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Estimating the size and status of waterbird populations in Africa

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There have been recent advances in estimating the size and status of waterbird populations at the global level. The main objectives of this process are to assist in identifying Wetlands of International Importance under the Convention on Wetlands, to identify conservation and research priorities in order to maintain global waterbird biodiversity, to identify gaps in knowledge, and to support the development of the Conventions on Wetlands, Migratory Species and Biological Diversity. Significant advances were made in reviewing and developing new estimates for waterbird populations occurring in Africa, in preparation for *Waterbird Population Estimates* (third edition), which was published in 2001. Estimates have now been made for over 80% of waterbird populations in Africa. The process is ongoing and depends upon the input of many contributors and on reviews of published materials and unpublished reports. This paper presents a review of the sizes, overall status and trends of waterbird populations in Africa, and provides generic recommendations for monitoring populations and improving their conservation status.

Introduction

A concerted and specific effort to estimate waterbird population sizes throughout the world began in the early 1990s after development and formal adoption of specific criteria for waterfowl under the Convention of Wetlands (Ramsar, Iran, 1971), also widely known as the Ramsar Convention. A key and immediate objective of developing population estimates was to assist in identification of wetlands of international importance under the Ramsar Convention, using waterbirds as bioindicators, through the so-called '1% criterion'. Additional objectives were: to identify priorities for conservation and research to maintain global waterbird biodiversity; to identify gaps in knowledge of waterbird populations; and to support development of the Ramsar and Biodiversity Conventions and the Bonn Convention, especially in more recent years through its African-Eurasian Migratory Waterbird Agreement (AEWA).

The specific Ramsar waterbird criteria have been updated slightly, and currently state that a wetland should be considered internationally important if it regularly supports 20 000 or more waterbirds (Criterion 5), or it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird (Criterion 6). The practical use and implementation of Criterion 6 thus required the availability of numerical population estimates. As one of the original partner organisations of the Convention, Wetlands International led the process of developing estimates, producing its landmark series of Waterbird (originally Waterfowl) Population Estimates, with editions published in 1994, 1997 and 2002 (Rose and Scott 1994, 1997, Wetlands International 2002).

An obvious conclusion from the first edition was the availability of fairly reliable estimates for waterbirds of Europe and North America, where monitoring schemes had been operating for some time already, compared to a general dearth of information from South America, Africa and much of Asia. In the first edition (Rose and Scott 1994), 27% of the gaps in suitable information were attributable to Africa, more than for any other of the Ramsar regions. By the second edition (Rose and Scott 1997) significant advances had been made and there were at least provisional estimates for 66% of the waterbird populations in Africa. However, the type of estimate (a reliability ranking) was generally low for many African populations. A concerted effort was made in 2001 to improve the population estimates for Africa, and by the time of publication of the third edition (Wetlands International 2002) 91% of the populations of waterbirds in Africa had published population estimates. Much of this information was collated by Dodman (2002) in a consultation draft, which presented many new estimates and supporting species texts to justify the new figures.

There continues, however, to be a widespread lack of information for certain waterbird groups, notably species that are not widely included in coordinated monitoring schemes and are crepuscular by nature and difficult to detect, such as many members of the rail family. Importantly, resources have been committed to ensure that the Waterbird Population Estimates programme is a process, with commitments for Wetlands International to provide three-yearly updates to the Ramsar Convention.

Waterbirds are considered under the Ramsar Convention to refer to species of birds that are ecologically dependent on wetlands. However, a whole-taxon approach is adopted for convenience, which embraces the following families: grebes, pelicans, cormorants, darter, herons, shoebill, hamerkop, storks, ibises, spoonbills, flamingos, ducks and geese, cranes, rails, finfoot, jacanas, waders, gulls, terns and skimmer. Discussions are currently underway to broaden the population

estimates programme to include some seabirds and raptors and some largely wetland-dependent passerines.

A waterbird population is defined by Wetlands International (2002) as a distinct assemblage of individuals that does not experience significant emigration or immigration. This definition works well when there is only limited interchange of individuals between populations. It is difficult to identify separate populations for species with a cosmopolitan distribution and in some cases it is appropriate (for conservation and management purposes) to define biogeographic units based on the biology of each species, often making use of the migratory flyways of different populations. The entire range of a biogeographic population comprises areas used for breeding, moulting, migrating and non-breeding areas.

