Agreement on the Conservation of Albatrosses and Petrels

Third Meeting of Advisory Committee

Valdivia, Chile, 19 – 22 June 2007

Africa IBA methodology

Author: AFRICA

METHODOLOGY

GEOGRAPHICAL DEFINITION OF AFRICA AND ASSOCIATED ISLANDS

The geographical area covered by this publication includes a total of 58 countries and territories (Figure 1). These comprise the whole of continental Africa, Madagascar, the western Indian Ocean islands of Seychelles, Mauritius (with Rodrigues), Réunion (with Iles Eparses), the Federal Islamic Republic of the Comores, and Mayotte, together with the French Southern Territories of Crozet, Kerguelen, Amsterdam and St Paul Islands, the Norwegian Dependency of Bouvetøya (Bouvet Island), St Helena and its Dependencies of Ascension Island and the Tristan da Cunha group (including Gough Island), São Tomé and Príncipe, and Cape Verde. Prince Edward and Marion Islands, belonging to South Africa, are also included. Excluded, however, are the Canary Islands (Spain) and Madeira archipelago (Portugal), which are covered by the European IBA programme (Heath and Evans 2000) and the island of Socotra (Yemen), which was included within the Middle East IBA inventory (Evans 1994).

DATA-GATHERING PROCESS

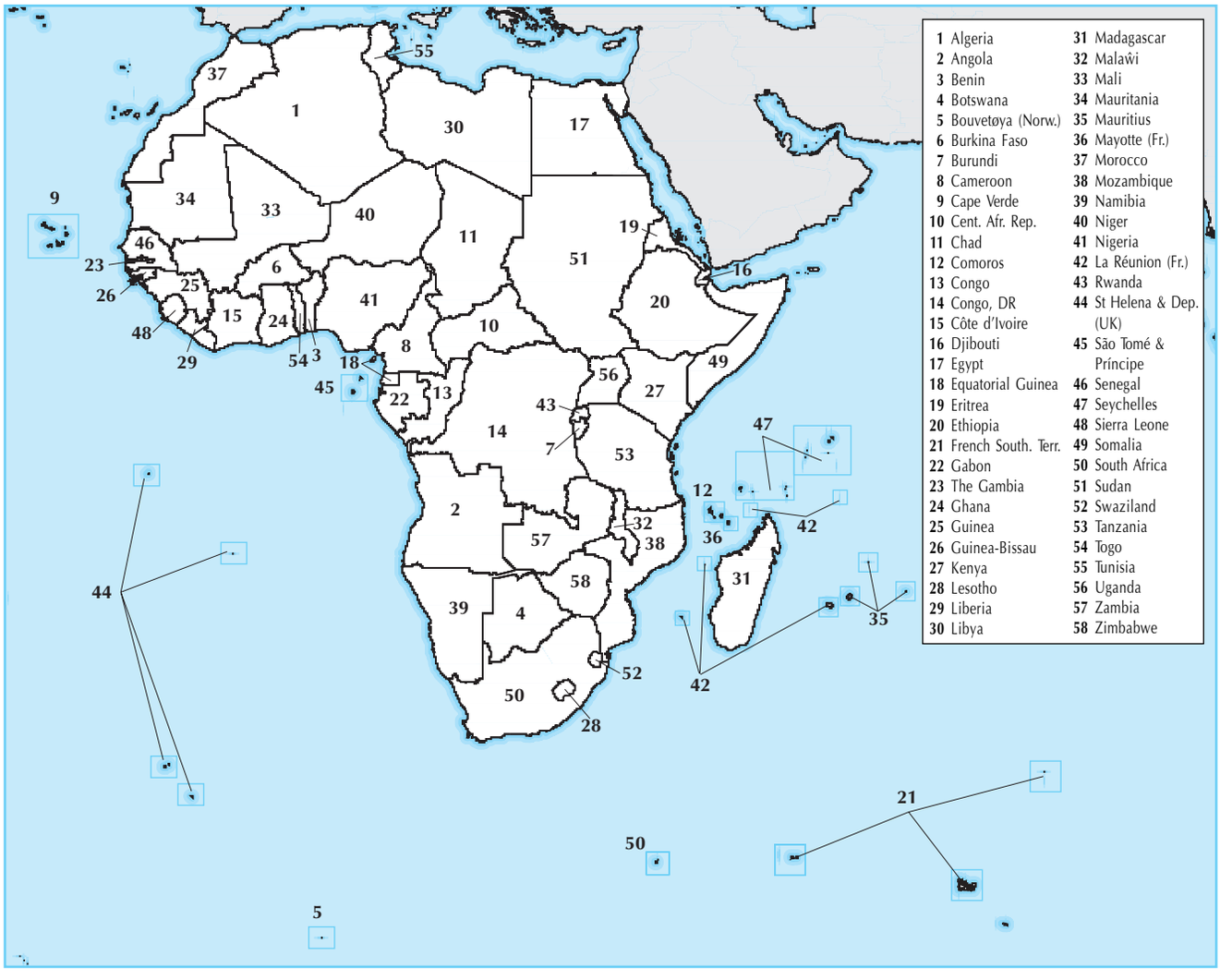
An extensive network of ornithologists, birdwatchers and conservation experts across the African region have contributed to this inventory. A large number have been involved in the collation of data specifically for this project, and are acknowledged in each country chapter. Indirectly, many hundreds more have laid the foundation for the inventory, through carrying out surveys of bird distributions and numbers over past decades.

The existence of the BirdLife International Partnership (see previous chapter) has greatly facilitated the assembly of this diverse network. The 17 Partners and affiliated organizations of BirdLife International in Africa have endorsed and are implementing the BirdLife Africa IBA programme, which was initiated in 1993. Many have an IBA coordinator (or team), responsible for delivering this programme within the country concerned.

In these countries, the national BirdLife Partner or Affiliate (or similar organization or individual) has, with external support, as appropriate, compiled the inventory. Allowing for variation between countries, this has usually involved the identification and appointment of a national IBA coordinator or team, followed by a thorough review of existing knowledge of, and consultations with people expert in, the national avifauna and its distribution, resulting in the selection of a preliminary list of sites. Between 1995 and 1998 national or sub-regional workshops were held in/for fifteen countries, involving local coordinators, contributors and experts, to publicize the project and to involve, train and enthuse participants.

These were followed by targeted field surveys of poorly known areas, the compilation of accounts for each site, and the population

Figure 1. The geographical definition of 'Africa and associated islands' as used in this book.



of a dedicated database (see Box 1). In addition, governmental approval and (wherever possible) participation have been obtained, either through inclusion of relevant ministry personnel on steering committees or the involvement in field-survey teams, or both. Training of staff in, amongst other things, bird identification and survey techniques has formed a significant part of this programme and has resulted in a considerable increase in the ornithological knowledge and expertise within participating organisations. IBA inventories for some 20 of the 58 countries have been compiled in this manner and, in most such cases, the national IBA coordinator or team are also the principal author(s) of the appropriate country chapter in this publication. There have also been, to date, six separate national or sub-regional directories published, documenting IBAs in 11 countries in Africa (see Box 4 in previous chapter, p. 3). These national inventories are the basis, in revised, condensed and, in some cases, updated form, of the relevant country chapters presented here.

For those countries where such an in-depth approach to identifying the IBA network has not so far been possible (for want of resources, lack of ornithological contacts and/or political instability), the inventories have been drawn up and the chapters written, as far as possible, by individuals expert on the avifauna of the country. These experts have drawn upon published and unpublished literature, personal knowledge and that of contacts and, in some cases, a certain amount of targeted fieldwork, to select sites. Although circumstances differ in each of the 38 countries and territories for which this general approach has been necessary, only for a very small number has not it proved possible to obtain input from people, nationals or otherwise, with significant local knowledge.

