NIGER

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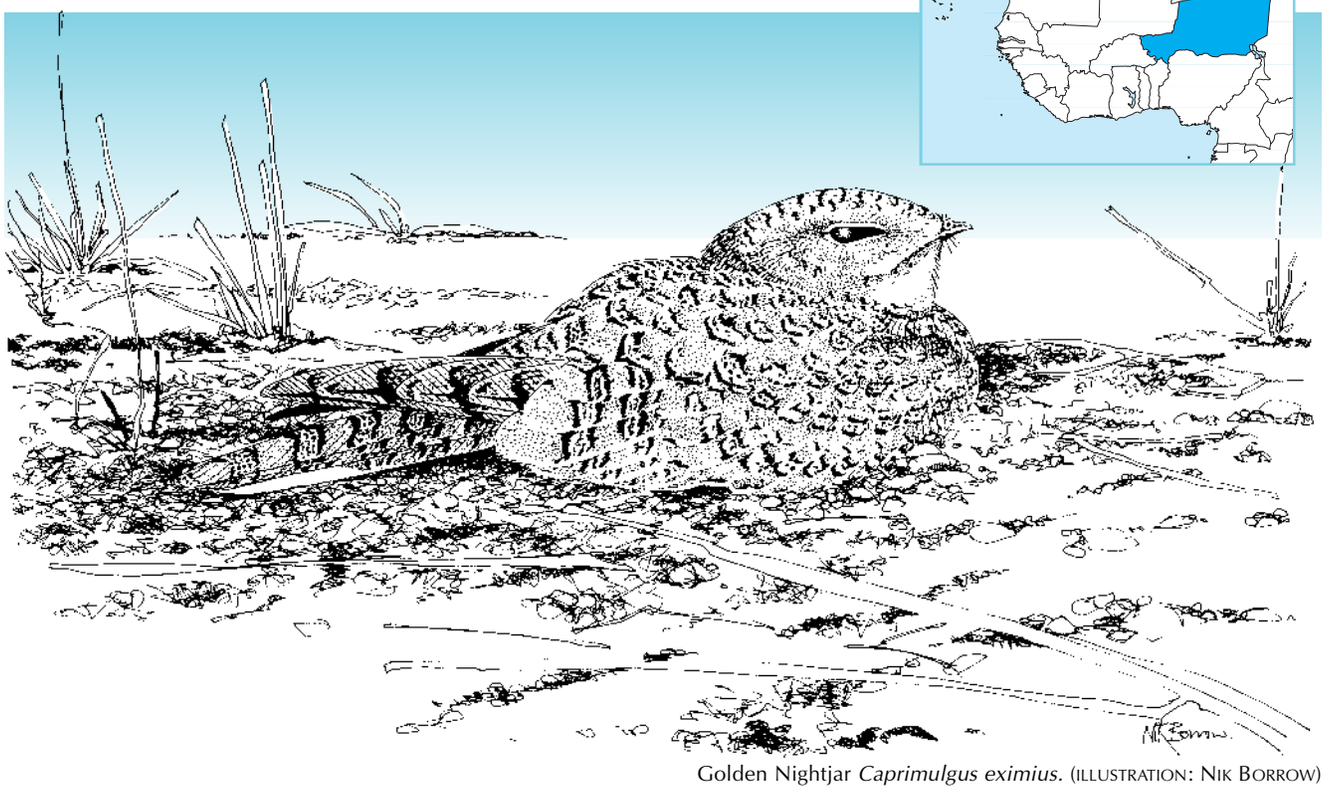

Golden Nightjar *Caprimulgus eximius*. (ILLUSTRATION: NIK BORROW)

GENERAL INTRODUCTION

The Republic of Niger is a landlocked country on the southern edge of the Sahara, with a land area of 1,267,000 km^2. It is bordered by Benin and Nigeria to the south, Chad to the east, Libya and Algeria to the north, and Mali and Burkina Faso to the west. In 1990, the human population was estimated at 7.73 million, with an annual growth-rate of 3.1%. This implies a total population of 10.5 million by the year 2000, at an average density of 8.3 people/km^2. However, due to lack of rainfall, the northern three-quarters of the country are largely unsuitable for agriculture with the result that about 85% of the population live in the southern fifth of the country, a narrow band 100–150 km wide bordering Nigeria, Benin and Burkina Faso. Here the average population density is approximately 36 people/km^2 (as compared with 1.6/km^2 in the north). The country is divided administratively into seven Départements, plus the capital Niamey. Niamey is by far the largest city, approaching one million inhabitants.

Niger is a relatively flat country, with most land lying between 200–500 m. The geological formations immediately underlying these areas are mostly Tertiary sediments. These sediments are often capped in higher areas by laterite, forming extensive plateaus. The extensive, more low-lying parts of the landscape are generally covered by layers of wind-deposited sands of varying thickness. Major areas of upland are the Aïr mountains in the central-north (highest point 2,022 m), the Djado plateau in the north-east (c.800–1,000 m), and the much smaller Termit range in the central-east (highest point 710 m). Due to their height, these areas receive more rainfall than the surrounding plains. The vegetation of the mountainous areas is relatively varied and contains some Mediterranean and Afromontane elements. Characteristic woody species in Aïr include *Acacia* spp., *Rhus tripartita*, *Ficus salicifolia*, *Salvadora persica* and *Ziziphus* and *Balanites* spp. The wild olive *Olea laperrinei* still occurs.

Except in highland areas, isohyets and ecological and biogeographical zones in Niger run in parallel, more or less east–west. The north of the country, where average annual rainfall is less than 100 mm, is occupied by the Sahara desert. This zone includes huge tracts of sand-dune areas as well as gravelly plains and rocky areas. Vegetation is very sparse and localized, and mostly limited to annuals such as *Stipagrostis* spp. and *Tribulus longipetalus*. Along sand-filled dry riverbeds, lines of *Acacia raddiana* trees may be found and, following rainfall, a carpet of annuals.

Further south lie the Sahelian grasslands, which receive about 150–350 mm of summer rainfall (June–August). These grasslands form an integral part of extensive livestock-grazing systems. Dominant grass species vary according to local conditions, but include *Panicum*, *Sorghum*, *Cenchrus*, *Aristida* and *Schoenefeldia* species. Further south, perennial grass and sedge species such as *Aristida pallida* and *Cyperus conglomerata* are also found. Trees and shrubs are rare in the northern part of this zone, but include *Acacia*, *Maerua* and *Balanites* species. In the south of the Sahel, the landscape becomes more wooded with *Combretum*, *Boscia*, *Guiera*, *Sclerocarya* and *Commiphora* species.

In the southern Sahelian zone (annual rainfall 350–600 mm, June–September) millet and sorghum fields now predominate over wide areas. The natural vegetation contains a variety of woody species of Combretaceae and other families, including *Hyphaene* palm trees in less dry situations. The herb layer is very varied and includes grasses, legumes and other species. The climax vegetation on the lateritic plateaus is so-called 'tiger bush'. This consists of bands of dense woody vegetation up to 6 m high (mostly Combretaceae and *Acacia* spp.), separated by strips of bare, crusted soil, tens of meters wide. The bare strips enable the adjacent woody vegetation to survive by providing it with run-off.

The extreme south of Niger lies within the northern Sudanian zone (annual rainfall 600–800 mm, May–October) and is the most densely populated. The natural vegetation is a varied open woodland, which includes baobab *Adansonia digitata*, *Bombax costata*, *Prosopis africana* and various Combretaceae. Gallery forests, containing e.g. *Khaya senegalensis*, occur along major watercourses.

Map 1. Location and size of Important Bird Areas in Niger.

