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Important Bird Areas in Namibia

by

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This series of Research Discussion Papers is intended to present preliminary, new or topical information and ideas for discussion and debate. The contents are not necessarily the final views or firm positions of the Ministry of Environment and Tourism. Comments and feedback will be welcomed.

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Introduction

The Important Bird Areas (IBA) project is a BirdLife International initiative to formally recognise the most important areas for birds in each country of the world. Its aim is to identify and protect a network of sites which are critical for the long-term viability of bird populations across the entire range of each species.

BirdLife International, in collaboration with the Avian Demography Unit at The University of Cape Town, has compiled information to produce a book identifying and describing all Important Bird Areas within Southern Africa (Barnes in prep). Experts within each country have identified areas of critical importance to birds. This Research Discussion Paper is based on the Namibian chapter of the book and presents information on Namibia's IBAs. Additional data and comments were received from other sectors of the Ministry of Environment and Tourism, the Ministry of Fisheries and Marine Resources and National Botanical Research Institute.

What are Important Bird Areas?

Important Bird Areas are discrete regions in which

- significant assemblages of birds occur (defined as 5 000 birds at a national level, or 20 000 globally),
- significant numbers of restricted-range or biome-specific birds occur (see Appendix 2),
- significant numbers of threatened birds occur (i.e. globally and nationally threatened Red Data species), or
- 1% of the world population of any species occurs[†]

[†] for some species we have taken the 1% level for the recognised subspecies rather than the full species e.g. Blacknecked Grebe *Podiceps nigricollis guerneyi*.

By identifying where these areas are we can not only prioritise our conservation efforts but add to a world-wide effort to recognise the relatively small number of core areas where most of the world's endangered birds are concentrated. The overall philosophy is that rather than trying to conserve "everything" we can put resources into first conserving the really critical sites. These may be IBAs or they may be Endemic Bird Areas (EBAs) as recognised by Bibby (1992).

What birds are "important"?

The birds included as important are those identified in Namibia's Red Data lists prepared by Brown et al. (in prep) as well as those recognised by Collar et al. (1994) as globally threatened (Table 1). For the purposes of this document we pared down Namibia's list of 86 Red Data species by disregarding:

- doubtful or erratic (vagrant) species,
- extinct species,
- species that are not threatened but require further work (e.g. amber species), and particularly
- species that have large ranges in adjacent countries but whose range just stretches into Namibia (e.g. several species in northern eastern Namibia).

All of Namibia's endemics are retained, as are species threatened by poisons and habitat degradation. We also retained threatened Palearctic migrants since their winter quarters are as important as their breeding areas.

Table 1: Birds occurring in Namibia classified as globally threatened by Collar et al. (1994)

Vulnerable	Near-threatened		
Slaty Egret	African Penguin	Black Harrier	Damara Tern
Cape Vulture	Cape Gannet	Pallid Harrier	Sclater's Lark
Lesser Kestrel	Crowned Cormorant	African Black Oystercatcher	Herero Chat
Blue Crane	Bank Cormorant	Great Snipe	Cinderella Waxbill
Wattled Crane	Lesser Flamingo	Blackwinged Pratincole	
Red Lark *			

* Erroneously included - does not occur in Namibia

Scientific names of all birds and other groups listed in the text are presented in Appendix 3. Plants are referred to by their Latin binomials throughout, and common names listed in Appendix 3, where applicable.

How were Namibia's Important Bird Areas selected?

IBA sites are selected taking into account the existing protected area network and conservation areas. In many cases these areas will form the backbone of the IBA network, with additional sites proposed to fill in the gaps. This has been the case in Namibia. As well as including individual sites which fulfil the criteria above, the national IBA network as a whole should include all threatened species which breed within the country and all biome-specific and restricted-range species. Each IBA should ideally be large enough to support self-sustaining populations of as many of the species as possible for which it was identified or, in the case of migrants, provide their requirements for the duration of their presence.

Sources of information on the population status of Namibia's bird populations used to evaluate IBA sites include:

- nationwide wetland bird monitoring since 1991 constituting part of the Wetlands International Program (Simmons 1996a),
- published estimates of endemic bird population sizes (Jarvis and Robertson in press),
- specific studies of individual species (e.g. Brown (1985b)), and
- estimates from the recent Bird Atlas data (Harrison et al. 1997)

World populations of wetland species were taken from Rose & Scott (1997), with modifications from local knowledge (e.g. for flamingos).

The selected IBAs

Table 2 (page 5) lists 21 sites in Namibia that we consider to be Important Bird Areas. These are presented in Figure 1 (page 7). We have included both large (e.g. Namib-Naukluft Park) and small (e.g. Mercury Island) areas, and every species that was identified as threatened in some way is included. The list is not exhaustive but probably captures 90% of the important areas for birds in Namibia.

Of the 21 sites, 19 qualify as globally important sites; the remaining two are of sub-regional importance. The sites are predominantly coastal, reflecting the importance of the Benguela current and coastal wetlands that boast large numbers of breeding gannets, penguins, and cormorants, as well as the hundreds of thousands of Palearctic migrants that congregate on the central coast.

Because of Namibia's predominantly arid environment it is little surprise that inland wetland sites also dominate the IBAs. These include protected areas such as Mahango Game Reserve (on the Okavango River), East

Caprivi's extensive wetlands and Etosha National Park. However, unprotected sites include the Bushmanland Pans in Tsumkwe District and the stretch of Cunene River between Ruacana and Epupa Falls. Some of these have been amalgamated into very large areas because the system is a single ecological unit.

We have also specifically included a site within the best area for Namibia's main endemic birds (listed in Appendix 1), just west of Etosha National Park. This area, encompassing three quarter-degree squares is predicted to contain 1% of the world's Herero Chats, a new finding. The Hobatere tourist lodge concession offers partial protection to this site, even though it is afforded no formal protection. All of Namibia's 14 near endemic birds are contained within the IBAs selected, including the newly elevated Barlow's Lark. Other possible near endemics which may be genetically determined in the near future, such as the Damara Redbilled Hornbill, will also fall within these IBAs.

Table 2: Important Bird Areas in Namibia and their conservation status

Site name	* IBA Status	Conservation status	† Criteria used to select site	Notes on Conservation Status
N001 Cunene River Mouth	SR	U	4	
N002 Epupa-Ruacana	G	U	1; 2; 3	
N003 Eastern Caprivi Wetlands	G	P	1; 3	Two National Parks
N004 Mahango Game Reserve & Okavango River	G	P	1; 3	Game Reserve
N005 Etosha National Park	G	F	1; 3; 4	National Park (and Ramsar site)
N006 Hobatere Area	G	P	2; 3	
N007 Bushmanland Pan System	G	U	1; 3; 4	Proposed Conservancy
N008 Waterberg Plateau Park	G	F	1; 3	Park
N009 Brandberg	G	U	2; 3	Proposed World Heritage Site
N010 Cape Cross Lagoon	G	U	1; 4	Nature Reserve
N011 Namib-Naukluft Park	G	F	1; 2; 3; 4	National Park
N012 Mile 4 Saltworks	G	F	1; 4	Private Nature Reserve
N013 30 km beach: Walvis - Swakopmund	G	U	1; 4	Proposed Nature Reserve
N014 Walvis Bay	G	U	1; 4	Ramsar Site
N015 Sandwich Harbour	G	F	1; 4	Park, Nature Reserve and Ramsar Site
N016 Hardap Nature Reserve	SR	F	4	Recreation Resort
N017 Mercury Island	G	P	1; 4	Recreation Resort
N018 Ichaboe Island	G	P	1; 4	Rec. Resort, Proposed Nature Reserve
N019 Lüderitz Bay Islands	G	P	1; 4	
N020 Possession Island	G	P	1; 4	Staffed by Ministry of Fisheries
N021 The Sperrgebiet	G	F	1; 2; 3; 4	Protected by NAMDEB, partial Ramsar Site

* G Global; SR Sub-regional.

† 1 includes threatened species; 2 includes restricted-range species; 3 biome-representative site; 4 wetland site

Since birds have been shown to be effective indicators of biodiversity in other plant and animal groups, the conservation of the IBA network should help to ensure the survival of a correspondingly large number of other taxa. It should be noted, however, that for many species a site-based conservation approach may not be appropriate, and for others it must be combined with broader-scale conservation measures to be effective.

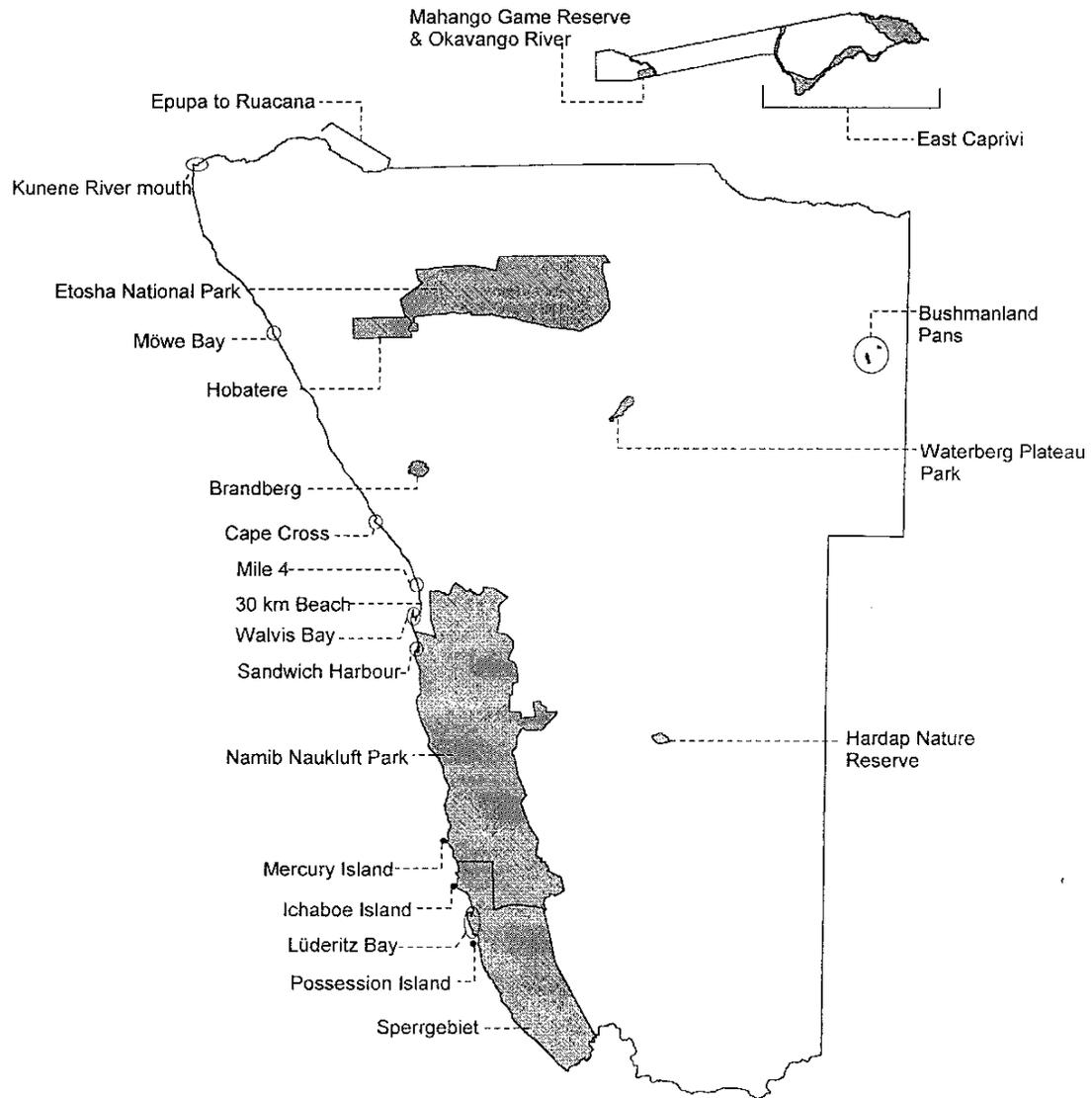
New sites may be added in future as avian research continues, and new data may also add to existing descriptions or species lists. As this is a draft document, comments are welcomed and should be directed to Rob Simmons, Ornithology Program, Private Bag 13306, Ministry of Environment and Tourism, Windhoek.

Acknowledgements

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Figure 1: Location of proposed Important Bird Areas in Namibia



Important Bird Area Accounts

N001 Cunene River Mouth

Unprotected (Skeleton Coast Park)
Sub-regional IBA

17°08'S; 11°53'E
500 ha

Site description

The Cunene River forms an east-west linear oasis of permanent freshwater which crosses the northern Namib Desert to reach the Atlantic Ocean. The river mouth is considered to be the section of river within 4 km of the coast. The small lagoon that occurs immediately east and south of the mouth is a 2.3 km long stretch of mud/sand which, at its widest point, is 1.6 km across. When river flow is low, the total area of exposed sand and mudflat is about 125 ha. The mouth itself varies from 30 to 80 m in width at low flows, to about 1 km in width during high flow years. At high tide fresh water backs up into the lagoon, which can then be up to 2 km wide. Shorebirds are concentrated in these areas. During low flow months (July-Nov) however, little water is backed up and large amounts of sandflats are exposed. Although not traditionally seen as an estuary, saline water penetrates the lagoon. At the mouth, sandbars develop from both northern and southern shores but these are periodically obliterated during large scale flood surges, and river flow to the sea is never closed off. Along the lower reaches of the river, only thin strips of wetland vegetation (*Phragmites australis*) occur, and the lagoon and vegetated islands at the mouth are probably the most biologically productive areas on the lower Cunene. Satellite images reveal the presence of large volumes of warm freshwater in the cold ocean for up to 100 km² north of the mouth.

Birds

Although this area never supports particularly high numbers of birds (with maximum counts of 3 900 birds), it is thought to be important as a staging and feeding post for waders which migrate to sites farther south such as Walvis Bay, Sandwich Harbour and on South African wetlands on the Atlantic coast. It is one of the most isolated coastal wetlands along the Atlantic flyway, with the nearest permanent wetland being almost 700 km away at Walvis Bay. It is, however, the second-richest coastal wetland in Namibia with 72 species of wetland birds recorded, including twelve Namibian

Red Data species. Wetland birds recorded here include Cape Gannet (offshore), White Pelican, Chestnutbanded Plover, and both breeding and migrating Damara Tern. Less frequently recorded species include Black Stork, African Black Oystercatcher and the nocturnal Whitecrowned Night Heron. Curlew Sandpiper, Little Stint and Sanderling are some of the commoner waders, while Ospreys, rare in Namibia, are almost always present fishing in the lagoon and at sea.

Other threatened/endemic wildlife

Nile Soft-Shelled Terrapin and Green Turtle utilise the river mouth and the former may breed here. This represents the southernmost limit of these turtles' distributions on the west coast of Africa. The large freshwater prawn *Macrobrachium vollehoveni* reaches its southern limit at the lower Cunene River. A variety of mammals including Elephant, Lion, Brown Hyaena and Springbok occasionally pass through the area. Of the 69 freshwater fish species in the lower Cunene, five are endemic to the river. A small population of Nile Crocodile occurs as far west as the mouth. It is also the western-most location of the Rock Python.

Conservation issues

The existence of this wetland, and some of the unique fauna which it supports, is threatened by the proposal to build a dam further upstream at Epupa. Feasibility studies reached their conclusion in 1998. During the filling of a dam at Epupa, which would take between one and four years, the reduced (or possibly zero) water flow at the Cunene River mouth would have drastic effects on this wetland. Reduced water flow may either allow the mouth to close or salinity levels to increase, drastically changing the character of the lagoon. Once in operation the dam would introduce cold water into an unusually warm water system possibly driving away poikilotherms such as crocodiles, snakes and turtles. Fish utilising the lower Cunene might also be lost if flow patterns and floods are regulated or smoothed, reducing or eliminating breeding.

Consequently, the guild of piscivorous birds would also disappear. The fate of the river will be decided shortly.

1991, Holtzhausen 1991, Noli-Peard and Williams 1991, Penrith 1970, 1976, Ryan et al. 1984, Simmons 1993a, 1993b, Tarr and Tarr 1987, Van Zyl 1991, Warwick 1996, Wipplinger 1960.

Further reading

Barnard 1998, Bethune 1995, Braine 1990, Curtis

	Breeding (pairs)	Total numbers
Globally near-threatened species		
¥ African Black Oystercatcher		OV
¥ Damara Tern	10	96 (av) - 2000 (max)
¥ Lesser Flamingo		300
Namibian Red Data species		
¥ White Pelican		125 (max)
¥ Greater Flamingo		147
¥ Chestnutbanded Plover		112 (max)
¥ Swift Tern		46 (max)
¥ Caspian Tern		36 (max)

¥ Species does not meet IBA threshold
 OV Occasional visitor

av Yearly average (max count)
 max Absolute maximum

N002 Epupa-Ruacana

Unprotected
Global IBA

17°18'S; 14°15'E
c. 28 000 ha

Site description

The Cunene River forms an east-west linear oasis of permanent freshwater crossing the northern Namib Desert to the Atlantic Ocean. It is a warm river, with highly variable annual flow volumes differing 14 fold between and high and low years. It also varies within years by as much as 11 fold between high flow in April to low flow in October. The lower Cunene is the 340 km stretch of river that forms the border between Namibia and Angola. Epupa Falls, about 190 km upstream of the river mouth, is the last major waterfall along this very steep river that flows for 1 050 km from source (in the Angolan highlands) to mouth. It also marks the proposed site for a hydro-electric dam which would produce a body of water c. 75 km in length. Hydro-power in Namibia is currently only generated from the diversion weir located at Ruacana, the end point of this IBA. Either side of the river, rocky cliffs, wind-stripped plains and dune fields mark its progress through the hyper-arid desert. Precipitation is about 300 mm p.a. in the east, decreasing to the west, and evaporation is high at 2 - 3 m p.a. Riparian vegetation is confined to a narrow strip along the river banks and the river is typically confined within rocky gorges for most of its 340 km journey along the border of Angola. Where the river widens and braids into several channels, or mist generated from waterfalls creates a relative humid environment, riverine vegetation occurs in profusion. *Hyphaene* palms are common and luxuriant at Epupa, attracting peripheral species found nowhere else in Namibia. Other riparian vegetation includes *Ficus verruculosa*, *Phragmites mauritanicus*, large *Faidherbia albida* and *Ficus sycamorus* trees and clumps of *Salvadora persica*. On surrounding hillsides *Colophospermum mopane* and *Commiphora* species dominate. Nomadic pastoralists, the Ova-Himba, descendant of the Herero, number about 5 000 and are reliant on the river for water in the dry season. Extremely high temperatures (over 40°C) are common here, and the river's effect as an oasis then becomes most apparent.

Birds

The river and surrounding areas support over 300 bird species. While two April river surveys revealed only 30 wetland birds/10km of river (mainly

herons), recent more comprehensive surveys revealed 63 birds/10 km at low flow - relatively high compared to other Namibian rivers. Where dense ribbons of palms fringe the river, much higher bird densities occur. The riparian fringe is home to two highly localised species found nowhere else in Namibia: Cinderella Waxbill and Rufoustailed Palmthrush. Both are associated with *Hyphaene* palms and adjacent thickets. Several species also occur in disjunct distributions here, hundreds of kilometres from their stronghold in the Okavango and adjacent wetlands. These include Hartlaub's Babbler, Jameson's Firefinch, Golden Weaver, Greyheaded Bush Shrike and Pygmy Kingfisher. Several species are, in fact, at the tail end of a more northerly tropical distribution. Grey Kestrels, common elsewhere in Africa, just extend into the subregion on the Cunene and further east in former Ovamboland. A distinctive race of Rednecked Francolin also appears here with the closest other southern African records being in eastern Zimbabwe. These species co-occur with near-endemics such Barecheeked Babbler, Herero Chat, Rüppell's Parrot and Whitetailed Shrike. Other species recorded include 17 species of raptor with Osprey, African Marsh Harrier and Martial Eagle being notable, as well as two species of owl uncommon in Namibia, Wood Owl and Barred Owl. It is thus an unusual section of river which supports a unique assemblage of species in Namibia.

Other threatened/endemic wildlife

Elephants use the river as an oasis. A newly discovered (1997) species of fish may go extinct if the proposed dam development goes ahead since it breeds in shallow water on flooded banks. Five species of fish are endemic to the river. Nile Crocodile inhabit most sections of the lower Cunene River. This area represents the southernmost distribution of the River Oyster. Recent findings include a new distribution record for *Simulium fragai*, from the Blackfly genus. The known global range of a recently described snake, the Cunene Racer, would be flooded by the proposed dam.

