

The birds of Owambo, Namibia

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Received July 1991; accepted May 1992

ABSTRACT

This paper provides the first comprehensive report on the status of the birds of the Owambo region, northern Namibia. A review of published information on birds collected and seen in the Owambo region revealed that 315 species had previously been recorded. A survey in April 1991 supplemented by an analysis of information obtained for the Namibian Bird Atlas Project increased the total number of species recorded for Owambo to 420. The relative abundance of each species (based on reporting frequency) is given for each of 10 habitats in Owambo and the dominant birds for each are listed. The improved information obtained on bird distribution significantly extends the known ranges of 34 bird species in the SAOS Checklist of southern African Birds (Clancey 1980) and 65 species in Roberts' Birds of southern Africa (Maclean 1985). Despite supporting about 45% of the human population of Namibia, large areas of Owambo are in an ecologically good condition. Even areas of high human concentration with high levels of utilised, e.g. the Cuvelai Delta system, support a rich avian diversity (270 species). The seasonal wetlands of the Cuvelai system are the largest and probably the most important ephemeral wetlands in Namibia. They support 91 species of wetland birds, 42% of which are listed as Red Data species. By contrast, 24% of all birds in Owambo are on the Red Data list. Protection should be given to parts of the Cuvelai wetlands, particularly to breeding sites of wetland birds and to sites appropriate for education and tourism.

INTRODUCTION

The Owambo (Ovambo) region of Namibia is situated in the centre of the northern part of the country, between the Angola border in the north and the Etosha National Park in the south. To the west it borders on the Kaokoland region, and to the east on the Kavango region (Figure 1).

The birds of Owambo have been little studied and the avifauna of the region is poorly known. The war of independence, fought mainly in the north of Namibia over the past 20 years, dissuaded ornithological investigations in Owambo, and information from earlier expeditions is scattered and piecemeal. The first collections of birds made in Owambo were by C.J. Andersson in the mid-1800s. He died in 1867 on a journey to the Cunene River (Winterbottom 1971). Andersson's companion, A.W. Eriksson, continued to collect ornithological material in Namibia and Angola until his own death in 1901. Information on most of Eriksson's collection was published by Rudebeck (1955) and Lundevall and Angermark (1989). A number of expeditions visited parts of Owambo this century, but these were all incidental to other destinations and their contact with Owambo was brief and peripheral (Winterbottom 1964, 1966a; Tarboton 1967; Clinning & Jensen 1979). The only exception was a visit to the region by Finch-Davies (1918) who spent about two weeks in January and February 1917 in the central area on a "punative expedition to the northern border of Ovamboland". He recorded about 128 bird species in the region.

In this paper I gather all the published records of birds

collected and recorded in Owambo (references listed above; Hoesch & Niethammer 1940; Winterbottom 1966b, 1969, 1971, 1972; Hall & Moreau 1970; Snow 1978; Clancey 1980, 1989), information contained in the Namibian Bird Atlas Project (NABAP) and the results of an expedition to the region by myself and colleagues from 8 to 17 April 1991.

STUDY AREA AND METHODS

The Owambo region covers about 51 800 km², some 6,3% of Namibia. Mean annual rainfall increases from about 300 mm in the west to 550 mm in the east. A number of biomes and vegetation types are represented in Owambo and some reach the limits of their distribution here. Well developed northern Kalahari woodland extends from

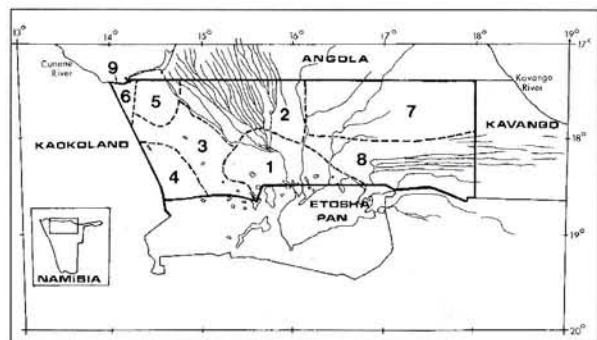


FIGURE 1: The Owambo region of Namibia showing nine of the 10 habitats for which bird data were analysed for presence and relative abundance. The habitats are: 1 = seasonally flooded grasslands, 2 = palm tree savanna, 3 = bush savanna, 4 = open shrub savanna, 5 = Ruacana woodlands, 6 = Kaokoveld escarpment, 7 = dry woodlands, 8 = dry bush savanna, and 9 = Cunene River and riparian fringe. The 10th habitat is the ephemeral Cuvelai wetlands system which flows seasonally through habitats 1 and 2.

Kavango in the east into the northeast of Owambo; thornveld savanna extends from the south into the south-east; mopane woodland dominates the western and central areas and the pro-Namib transition zone is evident in the extreme west, forming a clear escarpment in the northwest (Giess 1971; pers. obs.). The central area contains the Cuvelai delta system, a rich but ephemeral wetland of shallow drainage channels and pans (Marsh & Seely 1992).

Ten different habitats have provisionally been identified in Owambo (W. du Plessis and F. Coetzee pers. comm.; Figure 1). These are:

1. Seasonally flooded grasslands, extending from the edge of the Etosha Pan north up the Cuvelai system, on saline soils. Dominant grasses are *Odysea paucinervis*, *Sporobolus spicata* and *S. salsus*, *Panicum lanipes*, *Monelytrum luederitzianum* and *Eragrostis* species.
2. Palm tree savanna, extending from the above vegetation zone to the Angola border and containing most of the Cuvelai delta system. The area is characterised by open grassy drainage channels (oshonas) lined by *Hypphaene ventricosa* palm trees, with *Colophospermum mopane* dominating between the water courses.
3. Bush savanna on shallow sandy soils underlain by calcrete, dominated by *C. mopane* and *Combretum* species.
4. Open shrubveld on sandy soils, characterised by *Acacia erioloba*, *Catophractes alexandri* and other *Acacia* species in shrubby growth form.
5. Ruacana woodland, consisting of a tongue-like intrusion from the north of a predominantly *Combretum-Commiphora* association on deep sand.
6. Kaokoveld escarpment, a semi-desert, savanna transition zone dominated by shrubby *C. mopane*, *Terminalia prunoides*, *Cyphostemma* and *Commiphora* spp. and *Euphorbia guerichiana*.
7. Dry woodland on deep northern Kalahari sand, dominated by species such as *Baikiaea plurijuga*, *Pterocarpus angolensis*, *Burkea africana*, *Lonchocarpus capassa* and *Guibourtia coleosperma*.
8. Dry bush savanna on longitudinal dunes, characterised by *Acacia erioloba* and *A. hebeclada*, *Lonchocarpus nelsii*, *Boscia albitranca*, *Terminalia prunoides*, *Bauhinia* and *Combretum* spp.
9. Cunene River and riparian fringe, consisting of open water, mud banks, rocky outcrops, reedbeds and a narrow belt of forest consisting of large *C. mopane*, *Hypphaene ventricosa*, *Zizyphus mucronata* and isolated clumps of *Diospyros mespiliformis*.

10. Wetlands of the Cuvelai delta, an ephemeral system of shallow, meandering drainage channels, backwaters and pans, fed by local precipitation and inflow from the catchment area in Angola (Stengel 1963; Lindeque & Archibald 1991).

The Owambo region supports about 650 000 people, some 45% of the population of Namibia, mostly within the Cuvelai drainage system, where population density can exceed 100 people per km² (van der Merwe 1983; Marsh & Seely 1992). The subsistence economy of the region is based on dry-land cultivation of millet (mahango) on patches of ground above the flood level, on livestock, fish in the Cuvelai wetlands and migrant labour. The estimated number of livestock in the region is 485 000 head of cattle, 500 000 smallstock, 120 000 donkeys and 6 000 pigs. The main building material and fuel in Owambo is wood, and largescale deforestation has resulted, mainly in the central region (Marsh & Seely 1992).

A comprehensive list of birds previously recorded in the Owambo region was compiled from published information on museum specimens and sight records. A Namibian Bird Atlas Project has been running since 1977, for which the presence of bird species (positively confirmed) are recorded per quarter degree square (15' square) per month, or parts thereof (Williams 1985). In addition, a survey of Owambo was carried out from 8 to 17 April 1991, covering all the identified habitats in the region (Figure 2). The bird lists were combined for all quarter degree squares within each habitat. An indication of relative abundance was calculated from the reporting frequency of each species per habitat. Species recorded on >50% of field cards were considered to be abundant, those on 21-50% of cards were common, 5-20% of cards were uncommon, and species on fewer than 5% of cards were considered to be rare.

Habitats were compared for similarity by determining the number of dominant bird species they had in common. The 25 dominant species in each habitat were identified, based on reporting frequency. The numbers of species in common between different combinations of habitats were then compared by means of a simple matrix.