The different routes by which the national inventories have been compiled is one of the reasons for the variation in the depth of treatment between chapters. An equally important contributing factor is, of course, the considerable differences between countries in amount, quality, age and availability of the ornithological and other data.

Box 1. The IBA Database—a part of the World Bird Database

BirdLife International has been investing in the development of an information-management tool to support the activities of the Partnership for almost a decade. Known as the World Bird Database (WBDB), development started in 1993, with work on the current IBA module starting in 1994. Since 1998, with funds provided by the Royal Society for the Protection of Birds (BirdLife Partner in the UK), the database has been revised and extended so that it now covers species as well as sites. The IBA module, currently in use in 15 countries in the African region, underpins much of what appears in this book and contains additional information that could not be published here due to space constraints.

The World Bird Database provides the data-management tool for BirdLife's scientific data—in particular, data on IBAs and species of global conservation concern. It forms the basis of publications such as *Threatened birds of the world* (BirdLife International 2000) and *Important Bird Areas in Europe: Priority sites for conservation* (Heath and Evans 2000). For IBAs, data are included on site characteristics, habitats, land-uses, threats, species present, IBA criteria met, and text accounts across a number of themes. For species, data are stored on characteristics, range, population numbers, habitat use (including relative importance and seasonal use), threats (including timing, scope, severity and impact) and targets for future action.

Key benefits of the World Bird Database are the ability to:

- Manage and validate a large volume of information on sites and species that are of global conservation concern
- Analyse trends in data and monitor changes
- Link site data with species data
- Determine the conservation status of species
- Produce focused, targeted reports for specific purposes
- Improve the sharing of information between Partners
- Improve electronic links to non-BirdLife data and information, such as socio-economic and non-bird data, for use in analyses
- Link to geographic information systems (GIS) for presentation and analysis
- Deliver information over the Internet.

The World Bird Database is a two-way distribution channel, enabling data to flow between the people who collect the data or update it, those who collate and verify it, and those who make the analyses that turn data into information and targets, in order to influence policy and decision-making—moving from science to conservation action.

SOURCES OF DATA

The sources of information used to compile the IBA inventories are given in the bibliographies of the national chapters. Underpinning them all are a number of key works which have been used extensively to establish the framework of the programme and to guide the data-gathering processes. These include:

- *Birds to Watch 2* (Collar *et al.* 1994): this BirdLife publication identified, on behalf of IUCN—The World Conservation Union (the universally recognized authority on globally threatened species), all bird species considered of global conservation concern, including in the Africa region. It provided an updated list of such taxa compared to the lists provided by Collar and Stuart (1985) and Collar and Andrew (1988), and is the source of the list of bird species of global conservation concern that was used to select IBAs under the A1 criterion (see below and Appendix 3).
- The BirdLife Biodiversity Project—summary results of which appeared in ICBP (1992) and full details in Stattersfield *et al.* (1998)—furnished the lists of bird species of restricted range and information on Endemic Bird Areas (EBAs) and Secondary Areas, used to identify IBAs under the A2 criterion (see below and Appendix 4).
- The atlases of Afrotropical bird distributions of Hall and Moreau (1970) and Snow (1978), supplemented by the early volumes of *Birds of Africa* (Brown *et al.* 1982, Urban *et al.* 1986, Fry *et al.* 1988, Keith *et al.* 1992), used in conjunction with the vegetation maps of Africa and accompanying memoirs of White (1983) and, to a lesser extent, Keay (1959), were used to decide upon the biome divisions and generate the associated lists of biome-restricted bird species, which were then used to select IBAs under the A3 criterion (see below and Appendix 5). Information on range states for biome-restricted and other bird species come from Dowsett (1993, 1996) and Dowsett and Forbes-Watson (1993).
- Wetlands International has published much information on the sizes and geographical ranges of waterbird populations in Africa (Rose and Scott 1994, 1997)—analysed and mapped in more detail for geese and ducks (Scott and Rose 1996)—and also organizes the African Waterbird Census, details of which are published annually (Perennou 1991, 1992, Taylor, 1993, Taylor and Rose 1994, Dodman and Taylor 1995, 1996, Dodman *et al.* 1997, 1998). Wetlands International also provided access to unpublished data as well as analyses of their databases, using the 1% population thresholds for identifying IBAs under the A4i and A4iii criteria (see below and Appendix 6).

TAXONOMY AND NOMENCLATURE

The taxonomy and nomenclature used in this volume has somewhat mixed parentage. The global system used by the BirdLife International Secretariat and incorporated into the World Bird Database (Box 1) is based upon that of Sibley and Monroe (1990, 1993), but uses the family sequence of Morony *et al.* (1975). However, Collar *et al.* (1994) incorporated a number of departures from both systems, based as it was, for the African region, on the earlier Collar and Stuart (1985)—departures which have had to be followed here. Concerted attempts were also made to ensure compatibility, for taxa common to both, with the Middle East IBA programme (Evans 1994), with the list of bird species recognized as having globally restricted ranges (Stattersfield *et al.* 1998), with congregatory waterbirds, as defined by the Ramsar Convention (Rose and Scott 1997), and also with the European IBA programme (Heath and Evans 2000) which, however, follows the taxonomy and nomenclature of Cramp *et al.* (1977–1994).

Box 2. The different types of data collected on Important Bird Areas, and currently available in the IBA database for some countries in Africa.

Area accuracy

Reliable	A	accurate to within 10%
Incomplete	B	accurate to within 50%
Poor	C	definitely not accurate to within 50%
Unknown	U	

Land ownership

Private
State
Communal
Religious group
International waters
Mixed
Other
Unknown

Season types	Code	Description
Breeding resident	R	Species breeds in IBA and remains throughout the year.
Breeding visitor	B	Species breeds in IBA but is not present for parts of the year.
Winter visitor	W	Species spends a substantial part of the boreal/austral winter in IBA.
Passage visitor	P	Species stages in IBA during migration.
Non-breeding visitor	N	Species occurs in IBA but does not breed (usually over-summering immature birds or post-breeding moult-gatherings).
Unknown	U	Breeding or seasonal status of species in IBA is unknown or uncertain.

Population abundance

Abundant	Encountered in large numbers in preferred habitat.
Common	Encountered singly or in small numbers in preferred habitat.
Frequent	Often, but not always, met with in preferred habitat.
Uncommon	Encountered sporadically in preferred habitat.
Rare	Rarely seen, often implying less than 10 or so records.
Unknown	Not possible to assess abundance on available information.

