CHAPTER 8

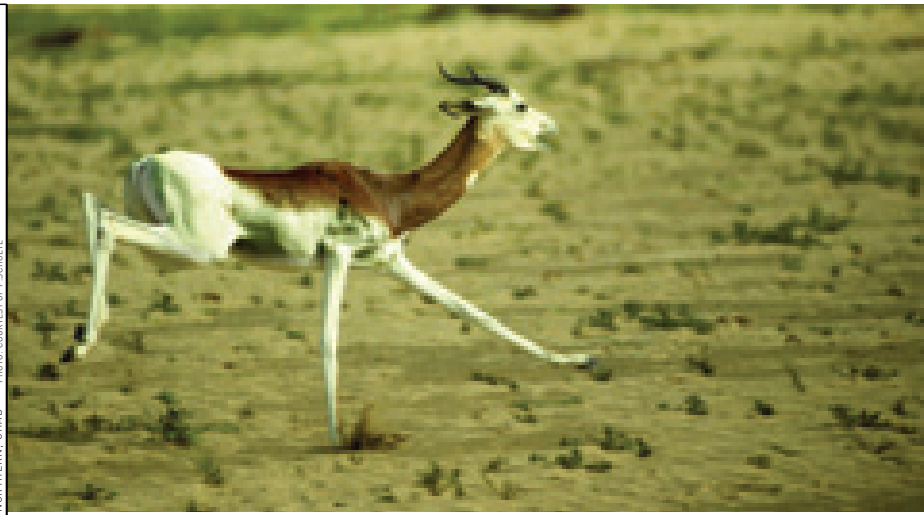
WILDLIFE

"When two elephants fight, the grasses carry the wounds."

[African proverb]

8 WILDLIFE

by
Paul Scholte[1],
Wim C. Mullié[2],
the **authors**
and **Douglas Williamson**[3]



NORTHERN, CHAD PHOTO: COURTESY OF P. SCHOLTE

LAKE CHAD IS STILL AN INTERNATIONAL STRONGHOLD FOR WILDLIFE, YET ANTELOPES SUCH AS THE DAMA GAZELLE ARE THREATENED WITH EXTINCTION BY HUNTING AND COMPETITION WITH LIVESTOCK

INTRODUCTION

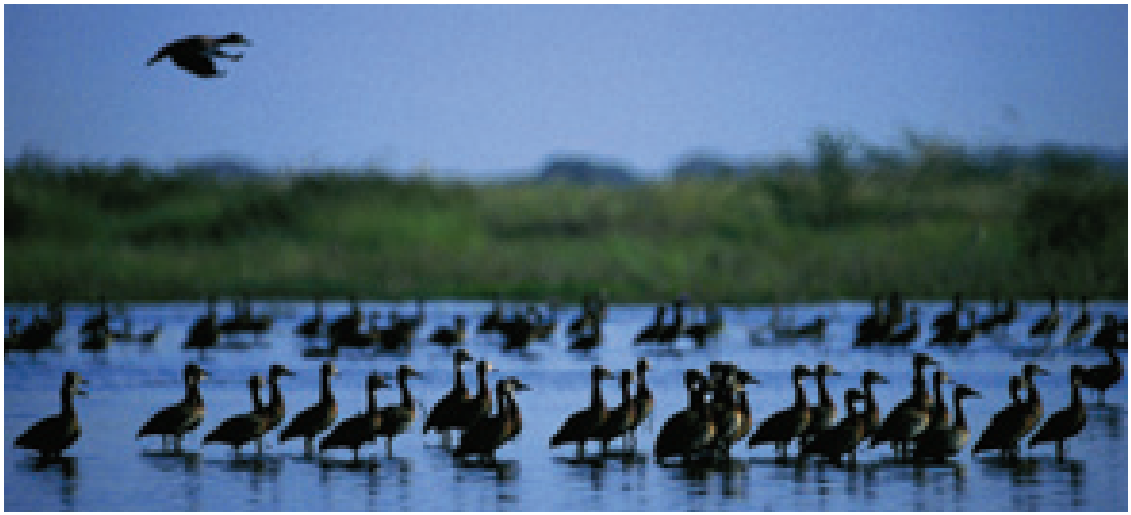
"When one recalled the large number of antelopes which the traveller encounters on all sides in the regions of Bornu, even in the neighbourhood of inhabited places, the difference was astonishing." The German explorer Nachtigal, who spent several years travelling in the Lake Chad Basin, made this remark while passing through the Sudan in 1874 [8.1]. Even at the beginning of the twenty-first century, the Lake Chad Basin remains an international stronghold for wildlife, particularly antelopes, such as the addax (*Addax nasomaculatus*) and dama gazelle (*Nanger dama*) in the Sahel and the korrigum (*Damaliscus lunatus korrigum*) and red-fronted gazelle (*Gazella rufifrons*) in the savannahs [8.2], as well as the black-crowned crane (*Balearica pavonina*) and a variety of other waterbirds in the basin's wetlands [8.3], [8.4]. The basin also harbours tourist attractions such as the elephant (*Loxodonta africana*), giraffe (*Giraffa camelopardalis*) and lion (*Panthera leo*) [8.5]. The basin's wetlands – Lake Chad, Lake Fitri, floodplains and dispersed ephemeral depressions – are the pillars underlying the ecology of the Lake Chad Basin and explain much of the variety and abundance of its wildlife and its spatial and temporal distribution.