Nomenclature follows the SAOS Checklist of southern African Birds (Clancey 1980) and its two updates (Clancey *et al.* 1987, 1991). Scientific names follow common names in Table 1 and are not repeated in the text.

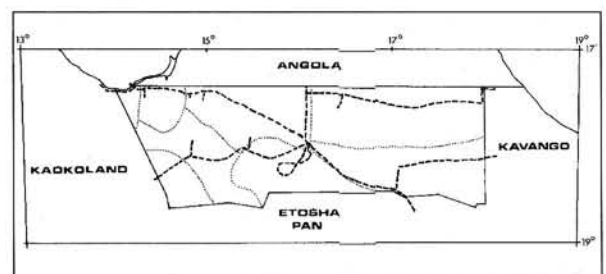


FIGURE 2: The route taken (dashed lines) in Owambo during the survey from 8-17 April 1991. The habitats are shown by dotted lines.

RESULTS AND DISCUSSION

Diversity

A review of published museum and sight records of the birds of Owambo (Table 1, column II) revealed that some 315 species had previously been recorded for the region. The coverage of the area was poor, however, with most records coming from the central and extreme north-western parts.

Information contained in the NABAP and obtained during the recent survey (Table 1, column I) has brought the total number of bird species recorded in Owambo to 420.

Ten species were obtained in past surveys that have not since been recorded. Two of these are wetland species, one (Striped Crake) is uncommon and highly secretive while the other (Whitewinged Widow) is attracted to large reedbeds. The rainfall in Owambo during the NABAP has been insufficient in most years to permit the growth of large reedbeds, and this species is probably an opportunistic visitor to the region. The other species were recorded either on the extreme edge of, or outside, their known distributions (e.g. Stanley's Bustard, Brownnecked Parrot, Pennantwinged Nightjar, Angola Swallow, Little Purplebanded Sunbird). Stanley's Bustard is probably a vagrant to the region whereas the others will probably be found to be a regular part of the avifauna with further ornithological investigation.

TABLE 1: Birds recorded in Owambo, Namibia, during (I) a survey from 8-17 April 1991 and including data contained in the Namibian Bird Atlas Project (NABAP), and (II) published accounts of the birds of the region (Finch-Davies 1918; Winterbottom 1964, 1966, 1969, 1971; Tarboton 1967; Hall & Moreau 1970; Snow 1978; Clinning & Jensen 1979; Clancey 1980, 1989). The species are listed for each of 10 habitats (Figure 1) with an indication of status based on the percentage of field cards recording each species: A = abundant (recorded on >50% of field cards), C = common (21-50% of cards), U = uncommon (5-20% of cards) and R = rare (<5% of cards). The habitats are: 1 = seasonally flooded grasslands (116 field cards), 2 = palm tree savanna - Cuvelai drainage system (106 cards), 3 = bush savanna (23 cards), 4 = open shrub veld on sand (21 cards), 5 = Ruacana woodlands (25 cards), 6 = Kaokoveld escarpment (35 cards), 7 = dry woodlands on deep sand (24 cards), 8 = dry bush savanna on longitudinal dunes (76 cards), 9 = Cunene River and riparian fringe (17 cards), 10 = wetlands of the Cuvelai system. Scientific and common names follow Clancey (1980) and Clancey *et al.* (1987, 1991).

Species	(I) Habitat										(II)	
	1	2	3	4	5	6	7	8	9	10		
Ostrich	<i>Struthio camelus</i>	U	R	C	A	R	U	U	C			*
Blacknecked Grebe	<i>Podiceps nigricollis</i>	R	R						R		*	*
Little Grebe	<i>Tachybaptus ruficollis</i>	U	R			R	R	U	U	R	*	*
White Pelican	<i>Pelecanus onocrotalus</i>	R							R		*	*
Whitebreasted Cormorant	<i>Phalacrocorax carbo</i>	R				R	R			U	*	
Reed Cormorant	<i>Phalacrocorax africanus</i>	R	R			U	U		R	U	*	*
Darter	<i>Anhinga melanogaster</i>					U	U			C	*	*
Grey Heron	<i>Ardea cinerea</i>	U	U	U	R	U	U	C	R	U	*	*
Blackheaded Heron	<i>Ardea melanocephala</i>	C	C	U		U	U	U	U	U	*	*
Goliath Heronzz	<i>Ardea goliath</i>	R				U	R			U	*	*
Purple Heron	<i>Ardea purpurea</i>						U			R	*	*
Great White Heron	<i>Casmerodius albus</i>	R				U	R	U	R		*	
Little Egret	<i>Egretta garzetta</i>	R	R				R			U	*	*
Yellowbilled Egret	<i>Egretta intermedia</i>	R				R		U	R	U	*	*
Black Egret	<i>Egretta ardesiaca</i>									U	*	*
Slaty Egret	<i>Egretta vinaceigula</i>		R								*	
Cattle Egret	<i>Buulcus ibis</i>	C	C	U		U	U	U	U	U	*	*
Common Squacco Heron	<i>Ardeola ralloides</i>	U	R			U					*	*
Greenbacked Heron	<i>Butorides striatus</i>	R	R			R	U	U		U	*	*
Rufousbellied Heron	<i>Butorides rufiventris</i>	R	R			R				R	*	*
Blackcrowned Night Heron	<i>Nycticorax nycticorax</i>	R				R	R	U		U	*	*
Little Bittern	<i>Ixobrychus minutus</i>									R	*	
Rail Heron	<i>Ixobrychus sturmii</i>	R	R			R	R		R	U	*	*
Hamerkop	<i>Scopus umbretta</i>					U	R	U		C	*	*
White Stork	<i>Ciconia ciconia</i>	R							R			
Black Stork	<i>Ciconia nigra</i>	R								R	*	
Whitebellied Stork	<i>Ciconia abdimii</i>			U			U	U	U	U		*
Woollynecked Stork	<i>Ciconia episcopus</i>	R							R		*	
African Openbill	<i>Anastomus lamelligerus</i>	U	U			U	U	U		R	*	*

Species		(I) Habitat										(II)
		1	2	3	4	5	6	7	8	9	10	
Saddlebill	<i>Ephippiorhynchus senegalensis</i>	R	R					R				*
Marabou	<i>Leptoptilos crumeniferus</i>	U	R	R	R	R	R		U			*
Yellowbilled Stork	<i>Mycteria ibis</i>									U		* *
Sacred Ibis	<i>Threskiornis aethiopicus</i>	R										* *
Glossy Ibis	<i>Plegadis falcinellus</i>	R	R						R			* *
African Spoonbill	<i>Platalea alba</i>	R	R						R			* *
Greater Flamingo	<i>Phoenicopterus ruber</i>	U	R					R	R			* *
Lesser Flamingo	<i>Phoeniconaias minor</i>	U	R						U			*
Whitefaced Duck	<i>Dendrocygna viduata</i>	U	U			R		U				* *
Fulvous Whistling Duck	<i>Dendrocygna bicolor</i>	U	R			U						* *
Egyptian Goose	<i>Alopochen aegyptiacus</i>	U			R	U	U	U	U	U		* *
Cape Teal	<i>Anas capensis</i>	R	R					R				* *
Hottentot Teal	<i>Anas hottentota</i>		R			R	R			U		* *
Redbilled Teal	<i>Anas erythrorhyncha</i>	U	U			U		C	U	R		* *
Cape Shoveller	<i>Anas smithii</i>	U	R									* *
Southern Pochard	<i>Netta erythrophthalma</i>	R	R			R						* *
Pygmy Goose	<i>Nettapus auritus</i>							U				*
Knob-billed Duck	<i>Sarkidiornis melanotos</i>	R	R			R	R	U		R		* *
Spurwinged Goose	<i>Plectropterus gambensis</i>	R	R			U	R			R		* *
Maccoa Duck	<i>Oxyura maccoa</i>	R	R						R			*
Whitebacked Duck	<i>Thalassornis leuconotus</i>	U				R						*
Secretarybird	<i>Sagittarius serpentarius</i>	C		U	A		R	U	U			*
Egyptian Vulture	<i>Neophron percnopterus</i>									R		
Hooded Vulture	<i>Necrosyrtes monachus</i>					R						
Cape Vulture	<i>Gyps coprotheres</i>	R										
Whitebacked Vulture	<i>Gyps africanus</i>	C		C	A	U		R	C	R		*
Lappetfaced Vulture	<i>Torgos tracheliotus</i>	U		U	A	R		U	U			*
Whiteheaded Vulture	<i>Trigonoceps occipitalis</i>	U			C			U	U	R		*
Black Kite	<i>Milvus migrans migrans</i>	U	U	R				U	U	R		*
Yellowbilled Kite	<i>Milvus migrant parasitus</i>	C	C	U	U	C	C	U	U	U		*
Blackshouldered Kite	<i>Elanus caeruleus</i>	U	R	U	C	U	U	U	U	R		*
Black Eagle	<i>Aquila verreauxii</i>				U		U					
Tawny Eagle	<i>Aquila rapax</i>	U	R	C	C	R	U	U	C	U		*
Steppe Eagle	<i>Aquila nipalensis</i>	R						U	R			
Lesser Spotted Eagle	<i>Aquila pomarina</i>								R			
Wahlberg's Eagle	<i>Aquila wahlbergi</i>	R				U	U	C	U	U		*
Booted Eagle	<i>Hieraaetus pennatus</i>						R		R			*
African Hawk Eagle	<i>Hieraaetus spilogaster</i>				U	R	U	U	R	U		*
Longcrested Eagle	<i>Lophaetus occipitalis</i>					R						
Martial Eagle	<i>Polemaetus bellicosus</i>	U	R	R	C		U	U	U	U		*
Brown Snake Eagle	<i>Circaetus cinereus</i>	R	R		R	U	R	U	U	U		*
Blackbreasted Snake Eagle	<i>Circaetus gallicus</i>	R	R	U	R	U	U	R	R			*
Bateleur	<i>Terathopius ecaudatus</i>	C	U	C	A	C	C	C	C	U		*
African Fish Eagle	<i>Haliaeetus vocifer</i>	R	R			U	R	U		C		* *
Steppe Buzzard	<i>Buteo buteo</i>	R	R	R			U	R	U	U		*
Augur Buzzard	<i>Buteo augur</i>						U					
Lizard Buzzard	<i>Kaupifalco monogrammicus</i>					R						
Ovambo Sparrowhawk	<i>Accipiter ovampensis</i>	R		R				U	U	U		*
Little Sparrowhawk	<i>Accipiter minullus</i>	R	R			R			R			*
Little Banded Goshawk	<i>Accipiter badius</i>	R	R			U	U	U	R	C		*
Gabar Goshawk	<i>Micronisus gabar</i>	U	R	U	C	U	U	U	U	U		*
Pale Chanting Goshawk	<i>Melierax canorus</i>	U		C	A	U	U	U	C			*
Dark Chanting Goshawk	<i>Melierax metabates</i>		R					C	R			
Pallid Harrier	<i>Circus macrourus</i>								R			