Methods

Waterbird population estimates are achieved through technical assessments of information from waterbird count data/census schemes and analyses, for example under the African Waterbird Census (AfWC), significant 'regional' publications, far-reaching literature reviews and qualitative expert information. It is generally not possible to devise population estimates by basic extrapolations of counts, as waterbirds are not generally distributed very evenly and there are significant gaps in knowledge of sites and movements. Brouwer and Mullié (2001) present a method for making whole country estimates applied to annual waterbird census data from Niger, in which they use different multipliers based largely on wetland type, habitats and area of count coverage. Specific efforts at estimating population size have also been made for individual species, often under the development of conservation action plans. Williams *et al.* (2002) produced estimates for Black Crowned Crane based on a comprehensive review of the species' status across its range and on field surveys and other actions supported by the programme. Such approaches contribute to advances in the provision of estimates, but inevitably estimates draw widely on qualitative information, especially due to the significant information gaps from important areas.

However, the general preference of the waterbird population estimates programme is to establish an estimate as far as possible. For poorly-known populations, broad estimates are given according to established categories: A: <10 000, B: 10 000–25 000, C: 25 000–100 000, D: 100 000–1 000 000 and E: >1 000 000. This provides a baseline to use for improvements for future editions. Thresholds of 1% are also set for each population estimate, which enable the use of estimates for identification of key sites.

A key source of information for Africa is the African Waterbird Census database, and the published AfWC reports, with annual reports from 1991 to 1998 (Perennou 1991, Perennou 1992, Taylor 1993, Taylor and Rose 1994, Dodman and Taylor 1995, Dodman and Taylor 1996, Dodman *et al.* 1997, Dodman *et al.* 1999) and triennial reports for 1999–2001 (Dodman and Diagana 2003) and 2002–2004 (Diagana and Dodman, in press). Other regular sources of information are the Wetlands International Specialist Groups and the Flyway Atlas series developments, notably the Anatidae Atlas (Scott and Rose 1996) and the Wader Atlas (Delany *et al.* in prep.). The waterbird population estimates of 2001 are used here to draw basic characteristics of waterbird populations in Africa.

Results and discussion

In 2001 there were 284 recognised waterbird species occurring in Africa and its associated islands (excluding vagrants), comprising 618 recognised populations, of which 603 are extant. Of these, 554 populations (92%) have estimates. All following analyses refer to these 554 populations, unless stated otherwise. A high proportion of populations are small, with 116 populations (27.5%) having less than 10 000 individuals and 41% having less than 25 000 individuals (Figure 1). Of these, there are 36 populations numbering less than 1 000 individuals, including seven

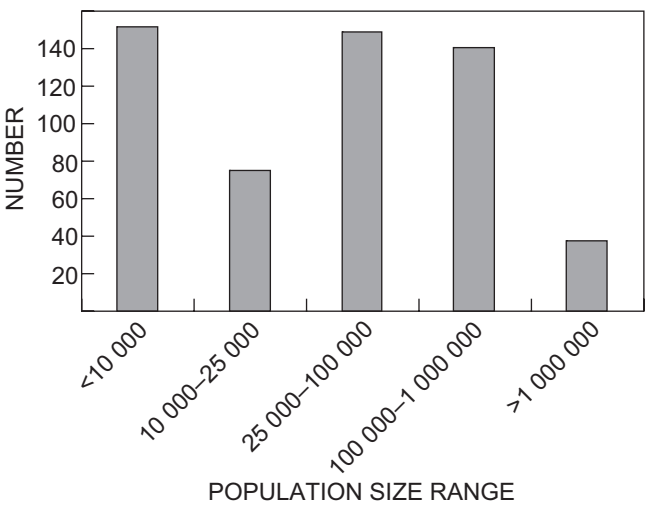

Figure 1: Waterbird species population sizes in Africa

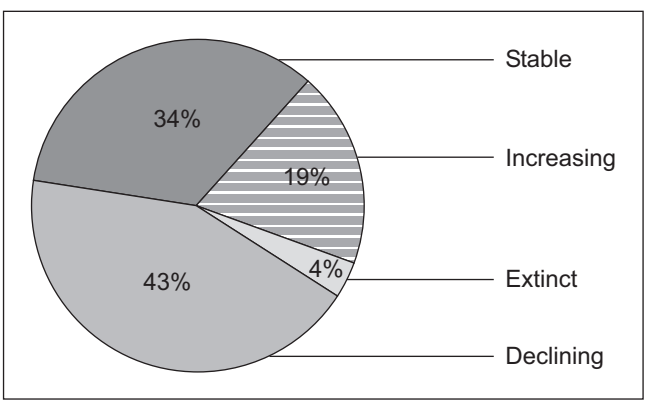

Figure 2: Status of waterbird populations in Africa

Anatidae, six cranes, five Rallidae and four ibises. Apart from the cranes, most are island populations.

