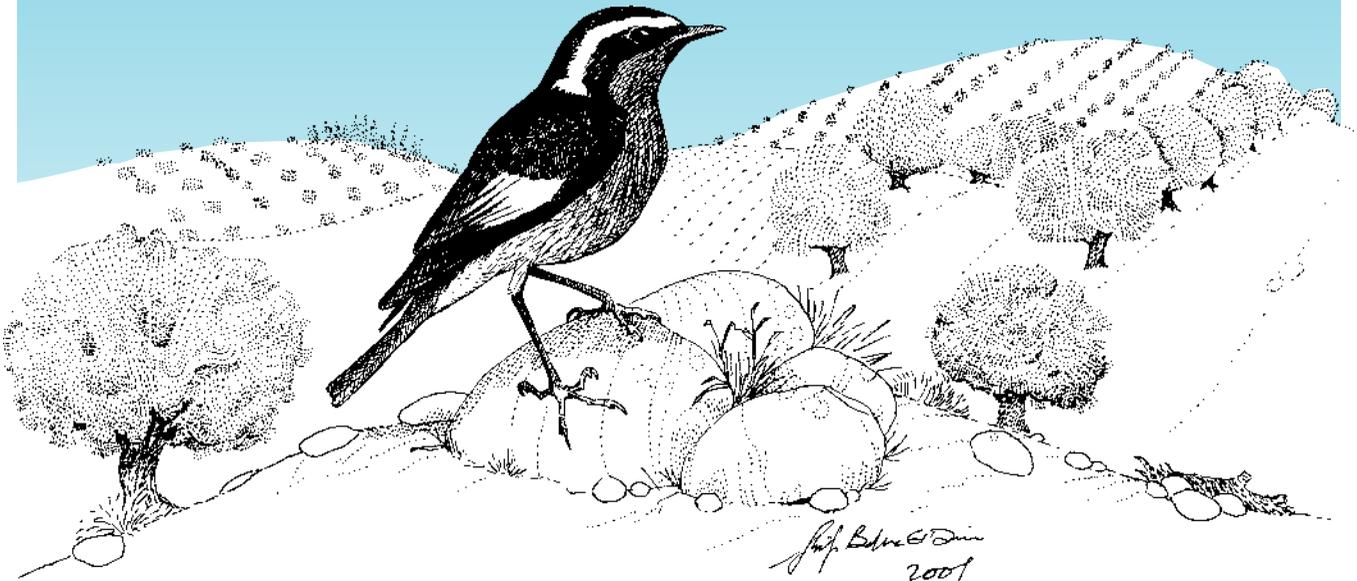


TUNISIA

MOURAD AMARI AND HICHEM AZAFZAF



Moussier's Redstart *Phoenicurus moussieri*. (ILLUSTRATION: SHERIF BAH EL DIN)

GENERAL INTRODUCTION

The Republic of Tunisia is the northernmost country in Africa and is bordered by Algeria to the west, Libya to the south-east and, with a coastline of over 1,300 km, by the Mediterranean Sea to the north and east. The country has a land area of 164,150 km² and a population of nine million, increasing at an annual rate of 1.9%. Although the average population density is about 55 inhabitants/km², densities in desert regions are very low since the majority of people live in coastal areas, including 1.5 million in the capital, Tunis. Administratively, the country is divided into 23 governorates or provinces. The climate of the country is mainly Mediterranean with an increasing Saharan influence in the south. Temperatures range from -5°C in winter in the north and on the central plateau to 45°C in summer in the south. In general, the north-west of the country receives the highest rainfall with an annual average of over 1,000 mm, decreasing southwards and eastwards to between 20 and 100 mm in the Saharan region. Tunisia has, in general, a low relief, with the highest peak, Djebel Chaambi (1,544 m), in the mid-west. Over 2,200 species of plant have been recorded in Tunisia, of which 19 are endemic. The country can be divided into six main biogeographical zones, each with a characteristic climate, flora and fauna.

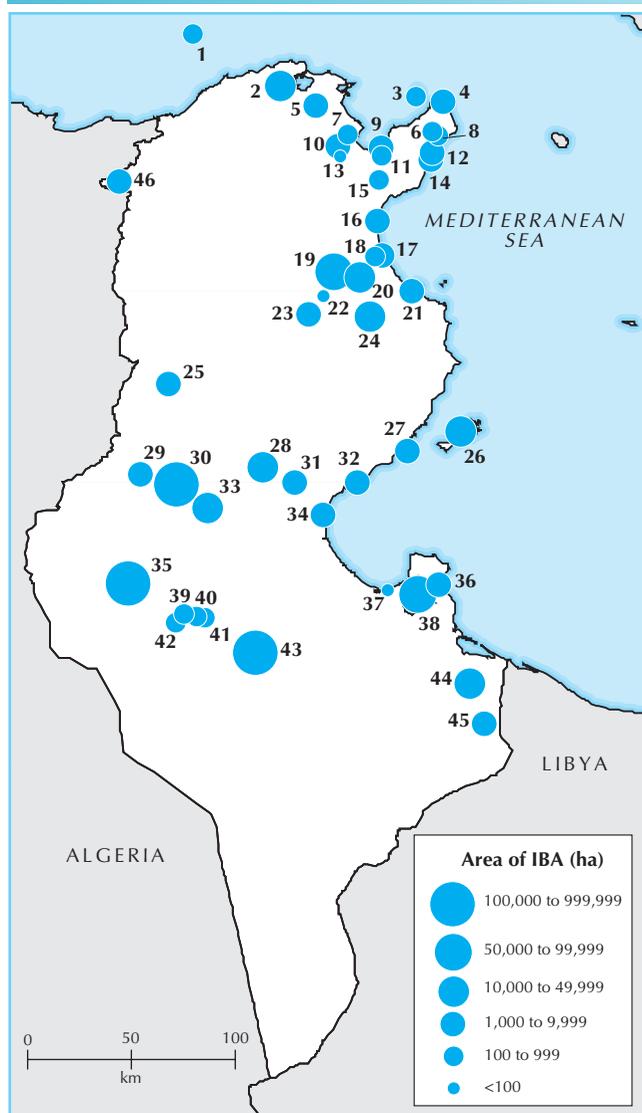
The north-east (Medjerda plain and Cap Bon) region has been inhabited by man for thousands of years and, as a result, virtually all the original woodlands and forests have been cleared for agriculture (mainly now cereals, vines and citrus). Small remnants of the original vegetation occur in places; dominant woody species include olive *Olea europaea* and pistachio *Pistacia lentiscus* trees, with *Tetraclinis articulata* trees in mountains and on hills, and evergreen oak *Quercus coccifera* and dwarf-palm *Chamaerops humilis* along the coast. The typical wetlands of this area are freshwater marshes in river valleys, called 'garaa' or 'garaet' in Arabic, to distinguish them from 'sebkhas' (saline mudflats; see below). Many have been drained for agricultural purposes, but in some cases man-made reservoirs

have replaced some of the habitat formerly provided by natural wetlands.

Khroumirie and Mogods are an area in the north-west which comprises mountainous Mediterranean sclerophyllous forest, reaching altitudes of 1,200 m. The vegetation is dominated by oak trees, particularly *Quercus suber*, used in the cork industry, and *Quercus canariensis*, while along watercourses and in ravines, trees of alder *Alnus glutinosa*, poplar *Populus alba*, elm *Ulmus campestris* and ash *Fraxinus angustifolia* occur. The Mogods, to the east of the Khroumirie, is a region of Mediterranean maquis shrubland in which conspicuous elements include the shrubs *Cistus monspeliensis*, myrtle *Myrtus communis* and strawberry-tree *Arbutus unedo*.

The Dorsale range of mountains, aligned from north-east to south-west, extends from Cap Bon to the Algerian border, close to which the highest peak in Tunisia, Djebel Chaambi (1,544 m), is situated. The north- and north-west-facing slopes of the range receive considerably more rainfall than the southern and south-eastern slopes. Natural vegetation comprises forests of pine *Pinus halepensis*, evergreen oak *Quercus ilex* and juniper *Juniperus phoenicea* and *J. oxycedrus*, in association with the shrubs *Rosmarinus officinalis* and *Cistus clusii*.

Located in the centre of the country, the steppe or semi-desert grassland region marks the transition zone between the Dorsale and the desert and is divided altitudinally into the western high steppe and the low steppe in the east. Dominant plants of the region include the dwarf-shrub *Artemisia herba-alba* and the grass *Stipa tenacissima*. In the low steppe, there are many characteristic salt-lakes, called in Arabic 'sebkha' or 'sebkhet' or, sometimes, when very large, 'chott'. They take the form of depressions or closed basins, which receive water from rain or run-off in wet periods; immediately after rainfall or inflow they may be quite fresh but, following evaporation, they become extremely salty and may dry out completely for long periods. They are usually surrounded by salt-tolerant (halophytic) vegetation. Where the steppe meets the coast a number of wetlands occur. Among these are coastal lagoons, usually formed by long-shore currents which build up a line of sand-

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


dunes parallel with the coast, with a brackish pool behind the dunes that may break through to the sea at times of high rainfall, and that may dry out in summer. Furthermore, the coast of the Gulf of Gabès, from about Sfax to Ben Gardane, is an area of large tidal movement (of up to 2 m amplitude) which, together with the low relief, creates the only major expanse of tidal mudflats in the entire Mediterranean Sea, apart from the Venice lagoons in Italy. Along the ecotone where the steppe meets the desert in the south, there is a characteristic open woodland of *Acacia raddiana* trees, resembling East African savanna, which was formerly much more extensive, and is now conserved mainly in Bouhedma National Park.

The south-east is an area of subdesert located between the Gulf of Gabès, the Libyan border and the Matmata range of hills to the west. Rainfall is low (below 200 mm annually on the coast). The vegetation is generally low-growing with dominant species varying with soil-type; *Reaumuria vermiculata* dominates on gypsum, *Rhanterium suaveolens* on sand and *Zygophyllum album* on alkaline soils. In the Matmata hills, which reach 700 m, relict *Juniperus phoenicea*—*Pistacia atlantica* forest persists.

The Sahara extends across 2.5 million ha of the south of the country and is divided into two main biotopes. These are the stony regs on which the dominant plant species include *Arthrophyllum scoparium* and *A. schmittatum*, and the large sand-dunes of the Great Eastern Erg where grows a sparse vegetation of *Calligonum arich*, *C. azel*, *Retama raetam* and *Stipagrostis pungens*. Around the edges of the desert are a series of oases which arise where groundwater is forced to the surface by artesian springs. This water, even though it is slightly saline, enables dates to grow and irrigated agriculture to occur in the shade of the date-palms. Because of its brackish nature, the water used for irrigation has to be allowed to flush away beyond the farmed areas (otherwise salts would rapidly accumulate in the soil), and this creates characteristic small wetlands around the edges of the oases.

ORNITHOLOGICAL IMPORTANCE

Despite its relatively small area, Tunisia has a varied avifauna of about 360 species, of which some 160 breed. Nine species of global conservation concern have been recorded, of which four breed: *Oxyura leucocephala* (VU), *Marmaronetta angustirostris* (VU), *Falco naumanni* (VU) and *Larus audouinii* (CD). Of the other five species, *Crex crex* (VU) was recorded historically in very small

Table 1. Summary of Important Bird Areas in Tunisia.