Species		(I) Habitat										(II)		
		1	2	3	4	5	6	7	8	9	10			
Gymnogene	<i>Polyboroides typus</i>		R			R				R				
Osprey	<i>Pandion haliaetus</i>								R			*	*	
Peregrine	<i>Falco peregrinus</i>	R	R			R	R			U				
Lanner	<i>Falco biarmicus</i>	U			R	R	R	U	R	U			*	
Hobby	<i>Falco subbuteo</i>	R	R						R	U			*	
African Hobby	<i>Falco cuvierii</i>					R								
Rednecked Falcon	<i>Falco chicquera</i>							U	R					
Western Redfooted Kestrel	<i>Falco vespertinus</i>	U	C					U	C	U			*	
Eastern Redfooted Kestrel	<i>Falco amurensis</i>	R	R						R	R				
Rock Kestrel	<i>Falco tinnunculus</i>	R			C	R	C	R	R	U			*	
Greater Kestrel	<i>Falco rupicoloides</i>	U		U	C		U		R				*	
Lesser Kestrel	<i>Falco naumanni</i>							U						
Grey Kestrel	<i>Falco ardosiaceus</i>		R			R	U			U			*	
Dickinson's Kestrel	<i>Falco dickinsoni</i>							R						
Coqui Francolin	<i>Francolinus coqui</i>							R						
Crested Francolin	<i>Francolinus sephaena</i>	R	R					U	U				*	
Orange River Francolin	<i>Francolinus lewaillantoides</i>	R					U		R	U			*	
Redbilled Francolin	<i>Francolinus adspersus</i>	R	R	R		U	C	C	C	U			*	
Hartlaub's Francolin	<i>Francolinus hartlaubi</i>						U							
Rednecked Francolin	<i>Francolinus afer</i>									U			*	
Swainson's Francolin	<i>Francolinus swainsonii</i>	R	R			R		U	U	U			*	
Common Quail	<i>Coturnix coturnix</i>	U			R				R				*	
Harlequin Quail	<i>Coturnix delegorguei</i>	R						U						
Helmeted Guineafowl	<i>Numidia meleagris</i>	U	U	U	A		U	C	C	U			*	
Kurrichane Buttonquail	<i>Turnix sylvatica</i>	R	R	R	R	R		U					*	
Wattled Crane	<i>Bugeranus carunculatus</i>	U										*	*	
Blue Crane	<i>Anthropoides paradiseus</i>	U	R					R	R					
Southern Crowned Crane	<i>Balearica regulorum</i>	U											*	
African Crake	<i>Crex egregia</i>					R						*		
Black Crake	<i>Amaurornis flavirostris</i>	R	R			U	U			U		*	*	
Baillon's Crake	<i>Porzana pusilla</i>	R	R			R						*	*	
Striped Crake	<i>Aenigmatolimnas marginalis</i>												*	
Purple Gallinule	<i>Porphyrio porphyrio</i>	R	R			U						*		
Lesser Gallinule	<i>Porphyryla alleni</i>												*	
Moorhen	<i>Gallinula chloropus</i>	R	R			U	R	R				*	*	
Lesser Moorhen	<i>Gallinula angulata</i>	R	R			R		U				*	*	
Redknobbed Coot	<i>Fulica cristata</i>	U	U			U			R			*	*	
Kori Bustard	<i>Ardeotis kori</i>	C	R	U	A			U	C				*	
Stanley's Bustard	<i>Neotis denhami</i>												*	
Ludwig's Bustard	<i>Neotis ludwigii</i>				C									
Ruppell's Korhaan	<i>Eupodotis rueppellii</i>				R									
Redcrested Korhaan	<i>Eupodotis ruficrista</i>	U	R	U	U		U	C	C	C			*	
Whitewinged Black Korhaan	<i>Eupodotis afraoides</i>	C	R	C	A			U	C				*	
African Jacana	<i>Actophilornis africanus</i>	R	R			U	U			R		*	*	
Painted Snipe	<i>Rostratula benghalensis</i>	R	R									*	*	
Ringed Plover	<i>Charadrius hiaticula</i>	R	R									*		
Whitefronted Plover	<i>Charadrius marginatus</i>	R	R	R						U		*	*	
Chestnutbanded Plover	<i>Charadrius pallidus</i>	U							R	R		*	*	
Kittlitz's Plover	<i>Charadrius pecuarius</i>	U	U	R			U	U	R	U		*	*	
Threebanded Plover	<i>Charadrius tricollaris</i>	U	U			U	C	U	U	C		*	*	
Caspian Plover	<i>Charadrius asiaticus</i>	R	R									*	*	
Crowned Plover	<i>Vanellus coronatus</i>	C	U	C	C	U	U	C	C				*	
Blacksmith Plover	<i>Vanellus armatus</i>	C	C	U	C	C	C	C	C	C		*	*	
Wattled Plover	<i>Vanellus senegallus</i>	R	R	U		R		U	R			*	*	