Accuracy of Population size/Trend

Reliable	A	accurate to within 10%
Incomplete	B	accurate to within 50%
Poor	C	definitely not accurate to within 50%
Unknown	U	

Estimate of trend

+2	Large increase
+1	Small increase
0	Stable
-1	Small decrease
-2	Large decrease
F	Fluctuating
N	New breeder
X	Extinct
U	Unknown

Impact of threat

High
Medium
Low
Unknown

Relationship of protected area/IBA

Protected area is contained by IBA
Protected area contains IBA
Protected area overlaps with IBA
Protected area is adjacent to IBA
Relationship unknown

Geographical data	
Compiler	Person(s) or organization(s) responsible for the IBA data provided.
Date	Date of completion of data compilation.
IBA codes	Current site-code; national IBA code.
Site names	International name; national name in national language.
Country	Country or territory in which IBA is located.
Administrative regions	Administrative region(s) in which IBA is located (at primary and secondary levels).
Area of IBA	Area of IBA in hectares (ha); 100 hectares = 1 km^2.
Area accuracy	Accuracy to which area of IBA is known.
Central coordinates	Central coordinates of IBA, in degrees and minutes (latitude/longitude; Greenwich).
Altitude	Altitudinal range spanned by IBA (in metres above/below sea level).
Map	Whether a map showing IBA boundaries (in paper or digitized form) is available.
General description	A general description of the IBA, its location and general appearance.
Ownership	An indication of the dominant type of ownership of the land within the IBA (should cover >50% of the IBA area).
Management plan	An indication of whether the IBA is covered (partly or wholly) by any existing management plan(s).
Criteria	
Endemic Bird Areas	Name of Endemic Bird Area or Secondary Area, if A2 criterion is met; see this chapter for further explanation.
Biomes	Name of biome(s), if A3 criterion is met; see this chapter for further explanation.
Criteria	The reasons why the site is considered ornithologically important (summary list of IBA criteria fulfilled at the site). See this chapter for an explanation of the criteria.
Ornithological data	
Species name	See Appendix 2 for a list of scientific, English and French names of birds used in this book.
Season	The season in which the species occurs in the IBA.
Year	The year of the latest data on which the population estimate is based.
Population size (minimum and maximum)	An estimate of minimum and maximum population size of the species at the IBA.
Population size accuracy	Accuracy of population-size estimate.
Population abundance	Qualitative estimate of population size. Only completed if minimum and maximum values not available.
Trend	An indication of the population-size trend at the site over the last 10 years.
Trend accuracy	Accuracy of indicated trend.
Criteria	IBA criteria fulfilled by species's population at site (see this chapter for an explanation of the criteria).
Habitat data	
Habitat type	Habitat types covering >5% of the IBA area. Two levels of habitat data can be provided (see Appendix 7 for classification).
Percentage cover	The percentage of the IBA covered by the habitat type.
Land-use data	
Land-use type	Land-uses covering >5% of the IBA area. (See Box 3 for classification.)
Percentage cover	The percentage of the IBA covered by the land-use.
Threat data	
Threat type	Key threats impacting on the IBA. (See Box 4 for classification.)
Impact of threat	The seriousness of the threat (actual or potential).
Protection status	
Name	The name of the protected area.
Designation	The national or international designation-type (e.g. National Park).
Year	The year of initial designation.
IUCN category	The IUCN protected-area management category (I–VI) (IUCN 1994).
Area	The area, in hectares (ha; 100 ha = 1 km^2), of the protected area.
Central coordinates	The central coordinates of the protected area (in degrees/minutes of latitude/longitude; Greenwich).
Relationship to IBA	The spatial relationship between the IBA and the protected area.
Overlap	The extent of overlap in hectares (ha) between the IBA and protected area.
Other data	
General ornithological description	A general description of the ornithological importance of the IBA.
Other flora/fauna	Other significant flora and fauna present in the IBA.
Habitats/Land-uses/Threats	Additional text on habitats, land-uses or threats.
Research/conservation projects	Information on research, conservation or management activities at the IBA. Further details on protection, including any proposed protection measures.

Furthermore, aspects of Sibley and Monroe's work found only limited favour with a large proportion of African ornithologists and others familiar with its avifauna. Therefore, partly in recognition of this, partly from the preferences of the editors and members of the programme's Technical Advisory Committee, and partly from expediency, the taxonomy and nomenclature of a large number of species follow Dowsett and Forbes-Watson (1993), because of the availability of this list in computer database form with range-state information for all species that it recognized, generously put at the Africa IBA programme's disposal by its authors.

All 2,313 species that are recognized for the African region by the IBA programme, together with the IBA criteria that each species can potentially fulfil (see below), are listed in taxonomic sequence in Appendix 2. The English vernacular names listed there derive also from Sibley and Monroe (1990, 1993), changed, where necessary and/or preferred, to those, mainly, of Dowsett and Forbes-Watson (1993), while French vernacular names are taken from Devillers *et al*. (1993). Since only the scientific names of bird species are used in the text, Appendix 10 lists all species alphabetically by scientific name against English and French vernacular names (cross-referenced to Appendix 2).

DATA-COLLECTION AND HANDLING

For each IBA across the African region, key data have, as far as possible, been collected on:

- Location
- Bird species
- Reasons for importance
- Habitats and land-uses
- Threats
- Protection status
- Conservation action

Box 2 presents a fuller explanation of the types of data sought and, where possible, collected. This reflects the structure and content of the IBA module of the World Bird Database, as used by the BirdLife International Partnership worldwide, as well as its corresponding data-form (paper questionnaire). The methods used for compiling and classifying this information have thus been standardized as much as possible. Standard lists have been developed for several classes of the data, to simplify collection and to facilitate any subsequent comparison and analysis of data between sites at local, national, regional and global levels. Thus, for habitats, land-uses and threats, a standard classification was drawn up for each that sought to cover all possible options that might be encountered at IBAs in the African region, and these are listed in Appendix 7 (habitats), Box 3 (land-uses) and Box 4 (threats).

The importance of an individual site for bird conservation was also categorized in a standard way, such that a site could qualify as an IBA on the basis of one or more of seven ornithological criteria. The ornithological data provided for each site were analysed systematically to ensure that all IBAs were truly of international importance and that these reasons for qualification were clearly documented. These standard criteria are fundamental to the IBA concept and are fully explained below.

Box 3. Classification of land-uses at Important Bird Areas in Africa.

Agriculture (pastoral and arable)
Fisheries/aquaculture
Forestry
Hunting
Military
Nature conservation/research
Tourism/recreation
Urban/industrial/transport (including residential areas and mining)
Water management (including watershed management)
Not utilized
Other
Unknown

Box 4. Classification of threats at Important Bird Areas in Africa.

Abandonment/reduction of land management (including undergrazing)
Afforestation
Agricultural intensification/expansion (including irrigation, high input of fertilizer or other chemicals, changes in crop species or cultivation method, and overgrazing)
Aquaculture/fisheries
Burning of vegetation (not caused by natural events)
Consequences of animal/plant introductions
Construction/impact of dyke/dam/barrage
Deforestation (commercial)
Disturbance to birds (limited to direct disturbance to birds by man (often wilful) and domestic animals)
Drainage
Dredging/canalization
Extraction industry (mining)
Filling-in of wetlands
Firewood collection
Forest grazing
Groundwater abstraction
Industrialization/urbanization (including construction, chemical run-off and spillage, sewage effluent, etc.)
Infrastructure (including roads, railways and overhead transmission lines, etc.)
Intensified forest management
Natural events (drought, erosion, storms, etc.)
Recreation/tourism
Selective logging/cutting
Shifting agriculture
Unsustainable exploitation (including hunting, egg collection, etc.)
Other
Unknown

As is apparent from Box 2, the IBA database module has provision for handling more detailed quantitative data than are currently available for the overwhelming majority of IBAs identified in this book, and thus it has some data-fields hitherto unused by the Africa IBA programme; these are therefore not explained further here—see Heath and Evans (2000) for details of them. Furthermore, since a significant proportion of the 38 national inventories that were compiled by means other than dedicated national IBA programmes operated by BirdLife Partner organizations or equivalents (as described above), the database has yet to be fully populated, which is one of the reasons why the compilation of this inventory was not more completely database-driven, in the way that its recent European equivalent was (Heath and Evans 2000).

DATA CHECKING/VALIDATION

Once the national coordinator or compiler had submitted details of potential IBAs, the data provided were checked for errors and inconsistencies by BirdLife International Secretariat staff, and the importance of each site was evaluated against the seven ornithological criteria mentioned earlier. This evaluation process is explained more fully below.