IBA code	Site name	Administrative region	46 IBAs covering 12,529 km ²						
			Criteria (see p. 11; for A3 codes, see Table 2)						
			A1	A3 A01 A02	A4i	A4ii	A4iii	A4iv	
TN001	Galite archipelago	Bizerte	✓	✓		✓			
TN002	Ichkeul	Bizerte	✓	✓	✓		✓		
TN003	Zembra and Zembretta islands	Nabeul	✓			✓	✓		
TN004	Djebel el Haouaria	Nabeul		✓				✓	
TN005	Garaet Mabtouh	Bizerte			✓				
TN006	Mlaâbi reservoir	Nabeul	✓						
TN007	Mornaguia reservoir	Ariana	✓		✓				
TN008	Sidi Abdelmonem reservoir	Nabeul	✓						
TN009	Lake Tunis (Lake Radès)	Tunis, Ben Arous			✓				
TN010	Sebkhet Sedjoui	Tunis			✓		✓		
TN011	Soliman	Nabeul	✓		✓				
TN012	Lebna reservoir	Nabeul	✓		✓		✓		
TN013	Zaghuan aqueduct	Ben Arous	✓						
TN014	Lagune de Korba	Nabeul	✓		✓				
TN015	Masri reservoir	Nabeul	✓						
TN016	Sebkhet Sidi Khelifa	Sousse			✓				
TN017	Sebkhet Halk el Menzel	Sousse			✓				
TN018	Oued Sed	Sousse	✓		✓				
TN019	Kairouan plains	Kairouan		✓	✓				
TN020	Sebkhet Kelbia	Sousse	✓	✓	✓		✓		
TN021	Salines de Monastir	Monastir			✓				

Important Bird Areas in Africa and associated islands – Tunisia

Table 1 ... continued. Summary of Important Bird Areas in Tunisia. 46 IBAs covering 12,529 km²

IBA code	Site name	Administrative region	Criteria (see p. 11; for A3 codes, see Table 2)								
			A1	A3		A4i	A4ii	A4iii	A4iv		
				A01	A02						
TN022	Metbassta	Kairouan	✓					✓			
TN023	El Houareb reservoir	Kairouan	✓					✓			
TN024	Sebkhet Sidi el Hani	Sousse						✓			
TN025	Chaâmbi	Kasserine		✓							
TN026	Kerkennah islands	Sfax		✓				✓			
TN027	Salines de Thyna	Sfax						✓	✓		
TN028	Bouhedma	Sidi Bouzid		✓	✓						
TN029	Garaet Douza	Gafsa						✓			
TN030	Gafsa	Gafsa		✓	✓						
TN031	Sebkhet En Noual	Sidi Bouzid		✓	✓			✓			
TN032	Kneiss	Sfax		✓				✓	✓		
TN033	Sebkhet Sidi Mansour	Gafsa	✓	✓	✓			✓			
TN034	Sebkhet Dreïaa	Sfax						✓			
TN035	Chott Djerid	Tozeur, Kebili		✓	✓			✓	✓		
TN036	Bordj Kastil	Medenine						✓			
TN037	Gourine	Medenine						✓	✓		
TN038	Boughrara	Medenine						✓	✓		
TN039	Sebkhet Nouaïel	Kébili	✓					✓			
TN040	Douz Laâla	Kébili	✓					✓			
TN041	Snam	Kébili	✓					✓			
TN042	Ghidma	Kébili	✓					✓			
TN043	Jbil	Kébili		✓	✓						
TN044	Bibane	Medenine						✓	✓		
TN045	Sidi Toui	Medenine		✓	✓						
TN046	El Feidja	Jendouba		✓							
Total number of IBAs qualifying:			20	16	8			32	2	11	1

Table 2. The occurrence of biome-restricted species at Important Bird Areas in Tunisia. Sites that meet the A3 criterion are highlighted in bold.

A01 – Mediterranean North Africa biome (16 species in Tunisia; 16 sites meet the A3 criterion)

IBA code:	001	002	004	019	020	022	023	024	025	026	028	030	031	032	033	034	035	037	038	043	045	046
<i>Falco eleonorae</i>	✓	✓																				✓
<i>Alectoris barbara</i>		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓			✓	✓			✓
<i>Caprimulgus ruficollis</i>				✓							✓		✓	✓								
<i>Picus vaillantii</i>									✓													✓
<i>Ramphocoris clotbey</i>											✓									✓		
<i>Chersophilus duponti</i>												✓			✓		✓					
<i>Eremophila bilopha</i>											✓		✓	✓			✓			✓	✓	
<i>Phoenicurus moussieri</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
<i>Oenanthe leucura</i>		✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Oenanthe moesta</i>				✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Oenanthe hispanica</i>		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Sylvia melanocephala</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
<i>Sylvia cantillans</i>			✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
<i>Sylvia conspicillata</i>			✓			✓	✓			✓				✓		✓						
<i>Sylvia deserti</i>									✓	✓	✓	✓	✓	✓	✓		✓			✓		
<i>Sturnus unicolor</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Number of species recorded:	2	7	7	9	8	8	8	3	10	7	12	10	11	10	10	7	9	6	6	10	8	7

A02 – Sahara–Sindian biome (13 species in Tunisia; eight sites meet the A3 criterion)

IBA code:	019	028	030	031	033	035	037	038	039	040	041	042	043	045
<i>Pterocles senegalensis</i>	✓		✓						✓	✓	✓	✓	✓	
<i>Pterocles coronatus</i>	✓													
<i>Bubo ascalaphus</i>		✓	✓	✓					✓	✓	✓	✓		
<i>Caprimulgus aegyptius</i>									✓	✓	✓	✓	✓	✓
<i>Ammomanes cincturus</i>		✓	✓	✓				✓	✓				✓	
<i>Ammomanes deserti</i>								✓	✓	✓	✓	✓	✓	✓
<i>Alaemon alaudipes</i>		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Oenanthe leucopyga</i>		✓	✓		✓									
<i>Oenanthe lugens</i>			✓		✓									
<i>Turdoides fulvus</i>	✓	✓		✓	✓			✓	✓	✓	✓	✓	✓	✓
<i>Scotocerca inquieta</i>				✓	✓	✓								✓
<i>Rhodopechys githaginea</i>		✓	✓	✓	✓									✓
<i>Passer simplex</i>														✓
Number of species recorded:	3	6	6	6	6	6	4	4	4	6	6	6	6	8

numbers, mainly on spring passage, but also in autumn, and *Circus macrourus* (NT) is a regular passage migrant, while *Aythya nyroca* (VU) is a regular passage migrant and winter visitor in small numbers and for which there is also a breeding record; there are historical records of *Numenius tenuirostris* (CR) and *Tetrax tetrax* (NT). There are no restricted-range species known from Tunisia. In ornithological terms, two biomes are represented in the country, with the Mediterranean North Africa biome (A01) covering the northern half and the Sahara–Sindian biome (A02) the remainder. All 16 of the species restricted to A01 occur in Tunisia, as do 13 of the 22 species characteristic of A02.

Tunisia has a wide variety of wetlands and many are of considerable importance for birds. These wetlands comprise natural freshwater lakes, artificial dams, seasonal salt-lakes and pans (sebkhas and chotts) and coastal lagoons, as well as the littoral which includes, notably, the Gulf of Gabès, one of the most important areas for wintering waders in the Mediterranean (regularly holding more than 300,000 waterbirds). The island archipelagos of La Galite and Zembra support breeding populations of *Calonectris diomedea*, *Falco eleonora* and *Larus audouinii*. Tunisia is an important wintering ground for Palearctic species, in particular waterbirds. It is also a very important stop-over site for trans-Saharan Palearctic migrants.

The short distance between Djebel el Haouaria, at the north-eastern tip of Cap Bon, and Sicily (only about 100 km beyond, across the Mediterranean Sea), means that many soaring birds, such as raptors, cranes and storks, use this short cut between Africa and Europe rather than make the long detour via Gibraltar or the Bosphorus in Turkey. This movement is much more pronounced in spring, when some 40,000 raptors belonging to 23 species occur, than in autumn. Passerines, which move on a broader front, are also much more numerous in spring than in autumn, curiously so given that the number of birds should be much greater after the breeding season; this is perhaps related to the much drier and more inhospitable conditions after the long Mediterranean summer. The oases are very important for passerine and other migrants in spring, since they offer the first green and wet areas after the long northward crossing of the Sahara Desert.

CONSERVATION INFRASTRUCTURE AND PROTECTED-AREA SYSTEM

The current legal provision for protected areas is based upon the Code Forestier (Forestry Code). All protected areas are managed by the Direction Générale des Forêts within the Ministère de l'Agriculture (Ministry of Agriculture). There are three kinds of protected area:

- Parc national—National Parks are declared by presidential decree after recommendation submitted by the Ministry of Agriculture and the Ministry of Environment. There are currently eight National Parks: Ichkeul, Zembra, Chaâmbi, Bouhedma, Feija, Boukornine, Jbil and Sidi Toui. They cover a combined area of 2,018 km². The function of National Parks is the 'protection and management of physical and biological features' and 'the development of both education and the appreciation of nature through increased tourism'.
- Réserve naturelle—Natural Reserves are established by the Ministry of Agriculture by ministerial order. There are 16 Natural Reserves covering a total area of 161.4 km² which are designated for the strict protection of flora and fauna. They are mostly natural habitats, either managed or left undisturbed.
- Réserve de chasse—The network of Hunting Reserves is renewed annually by order of the Ministry of Agriculture. With these areas the hunting of game, including birds, is only allowed under license, while activities such as fishing and logging are strictly controlled. A Hunting Reserve may be declared or altered by the Office of the Prime Minister, the Ministry of Agriculture or the Ministry of Environment, with the approval of the regional authorities. The status of réserve de chasse confers no habitat protection and simply prevents shooting. While there is some wardening in the National Parks, both National Parks and Natural Reserves suffer from inadequate institutional infrastructure and a shortage of trained wardens.

INTERNATIONAL MEASURES RELEVANT FOR THE CONSERVATION OF SITES

Tunisia has ratified the Convention on Biological Diversity, the Ramsar Convention, the Convention on International Trade in Endangered Species, the Bonn Convention, the Convention to Combat Desertification, the Convention on Climate Change and the World Heritage Convention. Ichkeul National Park has been designated as both a natural World Heritage Site and a Ramsar Site. Tunisia also participates in the UNESCO Man and Biosphere Programme, under which four National Parks (Ichkeul, Zembra, Chaâmbi and Bouhedma) have been designated as Biosphere Reserves. Regionally, Tunisia has ratified the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (under the Barcelona Convention) and the Berne Convention for the Conservation of Wildlife and Natural Areas in Europe.

OVERVIEW OF THE INVENTORY

The inventory contains 46 Important Bird Areas (IBAs), covering 12,529 km², or about 7.6% of the area of the country (Map 1, Table 1). Sixteen of the sites are protected areas, one is partially protected by law and 29 are unprotected legally. Thirty-five sites are inland or coastal wetlands and qualify, under categories A1, A4i or both, for the numbers of waterbirds they hold. Sixteen sites have been selected for the Mediterranean North Africa biome (A01) which, between them, hold all 16 species that are restricted to the biome, although three species are currently only known from single sites (Table 2). Eight sites qualify for the Sahara–Sindian biome (A02), holding all 13 characteristic species of this biome recorded nationally (Table 2). One site is a major migration bottleneck (meeting the A4iv criterion), one is an archaeological site which supports a nesting colony of the globally threatened *Falco naumanni*, while two sites are offshore islands, one of which holds significant numbers of breeding seabirds while on the other there is, among other things, an important breeding colony of *Falco eleonora*.

It is probable that, as further data are gathered, additional sites will be added to this inventory, notably in the forests of the north-west, the central wetlands and along the steppe/desert interface, while information on existing sites will undoubtedly be refined.

COMMENTS ON THE INVENTORY

- Figures given in the tinted Box for key species (in each site-account) refer to numbers of individuals, unless otherwise stated.
- The spelling of place names, etc. follows those used on maps issued by the Office de la Topographie et de la Cartographie.

ACKNOWLEDGEMENTS

The inventory was compiled from data obtained by Association 'Les Amis des Oiseaux' (AAO) and its regional sections during field surveys and other activities, together with information provided by Thierry Gaultier, Michael Smart, Faouzi Maâmouri, and the reports of the Foundation Working Group for International Wader and Waterfowl Research (WIWO). Special thanks go to all AAO volunteers who collaborated in collecting data.

GLOSSARY

bahiret or bahira salt-water lagoon connecting with the sea.
chott literally, a beach; used in the south of the country to mean a very large sebkha.
djebel mountain or hill.
erg area of high sand-dunes.
garaet or garaa freshwater lake or marsh, often seasonal.
oued river or watercourse, in arid regions often remaining dry for long periods.
sebkha or sebkhet salt-lake or depression where water collects seasonally and evaporates leaving a saline surface or mudflat; sometimes also used as a term for coastal lagoons.

SITE ACCOUNTS

Galite archipelago

Admin region Bizerte

Coordinates 37°32'N 08°56'E

Area 700 ha Altitude 0–391 m

TN001

A1, A3 (A01), A4ii
Hunting Reserve

Site description

The Galite archipelago is situated 40 km off the coast of Tunisia, 45 km north-west of Cap Serrat and 64 km north-east of the town of Tabarka. The archipelago is dominated by the T-shaped main island of Galite (650 ha), which is 5.4 km long and c.950 m wide at the narrowest point and 2.5 km at the widest. About 2.5 km to the south-west of Galite is the low-lying islet of La Fauchelle (14 ha). The islet of Galiton lies only 50 m west of La Fauchelle, has an area of 27 ha and is topped by a lighthouse. A trio of small islets, the Îlots de Chiens, lie 1.6 km north of Galite. The largest of these is less than 9 ha, but reaches an altitude of 119 m. Much of Galite is covered by 'diss', *Ampelodesma mauritanicus*, a low grass that grows densely on hills. Elsewhere, the maquis vegetation grows so densely in places, particularly in valleys in the north-west of Galite, as to be impenetrable. Dominant species include *Pistacia lentiscus*, *Olea europaea*, *Tamarix africana*, *Laurus nobilis*, *Rosmarinus officinalis*, *Scilla maritima*, *Cynara scolymus* and *Ceratonia siliqua*.

