to be a painstaking challenge, because the entire Greater Goldenback species, as currently constituted, extends throughout South and South-East Asia: a serious taxonomic revision, which would probably require the loan of material from several museums, clearly therefore represents a considerable intellectual and logistical challenge, and the work of many weeks spread over many months.

In *Threatened birds of Asia* very few taxonomic innovations have been made, and none, it is hoped, that will prove to be problematic in the manner outlined above. The general rule has been to accept recent splits where they have been supported by convincing published evidence. Thus Lambert's (1996) separation of the two Philippine broadbills was backed by a full morphological review, whereas Feare and Craig's (1998) separation of Nias Hill Myna *Gracula religiosa robusta* was not. An exception is the split of Long-billed Vulture *Gyps tenuirostris* into two species, Indian Vulture *G. indicus* and Slender-billed Vulture *G. tenuirostris*, prior to the formal but impending publication of this assessment (Rasmussen and Parry in press). This decision was very largely driven by the sudden crisis in *Gyps* vulture conservation in India, and the need to contribute positively to the best understanding of the current situation (hence the frontispiece to part A of this book). Two further exceptions are the splitting of two Philippine species, both Sulu archipelago endemics, without prior published justification, namely the Tawitawi Brown-dove *Phapitreron cinereiceps* and Sulu Woodpecker *Picoides ramsayi*; but the justifications for these views appears in the respective *Remarks* section for these species. It had been hoped that progress on separating the Philippine Hawk-owl *Ninox philippensis* into two or more species, one resident on Mindoro, would have been sufficient to allow the treatment of the latter as threatened, but this work, initiated jointly by NJC and P. C. Rasmussen, has proved so complicated (owing, amongst other things, to the existence of Mindoro-type birds on Sibuyan, Cebu, Camiguin Sur and the Sulu archipelago) that it was felt wiser not to press any still very tentative and somewhat confused conclusions into print.

Some species that are already threatened may in future be split into two species and thus almost certainly upgrade their formal threat classification: Crested Fireback *Lophura erythrophthalma* and White-bellied Shortwing *Brachypteryx major* are two such examples. Some Near Threatened species may also be split, with one or both the resulting "new" species being threatened: Brown Hornbill *Anorrhinus austeniltickellii*, Moluccan Thrush *Zoothera*

dumasil/joiceyi, Wedge-billed Wren-babbler *Sphenocichla humei/roberti* and Rufous-vented Prinia *Prinia burnesii/cinerasens* are strong examples (indeed Brown Hornbill *is* split in del Hoyo *et al.* 2001). Among non-threatened species where splitting appears justified, and where the result would or will be one or more "new" species which might qualify as threatened, are: Asian Woolly-necked Stork *Ciconia (episcopus) episcopus* (i.e. by subtracting African *C. e. microscelis*); Andaman Grey Teal *Anas (gibberifrons) albogularis*; Indian Lesser Spotted Eagle *Aquila (pomarina) hastata* (*fide* S. J. Parry verbally 1999); Hainan Grey Peacock-pheasant *Polyplectron (bicalcaratum) katsumatae*; Asian Marbled Murrelet *Brachyramphus (marmoratus) perdix*; Blue-tailed Trogon *Apalharpactes (reinwardtii) reinwardtii* (as in fact treated in del Hoyo *et al.* 2001); Sumatran Grey-headed Woodpecker *Picus (canus) dedemi*; Gansu Pallas's Leaf-warbler *Phylloscopus (proregulus) kansuensis*; Annam Spot-breasted Laughingthrush *Garrulax (merulinus) annamensis*; Chin Hills Long-tailed Wren-babbler *Spelaeornis (chocolatinus) oatesi*; and Chinese Narcissus Flycatcher *Ficedula (narcissina) elisae*. However, it must be stressed that this list is nothing more than a set of examples, a compilation of incidental perceptions or information generated in the course of the project, and in no way is it intended to represent a concerted outline of species limits issues in relation to potentially threatened taxa (desirable as such a review is).

At the other end of the scale, in the course of this project, work was undertaken to show that one "threatened" Asian species, Intermediate Parakeet *Psittacula intermedia* (treated in King 1978–1979, Collar and Andrew 1988, Collar *et al.* 1994) is in fact a hybrid (Rasmussen and Collar 1999). The same seems likely to be true of Imperial Pheasant *Lophura imperialis* (Rasmussen 1998), but unfortunately the conclusive evidence has not yet been mustered into print, so the species appears here as "Data Deficient". However, a typescript submitted to *Forktail* (R. S. R. Williams ms) proposing a hybrid origin for Blue-wattled Bulbul *Pycnonotus nieuwenhuisii* (treated as Data Deficient in *Birds to watch 2*, and known from two nineteen-century specimens, one on Borneo and one on Sumatra: van Marle and Voous 1988, Smythies and Davison 1999) is regarded here as convincing. Moreover, Annam Partridge *Arborophila merlini* (Endangered in *Birds to watch 2*) is here treated as part of the Green-legged or Scaly-breasted Partridge *A. chloropus* group pending further taxonomic studies (Inskipp *et al.* 1996), Sichuan Wood-owl *Strix davidi* (Vulnerable in *Birds to watch 2*) is here treated as a subspecies of Ural Owl *S. uralensis* (following Cheng Tso-hsin 1987), Vanderbilt's Babbler *Malacocincla vanderbilti* (Vulnerable in *Birds to watch 2*) is regarded as a synonym of Horsfield's Babbler *M. sepiarium barussana* (Hoogerwerf 1966, Mees 1995) and Deignan's Babbler *Stachyris rodolphei* (Vulnerable in *Birds to watch 2*) is regarded as a synonym of Rufous-fronted Babbler *S. rufifrons rufifrons* (Robson 2000). Conversely, *Acrocephalus orinus* (A. O. Hume in *Ibis* [2]5 [1869]: 355–357 and *Ibis* [3]1 [1871]: 23–38), from Rampur (a traceable one!—see above) in the Sutlej valley, Himachal Pradesh, India, although treated in various ways (see Inskipp *et al.* 1996: 169–170), has very recently been determined a valid species (Bensch and Pearson in press).