IDENTIFYING IMPORTANT BIRD AREAS

Why apply IBA criteria?

The selection of Important Bird Areas (IBAs) is achieved through the application of quantitative ornithological criteria, grounded, as far as possible, in accurate, up-to-date knowledge of species's distributions and the sizes and trends of bird populations. The criteria by which sites are selected as IBAs ensure that the sites are of true significance for the international conservation of bird populations, and provide a common currency to which all IBAs adhere, thus creating consistency among, and enabling comparability between, sites at national, continental and global levels. It is crucial to understand why a site is important, and to do this it is necessary to examine its international significance in terms of the presence and abundance of species that occur at it in different

seasons. Other aspects of these species that need to be taken into account include threat and breeding status, range size, the composition of the species assemblages, vulnerability through congregation, and the proportion of the total population of each species that occurs at a site; all these are important factors in determining a site's importance.

A main aim of the African IBA Programme is to attain protection for IBAs, and the provision of convincing bird data is an essential part of any argument for statutory or other form of protection. Importantly, the application of criteria to significant species, together with future data-gathering and the development of monitoring programmes, permit not only the assessment of changes in species's numbers, but also an examination of how these changes impact on the overall importance of the site, thus helping to guide the management and conservation of the area. The more specific, quantitative and comprehensive is the information available on IBAs, with links showing fulfilment of the requirements, as appropriate, of the various international agreements on biodiversity conservation, the stronger is the case for protection. To this end, the criteria build upon existing international legal instruments that contain a site-conservation component, such as the Ramsar Convention, under which contracting parties must designate at least one Ramsar Site.

IBA criteria

The criteria used to select IBAs in the African region derive from those initially used in the first European IBA inventory (Grimmett and Jones 1989), which in turn took account of several previous studies of IBA criteria at the level of the European Community (Osieck and Mörzer Bruyns 1981, Grimmett and Gammell 1989). The 1989 criteria had, however, been developed specifically for application in Europe and, with the globalization of the IBA programme, had to be adapted, first for the Middle East IBA programme (Evans 1994), and subsequently, following extensive consultation with the BirdLife International Partnership and beyond, further developed and standardized for application worldwide (Bennun and Fishpool 2000, Fishpool *et al.* 1998, Heath and Evans 2000).

These standardized criteria are designed to identify IBAs of global significance ('level A' criteria). They allow, however, for additional criteria to be 'nested' within them, so as to enable the international importance of sites to be identified and categorized at the regional level ('B' criteria) and/or sub-regional level ('C' criteria), and thus permit meaningful comparison to be made between sites across regions of the world. The European IBA programme uses up to 20 criteria, at all three levels, to identify IBAs in Europe (Heath and Evans 2000), while both global (A) and sub-regional (C) criteria have been applied in the southern African subregion (Barnes 1998).

Early in the African IBA programme, it was agreed with the programme's Technical Advisory Committee (see previous chapter) that only sites of global significance were, at this stage, to be identified in the region. Using the global ('A') criteria, IBAs are selected based on the presence of:

- bird species of global conservation concern;
- assemblages of restricted-range bird species;
- assemblages of biome-restricted bird species;
- concentrations of numbers of congregatory bird species.

A summary of the seven global criteria, (signified by the prefix A, thus A1, A2, A3, A4i, A4ii, A4iii and A4iv), is given in Table 1 and each is explained in more detail below.

The application of IBA criteria

Each category has an associated list of eligible species, with each species, in categories A1 and A4, having a numerical population threshold which must be matched or exceeded in order for the site to qualify for that category. These population thresholds were derived, wherever possible, from internationally recognized sources of bird population data (see below). The application of the criteria involved either comparing the data provided for each relevant bird species at the site—often in the form of an estimate of the number of individuals or pairs of the species using the site—against the numerical threshold for the species concerned (normally representing 1% of the species's population in question, e.g. when applying category A4i or A4ii) or, in the case of, e.g., data-poor species of category A1, assessing whether its known presence at a site implied its occurrence there regularly and/or in significant numbers. For categories A2 and A3, the application process required assessments of the groups (assemblages) of relevant species at a given site to be made in comparison with those groups of species at other sites potentially qualifying for the same category.

In many countries, it has not been possible to apply the criteria fully to all relevant species, due to a lack of data. Therefore, the selection of sites for some of these species, or the data presented on qualifying species at these sites, is likely to be incomplete (see next chapter, 'Overview and recommendations'). Much effort has been expended in obtaining the best ornithological data possible, and in checking their validity, but there can be no guarantee for the accuracy of every species record provided in this book.

The definitions of the criteria given in this chapter are guidelines for the identification of IBAs. They have been followed as far as possible but, since definitions of this sort cannot cover all

Table 1. Summary of global ('A') criteria for selection of Important Bird Areas.

Category		Criterion	Notes
A1 Species of global conservation concern		The site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern.	The site qualifies if it is known, estimated or thought to hold a population of a species categorized as Critical or Endangered. Population-size thresholds for Vulnerable, Conservation Dependent, Data Deficient and Near Threatened species are set regionally, as appropriate, to help in site selection.
A2 Assemblage of restricted-range species		The site is known or thought to hold a significant component of the restricted-range species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA).	The site has to form one of a set selected to ensure that, as far as possible, all restricted-range species of an EBA or SA are present in significant numbers in at least one site in the set and, preferably, in more.
A3 Assemblage of biome-restricted species		The site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.	The site has to form one of a set selected to ensure that, as far as possible, all species restricted to a biome are adequately represented.
A4 Congregations		**(i)** The site is known or thought to hold, on a regular basis, ≥1% of a biogeographic population of a congregatory waterbird species.	This applies to waterbird species as defined by Rose and Scott (1997). Thresholds are generated in some instances by combining flyway populations within a biogeographic region, but for other species that lack quantitative data, thresholds are set regionally or inter-regionally, as appropriate. In such cases, thresholds will be taken as estimates of 1% of the biogeographic population.
	or	**(ii)** The site is known or thought to hold, on a regular basis, ≥1% of the global population of a congregatory seabird or terrestrial species.	This includes those seabird species not covered by Rose and Scott (1997). Where quantitative data are lacking, numerical thresholds for each species are set regionally or inter-regionally, as appropriate. In such cases, thresholds will be taken as estimates of 1% of global population.
	or	**(iii)** The site is known or thought to hold, on a regular basis, ≥20,000 waterbirds or ≥10,000 pairs of seabirds of one or more species.	For waterbirds, this is the same as Ramsar Convention criteria category 5.
	or	**(iv)** The site is known or thought to exceed thresholds set for migratory species at bottleneck sites (see Box 7 for definition).	Numerical thresholds are set regionally or inter-regionally, as appropriate.

possibilities, they are not inflexible rules. The need for scientific objectivity and standardization has had to be balanced by common sense and the practical objectives of the exercise.

DETAILED DEFINITIONS OF THE GLOBAL IBA CRITERIA

Globally threatened species—Category A1

The site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern.

Sites are identified under this category for those species most threatened with global extinction. This includes species classified as 'Critical', 'Endangered' and 'Vulnerable', according to the recent, universally recognized criteria for global threat status (IUCN 1994), as well as those designated 'Conservation Dependent', 'Data Deficient' and 'Near Threatened'. Species in the latter three categories, although, strictly, not globally threatened, are considered to be of sufficient global conservation concern to merit inclusion under this category.