Birds

See Box and Table 2 for key species. Breeding species include *Larus audouinii* (40 pairs), as well as *Calonectris diomedea* (fewer than 100 pairs), *Phalacrocorax aristotelis* (10 pairs), *Larus cachinnans* (500 pairs), *Falco peregrinus* and *F. tinnunculus*.

Key species

A1 *Larus audouinii*

A3 (A01) Mediterranean North Africa biome: Two of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A4ii	Breeding (pairs)	Non-breeding
<i>Falco eleonorae</i>	140	—

Other threatened/endemic wildlife

The seal *Monachus monachus* (CR) used to occur, but has not been seen since 1986. The scorpion *Euscorpis flavicaudis*, confined to a number of Mediterranean islands, is present.

Conservation issues

The site is likely to be declared a National Park. The seas surrounding the archipelago are a Marine Reserve.

Further reading

Association Les Amis des Oiseaux and Medmaravis (1995), Association Les Amis des Oiseaux (2000), Azafzaf (2000), Gaultier (1977), Ministère de l'Agriculture, Direction Générale des Forêts (2000), Ministère de l'Environnement et de l'Aménagement du Territoire (1999), Noura (1995), Oueslati (1995).

Ichkeul

Admin region Bizerte

Coordinates 37°10'N 09°40'E

Area 12,600 ha

Altitude -2–511 m

TN002

A1, A3 (A01), A4i, A4iii
National Park, Biosphere Reserve,
World Heritage Site, Ramsar Site

Site description

Ichkeul National Park, situated 25 km south-west of the town of Bizerte on the Mateur plain in north-eastern Tunisia is (with Doñana in Spain, the Camargue in France and the El Kala wetlands in Algeria) one of the four major wetlands of the Western Mediterranean. It provides habitat for passage and wintering waterbirds from the northern Palearctic and breeding habitat for many southern Palearctic species, some of them globally threatened or biome-restricted. The park consists of an isolated wooded massif (Djebel Ichkeul), a permanent fresh/brackish lake, Lake Ichkeul (8,500 ha) and areas of freshwater marshland (Garaet Ichkeul). The lake is fed by a number of rivers from the west and south, and is indirectly connected to the sea, via the marine lagoon of the Lac de Bizerte, by the Oued Tindja. The massif supports a mixed woodland of

Olea europaea, *Pistacia lentiscus* and *Euphorbia dendroides* while the marshes are dominated by *Phragmites communis*, *Tamarix africana*, *Typha angustifolia* and *Juncus* species. Within the lake the waterplant *Potamogeton pectinatus* is of particular importance as a food-source for wintering waterfowl. During the last 10 years the ecological character has changed dramatically, with the building of dams on inflow rivers, the consequent decrease of river water and increased evaporation.

Birds

See Box and Table 2 for key species. Before the construction of the upstream dams, 200,000 or more waterbirds were regularly recorded in winter at Ichkeul—these included, as well as those listed in the Box, the species of global conservation concern *Aythya nyroca* (20–90 birds), as well as up to 5,000 *Anas crecca* and smaller numbers of *A. acuta* and other ducks. Ichkeul was the major wintering ground for the population of *Anser anser* (up to 25,000 birds) that breeds in Central Europe. It also supported major congregations on passage of trans-Saharan migrant waterbirds such as *Anas querquedula*, *Limosa limosa*, *Philomachus pugnax* and *Tringa stagnatilis*, and post-breeding (probably moulting) concentrations of *Anas crecca* and *Limosa limosa*. Breeding birds of the marshes included *Ardea cinerea*, *A. purpurea*, *Egretta garzetta*, *Marmaronetta angustirostris* (probably also *Oxyura leucocephala*), *Porphyrio porphyrio*, *Rallus aquaticus*, *Himantopus himantopus* and *Glareola pratincola*, together with many passerines such as *Acrocephalus arundinaceus* and *A. scirpaceus*. On passage, there are good numbers of raptors including *Circus macrourus*, and especially in summer and early autumn, *Falco eleonorae* and *Circus pygargus*. Thick cover along the banks of the inflow rivers provides habitat for a number of passerines including *Tchagra senegalus*. The massif still provides breeding sites for a number of raptors such as *Neophron percnopterus*, *Hieraetus fasciatus*, *Buteo rufinus*, *Falco peregrinus* and *F. tinnunculus*, as well as a number of rock-loving passerines such as *Phoenicurus moussieri*, *Oenanthe leucura*, *O. hispanica* and *Monticola solitarius*.

Key species

A1 *Oxyura leucocephala* *Aythya nyroca*

Marmaronetta angustirostris

A3 (A01) Mediterranean North Africa biome: Seven of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A4i	Breeding (pairs)	Non-breeding
<i>Phoenicopterus ruber</i>	—	500–4,500 (w)
<i>Anser anser</i>	—	300–25,000 (w)
<i>Marmaronetta angustirostris</i>	50–200	—
<i>Anas penelope</i>	—	10,000–50,000 (w)
<i>Anas clypeata</i>	—	5,000–10,000 (w)
<i>Aythya ferina</i>	—	10,000–90,000 (w)
<i>Oxyura leucocephala</i>	—	12–600 (w)
<i>Fulica atra</i>	—	2,000–45,000 (w)
<i>Glareola pratincola</i>	200–600	—
<i>Limosa limosa</i>	—	3,000–6,000 (p)

A4iii Up to 200,000 waterbirds have been recorded at this site.

Other threatened/endemic wildlife

There used to be a population of the otter *Lutra lutra* (VU), but it is unlikely to have survived the construction of the dams. The plant *Teucrium schoenbergeri* is only known from Ichkeul.

Conservation issues

The site was declared a National Park in 1980. It is also a Biosphere Reserve, a World Heritage Site and a Ramsar Site. The ecology of the lake and marshes of Ichkeul has been much altered by the reduced inflow of fresh water as a consequence of the construction of dams on affluent rivers. The amount of freshwater inflow has decreased and has been replaced by an inflow of saltwater from the sea. The resulting increase in salinity has destroyed the freshwater vegetation and numbers of waterbirds have crashed. A large number of studies have been carried out under the auspices of the Tunisian government, and a restoration plan has been developed with a planned allocation of fresh water. It remains to be seen whether this plan will be successful, and whether the wetland may lose some of its international designations. The mountain is not affected by these activities and quarrying has been halted and grazing reduced.

Further reading

Direction Générale des Forêts *et al.* (1997), Gaultier (1986, 1987b, 1988a), GTZ (1994), Hollis and Smart (1986), Hughes *et al.* (1997), Maamouri and Hughes (1991), Ministère de l'Environnement et de l'Aménagement du Territoire (1999), Nabli (1989), Nieri *et al.* (1992), Rigaux (1989), Smart (1975), Tamisier (1988), Thomsen and Jacobsen (1979), Zouaghi (1995).

Zembra and Zembretta islands

TN003

Admin region Nabeul

Coordinates 37°06'N 10°48'E

A1, A4ii, A4iii

Area 391 ha Altitude 120–435 m National Park, Biosphere Reserve

Site description

Located in the eastern part of the Gulf of Tunis, to the west of Cap Bon, Zembra island is situated about 15 km west-north-west of the town of El Haouaria. It is a mountainous island rising to 435 m, and is a seaward extension of the Dorsale. The vegetation is Mediterranean maquis and a total of 230 plant species have been recorded, with *Olea europaea*, *Pistacia lentiscus*, *Arbutus unedo* and *Erica multiflora* as dominants. The vegetation of the small, neighbouring island of Zembretta is halophytic.

Birds

See Box for key species. Zembra holds the largest known breeding colony of *Calonectris diomedea* in the Mediterranean Sea. The 9 km of cliffs of the island also hold 10 breeding pairs of *Falco peregrinus*, one of the highest densities known for this species. Other breeding birds include *Larus audouinii* (10 pairs), *Phalacrocorax aristotelis* and *Larus cachinnans* (100 pairs).

Key species

A1	<i>Larus audouinii</i>		
A4ii		Breeding (pairs)	Non-breeding
	<i>Calonectris diomedea</i>	20,000	—
A4iii	Up to 20,000 pairs of breeding seabirds occur at this site.		

Other threatened/endemic wildlife

The seal *Monachus monachus* (CR) was last recorded in 1975.

Conservation issues

Zembra was declared a National Park in 1977. The site is also a Biosphere Reserve.

Further reading

Association Les Amis des Oiseaux (2000), Association Les Amis des Oiseaux and Medmaravis (1995), Azafzaf (2000), Ben Maïz and Boudouresque (1984), Ben Saad (1984), Centre d'Activités Regionales pour les Aires Spécialement Protégées (1986), Gaultier (1978, 1982, 1980), Hollis (1986), Ministère de l'Environnement et de l'Aménagement du Territoire (1999), Oueslati (1995), Smart (1975).

Djebel el Haouaria

TN004

Admin region Nabeul

Coordinates 37°04'N 11°01'E

A3 (A01), A4iv

Area 1,300 ha Altitude 0–393 m Hunting Reserve

Site description

Djebel el Haouaria is situated on the northern point of the Cap Bon peninsula in the extreme north-east of the country. The low peak (393 m) of El Haouaria is the northernmost mountain at the end of the Dorsale range. It supports a Mediterranean maquis vegetation of *Olea europaea*, *Pistacia lentiscus*, *Myrtus communis* and *Cistus monspeliensis*.

Birds

See Box and Table 2 for key species. Birds which have wintered in Africa and are moving back to breeding grounds in Europe concentrate here for the short sea-crossing to Sicily, particularly large, soaring birds which avoid long sea-crossings. The site is comparable in importance to Gibraltar and the Bosphorus. Annually between March–May some 20,000–40,000 raptors of 24 species, including *Circus macrourus* and *Falco naumanni* overfly the site, as do significant numbers of *Ciconia ciconia*, *C. nigra*, *Grus grus*, *Asio otus*, *Asio flammeus*, *Otus scops*, *Coturnix*

coturnix and *Oriolus oriolus*. Raptors breeding on the cliffs include *Buteo rufinus cirtensis*, *Falco peregrinus*, *F. biarmicus* and *F. tinnunculus*.

Key species

A3 (A01)	Mediterranean North Africa biome: Seven of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.
A4iv	More than 20,000 storks, raptors and cranes regularly pass through this site on migration.

Other threatened/endemic wildlife

Djebel el Haouaria hosts one of the most important colonies of bats in Tunisia, including *Rhinolophus ferrum-equinum* (LR/cd).

Conservation issues

The site is protected as a Hunting Reserve and the cave used by the bats has been declared a Natural Reserve. There was a long tradition of bird-catching by local people at El Haouaria; large birds such as raptors were caught for food, using clap-nets on the side of the mountain, while *Accipiter nisus* were trapped and trained to catch migratory *Coturnix coturnix*; passerines were caught to feed the captive *Accipiter nisus*. In the 1970s, the catching of raptors was stopped, largely as a result of the efforts of the A.A.O., falconry with *A. nisus* was brought under strict control, and a falconry festival instituted in May each year.

Further reading

Azafzaf (1995), Gaultier (1987a, 1988a), Hein and Kising (1994), Ministère de l'Agriculture, Direction Générale des Forêts (2000), Thiollay (1975, 1977), Thomsen and Jacobsen (1979).

Garaet Mabtough

TN005

Admin region Bizerte

Coordinates 37°02'N 09°57'E

A4i

Area 2,000 ha Altitude 15–25 m

Unprotected

Site description

Garaet Mabtough is a freshwater marsh, situated some 20 km south of Bizerte, in the lower flood-plain of the Medjerda, Tunisia's largest river (which rises in Algeria). Formerly, the whole of the flood-plain must have been a magnificent wetland, but most has now been reclaimed for agriculture, and Garaet Mabtough is the only part which still floods. In dry winters the site is not flooded, but in wet seasons it can hold considerable numbers of waterbirds, no doubt originating at nearby Ichkeul.

Birds

See Box for key species. Other species wintering at the site include *Egretta garzetta*, *Ardea cinerea*, *Anas penelope*, *A. crecca*, *Circus aeruginosus*, *Fulica atra*, *Grus grus*, *Himantopus himantopus*, *Pluvialis apricaria* and *Vanellus vanellus*.

Key species

A4i		Breeding (pairs)	Non-breeding
	<i>Anas clypeata</i>	—	3,000–6,000 (w)
	<i>Glareola pratincola</i>	300	—

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Main threats are hunting, drainage and the effects of the use of pesticides.

Further reading

Gaultier (1988a), Hughes *et al.* (1997), Pottier-Alapetite (1979, 1981).