Local communities in the Lake Chad Basin have always exploited wildlife, as evidenced by the abundance of hunting scenes in centuries-old rock paintings. With a generally low population pressure this exploitation has taken place on a more or less sustainable level. However, there has also been excessive hunting, which has led to the extinction of species such as the western black rhino (*Diceros bicornis longipes*), which roamed most of the basin until the early twentieth century. Elephants were almost driven to extinction at the end of the nineteenth century because of the rising demand for ivory in Europe and the United States. However, they recovered remarkably well in the second part of the

1 Ecologist and Wildlife expert, until 2000 Education and Conservation Professor in Cameroon at the "Ecole pour la formation des spécialistes de la faune" and presently Visiting Scientist and Consultant at the Center of Environmental Science of Leiden.

2 Chief Technical Advisor of CERES - Locustox Foundation - Senegal, FAO Locustox Project GCP/SEN/053/NET.

3 Forestry Officer (Wildlife and Protected Area Management), FORC,FAO.



NEAR GUITTE (NDJAMENA), CHAD

BIRD POPULATIONS ARE UNDER PRESSURE FROM THE INTENSIFICATION OF FISHERIES, GRAZING AND AGRICULTURE IN WETLANDS

twentieth century, when protected areas were created and effectively managed, receiving an influx of elephants from other places. With the increasing population pressure during the twentieth century, exploitation of the wildlife outside protected areas has steadily intensified. The instability experienced during the last few decades, especially in Chad and the Niger, triggered a collapse of wildlife populations both in and outside protected areas, threatening the survival of a dryland fauna that could be found nowhere else. International recognition for the area's outstanding wildlife has long been wanting but recently a series of wildlife conservation activities has been initiated throughout the basin.

In this chapter we present the main wildlife assets of the Lake Chad Basin and discuss their importance for conservation as well as for other wise-use purposes. This review of experiences from the basin may guide future directions in wildlife management.

NORTH CAMEROON

PHOTO: COURTESY OF P.SCHOLTE

SKINNING OF AN "ILLEGALLY" HUNTED MONITOR LIZARD: MANAGEMENT STARTS BY GIVING PEOPLE OFFICIAL USER RIGHTS

WAZA NATIONAL PARK, CAMEROON

WILD HERBIVORES MIGRATE OVER LONG DISTANCES IN SEARCH OF GOOD–QUALITY GRASSLANDS. NOMADS OFTEN FOLLOW THE SAME MIGRATION PATTERNS WITH THEIR LIVESTOCK

LARGE MAMMALS

SAHELIAN FAUNA

Although grasslands in the sandy northern part of the Lake Chad Basin generally have a low biomass, they have a high nutritional value. This explains why nomads make such an enormous effort to migrate into these areas each rainy season with their herds of cattle, intensively exploiting the short and young grasslands for a few weeks only. Lack of water and a rapidly diminishing stock of grass oblige the herders to move back to the south at the start of the dry season, when they migrate either into the grasslands of the lakes and floodplains or further south into the Sahelo–Sudanian savannahs. This migration pattern is not unique to pastoralists but, until recently, was also followed by the scimitar oryx (*Oryx dammah*), addax, dama gazelle, dorcas gazelle, red-fronted gazelle and korrigum. These species have suffered from the increasing grazing pressure on the northern grasslands and the fragmentation of the southern fringe of the Sahel by millet cultivation, which have blocked their migration routes into the wetlands and savannahs. Armed militia and rebels have further reduced the herds, which once numbered thousands of animals. Present populations, of scattered individuals only, are confined to either the northern Sahel (the addax and the dama and dorcas gazelles) or to the savannahs and floodplains further south (korrigum and red-fronted gazelle). With the exception of the oryx, which has been driven into extinction, their populations in the Lake Chad Basin represent the world's last remaining individuals; all feature on the Red List of Threatened Animals compiled by the World Conservation Union (IUCN).