These species are collectively termed 'species of global conservation concern' and are listed, together with their threat status, in Appendix 3, as well as described in more detail in *Birds to watch 2* (Collar *et al*. 1994). Very recently, several years after the Africa IBA programme had commenced, the global threat status of all bird species was comprehensively revised (BirdLife International 2000), and thus this revised global threat status (if different) is also listed in Appendix 3, together with any additional species classified as 'of global conservation concern' for the first time in the more recent review. As explained in the previous chapter, data collection for the Africa IBA programme began in 1993 and, other than for a very few exceptions explained in the relevant site accounts, it has not proved possible to update the national IBA inventories to incorporate these recent revisions to some species's global threat status.

In general, the regular presence of a Critical or Endangered species, irrespective of its abundance at the site, is considered sufficient to propose the site as an IBA. Species in the other threat categories have to be known, or thought, to be present at a site in 'significant' numbers for the site to qualify under this criterion for these species. The following numeric thresholds were used, where possible, to propose qualification of a site for species in these categories, while recognizing that these figures may not be appropriate for all species (especially those that are threatened more through the steepness of their actual or potential decline than through any rarity *per se*):

Vulnerable

Non-passerines	10 pairs/30 individuals
Passerines	10 pairs/30 individuals

Near Threatened, Data Deficient, Conservation Dependent

Non-passerines	10 pairs/30 individuals
Passerines	30 pairs/90 individuals

In many cases, particularly for passerines, data were insufficient to be able to apply these thresholds directly, and inference was used. In general, the words 'regular' and 'significant' in the category definition are intended to exclude instances of vagrancy, marginal occurrence and ancient or historical records. 'Regular' includes seasonal presence (and presence at longer intervals, if suitable conditions themselves only occur at extended intervals, as is often the case for temporary wetlands in deserts or in semi-arid lands, for example). In addition, the category allows for the inclusion of sites that have the potential to hold species of global conservation concern, following habitat-restoration work or re-introductions, etc. Exceptionally, a few sites have been included in this inventory, under this category, on the basis of the presence of a globally threatened subspecies which may be a valid species—the majority of such subspecies are listed in Collar *et al*. (1994: Box 2, p. 11) and are listed in Appendix 3. In all cases, these taxa occur at sites that also qualify as IBAs under the A1 criterion for other species of global conservation concern, or under other criteria.

Restricted-range species—Category A2

The site is known or thought to hold a significant component of a group of species whose breeding distributions define an Endemic Bird Area (EBA) or a Secondary Area.

Sites are identified under this category for species of Endemic Bird Areas (EBAs). EBAs are defined as places where two or more species of restricted range, i.e. with world distributions of under 50,000 km^2, occur together (Stattersfield *et al*. 1998). There are 218 EBAs globally, 39 of which occur in the African region. These are listed in Appendix 4, together with the restricted-range species by whose combined ranges they are defined geographically.

For those EBAs which hold a large number of restricted-range species, it is necessary that a network of sites be chosen by complementarity analysis, to ensure adequate representation of all constituent species, both across the EBA as a whole and, for those which span two or more countries, for all of its species which occur in each range state.

The 'significant component' term in the category definition is intended to avoid selecting sites solely on the presence of one or more restricted-range species that are common and adaptable within the EBA and, therefore, occur at other chosen sites. Additional sites may, however, be selected for the presence of one or a few species which would, e.g. for reasons of particular habitat requirements, be otherwise under-represented. For this reason, the term 'significant component' is not more precisely defined.

Also included here are species of Secondary Areas. A Secondary Area supports one or, rarely, more restricted-range species, but does not qualify as an EBA because fewer than two species are entirely confined to it (Stattersfield *et al*. 1998). Typical Secondary Areas include single restricted-range species which do not overlap in distribution with any other such species, and places where there are widely disjunct records of one or more restricted-range species, which are clearly geographically separate from any of the EBAs. There are 29 Secondary Areas in the African region, listed in Appendix 4 together with their restricted-range species.

Biome-restricted assemblages—Category A3

The site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.

This category applies to groups of species with largely shared distributions, often of greater than 50,000 km^2, which occur mostly or wholly within all or part of a particular biome. Many of these assemblages are found in large areas of relatively intact and continuous habitat where delimiting IBAs may be particularly difficult. Biome-restricted species are those whose entire (global) breeding distribution lies entirely or mostly within the defined boundaries of the biome.

A biome is defined as a major regional ecological community, characterized by distinctive life forms and principal plant species. No system of biome classification was found which provided a suitable basis for generating lists of biome-restricted bird species globally. This necessitated the adoption of regional biome classifications and has, therefore, resulted in some inter-regional differences but, as far as possible, the overall scale at which biome divisions are recognized—the 'depth' of treatment—is comparable.

Thirteen terrestrial biomes, based mostly upon White (1983) but also owing something to the earlier work of Keay (1959), have been adopted for Africa and a further two in Madagascar, as shown on Plate 1 (p. 17). Lists of biome-restricted species for all biomes, together with their range-state data, as well as details of biome representation by country, are given in Appendix 5. All smaller islands have been excluded from this analysis, as have all seabirds and most waterbirds (as defined under Category A4i), since wetlands are largely 'azonal'. Further detail is given in Box 5 of how the lists of biome-restricted assemblages were generated.

As with Category A2, a network of sites is chosen to ensure, as far as possible, adequate representation of all constituent species, both across the biome as a whole and, as ten of the thirteen biomes

span two or more countries, for all of its species in each range state. The 'significant component' term in the category definition is intended to avoid selecting sites solely on the presence of one or a few biome-restricted species that are common, widespread and adaptable within the biome and, therefore, occur at other chosen sites. Additional sites may, however, be chosen for the presence of one or a few species which would, e.g. for reasons of particular habitat requirements, be otherwise under-represented. For this reason, the term 'significant component' is not more precisely defined.

In applying this category, the number of sites selected per country also takes into account both the size of the country and the relative amount of a given biome within it. The size of the site is also relevant; it is preferable to select a few, large sites that reflect the distribution of biome across the country rather than many small ones confined to only a part of it. This ensures that a greater number of species are represented per site and takes account of their geographical distribution. Sites are, however, not so large as to be unamenable to conservation and, in some cases, small sites with high population densities were preferred to large ones with lower densities.

Globally important congregations—Category A4

The site may qualify on any one or more of the four criteria listed below:

- ***i The site is known or thought to hold, on a regular basis, 1% or more of a biogeographic population of a congregatory waterbird species.***
- ***ii The site is known or thought to hold, on a regular basis, 1% or more of the global population of a congregatory seabird or terrestrial species.***
- ***iii The site is known or thought to hold, on a regular basis, at least 20,000 waterbirds, or at least 10,000 pairs of seabird, of one or more species.***
- ***iv The site is known or thought to be a 'bottleneck site' where at least 20,000 pelicans (Pelecanidae) and/or storks (Ciconiidae) and/or raptors (Accipitriformes and Falconiformes) and/or cranes (Gruidae) pass regularly during spring and/or autumn migration.***

This category is applied to those species that are (perceived to be) vulnerable, at the population level, to the destruction or degradation

Box 5. Identification of biomes and generation of the lists of biome-restricted species.

The bird species lists for the African IBA biomes were generated from the *Atlases of speciation in African passerine and non-passerine birds* (Hall and Moreau 1970, Snow 1978), used in conjunction with the vegetation maps of Africa by Keay (1959) and, in particular, by White (1983). The atlases show locality information, i.e. point data for individual species (based solely on museum specimens), for all Afrotropical breeding species, plotted over a simplified version of Keay's vegetation map.