Mlaâbi reservoir

TN006

Admin region Nabeul

Coordinates 36°51'N 10°56'E

A1

Area 200 ha Altitude 25–50 m

Unprotected

Site description

Mlaâbi reservoir is a small, man-made water-body behind a dam

built across a modest watercourse, for irrigation of local agriculture, near the northern tip of Cap Bon, just north of the town of Menzel Temime. Water-levels vary as water is extracted, so there is little permanent vegetation; small areas of *Typha angustifolia*, *Tamarix* and *Juncus* species are found. It is one of several similar reservoirs at the tip of Cap Bon which form important stop-over points for migrating birds, not only waterbirds, since the drainage of Garaet el Haouaria.

■ Birds

See Box for key species. It is suspected that *Oxyura leucocephala* (12–80 pairs) and *Marmaronetta angustirostris* breed. Other species that occur during passage and winter include *Podiceps cristatus*, *Anas platyrhynchos*, *A. clypeata*, *A. acuta*, *Aythya ferina*, *A. nyroca*, *Fulica atra*, *Himantopus himantopus*, *Glareola pratincola*, *Charadrius dubius*, *C. alexandrinus*, *Calidris minuta*, *Tringa totanus*, *T. nebularia*, *T. glareola* and *T. hypoleucos*.

Key species

A1 *Oxyura leucocephala*

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Threats include human disturbance and hunting.

■ Further reading

Gaultier (1987b, 1988a), Hughes *et al.* (1997).

Mornaguia reservoir

Admin region Ariana

Coordinates 36°50'N 10°13'E

Area 300 ha Altitude 134 m

TN007

A1, A4i

Unprotected

■ Site description

Mornaguia reservoir is a recently built reservoir, located 12 km west of Tunis and surrounded by agricultural land. Water is pumped into it from dams in the national water grid, so that water-levels fluctuate considerably and there is little natural vegetation except where a stream flows in; here stands of *Phragmites australis*, *Typha angustifolia*, *Inula viscosa* and *Juncus* species occur. As one of the few freshwater lakes in the area it attracts a variety of migrants, especially in late summer when other sites are dry.

■ Birds

See Box for key species. *Oxyura leucocephala* is present throughout the year and may breed, although numbers are often highest in late summer and autumn, suggesting through-passage. *Marmaronetta angustirostris* is regularly present in summer and probably breeds, as do *Tachybaptus ruficollis*, *Podiceps cristatus* and *Fulica atra*. In late summer there are considerable concentrations of waders, *Glareola pratincola*, *Chlidonias niger* and *Sterna nilotica*; *S. nilotica* and *G. pratincola* may breed in favourable years. Up to several hundred *Aythya nyroca* occur in late summer, presumably migrants stopping to moult, and a few (up to 20) stay through the winter. Other wintering waterbirds include *Aythya ferina*, *Anas platyrhynchos*, *A. strepera*, *A. acuta*, *A. crecca* and *Fulica atra*.

Key species

A1	<i>Marmaronetta angustirostris</i>	<i>Oxyura leucocephala</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Marmaronetta angustirostris</i>	8–30 birds	—
	<i>Oxyura leucocephala</i>	12–220 birds	—

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Hunting of waterbirds on the reservoir, although illegal, occurs and is the main threat.

■ Further reading

Gaultier (1987b, 1988a), Hughes *et al.* (1997), Karem *et al.* (1997).

Sidi Abdelmonem reservoir

Admin region Nabeul

Coordinates 36°50'N 10°58'E

Area 250 ha Altitude 77–100 m

TN008

A1

Unprotected

■ Site description

One of the smallest of the Cap Bon man-made reservoirs, Sidi Abdelmonem is also one of the oldest, with the most natural fringing vegetation cover, including *Phragmites australis*, *Typha angustifolia* and *Juncus* species.

■ Birds

See Box for key species. Due to the fringing vegetation, this is one of the best sites for nesting *Oxyura leucocephala* (15–80 pairs resident). *Marmaronetta angustirostris* also occurs and probably breeds. Small numbers of *Aythya nyroca* occur in late summer. Other waterbirds that winter at the site include *Anas platyrhynchos*, *A. querquedula*, *A. clypeata*, *A. acuta*, *Aythya ferina*, *Fulica atra* and *Porphyrio porphyrio*.

Key species

A1 *Oxyura leucocephala*

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Disturbing and hunting are the main threats affecting the site.

■ Further reading

Gaultier (1987b, 1988a), Hughes *et al.* (1997).

Lake Tunis (Lake Radès)

Admin region Tunis, Ben Arous

Coordinates 36°45'N 10°30'E

Area 3,700 ha Altitude -5–5 m

TN009

A4i

Hunting Reserve

■ Site description

Lake Tunis is a large, shallow lagoon, possibly a former mouth of the Medjerda river, once connected to the sea, but now separated from it on the eastern side by the coastal dunes on which Carthage and La Goulette stand. Tunis, the capital, is situated on higher ground to the west of the lake, and is gradually spreading all round it, joining up with Radès on the southern side. The lake is bisected by a ship canal and motorway. In the northern half of the lake is the island of Chikly which has a ruined Spanish fortress on it. The southern half of the lake includes the former salt-production pans at Radès/Mégrine. The lake formerly received most of the sewage effluent and rainwater run-off from Tunis, but in the 1960s and 1970s, a clean-up operation was carried out, with waste-water being piped to a treatment station at Ariana, and circulation of water in the shallow lake improved. In the 1980s, most of the northern shores of the lagoon were reclaimed for urban expansion, destroying all natural habitat. The same has occurred in the late 1990s in the southern half of the lagoon, and the salt pans have been closed and filled in. The current ornithological status of the lake is uncertain, as the reclamation work on the south of the lake is still in progress, but it is likely that it will retain very little of its former ornithological interest, although some birds originating from nearby Sebkhet Sedjoumi and Ariana may still occur.

■ Birds

See Box for key species. Other wintering waterbirds found on Lake Radès include many hundreds of *Podiceps nigricollis* (a species rarely found in such numbers elsewhere in Tunisia), *Casmerodius albus*, *Ardea cinerea*, *Plegadis falcinellus*, *Platalea leucorodia*, *Tadorna tadorna* (200–2,000), *T. ferruginea*, *Anas acuta* (500–800), *A. clypeata* (1,000–2,000), *Aythya fuligula*, *A. ferina*, *Fulica atra* (500–4,000), *Himantopus himantopus*, *Larus genei*, *L. ridibundus*, *L. cachinnans* and *Sterna albifrons*. The island of Chikly has breeding colonies of about 70 pairs of *Egretta garzetta* and about 100 pairs of *Larus cachinnans* which breed at the base of the ruins, together with the occasional *Tadorna tadorna*, and with *Falco peregrinus* and *F. tinnunculus* in the ruins themselves. Elsewhere, around the shores of the lake, there were

formerly extensive breeding colonies of *Sterna albifrons* and *Glareola pratincola*, with good populations of *Charadrius alexandrinus*, *Himantopus himantopus* and *Burhinus oedienemus*; it is unlikely that many of these breeding waders will survive the recent reclamation.

Key species		
A4i	Breeding (pairs)	Non-breeding
<i>Podiceps nigricollis</i>	—	500–3,000 (w)
<i>Phalacrocorax carbo</i>	—	2,000–6,000 (w)
<i>Platalea leucorodia</i>	—	80–220 (w)
<i>Phoenicopterus ruber</i>	1,000–5,000	—

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The site is a Hunting Reserve while the island of Chikly is also a Natural Reserve. The reserve is, however, poorly wardened and there is much disturbance from people, dogs and rats, so that breeding birds rarely succeed. The whole of the lagoon has undergone extreme change in ecological status, which was perhaps inevitable because of its proximity to the capital, and ornithological interest has decreased steeply in the last 20 years.

■ Further reading

Arnoud and Lachaux (1974), Ben Maïz and Boudouresque (1984), Gaultier (1986, 1987b, 1988a), Hughes *et al.* (1997), Maamouri and Hughes (1991), Ministère de l'Agriculture, Direction Générale des Forêts (2000), Shili (1995).

Sebkhet Sedjoui		TN010
Admin region Tunis		
Coordinates 36°45'N 10°08'E		
Area 2,700 ha	Altitude 1–5 m	A4i, A4iii Hunting Reserve

■ Site description

Sedjoui is the most northerly of the sebkhas or saline depressions typical of central and southern Tunisia. Being situated in an area of higher rainfall, it receives precipitation more regularly than other sebkhas further south, and therefore holds water every winter. In summer it dries out to a large extent, but small quantities of sewage and waste-water flow in from the suburbs of Tunis to the north, so that there is water and habitat for *Phoenicopterus ruber* and waders even in late summer. As such, it is a key wetland in late summer and autumn. In the southern and western parts of the lake there are about 40 islands varying in size from a few square metres to several hectares. There is little fringing vegetation because of the high salt content of the soil.

■ Birds

See Box for key species. Sedjoui is important in all seasons for bird species typical of salt depressions, such as *Phoenicopterus ruber*, *Tadorna tadorna*, *Himantopus himantopus* and *Larus genei*. *P. ruber* has attempted to nest on the islands, but failed due to disturbance. Other nesting species include *Tadorna tadorna* in small numbers, *Himantopus himantopus*, and even, at times, *Marmaronetta angustirostris*. At other periods of the year, Sedjoui is one of the most important sites in Tunisia for *P. ruber*, with numbers regularly above 10,000, a large proportion of which are adult birds, suggesting that this is a preferred feeding site. The site is extremely important for migrant and wintering waders (many thousands of all species) and for wintering ducks, notably *Tadorna tadorna*, which has its highest Tunisian concentration here, *Anas acuta* (3,000–5,000) and *A. clypeata*. *Anser anser* has become a regular winter visitor (up to 100) since the loss of Ichkeul as a goose habitat. In winters when other local wetlands are dry; *Grus grus* use the site as a roost.

Key species		
A4i	Breeding (pairs)	Non-breeding
<i>Phoenicopterus ruber</i>	—	4,000–25,000 (w)
<i>Tadorna tadorna</i>	—	1,000–12,500 (w)
<i>Anas clypeata</i>	—	2,000–10,000 (w)
A4iii	Up to 70,000 waterbirds have been recorded at this site.	

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Although the site is a Hunting Reserve, there is some poaching and illegal hunting as well as disturbance by human visitors and stray dogs. Much more important, however, is the inexorable reclamation of the edges. The site is in the suburbs of the capital, and there are a number of road-building and construction projects around its edges. It is likely that the inflow of waste-water will be cut off. There is a large rubbish tip at the southern end. Given the decrease in importance of the Lake of Tunis, it would be a high priority to establish a properly managed reserve or National Park here at the gates of the capital.

■ Further reading

Gaultier (1986, 1987b, 1988a), Hughes *et al.* (1997), Maamouri and Hughes (1991), Ministère de l'Agriculture, Direction Générale des Forêts (2000).

Soliman		TN011
Admin region Nabeul		
Coordinates 36°42'N 10°30'E		
Area 600 ha	Altitude 0–10 m	A1, A4i Unprotected

■ Site description

The site is on the coast at the base of the Cap Bon peninsula, between the town of Soliman and the sea, at the mouth of the Oued el Melah. Habitats includes flood-plain (much reclaimed for agriculture), saltmarsh, springs, former salt pans and an inlet of the sea. The vegetation is mainly halophytic, with *Arthrocnemum* and *Salicornia* species dominating. It is the first wetland on the North African coast for birds migrating from the north in autumn.

■ Birds

See Box for key species. The area holds a wide variety of waterbirds. Breeding birds include *Marmaronetta angustirostris*, as well as *Himantopus himantopus* and *Glareola pratincola*. During the passage season, there are good numbers of herons, *Plegadis falcinellus* and several thousand waders of many species including several hundred *Tringa stagnatilis*, together with *Charadrius hiaticula*, *Pluvialis apricaria*, *Vanellus vanellus*, *Limosa limosa* and *Numenius arquata*. There is a major roost of gulls and terns (Laridae), and wintering birds include *Phoenicopterus ruber* and several ducks.

Key species			
A1		Breeding (pairs)	Non-breeding
A4i	<i>Marmaronetta angustirostris</i>	—	50–220 (w)
	<i>Marmaronetta angustirostris</i>	—	500–1,600 (w)
	<i>Larus genei</i>	—	500–1,600 (w)

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The area is situated within 30 km of the capital, and there is much building of housing and industrial facilities. The area has no protected status and some habitat conservation measures are urgently required. Hunting and human disturbance from nearby tourist hotels are minor in comparison to the building activity.

■ Further reading

Gaultier (1986, 1987b, 1988a), Hughes *et al.* (1997), Meininger *et al.* (1994).

Lebna reservoir		TN012
Admin region Nabeul		
Coordinates 36°42'N 10°56'E		
Area 1,000 ha	Altitude 43 m	A1, A4i, A4iii Unprotected

■ Site description

Lebna is the largest and probably the most important of the artificial reservoirs of the northern Cap Bon peninsula, with the most extensive vegetation along the two streams which flow into it and which are dammed; there are extensive stands of *Phragmites communis*, *Typha angustifolia* and *Juncus* spp., which provide nesting habitat and cover for many waterbirds.