Conservation issues

The existence of this area is threatened by a proposal to build a hydroelectric scheme near Epupa Falls further upstream. No fewer than nine

dams have been proposed for the lower reaches of the river, four between Epupa and Ruacana, the proposed IBA area. The first, at Epupa Falls, will be 17 times larger than Namibia's largest existing dam, flooding 75 km of river and an area of 200 km² including most of the IBA. During the time it would take for the dam to fill and reach operational level (up to 4 years), the resulting reduced or possibly zero water flow along the Cunene could have drastic effects on the river and its riparian vegetation. If the Epupa site is chosen, the main area for Cinderella Waxbill and Rufoustailed Palmthrush will be inundated by the dam waters. Due to the expected annual draw-down in the dam level it is expected that none of the riverine vegetation would re-establish, effectively eliminating the most speciose areas associated with

the palm fringe. A dam in the downstream Baynes Mountains would have less impact due to lower species richness and fewer palms. The effect of the Ruacana diversion weir has been to create fluctuations in water levels of 20 - 110 cm (depending on river width) within a 24 h period. Fish and insect larvae reliant on flooding of levees have already been severely affected and may eventually go extinct if these short term fluctuations persist.

Further reading

Barnard 1997, 1998, Bethune 1995, Braine 1990, de Moor 1998, Harrison et al. 1997, Holtzhausen 1991, Noli-Peard and Williams 1991, Jarvis and Robertson 1997, Simmons 1993b, Simmons and Herremans 1997, Underhill and Brown 1997.

	Breeding (pairs)	Total numbers
Globally near-threatened species		
Herero Chat		10 - 20
Cinderella Waxbill	100 - 200	200 - 500
Restricted-range and biome restricted species		
Rüppell's Parrot		Common
Bradfield's Hornbill		Uncommon
Monteiro's Hornbill		Fairly Common
Stark's Lark		Common
Blackfaced Babbler		Common
Hartlaub's Babbler		Common
Barecheeked Babbler		Fairly Common
Kalahari Robin		Common
Herero Chat		Uncommon
Rockrunner		Rare
Whitetailed Shrike		Common
Carp's Black Tit		Uncommon
Violet Woodhoopoe		Uncommon
Whitebellied Sunbird		Fairly Common

N003 Eastern Caprivi Wetlands

Partially Protected
Global IBA

17°40'S-18°30'S; 23°16'E-25°15'E
c. 468 000 ha

Site description

Located in the eastern Caprivi bulge, this wetland system forms the international borders with Botswana, Zambia and Zimbabwe, and stretches from the Kwando River in the west to the Zimbabwean border post at Kazangula in the east. It is Namibia's largest single permanent wetland and is fed by two of Namibia's five perennial rivers. The area is divided into five geographically distinct zones: the Upper Kwando (137 km²), Lower Kwando and Linyanti Swamp (3 830 km²), the ephemeral Lake Liambezi (406 km²), the Chobe River and marsh (311 km²) and the Zambezi floodplains (1 800 km²). The area is topographically featureless and almost completely flat - a key determinant in the unusual hydrological regime. Under flood conditions the Kwando is essentially linked to the Zambezi, with water flowing from the Kwando into the Linyanti Swamps, about 10% of which finally reaches Lake Liambezi. This water is, however, insufficient to keep the lake level from dropping, and the lake is usually dry. When full, it has an outlet to the Chobe River which subsequently joins the Zambezi at Kazangula. When the Zambezi is in flood the flow is reversed and water is pushed up the Chobe to fill Lake Liambezi - a rare occurrence last seen in the late 1970s. Lake Liambezi and the floodplain zone are thus only intermittently inundated, while the Zambezi, Kwando and Linyanti Swamp are permanent wetland features. The abrupt change in the direction of the Kwando River as it merges into the Linyanti system is due to the extensive geological faulting present in the area. Flood waters channel down the Kwando between June and August and then swing north-east along the Chobe fault into the Linyanti Swamps. It may take up to six months for water to percolate through the *Phragmites* / *Cyperus* dominated reed swamp as less than one third of the area is open water. Lake Liambezi is now (1998) completely overgrown, and the dry lakebed is farmed. These long-term wet/dry periods appear to be cyclical. The Chobe Marsh, into which the Linyanti and Lake Liambezi drain when full, is more usually inundated by water backing up along the Chobe from the Zambezi River. The Zambezi floods typically last 4 to 6 weeks in March or April, before subsiding back into side channels and the main Chobe-Zambezi

riverbed. The lower lying floodplains remain inundated for longer periods, however, and support vast papyrus and reed beds in a maze of small channels and islands. The climate of the region can be divided into two distinct seasons - a dry season between April and November, and a shorter wet season from the end of November to late March early April. This is the wettest area in Namibia with rainfall averaging 650 mm p.a. and sometimes exceeding 1 000 mm p.a. The monthly average maximum temperature is about 30°C.

The area is surrounded by pristine riparian fringes which are extremely rare in Namibia as most have been destroyed by human activity. These are dominated by *Lonchocarpus capassa*, *Garcinia livingstonei*, *Syzigium guineense* and *Diospyros mespiliformis*. The floodplain is made up of reedbeds, swamps, open flooded grasslands and papyrus. *Phoenix reclinata* and *Adansonia digitata* are conspicuous on the edge of the floodplain.

Birds

East Caprivi as a whole, and its wetlands in particular, holds one of the richest diversities of bird species anywhere in Namibia. This high diversity reflects the combination of wetland and tropical passerine species. The most important features of this system are the swampy areas and floodplains which are important breeding habitat for wetland birds including Slaty Egret, Wattled Crane, Rufousbellied Heron, Saddlebilled Stork, Lesser Jacana, Whitecrowned Plover, Longtoed Plover, Redwinged Pratincole, Pinkthroated Longclaw and Montagu's Harrier. The reed and bulrush beds on the margins hold Swamp Boubou, Chirping Cisticola and Greater Swamp Warbler. The riverbanks hold African Skimmer, the mid-stream rocks hold Rock Pratincole, while the densest riparian vegetation in certain areas holds Pel's Fishing Owl and Whitebacked Night Heron. While diversity is high, linear densities of wetland birds are low, possibly because of low-nutrient water.

The surrounding grassveld is also good for palearctic migrants, including Blackwinged Pratincole and Caspian Plover. The area is rich in raptor species and Secretarybird, Whitebacked Vulture and Lappetfaced Vulture are common.

Whiteheaded Vulture, Lesser Kestrel, Dickinson's Kestrel and African Hobby Falcon occur less commonly. Eagles found here include Tawny Eagle, Ayre's Hawk Eagle, Western Banded Snake Eagle, Martial Eagle and Bateleur. Kori Bustard, Blackbellied Korhaan, Temminck's Courser and the Yellowthroated Sandgrouse and Burchell's Sandgrouse can be found around the open woodland. Species preferring acacia and broadleaf woodland include Bradfield's Hornbill, Redbilled Francolin, Redcrested Korhaan, Monotonous Lark, Crimsonbreasted Shrike, Whitecrowned Shrike, Kalahari Robin, Pied Babbler, Blackfaced Babbler, Cape Parrot, Southern Ground Hornbill, Greyrumped Swallow, Hartlaub's Babbler, Longtailed Shrike, Brown Firefinch, Burntnecked Eremomela, Marico Flycatcher, Whitebellied Sunbird, Scalyfeathered Finch, Violeteared Waxbill, Shafttailed Whydah, Longtailed Glossy Starling and Burchell's Glossy Starling.

Other threatened/endemic wildlife

Threatened mammals occurring in the area include Leopard, Wild Dog, thousands of Elephant, Roan Antelope and Sable Antelope. Red Lechwe are common on the floodplains of the lower Kwando. Puku may exist in very small numbers while Oribi and Waterbuck are probably extinct but may filter in from Zambia as poaching decreases. Other particularly rare mammals include the last known individuals of the *chobensis* subspecies of Black Rhino, which unconfirmed reports suggest may still also occur in south eastern Angola. The highly endangered Blackfooted Cat has also been reported from this area. Among other taxa, particularly vulnerable species include the Mpacha Grass Frog which is an endemic known only from the Mpacha airport in Katima Mulilo. The highly unusual Striped Killifish, which survives desiccation in egg form only, is found exclusively in ephemeral pools south of Katima. East Caprivi boasts the highest species richness of frogs (38 species), reptiles (particularly snakes and terrapins) and mammals (particularly water dependent mammals such as rats and bats) in Namibia.

Conservation issues

Until recently there were no conservation areas in East Caprivi. On 1 March 1990 two conservation areas were proclaimed. One of these, Mamili National Park (32 000 ha), is centred on the Nkasa and Lupala Islands near the Linyanti Swamps in the southwestern corner of East Caprivi. The surface area of water fluctuates, but at high floods some 80% of the area is inundated, thus this area provides

essential protection for swamp and floodplain species. The second conservation area, Mudumu National Park (101 400 ha), is mainly woodland with small areas of wetland on the western fringes where it borders the Kwando River. In dry years it is possible that these parks will be the only areas in East Caprivi which are not overgrazed. These two parks will, however, only be effective at maintaining the region's biotic diversity if legislation and enforcement are improved and wildlife education and communication programmes are continued and expanded. Involvement of local communities in the management of buffer zones, setting up of conservancies linking the two parks and running of tourist camps will help to alleviate encroachment of people and livestock into these parks.

The region's waterways have held the alien water weed *Salvinia molesta* since the 1950s. This weed has caused massive problems by clogging waterways and altering the functioning of the wetlands and threatening other macrophytes with local extinction. Currently the *S. molesta* infestation is under control due to a successful biological control programme initiated in 1981. The distribution of the weed has not changed but the intensity of the infestation has been drastically reduced and, in some places, is entirely under control. The demise of the herbivores that once teemed this region has been largely attributed to organised poaching for ivory and hunting for meat. Uncontrolled army poaching during the guerrilla war also took its toll. Campaigns by various government and non government organisations have temporarily reduced the poaching problem but the animal stocks have been drastically depleted and will require some time to recover before sustainable harvesting can be implemented. Spraying of Dieldrin and DDT to control Tsetse fly and Malaria has been widespread in the past and DDT is still used. Monitoring programmes investigating toxicity levels in the resident human population and non-target tertiary consumers are essential as these organisms could accumulate toxins, resulting in detrimental side effects. The greatest environmental threat in this area is the grazing pressure exerted by a burgeoning population of over 100 000 head of cattle, approximately 60% of which is concentrated in the eastern floodplain (30% of the land area). With the drying of Lake Liambezi, local inhabitants intensively fish the Chobe River with mosquito nets. This non-selective method, and the unsustainable level, of fishing may have drastic consequences on the recovery of fish populations

once floods return. Fires are deliberately started on a massive scale each year and over 3 000 may be started in one season in an attempt to promote new grass growth for cattle. This also reduces plant diversity, promoting fire-tolerant species. Human disturbance to African Skimmers in the area from waves caused by speed boats destroys nesting sites. Disturbance by humans causes adult birds to abandon their nests, exposing eggs and chicks to

intolerable heat and additional predation pressure.

Further reading

Barnard 1998, Bethune 1995, Crerar 1986, Griffin and Channing 1991, Griffin and Grobler 1991, Mendelsohn and Roberts 1997, Olivier and Olivier 1993, Robertson et al. 1998, Schlettwein et al. 1991.

	Breeding (pairs)	Total numbers
Globally threatened species		
Slaty Egret	30 - 200	100 - 500
¥ Lesser Kestrel		OV
Wattled Crane	20 - 40	50 - 100
Globally near-threatened species		
Blackwinged Pratincole		500 – 1 000
Restricted-range and biome restricted species		
Dickinson's Kestrel		Fairly Common
Burchell's Sandgrouse		Uncommon
Copperytailed Coucal		Common
Rackettailed Roller		Uncommon
Bradfield's Hornbill		Common
Blackfaced Babbler		Uncommon
Hartlaub's Babbler		Common
Kurrichane Thrush		Common
Arnot's Chat		Common
Kalahari Robin		Uncommon
Barred Warbler		Uncommon
Stierling's Barred Warbler		Uncommon
Burchell's Glossy Starling		Common
Longtailed Glossy Starling		Common
Whitebellied Sunbird		Common
Brown Firefinch		Common
Broadtailed Paradise Whydah		Uncommon

¥ Species does not meet IBA threshold

OV Occasional visitor

N004 Mahango Game Reserve and Okavango River

Partially protected
Global IBA

18°15'S-18°20'S; 20°33'E-20°41'E
24 462 ha

Site description

This IBA includes the portion of the Okavango River between Andara Mission and the Botswana border on the western edge of the Caprivi Strip. The IBA includes the Mahango Game Reserve which essentially consists of the vast floodplain along the Okavango River (the start of the panhandle of the Okavango Delta) and its associated riverine forest and woodlands. After leaving Namibia, the Okavango River flows into Botswana and creates the Okavango Delta. High water occurs in April as a result of rains in the highlands of Angola, and floods usually reach heights 3 - 4 m above the low water level of November. This flooding is essential to the ecology of the aquatic systems along the river. The climate of the region can be divided into two distinct seasons - a dry season between April and November, and a shorter wet season from the end of November to early April. The monthly average maximum temperature is 30°C and about 80% of the region's rain (550 to 600 mm) falls between October and April. Vegetation along the river is extremely diverse with 869 plant species from 88 families recognised so far; about 25% more speciose than the delta itself. The vegetated dunes that dominate the topography include extensive dry woodlands. Dominant species of the riparian woodland include *Garcinia livingstonei*, *Sclerocarya birrea*, *Diospyros mespiliformis*, *Acacia nigrescens* and *Grewia* spp. The vegetation of the dunes is dominated by mixed *Pterocarpus angolensis*, *Schinziophyton rautanenii*, *Terminalia* species, *Ziziphus mucronata*, dense stands of *Baikiaea plurijuga* and *Baphia massaiensis*. This riparian vegetation is of particular importance: mature riparian woodland is increasingly rare in Namibia as it is mostly destroyed during human settlement. The floodplain comprises reedbeds, swamps, open flooded grasslands and Papyrus. Two conspicuous species on the edge of the floodplain are the *Phoenix reclinata* and *Adansonia digitata*.

Birds

The reserve's most important feature is the floodplain which is critical habitat for breeding wetland bird species. About two thirds of Namibia's bird species have been recorded in Mahango; a consequence of high richness of both wetland and tropical species. The floodplain

supports important populations of rare wetland birds including Slaty Egret, Wattled Crane, Rufousbellied Heron, Pinkbacked Pelican, Saddlebilled Stork, Lesser Jacana, Whitecrowned Plover, Longtoed Plover, Redwinged Pratincole, Pinkthroated Longclaw and Montagu's Harrier. The reed and bulrush beds on the margins hold Swamp Boubou, Chirping Cisticola and Greater Swamp Warbler. The riverbanks and rocks support Rock Pratincole and African Skimmer. Pel's Fishing Owl, Whitebacked Night Heron and African Finfoot are found in the fringing riparian vegetation. The surrounding grassveld also holds palearctic migrants, including Blackwinged Pratincole and Caspian Plover. The reserve is rich in raptor species (48 species recorded) including Secretarybird, Whitebacked Vulture, Lappetfaced Vulture, Palmnut Vulture, African Marsh Harrier, Dickinson's Kestrel, Cuckoo Hawk and even Osprey. Whiteheaded Vulture, Bat Hawk, Lesser Kestrel and African Hobby Falcon and European Marsh Harrier are less common. Several species of eagle are found here including Tawny Eagle, Ayre's Hawk Eagle, Western Banded Snake Eagle, Martial Eagle and Bateleur. Typical open country species include Kori Bustard, Blackbellied Korhaan, Temminck's Courser and Doublebanded Courser.

Woodland and riparian species include Bradfield's Hornbill, Redbilled Francolin, Redcrested Korhaan, Monotonous Lark, Crimsonbreasted Shrike, Whitecrowned Shrike, Kalahari Robin, Pied Babbler, Blackfaced Babbler, Cape Parrot, Southern Ground Hornbill, Greyrumped Swallow, Rufousbellied Tit, Hartlaub's Babbler, Longtailed Shrike, Sharptailed Glossy Starling, Brown Firefinch, Barred Warbler, Burntnecked Eremomela, Marico Flycatcher, Whitebellied Sunbird, Scalyfeathered Finch, Violeteared Waxbill, Shafttailed Whydah, Longtailed Glossy Starling and Burchell's Glossy Starling. The riparian forest supports the rare Cape Parrot, Emerald Cuckoo and Wood Owl.

Other threatened/endemic wildlife

Threatened mammals occurring in the reserve include Leopard, Wild Dog, Elephant, Roan Antelope and Sable Antelope. Uncommon species include Red Lechwe (decreasing), Sitatunga, Puku,

Waterbuck, Oribi and unsubstantiated reports of Blackfooted Cat. The vulnerable Spotted Necked Otter, which requires pristine aquatic habitat, is also found here. It is the second most species-rich area for mammals in Namibia, with 99 species. The Spotted Rubber Frog, with only five specimens known, also occurs here. About 71 species of fish occur in the Okavango River, two of which inhabit rocky rapids and are Red Data species.

Conservation issues

Declared a conservation area by the former Kavango Executive Committee in 1983, Mahango was opened to the public three years later in 1986. The reserve was officially proclaimed in 1989. After Namibian Independence, ownership of the reserve was transferred to the Ministry of Environment and Tourism. Mahango is part of a comprehensive planning programme in the Caprivi Strip under the Northeast Parks Project, largely funded by the German Development Bank (KFW). The project involves development planning for tourism infrastructure and wildlife management. The management of the riparian strip and floodplain is of utmost importance. Any dramatic alteration of the Namibian portion of this river will affect the Okavango Delta (also an IBA) in neighbouring Botswana. The entire portion of the river in Namibian territory needs careful management planning since 78% of the 120 000 people who live along the Okavango live within 5 km of the river and the pressure for resources is intense. The greatest environmental problem is deforestation caused by fires and elephants. Uncontrolled fires in the Kavango region can also cause extensive damage to wildlife and reduce plant species diversity. Mitigating measures on human impacts and alternative options to slash and burn agriculture need to be sought. Education campaigns on

sustainable utilisation of the river's resources and its surrounding habitats must be a priority.

Species such as Elephant and Red Lechwe migrate out of the park and are threatened by poachers in the neighbouring areas. Furthermore, uncontrolled growth in the elephant population is of some concern. The highly sensitive riparian zone has already suffered considerable impact and habitat modification by elephants in the last few years. Human disturbance to African Skimmers is caused by the wake generated by speed boats destroying sand-bank nesting sites, and also by the collection of eggs. Disturbance by humans causes adult birds to abandon their nests, exposing eggs and chicks to intense heat and additional predation pressure. Pesticides used annually to control malarial mosquitoes and Tsetse fly (DDT and Dieldrin) are found in the river and occur mainly from the practice of rinsing equipment and sometimes simply dumping extra supplies direct into the river. That this happens in the protected Mahango Reserve is cause for great concern

If future water abstraction occurs at Rundu to supply the growing population in Windhoek, takeoff during times of flooding may be detrimental to spawning fish dependent on flooding. Non-selectivity of fishing gear has led to an almost total absence of larger fish. It has been suggested that fishing be restricted in some areas to allow fish stocks to recover.

Further reading

Andersson 1861, Barnard 1998, Bethune 1991, Griffin and Channing 1991, Griffin and Grobler 1991, Skelton and Merron 1987.