Species		(I) Habitat										(II)	
		1	2	3	4	5	6	7	8	9	10		
Common Sandpiper	<i>Actitis hypoleucos</i>	U	U			R	U	R	U	C	*	*	
Wood Sandpiper	<i>Tringa glareola</i>	R	R	U				U	R	R	*	*	
Marsh Sandpiper	<i>Tringa stagnatilis</i>	R	R	U				R	R	R	*		
Greenshank	<i>Tringa nebularia</i>	R	R					U	R	R	*	*	
Curlew Sandpiper	<i>Calidris ferruginea</i>	R							R		*		
Little Stint	<i>Calidris minuta</i>	R	R						R	R	*	*	
Ruff	<i>Philomachus pugnax</i>	R	R	U			R	U	U	U	*	*	
Great Snipe	<i>Gallinago media</i>		R									*	
Ethiopian Snipe	<i>Gallinago nigripennis</i>		R									*	
Blacktailed Godwit	<i>Limosa limosa</i>	R									*		
Avocet	<i>Recurvirostra avosetta</i>	U	R						U		*	*	
Blackwinged Stilt	<i>Himantopus himantopus</i>	C	U	R		R		U	U	U	*	*	
Spotted Dikkop	<i>Burhinus capensis</i>	U	U	U	C		U	C	U	U		*	
Water Dikkop	<i>Burhinus vermiculatus</i>	R	R				U			C	*	*	
Burchell's Courser	<i>Cursorius rufus</i>	R	R										
Temminck's Courser	<i>Cursorius temminckii</i>	R	R	R			U	R	R	U		*	
Doublebanded Courser	<i>Smutsornis africanus</i>	R		U	U			U	U			*	
Threebanded Courser	<i>Rhinoptilus cinctus</i>							U				*	
Bronzewinged Courser	<i>Rhinoptilus chalcopterus</i>	R							R			*	
Blackwinged Pratincole	<i>Glareola nordmanni</i>	R	R										
Greyheaded Gull	<i>Larus cirrocephalus</i>	U	U						R	U	*	*	
Whiskered Tern	<i>Chlidonias hybridus</i>	R	R						R		*		
Whitewinged Black Tern	<i>Chlidonias leucopterus</i>	U	R					U			*	*	
Namaqua Sandgrouse	<i>Pterocles namaqua</i>	U	R	R	C	U	U	R	U	U		*	
Spotted Sandgrouse	<i>Pterocles burchelli</i>	R	R	U	C			U	U			*	
Yellowthroated Sandgrouse	<i>Pterocles gutturalis</i>							R					
Doublebanded Sandgrouse	<i>Pterocles bicinctus</i>	U			C		R	R	R	U		*	
Feral Pigeon	<i>Columba livia</i>	R					U			U			
Speckled Pigeon	<i>Columba guinea</i>						U						
Redeyed Dove	<i>Streptopelia semitorquata</i>	R	R			U		C		R		*	
Mourning Dove	<i>Streptopelia decipiens</i>	U	U	R	R	U	U		R	C		*	
Cape Turtle Dove	<i>Streptopelia capicola</i>	C	U	C	A	C	A	A	A	A		*	
Laughing Dove	<i>Streptopelia senegalensis</i>	A	A	C	C	C	C	C	A	A		*	
Namaqua Dove	<i>Oena capensis</i>	C	C	C	A	C	C	C	C	C		*	
Emeraldspotted Dove	<i>Turtur chalcospilos</i>	R	R			U	C	C	U	C		*	
Green Pigeon	<i>Treron calva</i>		R			U	R	R		R		*	
Brownnecked Parrot	<i>Poicephalus robustus</i>											*	
Meyer's Parrot	<i>Poicephalus meyeri</i>	R	U			R		U	U			*	
Ruppell's Parrot	<i>Poicephalus rueppellii</i>			R	R	U	U			C		*	
Rosy faced Lovebird	<i>Agapornis roseicollis</i>	U	U	R		U	C	U	R	A		*	
Grey Lourie	<i>Corythaixoides concolor</i>	U	U	R	C	C	C	C	C	A		*	
Grey Cuckoo	<i>Cuculus canorus</i>							U				*	
African Cuckoo	<i>Cuculus gularis</i>			R		R			R	U		*	
Redchested Cuckoo	<i>Cuculus solitarius</i>						R			R			
Black Cuckoo	<i>Cuculus clamosus</i>					R		U	R				
Great Spotted Cuckoo	<i>Clamator glandarius</i>	R	R	R	R		R	U	R	U		*	
Striped Crested Cuckoo	<i>Clamator levaillantii</i>						R	R		R			
Jacobin Cuckoo	<i>Clamator jacobinus</i>				R		R		R	U		*	
Klaas' Cuckoo	<i>Chrysococcyx klaas</i>							U	R				
Didric Cuckoo	<i>Chrysococcyx caprius</i>	U	U	R		U	U	U	U	C		*	
Black Coucal	<i>Centropus bengalensis</i>	R	R										
Senegal Coucal	<i>Centropus senegalensis</i>					R				R			
Whitebrowed Coucal	<i>Centropus superciliosus</i>									R		*	
Barn Owl	<i>Tyto alba</i>	U	U	U	C	U	U		U	U		*	

Species		(I) Habitat										(II)
		1	2	3	4	5	6	7	8	9	10	
Marsh Owl	<i>Asio capensis</i>	R	R					U				*
African Scops Owl	<i>Otus senegalensis</i>		U	R		U	U	U	R	U		*
Whitefaced Owl	<i>Otus leucotis</i>	U	U	U	R	R			R	R		
Pearlspotted Owl	<i>Glaucidium perlatum</i>	R	U	U	R	U	U	U	U	C		*
Barred Owl	<i>Glaucidium capensis</i>							R	R			
Spotted Eagle Owl	<i>Bubo africanus</i>	U	R	R	R	U	U	U	R	U		
Giant Eagle Owl	<i>Bubo lacteus</i>		R			R	R		R	R		
Fierynecked Nightjar	<i>Caprimulgus pectoralis</i>		U	U	R	U		U	R	R		*
Rufouscheeked Nightjar	<i>Caprimulgus rufigena</i>	U	U	R	R	U	U		R	U		*
Freckled Nightjar	<i>Caprimulgus tristigma</i>						U					*
Mozambique Nightjar	<i>Caprimulgus fossii</i>	R	R					R		U		*
Pennantwinged Nightjar	<i>Macrodipteryx vexillaria</i>							R				*
European Swift	<i>Apus apus</i>	R	R	U	R			U	U	U		*
Bradfield's Swift	<i>Apus bradfieldi</i>						U		R	C		*
Whiterumped Swift	<i>Apus caffer</i>		R			R	U		R	C		*
Horus Swift	<i>Apus horus</i>					R						
Little Swift	<i>Apus affinis</i>	U	U			U	C		R	C		*
Alpine Swift	<i>Apus melba</i>			R			U			C		
African Palm Swift	<i>Cypsiurus parvus</i>	C	A	U		U	U	C	U	C		*
Redfaced Mousebird	<i>Urocolius indicus</i>	C	C	R		U	C	U	U	C		*
Pied Kingfisher	<i>Ceryle rudis</i>	U	R			R	U			A	*	*
Giant Kingfisher	<i>Ceryle maxima</i>						R			C	*	*
Malachite Kingfisher	<i>Alcedo cristata</i>					R				C	*	*
Woodland Kingfisher	<i>Halcyon senegalensis</i>	U	U			U	U	U		C		*
Chestnutbellied Kingfisher	<i>Halcyon leucocephala</i>	R				R	U	U	R	C		*
Striped Kingfisher	<i>Halcyon chelicuti</i>		R			R		U	R			*
European Bee-eater	<i>Merops apiaster</i>	U	U	R		R		C	C	U		*
Olive Bee-eater	<i>Merops superciliosus</i>		U			U	C			C		*
Bluecheeked Bee-eater	<i>Merops persicus</i>	R				R			R	U		*
Carmine Bee-eater	<i>Merops nubicoides</i>					R						
Little Bee-eater	<i>Merops pusillus</i>	U	U				R			C	*	*
Swallowtailed Bee-eater	<i>Merops hirundineus</i>	U	U	C	U	C	U	C	C	C		*
European Roller	<i>Coracias garrulus</i>	U	R			R		U	U	U		*
Lilacbreasted Roller	<i>Coracias caudata</i>	C	C	U	C	C	C	A	A	C		*
Purple Roller	<i>Coracias naevia</i>	U	R	U		U	C	C	C	C		*
Hoopoe	<i>Upupa epops</i>	U	U	C	U	C	C	C	C	C		*
Redbilled Woodhoopoe	<i>Phoeniculus purpureus</i>	R	R		R	U	U	C	R	C		*
Violet Woodhoopoe	<i>Phoeniculus damarensis</i>				R		R					
Greater Scimitarbill	<i>Rhinopomastus cyanomelas</i>	U	R	U		U	U	C	U	C		*
Grey Hornbill	<i>Tockus nasutus</i>	C	C	C	U	C	C	A	C	C		*
Redbilled Hornbill	<i>Tockus erythrorhynchus</i>	U	R	R	U	U	U	U	A	C		*
Yellowbilled Hornbill	<i>Tockus leucomelas</i>	C	R	C	C	C	C	C	A	C		*
Bradfield's Hornbill	<i>Tockus bradfieldi</i>		R					C	R			
Monteiro's Hornbill	<i>Tockus monteiri</i>				U		C			C		*
Southern Ground Hornbill	<i>Bucorvus leadbeateri</i>	U	U	R		R	R	U	R	R		*
Blackcollared Barbet	<i>Lybius torquatus</i>		R					U				
Acacia Pied Barbet	<i>Tricholaema leucomelas</i>	C		R	U	C	C	C	C	C		*
Yellowfronted Tinkerbird	<i>Pogoniulus chrysoconus</i>		R			R		U				*
Greater Honeyguide	<i>Indicator indicator</i>	R								R		*
Lesser Honeyguide	<i>Indicator minor</i>	R	R						R			*
Sharpbilled Honeyguide	<i>Prodotiscus regulus</i>	R	R									
Bennett's Woodpecker	<i>Campethera bennettii</i>							U	R	R		*
Goldentailed Woodpecker	<i>Campethera abingoni</i>	R	R			U	R	U	R	U		*
Cardinal Woodpecker	<i>Dendropicos fuscescens</i>	U	R	R	R	U	R	C	U	U		*