TABLE 21 **SIMPLIFIED HYDROSERE OF LAKE CHAD WETLANDS**

WATER LEVELS	Water depth (m)	Flood duration (months)	Plant life Common name	Plant life Scientific name	Characteristic animal life
OPEN WATER without vegetation	>3				Hippopotamus, otters, ducks, storks
DEEP	3–5	>6	Water lily	*Nymphaea* spp.	Jacana
	3	<6	Acacia forest	*Acacia nilotica* *Mitragyna inermis*	Breeding colonies of egrets, storks
FLOODING	1–3	4–5	*Bourgou*	*Vossia cuspidata* *Echinochloa stagnina*	**Wet season:** Sitatunga herons, egrets, ducks
	0.2-0.7	3–4	Wild rice *Kreb*	*Oryza longistaminata* *Echinochloa pyramidalis*	**Dry season:** Kob, reedbuck, waterbuck, pratincole, ruff, black-crowned crane, ducks
SHALLOW	0.2–0.5	2–3	Vetiver	*Vetiveria nigritana*	
	<0.4	1	Wild sorghum	*Sorghum arundinaceum*	Elephants Weaver birds
	<0.2	<1	*Kreb*	*Echinochloa colona* *Panicum laetum*	Variety of birds, including black-crowned crane and quelea
DRY LAND					

Source: P. Scholte, 2003

WETLAND FAUNA

Wetlands provide high-quality forage when surrounding grasslands have dried out. The productivity of these inundated grasslands is particularly high because of the availability of soil moisture throughout the year, combined with some of the richest soils on the African continent. Wetlands vary, from the vast Lake Chad to the relatively small lakes Fitri and Iro, also called "mini-Chads", in central and southeastern Chad respectively. Lakes Fitri and Iro fill up quickly during the rainy season but are reduced to small tracts of open water during the dry season. Because of their relatively small size, they provide little refuge for wildlife during droughts; this, for example, led to the extinction of the hippopotamus in Lake Fitri in 1913. Floodplains along the Chari and its tributaries, the Logone and the Komadugu, resemble these smaller lakes in many ways but are even more sensitive to human pressures. Neglected until recently by many researchers are the smaller floodplains and depressions, which are dispersed over virtually the entire basin and contain water only during the rainy season [8.6] [8.7].

Wetlands in the Lake Chad Basin have a characteristic sequence of plant species (hydrosere) that is related to maximum water depth and duration of flooding (Table 21).

Two species of otter (*Lutra maculicollis*, *Aonyx capensis*) as well as hippopotamuses (*Hippopotamus amphibius*) are found in the surface waters of the Lake Chad Basin. However, although

BLANGOUA VILLAGE (KOUSSERI), CAMEROON

DELTA OF CHARI RIVER, CHAD

HIPPOPOTAMUSES IN THE LAKE CHAD BASIN HAVE ADAPTED TO THE PRESENCE OF HUMANS

<< LEFT: THE HEAD OF THIS DEAD HIPPOPOTAMUS HAS BEEN CONFISCATED BY LOCAL AUTHORITIES TO PREVENT ILLEGAL TRADE OF IVORY

these species have adapted to the presence of humans, their numbers, especially of the hippotamus, have fallen sharply. The sitatunga (*Tragelaphus spekei*), an antelope with elongated hoofs well adapted to muddy soil, can nowadays only be found in reed beds and papyrus swamps, where human access is difficult. The kob (*Kobus kob*) is the most abundant antelope species in the wetlands of the Lake Chad Basin. Although less adapted to wetlands than the sitatunga, it is strongly dependent on the nutritious *bourgou* vegetation. During the dry season, an estimated 25 000 kob could be seen in the Waza–Logone floodplain. However, the construction of an upstream dam and the subsequent drying of the floodplain, exacerbated by the droughts of the 1970s and 1980s, have left a mere 5 000 individuals. Increased pressure on the lake habitat has reduced populations of other species, including the African elephant, which is now mostly confined to the national parks situated in the Sahelo–Sudanian savannah.

WAZA NATIONAL PARK, CAMEROON

PHOTO: COURTESY OF P SCHOLTE

ELEPHANT FEEDING ON *ACACIA SEYAL*

SAHELO–SUDANIAN SAVANNAH FAUNA

In contrast to the Sahelian grasslands, there is a high grass biomass in the Sahelo–Sudanian savannah further south, but this is only of low quality. Leaves of trees and shrubs, such as the common *Acacia sieberiana*, *A. seyal* and *Balanites aegyptiaca* (see Chapter 5) have a considerably higher nutrient quality and are intensively browsed by giraffes and elephants. The clayey soils, where water forms ponds for a few weeks each year during the rainy season, support a vegetation characteristic of the drier parts of the wetlands (Table 21). Grass biomass is sufficiently high to allow for bushfires, which trigger the regrowth of nutritious grasses in humid places early in the dry season. Later in the dry season, regrowth occurs only in wetlands.