	Breeding (pairs)	Total numbers
Globally threatened species		
Slaty Egret	Br	15 - 100
¥ Lesser Kestrel		OV
Wattled Crane	Br	6 - 10
Globally near-threatened species		
Blackwinged Pratincole		200 - 300
Restricted-range and biome restricted species		Status
Dickinson's Kestrel		Fairly Common
Burchell's Sandgrouse		Common
Copperytailed Coucal		Common
Rackettailed Roller		Rare
Bradfield's Hornbill		Common
Rufousbellied Tit		Uncommon
Blackfaced Babbler		Uncommon
Hartlaub's Babbler		Common
Kurrichane Thrush		Common
Arnot's Chat		Rare
Kalahari Robin		Common
Barred Warbler		Uncommon
Chirping Cisticola		Common
Burchell's Glossy Starling		Common
Longtailed Glossy Starling		Common
Sharptailed Glossy Starling		Uncommon
Whitebellied Sunbird		Common
Brown Firefinch		Common

¥ Species does not meet IBA threshold
 Br Confirmed breeding

OV Occasional visitor

N005 Etosha National Park

Fully protected

Global IBA

18°30'S-19°28'S; 14°20'E-17°10'E

2 291 200 ha

Ramsar site

Site description

Etosha National Park lies some 400 km north of Windhoek. The primary feature within the park is Etosha salt pan, “the great white place”, about 4 760 km² in size and up to 129 km long and 72 km wide, which covers almost one quarter of the park. Numerous smaller salt and clay pans exist to the west and north of Etosha pan, some of which lie just outside the park boundaries. The park represents an area of inland drainage on the great African plateau. Most of the year the pan lies dry, appearing barren, desolate and clearly visible on satellite images of southern Africa. However, during some wet seasons the pan is inundated with water from the Ekuma and Oshigambo rivers which drain catchments in former Owamboland and southern Angola. Inflow from the east through the Omuramba Owambo may also be important, flooding Fischer’s Pan and the southern ancient river course on the pan. The extent of flooding is dependent on the amount of rain that falls in the catchment area. In years of exceptional rain the pan becomes a shallow lake a few centimetres deep. Geologically, the area comprises calcareous sand, gravel and limestone with dolomite outcrops in the west. Soils are shallow and alkaline. Temperature variation is extreme, ranging from below freezing on some winter nights to above 45°C during the day in mid summer, when pan surface temperatures can reach 60°C. Annual rainfall averages 300 mm p.a. in the west and 500 mm p.a. in the east. The vegetation is primarily arid savanna, shrub and thorn scrub in the west, tending towards tree savanna and broadleaved woodland in the east. Acacia woodland is found throughout the region with mostly *Acacia tortilis*, *A. reficiens* and *A. nebrownii* dominating. Patches of *Combretum* spp. and *Colophospermum mopane* are also characteristic of the park, especially in the eastern broadleaved savanna belt. All these species occur throughout the park varying in shape and form from shrub to tree. Dominant grass genera include *Anthephora*, *Enneapogon*, *Aristida*, *Stipagrostis*, *Eragrostis* and *Sporobolus*.

Birds

This park supports at least 340 bird species. The main pan is of particular importance as both Greater and Lesser Flamingo mass breed here when

rainfall exceeds 440 mm p.a. Historical counts of up to 1.1 million flamingos have been recorded in exceptional rain years. Etosha is one of only two regular breeding sites for these species in southern Africa, the other being Sua Pan in the Makgadikgadi Salt Pans (also an IBA) in Botswana. Unfortunately breeding success is very limited and Etosha Pan cannot be considered a viable breeding area. In recent years the pan has regularly held over 20 000 waterbirds during the wet season. Apart from flamingos, White Pelican and Chestnutbanded Plover also breed here in large numbers in years of good rainfall. Rarities are also attracted at such times and Slaty Egret and Striped Crake are unusual visitors. The pan and surrounding grassveld are good for palearctic migrants, including important numbers of Blackwinged Pratincole and Caspian Plover. Occasionally small numbers of Redwinged Pratincole, Saddlebilled Stork, Wattled Crane and Crowned Crane occur on the pan in the wet season. Etosha also supports the only breeding population of Blue Crane outside South Africa; a tiny population of about 60 birds known to have declined in the last 10 years. The park is particularly rich in raptors with 46 species recorded. It supports all the vulture species found in Namibia including Cape Vulture, the locally rare Egyptian Vulture, and Lappetfaced Vulture. Scavengers such as Tawny Eagle and Bateleur are particularly common since they are unaffected by poisons here, while both Greater Kestrel and Rednecked Falcon breed. Whiteheaded Vulture, Pallid Harrier, Montagu’s Harrier and Lesser Kestrel are less common. A host of eagles (12 species) is found here including Martial Eagle and the migrant Steppe and Lesser Spotted Eagle during the rains. Good rains also bring in Chestnut Weaver which form large breeding colonies. The far western woodland holds small populations of endemic and near-endemics including Violet Woodhoopoe, Carp’s Black Tit, Monteiro’s Hornbill, Bradfield’s Hornbill, Rosy-faced Lovebird, Rüppell’s Parrot, Whitetailed Shrike, Bradfield’s Swift, Rockrunner and Hartlaub’s Francolin. Typical open country species found most commonly around the pan include Kori Bustard, Ludwig’s Bustard, Blackbellied Korhaan, Burchell’s Courser, Temminck’s Courser, Doublebanded Courser and all of southern Africa’s

Sandgrouse species. Whitebellied Korhaan was recently sighted in the Andoni grasslands – the only known sighting in Namibia. Species found among acacia woodland and areas of partial cover include Redbilled Francolin, Redcrested Korhaan, Monotonous Lark, Crimsonbreasted Shrike, Whitecrowned Shrike, Kalahari Robin, Pied, Blackfaced and Barecheeked Babbler, Barred Warbler, Burntnecked Eremomela, Marico Flycatcher, Whitebellied Sunbird, Cape Penduline Tit, Pirit Batis, Scalyfeathered Finch, Violeteared Waxbill, Shafttailed Whydah, Longtailed and Burchell's Glossy Starling. Sociable Weaver and the associated Pygmy Falcon also occur.

Other threatened/endemic wildlife

Threatened mammals occurring in the park include Leopard, Cheetah, Elephant, Roan Antelope, Black Rhino, Hartmann's Mountain Zebra and the endemic subspecies Blackfaced Impala. The Namibian near-endemic Damara Dik-Dik also occurs here. Efforts to reintroduce African Wild Dog have so far failed. Reptiles include the Rock Python, Dwarf Python, Kalahari Star Tortoise, Leopard Tortoise and Etosha Agama.

Conservation issues

Originally established in 1907, Etosha Game Reserve covered 9 324 000 ha. This was reduced to 2 314 000 ha between 1947 and 1953. In 1958, it was officially designated a National Park under Section 37 of the Nature Conservation Ordinance 31. On the recommendation of the Commission of Enquiry into Southwest Africa's Affairs (Odendaal Commission) in 1964, the size of the park was increased to include sections of the Skeleton Coast, enlarging the area to 9 952 600 ha. By 1970 the parks borders were once again deproclaimed to provide land to Herero speaking people, reducing Etosha to its current size.

Several management challenges persist. Etosha is surrounded on its southern and western borders by commercial farmland and is delimited by double electric boundary fences, primarily designed to keep lion and elephant in the park and poachers and domestic animals out of the park. This has resulted in serious disturbance of ungulate migratory

patterns. In particular, wildebeest migration was blocked by the northern fence, with a resultant decline from 25 000 to 2 300 animals in the space of 25 years. Elephants, however, still migrate out of the park in the wet season and may then create problems in commercial and communal farms. Additionally, anthrax remains a problem, killing many species of herbivores. Another disease, Feline Immune Deficiency Virus (FIV) affects cats, particularly cheetah, although Etosha's lions remain FIV-free. Between 1955 and the present, elephant numbers increased by more than an order of magnitude from 100 to 1 500. Drought periods between 1979 and 1996 have further complicated issues as ungulates have been unable to migrate away from the area. High predation rates in combination with anthrax serve to reduce ungulate populations well below the available food resources. Lion dispersing from the Park are able to break through fencing and many individuals are shot outside the park each year. Some individuals disperse down the rivers to the Skeleton Coast to become the famous coastal lions, scavenging on seals and beached whales. These too are usually exterminated by communal farmers.

Recent research has shown that while flamingos occur in spectacular numbers they rarely breed successfully (once in 9 years) because the water rapidly evaporates, exposing chicks and fledglings to predators and eliminating food sources adjacent to the colony. Low breeding success in the last four decades indicate that the pan does not support a self-sustaining population. Measures to reverse this problem have been suggested but not implemented. Scientific research to assess and address management problems is conducted through the Etosha Ecological Institute at Okaukuejo.

Further reading

Archibald 1991, Archibald and Nott 1987, Aves 1992, Barnard 1998, Barnard et al. 1998, Berry 1972, Berry et al. 1973, 1987, Brown 1992, Brown et al. 1987, Clinning and Jensen 1976, Gasaway et al. 1996, Jensen and Clinning 1976, le Roux et al. 1988, Lindeque and Archibald 1990, Osborne and Osborne 1998, Simmons 1996b, Simmons et al. 1998b.

	Breeding (pairs)	Total numbers
Globally threatened species		
¥ Slaty Egret		V
¥ Lesser Kestrel		OV
¥ Wattled Crane		2 - 4
Blue Crane	20 - 30	40 - 60
Globally near-threatened species		
Lesser Flamingo	Br	1594 (av) - 1 000 000 (max)
Pallid Harrier		20 - 50
Blackwinged Pratincole		200 - 300
Restricted-range and biome specific species		
		Status
Hartlaub's Francolin		Uncommon
Ludwig's Bustard		Fairly Common
Burchell's Sandgrouse		Common
Rüppell's Parrot		Uncommon
Bradfield's Hornbill		Common
Monteiro's Hornbill		Uncommon
Stark's Lark		Common
Blackfaced Babbler		Uncommon
Barecheeked Babbler		Fairly Common
Kurrichane Thrush		Rare
Kalahari Robin		Common
Barred Warbler		Common
Rockrunner		Uncommon
Whitetailed Shrike		Uncommon
Burchell's Glossy Starling		Common
Longtailed Glossy Starling		Uncommon
Palewinged Starling		Uncommon
Whitebellied Sunbird		Common
Sociable Weaver		Common
Blackheaded Canary		Common
1% or more of population		
White Pelican		622 (av) – 3 000 (max)
Greater Flamingo		9 770 (av) - 100 000 (max)
Chestnutbanded Plover		166 (av) - 550 (max)
Caspian Plover		119 (av) - 382 (max)

¥ Species does not meet IBA threshold
 OV Occasional visitor
 av Yearly average (max count)

V Vagrant
 Br Confirmed breeding
 max Absolute maximum

N006 Hobatere

Partially protected
Global IBA

19°15'S; 14° 00'E
c. 222 000 ha

Site description

This IBA is one of the best areas holding Namibian-escarpment endemics and near-endemics. Its identification arose directly from research co-ordinated by the Ministry of Environment's Ornithology Section aimed at identifying the most important endemic areas using field survey and bird atlas data in conjunction with GIS techniques. The Namibian escarpment forms the interface between the interior plateau and coastal plain, varying in altitude between 400 and 2 500 m a.s.l. This high diversity zone stretches from Windhoek to just west of Ruacana. The most important node within this zone is the area surrounding the tourist lodge Hobatere, immediately west of the eastern boundary of Etosha National Park. The IBA consists of an east-west orientated block of three quarter degree squares falling just west of the interface between commercial (east) and communal (west) farmland in the Sesfontein-Kamanjab area. The IBA is part of the western catchment of the Ombonde/Hoanib River, one of the largest ephemeral rivers in north-western Namibia. Rainfall averages 200 - 300 mm and altitude varies from 900 to 1 500 m a.s.l. The rainfall gradient from east to west across this region is very steep varying from 300 mm p.a. in western Etosha to 15 mm p.a. in the Namib Desert over a mere 160 km. The river valleys running through this area enhance diversity indices because many Namibian endemics are comparatively abundant in rivers. Several private lodges running tourist safaris and small hunting operations have opened in the area: the land is leased from government and is afforded protection by the operators. To the west, low-use communal farms are concentrated in the ephemeral Ombonde River tributaries.

Birds

The main species here are Namibia's endemics (excluding the larks and Damara Tern) which are endemic to the Namibian escarpment and Namib Desert. These species are, in decreasing order of population size within the IBA, Whitetailed Shrike (11 900 birds), Carp's Black Tit (5 800 birds), and Monteiro's Hornbill (2 360 birds), all found in dry woodland where large trees are common. The area of highest density of the shrike lies slightly north of this IBA, while the main centre of distribution for the hornbill and tit occur somewhat east (higher

rainfall) of the IBA. Herero Chat and Rockrunner, occur predominantly on rocky hillsides common within the IBA. These two species are cryptic and most common in the remote areas of Namibia's rocky escarpment; consequently they are erroneously seen as very rare. Herero Chat density (1 870 birds) is relatively high in this region while Rockrunner (680 birds) is most common far to the southeast of this area. Namibian populations for both species are estimated at about 100 000 birds, and more than 1 % of Herero Chats are predicted to occur in this IBA. Rüppell's Korhaan (580 birds) is found on open plains mainly to the west of this IBA. Barecheeked Babbler (335 birds) is found predominantly in mopane woodland and favours river beds where it occurs in groups averaging six birds. Its centre of distribution (highest densities) occurs within this area. Rüppell's Parrot (450 birds) occurs at relatively high density in the river valleys here, but this bird is nowhere common, with a Namibian population of around 29 000 birds. One of the rarest of the endemics is Hartlaub's Francolin (450 birds), a bird found on inselbergs and koppies throughout this region. The rarest and most enigmatic is the Violet Woodhoopoe (35 - 70 birds), a species difficult to distinguish from the morphologically similar Redbilled Woodhoopoe, with which it hybridises. Only found close to large rivers with large trees, the Namibian population is predicted to be 1 800 birds.

Many non-endemic species occur within this IBA, and raptors are numerous with 33 species recorded. Notable among these are Cuckoo Hawk, Egyptian Vulture and Peregrine Falcon. Other species recorded here include Short-toed Rock Thrush, Stark's Lark and Rosy-faced Lovebird. A total of 215 species occur in this region, about half the number recorded in the most speciose areas of northeastern Namibia.

Other threatened/endemic wildlife

Black Rhino, Elephant and Lion occur in this region and may come into conflict with commercial farmers. The area is extremely rich in endemic frogs, reptiles, mammals and plants; more information on these is presented in the special issue of *Biodiversity & Conservation* (April 1998).

Conservation issues

The main concern is that the rich vein of endemism of Namibian birds, mammals, frogs, reptiles and plants falls squarely in between two of Namibia's main protected areas - the Etosha National Park in the east and the Skeleton Coast Park in the west. It has been suggested that a park joining the two would be ideally situated to protect many of these endemic taxa, as well as to act as a corridor for large mammals (e.g. Lion, Elephant, Giraffe) that regularly move between Etosha and the Skeleton Coast Park. Such a corridor could effectively help fill the Skeleton Coast park with mammals that once naturally occurred there. Proposed conservancies at Sesfontein and Bergsig should improve the situation.

Farming practices in this area are of relatively low intensity but on communal lands overstocking may

occur, particularly where goats congregate around waterholes. The dry river courses to the coast are inhabited by pastoralists who regularly shoot lion and other large mammals that "threaten" their livestock.

Among the endemic birds, only Rüppell's Parrot is under direct threat since it is illegally trapped for the cage bird trade. Unknown numbers of birds are removed from the wild population each year.

Further reading

Barnard 1998, Clinning and Tarboton 1972, du Plessis 1997, Jarvis and Robertson 1997, in press, Jensen and Jensen 1971, Robertson 1993, Robertson et al. 1995, 1998, Simmons 1997b, 1997c, 1997d, 1997e, 1997f, 1997g, 1997h, Simmons et al. 1998b.

Restricted-range and biome restricted species

	Status
Hartlaub's Francolin	Uncommon
Ludwig's Bustard	Uncommon
Rüppell's Korhaan	Fairly Common
Burchell's Sandgrouse	Common
Rüppell's Parrot	Fairly Common
Monteiro's Hornbill	Common
Stark's Lark	Uncommon
Blackfaced Babbler	Uncommon
Barecheeked Babbler	Uncommon
Kalahari Robin	Common
Herero Chat	Common
Layard's Titbabbler	Fairly Common
Barred Warbler	Fairly Common
Rockrunner	Fairly Common
Whitetailed Shrike	Common
Violet Woodhoopoe	Rare
Carp's Black Tit	Common
Burchell's Glossy Starling	Common

N007 Bushmanland Pan System

Unprotected
Global IBA

19°15'S-20°00'S; 20°33'E-20°41'E
c. 120 000 ha

Site description

Widely known as Bushmanland after the inhabitants of this region, the new name is Tsumkwe District. This very extensive wetland system of northeastern Namibia has developed on a broad, flat watershed on the eastern edge of the Kalahari Basin, between the Nhoma and Daneib drainage systems. Here, surficial hardpan calcretes, granite and quartzites restrict drainage and, as there are no major drainage lines out of the area, these pans, flooded grasslands and woodlands can remain wet throughout the dry season in years of above average rainfall. The town of Tsumkwe lies in the centre of the area, which is inhabited by the Ju'//Hoan people. Livestock, so common in other parts of Namibia, are largely absent from the area due to the hunter-gathering lifestyle which was, until recently, practiced by the inhabitants. However, cattle farming has recently been introduced and will largely replace hunter-gathering (Jones 1996).

The climate of the Tsumkwe district is characterised by high summer temperatures and seasonal rainfall between October and April. Rainfall shows considerable spatial and temporal variation, with an average of c. 450 mm p.a., and a range of 110 to 1 200 mm p.a. The pans system is centred on the Nyae-Nyae wetlands which run in a broad arc south-east of Tsumkwe. Nyae-Nyae pan itself consists of a large deflation basin comprising both grassland and open wetlands. Also included are the Pannetjies Veld wetlands 25 km east of Tsumkwe, comprising mainly flooded woodland, the Klein Dobe wetlands (2 pans of 30 and 50 ha) 15 km north of Tsumkwe and the CinQo wetlands 40 km northeast of Tsumkwe. The wetland system as a whole is both extensive and variable. The wetlands are widely interconnected and many of the 6 wetland types identified below intergrade into one another.

- 1) Unvegetated open water pans with highly alkaline evaporite basins. These pans are the last to dry up and can be up to 1.5 m deep.
- 2) Doline pans. These appear to be sinkholes formed in areas underlain by calcrete. When full they are more than 2 m deep and unvegetated.
- 3) Open water pans. These medium size pans form where the underlying soils are not very alkaline,

and can hold water for three months. Vegetation is dominated by floating and submerged macrophytes such as *Persicaria limbata*, *Nymphaea* spp., *Aponogeton* spp., *Elytrophorus globularis*, *Eragrostis viscosa*, sedges and members of the Characeae. Where grasses dominate, the commonest species are *Oryzidium barnardii*, *Echinochloa colona* and *E. stagnina*. Other common plants include *Sesbania macowaniana*, *Ottelia kunenensis*, *Aeschynomene indica* and the fern *Marsilea unicornis*. A second type of open water pan develops where shallow calcareous sands make the pans more alkaline. The vegetation in these pans is dominated by Cyperaceae and, in the deeper parts of the system, floating mats of *Polygonum limbatum*.

- 4) Grass pans. These small pans form where organic clays have impeded drainage and are dominated by *Echinochloa pyramidalis* and *E. colona*. Other grass pans dominated by *Diplachne fusca* are the commonest pans in the system.
- 5) Hygrophilous grasslands. These develop on calcareous sands where the period of inundation is short. *Digitaria* spp., *Odysea paucinervis*, *Sporobolus coromandelianus* or *Eriosperrum bakerianum* dominate, while prolonged inundation leads to domination by *Diplachne fusca*.
- 6) Flooded woodlands. These develop during periods of extreme inundation on clay soils. The overstory is dominated by typical woodland species such as *Combretum imberbe*, *C. hereroensis* and *Acacia luederitzii* and a grass layer including *Melinis repens*, *Sporobolus* spp., *Aristida rhiniochloa*, *A. hordeacea* and *A. adscensionis*. Scrubby areas of *Grewia flava* and *Croton* spp. become flooded in years of very high rainfall. Palms such as *Hyphaene petersiana* are found on high lying areas surrounding the pans.

Birds

The variety of wetland habitats, ranging from unvegetated open water systems to hygrophilous grasslands, supports a diverse assemblage of flora and fauna. This area holds important numbers of rare and endangered bird species; regularly holding

more than 10 000 waterbirds of 84 species when wet. The most important birds found here include breeding Slaty Egret, Great Snipe, and non-breeding Wattled Crane which occur in larger numbers here than anywhere else in Namibia. These wetlands are also important for Rallidae, especially migratory palearctic and intra-African crakes. The pans occasionally support thousands of both Greater and Lesser Flamingo (probably on passage between Etosha and Makgadikgadi Pans in Botswana) as well as thousands of Blackwinged Stilt. Other more common species include Dabchick, White Pelican, Little Egret, Dwarf Bittern, breeding Openbilled Stork, Saddlebilled Stork, Marabou Stork, breeding Glossy Ibis, Redbilled Teal, Southern Pochard, Pygmy Goose, African Marsh Harrier, Lesser Moorhen, Painted Snipe, Curlew Sandpiper and occasionally Redshank. Wood Sandpiper and Ruff may be particularly numerous with over 1 000 birds present. The pans also support some important populations of rare wetland and grassland birds including Rufousbellied Heron, Redwinged Pratincole, Montagu's Harrier and Pallid Harrier. The surrounding grassveld holds palearctic migrants including Blackwinged Pratincole and Caspian Plover. The flooded grasslands around Nyae Nyae support large mixed breeding colonies of Blacknecked Grebe, Whiskered Tern, Redknobbed Coot, Purple Gallinule, Lesser Moorhen, Stilt and a handful of Baillon's Crakes. The high species richness here puts it in the top 20 quarter degree squares for overall avian richness in Namibia.