It is worth noting that two species were described too late to be considered in this review, although both would almost certainly qualify for treatment. The Beijing Flycatcher *Ficedula beijingnica*, type locality Xiaolongmen Forest Farm (40º00′N 115º30′E), near Beijing, China (Zheng Guangmei *et al.* 2000), overlaps in range with Grey-sided Thrush *Turdus feae*, and will presumably benefit from forest conservation measures for that species. The Chestnut-eared Laughingthrush *Garrulax konkakinhensis*, type locality Mt Kon Ka Kinh (14º19′N 108º24′E), Gia Lai province, Vietnam, is known from Kon Ka Kinh Nature Reserve, just north of the area from which Golden-winged Laughingthrush *G. ngoclinhensis* is known (Eames and Eames 2001), and an important site for Crested Argus *Rheinardia ocellata* (see relevant account).

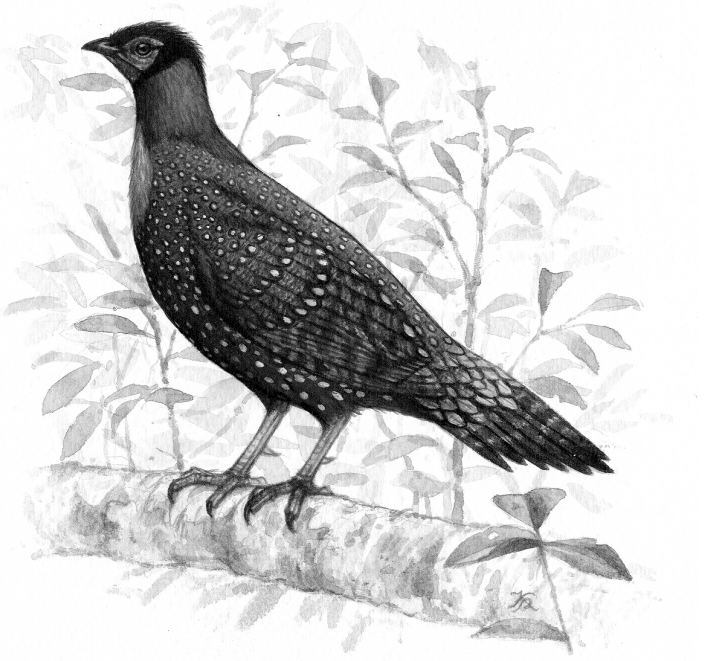
There appears to have been a tendency in recent global and regional lists to merge genera, and in some cases this has been taken too far. As a result, some highly distinctive and unusual

bird species, clearly of long independent lineage, have been assigned to polytypic genera, and the degree of their divergence thereby masked. In this book several monotypic genera have been reinstated or at least reaffirmed, including *Thaumatibis*, *Houbaropsis*, *Sypheotides* and *Rhinoplax*; moreover, *Padda* is retained for two munias in Indonesia sometimes merged in *Lonchura*, and the obscure genera *Heteroglaux* (separate from *Athene*) and *Dasycrotapha* (separate from *Stachyris*) are resuscitated, with explanations. The highly differentiated *Apalopteron* is acknowledged here as belonging with the white-eyes Zosteropidae rather than the honeyeaters Meliphagidae. This and the use of *Rhinoplax* and *Heteroglaux* are not in BirdLife International (2000).

Reasonable endeavours have been made to check the scientific names of other life-forms treated in this book. The great majority of these were already given in a source being cited, so the issue has basically been one of confirming or correcting any name derived from the primary literature. However, in such relatively minor matters a trade-off has had to be observed between accuracy and efficiency. Current plant genera and many (but of course not all) species are listed in Mabberley (1987), but it has not been possible to check plant species names that do not appear in that source. Mammal species names have been checked against Corbet and Hill (1991). Reptile, fish and invertebrate names (none of which often appear) have not been verified.

The limits of red-listing

The species is the unit of concern in this evaluation. The exclusion of subspecies from consideration is a necessary measure in order to render the exercise achievable within a reasonable time-frame (this argument has been elaborated on several occasions in the introductions to previous BirdLife Red Data Books); indeed, most conservationists (and almost all conservation laws outside the USA) acknowledge that species matter more in terms of biological diversity than subspecies. Moreover, it is important to re-state that this book is for *globally* threatened species, and because of the enormous number of such species in Asia,



The Western Tragopan *Tragopan melanocephalus* is classified as Vulnerable because its sparsely distributed, small population is declining and becoming increasingly fragmented. It is found in some of the remotest parts of Asia, in north Pakistan and north-west India, but even here the forests are increasingly exploited for logging and becoming degraded through browsing of understorey shrubs by livestock, tree-lopping for animal fodder and fuelwood-collection. Disturbance by graziers and collectors of edible fungi and medicinal plants may seriously interfere with nesting. Western Tragopan is currently the flagship species of a major conservation initiative, involving BirdLife, with the local people of the Palas Valley, Pakistan, where a substantial population of the species is known to survive.

and because of the stewardship role Asia has for them, since so many are national endemics, these birds *must* be the cardinal priorities for the conservation authorities and NGOs in the region.