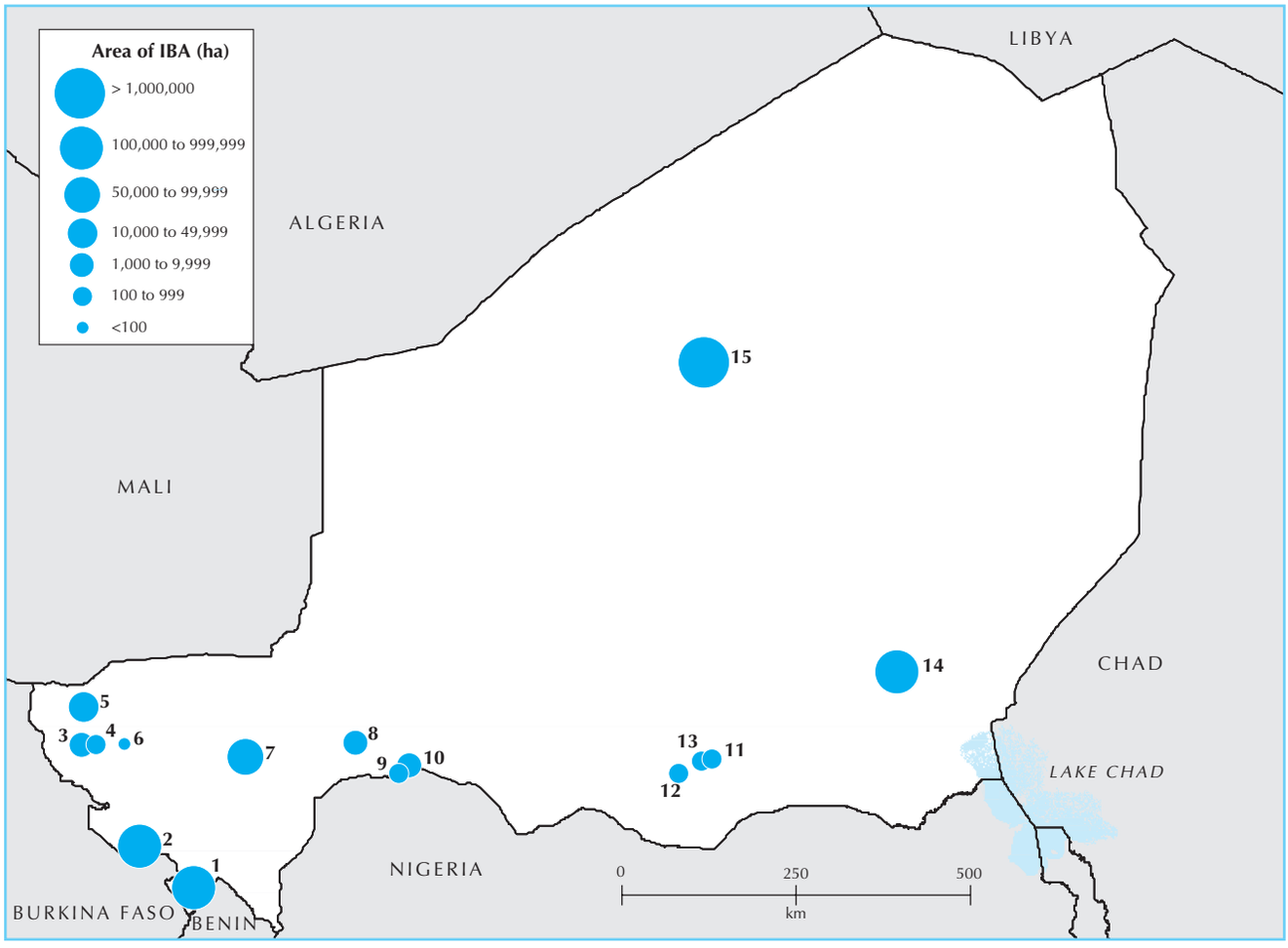

Table 1. Summary of Important Bird Areas in Niger. 15 IBAs covering 83,431 km²

IBA code	Site name	Administrative region	Criteria (see p. 11; for A3 codes, see Table 2) A1	A3 A02	A3 A03	A3 A04	A4i	A4iii
NE001	'W' National Park	Tillabéri	✔		✔	✔		
NE002	Makalondi district	Tillabéri			✔	✔		
NE003	Kokoro wetland	Tillabéri					✔	✔
NE004	Namga wetland	Tillabéri						✔
NE005	Ayorou	Tillabéri					✔	✔
NE006	Tillabéri roost	Tillabéri					✔	
NE007	Dallol Boboye	Tillabéri			✔			
NE008	Dan Doutchi wetland	Tahoua					✔	
NE009	Tchérassa reservoir	Tahoua					✔	
NE010	Mozagué reservoir	Tahoua					✔	
NE011	Lassouri–Karandi wetland	Zinder					✔	
NE012	Chiya wetland	Zinder					✔	✔
NE013	Atchi wetland	Zinder						✔
NE014	Dilia de Lagané	Diffa	✔		✔			
NE015	NNR Aïr–Ténéré	Agadez	✔	✔	✔			
	Total number of IBAs qualifying:		3	1	5	2	8	5

The main wetland area in Niger is formed by the Niger river and its flood-plains, which traverse the south-west of the country for a length of 550 km. Fringing vegetation originally included dense stands of *Borassus aethiopum* palms. Almost all of these have now been felled. The hydrology of the river has also changed greatly over the past 30 years, due to the construction of dams in Mali and Guinea. That part of Lake Chad in Niger, in the south-east of the country, has been dry for a number of years. The flow of the lake's main affluent in Niger, the Komadougou Yobé, has also greatly diminished. Again, this is attributable in large part to the construction of dams on the upper reaches of the river, in this case in Nigeria.

There are more than 1,000 isolated wetlands in Niger, ranging from several tens to more than 2,000 ha in size. Most are run-off dependent. Some hold water for only a few months after the end of the rainy season, others retain water year-round. Aquatic vegetation, where present, can range from dense fringing stands of *Acacia nilotica* and *Mitragyna* trees to various herbaceous zones with *Vetiveria*, *Cyperus*, *Oryza*, *Polygonum*, *Echinocloa*, *Ludwigia* and *Vossia* species, plus dense patches of water-lilies *Nymphaea*

spp. in deeper parts. In the north of the country, wetlands include areas of usually dry riverbeds and a number of oases. Palm trees often occur around oases, along with *Tamarix* spp. and, sometimes, an emergent vegetation of *Typha* and *Phragmites* spp.

Some 1,200 plant species have been recorded in Niger, of which four are considered endemic. About 130 species of mammals have been recorded. Of these, *Addax nasomaculatus* (CR) and *Oryx gazella dammah* (EW) may already be extinct nationally.

Threats to Niger's ecosystems include habitat degradation through prolonged droughts, unsustainable agricultural practices, clearance of new land (often only marginally suitable) for agriculture and overgrazing by livestock. Some of these problems are directly related to demographic developments, others to climatic changes; during the past 30 years annual rainfall everywhere in Niger has generally been roughly 100 mm less than it was during the preceding 30 years. Illegal hunting and, to some extent, bush fires have also had negative effects. Around urban centres the cutting of trees for firewood and construction is a major problem, as are a lack of adequate facilities for the disposal of solid and liquid wastes. The flood-plains of the Niger river are threatened by expanding rice cultivation, as well as by the construction of more dams in Mali and Guinea. There are also plans for the construction of dams within Niger. Virtually all wetlands in Niger are threatened by hydrological changes, erosion and/or sedimentation and destruction of vegetation. This is caused by changing and inappropriate land-use in their catchments and by a lack, so far, of integrated local management that involves all stakeholders.

ORNITHOLOGICAL IMPORTANCE

Given that Niger is landlocked and mostly arid, its avifauna is remarkably rich: 473 species were reported for the country by Giraudoux *et al*. (1988), since when a further 52 have been added (Brouwer and Mullié, in prep.). Of the 525 species, 368 (70%) are thought to be at least partially resident, 81 (15%) are thought to be at least partially intra-African migrants and 170 (32%) are at least partially Palearctic migrants (some species have resident as well as migratory populations). Under the harsh and variable conditions that prevail in most of Niger, many of the species usually considered to be fully resident probably also show at least some mobility in response to changes in seasonal or local conditions.

Five species of global conservation concern are known or thought to occur in Niger. Of these, three are seasonal migrants from the Palearctic. *Aythya nyroca* occurs in small numbers on several wetlands (a flock of 26 is the maximum reported). *Circus macrourus* is seen during the northern winter in ones and twos over natural vegetation throughout Niger. *Falco naumanni* has a similar distribution to *C. macrourus*, though it is less common and perhaps has a slightly more northerly distribution. The remaining two are presumed to be resident; *Neotis nuba* has strongholds in the Aïr and in the Dilia de Lagané while the status of *Prinia fluviatilis* is unclear. The species was recently described by Chappuis (1974) from 'south of Gao, Niger' while in Urban *et al*. (1997) the relevant locality information is given as 'Mali (Niger R. between Tillabéri and Gao)'. Since Gao is in Mali and Tillabéri is in Niger, it remains uncertain whether the species has been recorded from Niger. If not, it is, however, likely that it does occur as there is plenty of suitable habitat, particularly in the Ayorou area, between Tillabéri and international frontier with Mali. *Prinia fluviatilis* may also be found to occur along the Komadougou Yobé river near Lake Chad.

No species of restricted range are known from Niger nor are there any national endemics. Elements of three biome-restricted assemblages occur. The Sahara–Sindian biome (A02) spans the northern third of the country and 14 of the 22 species have been recorded. Much of the centre of the country lies within the Sahel biome (A03) and all 16 species of the biome occur in Niger. Finally, the south-west of the country lies within the Sudan–Guinea Savanna biome (A04) where 26 of its 54 species have been recorded.

More than 100 species of waterbird and almost 40 species of raptor have been recorded from Niger's wetlands, most of them during fieldwork for the African Waterbird Census. Slightly over half of the waterbird species are (partial) migrants from Eurasia. The average total number of waterbirds on Niger's wetlands in

Table 2. The occurrence of biome-restricted species at Important Bird Areas in Niger. Sites that meet the A3 criterion are highlighted in **bold**. Species of global conservation concern are highlighted in **bold blue**.