Raptors can be particularly numerous around the ephemeral pan system with 60 species recorded. These include Secretarybird, Whitebacked Vulture, Lappetfaced Vulture and Dickinson's Kestrel. Whiteheaded Vulture, Bat Hawk, Lesser Kestrel, Montagu's, Pallid, and European Marsh Harrier and African Hobby Falcon are of less common occurrence. A host of eagles is also found here including Tawny, Martial and Bateleur. Typical species found in the open woodland include Kori Bustard, Blackbellied Korhaan, Temminck's Courser, Doublebanded Courser and all of southern Africa's Sandgrouse species including the rare Yellowthroated Sandgrouse and Burchell's Sandgrouse. Species found in the acacia woodlands

include Bradfield's Hornbill, Redbilled Francolin, Redcrested Korhaan, Monotonous Lark, Crimsonbreasted Shrike, Whitecrowned Shrike, Kalahari Robin, Pied Babbler, Blackfaced Babbler, Southern Ground Hornbill, Greyrumped Swallow, Hartlaub's Babbler, Longtailed Shrike, Sharptailed Glossy Starling, Barred Warbler, Burntnecked Eremomela, Marico Flycatcher, Whitebellied Sunbird, Scalyfeathered Finch, Violeteared Waxbill, Shaftailed Whydah, Longtailed Glossy Starling and Burchell's Glossy Starling.

Other threatened/endemic wildlife

The temporary wetland system supports the near-endemic Shortridge's Mouse. Threatened mammals occurring in the area include Leopard, Cheetah, Wild Dog, Elephant, Tsessebe and Roan Antelope.

Conservation issues

Overall threats to temporary wetlands in this area are low since it is used mainly by traditional hunter-gathering Ju'//Hoan. Developments in the tourism industry and subsistence livestock farming introduced 10 years ago may have negative consequences if they are not adequately controlled. Tourism is on the increase in eastern Bushmanland and the pans of the Nyae-Nyae area can be heavily utilised. The area was gazetted as a Conservancy in February 1998 and land use policies and wildlife management plans have been initiated. Threats to birds come largely from disturbance of breeding waterfowl, and 4 x 4 vehicle users driving through wetland areas. Livestock farming in the Gautcha area has already led to overgrazing of upland sites and this may change drainage patterns, ground water percolation and vegetation development. Continued monitoring of these wetlands over a long period, encompassing both wet and dry phases, could give important insights into arid zone wetland functioning and resources. Careful assessment of the threats to this system, particularly tourism, is required.

Further reading

Bieseke and Weinberg 1990, Hines 1989, 1993, Jones 1988, 1996, Mendelsohn and Ward 1989, Olivier and Olivier 1993, Robertson et al. 1998, Simmons et al. in press.

	Breeding (pairs)	Total numbers
Globally threatened species		
Slaty Egret	0 – 29 (max)	15 - 200
¥ Lesser Kestrel		OV
Wattled Crane		38 (av) – 95 (max)
Globally near-threatened species		
Lesser Flamingo		475 (av) – 2 634 (max)
Pallid Harrier		20 – 50
Great Snipe		12 (av) – 33 (max)
Blackwinged Pratincole		50 - 100
Restricted-range and biome restricted species		
Dickinson's Kestrel		Status Uncommon
Burchell's Sandgrouse		Common
Bradfield's Hornbill		Common
Blackfaced Babbler		Uncommon
Kurrichane Thrush		Fairly Common
Kalahari Robin		Common
Barred Warbler		Common
Burchell's Glossy Starling		Common
Longtailed Glossy Starling		Common
Whitebellied Sunbird		Common
1% or more of population		
Greater Flamingo		740 (av) – 3 950 (max)
Blackwinged Stilt		391 (av) – 1 140 (max)
Caspian Plover		50 - 200

¥ Species does not meet IBA threshold
av Yearly average (max count)

OV Occasional visitor
max Absolute maximum

N008 Waterberg Plateau Park

Fully protected
Global IBA

20°25'S; 17°13'E
c. 40 500 ha

Site description

Waterberg Park is located some 30 km east of Otjiwarongo. The primary feature within the park is the Waterberg Plateau which rises to 1 800m a.s.l. on the western and southern sides. The majority of this differentially weathered sandstone plateau is at 1 600 m a.s.l., some 150 to 200 m above the surrounding plain. The plateau itself comprises an undulating landscape with deep sand and scattered granite koppies. On the east and west the plateau is demarcated by near-vertical cliffs, up to 140 m high. In the north the plateau gradually widens and dips to join the plain. Below the cliffs the ground slopes steeply but evenly away to the base of the mountain; these slopes are covered by sandstone rocks weathered from the summit. The plateau is an erosional relic of a hard Etjo sandstone casing which covered large parts of Namibia millions of years ago. Most of the plateau was carved up over aeons, but the Etjo sandstone resisted erosion to form the Waterberg. To the south of the main plateau lies the Klein Waterberg, an inselberg rising to 1 930 m a.s.l., now part of a large conservancy surrounding the park. The summer months are hot, with temperatures reaching 40°C, whilst winter is cool with temperatures falling below zero. About 85% of the region's mean annual rainfall of 400 mm falls between November and March. Due to altitudinal variation the park supports a clearly demarcated variety of woodlands, with some 60 tree species. Thick broadleaved woodland and shrub savanna occurs on the top of the plateau right to the edge of the escarpment. This is dominated by *Terminalia sericea*, *Burkea africana*, *Combretum collinum*, *Combretum psidioides* and *Peltophorum africanum*. Below this, and surrounding the plateau for thousands of square kilometres, lies a sea of dense, bush encroached acacia scrub dominated by *Acacia mellifera* and *Dichrostachys cinerea*. Isolated grass savanna valleys are dominated by *Aristida meridionalis*, *Antheplora pubescens* and *Eragrostis superba*.

Birds

This park supports over 200 bird species. These include Namibia's only breeding population of Cape Vulture, on the cliffs of Okarukuwisa Mountain (1 884 m a.s.l.) in the Waterberg range. It is the only area in Namibia where Booted Eagles are

known to breed. Other cliff nesting raptors breeding on the Waterberg include Peregrine Falcon and Black Eagle. Vultures include Lappetfaced, Whiteheaded and Whitebacked Vulture. Other raptors include Secretarybird, Bateleur, Martial Eagle and Tawny Eagle. The plains support Kori Bustard and Blackbellied Korhaan. The Sociable Weaver and associated Pygmy Falcon occur at the base of the plateau. The woodland, kloofs and gorges which are typically spring-fed throughout the year hold some interesting endemic and near-endemics including Monteiro's Hornbill, Bradfield's Hornbill, Rosy-faced Lovebird, Rüppell's Parrot, Bradfield's Swift, Rockrunner and Hartlaub's Francolin. Indeed, this is one of the areas of highest diversity of endemic birds in Namibia. The acacia savanna holds several species typical of southern Africa's arid woodlands including Redbilled Francolin, Redcrested Korhaan, Burchell's Sandgrouse, Monotonous Lark, Crimsonbreasted Shrike, Whitecrowned Shrike, Kalahari Robin, Pied Babbler, Barecheeked Babbler, Barred Warbler, Burntnecked Eremomela, Marico Flycatcher, Whitebellied Korhaan, Violeteared Waxbill, Shafttailed Whydah, Scalyfeathered Finch and Burchell's Glossy Starling. Isolated populations of Rufousbellied Tit are suspected but not confirmed.

Other threatened/endemic wildlife

The park was originally established to resettle and breed rare and endangered species. To date Roan Antelope, Sable Antelope, Eland, Giraffe, Blue Wildebeest, White Rhino, Black Rhino and Buffalo have been reintroduced. Other threatened mammals occurring in the park include Leopard and Cheetah. The Namibian near-endemic Damara Dik-Dik is common here.

Conservation issues

Originally established in 1965 as the Eland Game Reserve, the Waterberg Plateau Park was proclaimed in 1972. The Cape Vulture colony numbered over 500 in the 1950s, but this declined to 20 birds by 1980, and an all time low of 14 birds remained in 1987, with only 3 pairs breeding in 1996. Vultures have declined as a result of indiscriminate use of poisons by farmers to control vermin and the severe increase in tree cover

throughout their foraging range. These birds are now exceptionally vulnerable, and a single poisoning event could result in this species going extinct in Namibia. Poisoning may have been responsible for the sudden cessation of breeding in 1995 and the drop in population size from 25 birds to the present five birds. In an attempt to prevent extinction of this colony, a vulture restaurant was established in 1984 to supplement the bird's diet. Concurrent with this was the initiation of a farmer awareness programme. Other conservation problems include severe bush encroachment around the plateau due to grazing, disturbance of the natural fire regime and the influence of turn of the century rinderpest epidemics that decimated browsers, allowing the establishment of acacia

where grassland once dominated. This is being partially reversed through controlled burning. In 1997 a Conservancy completely surrounding the plateau was established; one of the first and largest to be established in Namibia. The plateau features a 18 600 ha wilderness area where human activities are kept to a minimum. The park is rich in cultural heritage with many rock engravings from Stone Age inhabitants and dinosaur footprints from earlier times.

Further reading

Barnard 1998, Brown 1985a, 1985b, Brown and Cooper 1987, Jankowitz and Venter 1987, Olivier and Olivier 1993.

	Breeding (pairs)	Total numbers
Globally threatened species		
Cape Vulture	3 - 5	10 - 25
¥ Lesser Kestrel		OV
Restricted-range and biome restricted species		
Hartlaub's Francolin		Status Uncommon
Burchell's Sandgrouse		Uncommon
Rüppell's Parrot		Common
Bradfield's Hornbill		Fairly Common
Monteiro's Hornbill		Common
Barecheeked Babbler		Common
Kalahari Robin		Fairly Common
Barred Warbler		Common
Rockrunner		Fairly Common
Burchell's Glossy Starling		Fairly Common
Palewinged Starling		Common
Whitebellied Sunbird		Common

¥ Species does not meet IBA threshold

OV Occasional visitor

N009 Brandberg

Unprotected
Global IBA

21°08'S; 14°35'E
50 000 ha

Site description

Namibia's highest mountain, at 2 606m, this massive conical mountain is an ancient volcanic granitic plug situated in the central section of the Namib Desert. Rainfall averages 100 mm p.a. Basalt plains occur on the northern side supporting slightly different vegetation assemblages to elsewhere. The mountain is uninhabited, but the ephemeral Ugab River flowing past its northern extremities supports traditional pastoralists. Due to higher cloud cover and the relative accumulation of water on top of the mountain, many of the grasses on the mountain's plateau-like summit are perennial, replacing the annuals common on the plains below. Grass composition may, however, change in decades with poor rainfall when both plants and some vertebrates may disappear. The western side receives coastal fog and consequently supports higher vegetation biomass than other slopes. The valleys and gorges in these areas also differ in plant community composition because of the higher runoff and some species found high up (e.g. *Sterculia quinqueloba*) are replaced by close relative (e.g. *S. africana*) on lower slopes. Woody vegetation is more common on the top and flanks than on the barren plains below, but these plants generally occur in stunted forms on the mountain top, together with dwarf shrubs (such as *Ruellia brandbergensis*) and narrow-leaved Fynbos-like vegetation. *Olea europaea* subsp. *africana* and *Acacia hereroensis* are common species on the plateau where *Euphorbia* spp and endemic *Lithops* spp. are also found.

Birds

Brandberg is rich in raptor species (18 species). Lappetfaced Vulture, Black Eagle, Tawny Eagle, Martial Eagle whilst uncommon are breeding residents, while Pale Chanting Goshawk and Rock Kestrel are particularly abundant. The Brandberg inselberg, and the Ugab River which runs north of it, holds many of the typical Namib species. The flat plains below the inselberg are home to Kori Bustard, Ludwig's Bustard, Rüppell's Korhaan, Doublebanded Courser, Gray's Lark, Stark's Lark and Tractrac Chat. Typical Namibian near-endemic species which occur in the gorges and valleys around the mountain include Hartlaub's Francolin,

Rosy-faced Lovebird, Rüppell's Parrot, Monteiro's Hornbill, Barecheeked Babbler, Violet Woodhoopoe, Herero Chat, Rockrunner, Shorttoed Rock Thrush and Whitetailed Shrike. Species preferring acacia woodland and partial cover include Redbilled Francolin, Kalahari Robin, Crimsonbreasted Shrike, Pirit Batis and Scalyfeathered Finch. Bradfield's Swift nest in fissures in the rock face, and more atypical species such as Hamerkop and Cape White-eye may be attracted to the mountain in wetter periods. About 150 species have been recorded on this mountain, twice as many as on the surrounding gravel plains.

Other threatened/endemic wildlife

Recent analyses show that Brandberg is the epicentre of a rich vein of endemic mammals, reptiles, plants and amphibians that runs from the Sperrgebiet in the south to the Otjihipa mountains in the north. No other area in Namibia is as rich in endemics as the Brandberg massif; among the 90 endemic plants, eight are found nowhere else, whilst three of six near-endemic frogs, eight of 14 near-endemic mammals, 49 of 59 near-endemic reptiles, and 11 of 14 near-endemic birds occur on or around this outstanding inselberg. Further details can be found in the special issue of *Biodiversity & Conservation* (April, 1998).

Conservation issues

Brandberg is famous for the prodigious quantities of rock art left by nomadic peoples who inhabited the mountain 4 000 to 500 years ago. The enigmatic "White Lady" painting is visited by thousands of tourists annually. Thus this mountain is of particular importance within Namibia, ecologically, culturally and historically, and for these reasons it has been proposed Namibia's first World Heritage Site. The local community experiences problems with visitors to the mountain and currently derives no benefits. Community programmes similar to that at nearby Spitzkoppe may alleviate such problems, providing custodianship and some protection to the species and rock art unique to the mountain.

Further reading

Barnard 1998, Brown 1991, Bruyns, Craven 1989, 1997, Griffin 1998, Kinahan 1986, 1992, Maggs et al. 1998, Nordenstam 1974, Robertson et al. 1998,

Simmons et al. 1998b.

Restricted-range and biome restricted species	Status
Hartlaub's Francolin	Common
Ludwig's Bustard	Fairly Common
Rüppell's Korhaan	Common
Rüppell's Parrot	Common
Monteiro's Hornbill	Common
Stark's Lark	Fairly Common
Gray's Lark	Uncommon
Barecheeked Babbler	Uncommon
Tractrac Chat	Fairly Common
Kalahari Robin	Common
Herero Chat	Fairly Common
Layard's Titbabbler	Fairly Common
Rockrunner	Common
Palewinged Starling	Common
Whitetailed Shrike	Common
Sociable Weaver	Common

Additional data provided by Pat Craven

N010 Cape Cross Lagoon

Unprotected
Global IBA

21°45'S; 13°50'E
500 ha
Proposed Ramsar Site

Site description

Longshore drift of sediments from south to north along the coast, driven by the Benguela current, has resulted in the formation of a sand barrier across what was formerly a coastal embayment just south of the rocky promontory of Cape Cross. The inner part of the embayment remains a series of saline lagoons. These receive saline sea water from seepage through the sand barrier and, during extreme high tides or storms, by water washed over the sand barrier. The lagoons vary in size and number depending on water level and are controlled by two main factors: evaporation and seawater input. Desiccation of the eastern borders of the embayment has produced sterile salt pans and flats. These salt deposits are worked commercially on a small scale. Three wooden platforms with a total area of 68 000 m² have been erected in some of the lagoons to provide roosting and breeding places for seabirds whose guano is commercially harvested. Guano from these platforms probably also serves to enrich the micro-flora and fauna of the lagoons. There is an irregular fringe of salt marsh vegetation along the coastal edge of the lagoons; the species composition of this vegetation has not been documented. Inland of this region are the rocky and gravel plains of the Namib Desert.

Birds

The lagoons and platforms have been known to support up to 14% of the global population of Cape Cormorant (30 600 pairs), with estimates as high as 900 000 cormorants made from aerial counts in 1974. Counts indicate that in addition to cormorants these lagoons regularly support up to 11 000 other birds. In total, the lagoon and platforms regularly support over 20 000 birds, including up to 16% of the southern African endemic subspecies of the Blacknecked Grebe and large numbers of Greater

and Lesser Flamingo, Chestnutbanded Plover, Curlew Sandpiper, Little Stint, Kelp Gull, Hartlaub's Gull, Damara Tern, Swift Tern and large flocks of Common Tern.

Other threatened/endemic wildlife

A massive mainland breeding colony of the near-endemic Cape Fur Seal, numbering 156 000 adult and subadults, occurs here. This is one of two populations in Namibia that are harvested commercially, mainly pups for their pelts, and some bulls for their genitalia.

Conservation issues

Currently this wetland is registered as a Private Nature Reserve. The purpose of this registration was to restrict access to the public who might disturb birds on the guano platforms. It is also a seal reserve, visited by 40 000 tourists per year. Substantial quantities of guano enter the water. The effect of this guano enrichment on productivity of micro-organisms has not been assessed but algal production is likely to be enhanced. This area qualifies for registration as a wetland of international importance under the Ramsar Convention. The large number of seals may potentially threaten the seabirds which feed in the area, since a small fraction of seals are known to take young birds at sea. The Ministry of Environment and Tourism and Fisheries has jurisdiction over the area, while the Ministry of Marine Resources is responsible for management of the seals.

Further reading

Berry 1976b, Cooper et al. 1982, Noli-Peard and Williams 1991, Olivier and Olivier 1993, Simmons 1991, 1992, Williams 1993, Tarr 1996.

	Breeding (pairs)	Total numbers
Globally near-threatened species		
Lesser Flamingo		779 (av) – 1 435 (max)
Damara Tern		4 - 20
1% or more of population		
Blacknecked Grebe		1 120 (av) – 2 187 (max)
Cape Cormorant	1 200 - 30 600 (max)	2 420 (av) - 60 000 (max)
Greater Flamingo		1 354 (av) – 1 961 (max)
Kelp Gull		126 (av) - 300 (max)
Swift Tern		265 (av) - 500 (max)
Other important populations		
¥ Chestnutbanded Plover		32 - 112 (max)

¥ Species does not meet IBA threshold
max Absolute maximum

av Yearly average (max count)

N011 Namib-Naukluft Park

Fully protected
Global IBA

22°35'S-26°40'S; 14°25'E-16°22'E
4 976 800 ha

Site description

This massive conservation area, one of the largest in Africa, incorporates a large portion of the Namib Desert, which some authorities consider the oldest desert in the world. The park contains gravel plains of intensely weathered schists, marbles, quartzites and granites, with some gypsum crusts, calcrete and desert pavement. River canyons are intermittent and sand-filled. Extensive sand dunes form a dune sea which runs parallel to the coastline for up to 120 km inland. The Naukluft Mountains are part of the high rising escarpment which marks the western edge of the interior highlands of Namibia. The flat, plateau-like top of the mountain complex is separated from the adjacent highland plateau to the south by impressive near vertical cliffs, while in the northwest and west its highest peaks loom almost 1 000 m above the plains of the Namib Desert. The Naukluft mountains form part of a large triangular plateau which is higher than the main Namibian plateau and separated from it by almost unbroken cliffs, 500 m high. The plateau consists mainly of dolomite and limestone formations. Dissolution of the dolomite and limestone by water over many millennia has given rise to karstification of the plateau and an extensive underground drainage system. In some of the deeply incised kloofs, discharge from this underground water reservoir occurs as crystal clear springs and streams. Soils are shallow except on the less pronounced slopes. The southern portion of these mountains holds the Sesriem Canyon, where the Tsauchab River has carved a spectacular gorge into the gravels deposited some 15 to 18 million years ago. It is thought that the Tsauchab once flowed to the Atlantic Ocean but, approximately 60 000 years ago, was blocked by encroaching sand dunes some 70 km inland. Over thousands of years the Tsauchab River has, nevertheless, managed to keep parts of its course open, ending at Sossusvlei, a clay pan 65 km southwest of Sesriem. The sand dune desert occurs as widely dispersed patches north of the Orange River, becoming a vast sea of dunes north of Lüderitz. Its northwards spread is abruptly stopped by the Kuiseb River. The mean daily temperature in the desert is 20°C with almost no frost. Mean annual rainfall is as low as 23 mm, but a further 31 mm p.a. results from fog precipitation, which occurs on an average of 60 days annually. In

the mountains the summers are hot with a mean maximum temperature of 35°C. Summer convective storms provide 200 mm of rain, and the winters are cool and dry with occasional frosts. Large portions of the desert are usually devoid of vegetation. After good rains, or when conditions permit, ephemeral species grow rapidly and flower quickly. Vegetation is extremely sparse on the shifting dunes of the sand sea with occasional grassy pockets of Dune Grass in more stable slacks. Plants which can tolerate the extreme aridity on a permanent basis include the lichens and succulent plants which dominate on inselbergs and pegmatite dykes, making use of the moisture in fog and dew. Lichens include *Parmelia hottentotta*, *P. namaensis* and *Caloplaca elegantissima*. Succulent genera include *Hoodia*, *Lithops*, *Sarcocaulon*, *Euphorbia*, *Aloe* and *Mesembryanthemum*. Sandy wastes support halophytes such as *Zygophyllum stapfii*, *Z. simplex* and *Aizoon dinteri*. The plains also hold the bizarre *Welwitschia mirabilis*. Riverbeds near the coast are colonised by *Tamarix*, *Lycium* and *Salsola* and inland by a denser growth of *Acacia erioloba* and *Faidherbia albida* with some *Euclea pseudebenus* and *Salvadora persica*. The fruit of *Acanthosicyos horridus*, which occurs in the Kuiseb Valley, is a valuable source of water in the desert. The vegetation on the Naukluft mountains is complex and varied due to the wide variation in aspect and edaphic conditions. The plateau surface peneplain is a mosaic of smaller communities dominated by low scattered scrub interspersed with bare ground or clumps of perennial grass. The southern slopes of the mountain massif are covered mainly by grass and short shrub species including *Commiphora*, *Euphorbia*, *Boscia albitrunca*, *Maerua schinzii*, *Aloe dichotoma* and *Moringa ovalifolia*. Uncommon species include *Aloe sladeniana*, *Lithops*, *Huernia*, *Stapelia*, *Aloe striata* subsp. *karasbergensis* and *Cyphostemma* spp.