Birds

See Box for key species. Regular breeding species include *Oxyura leucocephala* (20–50 birds also winter) and *Marmaronetta angustirostris* (50–100 birds winter), as well as *Porphyrio porphyrio*, together with species such as *Tachybaptus ruficollis*, *Podiceps cristatus* and *Fulica atra*. *Elanus caeruleus* breeds in the vicinity. Being situated near the tip of Cap Bon, Lebna, to some extent, replaces the drained former marsh of Garaet el Haouaria, and attracts a good number and variety of passage waterbirds, including species such as *Plegadis falcinellus*, *Platalea leucorodia*, storks, waders and terns. Several hundred *Aythya nyroca* regularly occur as post-breeding migrants. Wintering waterbirds include *Anas platyrhynchos*, *A. acuta*, *A. penelope*, *A. clypeata*, *A. strepera*, *Aythya fuligula*, *A. ferina* and *Fulica atra*, with total numbers of up to 20,000.

Key species

A1	<i>Marmaronetta angustirostris</i> <i>Aythya nyroca</i>	<i>Oxyura leucocephala</i>	
A4i	<i>Marmaronetta angustirostris</i>	Breeding (pairs) Breeds	Non-breeding 50–100
A4iii	More than 20,000 waterbirds have been recorded at this site.		

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Threats include human disturbance and hunting.

Further reading

Gaultier (1986, 1987b, 1988a), Hughes *et al.* (1997), Meininger *et al.* (1994).

Zaghouan aqueduct

Admin region Ben Arous
Coordinates 36°41'N 10°10'E
Area 40 ha Altitude 5–30 m

TN013

A1

Hunting Reserve

Site description

The site is a Roman aqueduct, situated 17 km south of Tunis, which used to form part of the Zaghouan to Carthage water-supply system. It consists of a series of 20-m-high pillars and arches in which many cavities and holes have developed. The site, which crosses the valley of the Miliana river, is surrounded by wheat fields.

Birds

See Box for key species. The cavities and holes in the aqueduct are used as nesting and roosting sites by *Falco naumanni* (30 pairs), *F. biarmicus*, *F. tinnunculus*, *Coracias garrulus*, *Petronia petronia*, *Sturnus unicolor* and *Corvus corax*.

Key species

A1	<i>Falco naumanni</i>
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Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The surrounding area is a Hunting Reserve and the aqueduct is protected as an archaeological monument. The widespread use of pesticides in the areas where the raptors feed is a cause for concern.

Further reading

Gaultier (1988a), Ministère de l'Agriculture, Direction Générale des Forêts (2000).

Lagune de Korba

Admin region Nabeul
Coordinates 36°41'N 10°56'E
Area 1,200 ha Altitude 0–2 m

TN014

A1, A4i

Hunting Reserve

Site description

The site is a narrow coastal lagoon located between the towns of Korba and Menzel Temime, on the eastern coast of the Cap Bon peninsula.

It is 12 km long, but never exceeds 400 m in width. It is the largest surviving lagoon of a chain which used to extend all along the eastern shore of the Cap Bon peninsula, several of which have dried up because of agricultural use of groundwater. Water-levels are quite deep in winter, because of winter rainfall, but most dry out in summer; the Korba lagoons remain wet even in summer because they receive treated waste-water from the town and the organic outflow from canning factories. The seaward shoreline supports a dune vegetation comprising *Ammophila arenaria*, *Erygium maritimum* and *Euphorbia paralias*. The edges of the lagoon itself support a halophytic vegetation, including *Arthrophytum* and *Salicornia* species.

Birds

See Box for key species. Given the site's situation directly on the path of birds migrating between Africa and Europe, it is a key stop-over site for migrants in spring and autumn (when it is one of the few wetland sites which regularly hold water). A wide variety of waterbirds occur, especially herons, waders, gulls and terns, including *Ardea cinerea*, *Egretta garzetta*, *Phoenicopiterus ruber*, *Tadorna tadorna*, *Marmaronetta angustirostris* (40–100 birds on passage), *Anas platyrhynchos*, *A. clypeata*, *A. acuta*, *Calidris minuta*, *Himantopus himantopus* (up to 250 pairs breed), *Charadrius dubius*, *C. alexandrinus* and *Recurvirostra avosetta*.

Key species

A1	<i>Marmaronetta angustirostris</i>		
A4i	<i>Marmaronetta angustirostris</i>	Breeding (pairs) —	Non-breeding 40–100 (p)
	<i>Glareola pratincola</i>	200	300

Other threatened/endemic wildlife

None are known to BirdLife International.

Conservation issues

Although the site is designated a Hunting Reserve, illegal hunting occurs. Other threats include pollution caused by effluent from the town of Korba and human disturbance. The lagoon is one of the main sites included in the Medwet coastal project.

Further reading

Gaultier (1986, 1987b, 1988a), Hughes *et al.* (1997), Karem *et al.* (1997), Maamouri (1995), Meininger *et al.* (1994), Ministère de l'Agriculture, Direction Générale des Forêts (2000).

Masri reservoir

Admin region Nabeul
Coordinates 36°31'N 10°29'E
Area 150 ha Altitude 20–200 m

TN015

A1

Unprotected

Site description

Masri reservoir is, unlike the Cap Bon reservoirs, being constructed for water-supply to the national grid rather than local irrigation. It is situated quite high up in the Dorsale and flanked by mountains which reach 660 m, to the west of the town of Grombalia, south-east of Tunis. The shores are lined with vegetation composed mainly of *Phragmites communis*, *Typha angustifolia* and *Juncus* species. The mountain slopes are clothed in a forest of *Tetraclinis articulata*.

Birds

See Box for key species. Though the reservoir is small, it holds *Oxyura leucocephala* (10–50 pairs), while breeding species include *Podiceps cristatus* and *Tachybaptus ruficollis*. Wintering waterbirds include *Aythya ferina* and *Fulica atra*.

Key species

A1	<i>Oxyura leucocephala</i>
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Other threatened/endemic wildlife

The mammal *Hyaena hyaena* (LR/nt) has been recorded from the mountains around the site.

Conservation issues

Threats include hunting and human disturbance.

Further reading

Gaultier (1988a), Hughes *et al.* (1997).

Sebkhet Sidi Khelifa

Admin region Sousse
Coordinates 36°14'N 10°28'E
Area 1,000 ha Altitude 0–5 m

TN016

A4i
Unprotected

Site description

The site is partly a coastal lagoon, on the eastern coastline, south of Korba lagoons and 25 km south of Hammamet. In most years it dries out entirely in summer, unlike Korba. It is also partly a saline depression, receiving run-off from the Dorsale mountains, and is surrounded by agricultural land. The vegetation is mainly salt-tolerant, with *Arthrocnemum*, *Salicornia* and *Atriplex* species dominant.

Birds

See Box for key species. The site is also important, especially in wet winters, for other wintering waterbirds including *Ardea cinerea*, and a variety of ducks notably *Anas penelope* and *A. clypeata*. *Grus grus* use the site as a roost, especially in winters when Kelbia is dry. On the beach seaward of the lagoon, some *Sterna* species breed, in particular *S. albifrons* and perhaps also *S. hirundo*.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Phoenicopterus ruber</i>	—	500–3,000 (w)

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Threats include human disturbance and hunting, and extension of hotel and tourist facilities southward from Hammamet.

Further reading

Gaultier (1988a), Hamrouni (1999), Hughes *et al.* (1997).

Sebkhet Halk el Menzel

Admin region Sousse
Coordinates 36°00'N 10°30'E
Area 1,000 ha Altitude 2–10 m

TN017

A4i
Unprotected

Site description

Like Sidi Khelifa (site TN016), situated some 30 km north along the coast, Sebkhet Halk el Menzel is partly coastal lagoon, partly saline depression, but is also linked to the inland sites of Kelbia (site TN020) and Oued Sed (TN018). In very wet years, Kelbia flows out to the sea, via Oued Sed, and reaches the sea through Halk el Menzel. It is likely that the freshwater springs round Oued Sed contribute to provision of water for Halk el Menzel in the summer, and there may be some reverse flood of seawater through the dune cordon, since Halk el Menzel retains some water in most summers. The surrounding vegetation is halophytic and includes *Arthrocnemum*, *Salicornia* and *Atriplex* species.

Birds

See Box for key species. The site's location, on the coast along a major north–south flyway, with water available for most of the year, means that, in addition to overwintering species (such as *Platalea leucorodia*, a variety of ducks including *Tadorna tadorna*, *Anas acuta* and *A. clypeata*, and waders), the site attracts many passing migrants, including waders such as *Limosa limosa*, *Numenius arquata*, *N. phaeopus* and terns. In winters, when other roosting sites are dry, *Grus grus* may use the site as a roost. Breeding birds include *Sterna albifrons* and, possibly, the occasional *S. hirundo*, as well as *Charadrius alexandrinus* and some *T. tadorna*.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Phoenicopterus ruber</i>	—	500–3,000
<i>Grus grus</i>	—	2,000

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Threats include poaching and disturbance resulting from a road which crosses the western edge of the site and from feral dogs. The spread of tourist developments along the shore, coming southward from Hammamet and northward from Sousse, two of Tunisia's principal tourist centres, is bound to impact the site unless some habitat conservation measures are taken.

Further reading

Gaultier (1986, 1987b, 1988a), Hamrouni (1999), Hughes *et al.* (1997).

Oued Sed

Admin region Sousse
Coordinates 35°59'N 10°27'E
Area 100 ha Altitude 0–19 m

TN018

A1, A4i
Unprotected

Site description

Oued Sed is a watercourse located 20 km north of Sousse. In very wet years, it is part of the outlet from Sebkhet Kelbia (site TN020) to the sea via Sebkhet Sidi Khelifa (TN016). Oued Sed receives some water in normal winters through local run-off; it also appears to be fed by local springs, since it retains water throughout the summer and the vegetation (*Phragmites communis* and *Typha angustifolia*) is characteristic of freshwater sites.

Birds

See Box for key species. Because of its freshwater character and thick vegetation, not common in central Tunisia, this small site is important for a number of breeding birds. Apart from *Marmaronetta angustirostris*, breeding species include *Tadorna tadorna*, *Ixobrychus minutus*, *Acrocephalus arundinaceus*, *A. scirpaceus* and, probably, *Porphyrio porphyrio*. *Aythya nyroca* has been recorded wintering in small numbers (3–10). At the end of the dry summers, large numbers of waders, notably *Charadrius alexandrinus*, may congregate. Located near the coast, the site also provides habitat for passage migrants.

Key species

A1	A4i	Breeding (pairs)	Non-breeding
<i>Marmaronetta angustirostris</i>			
	<i>Marmaronetta angustirostris</i>	30	—

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Threats include pollution (particularly by residues from the olive-oil industry), human disturbance, reed-cutting and hunting. This small site is crossed by the main north–south motorway and the main north–south trunk road, and is inevitably a prey to constant disturbance. Some form of habitat conservation is urgently necessary if it is to survive.

Further reading

Gaultier (1988a), Hamrouni (1999), Hughes *et al.* (1997).

Kairouan plains

Admin region Kairouan
Coordinates 35°53'N 10°07'E
Area 75,000 ha Altitude 65 m

TN019

A3 (A01, A02)
Unprotected

Site description

The site comprises a series of alluvial plains north of the town of Kairouan, bounded by the small towns of Sbikha and Alam. The vegetation is a mixture of halophytes such as *Arthrocnemum* and *Salicornia* together with *Stipa tenacissima* grassland with *Artemisia herba-alba* and, more rarely, *Rhus tripartitum* and *Lycium arabicum*.

Birds

See Box and Table 2 for key species. The three Sahara–Sindian biome species include *Pterocles coronatus*, this being the only IBA from which the species has been recorded. Other species occurring at the site include *Falco biarmicus* and *Pterocles orientalis*. The site is also the northernmost known locality in Tunisia at which *Chlamydotis undulata* has been recorded breeding.

Key species

A3 (A01) Mediterranean North Africa biome: Nine of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A3 (A02) Sahara–Sindian biome: Three of the 13 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Threats include conversion of parts of the site into olive-groves, overgrazing and hunting.

Further reading

Gaultier (1988a), Hamrouni (1992), Nabli (1989).