A02 – Sahara–Sindian biome
(14 species in Niger; one site meets the A3 criterion)

IBA code:	007	014	**015**
Falco concolor			(✔)
Pterocles senegallus			✔
Pterocles coronatus			✔
Pterocles lichtensteinii			✔
Bubo ascalaphus		?	✔
Ammomanes cincturus			✔
Ammomanes deserti	✔		✔
Alaemon alaudipes		✔	✔
Hirundo obsoleta			✔
Oenanthe leucopyga			✔
Cercomela melanura	✔		✔
Turdoides fulvus		✔	✔
Rhodopechys githaginea			✔
Passer simplex		✔	✔
Number of species recorded:	2	3	**13**

A03 – Sahel biome (16 species in Niger; five sites meet the A3 criterion)

IBA code:	**001**	**002**	005	**007**	**014**	**015**
Neotis nuba					✔	✔
Ardeotis arabs	✔	✔			✔	
Eupodotis savilei	✔	✔		✔		
Streptopelia roseogrisea	✔	✔		✔	✔	✔
Caprimulgus eximius					✔	
Trachyphonus margaritatus				✔	✔	✔
Dendropicos elachus					✔	✔
Mirafra cordofanica						
Mirafra rufa						
Eremalauda dunni					✔	
Cercotrichas podobe	✔	✔		✔	✔	✔
Prinia fluviatilis	?		?			
Spiloptila clamans					✔	✔
Anthoscopus punctifrons		✔				
Passer luteus	✔	✔		✔	✔	✔
Lamprotornis pulcher	✔	✔		✔	✔	✔
Number of species recorded:	**6**	**7**		**6**	**11**	**8**

A04 – Sudan–Guinea Savanna biome
(26 species in Niger; two sites meet the A3 criterion)

IBA code:	**001**	**002**	007	014
Falco alopex		✔	✔	✔
Poicephalus senegalus	✔	✔		
Musophaga violacea	✔			
Merops bulocki	✔	✔		
Coracias cyanogaster	✔			
Lybius dubius	✔	✔		
Galerida modesta	✔	✔		
Hirundo leucosoma	✔			
Corvinella corvina	✔	✔		
Cossypha albicapilla	✔			
Myrmecocichla albifrons	✔			
Turdoides reinwardtii		✔		
Cisticola ruficeps				
Hypergerus atriceps	✔			
Eremomela pusilla	✔	✔		
Muscicapa gambagae				
Pytilia phoenicoptera	✔			
Lagonosticta larvata	✔	✔		
Estrilda caerulescens	✔	✔		
Estrilda troglodytes	✔	✔		
Petronia dentata	✔	✔	✔	
Plocepasser superciliosus	✔	✔		
Ploceus heuglini	✔			
Lamprotornis purpureus	✔	✔		
Lamprotornis chalcurus		✔		
Ptilostomus afer	✔	✔		
Number of species recorded:	**21**	**16**	2	1

January–February is estimated to be 1.1 million (Brouwer and Mullié, in press).

CONSERVATION INFRASTRUCTURE AND PROTECTED-AREA SYSTEM

Since 1993, the national policy on natural resource management in Niger has been the responsibility of the Cellule de Gestion des Ressources Naturelles (Natural Resource Management Unit), which comes under the Sous-Comité Interministériel chargé de la politique de Dévelopement Rural au Niger (Inter-ministerial Sub-committee for Rural Development). Protected areas are administered by the Direction de la Faune, de la Pêche et de la Pisciculture (DFPP) of the Ministère de l'Hydraulique et de l'Environnement (MHE). The implementation of management plans for protected areas is the responsibility of the DFPP's Service d'Aménagement de la Faune et de l'Apiculture (SAFA). However, its means are limited; although there has since been a limited increase in numbers, in 1987 only 40 people were responsible for guarding and managing wildlife throughout the country. In addition, the remit of the Ministère de l'Agriculture et de l'Elevage means it, too, is much involved with land-use issues and, thus, various aspects of biodiversity conservation.

The following categories of protected area are currently recognized in Niger:

- Parc National—There is one National Park, the Parc National du 'W' (220,000 ha).
- Reserve Naturelle Nationale—There is one National Natural Reserve, the RNN Aïr–Ténéré (7,736,000 ha), which includes the RI Sanctuaire des Addax.
- Reserve Intégrale—There is one Strict Reserve, the Sanctuaire des Addax (1,280,500 ha), which lies within the RNN Aïr–Ténéré.
- Reserve Total de Faune—There are two Total Faunal Reserves, RTF Tamou (77,740 ha; buffer zone for PN du 'W') and Gadabeji (76,000 ha; part RTF, part Forêt Classée).
- Reserve Partiel de Faune—There is one Partial Faunal Reserve, PFR Dosso (306,000 ha; buffer zone for PN du 'W').

At present, therefore, the protected-area system in Niger comprises a National Park and five reserves (one entirely enclosed within a second), which cover about 7% of the country. A proposal is being considered by government for the setting up of an authority to raise funds and manage as a single unit 'W' National Park in Niger and the contiguous National Parks of the same name in Burkina Faso and Benin.

In addition, between 1937 and 1956, 79 Forêts Classées (Forest Reserves), totalling 212,000 ha, and 51 restoration and defence areas (total 69,000 ha), were created, which have had varying degrees of success. These 130 areas fall under the Direction de l'Environnment of the MHE.

Wild natural resources are not owned by anyone and, as wildlife is often perceived not to be useful, little reason is seen for conserving fauna or its habitat. On the other hand, there is recognition by older people of the value of conserving certain species of birds and mammals for the benefit of their descendants. A few sacred forests still exist, mostly in the Gourmantché region in the extreme south-west. Plants and animals are also appreciated as sources of traditional medicine and as environmental indicators. For instance, in large parts of Niger the arrival of migrant *Ciconia abdimii* signals that the rains are about to arrive and that the fields should be prepared for the new cropping season.

Environmental legislation in Niger is based primarily on French colonial laws and, where these were lacking, on traditional and Islamic law. Laws exist for the protection and use of water, soils, forests and trees on arable land, flora and fauna, but implementation and enforcement remain a problem. Hunting was largely banned in 1974, but has, since 1996, been legalised again on a much wider scale and, as such, represents a significant threat to fauna throughout the country. Illegal hunting is a serious problem. Conflicts between farmers and pastoralists over scarce resources, such as grazing land and access to wetlands, are ever more common. Traditional management structures are no longer adequate because of social, cultural, demographic and environmental changes. The Code Rural is to define rural property ownership issues as well as to regulate rural land-use and use of resources such as forests, fish and wildlife. This piece of legislation will be extremely important for the sustainable management of all natural resources.

INTERNATIONAL MEASURES RELEVANT TO THE CONSERVATION OF SITES

Niger has ratified the Convention on Biological Diversity, the Convention on Migratory Species, CITES, the Convention to Combat Desertification, the Convention on Climate Change, the World Heritage Convention, under which two sites, 'W' National Park and the Aïr and Teneré Natural Reserves have been designated, and the Ramsar Convention, under which four sites, 'W' National Park, Kokoro wetland, Lac Tchad and Zone humide du moyen Niger have been designated. Niger is also a party to the African-Eurasian Migratory Waterbird Agreement. Niger also participates in UNESCO's Man and the Biosphere Programme, under which the Région 'W' du Niger and Aïr–Ténéré have been designated as Biosphere Reserves. Regionally, Niger has signed the African Convention on the Conservation of Nature and Natural Resources. In addition, Niger is party to the Convention on Game Hunting and the Convention on Plant Protection.

OVERVIEW OF THE INVENTORY

The 15 Important Bird Areas (IBAs) in the inventory cover 83,431 km^2, or 6.6% of the area of the country (Map 1, Table 1). Of these sites, only two are legally protected. Three sites qualify on the presence of species of global conservation concern; two for *Neotis nuba*, one for the numbers of *Circus macrourus* present seasonally, while another is suspected to hold *Prinia fluviatilis*, although this remains to be confirmed. The majority of the area included in the network is contributed by one site; the 77,360 km^2 of mountains and desert in the National Nature Reserve of the Aïr and Ténéré (site NE011) in the central-north of the country. All 14 species of the Sahara–Sindian biome known from Niger have been recorded from this site, although one is merely vagrant (Table 2). Five sites have been selected for the Sahel biome which, between them, hold 14 of the 16 species of the biome recorded nationally (Table 2). The two species not included are the larks *Mirafra cordofanica* and *M. rufa*, known only from a few observations dating from the 1920s and 1930s from near Tahoua and Ouallam. Although it is likely that they have been overlooked ever since, their current status should be investigated. This is an indication of how little-known ornithologically the country remains. The two sites which qualify for the Sudan–Guinea Savanna biome hold 24 of its 26 species recorded from Niger (Table 2).

The two species missing are *Cisticola ruficeps*, known only from several individuals recorded in the Dosso area, and *Muscicapa gambagae*, of which there are only three recent reports from near Niamey. Both species are likely to have been overlooked elsewhere. Further surveys are required to identify other possible biome sites, e.g. in the mountain areas of Termit and the Djado Plateau, in the foothills of the Aïr at Tchérozérine, at Takakout near Tanout and in the Total Faunal Reserve of Tadrès between Tahoua and Agadez. Other areas worthy of investigation closer to Niamey include the Total Faunal Reserve of Tamou, the Liptako–Gourma and the Tillabéri–Ouallam–Filingué areas.

Ten sites in the inventory are wetlands, qualifying for the numbers of waterbirds they hold; these comprise two along the Niger river, two reservoirs and six isolated wetlands well spread-out from west to east in the 300–600 mm rainfall zone. All are at present unprotected, although two are being proposed as wetlands of international importance under the Ramsar Convention. Site selection is based on count results up to and including 1998. Continuation and expansion of the annual waterbird counts will no doubt lead to identification of other wetlands worthy of inclusion in this inventory, e.g. in the Liptako near the borders with Burkina Faso and Mali, along the Niger river, in the area east of Zinder, at Tabalak and Gawoy north of Tahoua and, possibly, at Galmi east of Birni N'Konni. Migration counts of both passerines and non-passerines in, for example, the northern Aïr Mountains, along the Niger river and in the Dallol Boboye could also prove worthwhile.

Much remains to be discovered ornithologically in Niger—between 1986 and 1998, 52 new species for Niger were found and much of the rest of the country is also relatively little-known. Only the Makalondi district, 'W' National Park, the area around Niamey and the Aïr–Ténéré in the north have received some level of systematic attention from ornithologists. In addition, since 1992 up to 50 isolated wetlands in southern Niger have been surveyed during the annual waterbird counts in January–February.