Birds

The park is rich in raptors with Secretarybird, Whitebacked Vulture, Lappetfaced Vulture, Tawny Eagle, Martial Eagle and Greater Kestrel being particularly common breeding species. Whiteheaded Vulture, Pallid Harrier, Black Harrier and Lesser Kestrel occur less frequently. In the east the Naukluft mountains hold breeding Black Eagle and

Black Stork. Several typical karoo species reach the northern limit of the distribution in the southern portion of the park, including Karoo Korhaan, Layard's Titbabbler, Karoo Eremomela, Cinnamonbreasted Warbler, Blackheaded Canary and Blackeared Finchlark. Other species more typical of northern Namibia also penetrate the northern section of the park around the Naukluft mountains, including Hartlaub's Francolin, Rüppell's Parrot, Monteiro's Hornbill, Herero Chat, Rockrunner, Shorttoed Rock Thrush and Whitetailed Shrike. Typical desert dune and gravel plains species include Kori Bustard, Ludwig's Bustard, Rüppell's Korhaan, Burchell's Courser, Temminck's Courser, Doublebanded Courser, Dune Lark, Gray's Lark, Stark's Lark, Karoo Chat, Tractrac Chat and Rufouseared Warbler. Species preferring acacia woodland and partial cover include Redbilled Francolin, Pied Babbler, Kalahari Robin, Barred Warbler, Marico Flycatcher, Crimsonbreasted Shrike, Rosy-faced Lovebird, Cape Penduline Tit, Pririt Batis, Scalyfeathered Finch, Violeteared Waxbill and Shafttailed Whydah. Sociable Weaver and the associated Pygmy Falcon occur where there are trees large enough to support their massive nests. The coastline holds roosting and foraging areas for African Black Oystercatcher, Common Tern, (breeding) Damara Tern, African Penguin, Bank Cormorant, Crowned Cormorant and Hartlaub's Gull. The coast also holds Namibia's only mainland breeding colony of African Penguin. When wet, Sossusvlei may hold several wetland birds including flamingos.

Other threatened/endemic wildlife

This park supports many species which are endemic to the Namib desert. Unique threatened or endemic plants include *Aloe namibensis*, *A. sladeniana*, *Aloe striata* subsp. *karasbergensis*, *Welwitschia mirabilis*, *Lithops schwantesii*, *Trichocaulon* spp. and the *Myrothamnus flabellifolius*. Interesting endemic invertebrates include *Onymacris unguicularis* and *Lepidochora* spp. Reptiles include *Palmatogecko rangei*, *Aporosaura anchietae* and Sidewinder Adder. Endemic and

threatened mammals include Desert Golden Mole, Hairy-footed Gerbil, Leopard, Cheetah and Hartmann's Mountain Zebra.

Conservation issues

The Namib Desert National Park was first established as a game reserve in 1907, with the Sandwich Bay area being incorporated in 1941. In 1956 the reserve was enlarged by the inclusion of the Kuiseb Canyon, Swakop River Valley and the Welwitschia Plains, changing the name to the Namib Desert Park. In 1966 Naukluft Farm was purchased and two years later the Naukluft Mountain Zebra Park was established. The Zebra Park was amalgamated in 1979, by the addition of a 30 km wide corridor. The area was officially proclaimed as a National Park in 1986 when the remainder of Diamond Area II was added under Nature Conservation Ordinance No 31. The land tenure is currently under the jurisdiction of MET. The Topnaar Hottentots are a permanent population of the park, having lived in the Kuiseb River Valley for many generations, farming goats and cattle. Illegal nomadic farming in the Kuiseb floodplain is a conservation concern and is being stopped.

Three large inactive mining concessions remain in the park. Prospecting in the region prior to park establishment has left visible scars in several areas. Natural migration patterns of gemsbok are threatened because numerous springs of the escarpment are being farmed intensely, resulting in land degradation and/or fencing. The area has been well studied, particularly through the Desert Ecological Research Institute which was established in 1963 and is located at Gobabeb on the banks of the Kuiseb River. Studies have particularly concentrated on the physiological and behavioural adaptations of invertebrates and small vertebrates to extreme desert conditions.

Further reading

Barnard 1998, Brown et al. 1987, Boyer 1988, Olivier and Olivier 1993.

	Breeding (pairs)	Total numbers
Globally threatened species		
African Penguin	230	500
Globally near-threatened species		
Bank Cormorant		100 -200
Crowned Cormorant		50 - 150
Lesser Flamingo		200 (max)
African Black Oystercatcher	Br	30 - 50
Damara Tern	220	560
Restricted-range and biome restricted species		Status
Hartlaub's Francolin		Uncommon
Ludwig's Bustard		Fairly Common
Karoo Korhaan		Fairly Common
Rüppell's Korhaan		Common
Rüppell's Parrot		Uncommon
Monteiro's Hornbill		Uncommon
Dune Lark		Common
Stark's Lark		Common
Gray's Lark		Common
Blackeared Finchlark		Uncommon
Tractrac Chat		Common
Karoo Chat		Common
Kalahari Robin		Common
Herero Chat		Uncommon
Layard's Titbabbler		Uncommon
Karoo Eremomela		Uncommon
Barred Warbler		Common
Cinnamonbreasted Warbler		Uncommon
Rockrunner		Uncommon
Whitetailed Shrike		Uncommon
Palewinged Starling		Common
Sociable Weaver		Fairly Common
Blackheaded Canary		Common
1% or more of population		
Kelp Gull	Br	250 - 350
Common Tern		10 000 (max)
max Absolute maximum		Br Confirmed breeding

N012 Mile 4 Saltworks

Fully protected
Global IBA

22°39'S; 14°33'E
3 400 ha

Site description

This coastal IBA comprises a private nature reserve of 400 ha and a saltworks. It lies adjacent to the sea on the central Namib Desert coast and has been extensively altered to create numerous evaporation ponds. Immediately inland lie the gravel plains of the Namib Desert. The saltworks are situated about 7 km (4 miles) north of Swakopmund, off route 76 to Terrace Bay. Production of the concentrated brine at the salt pan known as Panther Beacon began in 1933, but by 1952 the salt source was exhausted. Seawater has since been pumped into open evaporation and concentration ponds from which crystallised salt is removed with mechanical scrapers. The pans are shallow and of varying salinity. A large wooden commercial guano platform covering 31 000 m² has been built in one of the northern pans. Apart from a few halophytes, the saltworks are devoid of vegetation.

Birds

Mile 4 occasionally supports massive numbers of waterbirds: the guano platform alone has supported up to 700 000 Cape Cormorant, with an average of 45 000 birds in recent years. Cormorants aside, the area may support more than 50 000 waterbirds, including large numbers of Greater and Lesser Flamingo, African Black Oystercatcher and up to 100 000 Common Tern. Breeding species include Damara Tern, Chestnutbanded Plover, Kelp Gull, Hartlaub's Gull and Caspian Tern.

A maximum of 34 White Pelicans have been recorded. This species probably would breed on the platforms but are dissuaded (by the owners) from doing so as they produce poor quality guano and disrupt breeding cormorants. In 1997, the area witnessed the first recorded breeding attempt of Greater and Lesser Flamingos in coastal areas. Just over 100 nests were built in the salt pan and eggs

were laid but presumed disturbance by Blackbacked Jackals led to early breeding failure. Recent breeding attempts on islands in the salt pans by Bank Cormorants, and the occurrence and possible breeding of the endemic Gray's Lark immediately inland add to the reserve's importance.

Other threatened/endemic wildlife

Brown Hyaenas occur at the nearby Swakopmund dump and scavenge along the beaches in this area.

Conservation issues

The proprietors of the salt works have registered the aquatic portion of this wetland, an area of 400 ha, as a private nature reserve. The Richwater Oyster Company has been cultivating oysters on the pan since 1985. Oyster production and guano scraping at the salt works appears to be compatible with maintaining large numbers of terns, cormorants and plovers, some of which breed there. The value of these commercial salt pans as habitat for waders and others birds is evident from biannual wetland counts, with up to 93 000 birds of c. 35 species recorded at any one time. Management options which enhance the value of these systems to breeding flamingos should be sought, although the owners are not keen on large numbers of visitors who may disturb the breeding cormorants. Substantial quantities of guano either fall into the pans or are washed off the birds when they bathe. The effect of this guano enrichment on productivity of micro-organisms in the pan has not been directly assessed. The site can be considered secure as long as guano harvesting remains commercially viable.

Further reading

Berry 1976a, Cooper et al. 1982, Crawford and Dyer 1995, Noli-Peard and Williams 1991, Simmons 1991, 1992, Tarr 1996.

	Breeding (pairs)	Total numbers
Globally near-threatened species		
Lesser Flamingo	40 (once)	883 (av) – 1 996 (max)
African Black Oystercatcher		21 (av) - 34 (max)
Damara Tern	9 - 12	12 (av) - 88 (max)
1% or more of population		
Cape Cormorant	Br	45 400 - 700 00 (max)
Greater Flamingo	64 (once)	1 306 (av) – 2 688 (max)
Kelp Gull	120	372 (av) - 706 (max)
av Yearly average (max count)	max Absolute maximum	
Br Confirmed breeding		

N013 30 km beach: Walvis - Swakopmund

Unprotected
Global IBA

22°42'S-22°56'S; 14°31'E
c. 2 100 ha

Site description

This coastal IBA is situated in central Namibia on the edge of the Namib Desert, between the towns of Walvis Bay and Swakopmund. It is essentially a 30 km stretch of beach, 700m wide, comprising mainly sand, with rocky outcrops forming less than 5% of its length. Two small resorts occur in this otherwise uninhabited section of coast, namely Longbeach and Dolphin Park. Rainfall here is highly variable, averaging about 15 mm p.a., but coastal fog occurs on average every three days. Line angling is common along the northern sections, while swimmers and surfers are concentrated around the two resorts. The area is the focus of an intense ocean upwelling system that begins in Lüderitz, where nutrients are brought to the surface, and algal and zooplankton blooms form as the water is swept north by the Benguela Current. In the area between Walvis Bay and Henties Bay (to the north), inshore winds push large quantities of nutrients onshore, supporting an abundance of invertebrates on the sandy and rocky shores. Invertebrate densities on both shore types are higher than any other beach in southern Africa. Furthermore, the Pelican Point sandspit at Walvis Bay refracts waves around and into the bay, concentrating the nutrients still further on these shores. Little vegetation occurs although stranded Kelp occurs on some sections and provides a rich microhabitat for kelp flies and associated shorebirds. Associated with this beach is the only bulge along an otherwise straight shore, known as Caution Reef (or Patrysburg). This is an area of sand flats immediately behind a shingle beach about 600 m inland, rising to a plateau overlooking the shore. The national road between Swakopmund and Walvis Bay acts as boundary to this area.

Birds

This site is not only the richest shoreline in terms of shorebird density anywhere in southern Africa, but it also supports the densest colony of breeding Damara Terns known. Surveys 20 years ago showed the beach to hold a peak shorebird numbers of 448 birds/km, a density which was confirmed in 1996 (451 birds/km). Individual 10 km sections which include the rocky shores between Caution Reef and Swakopmund peak even higher at 770 birds/km. Totals for this 30 km beach section therefore exceed 13 000 shorebirds of 31 species, most of which are

Palaearctic migrants. The most abundant Charadrii are Turnstone, Curlew Sandpiper, Grey Plover and Whimbrel. Breeding Damara Terns occur mainly at Caution Reef, from October to February. Densities within a 2 km² study area have exceeded 120 nesting pairs, or 60 pairs/km². This is considerably higher than the modal density along Namibia's shore of about 1 pair/km². Other birds breed further inland at lower densities and breeding and ringing studies have continued since 1995. Large numbers of Common and Arctic Terns flock here, and large numbers of cormorants which use the artificial guano platform at the southern end of this IBA sometimes roost on the beach.

Other threatened/endemic wildlife

In recent years Pygmy Sperm Whale, Southern Bottlenosed Whale, Pygmy Right Whale and Minke Whale have all occurred, or been stranded, on these beaches, while the endemic Dusky, common Bottlenosed and the rare Heaviside's Dolphin are frequent visitors. Leatherback Turtles have also been seen in the bay.

Conservation issues

This important breeding area of dune slacks and beach is unprotected. Tracks of 4WD vehicles are numerous. Breeding Damara Terns are unprotected on their Caution Reef breeding site. Losses are attributable to 4WD vehicles driving over eggs and increased egg predation by Kelp Gulls attracted to fishermen and their bait. Predation rates are higher at this colony than any other closely studied colony where disturbance is lower.

Fishermen regularly use the same beaches as the shorebirds but space competition is not severe. More important is the possibility of major developments, including casinos and hotels, proposed for the Caution Reef plains. A building on, or close to, the site is likely to drive birds away even though a certain degree of visitor traffic is tolerated by these terns. Dogs and visitors to the two resorts also disturb feeding birds in some sections of this productive beach, but this impact is relatively minor at current levels.

Pollution is becoming increasingly common and tankers anchored in the bay frequently clean bilge

tanks and throw garbage overboard opposite Pelican Point. The nature of the wave action means virtually all of this stays in the bay.

Further reading

Braby 1995, Simmons et al. 1998a, Simmons and Cordes submitted, Summers et al. 1987, Tarr et al. 1985, Whitelaw et al. 1978.

	Breeding (pairs)	Total numbers
Globally near-threatened species		
African Black Oystercatcher		17 (max)
Damara Tern	120	250 (max)
1% or more of population		
Turnstone		5 211 (max)
Kelp Gull		1 688 (max)
Other important populations		
Cape Cormorant		2 916 (max)
Grey Plover		438 (max)
Curlew Sandpiper		3 905 (max)
Swift Tern		323 (max)
Common Tern		5 400 (max)

max Absolute maximum

With additional contributions from Rod Braby

N014 Walvis Bay

Unprotected
Global IBA

22°59'S; 14°31'E
c. 4 000 ha
Ramsar Site

Site description

Once famous for its whales, hence the name, Walvis Bay is a large modern town and Namibia's only commercial port. It is one of four Ramsar sites in Namibia and is located in the Kuiseb River delta, approximately half way down the Namib Desert Coast. The wetlands south and west of the town comprise the natural areas of Walvis Bay Lagoon, and include inter-tidal mudflats and the eastern half of a north-south sand spit extending 10 km, called Pelican Point. This spit provides protection to the bay from Atlantic swells. A lagoon lies at the southern end of the open water. A saltworks at the southern end of the lagoon reduces the tidal sweep, possibly adding to increased siltation. Included in this IBA are the artificially flooded evaporation ponds of the saltworks, as well as the occasionally flooded areas to the south of the saltworks. The only terrestrial vegetation in the wetland is the extensive riverine vegetation in the delta and ephemeral river itself. Walvis Bay is only 55 km north of Namibia's second most important wetland, Sandwich Harbour. Walvis Bay lagoon is a tourist attraction because of the proximity of a hundred thousand birds, mainly flamingos, to public areas, and fishermen and tourists throng to its cool shores in December-January. Rainfall is sporadic and averages about 15 mm p.a. while coastal fog is common.

Birds

In terms of bird numbers this is the most important coastal wetland area in southern Africa and is probably one of the three most important coastal wetlands in Africa. This area regularly supports over 100 000 birds in summer and 50 000 birds in winter. Peak counts per species indicate annual use by up to 150 000 wetland birds. Most birds (c. 90% by number) which use the wetland in summer are non-breeding intra-African and palearctic migrants. The area is vitally important for palearctic waders and flamingos which make up the majority of the birds. Between 80 and 90 % of the subcontinent's flamingos winter here and at Sandwich Harbour, utilising especially the evaporation ponds of the salt works. As many as 13 species occur in numbers exceeding the 1% world population criteria for inclusion in the Ramsar Convention.

Several species number in their thousands including Greater and Lesser Flamingo, Curlew Sandpiper, Little Stint and Common/Arctic Tern, and significant proportions of the global population of the Chestnutbanded Plover and Blacknecked Grebe. Other common species include African Black Oystercatcher, breeding Damara Tern, Grey Plover, Whitefronted Plover, Turnstone, Sanderling, Avocet, Kelp Gull, Hartlaub's Gull, breeding Caspian Terns, Swift Tern, Sandwich Tern and most of southern Africa's Black Terns. It also holds large proportions of the southern African populations of Knot, Bartailed Godwit, Curlew and Whimbrel. Smaller numbers of White Pelican, Cape Teal and Ringed Plover occur. It is possibly the only place in southern Africa where one or more species of Phalarope are regular visitors (with up to 12 birds present at a time,) to the salt works and offshore. The very high species richness and abundance is probably due to nutrients from the high-production Lüderitz upwelling cell being brought north by the cold Benguela current and being blown onshore by year-round winds. The sandy and rocky beaches here also support higher linear densities of wading birds than any other area in southern Africa (see IBA N013). Dune Lark, entirely endemic to the gravel plains and inter-dune areas of the central Namib, occurs within this area.

Other threatened/endemic wildlife

Whales including the Southern Right Whale and Humpback Whales once brought their calves into these sheltered waters but were exterminated by early whalers; they are still sometimes seen at sea. In recent years Pygmy Sperm Whales, Southern Bottlenosed Whales, the rare Pygmy Right Whale and the Minke Whale have all occurred. Dusky, Common Bottlenosed and the poorly-known Benguela endemic Heaviside's Dolphin are frequent visitors. Leatherback Turtles have been recorded as vagrants to the lagoon and just north.

Conservation issues

Once an enclave of South Africa, Walvis Bay ceded to Namibia in March 1994. However, the legislation in the Walvis Bay and Offshore Islands Act of 1994 made no provision for the gazetted Cape Nature

Reserve to be re-promulgated and it is not formally protected. However, the recently formed Walvis Bay Environmental Action Group, the Municipality and the Ministry of Environment and Tourism are making progress towards rectifying this and management problems in the reserve.

Although the construction of the salt works at Walvis Bay destroyed large areas of naturally flooded salt pan, it does provide large areas of permanently flooded shallow water with a range of salinities not naturally occurring in this environment. This artificial section of the wetland regularly supports more than half the birds at Walvis Bay. Natural threats to the system include the deposition of large quantities of wind-driven sand from the Kuiseb delta into the lagoon and the large silt load present in the ocean in and around the mouth of the lagoon which may lead to the eventual siltation of part of the system. The growth of the Pelican Point sand spit at around 22 m per year decreases the tidal sweep that once helped scour the

bay of wind-transported sand.

Fish oils, fish processing wastes and ship-borne pollution from the harbour have affected an already hyper-rich system, but most marine die-offs are associated with natural build ups of sulphur dioxide precipitated by the high nutrient load of the waters. Contingency plans are in place to deal with potential oil spill problems.