The characteristic large mammal community of the savannah includes the giraffe, elephant, lion, African buffalo (*Syncerus caffer*) and a variety of antelopes, such as roan (*Hippotragus equinus*), korrigum, red-fronted gazelle and kob. The density of this wildlife, which is mostly confined to national parks such as Waza and Zakouma, exceeds those of surrounding countries. This is probably because of the basin's rich soils and its variety of habitats, which include wetlands (dry season) and upland and sandy areas (rainy season), thus allowing a short-range migration.

Elephants in the Lake Chad Basin once occupied all habitats except the driest Sahelian grasslands, but are becoming increasingly confined to the Sahelo–Sudanian savannah. Although elephants consume large quantities of water and vegetation, competition with livestock is generally non-existent. Nevertheless, local communities around all the protected areas in the Lake Chad Basin complain that elephants cause severe damage to agricultural land, and there are serious conflicts between the laws protecting the elephants and the people who live in the region.

KALAMALOUÉ NATIONAL PARK, CAMEROON

NEAR DIFFA, THE NIGER

OVER 500 SPECIES OF BIRDS HAVE BEEN RECORDED IN THE LAKE CHAD BASIN

BIRDS: THE LINK BETWEEN WETLANDS

The number of bird species recorded from Chad, fairly representative for the basin, is 532, including 354 residents and 155 migrants, of which 117 are Palaearctic in origin. With 379 bird species, Waza–Logone (Cameroon) is probably the most varied area in the basin, if not the best studied ornithologically [8.8]. The Sahelian grassland birdlife is spectacular, with bustards (*Ardeotis arabs*, *Neotis denhami* and *N. nuba*, *Eupodotis senegalensis* and *Lophotes savilei*) still commonly present; only the ostrich (*Struthio camelus*) is now limited to protected areas such as Waza and Zakouma. Waterbirds, discussed below, are among the most spectacular creatures in the Lake Chad Basin. The sight of hundreds of pelicans, marabous, storks and egrets gathered in a depression when the floodplain dries up, feasting on stranded fish, is unforgettable.

From aerial surveys we know that, at least until the early 1980s, the Lake Chad Basin held internationally important populations of waterbirds [8.9]. However, it was not until the mid- to late 1990s that new aerial censuses were undertaken [8.4]. These revealed high numbers of waterbirds at Lake Fitri (almost 300 000) and on the lower Logone and Chari floodplains and Lake Chad (each more than 100 000) (see Table 22). To these figures can be added the almost 300 000 waterbirds counted on ephemeral wetlands in the Niger during the same period [8.4], although two or even three times this number can be expected [8.7]. It has become increasingly evident that the Lake Chad Basin harbours a substantial proportion of the world population of the black-crowned crane (*Balearica pavonina pavonina*), black heron (*Egretta ardesiaca*) and several species of