COMMENTS ON THE INVENTORY

- The spelling of place names is mostly taken from the 1:200,000 map sheets of Niger published by IGN, Paris, in collaboration with the Direction de la Topographie et du Cadastre de la République du Niger.
- It is emphasized that the importance to waterbirds of wetlands in semi-arid regions often varies greatly from year to year, according to local and regional rainfall patterns during the preceding rainy seasons.

ACKNOWLEDGEMENTS

General information on Niger and its natural resources was taken from IUCN (1993), Le Berre (1995), Kabala and Le Berre (1994), Millington *et al.* (1994), and RESADEP-Institut Panos (1996). Ornithological information for Niger as a whole was taken mainly from Giraudoux *et al.* (1988) as well as from Millington (1990) and from personal communications from J. Newby, P. J. Jones and the late P. Souvairan. The information on 'W' National Park contains unpublished observations by Seyni Seydou (ex-director of the park), J. Brouwer and W. C. Mullié. The information on Makalondi district stems almost entirely from the work of P. Souvairan.

Information on wetlands and waterbirds mostly derives from the annual waterbird counts in Niger initiated by W. C. Mullié, with assistance from S. F. Codjo, J. Brouwer, Adamou Kounou, T. Crisler, C. Jameson, Mahamadou Salifou, P. Souvairan, Gaby Schmelzer (plant identification), Piet Schermerhorn and regional staff of the Ministère de l'Hydraulique et de l'Environnement and others. The surveys were supported in various ways by the Direction de la Faune, de la Pêche et de la Pisciculture, Niger, IUCN-Niger, and the Département de la Formation de Protection en Végétaux in Niamey. The data collected have been published in part in various papers with Mullié or Brouwer as senior author.

GLOSSARY

dallol ancient river valley.
DDE Direction Départementale de l'Environnement.
graben a valley produced by faulting and subsidence.
tiger bush strips or arcs of vegetation alternating with bare ground in semi-arid areas.

SITE ACCOUNTS

'W' National Park — NE001

Admin region Tillabéri
Coordinates 12°20'N 02°25'E — A1, A3 (A03, A04)
Area 220,000 ha **Altitude** 170–310 m — National Park

Site description

The 'W' National Park lies 150 km south of Niamey, at the point where Niger, Burkina Faso and Benin meet. Together with the contiguous parks of the same name in Burkina Faso (part of IBA BF008) and Benin (BJ001), it forms the largest tract of protected savanna in West Africa. In the north-east the boundary of the park is formed by the Niger river. The river here makes several sharp turns, which together form the shape of the letter 'W' from which the park takes its name. In the south the boundary is formed by the Mékrou river (which also forms the international frontier with Benin), in the west by the international border with Burkina Faso and in the north by the Tapoa river. Large parts of the park are rocky, as a result of outcroppings of metamorphic Precambrian rocks (e.g. quartzites, schists and gneisses). In certain areas, these are overlain by Tertiary sediments, which give rise to widespread laterite-capped plateaus. Along the three rivers there are Quaternary alluvial flood-plains. The vegetation is predominantly wooded savanna and shrubland, transitional between the Sahelian and Sudanian savanna-types, together with a small amount of grassland. In addition to the flood-plains along the Niger river, there are gallery forests along its main tributaries and a number of ephemeral pools and wetlands in upland areas. Average annual rainfall in the park for the period 1961–1990 was c.700 mm.

Birds

See Box and Table 2 for key species. At least 355 species of bird have been recorded from the park, of which at least 48 are intra-African wet-season migrants, 63 intra-African dry season migrants and 63 dry-season migrants from Eurasia. Several species of global conservation concern have been recorded. In addition to *Circus macrourus*, of which more than 30 are likely to be present annually during the northern winter, *Falco naumanni* is a rare dry-season visitor. There is also a possible observation of *Prinia fluviatilis* from just north of the park boundary in suitable habitat, which also occurs within the park. Of the Sudan–Guinea Savanna species, *Coracias cyanogaster* and *Galerida modesta* are dry-season vagrants while *Hypergerus atriceps* is a rare dry-season visitor. All other 18 species are proven or likely breeders. The six species of the Sahel biome occur mostly during the dry season and all are uncommon to rare. However this site, together with Makalondi (NE002), are the only IBAs in the non-breeding range of some of the Sahelian species.

The various aquatic habitats are important for waterbirds. The largest single waterfowl count during January–February 1993–1998 was of 10,337 birds in 1997, along the Niger river only. Further counts may reveal totals of more than 20,000 waterbirds. Significant observations include a group of nine *Ciconia nigra* at a small wetland in January 1998 while, in March 1997, 1,412 *Sarkidiornis melanotos*, 7,979 *Dendrocygna viduata* and 325 *Plectropterus gambensis* were counted on the river. In addition, there are quite large rookeries of egrets, etc. in the interior of the park, which have never been properly censused.

Key species

A1	*Circus macrourus*
A3 (A03)	Sahel biome: Six of the 16 species of this biome that occur in Niger have been recorded at this site; see Table 2.
A3 (A04)	Sudan–Guinea Savanna biome: 21 of the 26 species of this biome that occur in Niger have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

A total of 82 species of mammal have been identified, including *Loxodonta africana* (EN), *Panthera leo* (VU), *Acinonyx jubatus* (VU), *Syncerus caffer* (LR/cd) and 11 species of antelope; *Trichechus senegalensis* (VU) also occurs.

Conservation issues

The area now occupied by the park was first identified as a potential reserve in 1926. It was created the first protected area in Niger in 1937, classified as a Total Faunal Reserve in 1953 and declared a National Park in 1954. In addition, it was designated a Ramsar Site in 1987. In 1962, two reserves adjoining the park were created as buffer zones: these are Dosso Partial Reserve (306,000 ha) to the north-east, on the other side of the Niger river and Tamou Total Fauna Reserve, to the north of the Tapoa river.

An initial long-term management plan, drafted in 1982, sought to address the issues of poaching and disturbance, burning by poachers and pastoralists, illegal grazing (made possible by eradication of tsetse fly; up to 10,000–15,000 head of cattle are thought to be present illegally during the wet season), illegal cutting of trees and collection of other natural products, illegal fishing, construction of new roads and tourism. However, this management plan has not been followed up and the park is currently managed using yearly or short-term plans.

Other threats include the mining of phosphate and the construction of dams. In January 1999, the Niger and Benin governments signed an agreement concerning the construction of the Dyodyonga Hydroelectric Facility in the gorge in the Mékrou river on the southern boundary of the park (c.12°18′N 02°37′E). In addition to the generation of electricity that the project will allow, it is intended that the development of small and medium-sized industries will follow, as well as the exploitation of mineral resources in the Mékrou area. The possible consequences of this on the park are unknown and have not, apparently, been addressed.

Further reading

Brouwer (1993), Brouwer and Mullié (1993), Jameson and Crisler (1996), Koster and Grettenberger (1983), Newby *et al.* (1982), Shul *et al.* (1986).

Makalondi district — NE002

Admin region Tillabéri
Coordinates 12°50′N 01°40′E — A3 (A03, A04)
Area 200,000 ha **Altitude** 210–300 m — Unprotected

Site description

Makalondi district is the name used here for an area with a radius of approximately 25 km, centred on the border village of Makalondi, 100 km south-east of Niamey on the road to Burkina Faso. The area, which lies in the transition between the Sahel and Sudan zones, is relatively flat, but there are a number of lateritic plateaus and flat-topped hills which rise 40–60 m above the surrounding land. The plateaus support a (degraded) tiger-bush vegetation, while wooded savanna with dry thorn-scrub as well as some large trees occurs in the lower-lying areas. There are a number of temporary watercourses which, during the dry season, are reduced to a number of isolated wetlands that hold water for periods ranging from a few months to almost the whole year. These include the wetlands of the Goroubi river to the north and west, Balla Foulbé wetland 25 km to the north-east along the road to Tamou, and Koulbou wetlands, 10 km south-east of Makalondi. The latter are heavily vegetated with water-lilies, rushes and wild rice, as well as clumps of *Mytragyna* trees. A number of small villages occur throughout the site, mostly near the drainage lines. Subsistence farming is widespread with sorghum and millet the main crops. There are also numerous herds of cattle, sheep and goats. Average annual rainfall for the period 1961–1990 was approximately 600 mm.

Birds

See Box and Table 2 for key species. In total, some 310 bird species were recorded in Makalondi district by Pierre Souvairan, who lived and worked in the area between 1968–1998. The avifauna includes a number of species not known from nearby 'W' National Park (site NE001). Of the Sahel biome species, this is the only site at which *Anthoscopus punctifrons* has been reported. The site is also important for *Cercotrichas podobe* (probably breeds) and *Lamprotornis pulcher* (definitely breeds) and, with Dallol Boboye (site NE007), for *Eupodotis savilei*. The latter is resident, at a density of approximately 1 pair/km^2 in good quality shrubland and tiger bush. For the other Sahel biome species that show seasonal movements, Makalondi district is mainly a wintering area. The only observations in Niger of the Sudan–Guinea Savanna biome species *Turdoides reinwardtii* and *Lamprotornis chalcurus*, together with two of the three known records of *Galerida modesta*, are from this IBA. Except for *Falco alopex*, *Lagonosticta larvata* and *Ptilostomus afer* (single records only), the other Sudan–Guinea Savanna biome species are present all year and are presumed to breed. In addition, there is one observation of a male *Aythya nyroca* in March 1987 and several records of *Circus macrourus* during the dry season.

Key species

A3 (A03) Sahel biome: Seven of the 16 species of this biome that occur in Niger have been recorded at this site; see Table 2.