Light aircraft, prohibited from flying low over the lagoon and mudflats, consistently violate the height restrictions and regularly disturb feeding birds, particularly flamingos.

Further reading

Barnard 1998, Berry 1976a, 1976b, Boyer 1988, Curry 1997, Hockey et al. 1992, Jacobson et al. 1995; Noli-Peard and Williams 1991, Simmons 1991, 1992, 1996a, 1997a, Ward 1997, Whitelaw et al. 1978, Williams 1987, 1988, 1997, Williams et al. in prep.

	Breeding (pairs)	Total numbers
Globally near-threatened species		
¥ Bank Cormorant		5 - 8
Lesser Flamingo		14 200 (av) - 33 060 (max)
African Black Oystercatcher		110 (av) - 204 (max)
Damara Tern	15	60 (av) - 265 (max)
1% or more of population		
Blacknecked Grebe		2 050 (av) - 4 230 (max)
Greater Flamingo		11 350 (av) - 31 800 (max)
Avocet		818 (av) - 2 340 (max)
Grey Plover		816 (av) - 3 360 (max)
Chestnutbanded Plover	30-50	1 810 (av) - 6 040 (max)
Whitefronted Plover		1 010 (av) - 1 610 (max)
Turnstone		2 110 (av) - 4 420 (max)
Sanderling		2 110(av) - 7 360 (max)
Curlew Sandpiper		11 180 (av) - 22 700 (max)
Kelp Gull		1 710 (av) - 5 170 (max)
Caspian Tern		70 (av) - 230 (max)
Swift Tern		350 (av) - 1 660 (max)
Common Tern		5 410 (av) - 2 3610 (max)
Other important populations		
¥ White Pelican		88 (av) - 590 (max)

¥ Species does not meet IBA threshold
max Absolute maximum

av Yearly average (max count)

N015 Sandwich Harbour

Fully protected
Global IBA

23°20'S; 14°30'E
c. 8 500 ha
Ramsar Site

Site description

Sandwich Harbour is a natural lagoon which lies on the Namib Desert coast approximately 55 km south of Walvis Bay (see Figure 2). One of Namibia's four Ramsar sites, Sandwich was once a natural harbour for whalers and fish processors, who could gain access to freshwater here. Due to dynamic geomorphological change, its sand bars and lagoons shift constantly with winter storms and longshore currents. Two main sections of this wetland are recognised: the northern fresh water wetland, much reduced in size since the early 1970s when it covered several square kilometres, and the southern mudflats, a 20 km² area of sand and mudflats inundated daily by the tides. The northern wetland is now a thin sliver of mainly *Phragmites australis* fed by a massive freshwater aquifer beneath the high dunes of the Namib sand sea. This potable water, possibly up to 7 000 years in age, seeps slowly through the wetland and there supports ever decreasing stands of emergent vegetation. The brackish pools are partially fringed by *Typha capensis*, *Sarcocornia natalensis* and *Phragmites australis*. Further from the water, coarse grasses *Sporobolus virginicus*, *Odysea paucinervis* and *Cladoraphis cyperoides* intermingle, and together with the sedge *Scirpoides dioecus* and *Sarcocornia natalensis* cover large areas. The endemic *Acanthosicyos horridus* is found just inland within the dune sea where fresh water is available. The species' distributions are determined by the salinity gradient between the freshwater seepage and the marine system. The wetland is protected from the Atlantic Ocean swells by a barrier beach which has moved from 1 km offshore to within 150 m of the dunes in the last 30 years, forming a small lagoon. The southern lagoon, which leads into mudflats, is a relatively shallow water body some 5 km long by 3 km wide, protected from the main ocean by a western sandspit that once reached the northern wetland but now joins the mainland some 3 km south. This western sandspit is breached at the mouth of the southern lagoon, forming 3-4 sandbar islands which are jackal-free.

Sandwich Harbour is one of the most active geomorphic areas along the Namib coast. In the late 1800s there was no barrier beach and therefore no

protected wetland, but the southern sandspit provided some shelter for an otherwise open harbour. The system continues to evolve rapidly but, contrary to popular belief, is far from dead.

Birds

This is one of the most important wetland areas in southern Africa, regularly supporting over 50 000 birds in summer and over 20 000 in winter. To date, 115 species have been recorded here. Traditionally, the northern wetland holds the highest species diversity (with up to 51 species of wetland birds), while the southern mudflats hold by far the largest number of birds, dominated by terns, sandpipers, flamingos and cormorants. Shorebirds occur here at densities up to 7 000 birds/km², among the highest in the world. The largest number of birds counted at Sandwich Harbour was 238 000 birds in January 1998, of which 187 000 were Common and Black Terns. The area is vitally important for palearctic waders and flamingos which comprise the majority of the numbers. The area also supports massive numbers of several species including Cape Cormorant, Greater and Lesser Flamingo, up to 40% of the world population of Chestnutbanded Plover and tens of thousands of Curlew Sandpiper and Little Stint. Other numerous species include African Black Oystercatcher, Whitefronted Plover, Turnstone, Sanderling, Avocet, Kelp Gull, Hartlaub's Gull, Caspian Tern, Swift Tern, Sandwich Tern and breeding Damara Tern. This IBA also holds large proportions of the southern African populations of Ringed Plover, Grey Plover, Knot, Bartailed Godwit, Curlew and Whimbrel. Isolated breeding populations of Greatcrested Grebe, Blackcrowned Night Heron and Purple Gallinule occur, but like most fresh-water species their numbers here have decreased drastically with the reduction of the northern wetland. Rarities regularly detected include European Oystercatchers Collared Flycatcher, Greater Sandplover, Whiterumped and Broadbilled Sandpiper. Peregrine and Lanner Falcons occasionally come to hunt the shorebirds and terns but in lower numbers than the abundance of prey would suggest.

Other threatened/endemic wildlife

Bottlenosed Dolphins in pods of 10-20 animals are

not uncommon in the lagoon, while a non-breeding colony of c.10 000 Cape Fur Seals occupies the beach west of the mudflats. Brown Hyaena and Gemsbok are frequent visitors to the wetland, while the lagoon and marine environment hold 36 species of fish.

Conservation issues

A 45 km stretch of coastline centred on Sandwich Harbour was incorporated into the park 1979, extending 1.6 km into the sea from the low-water, however it's status is unclear. There have been no permanent human inhabitants at Sandwich since 1969, although remnants of a whaling station exist at the foot of the dunes and several wooden buildings belonging to earlier guano collectors and fishermen still stand. The entire area falls within the boundaries of the Namib-Naukluft Park (IBA N011), managed by the Ministry of Environment and Tourism. However, due to its discrete and dynamic nature, Sandwich Harbour is considered a separate IBA from the Namib-Naukluft system. Should current geomorphic processes eradicate the northern wetland most of the freshwater vegetation would be lost and species richness would probably decrease. Plans for the area should take cognisance of the fact that the most important area for birds is the southern end of the harbour and this will remain,

irrespective of the fate of the northern wetland. It is one of Namibia's best studied, most fascinating wetlands, with bird counts spanning a period of 27 years and further research planned on the invertebrate food of the numerous waders found here.

A ubiquitous conservation problem is the constant illegal low-flying undertaken by tour companies who disturb the flamingos and cormorants 5-6 times daily in order to show visitors the sites of Sandwich. A height restriction of 1 000 m has been regularly ignored but is now more stringently enforced. Commercial line fishing within the Namib-Naukluft park waters has been stopped. The history is well known and numerous artefacts, grave sites, shipwrecks and large shell middens litter this fascinating site.

Further reading

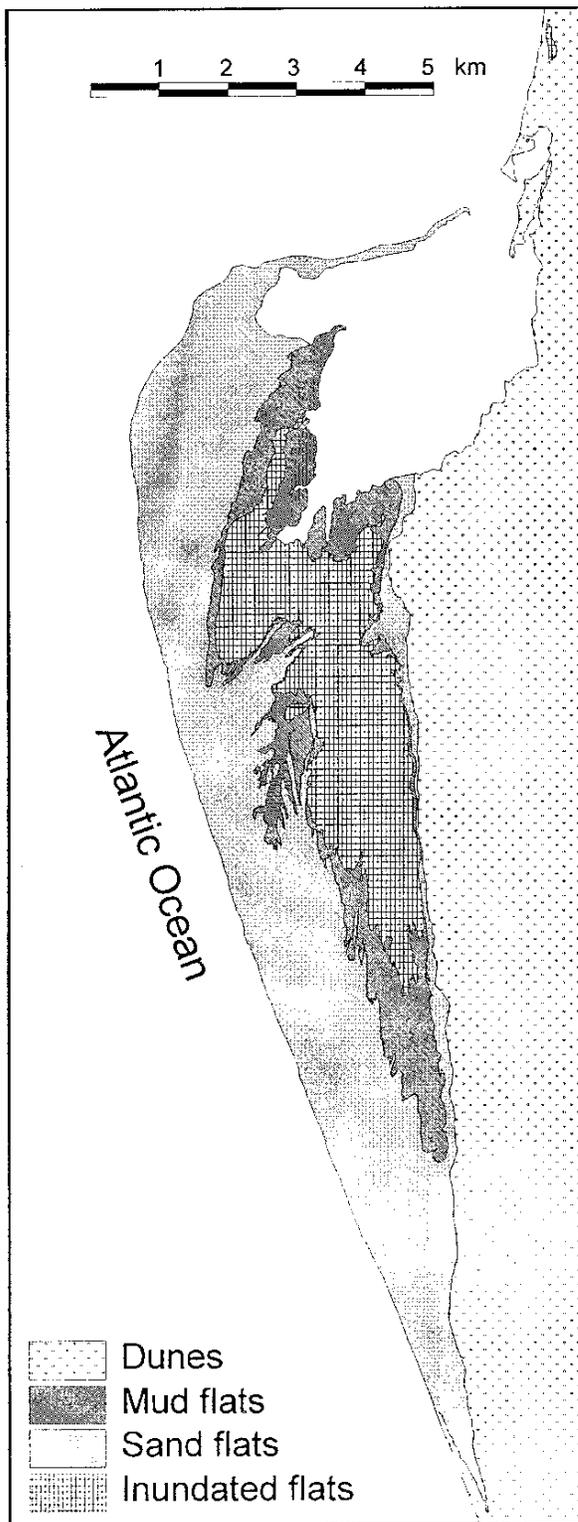
Barnard 1998, Berry and Berry 1975, Glassom and Branch 1997, Hellwig 1968, Kensley 1978, Kensley and Penrith 1977, Kinahan 1992, Lenssen et al. 1991, Noli-Pearl and Williams 1991, Prozesky 1963, Simmons 1991, 1996b, 1996a, Terrblanche 1980, Ward and Seely 1990, Whitelaw et al. 1978, Wilkinson et al. 1989.

	Breeding (pairs)	Total numbers
Globally near-threatened species		
‡ Bank Cormorant		5 - 8
Lesser Flamingo		2 000 (av) – 13 100 (max)
African Black Oystercatcher		20 (av) - 90 (max)
Damara Tern	20	50 (av) - 300 (max)
1% or more of population		
Cape Cormorant		4 230 (av) – 25 300 (max)
Greater Flamingo		2 480 (av) – 11 900 (max)
Avocet		120 (av) - 940 (max)
Chestnutbanded Plover		1 170 (av) – 5 590 (max)
Whitefronted Plover	10	440 (av) – 2 540 (max)
Turnstone		402 (av) – 2 260 (max)
Sanderling		1 630 (av) – 14 160 (max)
Little Stint		3 590 (av) – 30 480 (max)
Curlew Sandpiper		3 580 (av) – 43 680 (max)
Kelp Gull		280 (av) – 3 200 (max)
Caspian Tern		30 (av) - 168 (max)
Swift Tern		80 (av) - 820 (max)
Sandwich Tern		200 (av) – 3 660 (max)
Common Tern		4 610 (av) – 42 000 (max)

‡ Species does not meet IBA threshold
max Absolute maximum

av Yearly average (max count)

Figure 2: Sandwich Harbour's southern mudflats as they appeared in 1997. This area regularly holds over 50 000 birds including vast flocks of terns and sandpipers. It is regularly surveyed using GPS technology to monitor geomorphological change.



N016 Hardap Nature Reserve

Fully protected
Sub-regional IBA

24°30'S; 17°50'E
c. 25 000 ha

Site description

This reserve is centred on Namibia's largest dam at Hardap on the Fish River, just to the west of Mariental. The reserve is divided into two sections by the dam, covering 1 848 ha in the north and 23 420 ha in the south. The surrounding area comprises a rugged, rocky landscape with scattered basalt ridges. An extensive plateau occurs in the west, tapering into a valley in the east. The topography of the reserve consists of wide plains interspersed by small round hills and stony ridges, especially near the upper reaches of the dam. The summer months are hot with temperatures reaching 40°C, whilst winter is cool with temperatures falling below zero. The area is semi-arid with an average rainfall of 192 mm p.a. and an average evaporation of 3 397 mm p.a. The reserve's vegetation has been classified as Dwarf Shrub Savanna with scattered trees such as *Acacia karroo* and *Tamarix usneoides* occurring mainly along the river courses. The open veld is characterised by *Acacia erioloba*, *Acacia nebrownii*, *Boscia foetida* and *Parkinsonia africana*. *Rhigozum trichotomum* and *Cataphractes alexandri* dominate the shrub layer while the most important grasses are of the genera *Stipagrostis*, *Eragrostis* and *Aristida*.

Birds

Owing to the diverse habitat types some 260 bird species are found in the reserve, with wetland birds present in reasonably large numbers. This is one of only two sites in Namibia that regularly hold large numbers of White Pelican which breed on the rocky islands near the west shores. Darter, Little Egret, African Spoonbill and occasionally Whitebacked Duck also occur. Booted Eagles and breeding Fish Eagles occur on the highest cliffs. The surrounding areas support Kori Bustard, Marabou Stork and

Doublebanded Courser.

Other threatened/endemic wildlife

Threatened wildlife occurring in the park include Cheetah and Cape Wolf Snake. Hartmann's Mountain Zebra, Black Rhinoceros and several species of game have been reintroduced to the reserve.

Conservation issues

The recreation resort was originally established in 1964. The Nature Reserve surrounding the dam was established in 1968 by the merging of several farms. The management plan makes provision for a recreation area on 5% of the reserve, with the remainder of the reserve being managed as a conservation area to which people are excluded. Ownership of the reserve was transferred to the Ministry of Environment and Tourism after Namibian Independence. Below the dam wall is the Fresh Water Fish Institute of the Ministry of Fisheries and Marine Resources where research into various aspects of fish production, breeding and conservation problems is conducted. The reserve is situated in a high-intensity, small stock farming area leading to periodic tension with neighbouring farms over small carnivores originating in the reserve but preying on small-stock. Intense use of fertilisers in the irrigated "Hardap Scheme" lucerne growing areas immediately south of the dam wall, has choked the natural river with a thick growth of *Phragmites australis*. Various methods of clearing the blockage have failed, adding to the possibility that if the dam overflows the river itself will overflow and flood Mariental.

Further reading

Olivier and Olivier 1993.

	Breeding (pairs)	Total numbers
Globally threatened species		
‡ Lesser Kestrel		OV
Other important populations		
White Pelican		717 (av) - 1396 (max)

‡ Species does not meet IBA threshold

OV Occasional visitor

N017 Mercury Island

Partially protected
Global IBA

25°43'S; 14°50'E
c. 3 ha

Site description

Located 800 m offshore, Mercury Island lies within Spencer Bay, about 110 km north of Lüderitz. Geologically it is comprised of meta-arkoses with a dyke of Karoo dolerite that has been preferentially eroded. The island is within an area of intense ocean upwelling which adds to the high nutrients and high fish biomass around these near-shore islands. Somewhat elongate at 500 m by 100m, this small steep sided island reaches 40 m a.s.l. It is the smallest of the three guano islands at 3 ha; the other two are Possession and Ichaboe, also global IBAs. Known as the island that shakes, the interior of the island is hollow, and large swells, common in this region, thunder inside the coves under the island causing it to reverberate ominously. The island has one stone building for permanent staff. The island is unvegetated and was first exploited for guano in the 1840s when thousands of tons of “white gold” were stripped from its flanks. It is the northernmost of the 18 near shore islands off the Diamond Coast used by breeding seabirds.

Birds

Mercury Island is one of three very important coastal seabird breeding islands along the Diamond Coast of south western Namibia; the other two are Ichaboe (IBA N018) and Possession (IBA N020). Mercury regularly supports over 15 000 seabirds including 3 000 pairs of African Penguin, 1 300 pairs of Cape Gannet, 800 pairs of Bank Cormorant and small numbers of Crowned Cormorant. The island's Bank Cormorant population has decreased by about 50 % in the last 15 years. The seabirds cover virtually the whole surface area of the island leaving no space for other species. Wooden extensions to the island and a simple bridge to an adjoining section of island increases the surface area available for breeding cormorants and, thus, harvestable guano.

Other threatened/endemic wildlife

Killer whales occur around the island, taking young penguins or seals when the opportunity arises. Several whales migrate through these waters including Minke Whale, Southern Right Whale and Humpback Whales with their calves. Heaviside's Dolphin, Dusky Dolphin and the common Bottlenosed Dolphin also occur.

Conservation issues

All of the 18 near-shore islands on Namibia's Diamond coast were managed by Cape Nature Conservation as nature reserves under South African rule until the 1994 Walvis Bay and Offshore Islands Act returned them to Namibian jurisdiction. Now under Namibian law they no longer carry the same status, but fall under the jurisdiction of the Ministry of Fisheries and Marine Resources. Three seabird species, African Penguin, Cape Gannet and Cape Cormorant have suffered serious population declines in the last 30 years mostly because of overfishing of surface-shoaling fish such as Sardines and Pilchards, their main food source. From an already-reduced population of 70 000 African Penguins in the 1950s, only 5 300 pairs remained in Namibia 30 years later and, at current rates of decline, this species is projected to become extinct by the year 2155. These birds are renowned for their guano droppings which have been harvested for over 100 years for fertiliser. Disturbance caused by guano harvesting during breeding has compounded their population declines. The African Penguin is most severely affected as it prefers to burrow into the guano. Large scale harvesting removes their cover and forces penguins to breed in the open, exposing chicks and eggs to increased predation by gulls and seals, excessive heat during the day and other elements. Conservation measures presently ensure that these birds are not disturbed during the main breeding season by the now infrequent guano-scraping, but some disturbance is unavoidable since breeding occurs year-round. Egg-collecting occurred well into the 1970s on some of these islands. Further conservation problems for coastal seabirds include a Cape Fur Seal population which has been steadily increasing in number along the Namib coast after being severely depleted by hunting in the 1800s. Seals can disrupt and displace breeding seabirds on islands by occupying areas originally used for breeding by the birds. This has led to population declines in several of these species. Seals are discouraged from breeding where they dramatically affect sensitive seabird species and since seals were chased from the islands in 1986, penguin numbers have increased.

Further reading

Barnard 1998, Cooper et al. 1980, Crawford et al.

1989, 1982, Hockey 1982, Pallet 1995, Rand 1963,
Swart 1987, 1988, Williams 1993.

	Breeding (pairs)	Total numbers
Globally threatened species		
African Penguin	1 000 – 3 00	4 000 – 10 000
Globally near-threatened species		
Cape Gannet	1 300	10 000
Bank Cormorant	800 - 1 000	2 000
Crowned Cormorant	10	10 - 20
African Black Oystercatcher		20 - 30 (max)

With additional contributions from Imke Cordes

N018 Ichaboe Island

Partially protected
Global IBA

26°17'S; 14°56'E
c. 6.5 ha

Site description

This small (6.5 ha) island lies 1.4 km offshore from Namibia's Diamond Coast some 50 km north of Lüderitz. It is a circular island which is mostly flat and unvegetated and, geologically, comprises melanogneiss and schists intruded by granites. Rocky outcrops reach only 7 metres a.s.l. allowing sea spray to cover much of the island during storms. The island is now completely surrounded by a sea wall to prevent seals from hauling out and disturbing the birds. Repeated guano scraping since the 1840s, when guano deposits were over 20 m thick, have left the rocky island floor entirely exposed. Guano scraping is now limited. It lies in the heart of the one of the strongest upwelling systems in the world, caused by the consistently strong long-shore winds. The upwellings bring nutrients to the surface where they enhance phyto and zooplankton blooms that are the basis for rich abundance of fish on which the birds thrive. Rainfall is minimal (<10 mm p.a.) but coastal fog and storms often envelop this small island.