One solution to this difficulty is the development of a national conservation strategy using guidelines that allow for a mix of globally and nationally threatened and near-threatened species, subspecies and populations, not to mention non-threatened species and subspecies for which (through endemism) a nation has ultimate responsibility, species otherwise regarded of great national, regional or local interest, and representatives (endemics) of particular habitats and biomes. Article 6 of the Convention on Biological Diversity binds parties, which includes every country in the region except Brunei and Thailand (although the latter is a signatory), to "develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity", and it is fully acknowledged here that biological diversity does not stop with globally threatened species. On the other hand, how far the process of refining and refocusing concern can be taken must vary with circumstance; a helpful working model for the identification of a suite of national priorities has been provided by Fanshawe and Bennun (1991).

One model being contributed to the global debate on biodiversity priorities is the "Important Bird Area" (IBA) concept and programme of BirdLife International. This programme is a logical extension of the Red Data Book programme and targets the identification of key areas not only for globally threatened species but also for restricted-range species (as treated in Stattersfield *et al.* 1998), species which are vulnerable through their colonial or congregatory behaviour at some stage in their life cycle (e.g. seabirds), and species which are "endemic" to particular, fairly tightly defined biomes. IBAs are thus designed to embrace a wide range of biological diversity through these four target areas. They still

The stunning Bali Starling *Leucopsar rothschildi* qualifies as Critical because it has an extremely small population (only nine birds in 2001), and it is confined to just one locality on Bali, Indonesia. Like several threatened Asian species, the main reason for its decline, in this case to virtual extinction in the wild, is primarily attributable to unsustainable, illegal trapping in response to persistent demand for the cagebird trade. The Asian economic crisis in recent years has exacerbated this problem, with black market prices for cagebirds soaring. This was undoubtedly a major factor that led to a recent armed raid on the Bali Starling captive breeding and release centre in which a significant proportion of the birds awaiting release into the wild were taken.

may sometimes fail, unless adapted regionally, to address the problem of subspecies and of nationally threatened species *unless* they are concentrated, but the IBA model nevertheless represents a coherent and objective practical initiative in global biodiversity conservation. Moreover, as the introductions to *Threatened birds of Africa* and *Threatened birds of the Americas* have made clear, many threatened subspecies will occur in important areas for threatened species, and therefore stand to be secured by the work to secure sufficient habitat for the latter forms; the same must be true where restricted-range, congregatory, and biome-restricted species are concerned.

Towards a strategy for threatened birds in Asia

Threatened birds of Asia contains a huge quantity of data which will provide a baseline for future conservation of the most vulnerable elements of the region's avifauna, but it is recognised that for many people such a large, complex book will be difficult to use, particularly for those whose first language is not English. The BirdLife Asia Partnership intends to publish the book on CD, which will make it possible to search the text electronically. There are also plans to translate selected species into Japanese, Russian and Chinese, which would help to make the information accessible to many more people in Asia. However, there is an additional need for a much shorter, simpler output from the Asia Red Data Book Project that will be accessible to many more people, including those who do not have a specialist interest in birds. This output is to be prepared in the coming year, for publication in 2002.

The *Strategy for threatened birds in Asia* will essentially be a summary of the threats and conservation measures sections of the *Threatened birds of Asia*. It will act as a "front end" to the RDB, by guiding readers to sections of species accounts that give more details of the issues that are summarised in it. It will include an analysis of the key issues that are affecting threatened birds in Asia, many of which affect groups of species. Crucially, it will present an analysis of the most important actions for threatened birds and a baseline for monitoring progress with these actions, and hence provide a foundation for conservation work in Asia, including that of BirdLife International. It will identify priority sites, priority species for survey and research, and information on priority habitats and issues. The results will be presented by country, to provide a guide for conservation action at the national level. The analysis will identify actions which can be addressed directly by NGOs and their equivalents, such as surveys and site-based conservation projects, and those which can only be addressed by governments or other organisations, such as major land-use issues and legislation. It will aim to furnish the background information on these policy issues in a form that is meaningful to decision-makers, and hence provide substance for policy and advocacy work in the region.

For a high proportion of threatened bird species, especially for those with restricted ranges and strict habitat requirements, effective site protection and management is the key measure for their survival. The BirdLife Asia Partnership has already made considerable progress on its Important Bird Areas (IBA) Project, which will identify and document the major sites for birds in the region using an internationally agreed set of criteria, and then develop a programme for their conservation. The site-related data in *Threatened birds of Asia* will provide a major additional input into the IBA analysis, which will then further develop and implement conservation actions at the key sites. The IBA programme will therefore be the single most important mechanism for the development of conservation action and advocacy work for threatened birds in the region.