The first step in the process of defining biomes and producing associated lists of bird species involved enlarging onto a transparency the standard, simplified map of White's phytochoria (plant biomes), to the same scale as the base map used in the Atlases. An iterative process then followed, of going through the atlas maps to determine which bird species's distributions fell largely or wholly within the boundaries of one of White's phytochoria. In a few places, such as in the region of the Angola scarp, the vegetation boundaries shown on the earlier map of Keay seemed to conform better with the observed bird distributions. Several iterations, involving comparisons of successive versions of the biome map against bird distributions were necessary until a 'best fit' biome map was achieved.

At the continental scale used, the position of the biome boundaries is necessarily inexact. An approximate rule of thumb applied was that any species with at least 75% of points falling within the boundaries of a given biome was added to a preliminary list for that biome, although no attempt was made to count accurately the numbers of points on either side of the boundaries. There was a problem with habitat outliers, too small to be mapped at the scale used, some way removed from the main biome boundary. Reference to the large-scale source map and, in some cases, personal experience of the region and of the species concerned, enabled decisions to be taken as to whether such apparent 'anomalies' in bird distribution were attributable to the presence of these outliers (in which case the species concerned were added to/retained on the list for the biome) or to the species having a wider habitat tolerance in that part of its range (in which case it was usually deleted from the list, unless this difference in habitat preference appeared localized compared to its overall and, for the most part, biome-restricted, distribution).

The distributions of bird species that are non-breeding visitors to the Afrotropics (from Eurasia and other regions) are not plotted on the source maps, and hence do not figure on the biome lists. This is a deficiency of the lists themselves, but since no instances have come to light where, e.g. Palearctic migrants occur in a habitat-type that lacks biome-restricted, resident Afrotropical species, the application of the criterion in site selection using these lists does not 'miss' any important avian habitats. The atlases do map Afrotropical migrant species—in a few instances their distributions on either their breeding or, less often, their non-breeding ranges coincide with the limits of a biome and are hence included in the relevant list.

Unique names for the biome were chosen—hence, Guinea–Congo Forests, rather than e.g. 'lowland forest', for obvious reasons. Use of characterful names such as Guinea–Congo Forests does not imply that only forest in the narrow sense is included within the biome; other vegetation types, such as grassland and mangrove habitats in this case, can also fall within a biome.

Many large-scale wetland habitats, and hence bird species of them, are largely azonal and consequently do not fit into this classification system (and are, in any case, covered in the IBA selection process by the A4 criterion), but there are exceptions. In Africa, one such is papyrus swamps and their endemics, and many other biomes have passerines of wetlands, as well as rather fewer non-passerines, limited to them.

In the Afrotropics, it is an established convention that the altitudinal divide between lowland and montane habitat occurs at around the 1,500 m contour and this has been used here to separate the Afrotropical Highlands biome from the surrounding lowland ones. Obviously, this threshold has not been applied too rigorously—in some parts of the continent 1,800 m is a better limit, while in others, where highlands abut the coast and in the higher latitudes of southern Africa, things get more complex, with species which are Afromontane elsewhere occurring at much lower altitudes. The lowland/highland divide has led, perhaps counter-intuitively, to some highly forest-dependent species being omitted from the biome lists. Thus, an exclusively forest species with an altitudinal range of 0–2,200 m does not qualify as biome-restricted on the definitions used.

Two biomes which occur in Africa—the Mediterranean and the Sahara–Sindian—are not confined to it. The Africa IBA programme has identified and used only those species which occur in the African components of these biomes, although included in these are some species whose distributions extend into Arabia. Drawing up the lists for North Africa was complicated by the fact that the two bird atlases and the vegetation map of Keay cover only sub-Saharan Africa. White's (1983) map does, however, include North Africa: the approach adopted was to relate the simplified biome divisions of this map to bird distributions as mapped by the major handbooks *Birds of the Western Palearctic* (Cramp *et al.* 1977–1994) and *Birds of Africa* (Brown *et al.* 1982, Urban *et al.* 1986, Fry *et al.* 1988 and Keith *et al.* 1992). Assessing biome restriction extralimitally was done using Bailey (1989).

Generation of lists of biome-restricted species for those biomes which occur exclusively in southern Africa was undertaken largely by staff of the Avian Demography Unit, Cape Town, in particular David Allan, using data generated by the Southern African Bird Atlas Project (Harrison *et al.* 1997).

Numerous refinements and improvements to a number of the lists of biome-restricted species were made as a result of input from Dr F. Dowsett-Lemaire and R. J. Dowsett, who were enormously helpful in providing access to their databases and unpublished information—see Dowsett-Lemaire and Dowsett (2001) and references therein, for detailed considerations of the species assemblages of a number of the regions recognized by White (1983), corresponding closely to what are termed biomes in this study.

of sites, by virtue of their congregatory behaviour at any stage in their life-cycles.

The list of congregatory waterbird (A4i) species for which this category has been applied in the Afrotropics, together with their 1% numerical population thresholds (and the derivation of these figures), is given in Appendices 6a and 6b, and the list of waterbird species for North Africa, with their 1% thresholds, is given in Appendix 6c. The 1% thresholds for North Africa, as part of the Western Palearctic, are the same as those used by the European IBA programme (Heath and Evans 2000). One-percent threshold figures have been defined for the Africa IBA programme for almost all waterbird species, including those for which no thresholds are currently recognized under the Ramsar Convention. Wetlands International has collaborated significantly in generating numeric thresholds from range estimates and from unpublished population data (see Appendix 6b for more details).

Equivalent lists for congregatory seabirds and terrestrial (A4ii) species, their corresponding 1% thresholds and explanations of their derivations are given in Appendices 6d, 6e and 6f.

Criteria A4i and A4iii identify wetlands of international importance (Ramsar Sites), as they are similar to Ramsar criteria 6 and 5 respectively (see below and Box 6).

Definition of 'waterbird' and 'seabird'

The term 'waterbird' is used in the same sense as that used for 'waterfowl' under the Ramsar Convention, and covers (in Africa) all bird species in the following families (Rose and Scott 1997): Podicipedidae (grebes), Pelecanidae (pelicans), Phalacrocoracidae (cormorants), Anhingidae (darters), Ardeidae (herons), Balaenicipitidae (Shoebill), Scopidae (Hamerkop), Ciconiidae (storks), Threskiornithidae (ibises), Phoenicopteridae (flamingos), Anatidae (wildfowl), Gruidae (cranes), Rallidae (rails), Heliornithidae (finfoots), Jacanidae (lilytrotters), Rostratulidae (painted snipes), Dromadidae (Crab Plover), Haematopodidae (oystercatchers), Recurvirostridae (stilts, avocets), Burhinidae (stone-curlews), Glareolidae (coursers, pratincoles), Charadriidae (plovers), Scolopacidae (sandpipers and allies), Laridae (gulls and terns) and Rynchopidae (skimmers). By this definition waterbirds include, for example, cormorants, gulls and terns, which some authors have more traditionally considered as seabirds. It also includes species such as coursers and some plovers which are birds of arid lands, as well as species, some rallids for example, which are never congregatory. The term 'seabird' covers, in the African region, species in the following families: Spheniscidae (penguins), Diomedeidae (albatrosses), Procellaridae (fulmars, petrels, shearwaters and prions), Hydrobatidae (storm-petrels), Pelecanoididae (diving petrels), Phaethontidae (tropicbirds), Sulidae (gannets and boobies), Fregatidae (frigatebirds), Chionididae (sheathbills) and Stercoraridae (skuas).

Box 6. Categories for site selection under the Ramsar Convention (adopted at the Conference of the Parties, 7 May 1999).

1. Representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
2. Supports vulnerable, endangered, or critically endangered species or threatened ecological communities.
3. Supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
4. Supports plant and/or animal species at a critical stage in their life-cycles, or provides refuge during adverse conditions.
5. Regularly supports 20,000 or more waterbirds.
6. Regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.
7. Supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.
8. An important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

Box 7. Migration bottleneck sites

A migration bottleneck is a site at which, during certain, usually relatively short, well-defined seasons of the year, large numbers of migratory birds regularly pass through or over. The concentration of birds at these sites at such times is a consequence of both the sites' geographical location and their local topography. Types of site include:

- the land on either side of the narrowest crossing point, or straits, of a large water-body, together with the immediate surrounding area, over and across which birds may funnel in dense, often low-flying flocks.
- narrow corridors of land, such as, for example, a ridge of highland or the edge of a scarp, along which migrating flocks fly, often at low altitude.

In addition, such places may be used as temporary roosting sites by these flocks whilst on passage.

The birds which make most conspicuous use of such sites and are, therefore, most vulnerable while doing so, are large soaring or semi-soaring species which use thermals to migrate over land by day and, hence, cross bodies of water at their narrowest points. These include pelicans, storks, raptors and cranes.

Definition of 'biogeographic population'

The term 'biogeographic' in the A4i criterion is used in the sense of a zoogeographic realm. For African IBAs, the biogeographic regions are the Afrotropics, and that part of the Western Palearctic which includes North Africa (here taken to be the five countries of Morocco, Algeria, Tunisia, Libya and Egypt). All 'populations' of a given species of waterbird that are resident in, and/or migratory through the Afrotropics, are thus here combined to form the 'biogeographic population'. See Appendix 6a and 6b for further details. Feral populations of all qualifying species have, as far as possible, been excluded when applying these criteria.

There is a logical inconsistency between the A4i criterion for waterbirds (1% or more of the biogeographic population) and the A4ii criterion for seabirds and terrestrial species (1% or more of the global population). It was felt, however, that the alternative of using 1% of the global population for waterbirds would, as well as departing further from the criteria used by the Ramsar Convention, have insufficient biological justification, because of the way many migratory waterbird species are distributed and split into well-defined, discrete flyway populations. Using a threshold of 1% of global population would also have the effect of over-emphasizing regional waterbird endemics since, over much of their range, many of the more widely distributed species may rarely occur together in numbers exceeding 1% of the global population. For those species which are regional endemics, the biogeographic and global populations are, of course, the same.

The A4iii and A4iv criteria are applied at the site level only, not to individual species; the species which contribute to criteria A4iv are listed in Appendix 6g. The A4iv criterion covers sites over which flying migrants concentrate, e.g. at narrow sea-crossings, along mountain ranges or through mountain passes. A definition of such migration bottleneck sites is given in Box 7. Although it is the airspace at these sites that is important, conservation of the land beneath may be necessary to protect the site and its birds from threats such as shooting, trapping and the construction of lethal obstacles such as power-lines and high radio-masts. Also included here are migration stop-over sites and nocturnal roosts which may not hold 20,000 or more storks, raptors or cranes at any one time, but which, nevertheless, do hold such numbers over a relatively short period due to the rapid turnover of birds on passage.

HOW DO THE IBA CRITERIA RELATE TO THE IDENTIFICATION OF RAMSAR SITES UNDER THE RAMSAR CONVENTION?

The Ramsar (or Wetlands) Convention defines a wetland as 'an area of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which

at low tide does not exceed 6 m' (Article 1). Article 2.1 of the Convention also states that 'the boundaries of each wetland [...] may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than 6 m at low tide lying within the wetlands, especially where these have importance as waterfowl habitat'.

The criteria for identifying wetlands of international importance under the Ramsar Convention, as adopted at the Conference of the Parties on 7 May 1999, fall into eight categories (Box 6). There is a strong relationship between the Ramsar criteria for waterbirds and the IBA criteria. Category 5 of the Ramsar criteria is the same as the IBA category A4iii, while Ramsar category 6 is closely related to IBA category A4i, although there are differences in numerical thresholds for some species. This is because, in order to derive 1% threshold figures for the 'biogeographic' populations in the Afrotropics, separate flyway or other populations have had to be combined, as explained in Appendix 6b. This has resulted in threshold figures for IBA category A4i which are often higher, and in about 10 instances, for reasons explained in Appendix 6b, lower than those of Ramsar category 6. This means that, for those species for which different figures are used, sites holding populations which meet Ramsar category 6 will not always meet IBA category A4i and vice versa. However, there is no instance in which, as a consequence of these differences, a Ramsar Site in Africa, designated for the waterbird populations it supports, does not also qualify as an IBA.

In addition, numerous IBAs also comply with Ramsar criteria categories 2, 3 and 4, particularly wetland sites which are important for birds other than waterbirds (such as papyrus and other swamps, montane bogs, etc.). However, one difference is that IBA category A4i may also be applied to congregations of waterbirds in grassland and marine habitats (not classifiable as wetland habitat under the Ramsar definition) or may contain both coastal wetlands and some marine habitat deeper than 6 m. Thus, even though the 1% thresholds for some waterbirds may be met in these grassland and marine areas (Ramsar criterion 6), the Ramsar wetland definition excludes these sites from consideration under the Convention; therefore their eligibility for designation as Ramsar Sites has to be considered on a case-by-case basis.

DEFINING THE BOUNDARIES OF AN IBA

An Important Bird Area is defined so that, as far as possible, it:

i) is different in character or habitat or ornithological importance from the surrounding area;
ii) exists as an actual or potential protected area, with or without buffer zones, or is an area which can be managed in some way for nature conservation;
iii) is, alone or with other sites, a self-sufficient area which provides all the requirements of the birds, when present, for which it is important.

- Where extensive tracts of continuous habitat occur which are important for birds, only characteristics ii) and iii) apply. This definition is not applicable to migratory bottleneck sites.
- Practical considerations of how best the site may be conserved are the foremost consideration.
- Simple, conspicuous boundaries such as roads or rivers can often be used to delimit site margins, while features such as watersheds, ridge-lines and hilltops can help in places where there are no obvious discontinuities in habitat (transitions of vegetation or substrate). Boundaries of ownership are also relevant.
- There is no fixed maximum or minimum size for IBAs—the biologically sensible should be tempered with the practical. Neither is there a definitive answer on how to treat cases where a number of small sites lie near each other. Whether these are best considered as a series of separate IBAs, or as one larger site containing areas lacking ornithological significance, depends upon the local situation with regard to conservation and management.

REFERENCES

Bailey, R. G. (1989) Ecoregions of the continents—scale 1:30,000,000. Map of land-masses of the world, published as a supplement to *Environmental Conservation*, 16: 307–309.

Bennun, L. and Fishpool, L. (2000) The Important Bird Areas Programme in Africa: an outline. *Ostrich* 71: 150–153.

BirdLife International (2000) *Threatened birds of the world*. Barcelona, Spain/Cambridge, UK: Lynx Edicions/BirdLife International.

Brown, L. H., Urban, E. K. and Newman, K. (1982) *The birds of Africa*, vol. 1. London: Academic Press.

Collar, N. J. and Andrew, P. (1988) *Birds to watch: the ICBP world check-list of threatened birds*. Cambridge, UK: International Council for Bird Preservation (Techn. Publ. 8).

Collar, N. J. and Stuart, S. N. (1985) *Threatened birds of Africa and related islands: the ICBP/IUCN Red Data Book*. Cambridge, UK: International Council for Bird Preservation/International Union for Conservation of Nature and Natural Resources.