A3 (A04) Sudan–Guinea Savanna biome: 16 of the 26 species of this biome that occur in Niger have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

Until the 1970s, large mammals, including *Loxodonta africana* (EN), *Panthera leo* (VU) and *Syncerus caffer* (LR/cd) were common, particularly in the western part of the area. Most disappeared following extensive clearance of land for agriculture during the 1980s.

Conservation issues

Main threats are the increasing pressure on natural resources through agricultural expansion, due to demographic and, possibly, climatic changes. The Koulbou–Kpennyua wetlands, 10 km south-east of Makalondi, are said to have been classified an 'Ornithological Reserve', but this could not be confirmed.

Further reading

Mullié and Brouwer (1994a, b), Souvairan (1990).

Kokoro wetland — NE003

Admin region Tillabéri
Coordinates 14°12′N 00°54′E — A4i, A4iii
Area c.2,100 ha **Altitude** 250 m — Ramsar Site (Unprotected)

Site description

Kokoro wetland lies 150 km north-west of Niamey and 30 km north-east of Téra, next to the village of Kokoro and 10 km west of Namga wetland (site NE004). It is a large, shallow (0.5–1.0 m), wetland occupying part of an ancient valley surrounded by sand-dunes, some granite outcrops of Precambrian age and flat-topped hills carved from Tertiary sediments. It is a semi-permanent wetland, containing water 7–12 months of the year. At its greatest extent it is 13 km long and occupies 2,100 ha. Between 1961–1990 annual rainfall at Kokoro averaged approximately 380 mm. However, total rainfall at Kokoro varies enormously from year to year, which affects the size of the wetland (700–1,800 ha at the times of the waterbird censuses). Historically, the valley probably fed into the Niger river, from which it is now blocked at its eastern end by sand-dunes. The water of the wetland is brackish and of neutral pH, with low levels of nitrogen and high levels of phosphorus in the very sandy sediment. The substrate at the southern end contains a lot of clay and is vegetated mostly with *Ludwigia adscendens*. There is also some *Typha* sp. in the south-east. The northern end is quite sandy and covered by e.g. *Echinochloa obtusifolia* and *Cyperus distans*. The relatively small amounts of deeper, open water contain water-lilies *Nymphaea lotus* and *N. caerulea*. At the western end there is a tree-covered flood-plain several kilometres in length, where *Acacia nilotica* is the most common species. Smaller areas of flood-plain with trees are also found at the eastern end and fringing the southern margin.

Birds

See Box for key species. Waterbird counts made in January–February 1994–1998 and April 1997 are the only known ornithological data. Coverage was usually only partial, except when the water-level was very low. In total, 44 species of waterbird have been recorded. In January 1999 the total count was 50,191. In addition to those listed below, other notable counts include 1,000 *Dendrocygna bicolor* in February 1996, 2,500 *Dendrocygna viduata* in February 1995, 889 *Plectropterus gambensis* in February 1997, 251 *Plegadis falcinellis* in February 1995, and up to 440 *Sarkidiornis melanotos* and 257 *Himantopus himantopus* in February 1996. In addition, two *Circus macrourus* were seen in February 1997.

Key species

		Breeding (pairs)	Non-breeding
A4i			
	Porphyrio porphyrio	—	775 (April 1997)
A4iii	More than 20,000 waterbirds are thought to occur regularly at this site.		

Other threatened/endemic wildlife

None known to BirdLife International

Conservation issues

In 2001, Kokoro wetland was designated as a Ramsar Site. The wetland is owned by the government, but may be used by the local population under supervision. Towards the end of the dry season the wetland virtually becomes a flooded meadow, used heavily by cattle. Livestock increase the nutrient loading of the wetland and the phosphorus content of the sediments is relatively high. There is little doubt that this increases the primary and secondary production of

the wetland, but whether this is leading to eutrophication is not clear. Livestock also affect the vegetation through grazing or overgrazing and trampling. The wetland is also fished using cast nets and fixed lines. The lake was stocked with fish in 1986, but only *Protopterus annectens* remains. Expansion of agricultural activities along the borders may be a future threat, but there is, at present, little sign of this. Similarly, the limited amount of collection of natural products does not appear to be having much impact. Sand-dunes threaten the wetland at its northern border and have been the target of a dune-fixation programme. Hunting could become a problem although, as at many wetlands, the local population discourages hunting by outsiders. Kokoro and Namga (site NE004) wetlands will be the subject of an integrated wetland management and development project, as part of a GEF-financed migratory waterbird project for the African-Eurasian flyway.

Further reading

Brouwer and Mullié (1995), Hirigoyen (1989), Mullié and Brouwer (1994a,b), Mullié *et al.* (1999).

Namga wetland — NE004

Admin region Tillabéri
Coordinates 14°11′N 01°02′E — A4iii
Area c.600 ha **Altitude** 260 m — Unprotected

Site description

Namga wetland lies 150 km north-west of Niamey and 40 km north-east of Téra, next to the village of Namga or Namaga and 10 km east of Kokoro wetland (site NE003). Namga wetland is semi-permanent and up to several metres deep. During 1961–1990 annual rainfall averaged approximately 380 mm. However, total rainfall varies greatly from year to year, which affects the size of the wetland (400–500 ha at the times of the waterbird censuses). The water of the wetland is somewhat brackish and of neutral pH, with average nitrogen and low phosphorus contents in the rather clayey sediment. The wetland has an abundant aquatic vegetation of *Schoenoplectus subulatus* and *Cyperus distans* along its margins, with *Nymphaea lotus* in deeper parts. Approximately 40% is open water. Along its eastern and southern edges and in the valleys that feed into it, there are areas of woodland which include *Acacia nilotica*, *A. seyal*, *A. raddiana*, *Balanites aegyptiaca* and *Mitragyna inermis*.

Birds

See Box for key species. Waterbird counts made in January–February 1995–1998 and April 1997 are the only known ornithological data. In total, 54 species of waterbird were counted. In February 1997, 13,190 waterbirds were counted on an estimated 70% of the wetland and it is probable that numbers exceed 20,000 at times. Notable counts include 245 *Plegadis falcinellus* in February 1998, 7,155 *Dendrocygna viduata* and 749 *Sarkidiornis melanotos* in February 1997, 179 *Alopochen aegyptiacus*, 241 *Plectropterus gambensis* and 235 *Tachybaptus ruficollis* in April 1997 and 506 *Himantopus himantopus* in February 1997.

Key species

A4iii	More than 20,000 waterbirds are thought to occur at this site.		

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

A proposal has been prepared by the Niger government for the designation of Namga wetland as a Ramsar Site. The wetland is owned by government, but may be used by the local population under supervision. The wetland is used for grazing and watering of livestock. In addition there are some small gardens where gourds are grown. Some traditional hunting is also likely to take place. A number of dead vultures, mainly *Torgos tracheliotus*, found in 1995, indicates that poisoning of jackals probably occurs in the area.

Livestock coming to drink increase the nutrient loading, and thus the primary and secondary production, of the wetland. Whether this is leading to eutrophication is not clear. Livestock also affect the vegetation through grazing or overgrazing and trampling. Expansion of agricultural activities along the borders may be a future threat, but there is, at present, little sign of this. Similarly, the limited amount of collection of natural products does not appear to be having much impact. Hunting could become a problem although, as at many wetlands, the local population discourages outsiders coming to hunt. Namga and Kokoro (site NE003) wetlands will be the subject of an integrated wetland management and development project, as part of a GEF-financed migratory waterbird project for the African-Eurasian flyway.

Further reading

Brouwer and Mullié (1995), Mullié and Brouwer (1994a, b), Mullié *et al.* (1999).

Ayorou — NE005

Admin region Tillabéri
Coordinates 14°40′N 00°55′E — A4i, A4iii
Area c.10,000 ha **Altitude** 210 m — Unprotected

Site description

The part of the Niger river which is often referred to as Ayorou lies south-west and south of the town of the same name, 220 km north-west of Niamey. The river here is relatively shallow, due to the presence at the surface of erosion-resistant Precambrian rocks, and up to 6 km wide, with numerous small islands as well as seasonally flooded areas. This local 'inner delta' covers about 10,000 ha. Its character varies greatly with the level of river water, which tends to be lowest just before the wet season (April–June) and highest in December–January, since the inland delta of central Mali delays the arrival of maximum water-levels by some four months. Vegetation on the islands consists mostly of grasses and herbs, but also includes scattered trees such as *Hyphaene thebaica*. The riverine vegetation surrounding the islands includes *Echinochloa*, *Cyperus* and *Sesbania* spp. During the past 20 years, however, the river's regime has changed considerably, due to the construction of dams and other off-takes upstream in Guinea and Mali. Average flows have decreased, as have frequency and levels of flooding.

Birds

See Box for key species. *Prinia fluviatilis* is likely to occur. Although never systematically surveyed, Ayorou is believed to be of considerable importance for waterbirds. Very incomplete counts were undertaken in February 1995 and in April 1997, when 33 species of waterbird were recorded. The total number counted in February 1995 was 10,907, when only 5% of the area was censused. In addition to those listed below, noteworthy counts include 2,752 *Dendrocygna viduata* in February 1995 and 130 *Balearica pavonina* in February 1984. The only large sub-population of *B. pavonina* between northern Cameroon and the Inner Delta in Mali breeds at isolated wetlands in north-west Niger and adjoining parts of Burkina Faso and Mali; Ayorou is likely of importance for this sub-population during the dry season.