Birds

Ichaboe Island is one of the most important and densely-packed coastal seabird breeding islands in the world. It regularly supports over 50 000 seabirds of at least eight species including large numbers of African Penguin (3 400 pairs), Cape Gannet (40 000 birds), Cape Cormorant (8 000 pairs) and Bank Cormorants (5 200 pairs). Kelp Gulls and African Black Oystercatcher also breed here. Ichaboe is the most important location for Bank Cormorant in the world, holding 65% of the global population. About 4% of the world breeding population of Crowned Cormorants also occurs

here. The island may also harbour thousands of roosting terns, particularly Common and Black Tern.

Other threatened/endemic wildlife

Killer whales are sometimes sighted around the island and may take young penguins or seals when the opportunity arises. Other whales sighted here include the Southern Right Whale, Humpback Whale and Minke Whale. The Dusky, common Bottlenosed and the endemic Heaviside's Dolphin are also visitors to the island's waters.

Conservation issues

See the account for Mercury Island (IBA N017) for a general discussion of conservation issues relating to the offshore islands around Lüderitz.

The guano on Ichaboe island was 22 m deep when exploitation began in the 1840s, but within three years it was completely cleared. Decisive conservation action on Ichaboe Island involving limiting guano collection to certain times of the year, and active prevention of seals landing to breed has begun to restore the penguin population. A crayfish sanctuary has been established around the island where crayfishing is not allowed. European Rabbits were introduced onto the island to supplement the diet of visitors, but they are not a threat to bird populations.

Further reading

Crawford et al. 1982, in prep, Pallet 1995, Rand 1963, Simmons and Cordes submitted, Swart 1987, 1988.

	Breeding (pairs)	Total numbers
Globally threatened species		
African Penguin	2 000 – 3 300	5 000 – 10 000
Globally near-threatened species		
Cape Gannet	11 000	25 000 – 40 000
Crowned Cormorant	143	190
Bank Cormorant	5 200	10 000 (av) – 12 000 (max)
African Black Oystercatcher	Br?	5 - 10
1% or more of population		
Cape Cormorant	8 000	19 960 (av) – 36 544 (max)

av Yearly average (max count)

max Absolute maximum

Br? Suspected breeding

With additional contributions from Imke Cordes

N019 Lüderitz Bay Islands

Partially protected
Global IBA

26°37'S; 15°07'E
c. 80 ha

Site description

The Lüderitz Bay Island complex consists of three coastal islands all falling within one kilometre of the shore: Halifax Island (3 ha), Penguin Island (36 ha) and Seal Island (44 ha). The rocky shoreline including Lüderitz fishing harbour is also included within this IBA. Halifax Island is located at the south end of Guano Bay near Diaz Point, a promontory at the western entrance of Lüderitz Bay and one of the first landfalls of Portuguese explorers in the 1400's. The other two islands are to the east of Halifax, within Lüderitz Bay. The whole area lies within the intense upwelling cell off the Lüderitz coastline and this adds to the high marine productivity of the area, explaining the large number of seabirds here. The islands hold some abandoned guano-scrappers buildings which are now used by penguins for nest sites. They support no terrestrial vegetation.

Birds

This island complex regularly supports over 10 000 seabirds. Halifax Island is an important coastal seabird breeding island in Namibia, supporting over 2 000 seabirds including substantial numbers of breeding African Penguin (400 pairs), Crowned Cormorant (50 pairs) and Swift Tern (800 pairs). Penguin and Seal Islands are mostly used for roosting, however Bank (60 pairs), Crowned (80 pairs), Cape (2 000 pairs) and Whitebreasted Cormorants (20 pairs) all breed on Penguin Island. This island also holds large numbers of African Black Oystercatcher, which probably breed, and roosting Damara Terns. Seal Island holds 80 pairs, or 3%, of the world population of Crowned Cormorants, and 400 pairs of Kelp Gull which are known to predate cormorant eggs when disturbance occurs.

On the adjacent mainland, the harbour supports

dense nesting populations of Hartlaub's Gull and Swift Tern. In 1994, at least 2 470 pairs of Swift Terns (40 % of the southern African population) nested successfully there and on the rocky promontory called Shark Island.

The shoreline here is completely rocky and the Lüderitz peninsula alone holds about 14 000 shorebirds. At 30 birds/km it is locally rich but supports a lower linear density than shores farther north in central Namibia.

Other threatened/endemic wildlife

Killer Whales, many Heaviside's Dolphin and the rarer Humpback, Minke and Southern Right Whales all occur. Dusky and common Bottlenosed Dolphins are also seen.

Conservation issues

See the account for Mercury Island (IBA N017) for a general discussion of conservation issues relating to the offshore islands around Lüderitz.

Previously these islands were more populated by breeding birds than at present: their proximity to the mainland suggests they were heavily exploited by man probably even before the precipitous decline of the African Penguin in the 19th and 20th centuries.

Onshore, harbour pollution appears minimal but disturbance to breeding gulls and terns in the harbour itself by humans, dogs and cats has been severe. Although attempts to control these impacts have met with some success, disturbance will inevitably increase as the harbour is renovated.

Further reading

Barnard 1998, Berry et al. 1974, Cooper et al. 1982, Cordes et al. in press, Crawford et al. 1989 in prep, Hockey 1982, Pallet 1995, Rand 1963.

	Breeding (pairs)	Total numbers
Globally threatened species		
African Penguin	330 - 471	800 – 1 500
Globally near-threatened species		
Crowned Cormorant	80	160 - 350
Bank Cormorant	60	200
African Black Oystercatcher	5 – 10	200
1% or more of population		
Kelp Gull	500 - 800	1 200 – 2 000
Hartlaub's Gull	200 – 400	1 500
Swift Tern	800 – 2 470 (max)	6 000 (max)
av Yearly average (max count)	max	Absolute maximum

With additional contributions from Imke Cordes

N020 Possession Island

Partially protected
Global IBA

27°01'S; 15°12'E
c. 80 ha

Site description

Possession Island is located 1.6 km from the Diamond Coast of southwestern Namibia, just south of Elizabeth Bay, c. 40 km south of Lüderitz. At 90 ha, this rectangular island is the largest of the three IBA guano, extending 4 km from north to south by up to 1 km wide. Low rainfall (< 10 mm) and frequent storms inhibit vegetation growth and isolated bushes are scattered around otherwise barren and somewhat sandy ground. Old diamond diggings have broken much of the sandy surface. The island still holds a main jetty and the remains of a small village. Like the other islands it was stripped of its guano cap in the 1840s and has never regained it. It is permanently manned to keep seals from settling on the island.

Birds

Possession Island has the potential to hold more breeding seabirds than the other coastal islands since it is bigger. However, Ichaboe which is 14 times smaller, currently holds more. Possession Island is a vitally important coastal seabird breeding site, supporting over 20 000 seabirds in total. These include 900 pairs of African Penguin, 800 pairs of Cape Gannet, 3 000 pairs of Cape Cormorant, 200 pairs of Crowned Cormorant and about 10 pairs of Bank Cormorant. Some of these breeding seabirds have declined since the island was first surveyed in 1956: African Penguin by 92% and Cape Gannet by 68%. While some colonies have disappeared, others remain, though at a much reduced density. Single breeding pairs are unusual but highly successful, with burrows scattered haphazardly over the barren areas of the island. Large areas of previously used breeding habitat are now barren and unused. Recent observations suggest that it may be the only island breeding site of the normally mainland-breeding Damara Tern, but this requires verification. Small colonies of Damara Terns that once bred between barchan dunes on the adjacent mainland have largely disappeared since the early 1970s. Swift Terns are said to have nested on the island but no longer do. African Black Oystercatchers are common on this island, with over 60 breeding pairs recorded.

Other threatened/endemic wildlife

Killer Whales are occasionally seen around the

island, hunting seals and seabirds. Of great significance was the first known birth of a Southern Right Whale on the Namibian coast for over one hundred years, in Elizabeth Bay in 1996.

Conservation issues

See the account for Mercury Island (IBA N017) for a general discussion of conservation issues relating to the offshore islands around Lüderitz.

This island suffered particularly from guano scraping since it is relatively featureless and the lack of guano reduced penguin nesting habitat to a few shoreline areas. Penguin populations plummeted from 35 000 birds in 1956 to less than 3 000 birds in 1997. All three IBA islands are now manned by permanent staff to prevent seals from displacing the seabirds, and thus allow the accumulation of guano. Currently, little guano is harvested due to the severely reduced numbers of birds on the island and it remains to be seen whether guano harvesting will prove economically viable. Ministry of Fisheries and Marine Resources research includes assessing breeding success of colonial and solitary penguins, and the effect of the numerous parasites on brood size and growth rates. Unauthorised landing by fishermen still occurs on the island but disturbance is minimised by Fisheries personnel.

Onshore disturbance is higher here than the other two islands since a large diamond mine was established in Elizabeth Bay in 1991. European Rabbits were released on the island by early settlers, but it is unknown whether they still occur; they fed on seaweeds washed up in the intertidal area.

Further reading

Barnard 1998, Cooper et al. 1980, Cordes et al. in press, Crawford et al. 1982, 1989, Hockey 1982, Pallet 1995, Rand 1963, Simmons et al. 1998a, Swart 1987, 1988, Williams 1993.

	Breeding (pairs)	Total numbers
Globally threatened species		
African Penguin	300 - 900	500 – 2 700
Globally near-threatened species		
Cape Gannet	800 – 3 000	2 000 – 10 000
Bank Cormorant	10	20 - 40
Crowned Cormorant	20 - 280	50 - 500
African Black Oystercatcher	66	200 - 300
Damara Tern	Br	5 - 10
1% or more of population		
Cape Cormorant	2 000 – 4 000	5 704 (max)
Kelp Gull		2 864 (max)

max Absolute maximum

Br Confirmed breeding

With additional contributions from Imke Cordes

N021 The Sperrgebiet

Fully protected

Global IBA

26°00'S-28°20'S; 14°55'E-16°55'E

c. 2 600 000 ha

Incl Ramsar site

Site description

The Sperrgebiet, or forbidden territory, lies in the southwestern corner of Namibia. Famous for its diamonds, discovered in 1907, the area is bordered by the Orange River in the south and the Atlantic Ocean to the west. The northern boundary was established at 26°S, whereas the eastern boundary parallels the coast c. 100 km inland. The IBA includes the Namibian side of the Orange River mouth. The only towns in the largely uninhabited Sperrgebiet are Oranjemund on the southern coast and Lüderitz on the northern coast. The Sperrgebiet is an extremely arid zone, encompassing the northern extremity of the winter rainfall portion of the Namib Desert. The only permanent water in the area is the perennial Orange River. The northern coastal plain is rocky and holds various sandy bays; the southern shores, intensively mined for diamonds, are reconstituted sandy beaches. The majority of the remaining area comprises sand and gravel plains with low isolated hills, and in the centre and the north of the Sperrgebiet dune sand and sand sheets predominate. The most prominent of these is Obib dune field which rises to 500 m a.s.l. Several rocky ranges, low mountains and inselbergs are scattered throughout the area, the most prominent being Schakalsberg in the south, and Boegeberg (502 m a.s.l.), Aurus (1 082 m a.s.l.), Klinghardtberg (750 - 950 m a.s.l.) and Tsaus in the centre and north. Falling within the southern sector of the Namib Desert, the climate of the Sperrgebiet is dominated by three main factors: strong southerly winds in summer and short duration berg winds from inland in winter; meagre rainfall, generally less than 100 mm p.a., which falls predominantly in winter, but towards the north changes to summer rainfall; and precipitation from coastal fog which extends inland to provide life-giving moisture. Inland temperatures can be extreme, occasionally reaching over 50°C, although the high temperatures expected of a desert environment are moderated by coastal winds and fog. The mean daily temperatures range between 15°C and 25°C within the area.

Various vegetation types are found, including coastal zone vegetation which consists of plant hummocks in sandy areas which stabilise dunes and

form barriers to sand movement. Close to the coast *Salsola nollothensis* and *Cladoraphis cyperoides* dominate, further inland *Othonna furcata* becomes more common. Lichens such as *Xanthoria turbinata* are found on the numerous rocky outcrops and dead *Salsola* plants. The central sand plain lies between 300 and 600 m a.s.l. and is covered by dune fields and coarse sands that are driven inland by prevailing southerly winds. The Obib red dunes in the south-east hold large !Nara hummocks and typical dune grasses. The more elevated eastern sand plains consist predominantly of gravel plains with a single permanent dune system north-east of the Klinghardtberg. Dominant plants here consist of several *Euphorbia* and *Zygophyllum* spp. Scattered stands of *Acacia erioloba* are found in the ephemeral washes and on open plains towards Tsaus. The scattered rocky outcrops and high inselbergs which are found throughout the Sperrgebiet receive higher precipitation and more fog moisture and have a more diverse flora than the surrounding areas. Lichens, aloes, acacias and lithops are more frequent there. The Aurusberg supports the highest diversity and density of plants in the Sperrgebiet. A highly adapted flora grows at the Aurus summit, with several ferns, two *Gladiolus* spp. and an orchid. The linear Orange River in the south holds dense riverine woodland including stands of *Rhus*, *Tamarix* and *Salix mucronata*. The scrubby open woodland in the floodplain is dominated by *Euclea pseudebenus*, *Ziziphus mucronata* and *Acacia karroo*.

Birds

This extremely arid area holds a depauperate avifauna of only around 110 bird species, many of which are restricted to the Namib-Karoo system. However, with the inclusion of the Orange River mouth the species total becomes 251 birds. The recently recognised Barlow's Lark is virtually restricted to the Sperrgebiet, which holds over 80% of its tiny 18 000 km² range. The Orange River and its associated cliffs hold populations of Black Stork and Peregrine Falcon, while Whitebacked Night Heron and Cape Eagle Owl may occur within suitable habitat in this IBA. African Fish Eagle has a stronghold here and Namaqua Warbler and Cape Francolin reach the northern limit of their

distributions. The Orange River mouth is particularly species rich with 64 wetland species, and is the sixth most important wetland for total bird abundance in southern Africa, with a maximum of 26 000 birds recorded. Four species occur in numbers exceeding 1% of their world population. The Orange River mouth is thus one of Namibia's four Ramsar sites.

Raptors number only 24 species but include both Black and African Marsh Harrier. Several typical karroid species occur including Karoo Korhaan, Southern Grey Tit, Cinnamonbreasted Warbler and Layard's Titbabbler. Other arid zone species found within the area include Ludwig's Bustard, Dune Lark, Blackeared Finchlark, Gray's Lark, Stark's Lark, Tractrac Chat, Karoo Chat, Sicklewinged Chat and Blackheaded Canary. The shoreline in the intensively mined Diamond Area No. 1 (extending 100 km north of Oranjemund) is depauperate in birds, holding only 14 shorebirds/km of 16 species compared with 45 birds/km of 29 species immediately north. Shores around Lüderitz, by contrast, support 89 birds/km because of the rocky substrate. Both Greater and Lesser Flamingo occur.

Other threatened/endemic wildlife

The Sperrgebiet is characterised by high levels of endemism in various taxa. At least 45 plant species are endemic to the Sperrgebiet and thus Namibia, but many more are endemic to the Sperrgebiet and Richtersveld of South Africa. The coastal zone holds the spectacular endemic *Sarcocaulon patersonii*. Aurusberg holds several plants which are exclusive to this peak. In the Orange River valley the inselbergs Skilpadberg and Swartkop hold several plants endemic to the lower Orange River including *Aloe ramosissima* and *A. gariopensis*. Endemic and near-endemic amphibians include Desert Rain Frog, Namaqua Rain Frog, Namaqualand Frog and the as yet undescribed Paradise Toad. Endemic and near-endemic reptiles include Nama Padloper, Namaqua Dwarf Adder, Dwarf Mountain Adder and two legless and burrowing skinks. The Sperrgebiet comprises about 40% of the global range of the Namaqua Dune Molerat. Heaviside's Dolphin, probably one of the world's rarest dolphins, is endemic to the southwest coast of Africa and is fairly common off the Sperrgebiet coast. Aardwolf, Brown Hyaena, Spotted Hyaena, Cape Fox, Bateared Fox, Wild Cat, Cheetah and Cape Clawless Otter all occur in the Sperrgebiet and are considered vulnerable in Namibia.

Conservation issues

The Sperrgebiet is currently protected by virtue of the security surrounding the diamonds mined there. Following its deproclamation, the area is earmarked to become a protected area under the auspices of the Ministry of Environment & Tourism, which would thus create a continuous strip of land between the Cunene and Orange Rivers all under MET jurisdiction. It is adjacent to the Namib-Naukluft Park to the north, and is also narrowly to the recently proclaimed Ai-Ais/Hunsberg Reserve Complex in the east. To the southeast, across the Orange River, is the Richtersveld National Park in South Africa. This park shares the lower Orange River as a common boundary for several kilometres. The scenic value of this area has the potential to make an important contribution to the local and national economy.

The only permanent water supply in the area is the Orange River, but flow rates have dwindled and will continue to do so in future as the Lesotho Highlands Scheme diverts more water from the headwaters. Agricultural potential along the lower Orange River is low and difficult to realise because of the great distance from suitable markets and the anticipated reduction of available water in the river. Nevertheless, organophosphates constantly filter into the river from lucerne farming on the riverbanks and may be detrimental to the riverine flora and fauna.

The area is largely utilised for diamond prospecting and mining by NAMDEB; the remainder of the area falls under the jurisdiction of the Ministry of Mines and Energy, which intends to maintain the security of the entire Sperrgebiet by restricting access and thereby restricting human impacts in the region. The Ministry of Mines and Energy has recently opened up 46 concessions along a 3 km wide strip of the Orange River. Environmental Assessment procedures are in place, thus minimising further impacts of all mining activities. Additionally, mining activities should be restricted, mined areas require rehabilitation, and the massive quantities of waste generated by mining should be appropriately managed.

The vegetation of the Sperrgebiet is, for the most part, pristine. The main terrestrial impacts on this area occur for 100 km along the coast and about 3 km inland from the town of Oranjemund. The intensity of mining in this area appears to have affected both shorebird numbers using the beaches and the number of breeding Damara Terns on the

coastal plains. Older mining concessions exist around Lüderitz and along the eastern margin of the area, where emergency grazing has been permitted since the 1950's.

The Sperrgebiet has the distinction of supporting more alien mammals than any other area of Namibia. Feral donkeys, European Rabbits and House Mice are among the aliens here, but ranges are restricted by the severe environment outside the winter rainfall area. Offshore stocks of the Cape Rock Lobster have been severely over-exploited in the last 30 years and may be affected by the suction

techniques of marine diamond mining currently being employed. Bank Cormorants, which forage primarily on crayfish, have recently suffered a dramatic decline which may be attributed to a drastic reduction of the crayfish stocks.

Further reading

Barnard 1998, Brown et al. 1998, Cooper et al. 1980, Harrison et al. 1997, Hockey 1982, Maggs et al. 1998, Pallet 1995, Robertson et al. 1998, Ryan 1980, Ryan et al. 1996, 1998, Simmons 1994, in prep, Simmons et al. 1998a, Simmons and Cordes submitted, Williams 1986, 1993.

	Breeding (pairs)	Total numbers
Globally near-threatened species		
‡ Bank Cormorant		5 - 8
Lesser Flamingo		310 (av) - 886 (max)
African Black Oystercatcher	20 - 50	78 (av) - 296 (max)
Damara Tern	10 - 40	35 (av) - 65 (max)
Restricted-range and biome restricted species		
Cape Francolin		Common
Ludwig's Bustard		Fairly Common
Karoo Korhaan		Common
Cape Longbilled Lark		Common
Dune Lark		Uncommon
Barlow's Lark		Common
Gray's Lark		Uncommon
Stark's Lark		Fairly Common
Blackeared Finchlark		Uncommon
Tractrac Chat		Uncommon
Karoo Chat		Common
Sicklewinged Chat		Fairly Common
Namaqua Prinia		Common
Cinnamonbreasted Warbler		Uncommon
Layard's Titbabbler		Common
Blackheaded Canary		Fairly Common
1% or more of population		
Blacknecked Grebe		250 - 300
Cape Cormorant		1 228 (av) - 6 000 (max)
Kelp Gull	Br	354 (av) - 1 433 (max)
Swift Tern		869 (av) - 4 941 (max)

‡ Species does not meet IBA threshold
max Absolute maximum

av Yearly average (max count)
Br Confirmed breeding

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Appendices

Appendix 1: Endemic and near-endemic birds of Namibia i.e. species for which Namibia holds 90 % or more of their distribution (after Brown et al. (1998), Jarvis and Robertson (1997)).