Species	(I) Habitat										(II)
	1	2	3	4	5	6	7	8	9	10	
Bearded Woodpecker		R				U	U	U	U		*
Monotonous Lark	R	R						U			
Rufousnaped Lark	U		R	R		U	U	R			*
Clapper Lark	U		C	U				U			*
Flappet Lark					R		U	R			*
Fawncoloured Lark	U		U	R	R	R		U			*
Sabota Lark	U	R	U			C	U	U			*
Dusky Lark	R						U		U		*
Spikeheeled Lark	U	R	R					R			*
Redcapped Lark	U							U			*
Pinkbilled Lark	R							R			*
Stark's Lark											*
Chestnutbacked Finchlark	U	U		R	U	U	U	R			*
Greybacked Finchlark	C	U		C				U			*
European Swallow	U	U	U	U	U	U	U	U	C		*
Angola Swallow											*
Whitethroated Swallow											*
Wiretailed Swallow	R	R			R	U			C		*
Pearlbreasted Swallow		R				R			C		*
Redbreasted Swallow	U	C			U	U	U	U	R		*
Mosque Swallow	U	U			U	U	U		R		*
Greater Striped Swallow	R	R			R	U		U	C		
Lesser Striped Swallow		U	R		U	C	R		C		*
South African Cliff Swallow						R			R		
African Rock Martin			R			C			C		
House Martin	R					R			U		*
Greyrumped Swallow									U		
Sand Martin									U		
Brownthroated Sand Martin		R						R	U		
Banded Sand Martin	U			R					U		*
Black Cuckooshrike		R			R		U		R		*
Whitebreasted Cuckooshrike											*
Forktailed Drongo	U	U	C	A	A	A	A	A	A		*
Golden Oriole	R	R		R				U	U		
African Golden Oriole		R	R		R		C	U	C		*
Blackheaded Oriole	R	R					C		R		
Black Crow	C	U	U	A			U	U			*
Pied Crow	A	A	C	A	C	U	U	U			*
Acacia Grey Tit	R	R	R	R			R	U			
Southern Black Tit		R			U		C				*
Carp's Black Tit			R			C			C		*
Rufous Tit							U				*
Cape Penduline Tit	U	R						U			*
Grey Penduline Tit								R			*
Arrowmarked Babbler							U				
Blackfaced Babbler					U		U	R	R		*
Pied Babbler	U		U				U	C			*
Barecheeked Babbler			R			C			U		*
Redeyed Bulbul	U	U	R	A	A	A	C	C	A		*
Blackeyed Bulbul	C	C			R		C				*
Yellowbellied Bulbul		R					U	R	C		*
Kurrichane Thrush											*
Groundscraper Thrush	U	U	U		U	C	U	U	C		*
Short-toed Rockthrush						U			R		

Species		(I) Habitat										(II)
		1	2	3	4	5	6	7	8	9	10	
Mountain Chat	<i>Oenanthe monticola</i>						U				R	
Capped Wheatear	<i>Oenanthe pileata</i>	C	U	U	R		U	U	U			*
Familiar Chat	<i>Cercomela familiaris</i>						C					*
Arnot's Chat	<i>Thamnolaea arnoti</i>							U				
Anteater Chat	<i>Myrmecocichla formicivora</i>	U		C	U	R	U		U			*
Rufoustailed Morning Warbler	<i>Cichladusa ruficauda</i>										C	*
Whitebrowed Scrub Robin	<i>Erythropygia leucophrys</i>	R	U			U		C	R	C		*
Kalahari Scrub Robin	<i>Erythropygia paena</i>	U	U	C	U	U	C	R	C			*
Herero Chat	<i>Namibornis herero</i>						U					
Garden Warbler	<i>Sylvia borin</i>									R		
Whitethroat	<i>Sylvia communis</i>									R		
Chestnutvented Titbabbler	<i>Parisoma subcaeruleum</i>	U	U	R	U	U	U	C	U	C		*
Icterine Warbler	<i>Hippolais icterina</i>	R	R			U	U		U	R		*
Great Reed Warbler	<i>Acrocephalus arundinaceus</i>					R				R		*
African Reed Warbler	<i>Acrocephalus baeticatus</i>	R	R			U	U			R		*
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>	R	R			R				U		*
Lesser Swamp Warbler	<i>Acrocephalus gracilirostris</i>	R	R			R				U		*
Willow Warbler	<i>Phylloscopus trochilus</i>	U	U	U	R	U	U	U	U	C		*
Yellowbreasted Apalis	<i>Apalis flavida</i>							C	U	R		*
Crombec	<i>Sylvietta rufescens</i>	U	U		C	C	C	C	U	C		*
Yellowbellied Eremomela	<i>Eremomela icteropygialis</i>	U			U		U	U	U	U		*
Burntnecked Eremomela	<i>Eremomela usticollis</i>							U				
Greybacked Bleating Warbler	<i>Camaroptera brevicaudata</i>		R			C	R	C	U	C		*
Barred Bush Warbler	<i>Calamonastes fasciolatus</i>	R		R	R	U	U	R	U	R		*
Rockrunner	<i>Achaetops pycnopygius</i>						U					
Fantailed Cisticola	<i>Cisticola juncidis</i>	U	U	U		U		U	R			
Desert Cisticola	<i>Cisticola aridula</i>	C	U	U	U	U	U	R	R	U		*
Tinkling Cisticola	<i>Cisticola rufilata</i>	U	R	U	U			R	R			*
Rattling Cisticola	<i>Cisticola chiniana</i>	C	C	R	U	C	C	U	U	C		*
Neddicky	<i>Cisticola fulvicapilla</i>					R		R				*
Tawnyflanked Prinia	<i>Prinia subflava</i>		R			U		C	U	U		*
Blackchested Prinia	<i>Prinia flavicans</i>	C	C	C	U	U	C	C	C	C		*
Spotted Flycatcher	<i>Muscicapa striata</i>	U	U	R	U	U	U	U	U	C		*
Bluegrey Flycatcher	<i>Muscicapa caeruleascens</i>					U				R		*
Black Flycatcher	<i>Melaenornis pammelaina</i>		R			R				U		*
Marico Flycatcher	<i>Melaenornis mariquensis</i>	U	U	U	A	U	C	C	C	C		*
Mousecoloured Flycatcher	<i>Melaenornis pallidus</i>		R					C				*
Chat Flycatcher	<i>Melaenornis infuscatus</i>	R		R	U	R	R		U			*
Chinspot Batis	<i>Batis molitor</i>			U		U		U	U			*
Pirit Batis	<i>Batis pririt</i>	U	R	U	U	U	U		U	C		*
Paradise Flycatcher	<i>Terpsiphone viridis</i>	R				U	U	U		C		*
African Pied Wagtail	<i>Motacilla aguimp</i>	R								C		*
Cape Wagtail	<i>Motacilla capensis</i>	U	R			U	U		R		*	*
Grassveld Pipit	<i>Anthus cinnamomeus</i>	C	U	U	R	R			R			*
Plainbacked Pipit	<i>Anthus leucophrys</i>	U	R	U					R			*
Wood Pipit	<i>Anthus nyassae</i>							U				
Lesser Grey Shrike	<i>Lanius minor</i>	U	U	C	U	U	C	U	C	C		
Fiscal Shrike	<i>Lanius collaris</i>	R	R				U		R			*
Redbacked Shrike	<i>Lanius collurio</i>	U	U			U	U	U	U	U		
Sousa's Shrike	<i>Lanius souzae</i>							U				
Longtailed Shrike	<i>Corvinella melanoleuca</i>	R							U			*
Swamp Boubou	<i>Laniarius bicolor</i>									C		*
Crimsonbreasted Shrike	<i>Laniarius atrococcineus</i>	U	R	U	C	C	C	A	C	C		*
Puffback	<i>Dryoscopus cubla</i>		R			C	R	C		C		*