TABLE 22 **PRINCIPAL WATERFOWL AREAS IN THE LAKE CHAD BASIN***

Scientific name	Common name	Status**	Area	Country	Numbers
Phalacrocorax africanus	Long-tailed (reed) cormorant	R	Lower Chari Lake Fitri Logone floodplains Lake Chad	Cameroon Chad Chad Niger	1 294 3 013 9 687 1 725
Casmerodius albus	Great egret	R	Lake Fitri	Chad	3 626
Egretta ardesiaca	Black egret	R?	Waza–Logone Logone floodplains	Cameroon Chad	1 189 7 068
Egretta garzetta	Little egret	R, PM	Hadejia–Nguru	Nigeria	6 177
Bubulcus ibis	Cattle egret	R	Hadejia–Nguru	Nigeria	53 775
Ardeola ralloides	Squacco heron	PM	Waza–Logone Lake Fitri Logone floodplains	Cameroon Chad Chad	3 000 3 060 14 368
Mycteria ibis	Yellow-billed stork	R	Lake Chad	Niger	2 152
Leptoptilos crumeniferus	Marabou	R	Lake Chad	Niger	3 021
Platalea alba	African spoonbill	R	Lake Chad	Niger	2 475
Dendrocygna bicolor	Fulvous tree duck	R	Lake Fitri Logone floodplains	Chad Chad	5 469 1 518
Dendrocygna viduata	White-faced whistling duck	R	Waza–Logone Lower Chari Kalamaloué Lake Chad Lake Fitri Lower Chari Logone floodplains Hadejia–Nguru	Cameroon Cameroon Cameroon Chad Chad Chad Chad Nigeria	4 987 14 148 6 113 74 044 95 238 4 003 24 645 21 328
Plectropterus gambensis	Spur-winged goose	R	Waza–Logone Lake Fitri Hadejia–Nguru	Cameroon Chad Nigeria	4 442 2 195 1 917
Sarkidiornis melanotos	Knob-billed duck	R	Lake Chad Lake Fitri Logone floodplains	Chad Chad Chad	5 025 8 295 1 295
Nettapus auritus	Pygmy goose	R?	Waza-Logone	Cameroon	102
Anas acuta	Pintail	PM	Lower Chari Lake Fitri	Cameroon Chad	24 730 36 865
Anas querquedula	Garganey	PM	Lower Chari Lake Fitri Hadejia–Nguru	Cameroon Chad Nigeria	173 080 97 332 34 106
Anas clypeata	Shoveler	PM	Lake Chad	Niger	11 300
Aythya nyroca	Ferruginous duck	PM	Lake Fitri	Chad	3 800
Grus virgo	Demoiselle crane	PM	Logone floodplains	Chad	24
Balearica pavonina	Black-crowned crane	R	Waza–Logone Lake Chad Lake Fitri Lower Chari	Cameroon Chad Chad Chad	1 704 261 441 228
Vanellus spinosus	Spur-winged plover	R	Lake Chad	Niger	4 095
Limosa limosa	Black-tailed godwit	PM	Lake Chad Lower Chari Logone floodplains Hadejia-Nguru	Cameroon Cameroon Chad Nigeria	8 770 13 226 1 500 7 473
Philomachus pugnax	Ruff	PM	Logone floodplains Lake Chad	Chad Nigeria	33 754 200 052
Rhynchops flavirostris	Skimmer	R	Upper Chari	Chad	225
Larus cirrocephalus	Grey-headed gull	R	Logone floodplains Lake Chad	Chad Niger	848 4 870
Chlidonias hybridus	Whiskered tern	PM	Logone floodplains	Chad	622
Gelochelidon nilotica	Gull-billed tern	PM	Lake Chad	Niger	426
Glareola pratincola	Red-winged (collared) pratincole	R?, PM	Waza–Logone Logone floodplains	Cameroon Chad	1 888 9 692

* areas supporting more than 1 percent of known populations in 1999–2001

** R = Resident; PM = Palaearctic migrant

Source: after the approach of T. Dodman & C.H. Diagana, 2003 [8.4]

LOGONE FLOODPLAIN, CAMEROON

PHOTO: COURTESY OF P.SCHOLTE

THE FISH-EATING YELLOW-BILLED STORK IS A COMMON RESIDENT IN CHAD, AND IS SOMETIMES CONSIDERED A PEST BY FISHERMEN

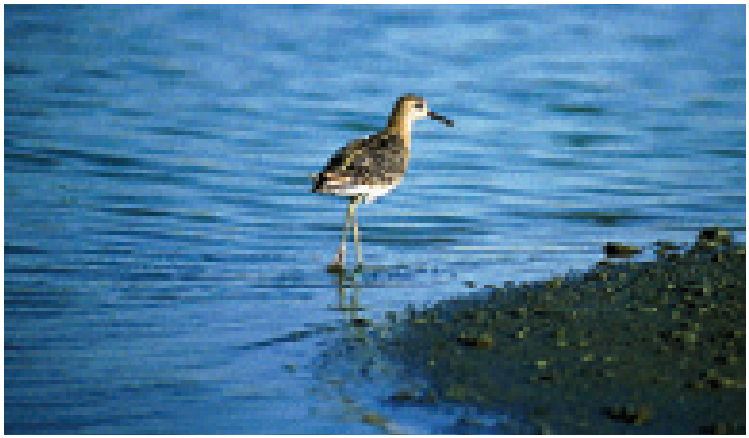
duck (e.g. *Dendrocygna viduata*, *Plectropterus gambensis* and *Sarkidiornis melanotos*) (Table 22). The Lake Chad Basin is also an important wintering ground for several western European bird species, such as the white stork (*Ciconia ciconia*) [8.10] and little egret (*Egretta garzetta*).

The numbers given in Table 22 are based on single counts from the early dry season and do not reflect the dynamics of birds moving between the various wetlands in the Lake Chad Basin. (The fluctuating Lake Chad reaches its maximum water level late in the dry season, when all surrounding areas, including the floodplains, are drying up.) Neither do these dry-season counts show the importance of the ephemeral wetlands that contain water earlier in the dry season [8.7].