Abbreviations and textual conventions

Museums contributing specimen data have been contracted to their (where known, standard) initials, as follows (note that museums and institutes in China have all been given the suffix CN): AMNH = American Museum of Natural History, New York, USA; ANSP = Academy of Natural Sciences, Philadelphia, USA; ANUCN = Anhui Normal University Museum, China;

ASCN = Academia Sinica, Beijing, China; AUCN = Anhui University Museum, China; BNHMCN = Natural History Museum of Beijing, China; BMN = Bishop Museum, Hawaii, USA; BMNH = Natural History Museum, Tring, UK; BNHS = Bombay Natural History Society, Bombay, India; CM = Carnegie Museum of Natural History, Pittsburgh, USA; CMNH = Cincinnati Museum of Natural History, Cincinnati, USA; DMNH = Delaware Museum of Natural History, Greenville, USA; DNHMCN = Natural History Museum of Dalian, China; FMNH = Field Museum of Natural History, Chicago, USA; FUSCN = Fudan University Museum, Shanghai, China; GIBCN = Guizhou Institute of Biology, China; GMCN = Museum of Guizhou, China; HMCN = Museum of Heilongjiang, China; HNUCN = Hunan Normal University Museum, China; HUCN = Hangzhou University Museum, China; HZICN = Zoological Institute of Heilongjiang, China; IRSNB = Institut Royal des Sciences Naturels, Brussels, Belgium; JASCN = Academy of Sciences, Jiangxi, China; KIZCN = Kunming Institute of Zoology, China; KUMNH = Kansas University Museum of Natural History, Lawrence, USA; LACM = Los Angeles County Museum, Los Angeles, USA; LAUCN = Lanzhou University Museum, China; LIUCN = Liaoning University Museum, China; LSUMZ = Louisiana State University Museum of Zoology, Baton Rouge, USA; MCML = Merseyside County Museums, Liverpool, UK; MCZ = Museum of Comparative Zoology, Boston, Massachusetts, USA; MSNG = Museo Civico di Storia Naturale, Genoa, Italy; MM = Manchester Museum, UK; MNHN = Muséum National d'Histoire Naturelle, Paris, France; MSU = Mindanao State University (Natural Science Museum), Iligan City, Philippines; MZB = Museum of Zoology, Bogor, Indonesia; NCSM = North Carolina State Museum of Natural Sciences, Raleigh, USA; NEFUCN = Northeast Forestry University Museum, China; NENUCN = Northeast Normal University Museum, China; NHMW = Naturhistorisches Museum, Vienna, Austria; NMS = National Museum of Scotland, Edinburgh, UK; NNUCN = Nanjing Normal University Museum, China; NRM = Natural History Museum, Stockholm, Sweden; NWIPBCN = Northwest Institute of Plateau Biology, China; OUMNH = Oxford University Museum of Natural History, Oxford, UK; PNM = Philippines National Museum, Manila, Philippines; RMNH = Rijksmuseum voor Natuurlijke Historie ("Naturalis"; National Museum of Natural History), Leiden, Netherlands; ROM = Royal Ontario Museum, Canada; SCICN = South China Institute of Endangered Animals, China; SIZCN = Shaanxi Institute of Zoology, China; SMF = Senckenbergmuseum, Frankfurt, Germany; SNHMCN = Shanghai Natural History Museum, China; SNMB = Staatliches Naturhistorisches Museum, Braunschweig, Germany; SNMS = Staatliches Museum für Naturkunde, Stuttgart, Germany; STCCN = Sichuan Teachers College, China; SUACN = University Museum of Agriculture, Sichuan, China; SUCN = Sichuan University Museum, China; SUNSM = Silliman University Natural Science Museum, Dumaguete City, Negros, Philippines; TISTR = Thailand Institute for Scientific and Technological Research; UMB = Uebersee Museum, Bremen, Germany; UMMZ = University of Michigan Museum of Zoology, Ann Arbor, USA; UPD = University of the Philippines in Diliman (Museum of Zoology), Luzon, Philippines; UPLB = University of the Philippines in Los Baños (Museum of Natural History), Luzon, Philippines; UMZC = University Museum of Zoology, Cambridge, UK; USCMC = University of San Carlos Museum, Cebu, Philippines; USNM = United States National Museum (Smithsonian Institution), Washington, D.C., USA; WFVZ = Western Foundation of Vertebrate Zoology, Los Angeles, USA; WUCN = Wuhan University Museum, China; YIO = Yamashina Institute for Ornithology, Chiba, Japan; YPM = Peabody Museum of Natural History, Yale University, New Haven, USA; ZMA = Zoologisch Museum, Amsterdam, Netherlands; ZMAK = Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany; ZMB = Zoologisches Museum, Berlin, Germany; ZMC = Zoologisk Museum, Copenhagen, Denmark; ZMH = Zoologisches Museum, Hamburg, Germany; ZMISU = Zoology Museum of Irkutsk State University, Russia; ZMMSU = Zoological Museum of Moscow State University, Russia; ZRCNUS = Zoological Reference Collection,

National University of Singapore; ZSM = Zoologisches Staatsammlung, Munich, Germany.