Species	(I) Habitat										(II)	
	1	2	3	4	5	6	7	8	9	10		
Brubru	<i>Nilaus afer</i>	U	R	U	U	C	U	C	U	U		*
Threestreaked Tchagra	<i>Tchagra australis</i>	U	U	C	U	U	U	U	U	U		*
Blackcrowned Tchagra	<i>Tchagra senegala</i>	R		U	R			A	R			*
Orangebreasted Bush Shrike	<i>Telophorus sulfureopectus</i>					R		U		R		*
Whitetailed Shrike	<i>Lanioturdus torquatus</i>				C		C			U		*
White Helmetshrike	<i>Prionops plumatus</i>	U	U	R		U	U	C	U	C		*
Redbilled Helmetshrike	<i>Prionops retzii</i>			R		R		U		R		*
Whitethroated Shrike	<i>Eurocephalus anguitimens</i>	U	U	C	C	C	C	C	C	C		*
Wattled Starling	<i>Creatophora cinerea</i>	U	U	R	C		U	U	U	C		*
Plumcoloured Starling	<i>Cinnyricinclus leucogaster</i>	R	R		R	U	C	U	R	C		*
Burchell's Glossy Starling	<i>Lamprotornis australis</i>	U	U		U	U	U	A	C			*
Longtailed Starling	<i>Lamprotornis mevesii</i>			R	R	U	C		R	A		*
Cape Glossy Starling	<i>Lamprotornis nitens</i>	C	U	C	A	A	C	C	C	A		*
Greater Blue-eared Starling	<i>Lamprotornis chalybaeus</i>		U					U	R			
Sharptailed Starling	<i>Lamprotornis acuticaudus</i>		R					U				*
Palewinged Starling	<i>Onychognathus nabouroup</i>						C					*
Yellowbilled Oxpecker	<i>Buphagus africanus</i>	R	R			U	U	R		C		*
Redbilled Oxpecker	<i>Buphagus erythrorhynchus</i>	R										
Marico Sunbird	<i>Nectarinia mariquensis</i>	C	C		U	U	U	U	U	U		*
Little Purplebanded Sunbird	<i>Nectarinia bifasciata</i>											*
Whitebellied Sunbird	<i>Nectarinia talatala</i>			R		C	U	C	U	C		*
Dusky Sunbird	<i>Nectarinia fusca</i>	U	U	U	U	U	U	U	R	U		*
Scarletched Sunbird	<i>Nectarinia senegalensis</i>	U	U			U	C	R	R	C		*
Black Sunbird	<i>Nectarinia amethystina</i>	R	R					U				
Yellow White-eye	<i>Zosterops senegalensis</i>		R			R		U	R			*
Redbilled Buffalo Weaver	<i>Bubalornis niger</i>	U	U	U	C	U	U	U	C	U		*
Whitebrowed Sparrow-Weaver	<i>Plocepasser mahali</i>	U	U	C	C	C	C	C	C	A		*
Sociable Weaver	<i>Philetairus socius</i>	U							R			*
House Sparrow	<i>Passer domesticus</i>	C	C		U	R	U		U			*
Great Sparrow	<i>Passer motitensis</i>	U	U	R	U				R			*
Cape Sparrow	<i>Passer melanurus</i>		R		C				R			
Southern Greyheaded Sparrow	<i>Passer diffusus</i>	U	U	U	C	C	C	C	U	C		*
Yellowthroated Sparrow	<i>Passer superciliaris</i>							C				
Scalyfeathered Finch	<i>Sporopipes squamifrons</i>	C	C	C	A	C	U	A	C	U		*
Spectacled Weaver	<i>Ploceus ocularis</i>									C		*
Spottedbacked Weaver	<i>Ploceus cucullatus</i>					R						
Chestnut Weaver	<i>Ploceus rubiginosus</i>	R	R	U			U	R		U		
Masked Weaver	<i>Ploceus velatus</i>	C	C	U	U	C	U	U	U	C	*	*
Lesser Masked Weaver	<i>Ploceus intermedius</i>	U	U						R	U	*	*
Golden Weaver	<i>Ploceus xanthops</i>	R	R							U	*	*
Redheaded Weaver	<i>Anaplectes rubriceps</i>		R							R		
Redbilled Quelea	<i>Quelea quelea</i>	C	U	U	C	U	U	C	C	C		*
Red Bishop	<i>Euplectes orix</i>	U	U			U		U		U	*	*
Golden Bishop	<i>Euplectes afer</i>	U	U	R		R				R	*	*
Whitewinged Widow	<i>Euplectes albonotatus</i>											*
Melba Finch	<i>Pytilia melba</i>	R	R		C	R	U	C	U	R		*
Jameson's Firefinch	<i>Lagonosticta rhodopareia</i>									C		*
Redbilled Firefinch	<i>Lagonosticta senegala</i>	U	C	R		R				U		*
Blue Waxbill	<i>Uraeginthus angolensis</i>	C	A	U	U	C	C	C	C	C		*
Violeteared Waxbill	<i>Uraeginthus granatinus</i>	U	U	R	U	U	U	A	C	U		*
Common Waxbill	<i>Estrilda astrild</i>								R	R		*
Blackchecked Waxbill	<i>Estrilda erythronotos</i>		R		U			U	U			*
Cinderella Waxbill	<i>Estrilda thomensis</i>									U		*
Quail Finch	<i>Ortygospiza atricollis</i>		R					U				*

Species		(I) Habitat										(II)
		1	2	3	4	5	6	7	8	9	10	
Cutthroat Finch	<i>Amadina fasciata</i>								U	R		
Redheaded Finch	<i>Amadina erythrocephala</i>	C	U	U	C	U	U		U	U		*
Shafttailed Whydah	<i>Vidua regia</i>	U	U	U		U	U	C	C	U		*
Paradise Whydah	<i>Vidua paradisaea</i>	R	R			R	R	U	U	U		*
Steelblue Widowfinch	<i>Vidua chalybeata</i>	R	R									*
Yelloweyed Canary	<i>Serinus mozambicus</i>		R					C				
Blackthroated Canary	<i>Serinus atrogularis</i>	C	C	U	U	C	C	C	U	U		*
Yellow Canary	<i>Serinus flaviventris</i>	U	U		R	R			U			
Whitethroated Seedeater	<i>Serinus albogularis</i>	U	R									
Goldenbreasted Bunting	<i>Emberiza flaviventris</i>	U	U	U	U	C	U	C	U	C		*
Cape Bunting	<i>Emberiza capensis</i>				U							
Cinnamonbreasted Rock Bunting	<i>Emberiza tahapisi</i>	R	R	R	C		C			C		*
Larklike Bunting	<i>Emberiza impetuani</i>			R	C	R	U					

Of the 105 species added to the list during the NABAP and the recent survey, 35% were recorded in only one of the nine habitats and 78% were recorded in three or fewer habitats. In addition, all but 11% (12 species) of the additional 105 species were classed as rare or uncommon in all habitats recorded; the comparable figure for all bird species in Owambo is 42%. Of these 12 species, five are common in the woodland in the northeast (habitat 7; Dark Chanting Goshawk, Bradfield's Hornbill, Blackheaded Oriole, Yellowthroated Sparrow and Yelloweyed Canary), three are common along the Cunene River (habitat 9; Alpine Swift, Greater Striped Swallow and Rock Martin (also common in habitat 6)), three in the open dry shrub veld in the southwest (habitat 4; Ludwig's Bustard, Cape Sparrow and Larklike Bunting), and one is seasonally common in a number of habitats (Lesser Grey Shrike).

The number of bird species recorded in each habitat (Table 2) gives an indication of their avian diversities. While the coverage of the habitats is not uniform, it is apparent that (a) the central areas containing the Cuvelai system support a particularly rich diversity of birdlife (250-270 species), including over 90 wetland species. This is surprising considering the high human population in this part of Owambo and the generally stated notion

TABLE 2: Number of bird species recorded in each of the 10 habitats in Owambo as shown in Figure 1 and set out in Table 1.

Habitats	No. species
1. Seasonally flooded grasslands	273
2. Palm tree savanna	249
3. Bush savanna	140
4. Open shrub veld on sand	126
5. Ruacana woodland	210
6. Kaokoveld escarpment	200
7. Dry woodland on deep sand	224
8. Dry bush savanna on longitudinal dunes	244
9. Cunene River and riparian fringe	239
10. Wetlands of the Cuvelai system	91
Total number of bird species recorded in Owambo 420	

that this area is ecologically severely degraded; (b) the higher rainfall areas to the east support more birds than lower rainfall areas in the southwest (about 240 compared to 140 species); and (c) the northwestern corner of Owambo, although relatively dry, is a highly diverse region for birds (about 210 species). It is evident from the numbers of species recorded, their distribution and frequency of reporting, that the Cuvelai delta and drainage system is one of the most (if not the most) important ephemeral wetland in Namibia. It compares favourable in its diversity of wetland birds with the rich floodplains of the Kavango, Kwando and Zambezi Rivers (Brown 1990; Schlettwein *et al.* 1991). This system requires urgent and immediate study from both hydrological and biological disciplines, particularly in view of increasing pressure from human use and development in the region.