By speculating on this link, we can deduce the following sequence, based on waterbird observations throughout the basin during most periods of the year. During the rainy season from June to September, hundreds of small, mostly ephemeral wetlands, dispersed over the Lake Chad Basin, harbour large numbers of Afro-tropical waterbirds (ducks, waders), many of which breed at this time of the year. A few weeks later, after the end of the rainy season, a proportion of these birds moves into the floodplains along the Chari, Logone and Komadugu–Yobé rivers, which dry up only in the early to mid–dry season (December–February). European migratory birds, such as the white stork, egrets, ducks, waders such as the ruff (*Philomachus pugnax*), and others join the Afro-tropical birds. Later in the dry season, birds are expected to move into the Lake

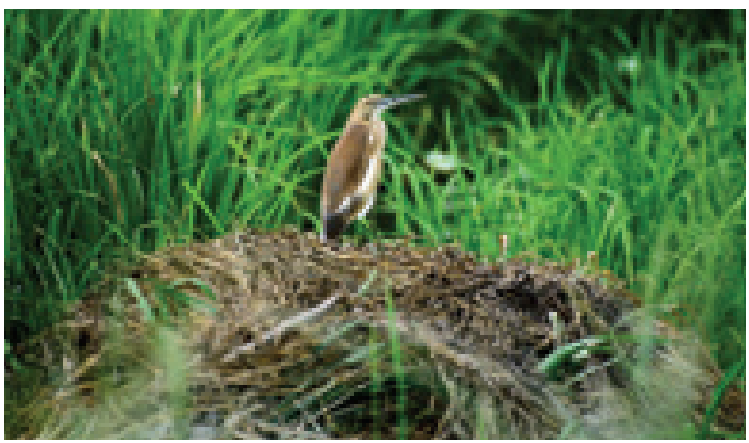
Chad area, which has by then reached its maximum level, before migrating back to Eurasia, whereas Afro-tropical waterbirds will rest there until the onset of the rains. Species such as the garganey (*Anas querquedula*) and black-winged stilt (*Himantopus himantopus*) seem to prefer ephemeral wetlands, whereas the white-faced whistling duck (*Dendrocygna viduata*) has a preference for the larger lakes, including Lake Chad, and riverine habitats.

Bird populations are under pressure from the intensifying use of the wetlands in the Lake Chad Basin. As mentioned above, the construction of an upstream dam in the Logone floodplain has resulted in a loss of more than half the population of the threatened West African subspecies of black-crowned crane, as well as a reduction in the wintering grounds for intercontinental migrants. On a wider scale, the intensification of fisheries, grazing and agriculture is putting further pressure on the basin's wetlands. A relatively new phenomenon is the capture of birds for commercial purposes or consumption, which especially threatens vulnerable breeding colonies.



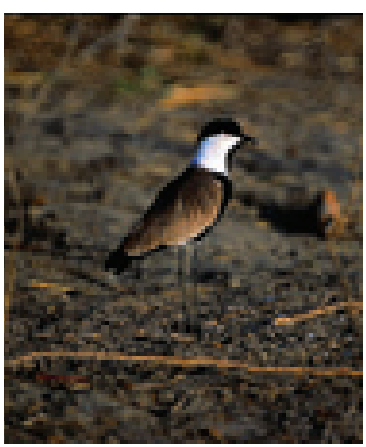
NEAR LELEWA VILLAGE (N'GUIGMI), THE NIGER