Sebkhet Kelbia

Admin region Sousse

Coordinates 35°50'N 10°20'E

Area 13,000 ha Altitude -3–65 m

TN020

A1, A3 (A01), A4i, A4iii

Natural Reserve, Unprotected

Site description

Like Ichkeul, Kelbia in central Tunisia, some 20 km north-east of Kairouan and 30 km west of Sousse, is one of the great flood-plain wetlands of Tunisia. It receives the waters of three major rivers that rise in the mountains of the Dorsale, the Nebhana, the Merguellil and the Zeroud. Since rainfall over these mountains of central Tunisia varies considerably from one year to another, the amount of water received varies enormously; even in natural conditions there were years when the lake dried out completely. But there were also times when the water remained largely fresh for several years, and when the lake overflowed beyond the natural sill in the north-east corner and reached the sea via Oued Sed (site TN018) and Sebkhet Halk el Menzel (TN017). Though the site is called 'sebkha' in Arabic, it never has the salt-crust typical of other such salt-lakes, as the water seems to drain away rapidly and efficiently, flushing salts out of the system. Fringing vegetation includes *Tamarix africana*, *Phragmites communis*, *Typha angustifolia* and, in the brackish waters, *Zannichellia palustris*. Since the building of major dams on the three inflow rivers in the last 20 years, the ecology of the site has changed considerably, with long periods when it remains dry, though there have been occasional releases from the dams, and some inflow from smaller tributaries.

Birds

See Box for key species. Historically, Kelbia was one of the most important sites for waterbirds in Tunisia, rivalling Ichkeul in numbers of birds in wet winters, providing breeding habitat for a great variety of birds in wet springs, and also for many steppe and desert-edge species which are not normally found further north. A vast and impressive array of Palearctic waterbirds wintered, including *Podiceps nigricollis* (400), *Ardea cinerea*, *Egretta garzetta*, *Plegadis falcinellus*, *Anser anser*, *Tadorna ferruginea*, *Oxyura leucocephala* (5–40) and *Anas crecca* (500–1,000). In wet winters it is the main roosting site for the population of *Grus grus* which winters on the plains of Kairouan. Breeding species included *Tadorna tadorna*, *Ardeola ralloides*, *Marmaronetta angustirostris*, *Sterna nilotica* and *Chlidonias hybridus*. Kelbia was also the centre of the relict resident Tunisian population of *Anthropoides virgo*, now apparently extinct.

Key species

A1 *Marmaronetta angustirostris* *Oxyura leucocephala*

A3 (A01) Mediterranean North Africa biome: Eight of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A4i	Breeding (pairs)	Non-breeding
<i>Phoenicopterus ruber</i>	—	1,000–15,000 (w)

A4i ... continued	Breeding (pairs)	Non-breeding
<i>Tadorna tadorna</i>	—	1,000–6,000 (w)
<i>Anas penelope</i>	—	8,000–20,000 (w)
<i>Anas strepera</i>	—	50–2,200 (w)
<i>Anas acuta</i>	—	14,000 (w)
<i>Anas clypeata</i>	—	10,000 (w)
<i>Marmaronetta angustirostris</i>	20–100	—
<i>Aythya ferina</i>	—	10,000–15,000 (w)
<i>Grus grus</i>	—	2,500–4300 (w)
<i>Himantopus himantopus</i>	—	1,000 (w)
<i>Recurvirostra avosetta</i>	—	1,600 (w)
<i>Charadrius alexandrinus</i>	—	2,000 (w)
<i>Calidris minuta</i>	—	2,000–3,000 (w)
<i>Sterna nilotica</i>	—	200–500 (w)
A4iii	Up to 40,000 waterbirds have been recorded at this site.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The dams which have been built on the three major inflow rivers in the last 20 years have totally changed the water regime of the site. In years of high rainfall, water is still released from the dams, and conditions resembling the original natural conditions may be recreated for a short time. In some winters heavy rain in the catchment of smaller tributaries may create a shallow water-body, but such natural conditions are unlikely to persist for long. Some two-thirds of the lake surface (8,000 ha) have been designated as a Natural Reserve, but proposals to reclaim the area for agriculture or to use it for storage of waste-water from neighbouring cities such as Sousse still recur. As at other protected areas in Tunisia, there is a need for active conservation and management. Minor local threats, which could easily be overcome by management and wardening include poaching, human disturbance and reed-cutting.

Further reading

Dalensi (1998), Gaultier (1986, 1988a, 1989), Hamrouni (1999), Hughes *et al.* (1997), Karem *et al.* (1997), Ministère de l'Agriculture, Direction Générale des Forêts (2000), Nabli (1989), Pottier-Alapetite (1979, 1981), Smart (1975).

Salines de Monastir

Admin region Monastir

Coordinates 35°45'N 10°46'E

Area 1,000 ha Altitude 2–5 m

TN021

A4i

Unprotected

Site description

The site is (with Thyna, site TN027) one of the only two remaining salt-production plants left in Tunisia following the closure of the Mégrine salt pans (site TN009). Because of the salt-production work, there is a series of shallow pans of varying salinity, where water-levels vary from day to day and attract many waterbirds. The plant is situated between the cities of Monastir and Sousse (with their extensive tourist facilities along the neighbouring beaches), and within a former coastal sebkha, part of which still functions as a saline depression in wet winters. The halophytic vegetation of the sebkha is dominated by *Arthrocnemum* and *Salicornia* species.

Birds

See Box for key species. The area is also important for wintering and passage waterbirds, with up to 1,000 *Tadorna tadorna* in winter, waders (notably *Himantopus himantopus* and *Recurvirostra avosetta* which may breed) and breeding *Larus cachinnans*, *S. albifrons* and, perhaps, some *S. hirundo*.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Casmerodius albus</i>	—	80–150 (w)
<i>Phoenicopterus ruber</i>	—	1,000–3,000 (w)

Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The site is situated near an airport, the activities of which are a source of a significant amount of disturbance. Other threats to the site are hunting and the presence of numbers of feral dogs. As long as the salt pans remain a functioning entity, the site will be of importance. It would be desirable to guarantee their long-term survival, in view of the loss of the Mégrine salt pans and the expansion of tourism facilities in the immediately surrounding area.

■ Further reading

Gaultier (1986, 1988a, 1989), Hamrouni (1999), Hughes *et al.* (1997).

Metbassta

Admin region Kairouan
Coordinates 35°42'N 10°01'E
Area 40 ha Altitude 65 m

TN022

A1, A4i
Hunting Reserve

■ Site description

Metbassta is a small shallow wetland near Kairouan in the immediate vicinity of Kelbia (site TN020), to whose catchment it belongs. It is essentially fresh and may, like Oued Sed (site TN018), be fed by freshwater springs, as well as by the Oued Marguellil and the Oued Nebhana. It may dry out completely in summer.

■ Birds

See Box for key species. It is also a wintering site for *Casmerodius albus*, *Plegadis falcinellus*, *Phoenicopterus ruber*, *Anser anser*, *Tadorna tadorna*, *Anas penelope*, *A. clypeata*, *A. crecca*, *A. strepera*, *Aythya ferina* and *Fulica atra*. The plains around the lake are used as a roosting site by *Grus grus*. *Numenius tenuirostris* was recorded here in November 1992. In addition, eight species of the Mediterranean North Africa biome (A01) have been recorded (see Table 2).

Key species

Code	Species	Breeding (pairs)	Non-breeding
A1	<i>Marmaronetta angustirostris</i>		
A4i	<i>Marmaronetta angustirostris</i>	30–60 birds	—

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The site is a Hunting Reserve, but poaching occurs.

■ Further reading

Dalensi (1998), Gaultier (1986, 1988a, 1989), Hamrouni (1999), Ministère de l'Agriculture, Direction Générale des Forêts (2000).

El Houareb reservoir

Admin region Kairouan
Coordinates 35°35'N 09°54'E
Area 1,200 ha Altitude 242 m

TN023

A1, A4i
Unprotected

■ Site description

El Houareb reservoir is a man-made water-body built about 20 years ago on the Oued Merguellil, 35 km east of Kairouan, for flood-control and water-supply purposes. Where the river emerges from the Dorsale the reservoir is bordered by higher land, but also has extensive flat shores. It retains the waters which once flowed into Sebkhia Kelbia (site TN020). It has an average depth of nearly 20 m, but in periods of poor rainfall, it can remain completely dry for several years on end. The surrounding vegetation is composed mainly of *Tamarix africana*, *Typha angustifolia* and *Juncus* species. The waterplant *Potamogeton pectinatus* grows commonly in the reservoir and provides the main food-source for wildfowl.

■ Birds

See Box for key species. The reservoir has become one of the most important sites in Tunisia for breeding *M. angustirostris* and *O. leucocephala* (whose numbers appear to be augmented in winter)—although it is not clear where these species go in dry years. Other species,

including *Podiceps cristatus* and *Tachybaptus ruficollis*, also breed. The site is a wintering site for a broad array of species, including *Phalacrocorax carbo*, *Casmerodius albus*, *Anas penelope*, *A. acuta*, *A. clypeata*, *Aythya ferina*, *A. fuligula* and *Fulica atra*. In addition, eight species of the Mediterranean North Africa biome (A01) have been recorded (see Table 2).

Key species

Code	Species	Breeding (pairs)	Non-breeding
A1	<i>Marmaronetta angustirostris</i>		
A4i	<i>Marmaronetta angustirostris</i>	150–620 birds	—
	<i>Oxyura leucocephala</i>	breeds	334 (w)

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Uncontrolled hunting is the main threat to waterbirds. There are no obvious threats to the habitat and the site is patrolled by waterworks staff.

■ Further reading

Gaultier (1988a), Green (1993), Hughes *et al.* (1997), Meininger *et al.* (1994).

Sebkhet Sidi el Hani

Admin region Sousse
Coordinates 35°34'N 10°24'E
Area 36,000 ha Altitude 0–50 m

TN024

A4i
Unprotected

■ Site description

The site, the third-largest salt-lake in Tunisia, is located 25 km south-west of Sousse and 20 km east-south-east of Kairouan. It usually dries out in summer, but occasionally retains water all year. Salinity is very high and salt crystals sometimes remain on the substrate even when there is water in the lake. The vegetation is mainly halophytic with *Arthrocnemum*, *Salicornia* and *Suaeda* species as dominants.

■ Birds

See Box for key species. The main importance of Sidi el Hani is that it is big enough in very wet years to provide security for *Phoenicopterus ruber* to nest on the uninhabited islands in the centre. Wintering *Grus grus* which feed on the surrounding plains may also roost on the water. In very wet years, the salinity of the water may decrease sufficiently to provide wintering habitat for other waterbirds. In addition, three species of the Mediterranean North Africa biome (A01) have been recorded (see Table 2).

Key species

Code	Species	Breeding (pairs)	Non-breeding
A4i	<i>Phoenicopterus ruber</i>	500–10,000	500–10,000
	<i>Grus grus</i>	—	1,000–2,000

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Threats include hunting and disturbance by feral dogs.

■ Further reading

Gaultier (1988a), Hamrouni (1999), Hughes *et al.* (1997), Thomsen and Jacobsen (1979).

Chaâmbi

Admin region Kasserine
Coordinates 35°06'N 08°43'E
Area 6,723 ha
Altitude 565–1,544 m

TN025

A3 (A01)
National Park,
Biosphere Reserve

■ Site description

Chaâmbi National Park, situated 10 km west of the town of Kasserine is dominated by Djebel Chaâmbi which, at 1,544 m, is the highest

peak in Tunisia. Djebel Chaâmbi supports the largest remaining and best-conserved area of pine-dominated evergreen forest in the Tunisian Dorsale. Dominant trees are, at lower altitudes, *Pinus halepensis* and *Quercus ilex*, replaced near the summit by *Juniperus phoenicea* and *J. oxycedrus*. Common shrubs include *Rosmarinus officinalis* and *Globularia alypum*. Around the foot of the mountain the forest gives way to grassland of *Stipa tenacissima*.

■ Birds

See Box and Table 2 for key species. It is one of only two IBAs at which *Picus vaillantii* is recorded. The park also supports a diverse breeding raptor fauna including *Neophron percnopterus*, *Circaetus gallicus*, *Hieraaetus pennatus*, *Buteo rufinus*, *Falco peregrinus* and *F. tinnunculus*. Other breeding species include *Columba palumbus*, *Sylvia deserticola* and *Loxia curvirostra*.

Key species

A3 (A01) Mediterranean North Africa biome: 10 of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

■ Other threatened/endemic wildlife

The mammals *Ammotragus lervia* (VU), *Gazella cuvieri* (EN) and *Hyaena hyaena* (LR/nt) all occur, but are rare.

■ Conservation issues

The site was declared a Biosphere Reserve in 1978 and became a National Park in 1980. Forest-fire is probably the largest potential threat.

■ Further reading

Attia (1977), GTZ (1994), Hamrouni (1992), Müller (1983), Nabli (1989).

Kerkennah islands

Admin region Sfax

Coordinates 34°45'N 11°10'E

Area 15,000 ha Altitude 0–13 m

TN026

A3 (A01), A4i
Hunting Reserve

■ Site description

The Kerkennah islands form an archipelago, 20 km east of the town of Sfax, in the tidal Gulf of Gabès. The archipelago is composed of two main islands, Chergui and Gharbi, and 12 smaller ones. Relief is low; the highest point is only 13 m above sea-level. Common plant species include *Phoenix dactylifera*, *Nitraria nitriaria*, *Salicornia radicans*, *Imperata cylindrica* and *Zygophyllum album*.