Key species

A4i		Breeding (pairs)	Non-breeding
	Sarkidiornis melanotos	—	7,854 (Feb 1995)
A4iii	More than 20,000 waterbirds are thought to occur regularly at this site.		

Other threatened/endemic wildlife

The mammal *Trichechus senegalensis* (VU) occurs at this site.

Conservation issues

In addition to the influence of upstream dams and associated changes in hydrology, the Ayorou area is threatened by the proposed construction of a dam at Kandadji, immediately downstream. This proposal, for the generation of electricity and for water-supply and irrigation purposes, has been under discussion since the 1960s. The various alternatives would result in a maximum water-level of between 228–241 m above sea-level, effectively drowning the present area. There may, in future, also be detrimental effects from mining developments to the west, with a tarmac road and a permanent river crossing proposed just north of Ayorou. Increasing use of the area for crop and livestock production may also become a problem. Fishing is an important activity. The area is also used for watering and grazing cattle. Grasses, some of them aquatic, are collected for cattle fodder. Agriculture takes place on a number of the islands. Hunting or poaching with shotguns is said to take place locally. The Ayorou area

is best known for its *Hippopotamus amphibius* population which, together with the weekly market in the town of Ayorou, form a tourist attraction. Ayorou has been proposed as a protected area.

Further reading

Brouwer and Mullié (1996), Chappuis (1974), MHE-Niger (1991, 1993), Mullié *et al.* (1999), Soumana (1996).

Tillabéri roost — NE006

Admin region Tillabéri
Coordinates 14°11′N 01°29′E — A4i
Area c.8 ha **Altitude** 200 m — Unprotected

Site description

The Tillabéri roost occupies a *Eucalyptus* woodlot in an area of irrigated rice on the flood-plain of the Niger river near Daikaina, just east of Tillabéri. The woodlot is managed by the irrigation authority, ONAHA (Office National des Aménagements Hydro-Agricoles). Some of the trees were felled in early 1997 and, as a result, the birds temporarily moved to a wooded area 1.0–1.5 km to the south. More recently, however, the birds have moved back to the woodlot.

Birds

See Box for key species. The first site was counted in February 1995–1998 while counts of the alternative roost, following its relocation as a result of human disturbance, took place in April 1997. In total, 35 species of waterbird have been observed at the roost and in immediately surrounding areas. Notable counts, in addition to those listed below, include 1,132 *Phalacrocorax africanus* in February 1996 and 5,581 *Bubulcus ibis*, 333 *Nycticorax nycticorax* and 506 *Threskiornis aethiopicus* in February 1995. In March 1998, 14 *Ixobrychus minutus* were seen. Total numbers counted were 11,868, 10,762, 5,667 and 3,541 in February 1995–1998, respectively.

Key species

		Breeding (pairs)	Non-breeding
A4i	*Plegadis falcinellus*	—	2,838 (Feb 1995)

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The main roost-site was completely abandoned in 1997 for a short while as a result of the felling. Both the original roost and the alternative, another wooded area 1.0–1.5 km further south, need to be given immediate protection. For unknown reasons, some species appeared to have been declining in numbers even before the first roost-site was disturbed. These include *Ardeola ralloides* and *Egretta garzetta*. Because the site is so close to an urban centre, is sensitive to human activity and is important, for example, for the migratory *Plegadis falcinellus*, its conservation could be made to have a significant impact in raising public awareness. The Département de la Faune, de la Pêche et de la Pisciculture has formulated a project proposal for this.

Dallol Boboye — NE007

Admin region Tillabéri
Coordinates 14°00′N 03°10′E — A3 (A03)
Area c.70,000 ha **Altitude** 200–300 m — Unprotected

Site description

The Dallol Boboye is the central part of the Dallol Bosso, a graben running north–south through the relatively flat south-west part of Niger, approximately 100 km east of Niamey. The dallol was one of the main valleys that, historically, drained parts of the far north of Niger and extreme eastern Mali. The site defined here extends from Filingué to approximately 15 km south of Baléyara. The dallol in this section is 5–20 km wide and is bounded in many places by Tertiary sandstone cliffs ranging from less than 10 m to almost 100 m in height. The valley floor is mostly under permanent millet cultivation or a millet-fallow rotation. On the hills on either side there is more fallow land, some natural wooded savanna and thorn-scrub vegetation, and also a number of lateritic plateaus with tiger-bush vegetation. Although degraded in parts, some of the tiger bush is in excellent condition. The water-table in the dallol is quite near the surface and locally feeds several small wetlands. There are also a few small wetlands which depend on run-off and which are therefore more temporary. Average annual rainfall during the preiod 1961–1990 varied from 350 mm at Filingué to 450 mm at Baléyara.

Birds

See Box and Table 2 for key species. More than 100 species of bird have been recorded in Dallol Boboye during only a few visits in 1993–1994 and it is likely that many more remain to be discovered. In addition to the Sahel biome species, two Sahara–Sindian biome species and two Sudan–Guinea Savanna biome species breed (see Table 2). Indeed, for one of the latter, *Falco alopex*, this is the main known locality in Niger, with pairs breeding at regular intervals along the cliffs. Other observations of interest include two *Falco pelegrinoides* on cliffs at Damana (13°55′N 03°06′E) in August 1993, while unidentified swifts, *Apus* sp., appear to nest at several cliffs in the dallol during the rainy season. There is also some evidence that the dallol functions as a migration route for birds.

Key species

A3 (A03) Sahel biome: Six of the 16 species of this biome that occur in Niger have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Main threats appear to be the increasing pressure on natural resources caused by demographic and possibly climatic changes. Increased direct disturbance of birds is potentially also a problem, especially for cave- and ledge-nesting species. Main conservation efforts need to focus on the cliff areas, where most of the species of interest are found.

Further reading

Millington (1990).

Dan Doutchi wetland — NE008

Admin region Tahoua
Coordinates 14°14′N 04°39′E — A4i
Area c.1,780 ha **Altitude** 270 m — Unprotected

Site description

Situated in a fossil valley dating from the last ice-age or earlier, Dan Doutchi was, prior to July 1974, a small, temporary wetland surrounded by millet and sorghum fields. When, however, the 1973–1974 drought broke with torrential rains, this wide, shallow part of the valley filled to form a permanent wetland. The wetland, located some 80 km north-west of Birni N'Konni, extends from the village of Tawèy to that of Dan Doutchi, 6 km to the west and, at its maximum, occupies approximately 1,780 ha with an average depth of 1.8 m. Average annual rainfall in the Dan Doutchi area for the period 1961–1990 was 420 mm, but yearly variation is considerable. During the waterbird censuses in January–February, the area of the run-off dependent wetland accordingly varied from 450 to 1,500 ha. The water of the wetland is somewhat brackish and alkaline, with average levels of nitrogen and low levels of phosphorus in the fairly sandy sediment. Aquatic vegetation is absent. Woody species along the edges of the wetland include *Acacia nilotica* and the exotic *Eucalyptus camaldulensis*.

Birds

See Box for key species. A total of 55 species of waterbird were recorded at Dan Doutchi during counts in January 1992–1998. Numbers of birds are largest, according to local farmers, in April–May. In addition to those listed below, other significant counts include 376 *Tringa erythropus* in January 1992 and 1,500 *Ciconia ciconia* and 509 *Alopochen aegyptiacus* in January 1993. Also notable were the 10, 1,411 and 450 *Chelictinia riocourii* observed at a roost in 1993–1995, respectively. One or two *Circus macrourus* were present each year and a single *Falco naumanni* was seen in January 1995. The largest number of waterbirds counted was 4,497, in January 1993.

Key species		
A4i	Breeding (pairs)	Non-breeding
Anas crecca	—	470 (Jan 1994)

Other threatened/endemic wildlife
None known to BirdLife International.

Conservation issues
Dan Doutchi has been suggested as a potential Ramsar Site. The wetland is owned by government, but may be used by the local population under supervision. Fishing is an important activity that takes place all year-round using nets and traps, from gourd floats and boats. Fish species include *Bagrus bayad*, *Oreochromis niloticus*, *Tilapia zillii*, *T. monodii*, *Lates niloticus*, *Clarias anguillaris*, *Schilbe* spp., *Alestes* spp., *Achenoglanis* spp., *Synodontis schall* and *Chrysichthys auratus*. In addition to being smoked and dried locally, refrigerated lorries take part of the catch to Niamey, a distance of some 600 km. Each year, an estimated 80% of the land exposed as water-levels recede is cultivated (*Dolichos lablab*, maize, cassava). During the later part of the dry season the wetland is also an important watering point for large numbers of livestock. There is no management plan, other than yearly programmes to improve fish production. The Service d'Arrondisement d'Environnement is considering introducing *Echinochloa stagnina* in order to improve breeding conditions for the fish. Erosion and sedimentation, caused by human activity in the catchment, threaten the wetland. There are also signs of salinization in fields where crops are grown on residual moisture.

Further reading
Brouwer and Mullié (1994, 1995), DDE-Tahoua (1991), Le Berre (1995), Mullie and Brouwer (1994a, b), Mullié *et al.* (1999).

Tchérassa reservoir — NE009
Admin region Tahoua
Coordinates 13°51′N 05°18′E — A4i
Area c.150 ha **Altitude** 270 m — Unprotected

Site description
Tchérassa reservoir, also known as Tyéra(s)sa, is a permanent reservoir which takes its name from the nearby village, located 6 km north-east of the town of Birni N'Konni in southern Niger. It is filled by surface run-off and is used as a source of water for irrigation during the dry season. Average annual rainfall during the period 1961–1990 in the Birni N'Konni area was approximately 450 mm. However, rainfall totals vary considerably from year to year, which affects the size of the wetland (65–125 ha at the times of the waterbird censuses). The water of the wetland is brackish, alkaline and low in nutrients.