Collar, N. J., Crosby, M. J. and Stattersfield, A. J. (1994) *Birds to watch 2: the world list of threatened birds*. Cambridge, UK: BirdLife International (BirdLife Conservation Series 4).

Cramp, S. *et al.* (1977–1994) *The birds of the western Palearctic*. Vols 1–9. Oxford, UK: Oxford University Press.

Devillers, P., Ouellet, H., Benito-Espinal, E., Beudels, R., Cruon, R., David, N., Érard, C., Gosselin, M. and Seutin, G. (1993) *Noms français des oiseaux du Monde*. Sainte-Foy, Canada/Bayonne, France: MultiMondes/Chabaud.

Dodman, T. and Taylor, V. (1995) *African waterfowl census 1995. Les denombrements internationaux d'oiseaux d'eau en Afrique, 1995*. Slimbridge, UK: International Waterfowl and Wetlands Research Bureau.

Dodman, T. and Taylor, V. (1996) *African waterfowl census 1996. Les denombrements internationaux d'oiseaux d'eau en Afrique, 1996*. Wageningen, Netherlands: Wetlands International.

Dodman, T., Hubert, E., Vaan, C. de and Nivet, C. (1997) *African waterfowl census 1997. Les denombrements internationaux d'oiseaux d'eau en Afrique, 1997*. Wageningen, Netherlands: Wetlands International.

Dodman, T., Béibro, H.Y., Hubert, E. and Williams, E. (1998) *African waterfowl census 1998. Les denombrements internationaux d'oiseaux d'eau en Afrique, 1998*. Dakar: Wetlands International.

Dowsett, R. J. (1993) Afrotropical avifaunas: annotated country checklists. Pp. 1–322 in R. J. Dowsett and F. Dowsett-Lemaire, eds. *A contribution to the distribution and taxonomy of Afrotropical and Malagasy birds*. Liège, Belgium: Tauraco Press (Tauraco Research Report No. 5).

Dowsett (1996) Distribution of Afrotropical birds. Version 1.2 (1996, revised) for dBASE 4 (Windows)

Dowsett, R. J. and Forbes-Watson, A. D. (1993) *Checklist of birds of the Afrotropical and Malagasy regions*. Liège, Belgium: Tauraco Press.

Dowsett-Lemaire, F. and Dowsett, R. J. (2001) African forest birds. Patterns of endemism and species richness. Pp. 233–262 in W. Weber, L. J. T. White, A. Vedder and L. Naughton-Treves, eds. *African rain forest. Ecology and conservation*. New Haven, USA: Yale University Press.

Evans, M. I., ed. (1994) *Important Bird Areas in the Middle East*. Cambridge, UK: BirdLife International (BirdLife Conservation Series 2).

Fishpool, L. D. C., Heath, M. F., Waliczky, Z., Wege, D. C. and Crosby, M. J. (1998) Important bird areas—criteria for selecting sites of global conservation significance. In N. J. Adams and R. H. Slotow, eds. Proc. 22 Int. Ornithol. Congr., Durban. *Ostrich* 69: 428.

Fry, C. H., Keith, S. and Urban, E. K. (1988) *The birds of Africa*, vol. 3. London: Academic Press.

Grimmett, R. F. A. and Gammell, A. B. (1989) Inventory of Important Bird Areas in the European Community. (Unpubl. report prepared for the Directorate-General of the Environment, Consumer Protection and Nuclear Safety of the European Community, study contract B6610-54-88.) Cambridge, UK: International Council for Bird Preservation.

Grimmett, R. F. A. and Jones, T. A. (1989) *Important Bird Areas in Europe*. Cambridge, UK: International Council for Bird Preservation (Techn. Publ. 9).

Hall, B. P. and Moreau, R. E. (1970) *An atlas of speciation in African passerine birds*. London: British Museum (Natural History).

Harrison, J. A. Allan, D. G., Underhill, L. G., Herremans, M., Tree, A. J., Parker, V. and Brown, C. J., eds (1997) *The atlas of southern African birds.* Johannesburg: BirdLife South Africa.

Heath, M. F. and Evans, M. I., eds (2000) *Important Bird Areas in Europe: Priority sites for conservation*. Cambridge, UK: BirdLife International (BirdLife Conservation Series 8).

ICBP (1992) *Putting biodiversity on the map: priority areas for global conservation*. Cambridge, UK: International Council for Bird Preservation.

IUCN (1994) *Guidelines for protected area management categories*. Gland, Switzerland/Cambridge, UK: International Union for Conservation of Nature and Natural Resources.

KEAY, R. W. J. (1959) *Vegetation map of Africa south of the tropic of Cancer. Explanatory notes*. With coloured map 1:10,000,000. Oxford, UK: Oxford University Press.

KEITH, S., URBAN, E. K. AND FRY, C. H. (1992) *The birds of Africa*, Vol. 4. London: Academic Press.

MORONY, J. J., BOCK, W. J. AND FARRAND, J. (1975) *Reference list of the birds of the world*. New York: American Museum of Natural History (Department of Ornithology).

OSIECK, E. R. AND MÖRZER BRUYNS, M. F. (1981) *Important bird areas in the European community*. Cambridge, UK: International Council for Bird Preservation.

PERENNOU, C. (1991) *African waterfowl census 1991. Les dénombremonts internationaux d'oiseaux d'eau en Afrique 1991*. Slimbridge, UK: International Waterfowl and Wetlands Research Bureau.

PERENNOU, C. (1992) *African waterfowl census 1992. Les dénombremonts internationaux d'oiseaux d'eau en Afrique 1992*. Slimbridge, UK: International Waterfowl and Wetlands Research Bureau.

ROSE, P. M. AND SCOTT, D. A. (1994) *Waterfowl population estimates*. Slimbridge, UK: International Waterfowl and Wetlands Research Bureau (IWRB Spec. Publ. 29).

ROSE, P. M. AND SCOTT, D. A. (1997) *Waterfowl population estimates*. Second edition. Wageningen, Netherlands: Wetlands International (Publ. No. 44).

SCOTT, D. A. AND ROSE, P. M. (1996) *Atlas of Anatidae populations in Africa and western Eurasia*. Wageningen, Netherlands: Wetlands International (Publ. No. 41).

SIBLEY, C. G. AND MONROE, B. L. (1990) *Distribution and taxonomy of birds of the world*. New Haven, USA: Yale University Press.

SIBLEY, C. G. AND MONROE, B. L. (1993) *A supplement to Distribution and taxonomy of birds of the world*. New Haven, USA: Yale University Press.

SNOW, D. W., ED. (1978) *An atlas of speciation in African non-passerine birds*. London: British Museum (Natural History).

STATTERSFIELD, A. J., CROSBY, M. J., LONG, A. J. AND WEGE, D. C. (1998) *Endemic bird areas of the world: priorities for bird conservation*. Cambridge, UK: BirdLife International (BirdLife Conservation Series 7).

TAYLOR, V. (1993) *African waterfowl census 1993*. Slimbridge, UK: International Waterfowl and Wetlands Research Bureau.

TAYLOR, V. AND ROSE, P. (1994) *African waterfowl census 1994. Les denombrements internationaux d'oiseaux d'eau en Afrique, 1994*. Slimbridge, UK: International Waterfowl and Wetlands Research Bureau.

URBAN, E. K., FRY, C. H. AND KEITH, S., EDS (1986) *The birds of Africa*, Vol. 2. London: Academic Press.

WHITE, F. (1983) *The vegetation of Africa: a descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa*. Paris: United Nations Educational Scientific and Cultural Organisation.