The following institutional and practical abbreviations are used in this book: AWB = Asian Wetland Bureau; AWC = Asian Waterfowl Census; AZA = American Association of Zoological Parks and Aquaria; BBNP = Bali Barat National Park; BCST = Bird Conservation Society of Thailand; CBSG = Captive (now Conservation) Breeding Specialist Group; CIFOR = Center for International Forestry Research (Bogor, Indonesia); CITES = Washington Convention on International Trade in Endangered Species; CMB = Conservation and Management Board (Philippines); CMS = (Bonn) Convention on the Conservation of Migratory Species of Wild Animals; CPAWM = Centre of Protected Areas and Watershed Management (Laos); CPPAP = Conservation of Priority Protected Areas Project (Philippines); CRISP = Centre for Remote Imaging, Sensing and Processing, Singapore; CWBF = Chinese Wild Bird Federation (now Wild Bird Federation of Taiwan); DANCED = overseas programme of the Danish Ministry of the Environment; DBH = diameter at breast height; DENR = Department of the Environment and Natural Resources (Government of the Philippines); DGIS = Directoraat Generaal Internationale Samenwerking (Government of the Netherlands); DMZ = Demilitarised Zone; DOF = Dansk Ornitologisk Forening (BirdLife Partner, Denmark); EBA = Endemic Bird Area; EEP = European Endangered Species Programme; ENSO = El Niño–Southern Oscillation; EU = European Union; FFI = Fauna and Flora International; FIPI= Forest Inventory and Planning Institute (Vietnam); FPE = Foundation for the Philippine Environment; GEF = Global Environment Facility; GIS = geographical information system; HKBWS = Hong Kong Bird Watching Society; IBA = Important Bird Area; ICBP = International Council for Bird Preservation; ICDP = integrated conservation and development project; ICF = International Crane Foundation; IGNP = Indira Gandhi Nahar Project; ILCO = Industrial Logging Company; IPAS = Integrated Protected Area System; IUCN = International Union for Conservation of Nature and Natural Resources (The World Conservation Union); IWRB = International Waterfowl and Wetlands Research Bureau; JICA = Japan International Cooperation Agency; JWPT = Jersey (now Durrell) Wildlife Preservation Trust; KNCP = Khao Nor Chuchi Project; Kutilang IBC = Indonesian Birdwatching Club; LGU = local government unit; LIPI = Indonesian Institute of Sciences; MAPS = Migratory Animal Pathological Survey; MASS = MacKinnon-Ali Software System (data stored at Center for Conservation Biology, Faculty of Science, Mahidol University, Bangkok); MNP = Memorial National Park (used with Maria Aurora, on Luzon); MNS = Malayan Nature Society; MOU = Memorandum of Understanding; NBCA = National Biodiversity Conservation Area, Laos; NGO = non-governmental organisation; NHA = non-hunting area; NIPAP = National Integrated Protected Areas Project; NIPAS = National Integrated Protected Areas System; NORDECO = Nordic Agency for Development and Ecology; NRF = national reserved forest; NWFP = North-West Frontier Province, Pakistan; OBC = Oriental Bird Club; PAMB = Protected Areas Management Board; PAWB = Protected Areas and Wildlife Bureau; PEFI = Philippine Eagle Foundation, Inc.; PEWG = Philippine Eagle Working Group; PHPA = PKA before 1999; PICOP = Paper Industries Corporation of the Philippines; PKA = Perlindungan dan Konservasi Alam (Directorate General of Nature Protection and Conservation), Indonesia; PWCF = Philippine Wetland and Wildlife Conservation Foundation, Inc.; RePPProT = Regional Physical Planning Programme for Transmigration; RDB = Red Data Book; RFD = Royal Forestry Department, Thailand; SACON = Salim Ali Centre for Ornithology and Natural History; SRNP = Subterranean River National Park (used with St Paul's, on Palawan); SSP = species survival plan; TRAFFIC = Trade Records Analysis of Fauna and Flora in Commerce; TWSI = Tourism and Wildlife Society of India; UNEP = United Nations Environment Programme; USAID = United States Agency for International Development; WARPA= Wild Animals Reservation and Protection Act (1992), Thailand; WBSJ = Wild Bird Society of Japan (BirdLife Partner in Japan); WCMC = World Conservation Monitoring Centre, Cambridge, UK; WCS = Wildlife Conservation

Society (New York Zoological Society), New York, USA; WWF = World Wide Fund for Nature, World Wildlife Fund; YPAL = Yayasan Pribumi Alam Lestari (Indigenous Nature Conservation Society); ZGAP = Zoologische Gesellschaft für Arten- und Populationsschutz, Munich;

The following initials are used for editors and compilers where they contributed original information: AVA = A. V. Andreev; BRT = B. R. Tabaranza; JAT = J. A. Tobias; JMV = J. M. Villasper; MJC = M. J. Crosby; MKP = M. K. Poulsen; NADM = N. A. D. Mallari; NJC = N. J. Collar; SC = S. Chan; SS = S. Subramanya; SvB = S. van Balen.

Metric measurement is used throughout, except in quotation, and conversion of miles and feet have generally been adjusted to reflect the evident approximations of the original figures (so "5,000 feet" becomes "1,500 m", not 1,515 m). Direct quotation is used when it is felt likely to be helpful, commonly in the *Population* section for phrasing used on abundance, in *Ecology* on habitat choice, and in cases where there is some ambiguity or uncertainty in the original.

The new IUCN Red List categories and criteria

In late 1994 new criteria for the identification and categorisation of threatened species were adopted by IUCN (IUCN SSC 1994). BirdLife International played an integral role in the development of these criteria over several years, and in the course of 1993–1994 used them to determine the species in *Birds to watch 2* (Collar *et al.* 1994). An outline of the criteria is given in the Introduction to *Birds to watch 2* along with a review of certain phenomena associated with them. In the process of their official ratification, however, the criteria were very slightly altered from the working set that BirdLife had been using. We present below a brief account of these criteria, but warn that anyone seriously planning to use them needs to refer to the official booklet (IUCN SSC 1994) or to the following web site:

http://iucn.org/themes/ssc/siteindx.htm

The following categories and criteria are reproduced almost wholly *verbatim* from IUCN SSC (1994) (see also Figures 4 and 5). Several definitions needed to interpret the criteria are appended at the end (see Figure 6).