There is less information on population trends or status of waterbirds in Africa than on population estimates; of the 603 extant populations, trends of only 405 populations (67%) have been established. Of those trends that are available, a worrying 47% of populations are either in decline or extinct (Figure 2). The Rallidae have the highest proportion of declining populations; of 44 populations of rails with known trends, eight are extinct and 28 are declining. Sixty percent of crane populations and 55% of Anatidae populations are in decline; only gull populations appear to be widely increasing. There are at least 19 extinct waterbird populations in Africa, of which 17 are extinct species (Table 1). All extinctions are from islands of the Indian and Atlantic Oceans.

There are 52 waterbird species of conservation concern in Africa. Following IUCN-SSC threat categories, these

Table 1: Extinct waterbird populations in Africa and associated islands (data from Dodman in press)

Species/population	Location	Notes
Extinct species		
Réunion Night-Heron		
Nycticorax duboisi	Réunion	Last recorded in 1674
Mauritius Night-Heron		
Nycticorax mauritianus	Mauritius	Last recorded in 1693
Rodrigues Night-Heron		
Nycticorax megacephalusus	Rodrigues	Last recorded in 1726
Réunion Flightless Ibis		
Threskiornis solitarius	Réunion	Last account in 1705
Mauritian Shelduck		
Alopochen mauritianus	Mauritius	Extinct between 1693 and 1698
Réunion Island Sheldgoose		
Alopochen kervazoi	Réunion	Probably survived until mid 1660s
Mauritian Duck		
Anas theodori	Mauritius, Réunion	Extinct by 1710
Réunion Rail		
Dryolimnas augusti	Réunion	Only known from fossil records; a likely account dates from 1674
Ascension Rail		
Atlantisia elpenor	Ascension	Extinct between 1650 and about 1815
St Helena Crake		
Atlantisia podarces	St Helena	Extinct after 1502
St Helena Rail		
Porzana astrictocarpus	St Helena	Extinct after 1502
Mauritian Red Rail		
Aphanapteryx bonasia	Mauritius	Extinct between 1675 and 1700
Leguat's Rail		
Aphanapteryx leguati	Rodrigues	Extinct about 1730
Réunion Gallinule		
Porphyrio coerulescens	Réunion	Probably extinct about 1730
Tristan Moorhen		
Gallinula nesiotis	Tristan de Cunha	Extinct by end of 19th century
Mascarene Coot		
Fulica newtoni	Réunion, Mauritius	Extinct after 1693
Canarian Black Oystercatcher		
Haematopus meadewaldoi	Eastern Canary Islands	Probably became extinct in 1940s
Extinct populations		
Greater Flamingo		
Phoenicopterus roseus	Mascarenes	Disappeared from Mascarenes about 1758
White-throated Rail		
Dryolimnas cuvieri abbotti	Seychelles (Assumption Island)	Extinct by 1937; probably this form also on Cosmoledo and Astove, where extinct by 1908
Possibly extinct species		
Alaotra/Rusty Grebe		
Tachybaptus rufolavatus	Madagascar	No definite record since 1985
Possibly extinct populations		
Olive Ibis		
Bostrychia olivacea rothschildi	Príncipe	Last reported sighting in 1991
Demoiselle Crane		
Grus virgo	Morocco	No definite records since mid 1980s

Table 2: Status of waders of conservation concern in Africa. CR = Critically Endangered, DD = Data Deficient, EXT = Extinct, NT = Near-Threatened, VU = Vulnerable

Species	IUCN status	Range	Island resident	Long-distance migrant
Canarian Black Oystercatcher *Haematopus meadewaldoi*	EXT	Canary Islands	X	
African Black Oystercatcher *Haematopus moquini*	NT	South-western Africa coast		
Black-winged Pratincole *Glareola nordmanni*	DD	Africa, Asia		X
Madagascar Pratincole *Glareola ocularis*	VU	Madagascar, East Africa coast		
Sociable Lapwing *Vanellus gregarius*	CR	North-eastern Africa, Asia		X
Black-banded Plover *Charadrius thoracicus*	VU	Madagascar	X	
St Helena Plover *Charadrius sanctaehelenae*	VU	St Helena	X	
Madagascar Snipe *Gallinago macrodactyla*	NT	Madagascar	X	
Great Snipe *Gallinago media*	NT	Africa, Asia, Europe		X
Slender-billed Curlew *Numenius tenuirostris*	CR	Africa, Asia, Europe		X

include 33 Threatened waterbird species (six Critical, ten Endangered, 17 Vulnerable), 17 Near Threatened and two Data Deficient species. Of the 33 Threatened waterbird species, 19 (58%) belong to the Atlantic and Indian Ocean islands, indicating the high vulnerability of small island populations. Some families are also clearly more vulnerable than others and four ibis, six duck and seven rail populations are all threatened. The 52 species of conservation concern are divided into 69 populations, of which 51 (74%) of the populations are endemic to Africa, 41 (59%) are declining, and 31 (45%) are declining and endemic to Africa. This demonstrates the need for increased conservation measures of African waterbirds. However, of nine waders of conservation concern, four are long-distance migrants that breed in the Palaearctic (Table 2).