■ Birds

See Box and Table 2 for key species. See under Kneiss (site TN032) for a general presentation of the ornithological importance of the Gulf of Gabès. The Kerkennah archipelago is an important wintering area for *Phalacrocorax carbo* and gulls and terns, including *Larus genei*, *L. fuscus*, *L. cachinnans*, *Sterna caspia* and *S. sandvicensis*. Species that breed on the islands include *Falco tinnunculus*, *Cursorius cursor*, *Merops apiaster* and *Lanius excubitor*. In addition, the islands are an important stop-over site each spring and autumn for hundreds of thousands of migrant passerines.

Key species

A3 (A01) Mediterranean North Africa biome: Seven of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A4i	Breeding (pairs)	Non-breeding
<i>Phalacrocorax carbo</i>	—	1,000–10,000 (w)
<i>Platalea leucorodia</i>	—	400–800 (w)
<i>Phoenicopter ruber</i>	—	400–1,500 (w)

■ Other threatened/endemic wildlife

The gerbil *Gerbillus simoni zakariai* is endemic to Kerkennah.

■ Conservation issues

The islands threatened by erosion by the sea, particularly if sea-levels rise.

■ Further reading

Association Les Amis des Oiseaux and Medmaravis (1995), Association Les

Amis des Oiseaux (2000), Azafzaf (1999b, 2000), Gaultier (1981, 1986, 1988b), Hughes *et al.* (1997), Maamouri and Hugues (1991), Ministère de l'Agriculture, Direction Générale des Forêts (2000), Noura (1986, 1992), Oueslati (1995), Thomsen and Jacobsen (1979), Waechter (1980).

Salines de Thyna

Admin region Sfax

Coordinates 34°38'N 10°43'E

Area 1,900 ha Altitude -2–3 m

TN027

A4i, A4iii

Hunting Reserve

■ Site description

The Thyna saltpans, immediately to the south of Sfax, are, with the Monastir saltpans (TN021), the only remaining commercially exploited saltpans in Tunisia, and much the biggest. The succession of shallow pools, of varying depth and salinity, provide prime habitat for waterbirds of all kinds and the constant supervision and wardening means that disturbance is restricted to a minimum. Their commercial exploitation means that there is always water available, even at the end of the long dry summer. The Thyna saltpans are, like Kerkennah (TN026), Kneiss (TN032), Oued Akarit (TN034), Bordj Kastil (TN036), Gourine (TN037) and Boughrara (TN038), situated at the centre of the Gulf of Gabès which, with its high tidal movement, is almost unique in the Mediterranean. Just offshore of Thyna are the tidal harbour of Sfax and extensive tidal mudflats, separated from the saltpans by an embankment.

■ Birds

See Box for key species. See under Kneiss (site TN032) for a general statement of the ornithological importance of the Gulf of Gabès; the waders and piscivorous birds mentioned there all occur at Thyna. The Thyna saltpans provide feeding habitat for numerous waterbirds in the pools and birds feeding on the nearby mudflats and shallow waters use the saltpans as a high-tide roost. The site is an important site for wintering *Phalacrocorax carbo* (up to 4,000) and *Limosa limosa* (up to 2,000). In winters when surrounding freshwater sites are dry, *Grus grus* roost in the saltpans. Large numbers of waterbirds also breed, including *Egretta garzetta* (100 pairs), *Larus genei* (700 pairs), *Sterna nilotica* (70 pairs), *S. hirundo* (250 pairs) and *S. albifrons* (80 pairs). *Marmaronetta angustirostris* regularly breeds in small numbers (1–3 pairs). *Numenius tenuirostris* was last recorded here in 1992 (1–4 individuals). *Phoenicopter ruber* attempts to nest almost annually.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Podiceps nigricollis</i>	—	600–2,500 (w)
<i>Phoenicopter ruber</i>	—	750–7,000 (w)
<i>Platalea leucorodia</i>	—	200–600 (w)
<i>Recurvirostra avosetta</i>	1,000 birds	1,000–2,000 (w)
<i>Calidris minuta</i>	—	2,500–5,500 (w/p)
<i>Calidris ferruginea</i>	—	2,000–5,500 (w/p)
<i>Larus genei</i>	1,400 birds	1,400–3,000 (w)
<i>Sterna nilotica</i>	70	—
<i>Sterna sandvicensis</i>	—	400–3,500 (w)
A4iii	More than 20,000 waterbirds have been recorded at this site.	

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The site is a Hunting Reserve. The saltpans are in the immediate suburbs of the large city of Sfax, and so are under permanent threat of urbanization. As long as the salt-production is maintained, however, guards from the salt company provide basic wardening and prevent excessive disturbance. There is, nevertheless, some disturbance from fishermen and casual visitors, better wardening, especially of breeding colonies, is desirable.

■ Further reading

Dalensi (1998), Gaultier (1988a, b), Hughes *et al.* (1997), Ministère de l'Agriculture, Direction Générale des Forêts (2000), Thomsen and Jacobsen (1979).

Bouhedma

Admin region Sidi Bouzid

Coordinates 34°30'N 09°30'E

Area 16,488 ha

Altitude 90–840 m

TN028

A3 (A01, A02)

National Park,
Biosphere Reserve

Site description

Situated 60 km south of the town of Sidi Bouzid, Bouhedma National Park represents an ecosystem unique in Tunisia. The vegetation of the park is woodland in which *Acacia raddiana* occurs in association with *Periploca laevigata* and *Rhus tripartitum*. The main peak within the park, Djebel Bouhedma, which reaches 840 m, supports a vegetation dominated by *Olea europaea*, *Juniperus phoenicea* and *Pistacia atlantica*. On the surrounding plains *Arthrophytum scoparium* and *A. schmittianum* are conspicuous elements.

Birds

See Box and Table 2 for key species. This is one of only two IBAs in Tunisia at which *Ramphocoris clotbey* occurs. In addition, *Aquila chrysaetos* and *Falco biarmicus erlangeri* breed in the park. There is a population of *Struthio camelus*, reintroduced in the 1980s, as was *Numida meleagris*.

Key species

A3 (A01) Mediterranean North Africa biome: 12 of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A3 (A02) Sahara-Sindian biome: Six of the 13 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

The mammals *Ammotragus lervia* (VU) and *Gazella dorcas* (VU) have been recorded. There are reintroduced populations of *Oryx dammah* (EW) and *Addax nasomaculatus* (EN).

Conservation issues

The site was declared a National Park in 1980; it is also a Biosphere Reserve. Threats to areas surrounding the park including overgrazing, wood-cutting and poaching.

Further reading

Blanc and Snane (1980), Caieb and Boukhris (1998), Dalensi (1998), GTZ (1994), Karem *et al.* (1993), Ministère de l'Environnement et de l'Aménagement du Territoire (1999), Nabli (1989).

Garaet Douza

Admin region Gafsa

Coordinates 34°28'N 08°29'E

Area 1,000 ha Altitude 390 m

TN029

A4i

Unprotected

Site description

Situated nearly 30 km west of the town of Gafsa, the site is a shallow depression in which rain-water run-off collects seasonally. The vegetation along the fringes of this temporary wetland is composed of *Typha angustifolia*, *Phragmites communis* and *Juncus acutus*. The surrounding area supports a low vegetation dominated by *Stipa tenacissima* and *Artemisia herba-alba*.

Birds

See Box for key species. The site is also important for other wintering and passage waterbirds including *Egretta garzetta*, *Ciconia ciconia*, *Tadorna tadorna*, *T. ferruginea*, *Anas clypeata* and *Fulica atra*.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Phoenicopterus ruber</i>	—	1,000–4,000 (w)

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Overgrazing and hunting are the main threats.

Further reading

Hughes *et al.* (1997).

Gafsa

Admin region Gafsa

Coordinates 34°25'N 08°47'E

Area 100,000 ha Altitude 150 m

TN030

A3 (A01, A02)

Unprotected

Site description

This site includes the area to the north of the town of Gafsa, bounded by Oued el Kebir and Oued Sidi Aich, and comprises large areas of grassland dominated by *Stipa tenacissima*, with *Juniperus phoenicea* occurring commonly in the hills. Average annual rainfall is less than 150 mm.

Birds

See Box and Table 2 for key species. Also common in this sub-desert region are *Falco biarmicus*, *Cursorius cursor*, *Pterocles orientalis* and *Oenanthe deserti*.

Key species

A3 (A01) Mediterranean North Africa biome: 10 of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A3 (A02) Sahara-Sindian biome: Six of the 13 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The main threats are poaching of gamebirds and increasing desertification due to the ploughing up of the grasslands for agriculture.

Further reading

Gaultier (1988a), Nabli (1989).

Sebkhet En Noual

Admin region Sidi Bouzid

Coordinates 34°24'N 09°46'E

Area 3,000 ha Altitude 50 m

TN031

A3 (A01, A02), A4i

Unprotected

Site description

The site is a salt depression situated 70 km south-west of the town of Sfax and forms the southern border of Bouhedma National Park (site TN028). The surrounding area, included in the IBA, is semi-desert grassland in which the dominant plant species include *Arthrophytum scoparium* and *Astragalus armatus*. The sebkha itself supports a halophytic vegetation which includes *Arthrocnemum* and *Salicornia* species.

Birds

See Box and Table 2 for key species. Other waterbirds that winter on the salt-flats, especially in years of good rainfall when the water is less saline, include *Ardea cinerea*, *Egretta garzetta*, *Tadorna tadorna*, *T. ferruginea*, *Anas clypeata* and *Grus grus*. The areas around the sebkha also hold *Chlamydotis undulata*, *Charadrius morinellus* (in winter), *Cursorius cursor*, *Pterocles orientalis*, *Lanius excubitor*, *Scotocerca inquieta* and *Emberiza striolata*.

Key species

A3 (A01) Mediterranean North Africa biome: 11 of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A3 (A02) Sahara-Sindian biome: Six of the 13 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A4i	Breeding (pairs)	Non-breeding
<i>Phoenicopterus ruber</i>	—	800–2,000 (w)

Other threatened/endemic wildlife

The mammal *Gazella dorcas* (VU) has been recorded.

Conservation issues

Threats include overgrazing and hunting.

Further reading

Gaultier (1988a), Nabli (1989).

Kneiss

Admin region Sfax

Coordinates 34°24'N 10°19'E

Area 5,850 ha Altitude 0–3 m

TN032

A3 (A01), A4i, A4iii
Natural Reserve

Site description

Located 50 km south of the town of Sfax and 25 km south-east of Mahares, Kneiss is a large area of wetland in the Gulf of Gabès. The site includes the surrounding semi-desert grasslands, the shoreline, intertidal flats and five offshore islands. The vegetation of the main island of Djeziret Bessila (650 ha) is composed of halophytic species including *Halocnemum*, *Arthrocnemum* and *Suaeda* species.

Birds

See Box and Table 2 for key species. The Gulf of Gabès in general, with its tidal range of up to two metres and its extensive mudflats at low water, is one of the most important sites in Tunisia for waders and piscivorous waterbirds, both on migration and in winter. The Kneiss islands and the shoreline opposite at Oued Maltine, is the ornithological centre-point of the Gulf of Gabès, but many of the typical species may also be found at other sites in the Gulf such as Kerkennah (site TN026), Thyna (TN027), Akarit (TN034), Bordj Kastil (TN036), Gourine (TN037) and Boughrara (TN038). The tidal mudflats provide habitat for wader species that otherwise occur only in small numbers in the Mediterranean, such as *Ostralegus haematopus*, *Arenaria interpres*, *Pluvialis squatarola*, *Numenius arquata*, *Limosa lapponica*, *Calidris canuta* and *Limicola falcinellus*, some of which have their only major Mediterranean wintering grounds in the Gulf. Some waders breed, notably *Charadrius alexandrinus*, *Recurvirostra avosetta*, *Himantopus himantopus* and *Tringa totanus*; the latter is particularly interesting since it scarcely breeds at all in northern and central Tunisia, and thus the breeding population in the Gulf of Gabès is isolated from others further north. Other trans-Saharan migrant waders such as *Calidris minuta*, *C. alba* and *C. ferruginea* occur in large numbers on passage, and some stay to winter; this is the only area in the Mediterranean with considerable numbers of wintering *C. ferruginea*.

The Gulf of Gabès is also notable for its wintering *Platalea leucorodia* (most of the central European breeding population winters here), and for wintering *Casmerodius albus*, *Ardea cinerea* and *Egretta garzetta*. There are ground-nesting colonies of *E. garzetta*. Among gulls and terns, large numbers of *Larus melanocephalus* and *L. genei*, mostly originating from Black Sea colonies, winter and there are some breeding colonies of *L. genei*. Wintering terns include *Sterna sandvicensis* and *S. caspia* in good numbers, with breeding colonies of *S. nilotica*, *S. albifrons* and *S. hirundo* (the latter, like *Tringa totanus*, only breeds in any numbers in the Gulf of Gabès and is thus isolated from more northerly breeding colonies). *S. bengalensis* occurs in small numbers on passage, and has been suspected of breeding.