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

A – population reduction in the form of either of

(1) an observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or 3 generations, whichever is the longer, based on (and specifying) any of: (a) direct observation; (b) an index of abundance appropriate for the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; (e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites;

(2) a reduction of at least 80%, projected or suspected to be met within the next 10 years or 3 generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above;

B – extent of occurrence estimated to be less than 100 km^2 or area of occupancy estimated to be less than 10 km^2, and estimates indicating any two of:

(1) severely fragmented or known to exist at only a single location;

(2) continuing decline, observed, inferred or projected, in any of: (a) extent of occurrence; (b) area of occupancy; (c) area, extent and/or quality of habitat; (d) number of locations or subpopulations; (e) number of mature individuals;

(3) extreme fluctuations in any of: (a) extent of occurrence; (b) area of occupancy; (c) number of locations or subpopulations; (d) number of mature individuals;

C – population estimated to number less than 250 mature individuals and either:

(1) an estimated continuing decline of at least 25% within 3 years or one generation, whichever is longer or

(2) a continuing decline, observed, projected or inferred, in numbers of mature individuals and population structure in the form of either: (a) severely fragmented (i.e. no subpopulation estimated to contain more than 50 mature individuals); (b) all individuals in a single subpopulation;

D – population estimated to number less than 50 mature individuals;

E – quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or 3 generations, whichever is the longer.

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

A – population reduction in the form of either of:

(1) an observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or 3 generations, whichever is the longer, based on (and specifying) any of: (a) direct observation; (b) an index of abundance appropriate for the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; (e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites;

(2) a reduction of at least 50%, projected or suspected to be met within the next 10 years or 3 generations, whichever is the longer, based on (and specifying) any of (b), (c), (d), or (e) above;

B – extent of occurrence estimated to be less than 5,000 km^2 or area of occupancy estimated to be less than 500 km^2, and estimates indicating any two of:

(1) severely fragmented or known to exist at no more than five locations;

(2) continuing decline, inferred, observed or projected, in any of: (a) extent of occurrence; (b) area of occupancy; (c) area, extent and/or quality of habitat; (d) number of locations or subpopulations; (e) number of mature individuals;

(3) extreme fluctuations in any of: (a) extent of occurrence; (b) area of occupancy; (c) number of locations or subpopulations; (d) number of mature individuals;

C – population estimated to number less than 2,500 mature individuals and either:

(1) an estimated continuing decline of at least 20% within 5 years or 2 generations, whichever is longer, or

(2) a continuing decline, observed, projected or inferred, in numbers of mature individuals and population structure in the form of either: (a) severely fragmented (i.e. no subpopulation estimated to contain more than 250 mature individuals); (b) all individuals in a single subpopulation;

D – population estimated to number less than 250 mature individuals;

E – quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or 5 generations, whichever is the longer.

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

A – population reduction in the form of either of:

(1) an observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or 3 generations, whichever is the longer, based on (and specifying) any of: (a) direct observation; (b) an index of abundance appropriate for the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; (e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites;

(2) a reduction of at least 20%, projected or suspected to be met within the next 10 years or 3 generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above;

B – extent of occurrence estimated to be less than 20,000 km^2 or area of occupancy estimated to be less than 2,000 km^2, and estimates indicating any two of:
  (1) severely fragmented or known to exist at no more than ten locations;
  (2) continuing decline, inferred, observed or projected, in any of: (a) extent of occurrence; (b) area of occupancy; (c) area, extent and/or quality of habitat; (d) number of locations or subpopulations; (e) number of mature individuals;
  (3) extreme fluctuations in any of: (a) extent of occurrence; (b) area of occupancy; (c) number of locations or subpopulations; (d) number of mature individuals;

C – population estimated to number less than 10,000 mature individuals and either:
  (1) an estimated continuing decline of at least 10% within 10 years or 3 generations, whichever is longer, or
  (2) a continuing decline, observed, projected or inferred, in numbers of mature individuals and population structure in the form of either: (a) severely fragmented (i.e. no subpopulation estimated to contain more than 1,000 mature individuals); (b) all individuals in a single subpopulation;

D – population very small or restricted in the form of either of:
  (1) population estimated to number less than 1,000 mature individuals;
  (2) population characterised by acute restriction in its area of occupancy (typically less than 100 km^2) or in the number of locations (typically less than 5);

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

Lower Risk (LR): A taxon is Lower Risk when it has been evaluated but does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories: 1. *Conservation Dependent* (CD): taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years; 2. *Near Threatened* (NT): taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable; 3. *Least Concern* (LC): taxa which do not qualify for Conservation Dependent or Near Threatened.

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

Not Evaluated (NE): A taxon is Not Evaluated when it is has not yet been assessed against the criteria.