Dominant avifauna

Knowing the dominant species in a particular habitat provides a simple means of describing that habitat. Habitats can also be evaluated on their degree of similarity or uniqueness by comparing their dominant fauna. A comparison of the dominant avifauna (the 25 most abundant and characteristic species, based on recording frequency) within each habitat in Owambo (Table 3) demonstrates a similarity between habitats 1 and 2 (52% overlap of dominant species), and between habitats 3, 4, 5 and 8 (Table 4). The first two areas are open, floodplain-dominated habitats with characteristic species such as Blackheaded Heron, Cattle Egret, Secretarybird, Kori Bustard, Crowned and Blacksmith Plovers, Palm Swift, Greybacked Finchlark, Pied Crow, Blackeyed Bulbul, Capped Wheatear and Grassveld Pipit. The second four areas are transition habitats between *Acacia* savannas and woodlands. Areas 3 and 8 (72% overlap), 4 and 8 (64% overlap) and 5 and 8 (68% overlap) show considerable affinity to each other, thereby demonstrating the north-westerly trend to the "South West Arid" zone suggested by Winterbottom (1966a). This trend is interrupted by the Cuvelai drainage system which has markedly influenced the topography, soils and vegetation in habitats 1 and 2. Species characteristic of the transition areas (habitats 3, 4,

5 and 8) are Ostrich, Whitebacked Vulture, Tawny Eagle, Bateleur, Pale Chanting Goshawk, Whitewinged Black Korhaan, Swallowtailed Bee-eater, Grey and Yellowbilled Hornbills, Forktailed Drongo, Redeyed Bulbul, Kalahari Scrub Robin, Marico Flycatcher, Crimsonbreasted and Whitecrowned Shrikes and Whitebrowed Sparrowweaver. The woodlands in the northeast (habitat 7) are characterised by Dark Chanting Goshawk, Redeyed Dove, Redbilled Woodhoopoe, Bradfield's Hornbill, African Golden and Blackheaded Orioles, Whitebrowed Scrub Robin, Tawnyflanked Prinia, Mousecoloured Flycatcher, Blackcrowned Tchagra, Yellowthroated Sparrow and

Yelloweyed Canary. The escarpment zone (area 6) contains many of the near-endemic Namibian birds, including Rosy-faced Lovebird, Monteiro's Hornbill, Carp's Black Tit, Barecheeked Babbler and Whitetailed Shrike. Characteristic species of the Cunene River and its riparian fringe (area 9) include Hamerkop, African Fish Eagle, Water Dikkop, Mourning Dove, Ruppell's Parrot, Rosy-faced Lovebird, Pied and Giant Kingfishers, Olive Bee-eater, Yellowbellied Bulbul, Rufoustailed Morning Warbler, Swamp Boubou, Longtailed Starling, Yellowbilled Oxpecker and Spectacled Weaver.

TABLE 3: Characteristic and dominant bird species in each of the ten habitats identified in the Owambo region of Namibia (Figure 1). The 25 most abundant species in each habitat are listed together with the number of atlas cards (n), the number of bird species recorded and the percentage of birds represented in each habitat by the 25 dominant species [x].

1. Seasonally flooded grasslands (n=116) 273 [9%]	2. Palm tree savanna (n=106) 249 [10%]	3. Bush savanna (n=23) 140 [18%]	4. Open shrub veld (n=21) 126 [20%]	5. Ruacana Woodland (n=25) 210 [12%]
Blackheaded Heron	Blackheaded Heron	Ostrich	Ostrich	Yellowbilled Kite
Cattle Egret	Cattle Egret	Whitebacked Vulture	Secretarybird	Bateleur
Secretarybird	Redbilled Teal	Tawny Eagle	Whitebacked Vulture	Cape Turtle Dove
Whitebacked Vulture	Yellowbilled Kite	Bateleur	Lappetfaced Vulture	Laughing Dove
Yellowbilled Kite	Bateleur	Pale Chanting Goshawk	Tawny Eagle	Namaqua Dove
Kori Bustard	Blacksmith Plover	Whitewinged Black Korhaan	Bateleur	Grey Lourie
Whitewinged Black Korhaan	Cape Turtle Dove	Crowned Plover	Pale Chanting Goshawk	wSwallowtailed Bee-eater
Crowned Plover	Laughing Dove	Cape Turtle Dove	Helmeted Guineafowl	Lilacbreasted Roller
Blacksmith Plover	Namaqua Dove	Laughing Dove	Kori Bustard	African Hoopoe
Blackwinged Stilt	African Palm Swift	Namaqua Dove	Whitewinged Black Korhaan	Grey Hornbill
Cape Turtle Dove	Redfaced Mousebird	Swallowtailed Bee-eater	Cape Turtle Dove	Yellowbilled Hornbill
Laughing Dove	Lilacbreasted Roller	Grey Hornbill	Namaqua Dove	Acacia Pied Barbet
Namaqua Dove	Grey Hornbill	Yellowbilled Hornbill	Lilacbreasted Roller	Forktailed Drongo
African Palm Swift	Redbreasted Swallow	Clapper Lark	Yellowbilled Hornbill	Redeyed Bulbul
Lilacbreasted Roller	Pied Crow	Forktailed Drongo	Forktailed Drongo	Longbilled Crombec
Greybacked Finchlark	Blackeyed Bulbul	Pied Crow	Black Crow	Greybacked Bush Warbler
Black Crow	Rattling Cisticola	Anteating Chat	Pied Crow	Crimsonbreasted Shrike
Pied Crow	Blackchested Prinia	Kalahari Scrub Robin	Redeyed Bulbul	Puffback
Blackeyed Bulbul	Marico Sunbird	Blackchested Prinia	Marico Flycatcher	Brubru
Capped Wheatear	House Sparrow	Lesser Grey Shrike	Crimsonbreasted Shrike	Whitewinged Shrike
Desert Cisticola	Scalyfeathered Finch	Threestreaked Tchagra	Whitetailed Shrike	Cape Glossy Starling
Blackchested Prinia	Masked Weaver	Whitecrowned Shrike	Whitecrowned Shrike	Whitebellied Sunbird
Grassveld Pipit	Redbilled Firefinch	Cape Glossy Starling	Cape Glossy Starling	Whitebrowed Sparrowweaver
Masked Weaver	Blue Waxbill	Whitebrowed Sparrowweaver	Whitebrowed Sparrowweaver	Blue Waxbill
Redbilled Quelea	Blackthroated Canary	Scalyfeathered Finch	Scalyfeathered Finch	Goldenbreasted Bunting
6. Kaokoveld escarpment (n=35) 200 [113%]	7. Dry woodland (n=24) 224 [111%]	8. Dry bush savanna (n=76) 244 [10%]	9. Cunene River and riparian fringe (n=17) 239 [10%]	10. Cuvelai wetlands 92 [27%]
Redbilled Francolin	Dark Chanting Goshawk	Ostrich	Darter	Little Grebe
Cape Turtle Dove	Redeyed Dove	Whitebacked Vulture	Hamerkop	Grey Heron
Laughing Dove	Cape Turtle Dove	Tawny Eagle	African Fish Eagle	Blackheaded Heron
Rosy-faced Lovebird	Emeraldspotted Dove	Bateleur	Common Sandpiper	Cattle Egret
Grey Lourie	Lilacbreasted Roller	Pale Chanting Goshawk	Water Dikkop	Common Squacco Heron
Little Swift	Redbilled Woodhoopoe	Cape Turtle Dove	Mourning Dove	African Openbill
Lilacbreasted Roller	Grey Hornbill	Laughing Dove	Cape Turtle Dove	Marabou
Purple Roller	Bradfield's Hornbill	Namaqua Dove	Laughing Dove	Greater Flamingo
Grey Hornbill	Cardinal Woodpecker	Grey Lourie	Ruppell's Parrot	Lesser Flamingo
Yellowbilled Hornbill	Forktailed Drongo	Swallowtailed Bee-eater	Rosy-faced Lovebird	Whitefaced Duck
Monteiro's Hornbill	African Golden Oriole	Lilacbreasted Roller	Grey Lourie	Fulvous Whistling Duck
Acacia Pied Barbet	Blackheaded Oriole	Grey Hornbill	African Palm Swift	Egyptian Goose
Sabota Lark	Blackeyed Bulbul	Redbilled Hornbill	Pied Kingfisher	Redbilled Teal
African Rock Martin	Whitebrowed Scrub Robin	Yellowbilled Hornbill	Giant Kingfisher	Cape Shoveller
Forktailed Drongo	Tawnyflanked Prinia	Acacia Pied Barbet	Olive Bee-eater	Redknobbed Coot
Carp's Black Tit	Mousecoloured Flycatcher	Forktailed Drongo	Forktailed Drongo	Chestnutbanded Plover
Barecheeked Babbler	Crimsonbreasted Shrike	Redeyed Bulbul	Redeyed Bulbul	Kittlitz's Plover
Redeyed Bulbul	Puffback	Kalahari Scrub Robin	Yellowbellied Bulbul	Threebanded Plover
Familiar Chat	Blackcrowned Tchagra	Blackchested Prinia	Rufoustailed Morning Warbler	Blacksmith Plover
Kalahari Scrub Robin	White Helmet Shrike	Crimsonbreasted Shrike	Swamp Boubou	Common Sandpiper
Blackchested Prinia	Burchell's Glossy Starling	Whitecrowned Shrike	Longtailed Starling	Avocet
Marico Flycatcher	Yellowthroated Sparrow	Whitecrowned Shrike	Cape Glossy Starling	Blackwinged Stilt
Whitetailed Shrike	Scalyfeathered Finch	Whitebrowed Sparrowweaver	Cape Glossy Starling	Greyheaded Gull
Cape Glossy Starling	Violeteared Waxbill	Scalyfeathered Finch	Whitebrowed Sparrowweaver	Whitewinged Black Tern
Palewinged Starling	Yelloweyed Canary	Blue Waxbill	Spectacled Weaver	Cape Wagtail
			Masked Weaver	

TABLE 4: A simple matrix showing the number of dominant bird species in common between the different habitats in Owambo (Figure 1). The 25 dominant species in each habitat are listed in Table 3.