Birds
See Box for key species. The only thorough count of the *Bubulcus ibis* roost, which lies immediately downstream of the dam in a stand of *Acacia nilotica*, dates from 1994. According to local inhabitants, the roost had then been in use for a number of years. The total number of waterbirds counted in 1994 was 18,025. Other significant observations, in addition to those listed below, include 2,100 *Dendrocygna viduata* in January 1995. Two *Circus macrourus* were reported in February 1998.

Key species		
A4i	Breeding (pairs)	Non-breeding
Bubulcus ibis	—	15,000 (Jan 1994)

Other threatened/endemic wildlife
None known to BirdLife International.

Conservation issues
The reservoir is owned by government, but may be used by the local population under supervision. The local fishery produces an annual catch estimated at 25–30 tonnes; fish species include *Clarias anguillaris*, *Oreochromis niloticus*, *Tilapia zillii*, *Protopterus annectens*, *Bagrus bayad*, *Auchenoglanis* spp. and *Schilbe mystus*. Grazing and watering of livestock are also important, as are market gardening, fruit growing and the cultivation of sugar-cane. Given the lack of woodland in the Birni N'Konni area, cutting of the *Acacia nilotica* riparian woodland, or at least increased collection of firewood, seems a real possibility. The DDE would like to remove the dead trees from the reservoir itself to allow the easier movement of boats and the use of certain fishing equipment. Whether such removal would have any effect on the birds is unclear. The DDE would also like to increase fish production through the introduction of *Lates niloticus* and *Heterotis* sp. and wishes to combat invasion of the edges of the reservoir by sedges *Cyperus* spp.

Further reading
DDE-Tahoua (1991), Mullié and Brouwer (1994a, b), Mullié *et al.* (1999).

Mozagué reservoir — NE010
Admin region Tahoua
Coordinates 13°54′N 05°27′E — A4i
Area c.1,300 ha **Altitude** 275 m — Unprotected

Site description
Mozagué reservoir is situated near the village of Mozagué or Mozagé, 20 km east of Birni N'Konni, in an old riverbed. The reservoir is filled by surface run-off during the rainy season and is used as a source of water for irrigation during the dry season. In the surrounding area there are outcrops of calcareous rocks. The maximum area of the reservoir is 1,300 ha, but its extent is heavily dependent on recent rainfall; the reservoir is shallow (5–7 m) with gently sloping sides, such that levels fall quickly after the rains and water only lasts for about eight months. Average annual rainfall in the Birni N'Konni area for the period 1961–1990 was approximately 450 mm, with large yearly variations. At the times of the surveys in January–February, the water area of the reservoir measured only 10–50 ha. The water of the reservoir is brackish and alkaline, with low levels of nitrogen, but very high levels of phosphorus in the clay-rich sediment. The reservoir supports no aquatic vegetation and is entirely surrounded by farmland.

Birds
See Box for key species. Waterbirds have been counted at Mozagué in January 1993–1998 during which time 32 species were recorded. Other significant counts, in addition to those listed below, include 2,350 *Calidris minuta* in January 1990, and five species of tern totalling 915 individuals in January 1993.

Key species		
A4i	Breeding (pairs)	Non-breeding
Tringa erythropus	—	1,000 (Jan 1995)

Other threatened/endemic wildlife
None known to BirdLife International.

Conservation issues
The reservoir is owned by government, but may be used by the local population under supervision. The reservoir is heavily fished for *Clarias anguillaris* and *Oreochromis niloticus* using cast and set nets. Watering of livestock (cattle and sheep) is also important. There is a considerable amount of dry-season cultivation of, e.g. *Dolichos lablab* and cassava, utilizing residual water in soil recently exposed ('culture de décrue'). Threats are poorly known, but may include disturbance by the local population, both directly and through increasing use of the reservoir and its surroundings. The DDE wishes to plant *Echinochloa stagnina* along the reservoir edges as fodder for livestock and to introduce the fish *Bagrus bayad*.

Further reading
DDE-Tahoua (1991), Mullié and Brouwer (1994a, b), Mullié *et al.* (1999).

Lassouri–Karandi wetlands — NE011
Admin region Zinder
Coordinates 14°02′N 09°35′E — A4i
Area 100 ha **Altitude** 415 m — Unprotected

Site description
The Lassouri–Karandi wetlands are a complex of two semi-permanent

wetlands, partly surrounded by a dune system, 20 km south-east of Damagaram-Taker. Lassouri, also called Lassiri, is relatively deep and steep-sided with a maximum area of approximately 25 ha. Karandi, also called Galdimari, is very shallow and at its greatest extent occupies about 75 ha. They are filled by surface run-off, but are probably also fed by groundwater originating in the surrounding dunes. Less than 1 km apart, Lassouri and Karandi are connected by open water when full, but become isolated as water-levels drop. According to local villagers the two wetlands dry out completely in most years. In 1997, they were almost dry by February. Average annual rainfall in the Lassouri area for the period 1961–1990 was approximately 300 mm, but variation between years is large. The area of water during waterbird censuses in January–February varied from 11 to 20 ha for Lassouri and from 25 to 65 ha for Karandi. The water of the wetlands is somewhat brackish and alkaline, with average levels of nitrogen and low levels of phosphorus in the very sandy sediment. Vegetation includes abundant *Leptochloa flavescens* and *Cyperus alopecurioides* with, at Karandi, also *Nymphaea* spp. and probably, *Echinochloa stagnina*. *Typha australis* was introduced in 1995. The surrounding area, particularly north-east of Lassouri, supports some woodland consisting of *Balanites aegyptiaca*, *Ziziphus mauritiana*, *Prosopis juliflora*, *Hyphaene thebaica* and various fruit trees (lemon, guava, tamarind). Around Karandi there are fewer trees, but those present include *Acacia nilotica*, *Hyphaene thebaica* and, locally, *Phoenix dactylifera*.

Birds

See Box for key species. Surveys have been made at these wetlands during January–February of 1993–1998 and a total of 48 species of waterbird recorded. Significant observations, in addition to those listed below, include five *Aythya nyroca*, 2,500 *Anas acuta* and 3,100 *A. querquedula* in January 1993, 200 *Anas crecca* in January 1995 and 1,600 *Dendrocygna bicolor* in January 1996. Two *Anser albifrons* were seen in January 1995. More than 7,000 waterbirds were counted at Lassouri–Karandi in three out of the six years including 1995, when coverage of Karandi, the largest wetland, was only 20%.

Key species			
A4i		Breeding (pairs)	Non-breeding
	Anas clypeata	—	1,600 (Jan 1993)

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The wetland is owned by government, but may be used by the local population under supervision. The wetland is much used for the grazing and watering of livestock. Other activities include crop growing on residual moisture and fishing, for *Clarias anguillaris* and *Protopterus annectens*. There appear, however, to be few immediate threats, other than greater usage of the wetlands and/or their catchments due to increased demographic pressure.

Further reading

Alio and Halikou (1993), Mullié and Brouwer (1994a, b), Mullié *et al.* (1999).

Chiya wetland — NE012

Admin region Zinder
Coordinates 13°48′N 09°10′E — A4i, A4iii
Area c.250 ha **Altitude** 400 m — Unprotected

Site description

Chiya or Chia wetland lies 2 km north-east of the village of Chia-ta Inga, 10 km due north of the town of Miria or Mirriah and 15 km east of Zinder, in southern Niger. It is a rain-fed, semi-permanent, shallow lake of up to 2 m in depth. Average annual rainfall in the Mirriah area for the period 1961–1990 was approximately 380 mm. However, there is enormous variation in rainfall between years which results in large annual differences in the size of the wetland; during surveys it ranged from zero to 250 ha. The water of the wetland is somewhat brackish and alkaline, with average levels of nitrogen and low levels of phosphorus in the quite sandy sediment. Chiya supports an abundant vegetation of water-lilies *Nymphaea lotus* and wild rice *Oryza longistaminata*. *Echinochloa* spp., *Neptunia oleracea* and *Ipomoea aquatica* are also common. There are patches of water lettuce *Pistia stratiotes*. The woody vegetation surrounding the wetland consists of *Acacia seyal*, *A. nilotica*, *A. albida*, *Adansonia digitata*, *Celtis diversifolia*, *Anogeissus leiocarpus*, *Piliostigma reticulatum*, *Hyphaene thebaica*, *Borassus aethiopum* and *Phoenix dactylifera*.

Birds

See Box for key species. Surveys have been undertaken at Chiya in January–February 1994–1998 and a total of 36 species of waterbird recorded. The number of waterbirds counted in January 1995, when only 50% of the wetland was surveyed, was 15,461. Counts, in addition to those listed below, include up to 4,100 *Anas querquedula* and 502 *Anas clypeata* in January 1994, five *Aythya ferina* and three *A. fuligula* in January 1995 and a single *Porzana pusilla* in March 1998. Giraudoux *et al.* (1988) mention up to 600 *Ciconia ciconia* being seen at Chiya during the dry seasons of 1977/78 and 1978/79, when many were trapped by local hunters. Of the rings so recovered, four were storks from Spain, one from Morocco, and one from Estonia. Giraudoux *et al.* make no mention of large numbers of Palearctic duck at Chiya, while no storks were seen during the more recent surveys. This may point to a change in character of the wetland, or of migration patterns. Of species of global conservation concern, five *Aythya nyroca* were seen in January 1995, one *Circus macrourus* in January 1996 and one *Falco naumanni* in February 1997.