RUFF, THE MOST ABUNDANT WADER IN THE LAKE CHAD BASIN



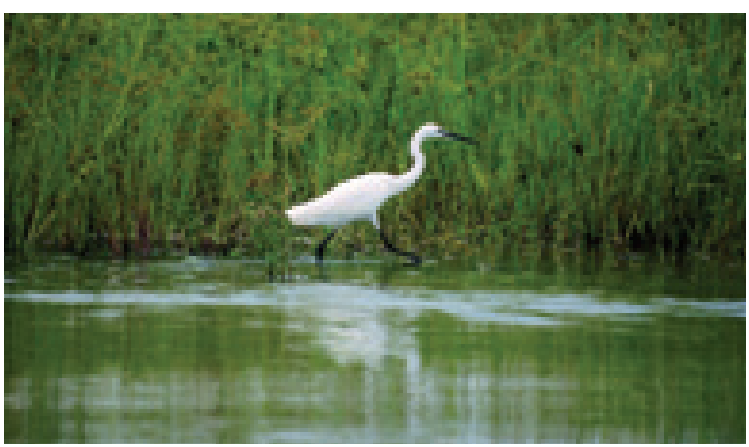
NEAR MALAM FATORI, NIGERIA

SQUACCO HERON



NEAR BOL, CHAD

SPUR-WINGED PLOVER



NEAR MALAM FATORI, NIGERIA

LITTLE EGRET

Lake Chad Basin: an international meeting point for wildlife

The Lake Chad Basin occupies a special biogeographic position in the otherwise monotonous Sahelian region from Senegal to the Sudan. At times in history, the expanding and shrinking lake has resulted in the isolation of Sahelian animal populations, which explains why the distribution of some subspecies is limited to the basin, for example, the korrigum (*Damaliscus lunatus korrigum* cf. *D. l. tiang*) and black-crowned crane (*Balearica pavonina pavonina* cf. *B. p. ceciliae*). In some species, the isolation has led to the evolution of distinct subspecies, such as the Kanuri red-fronted gazelle (*Gazella rufifrons kanuri*) [8.11].

On the other hand, many migratory birds travel long distances to reach the Basin. Satellite-tracked white storks (*Ciconia ciconia*) from Germany, Poland and Israel, followed on their migration through the Nile Valley, subsequently turned west deep into Chad, possibly following grasshoppers [8.10], [8.12]. In the Lake Chad Basin, these eastern European white storks meet their western European counterparts, showing that the previous distinction between populations arose because earlier researchers had neglected to consider the Lake Chad Basin. It is probable that other migratory birds common in the basin, such as the great white pelican (*Pelecanus onocrotalus*) [8.13] and purple heron (*Ardea purpurea*), may also have a more mixed origin, further highlighting the importance of the basin for European birds.

LOGONE FLOODPLAIN, CAMEROON

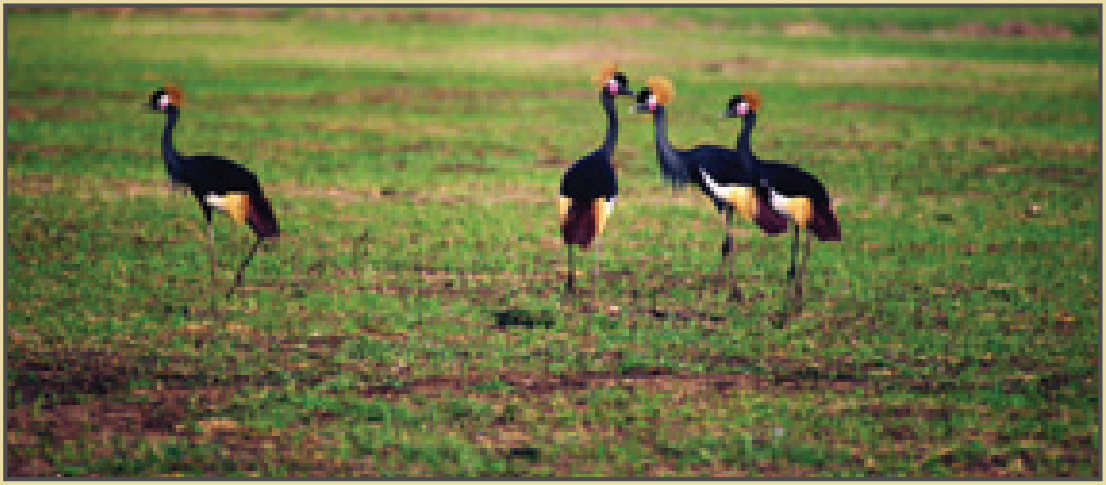


PHOTO: COURTESY OF P. SCHOLTE

BLACK-CROWNED CRANE

OPEN LAKE, CHAD

WHITE PELICAN

WAZA NATIONAL PARK, CAMEROON

SINCE 2000, VIRTUALLY THE WHOLE OF LAKE CHAD HAS BEEN PROCLAIMED A TRANSBOUNDARY RAMSAR SITE OF INTERNATIONAL IMPORTANCE

PROTECTED AREAS

Formal protection in the Lake Chad Basin started in 1936 with the creation of the Zina–Waza Hunting Reserve (Cameroon), which was designated a national park in 1968. From the 1960s onwards, there has been a steady movement to create protected areas in the Central African Republic, Chad and Nigeria, based mostly on the presence of spectacular wildlife, such as elephants, giraffes and large antelopes (Table 23). Since 2000, virtually the whole of Lake Chad has been proclaimed a transboundary Ramsar[1] site of international importance, following a declaration by the Lake Chad Basin Commission (LCBC). The area thus formally protected has reached a size of over 6 million ha, equivalent to about 6 percent of the area of the conventional basin (Table 23). Apart from the Ramsar site on its Lake Chad shores, no formally protected areas are found in the Niger region of the Lake Chad Basin.