In addition, there are threatened and declining populations of species not recognised as threatened (Table 3). Such populations are often ignored by global conservation plans and several are under serious threat of extinction. An example of how little protection is afforded to such populations is the Cape Verde Purple Heron (*Ardea (purpurea) bournei*). Endemic to the island of Santiago in Cape Verde and with a population of some 50 birds, this heron breeds in the adjoining crowns of two trees in a village. It presumably declined when wetlands were modified in Cape Verde and now feeds mainly on invertebrates in dry mountain habitat. There are few conservation measures for the population, considered by some to be a full species (e.g. Hazevoet 1995). Two other breeding colonies have been abandoned in recent years; at one the breeding trees were felled, and at the other disturbance and egg collection were high. Even at the one remaining colony, young birds are taken each year soon before fledging. There is thus a wider need for a population-based conservation approach and the fate of such dwindling populations should be better recognised in global threat rankings.

Conclusions and recommendations

Many waterbird populations in Africa have low sizes, with 40% of populations numbering less than 25 000 individuals, whilst 43% of waterbird populations in Africa are declining. All waterbird extinctions in Africa have occurred in islands. Of 50 threatened and near-threatened waterbird species, about 60% are declining, whilst 60% occur on islands. A number of populations of 'non-threatened species' are also threatened with extinction, many of which are largely ignored in current threat rankings.

In order to improve the conservation status of waterbirds in Africa, it is recommended to: (a) improve monitoring of waterbirds, especially through strengthening and expansion of the African Waterbird Census; (b) effect targeted monitoring of threatened/declining species and threatened/declining populations; (c) address gaps in knowledge of population limits and sizes; (d) carry out coordinated monitoring of wetland Important Bird Areas and AfWC sites; (e) improve adoption of the 1% criterion for identification of key sites for conservation action, especially for threatened or declining populations; and (f) adopt specific conservation actions for waterbird populations of Atlantic and Indian Ocean islands. Wide participation in the Waterbird Population Estimates process will further help to set reliable estimates for waterbird populations, which in turn provides a benchmark for monitoring and prioritisation.

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Table 3: Some waterbird populations of conservation concern in Africa

Species/population	Population range	Population estimate
Great Crested Grebe *Podiceps cristatus infuscatus*	East Africa	<1 000
(Cape Verde) Purple Heron *Ardea (purpurea) bournei*	Santiago Island, Cape Verde	~40
Great Bittern *Botaurus stellaris capensis*	Southern Africa	~6 500
Yellow Bittern *Ixobrychus sinensis*	Seychelles	<300
African Openbill *Anastomus lamelligerus madagascariensis*	Madagascar	<1 000
Olive Ibis *Bostrychia olivacea rothschildi*	Príncipe	<10?
Glossy Ibis *Plegadis falcinellus*	Madagascar	<5 000
Eurasian Spoonbill *Platalea leucorodia archeri*	Red Sea	~1 250
Greater Flamingo *Phoenicopterus roseus*	Aldabra	20–50
White-backed Duck *Thallasornis leuconotus leuconotus*	West Africa	<1 000
White-backed Duck *Thallasornis leuconotus insularis*	Madagascar	2 500–5 000
Ruddy Shelduck *Tadorna ferruginea*	Ethiopia	30–80
Ruddy Shelduck *Tadorna ferruginea*	North-western Africa	3 000
Cape Teal *Anas capensis*	East African Rift Valley	5 000–10 000
Cape Teal *Anas capensis*	Lake Chad Basin	<500
Hottentot Teal *Anas hottentota*	Lake Chad Basin	1 000–5 000
Demoiselle Crane *Grus virgo*	North-western Africa (breeding)	Extinct?
Demoiselle Crane *Grus virgo*	Black Sea (breeding; non-breeding visitor to Sahel)	600–750
Stone Curlew *Burhinus oedicnemus distinctus*	Western Canary Islands	900–1 200
Stone Curlew *Burhinus oedicnemus insularum*	Eastern Canary Islands	700–4 700
Cream-coloured Courser *Cursorius cursor exsul*	Cape Verde	150–350
Cream-coloured Courser *Cursorius cursor bannermani*	Canary Islands	300–1 800
Greater Black-winged Plover *Vanellus melanopterus minor*	Southern Africa	2 000–3 000
Bridled Tern *Sterna anaethetus melanoptera*	Gulf of Guinea	1 500

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