Key species			
A4i		Breeding (pairs)	Non-breeding
	Anas acuta	—	11,600 (Jan 1995)
A4iii	More than 20,000 waterbirds are thought to occur regularly at this site.		

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The wetland is owned by government, but may be used by the local population under supervision. Cropping on residual moisture, watering of livestock and fishing for *Protopterus annectens*, *Oreochromis niloticus* and *Clarias anguillaris* are important activities. Potential further spread of *Pistia stratiotes* may affect the wetland. In addition, there are more general threats from increased utilization of the wetland itself and of its catchment. The latter could lead to erosion and sedimentation problems. Trapping of *Ciconia ciconia* has apparently stopped.

Further reading

Alio and Halikou (1993), Giraudoux *et al.* (1988), Mullié *et al.* (1999).

Atchi wetland — NE013

Admin region Zinder
Coordinates 13°58′N 09°28′E — A4iii
Area c.800 ha **Altitude** 435 m — Unprotected

Site description

Atchi wetland is a large, shallow, (semi-?)permanent wetland surrounded by relatively dense, woody vegetation. It is located 2 km south-east of the town of Mazamni, 30 km north-north-west of Guidimouni and 55 km east-north-east of Zinder, in southern Niger. The wetland is said to have formed in the mid-1980s, possibly following the cessation of the 1983–1984 drought, in a way similar to that by which Dan Doutchi wetland (NE008) was formed after the end of the 1973–1974 drought. It is dependent on surface run-off following rain and its maximum known extent is an estimated 800 ha. Average annual rainfall in the Mazamni area for the period 1961–1990 was approximately 320 mm, but there is considerable yearly variation. The water of the wetland is fairly fresh and alkaline, with high levels of nitrogen, but low levels of phosphorus in the clay-rich sediment. The wetland is heavily vegetated. In January 1995 there was about 50 ha of *Leptochloa flavescens* and *Ludwigia adscendens diffusa*, as well as some wild rice *Oryza* sp. and water-lilies *Nymphaea lotus*. According to local villagers, water lettuce *Pistia stratiotes* reached Atchi in about 1993 and, by 1995, had already spread over a considerable area. Open water was estimated to cover 200 ha, while a further 400 ha supported

riparian forest made up of *Acacia nilotica*, *A. raddiana*, *Balanites aegyptiaca*, *Mitragyna inermis* and *Ziziphus mauritiana*.

Birds

See Box for key species. The wetland has been surveyed in January–February 1995–1998 during which time 26 species of waterbird were observed. In January 1995, 14,216 waterbirds were counted on only 5% of the total area. Of these, 5,000 were *Anas acuta*, 2,000 *A. querquedula* and 7,000 were unidentified ducks, probably also of Palearctic origin. As with many other wetlands in the region, Atchi's importance to birds varies greatly from year to year according to local and regional rainfall patterns.

Key species

A4iii	More than 20,000 waterbirds are thought to occur regularly at this site.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The wetland is owned by government, but may be used by the local population under supervision. There is much grazing and watering livestock and some fishing using set lines and set nets. Fish species include *Clarias anguillaris* and *Protopterus annectens*. There is little market gardening around the perimeter, probably because the marginal woody vegetation makes it difficult. Possible further spread of *Pistia stratiotes* may affect the wetland. In addition, there are more general threats from increased utilization of the wetland itself and of its catchment. The remains of some ducks were found in the fishermens' camps, but were thought to have been caught unintentionally in nets.

Further reading

Alio and Halikou (1993), Mullié *et al.* (1999).

Dilia de Lagané — NE014

Admin region Diffa
Coordinates 15°10′N 12°10′E — A1, A3 (A03)
Area c.100,000 ha **Altitude** 300–380 m — Unprotected

Site description

The Dilia or Dillia de Lagané is a linear depression stretching some 200 km north-west from Nguigmi, at the edge of the former extent of Lake Chad, to the southern end of the Termit Massif. The depression is probably a graben which historically carried water to Lake Chad during periods when the climate was wetter. The Dilia lies in a very sparsely populated area of low rainfall (annual average less than 200 mm for the period 1961–1990). Vegetation is sparse; much of the Dilia de Lagané lies in the northern Sahelian semi-desert grassland and shrubland zone, while the southern quarter falls within the Sahelian *Acacia* wooded grassland and deciduous woodland zone. Land-use is probably restricted to nomadic and/or transhumance livestock-rearing.

Birds

See Box and Table 2 for key species. What information there is dates from 1975 when *Neotis nuba* was found breeding in August (three nests with eggs). *Ardeotis arabs* was also recorded on numerous occasions and *Circus macrourus* was seen once. Of the Sahel biome species, *Caprimulgus eximius* has been reported only from this site. In addition, three Sahara–Sindian biome and one Sudan–Guinea Savanna biome species also occur (see Table 2).

Key species

A1	*Neotis nuba*
A3 (A03)	Sahel biome: 11 of the 16 species of this biome that occur in Niger have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

With the legal resumption of hunting in Niger in 1996 it is likely that bustards are being targeted; even before then foreign officials were reported to have visited the country for the express purpose of hunting bustards, among other target species.

Further reading

Giraudoux *et al.* (1988).

NNR Aïr–Ténéré — NE015

Admin region Agadez
Coordinates 19°12′N 09°30′E — A1, A3 (A02, A03)
Area 7,736,000 ha — National Nature Reserve,
Altitude 400–1,988 m — Strict Nature Reserve, World Heritage Site

Site description

The National Nature Reserve of the Aïr and the Teneré covers the eastern half of the Aïr massif and the western part of the Ténéré Desert. The Aïr massif reaches 2,022 m (1,988 m within the reserve). It was called the 'Switzerland' of Africa by the explorer Barth in 1850, and may be regarded as a Sahelian outpost in the Sahara. The Aïr–Ténéré forms a complex mosaic of arid and hyper-arid environments. Five principal habitats are recognized: mountains, plateaus, large wadis (dry watercourses), small-scale irrigated horticultural areas, and stony or sandy desert. Standing water may occur for longer or shorter periods in all five habitats.

Birds

See Box and Table 2 for key species. Information derives mainly from Newby *et al.* (1987) and Newby and Canney (1989?); the latter list 164 species for the reserve. Of these, 41% are resident, 12% are intra-Africa migrants (mostly present only during the rains) with the remaining 46% wintering or passage migrants from the Palearctic. *Neotis nuba* is known to breed and is present all year. Given the size of the reserve, the population is likely to be important (>10 pairs likely); in 1989 there were 38 observations of at least 47 birds. The (northern) Aïr appears to be on a migration route of *Circus macrourus*, with several observations from March and June. Other notable species include *Struthio camelus*. All 14 Sahara–Sindian biome species known from Niger have been reported. Of these, 12 are resident breeders, *Pterocles coronatus* is either resident or a breeding migrant while *Falco concolor* is probably merely vagrant. Of the eight Sahel biome species reported from the reserve, seven are breeding residents while *Spiloptila clamans* was only observed once. *Ardeotis arabs*, *Caprimulgus eximius* and *Anthoscopus punctifrons* may also occur, but have so far only been reported from nearby areas.

Key species

A1	*Neotis nuba*
A3 (A02)	Sahara–Sindian biome: 13 of the 14 species of this biome that occur in Niger have been recorded at this site; see Table 2.
A3 (A03)	Sahel biome: Eight of the 16 species of this biome that occur in Niger have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

Mammals of global conservation concern include *Acinonyx jubatus* (VU), *Gazella dorcas* (VU), *G. dama* (EN) and *Ammotragus lervia* (VU). *Oryx gazella dammah* (EW) and *Addax nasomaculatus* (CR) used to occur, but are presumed to do so no longer. The reserve is one of the few places in the world where wild olive *Olea laperrinei* still occurs.

Conservation issues

The National Nature Reserve of the Aïr and the Teneré was proclaimed in 1988. A Strict Nature Reserve, also called the Addax Sanctuary, was established within the boundaries of the Nature Reserve at the same time, covering 1,280,500 ha. The reserve also contains important archaeological and palaeontological sites. The two reserves were declared a World Heritage Site in 1991. The reserve belongs to the state, which appoints the team responsible for its (participatory) management. The Niger Government, WWF and IUCN used to run a large development project in the reserve, which sought the sustainable use of resources to the benefit of the inhabitants of the reserve and the preservation of their traditional activities of livestock-raising, market gardening and transport by camel caravans. In addition, the project tried to develop new forms of sustainable utilization of natural resources, including tourism. The project had to be discontinued in

1990 because of armed rebellion. Moves to re-open the project began in 1997. Although little information is available, larger wildlife in particular is likely to have suffered from shooting and poaching during the period of rebellion, as well as at other times, including by the armed forces. The local population is much involved in the management project, and tries to maintain earlier achievements. There is, however, no formal management plan for the reserve; instead, two- or three-year programmes are formulated on a rolling basis. Other threats include tourist vehicles pursuing wildlife to obtain photographs, overgrazing, competition/disturbance by livestock, over-exploitation of firewood (near centres of population), the illegal commercial collection of wood and the failure of reserve authorities to obtain the full recognition of the reserve by other government departments.

Further reading

Giraudoux *et al*. (1988), IUCN (1993), Kabala and Le Berre (1994), Le Berre (1995), Millington *et al*. (1994), Newby and Canney (1989?), Newby *et al*. (1987), Poilecot (1996), Villiers (1950).

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