		H A B I T A T S									
		1	2	3	4	5	6	7	8	9	10
H A B I T A T S	1	25									
	2	13	25								
	3	8	7	25							
	4	8	5	15	25						
	5	5	8	11	11	25					
	6	3	5	7	8	10	25				
	7	3	5	4	5	6	4	25			
	8	6	9	18	16	17	12	12	25		
	9	4	4	5	5	7	7	3	7	25	
	10	4	4	0	0	0	0	0	0	1	25

New distribution data

When comparing the distributions of birds reported on here with those given by Clancey (1980) and Maclean (1985), 34 and 65 species respectively were found to occur considerably beyond their previously known or reported ranges (Table 5). In addition, a number of Red Data and little known species were found to be fairly common, e.g. Bateleur, Grey Kestrel (five different birds seen in four days), Rednecked Francolin (seen daily on the Cunene River), Wattled Crane (a flock of 34 seen at Lake Oponono), Kori Bustard, Olive Bee-eater (the common bee-eater on the Cunene), Blackeyed Bulbul (common from central Owambo to the northeast), Rufoustailed Morning Warbler (found in most groups of palm trees along the Cunene, breeding in the fronds), Yellowbilled Oxpecker (17 in six different flocks on a total of about 400 head of cattle and 60 donkeys along the Cunene River (oxpecker:host ratio of 1:27). Group sizes were two groups of two, three of three and one of four birds). Spectacled Weaver were common along Cunene River and two flocks of Cinderella Waxbills were found below Ruacana falls.

TABLE 5: Bird species recorded in Owambo which significantly extends previously recorded distribution ranges as illustrated by (a) Maclean (1985) and given by (b) Clancey (1980).

Species	References		Species	References	
	(a)	(b)		(a)	(b)
Blacknecked Grebe	*	*	Greater Honeyguide	*	
Slaty Egret	*	*	Lesser Honeyguide	*	
Rufousbellied Heron	*	*	Sharpbilled Honeyguide	*	*
Blackcrowned Night Heron	*		Flappet Lark	*	*
Common Squacco Heron		*	Spikeheeled Lark	*	
Woolynecked Stork		*	Redbreasted Swallow	*	
Pygmy Goose	*	*	Mosque Swallow	*	*
Hooded Vulture	*		Lesser Striped Swallow	*	*
Longcrested Eagle	*	*	Sand Martin		*
Little Sparrowhawk	*		Banded Sand Martin		*
Hobby	*		Southern Black Tit	*	*
Eastern Redfooted Kestrel	*		Blackeyed Bulbul	*	
Coqui Francolin	*		Kurrichane Thrush	*	
Crested Francolin	*		Arnot's Chat	*	
Wattled Crane	*		Herero Chat		*
African Crake		*	Fantailed Cisticola	*	*
Black Crake	*		Neddicky	*	
Lesser Gallinule	*		Tawnyflanked Prinia	*	
Whitefronted Plover	*		Bluegrey Flycatcher	*	
Wattled Plover	*		Black Flycatcher	*	
Ethiopian Snipe	*	*	Pirit Batis	*	*
Greyheaded Gull	*	*	Wood Pipit	*	*
Yellowthroated Sandgrouse		*	Greater Blue-eared Starling	*	*
Redeyed Dove		*	Yellowbilled Oxpecker	*	*
Emeraldspotted Dove	*		Redbilled Oxpecker	*	
Redchested Cuckoo	*	*	Black Sunbird	*	
Black Coucal	*	*	Yellow White-eye	*	
Whitebrowed Coucal	*	*	House Sparrow	*	*
Fierynecked Nightjar	*		Cape Sparrow	*	
Pennantwinged Nightjar	*	*	Yellowthroated Sparrow	*	*
Horus Swift	*		Spottedbacked Weaver	*	*
Giant Kingfisher	*		Golden Weaver	*	*
Carmine Bee-eater	*		Redheaded Weaver	*	
Little Bee-eater	*		Red Bishop	*	
Ground Hornbill	*		Redbilled Firefinch	*	
Blackcollared Barbet	*		Yelloweyed Canary	*	*
Yellowfronted Tinkerbird	*				

TABLE 6: Conservation status of birds in the Owambo region per habitat. "Endangered" refers to species in danger of extinction in Namibia if causal factors continue to operate; "Vulnerable" are species believed likely to move into the endangered category in the near future if the causal factors continue operating; "Rare" are those species with small or localised populations; "Amber" are species requiring regular monitoring because of limited numbers, restricted distribution (including species endemic to Namibia), specialised requirements/habits or because insufficient information is currently available to class them in one of the other categories.

Habitat	Conservation status: no. species					Total no. of species	Percent Red Data species
	Amber	Rare	Vulnerable	Endangered	Total		
1. Seasonally flooded grasslands	24	11	10	4	49	273	18
2. Palm tree savanna	21	10	7	1	39	249	26
3. Bush savanna	11	4	2	0	27	140	120
4. Open shrub veld on sand	8	3	2	0	13	126	10
5. Ruacana woodland	23	8	3	0	34	210	16
6. Kaokoveld escarpment	22	6	3	0	31	200	16
7. Dry woodland on deep sand	15	12	7	0	34	224	15
8. Dry bush savanna on longitudinal dunes	18	6	6	1	31	244	13
9. Cunene River and riparian fringe	29	9	7	0	45	239	19
10. Wetlands of the Cuvelai drainage system	22	0	5	2	38	91	42
Total for Owambo	53	27	14	5	99	420	24

Conservation status

Of all the bird species recorded in the Owambo region, 99 (24%) are included in one of four categories in the Namibian list of Red Data birds (Williams & Brown in prep). The two categories reflecting the greatest degree of threat, "Endangered" and "Vulnerable", include five and 14 species respectively. The conservation status of birds within the 10 different habitats is given in Table 6 together with a brief definition of the four Red Data categories.

The most threatened group of birds were those of the Cuvelai wetlands with 42% of the species included on the Red Data list. All other habitats ranged between 10% and 19% with wetland-dominated habitats, e.g. the Cunene River (19%) and seasonally flooded grasslands (18%), having the highest proportion of Red Data species. The importance of maintaining wetland habitats for the conservation of wetland birds has been identified as a national conservation priority (Williams 1991) and has been highlighted in specific regions of the country, e.g. West and East Caprivi and Bushmanland (Brown 1990; Schlettwein *et al.* 1991; Hines 1993). The results from this survey of the birds in Owambo further support the needs for wetlands research and integrated environmental conservation.

CONCLUSION

The Owambo region contains a diversity of habitats that support a rich and varied avifauna. While some areas have been severely modified by man, mainly the central Cuvelai system, large areas remain in good condition. Even the highly modified areas support important populations of birds, particularly wetland species and mainly on a seasonal basis. It is important that future work in the region should identify (a) areas for habitat protec-

tion, and (b) areas for protection against disturbance from people and livestock. The latter areas should include important feeding and breeding sites of colonial wetland birds. Such sites could be developed as bird sanctuaries and provision should be made for school education, recreation and informal education for local communities, and for tourism.

ACKNOWLEDGEMENTS

I am grateful to my colleagues for a stimulating and productive survey: Brian Jones, Henk Coetzee, Wynand du Plessis, Mike Griffin and particularly the organiser, Malan Lindeque, and leader, Frans Coetzee. I thank all participants in the Namibian Bird Atlas Project for their assistance in the collection of information to make this analysis possible, and James Harrison and his SABAP team for their efficient services. The comments by Drs P A Clancey, Rob Simmons and Tony Williams on an earlier draft of this paper are much appreciated.

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