Protected areas listed in Table 23 exclude forest and faunal reserves that have never had any management structure and that are true "paper reserves". Nevertheless, only 13 percent of the institutionalized protected areas, mostly national parks, have a moderate or high degree of management effectiveness, implying that less than 1 percent of the Lake Chad Basin is under true protection. With the exception of the Lake Chad Basin National Park (Nigeria), these protected areas have benefited from external assistance via bilateral, multilateral or international cooperation (Table 23). It should be understood that the column entitled "Management effectiveness" in Table 23 may hide management constraints such as the present low number of park guards in

1 The Convention on Wetlands, signed in Ramsar, Islamic Republic of Iran, in 1971, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Ramsar Convention has identified a list of wetlands of international importance.

the Waza National Park (only eight of the 40 needed) which, until recently, was compensated for by ample equipment availability and especially by the improved relations with local communities.

With the designation of Ramsar sites on the Lake Chad shore, there has been a start to much-needed transboundary cooperation. For wildlife, boundaries do not exist and elephants, giraffes and korrigums frequently migrate between the Waza National Park in Cameroon and the Chingurmi–Duguma section of the Lake Chad Basin National Park in Nigeria. Zakouma's elephant population is also known to cross the Chadian boundary into the Central African Republic during the rainy season. For too long, poachers have exploited the limited control of national states along their frontiers, making cross-boundary poaching the main threat for Waza National Park, as the mortalities among its park personnel sadly testify. Recently, a collaboration programme has begun between the Waza and Lake Chad Basin National Parks concerning anti-poaching patrols and the creation of awareness among villagers living on the international boundary. In the long term this should lead to mixed patrolling and regular exchanges in their management programmes.

NEAR BOL, CHAD

WAZA NATIONAL PARK, CAMEROON

THE SPECTACULAR PRESENCE OF GIRAFFES IS MAINLY CONFINED TO PROTECTED AREAS

TABLE 23 **MAIN PROTECTED AREAS IN THE LAKE CHAD BASIN***

COUNTRY	Protected area	Protection category	Climatic zone	Size (1 000 ha)	Management effectiveness	External assistance	Participation by local communities***
CAMEROON	Waza	National park, biosphere reserve, Ramsar site	Sahelo-Sudanian	170	Moderate	Netherlands	Consultation, sometimes functional
	Kalamaloué	National park	Sahelian	5	Low	No	Passive
	Mozogo-Gokoro	National park	Sudanian	2	Moderate	No	Passive
CENTRAL AFRICAN REPUBLIC	Manova-Gounda-St Floris	National park, World Heritage Site	Sudanian	1 740	Moderate-low	European Union (EU)	Information–giving, locally functional
	Bamingui-Bangoran	National park, biosphere reserve,	Sudanian	1 070	Low	Some EU countries	Passive
	André Felix	National park	Sudanian	170	None	No	None
CHAD	Zakouma	National park	Sahaelo-Sudanian	300	High	EU	Information–giving
	Manda	National park	Sudanian	114	Moderate	France	Information–giving
	Fitri	Biosphere reserve, Ramsar site	Sahelian	195	No formal, yet traditionally high	Global Environmental Fund (GEF) planned	-
	Wadi Achim – Wadi Rime****	Faunal reserve	Sahara-Sahelian	7 795	None	No	None
	Lake Chad	Ramsar site	Sahelian	1 650	None	GEF planned	-
THE NIGER	Lake Chad	Ramsar site	Sahelian	340	None	GEF planned	-
NIGERIA	Lake Chad Basin	National park (four distinct sectors)	Sahelo-Sudanian	228	Moderate?	No	Passive?
	Hadejia-Nguru	Reserve - partly national park, Ramsar site	Sahelo-Sudanian	300	Moderate-low	IUCN, BirdLife, GEF	Information–giving

* Excluding gazetted forests and most faunal reserves

** Central African Republic: based on Blom, *et al.*, 2001 [B.14]; Chad: based on Scholte & Robertson, 2001 [B.15], pers. obs.; Cameroon: based on Fotso *et al.*, 2001 [B.16] and Scholte, pers. obs.; the Niger: based on WWF - Living Rivers Web site and Brouwer, *et al.*, 2001 [B.17]; Nigeria: based on Ezealor, 2001 [B.18] and Saleh, 2003 [B.19]

*** Following Pretty *et al.*, 1995 [B.20]

**** Wadi Achim – Wadi Rime situated just north of the conventional basin, indicated for their importance for Sahelian fauna