Those applying the new IUCN criteria are expected to consider the situation as carefully as possible. Clearly there are very few cases in which the exact number of birds alive is known,

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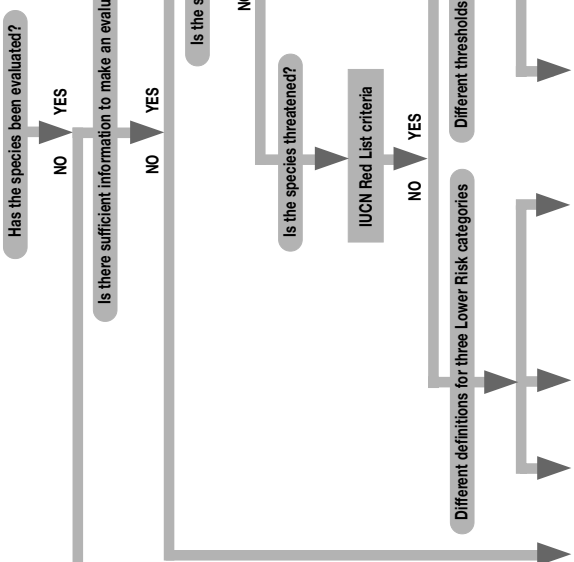
Figure 4 (opposite). This dendrogram shows the decision-making process by which a species's status is categorised, and also shows the relationship between the 10 possible options of IUCN's Red List categories. For each category, there is a definition (next to the appropriate two-letter code) and for the three threatened categories (Critical, Endangered and Vulnerable) there are additional criteria (see table overleaf).



EXTINCT
A species is Extinct when there is no reasonable doubt that the last individual has died.

EXTINCT IN THE WILD
A species is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A species is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual.

CRITICALLY ENDANGERED
A species is Critically Endangered (=Critical) when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria (A to E) overleaf.

ENDANGERED
A species is Endangered when it is not Critical but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria (A to E) overleaf.

VULNERABLE
A species is Vulnerable when it is not Critical or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria (A to E) overleaf.

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

NEAR THREATENED
Species which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.

LEAST CONCERN
Species which do not qualify for Conservation Dependent or Near Threatened.

DATA DEFICIENT
A species is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its range and/or population status. A species in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution is lacking. Listing of species in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. However, it is important to make positive use of whatever data are available.

NOT EVALUATED
A taxon is Not Evaluated when it is has not yet been assessed against the criteria.

Type of criteria	Main criteria	Sub-criteria	Qualifiers	Codes
A RAPID POPULATION REDUCTION	Reduction >80% in 10 years or 3 generations (**CR**) involving either 1 or 2:	**1.** Decline which has happened (observed, estimated, inferred or suspected) based on a–e opposite:	**a.** Direct observation **b.** Index of abundance **c.** Decline in Extent of Occurrence, Area of Occupancy, and/or quality of habitat **d.** Actual or potential levels of exploitation **e.** Effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites	**A1a** **A1b** **A1c** **A1d** **A1e**
	Decline >50% in 10 years or 3 generations (**EN**) involving either 1 or 2:			
	Decline >20% in 10 years or 3 generations (**VU**) involving either 1 or 2:	**2.** Decline likely in near future (projected or suspected) based on b–e opposite:	**b.** As b above **c.** As c above **d.** As d above **e.** As e above	**A2b** **A2c** **A2d** **A2e**
B SMALL RANGE AND FRAGMENTED, DECLINING OR FLUCTUATING	Extent of Occurrence estimated <100 km² (**CR**) with any two of 1,2 or 3: Extent of Occurrence estimated <5,000 km² (**EN**) with any two of 1, 2 or 3: Extent of Occurrence estimated <20,000 km² (**VU**) with any two of 1, 2 or 3: *or* Area of Occupancy estimated <10 km² (**CR**) with any two of 1, 2 or 3: Area of Occupancy estimated <500 km² (**EN**) with any two of 1, 2 or 3: Area of Occupancy estimated <2,000 km² (**VU**) with any two of 1, 2 or 3:	**1.** Severe fragmentation *or* At 1 location (**CR**) At <6 locations (**EN**) At <11 locations (**VU**)	None	**B1**
		2. Continuing decline (observed, inferred or projected) in any of a–e opposite:	**a.** Extent of Occurrence **b.** Area of Occupancy **c.** Area, extent and/or quality of habitat **d.** Number of locations or subpopulations **e.** Number of mature individuals	**B2a** **B2b** **B2c** **B2d** **B2e**
		3. Extreme fluctuations in any of a–d opposite:	**a.** Extent of Occurrence **b.** Area of Occupancy **c.** Number of locations or subpopulations **d.** Number of mature individuals	**B3a** **B3b** **B3c** **B3d**
C SMALL POPULATION AND DECLINING	Population <250 mature individuals (**CR**) and either 1 or 2 Population <2,500 mature individuals (**EN**) and either 1 or 2 Population <10,000 mature individuals (**VU**) and either 1 or 2	**1.** Decline >25% in 3 years or 1 generation (**CR**) Decline >20% in 5 years or 2 generations (**EN**) Decline >10% in 10 years or 3 generations (**VU**)	None	**C1**
		2. Continuing decline in numbers of mature individuals and population structure (observed, projected or inferred) in form of either a or b opposite:	**a.** Severe fragmentation: all subpopulations <50 (**CR**) Severe fragmentation: all subpopulations <250 (**EN**) Severe fragmentation: all subpopulations <1,000 (**VU**) **b.** All individuals in a single subpopulation	**C2a** **C2b**
D1 VERY SMALL POPULATION	Population <50 mature individuals (**CR**) Population <250 mature individuals (**EN**) Population <1,000 mature individuals (**VU**)	None	None	**D1**
D2 VERY SMALL RANGE	Typically, Area of Occupancy <100 km² or <5 locations (**VU** only)	None	None	**D2**
E QUANTITATIVE ANALYSIS* * Not used in this publication	Probability of extinction in the wild is >50% in 10 years or 3 generations (**CR**). Probability of extinction in the wild is >20% in 20 years or 5 generations (**EN**) Probability of extinction in the wild is >10% in 100 years (**VU**)	None	None	**E**