	Distribution in Namibia (000 km ²):	
	* Known	† Predicted
Hartlaub's Francolin <i>Francolinus hartlaubi</i>	34	28
Rüppell's Korhaan <i>Eupodotis rueppellii</i>	149	211
Damara Tern <i>Sterna balaenarum</i>	20	-
Rüppell's Parrot <i>Poicephalus rueppellii</i>	126	140
Violet Woodhoopoe <i>Phoeniculus damarensis</i>	36	93
Monteiro's Hornbill <i>Tockus monteiri</i>	163	250
Dune Lark <i>Certhilauda erythrochlamys</i>	23	-
Barlow's Lark <i>Certhilauda barlowi</i>	18‡	-
Gray's Lark <i>Ammomanes grayi</i>	46	-
Carp's Black Tit <i>Parus carpi</i>	94	252
Barecheeked Babbler <i>Turdoides gymnogenys</i>	76	91
Herero Chat <i>Namibornis herero</i>	29	113
Rockrunner <i>Achaetops pycnopygius</i>	58	248
Whitetailed Shrike <i>Lanioturdus torquatus</i>	155	209

* From Harrison et al. (1997)

† From Jarvis & Robertson (1997)

‡ From Ryan et al. (1998)

Appendix 2: Biome-restricted species occurring in Namibia

Namib-Karoo

Ludwig's Bustard *Neotis ludwigii*
Karoo Korhaan *Eupodotis vigorsii*
Rüppell's Korhaan *Eupodotis rueppellii*
Karoo Lark *Certhilauda albescens*
Dune Lark *Certhilauda erythrochlamys*
Red Lark *Certhilauda burra*
Sclater's Lark *Spizocorys sclateri*
Stark's Lark *Spizocorys starki*
Gray's Lark *Ammomanes grayi*
Cape Longbilled Lark *Certhilauda curvirostris*
Blackeared Finchlark *Eremopterix australis*
Southern Grey Tit *Parus afer*
Tractrac Chat *Cercomela tractrac*
Sicklewinged Chat *Cercomela sinuata*
Karoo Chat *Cercomela schlegelii*
Herero Chat *Namibornis herero*
Layard's Titbabbler *Parisoma layardi*
Karoo Eremomela *Eremomela gregalis*
Cinnamonbreasted Warbler *Euryptila subcinnamomea*
Namaqua Warbler *Phragmacia substriata*
Rufouseared Warbler *Malcorus pectoralis*
Blackheaded Canary *Serinus alario*

Bushveld-Kalahari

Redbilled Francolin *Francolinus adspersus*
Natal Francolin *Francolinus natalensis*
Hartlaub's Francolin *Francolinus hartlaubi*
Swainson's Francolin *Francolinus swainsonii*
Redcrested Korhaan *Eupodotis ruficrista*
Burchell's Sandgrouse *Pterocles burchelli*
Rüppell's Parrot *Poicephalus rueppellii*
Lilian's Lovebird *Agapornis lilianae*
Bradfield's Hornbill *Tockus bradfieldi*
Monteiro's Hornbill *Tockus monteiri*
Monotonous Lark *Certhilauda passerina*
Shortclawed Lark *Mirafraga chuana*
Blackfaced Babbler *Turdoides melanops*
Hartlaub's Babbler *Turdoides hartlaubii*
Pied Babbler *Turdoides bicolor*
Barecheeked Babbler *Turdoides gymnogenys*
Whitethroated Robin *Cossypha humeralis*
Boulder Chat *Pinarornis plumosus*
Kalahari Robin *Erythropygia paena*
Burntnecked Eremomela *Eremomela usticollis*
Barred Warbler *Calamonastes fasciolatus*
Rockrunner *Achaetops pycnopygius*
Chirping Cisticola *Cisticola pipiens*
Crimsonbreasted Shrike *Laniarius atrococcineus*
Whitetailed Shrike *Lanioturdus torquatus*
Whitecrowned Shrike *Eurocephalus anguitimens*
Burchell's Glossy Starling *Lamprotornis australis*
Longtailed Glossy Starling *Lamprotornis mevesii*
Whitebellied Sunbird *Nectarinia talatala*
Sociable Weaver *Philetairus socius*
Brownthroated Weaver *Ploceus xanthopterus*
Brown Firefinch *Lagonosticta nitidula*
Violeteared Waxbill *Uraeginthus granatinus*
Cinderella Waxbill *Estrilda thomensis*
Shafttailed Whydah *Vidua regia*

Appendix 3: Scientific names and English common and names of species mentioned in the text

Plants

Acacia erioloba Camel Thorn
Acacia hereroensis Mountain Thorn
Acacia karroo Sweet Thorn
Acacia luederitzii False Umbrella Thorn
Acacia nebrownii Water Acacia
Acacia nigrescens Knob Thorn
Acacia reficiens Red Umbrella Thorn
Acacia tortilis Umbrella Thorn
Acanthosicyos horridus !Nara
Adansonia digitata Baobab
Aloe dichotoma Quiver Tree
Baikiaea plurijuga Rhodesian Teak
Baphia massaiensis Sand Camwood
Boscia albitrunca Shepherd's Tree
Boscia foetida Smelly Shepherd's Tree
Burkea africana Wild Seringa
Catophractes alexandri Trumpet-thorn, Rattle Tree
Colophospermum mopane Mopane
Combretum collinum Weeping Bushwillow
Combretum hereroense Mouse-eared Combretum
Combretum imberbe Leadwood
Cyperus papyrus Papyrus
Dichrostachys cinerea Sickie bush

Diospyros mespiliformis Jackal Berry
Euclea pseudebenus False Ebony, Wild Ebony
Faidherbia albida Ana Tree
Ficus sycamorus Sycamore Fig
Ficus verruculosa Water Fig
Garcinia livingstonei African Mangosteen
Hyphaene petersiana Makalani Palm
Lonchocarpus capassa Apple Leaf
Myrothamnus flabellifolius Resurrection Plant
Olea europaea subsp. *africana* Wild Olive
Peltophorum africanum African Wattle
Phoenix reclinata Wild Date Palm
Pterocarpus angolensis Wild Teak
Salvadora persica Mustard Tree
Schinziophyton rautanenii Manketti
Sclerocarya birrea Marula
Stipagrostis sabulicola Dune Grass
Syzgium guineense Waterpear
Tamarix usneoides Tamarisk
Terminalia sericea Silver Terminalia
Welwitschia mirabilis Welwitschia
Ziziphus mucronata Buffalo Thorn

Birds

African Black Oystercatcher *Haematopus moquini*
African Finfoot *Podica senegalensis*
African Fish Eagle *Haliaeetus vocifer*
African Hobby Falcon *Falco cuvierii*
African Marsh Harrier *Circus ranivorus*
African Penguin *Spheniscus demersus*
African Skimmer *Rynchops flavirostris*
African Spoonbill *Platalea alba*
Arctic Tern *Sterna paradisaea*
Avocet *Recurvirostra avosetta*
Ayre's Eagle *Hieraetus ayresii*
Baillon's Crake *Porzana pusilla*
Bank Cormorant *Phalacrocorax neglectus*
Barecheeked Babbler *Turdoides gymnogenys*
Barlow's Lark *Certhilauda barlowi*
Barred Owl *Glaucidium capense*
Barred Warbler *Calamonastes fasciolatus*
Bartailed Godwit *Limosa lapponica*
Bat Hawk *Macheiramphus alcinus*
Bateleur *Terathopius ecaudatus*
Black Eagle *Aquila verreauxii*
Black Harrier *Circus maurus*
Black Stork *Ciconia nigra*
Black Tern *Chlidonias niger*
Blackbellied Korhaan *Eupodotis melanogastor*
Blackcrowned Night Heron *Nycticorax nycticorax*
Blackeared Finchlark *Eremopterix australis*
Blackfaced Babbler *Turdoides melanops*
Blackheaded Canary *Serinus alario*
Blacknecked Grebe *Podiceps nigricollis*
Blackwinged Pratincole *Glareola nordmanni*
Blackwinged Stilt *Himantopus himantopus*
Blue Crane *Anthropoides paradiseus*
Booted Eagle *Hieraetus pennatus*

Bradfield's Hornbill *Tockus bradfieldi*
Bradfield's Swift *Apus bradfieldi*
Broadbilled Sandpiper *Limicola falcinellus*
Brown Firefinch *Lagonosticta nitidula*
Burchell's Courser *Cursorius rufus*
Burchell's Sandgrouse *Pterocles burchelli*
Burchell's Glossy Starling *Lamprolornis australis*
Burntnecked Eremomela *Eremomela usticollis*
Cape Cormorant *Phalacrocorax capensis*
Cape Eagle Owl *Bubo capensis*
Cape Francolin *Francolinus capensis*
Cape Gannet *Morus capensis*
Cape Parrot *Poicephalus robustus*
Cape Penduline Tit *Anthoscopus minutus*
Cape Teal *Anas capensis*
Cape Vulture *Gyps coprotheres*
Cape White-Eye *Zosterops pallidus*
Carp's Black Tit *Parus carpi*
Caspian Plover *Charadrius asiaticus*
Caspian Tern *Hydroprogne caspia*
Chestnut Weaver *Ploceus rubiginosus*
Chestnutbanded Plover *Charadrius pallidus*
Chirping Cisticola *Cisticola pipiens*
Cinderella Waxbill *Estrilda thomensis*
Cinnamonbreasted Warbler *Euryptila subcinnamomea*
Collared Flycatcher *Ficedula albicollis*
Common Tern *Sterna hirundo*
Crimsonbreasted Shrike *Laniarius atrococcineus*
Crowned Cormorant *Phalacrocorax coronatus*
Cuckoo Hawk *Aviceda cuculoides*
Curlew Sandpiper *Calidris ferruginea*
Dabchick *Tachybaptus ruficollis*
Damara Tern *Sterna balaenarum*
Darter *Anhinga melanogaster*

Dickinson's Kestrel *Falco dickinsoni*
 Doublebanded Courser *Smutsornis africanus*
 Doublebanded Sandgrouse *Pterocles bicinctus*
 Dune Lark *Certhilauda erythrochlamys*
 Dwarf Bittern *Ixobrychus sturmii*
 Egyptian Vulture *Neophron percnopterus*
 Emerald Cuckoo *Chrysococcyx cupreus*
 European Oystercatcher *Haematopus ostralegus*
 Franklin's Gull *Larus pipixcan*
 Fulvous Duck *Dendrocygna bicolor*
 Glossy Ibis *Plegadis falcinellus*
 Golden Weaver *Ploceus xanthops*
 Gray's Lark *Ammomanes grayi*
 Great Crested Grebe *Podiceps cristatus*
 Great Snipe *Gallinago media*
 Greater Flamingo *Phoenicopterus ruber*
 Greater Kestrel *Falco rupicoloides*
 Greater Swamp Warbler *Acrocephalus rufescens*
 Grey Kestrel *Falco ardosiaceus*
 Grey Plover *Pluvialis squatarola*
 Greyheaded Bush Shrike *Malaconotus blanchoti*
 Greyheaded Gull *Larus cirrocephalus*
 Greyrumped Swallow *Pseudhirundo griseopyga*
 Southern Ground Hornbill *Bucorvus leadbeateri*
 Hamerkop *Scopus umbretta*
 Hartlaub's Babbler *Turdoides hartlaubii*
 Hartlaub's Francolin *Francolinus hartlaubi*
 Hartlaub's Gull *Larus hartlaubii*
 Herero Chat *Namibornis herero*
 Jameson's Firefinch *Lagonosticta rhodopareia*
 Kalahari Robin *Erythropygia paena*
 Karoo Chat *Cercomela schlegelii*
 Karoo Eremomela *Eremomela gregalis*
 Karoo Korhaan *Eupodotis vigorsii*
 Kelp Gull *Larus dominicanus*
 Knot *Calidris canutus*
 Kori Bustard *Ardeotis kori*
 Lanner Falcon *Falco biarmicus*
 Lappetfaced Vulture *Torgos tracheliotus*
 Layard's Titbabbler *Parisoma layardi*
 Lesser Flamingo *Phoeniconaias minor*
 Lesser Jacana *Microparra capensis*
 Lesser Kestrel *Falco naumanni*
 Lesser Moorhen *Gallinula angulata*
 Lesser Spotted Eagle *Aquila pomarina*
 Little Egret *Egretta garzetta*
 Little Stint *Calidris minuta*
 Longtailed Shrike *Corvinella melanoleuca*
 Longtailed Glossy Starling *Lamprotornis mevesii*
 Longtoed Plover *Vanellus crassirostris*
 Ludwig's Bustard *Neotis ludwigii*
 Marabou Stork *Leptoptilos crumeniferus*
 Marico Flycatcher *Melaenornis mariquensis*
 Martial Eagle *Polemaetus bellicosus*
 Meyer's Parrot *Poicephalus meyeri*
 Monotonous Lark *Certhilauda passerina*
 Montagu's Harrier *Circus pygargus*
 Monteiro's Hornbill *Tockus monteiri*
 Namaqua Sandgrouse *Pterocles namaqua*
 Namaqua Warbler *Phragmacia substriata*
 Openbilled Stork *Anastomus lamelligerus*
 Osprey *Pandion haliaetus*
 Painted Snipe *Rostratula benghalensis*
 Pale Chanting Goshawk *Melierax canorus*
 Pallid Harrier *Circus macrourus*
 Palmnut Vulture *Gypohierax angolensis*
 Pel's Fishing Owl *Scotopelia peli*
 Peregrine Falcon *Falco peregrinus*
 Pied Babbler *Turdoides bicolor*
 Pinkbacked Pelican *Pelecanus rufescens*
 Pinkthroated Longclaw *Macronyx ameliae*
 Pririt Batis *Batis pririt*
 Purple Gallinule *Porphyrio porphyrio*
 Pygmy Falcon *Polihierax semitorquatus*
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 Pygmy Kingfisher *Ispidina picta*
 Redbilled Francolin *Francolinus adspersus*
 Redbilled Teal *Anas erythrorhyncha*
 Redbilled Woodhoopoe *Phoeniculus purpureus*
 Redcrested Korhaan *Eupodotis ruficrista*
 Redknobbed Coot *Fulica cristata*
 Rednecked Falcon *Falco chicquera*
 Rednecked Francolin *Francolinus afer*
 Redshank *Tringa totanus*
 Redwinged Pratincole *Glareola pratincola*
 Ringed Plover *Charadrius hiaticula*
 Rock Kestrel *Falco tinnunculus*
 Rock Pratincole *Glareola nuchalis*
 Rockrunner *Achaetops pycnopygius*
 Rosy-faced Lovebird *Agapornis roseicollis*
 Royal Tern *Sterna maxima*
 Ruff *Philomachus pugnax*
 Rufousbellied Heron *Butorides rufiventris*
 Rufousbellied Tit *Parus rufiventris*
 Rufouseared Warbler *Malcorus pectoralis*
 Rufoustailed Palm Thrush *Cichladusa ruficauda*
 Rüppell's Korhaan *Eupodotis rueppellii*
 Rüppell's Parrot *Poicephalus rueppellii*
 Saddlebilled Stork *Ephippiorhynchus senegalensis*
 Sand Plover *Charadrius leschenaultii*
 Sanderling *Calidris alba*
 Sandwich Tern *Sterna sandvicensis*
 Scalyfeathered Finch *Sporopipes squamifrons*
 Sclater's Lark *Spizocorys sclateri*
 Secretarybird *Sagittarius serpentarius*
 Shafttailed Whydah *Vidua regia*
 Sharptailed Glossy Starling *Lamprotornis acuticaudus*
 Shorttoed Rock Thrush *Monticola brevipes*
 Sicklewinged Chat *Cercomela sinuata*
 Slaty Egret *Egretta vinaceigula*
 Sociable Weaver *Philetairus socius*
 Southern Black Tit *Parus niger*
 Southern Grey Tit *Parus afer*
 Southern Pochard *Netta erythrophthalma*
 Stark's Lark *Spizocorys starki*
 Steppe Eagle *Aquila nipalensis*
 Striped Crake *Aenigmatolimnas marginalis*
 Swamp Boubou *Laniarius bicolor*
 Swift Tern *Sterna bergii*
 Tawny Eagle *Aquila rapax*
 Temminck's Courser *Cursorius temminckii*
 Tractrac Chat *Cercomela tractrac*
 Turnstone *Arenaria interpres*
 Violet Woodhoopoe *Phoeniculus damarensis*
 Violeteared Waxbill *Uraeginthus granatinus*
 Wattled Crane *Bugeranus carunculatus*
 Western Banded Snake Eagle *Circaetus cinerascens*
 Whimbrel *Numenius phaeopus*

Whiskered Tern *Chlidonias hybridus*
White Pelican *Pelecanus onocrotalus*
Whitebacked Duck *Thalassornis leuconotus*
Whitebacked Night Heron *Gorsachius leuconotus*
Whitebacked Vulture *Gyps africanus*
Whitebellied Sunbird *Nectarinia talatala*
Whitebreasted Cormorant *Phalacrocorax carbo*
Whitecrowned Plover *Vanellus albiceps*
Whitecrowned Shrike *Eurocephalus anguitemens*
Whitefaced Duck *Dendrocygna viduata*

Mammals

Aardwolf *Proteles cristatus*
Bat-eared Fox *Otocyon megalotis*
Black Rhinoceros *Diceros bicornis*
Blackbacked Jackal *Canis mesomelis*
Blackfaced Impala *Aepyceros melampus petersi*
Blackfooted Cat *Felis nigripes*
Bottlenosed Dolphin *Tursiops truncatus*
Brown Hyaena *Hyaena brunnea*
Cape Clawless Otter *Aonyx capensis*
Cape Fox *Vulpes chacma*
Cape Fur Seal *Arctocephalus pusilla*
Cheetah *Acinonyx jubatus*
Damara Dik-Dik *Madoqua kirkii*
Desert Golden Mole *Eremitalpa granti*
Dusky Dolphin *Lagenorhynchus obscurus*
Elephant *Loxodonta africana*
Gemsbok *Oryx gazella*
Hairy-footed Gerbil *Gerbillarum tytonis*
Hartmann's Mountain Zebra *Equus zebra hartmannae*,
Heaviside's Dolphin *Cephalorhynchus heavisidii*
Humpback Whale *Megaptera novaeangliae*
Killer Whale *Orcinus orca*
Leopard *Panthera pardus*

Reptiles

Cape Wolf Snake *Lycophidion capense*
Cunene Racer *Coluber* sp
Dwarf Mountain Adder *Bitis xeropaga*
Dwarf Python *Python anchietae*
Etosha Agama *Agama etoshae*
Green Turtle *Chelonia mydas*
Kalahari Star Tortoise *Psammabates oculipes*
Leatherback Turtle
Leopard Tortoise *Leochelone pardalis*

Amphibians

Desert Rain Frog *Breviceps macrops*
Mpacha Grass Frog *Ptychadena mpacha*
Namaqua Rain Frog *Breviceps namaquensis*

Fish

Striped Killifish *Nothobranchius* sp

Molluscs

River Oyster *Etheria elliptica*

Whitefronted Plover *Charadrius marginatus*
Whiteheaded Vulture *Trigonoceps occipitalis*
Whitetailed Shrike *Lanioturdus torquatus*
Whitewinged Tern *Chlidonias leucopterus*
Wood Owl *Strix woodfordii*
Wood Sandpiper *Tringa glareola*
Yellowthroated Sandgrouse *Pterocles gutturalis*

Lion *Panthera leo*
Minke Whale *Balaenoptera acutorostrata*
Namaqua Dune Molerat *Bathyergus janetta*
Oribi *Ourebia ourebi*
Puku *Kobus vardonii*
Pygmy Right Whale *Caperea marginata*
Pygmy Sperm Whale *Kogia breviceps*
Red Lechwe *Kobus leche*
Roan Antelope *Hippotragus equinus*.
Sable Antelope *Hippotragus niger*
Shortridge's Mouse *Mastomys shortridgei*
Sitatunga *Tragelaphus spekei*
Southern Bottlenosed Whale *Hyperoodon planifrons*
Southern Right Whale *Balaena glacialis*
Spotted Hyaena *Crocuta crocuta*
Spotted Necked Otter *Lutra macucollis*
Springbok *Antidorcas marsupialis*
Tsessebe *Damiliscus lunatus*
Waterbuck *Kobus ellipsiprymnus*
Wild Cat *Felis lybica*
Wild Dog *Lycaon pictus*

Nama Padloper *Homopus* sp
Namaqua Dwarf Adder *Bitis schneideri*
Nile Crocodile *Crocodilus niloticus*
Nile Soft-Shelled Terrapin *Trionyx triunguis*
Rock Python *Python sebae*
Sidewinder Adder *Bitis peringueyi*

Namaqualand Frog *Strongylopus springbokensis*
Spotted Rubber Frog *Phrynomantis affinis*
Paradise Toad *Bufo* sp

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