or their exact area of distribution, so there is a constant need to use inference and assumption in making appropriate assessments of threat status. In this process, assessors are expected to use the *precautionary principle* as a means of deciding between difficult choices: in other words, it is always to be assumed that the situation of a species is worse rather than better in borderline cases between one category and another, including between threatened and non-threatened. However, in order to prevent the precautionary principle from operating according to the worst-case scenario, Collar *et al*. (1994) employed the notion of "responsible pessimism", which is intended to encourage a use of caution while disallowing the admission of the genuinely improbable.

Figure 5 (opposite). This table shows the IUCN Red List criteria used to determine the degree of threat for species included in this book.

Figure 6. Definitions of terms used in the IUCN Red List criteria.

Reduction
A reduction is a decline in the number of mature individuals of at least the amount (%) stated over the time period (years) specified, although the decline need not still be continuing.

Generation
Generation may be measured as the average age of parents in the population. Generation length is used in preference to the specified time period if the specified number of generation is longer.

Extent of occurrence
Extent of Occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a species, excluding cases of vagrancy.

Severe fragmentation
Severely fragmented refers to the situation where increased extinction risks to the species result from the fact that most individuals within a species are found in small and relatively isolated subpopulations. These small subpopulations may go extinct, with a reduced probability of recolonisation.

Extreme fluctuations
Extreme fluctuations occur where population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude.

Population
Population is defined as the total number of mature individuals, i.e. the number of individuals known, estimated or inferred to be capable of reproduction. Where the population is characterised by natural fluctuations, the minimum number should be used. Individuals that are environmentally, behaviourally or otherwise reproductively suppressed in the wild should be excluded. In the case of populations with biased adult or breeding sex ratios, it is appropriate to use lower estimates for the number of mature individuals which take this into account (e.g. the estimated effective population size).

Continuing decline
A continuing decline is a recent, current or projected future decline whose causes are not known or not adequately controlled and so is liable to continue unless remedial measures are taken.

Subpopulations
Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little exchange.

Area of occupancy
Area of Occupancy is defined as the area within its Extent of Occurrence which is occupied by a species, excluding cases of vagrancy. The measure reflects the fact that a species will not usually occur throughout the area of its Extent of Occurrence, which may, for example, contain unsuitable habitats. The Area of Occupancy is the smallest area essential at any stage to the survival of existing populations of a species (e.g. colonial nesting sites, feeding sites for migratory species).

Location
Location defines a geographically or ecologically distinct area in which a single event (e.g. pollution) will soon affect all individuals of the species present. A location usually, but not always, contains all or part of a subpopulation of the species, and is typically a small proportion of the species's total distribution.

The IUCN category and criteria are given in bold below the species's names at the start of each species account. It will be noted that a species can satisfy different category criteria, and an attempt has been made to indicate all the criteria in question, not merely those for the highest category.

Some considerations over IUCN Red List criteria application

Although the new IUCN criteria are intended to be as clear, objective and straightforward as possible, the options and qualifications they possess mean that their consistent application against moderate-quality data will be very difficult. Collar *et al.* (1994:16–21) highlit some problems in interpretation, and Stattersfield (1996) and Collar (1999) provided a more general review. In these latter essays, the point was made that the use of inference, which is constantly required in the absence of certain knowledge of range and population size, is extraordinarily subjective and produces highly variable classifications, even between people familiar with and experienced in the business of criteria application. Moreover, there is a major problem of consistency owing to the fact that different evaluators tend to use different background information (on threats, conservation measures) owing to differences in the availability of resource material, or in the diligence with which it is sought, or in the interpretation that is placed on it. For example, evaluator A may decide that the granting of a logging concession spells disaster for a particular species, evaluator B may decide that the concession is unlikely to result in total destruction of the area and consider the consequence serious but not disastrous, evaluator C may know that the concession is largely on such difficult terrain that only a small amount of timber can ever be extracted, and evaluator D may not know that a concession has been granted at all. Background information can thus be crucial to the listing of a species; and of course it is a key part of an even treatment of all taxa that this background information is available to all evaluators and interpreted by them in comparable ways. No less importantly, and one of the reasons for Red Data Books and not merely Red Lists, the background information used in an evaluation needs to be declared, otherwise the transparency of the entire process is lost.

Changes in the composition of Red Lists over time can be used as an approximate predictor of rates of extinction (Crosby *et al.* 1994, Stattersfield 1996). However, we are still at the stage where a great deal of influence on listing is exerted by taxonomic changes and improvement in knowledge of species's distributions, so that many changes are independent of environmental degradation or conservation management, and merely reflect higher-resolution data and taxonomic insight. Moreover, some changes (not necessarily additions or subtractions from the list, but changes in category or merely in criteria that trigger the category) may mostly reflect improving skill or more rigorous application by evaluators as the criteria become more familiar. In particular the use of Data Deficient may be viewed as an undesirable resort by those who are prepared to allow their imaginations and the precautionary principle to dominate the process, while for others it may appear to be the only intellectually honest way of catering for a species.