The above paragraphs refer to the Gulf of Gabès in general. Kneiss is the most important area, since it has the largest area of mudflats, the most important high-tide wader roosts, and some of the major breeding colonies. It is also the most important wintering area for waders in the Mediterranean, numbers of which can reach 330,000. The islands hold breeding populations of *Egretta garzetta*, *Tringa totanus*, *Larus cachinnans*, *Sterna hirundo* and *S. albifrons*. There are also historical records of *Numenius tenuirostris*.

Key species

A3 (A01) Mediterranean North Africa biome: 10 of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A4i	Breeding (pairs)	Non-breeding
<i>Platalea leucorodia</i>	—	200–1,000 (w)
<i>Phoenicopus ruber</i>	—	600–7,000 (w)
<i>Haematopus ostralegus</i>	—	10,000–20,000 (w)
<i>Charadrius hiaticula</i>	—	3,000–10,000 (w)
<i>Charadrius alexandrinus</i>	breeds	5,000–10,000 (w)

A4i ... continued	Breeding (pairs)	Non-breeding
<i>Pluvialis squatarola</i>	—	1,000–32,500 (w)
<i>Calidris alpina</i>	—	125,000 (w)
<i>Calidris minuta</i>	—	5,000–8,000 (w)
<i>Calidris ferruginea</i>	—	3,000–9,625 (w)
<i>Limosa limosa</i>	—	2,000–7,000 (w)
<i>Limosa lapponica</i>	—	2,000–5,000 (w)
<i>Numenius arquata</i>	—	800–6,000 (w)
<i>Tringa totanus</i>	breeds	40,000 (w)
<i>Arenaria interpres</i>	—	600–4,000 (w)
<i>Larus genei</i>	—	1,000–2,500 (w)
<i>Larus cachinnans</i>	breeds	600–8,000 (w)
<i>Sterna nilotica</i>	250–400	—
<i>Sterna sandvicensis</i>	—	1,000–3,000 (w)
A4iii	Up to 330,000 waterbirds have been recorded at this site.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The site was declared a Natural Reserve by ministerial order in 1993. Threats to the site include disturbance as a consequence of collection of the shellfish *Venerupis decussata* which affects, in particular, birds breeding on the islands.

Further reading

Gaultier (1988a), Groupe Internationale pour Recherche des Oiseaux d'eaux et des Zones Humides (1994), Meininger *et al.* (1994), Ministère de l'Agriculture, Direction Générale des Forêts (2000), Oueslati (1995), van der Have *et al.* (1994), van Dijk *et al.* (1986).

Sebkhet Sidi Mansour

Admin region Gafsa

Coordinates 34°14'N 09°03'E

Area 11,000 ha Altitude 40 m

TN033

A1, A3 (A01, A02), A4i

Unprotected

Site description

This site is called a sebkhet, or salt-lake, though parts of it have the character of a garaet or freshwater marsh. It is the lowest point of a major plain between Gafsa and Gabès, between the Djebel Orbata and the Djebel Hachichina, where steppe meets desert. In many winters it remains dry, but after wet winters it collects fresh water, like the other smaller depressions of the region (Bled Es-Segui), such as Garaet Fatnassa and Garaet Zougrata. Much of the lake floor is without a salt-crust and can be cultivated when rainfall permits. In many ways it resembles a southern version of Ichkeul or Kelbia, and has not as yet been affected by dam-building. The surrounding steppe is dominated by *Arthrophytum* species and *Astragalus armatus*. The shores of the sebkha support a halophytic vegetation in which *Arthrocnemum indicum* and *Salicornia arabica* are conspicuous elements.

Birds

See Box and Table 2 for key species. Populations of wintering and breeding waterbirds vary from year to year with precipitation. In wet winters, there are good numbers of Palearctic ducks (and even geese), including *Oxyura leucocephala* (40–80), and *Grus grus*, while in wet springs many waterbirds nest; there was a large colony of nesting *Phoenicopus ruber* in the last wet summer, 1990, when large numbers of *Marmaronetta angustirostris* also nested.

Key species

A1	<i>Oxyura leucocephala</i>	<i>Marmaronetta angustirostris</i>
A3 (A01)	Mediterranean North Africa biome: 10 of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.	
A3 (A02)	Sahara-Sindian biome: Six of the 13 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.	
A4i	Breeding (pairs)	Non-breeding
	<i>Phoenicopus ruber</i>	1,000 birds 3,000 (w)
	<i>Marmaronetta angustirostris</i>	50 birds 300 (w)
	<i>Grus grus</i>	— 1,000–2,000 (w)
	<i>Recurvirostra avosetta</i>	— 1,000–3,500 (w)

Other threatened/endemic wildlife

The mammal *Gazella dorcas* (VU) occurs but is rare.

Conservation issues

Overgrazing and hunting of wildfowl are the main threats. Unlike most other flood-plain wetlands in Tunisia, this site has not been affected by dam-building. The site is unprotected, and it would be desirable to afford it some protected-area status as an outstanding example of a desert-edge wetland.

Further reading

Dalensi (1998), Gaultier (1988a), Hughes *et al.* (1997).

Sebkhet Dreïaa

Admin region Sfax

Coordinates 34°05'N 10°22'E

Area 580 ha Altitude 0–30 m

TN034

A4i

Unprotected

Site description

The site is situated 14 km south-west of Skhira and 30 km north-west of the town of Gabès. It comprises a sebkhet (about 380 ha), an intertidal area (about 200 ha) and the part of Oued Rimth that crosses Sebkhet Dreïaa and ends into the Gulf of Gabès. The intertidal area is overgrown with *Zostera* and near the shoreline there is an abundant growth of *Halocnemum*, *Atriplex*, *Phragmites* spp. and *Juncus maritimus*. Further inland, the vegetation is more sparse and essentially consists of *Arthrocnemum* sp. while parts of the sebkhet are unvegetated.

Birds

See Box and Table 2 for key species. The area is also important for wintering and passage waterbirds, with up to 100 *Phalacrocorax carbo*, 35–50 *Egretta garzetta*, 150–200 *Platalea leucorodia*, 200–250 *Tadorna tadorna*, 1,400 *Anas penelope*, 100 *A. acuta*, *Grus grus*, *Haematopus ostralegus*, 7,000–8,000 *Calidris alpina*, 700 *Numenius arquata*, 1,070 *Tringa totanus*, 300–350 *Larus fuscus* in winter, and breeding *Larus cachinnans*, *Sterna albifrons* and, perhaps, some *S. hirundo*. Up to 14,000 waterbirds occur. In addition, seven species of the Mediterranean North Africa biome (A01) have been recorded (see Table 2).

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Charadrius alexandrinus</i>	—	700–1,000 (w)
<i>Pluvialis squatarola</i>	—	1,500–2,000 (w)

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Hunting and human disturbance are the main threats.

Further reading

Hughes *et al.* (1997), van Dijk *et al.* (1986).

Chott Djerid

Admin region Tozeur, Kebili

Coordinates 33°43'N 08°23'E

Area 700,000 ha Altitude 15 m

TN035

A3 (A01, A02), A4i, A4iii

Unprotected

Site description

Chott Djerid, situated between the towns of Tozeur and Kebili, is the largest salt depression in North Africa, and gives its name to the whole region. In very wet winters it resembles an inland sea, though water depth never exceeds 1 m; in most years it is a huge area of wet salt, unvegetated because of the high salinity. Also included in the IBA is the steppe surrounding the Chott.

Birds

See Box and Table 2 for key species. Most of the inhospitable salt-wastes of the Djerid are unattractive to birds, and wintering waterbirds

only occur during very wet winters. The Djerid is probably the only regular breeding site in Tunisia for *Phoenicopterus ruber*, but the breeding areas are so inaccessible that they have not recently been visited. The shores of Chott Djerid are important areas for many species of the steppe–desert ecotone.

Key species

A3 (A01) Mediterranean North Africa biome: Nine of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A3 (A02) Sahara–Sindian biome: Four of the 13 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A4i	Breeding (pairs)	Non-breeding
<i>Phoenicopterus ruber</i>	Breeds	3,000–15,000 (w)
A4iii	More than 20,000 waterbirds have been recorded at this site.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Threats include hunting, human disturbance and oil exploration.

Further reading

Ben Oueddou (1998), Dalensi (1998), Gaultier (1988a), Hughes *et al.* (1997), Nouria and Blanc (1986).

Bordj Kastil

Admin region Medenine

Coordinates 33°42'N 10°58'E

Area 1,300 ha Altitude 0–3 m

TN036

A4i

Unprotected

Site description

The site comprises a coastal lagoon and some islets on the eastern coast of the island of Djerba, in the southern part of the tidal Gulf of Gabès. The vegetation of site is a mixture of sand-loving species such as *Ammophila arenaria*, *Eryngium maritimum* and *Euphorbia paralias* and halophytes including *Arthrocnemum*, *Salicornia* and *Atriplex* species.

Birds

See Box for key species. See under Kneiss (site TN032) for the ornithological importance of the Gulf of Gabès; many of the species mentioned there occur at Bordj Kastil. It is an important site for wintering waterbirds including *Platalea leucorodia*, *Larus cachinnans*, *Sterna caspia* and numerous waders. *Larus cachinnans*, *Sterna hirundo* and *S. albifrons* breed.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Platalea leucorodia</i>	—	150–500 (w)
<i>Phoenicopterus ruber</i>	—	500–3,000 (w)

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The major threat would appear to be from disturbance by tourists who come to visit an historic monument, an old Turkish fortress, within the site.

Further reading

Azafzaf (1999a), Gaultier (1988a), Meininger (1998), Oueslati (1995).

Gourine

Admin region Medenine

Coordinates 33°39'N 10°34'E

Area 2,100 ha Altitude 0–5 m

TN037

A4i, A4iii

Unprotected

Site description

The site is an extensive coastal lagoon with an intertidal area covering 1,600 ha. It is situated on the southern edge of the Gulf of Gabès, 50 km north of the town of Medenine. It is fringed by saltmarshes;

the vegetation is therefore predominantly halophytic, dominated by *Halocnemum*, *Salicornia* and *Suaeda* species.

Birds

See Box for key species. See under Kneiss (site TN032) for the ornithological importance of the Gulf of Gabès; many of the species recorded there occur at Gourine. The area is important for wintering *Larus genei*, *L. ridibundus* and *Sterna caspia*. There are breeding populations of *Larus cachinnans* and *Sterna albifrons*. In addition, six species of the Mediterranean North Africa biome (A01) and four of the Sahara–Sindian biome (A02) occur at this site (see Table 2).

Key species

A4i		Breeding (pairs)	Non-breeding
	<i>Phalacrocorax carbo</i>	—	10,000–12,000 (w)
	<i>Larus cachinnans</i>	Breeds	2,000–6,000 (w)
A4iii	More than 20,000 waterbirds have been recorded at this site.		

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Human disturbance and hunting are the main threats.

Further reading

Azafzaf (1999a), Gaultier (1988a), Meininger (1998).

Boughrara

Admin region Medenine
Coordinates 33°37'N 10°48'E
Area 50,000 ha Altitude 0–5 m

TN038

A4i, A4iii
Unprotected

Site description

Boughrara is a large inlet of the sea, between the island of Djerba and the mainland in the southern part of the Gulf of Gabès. It is subject to tidal movement and has extensive tidal mudflats. The vegetation of the surrounding coastline is mainly halophytic.

Birds

See Box for key species. See under Kneiss (site TN032) for the ornithological importance of the Gulf of Gabès. Many of the typical species of the Gulf occur in good numbers at Boughrara, including large roosts of *Ardea cinerea*, *Egretta garzetta*, *Calidris alpina*, *Sterna caspia*, *S. hirundo* and *S. albifrons*. The site seems to be of particular importance for *Phoenicopterus ruber*, as a major site of concentration of first- and second-winter birds, with the possibility that the species breeds on offshore islands. In addition, six species of the Mediterranean North Africa biome (A01) and four of the Sahara–Sindian biome (A02) occur at this site (see Table 2).

Key species

A4i		Breeding (pairs)	Non-breeding
	<i>Phalacrocorax carbo</i>	—	2,500–5,000 (w)
	<i>Casmerodius albus</i>	—	100–300 (w)
	<i>Platalea leucorodia</i>	—	200–600 (w)
	<i>Phoenicopterus ruber</i>	—	3,000–5,000 (w)
	<i>Charadrius alexandrinus</i>	—	1,000–2,000 (w)
	<i>Calidris minuta</i>	—	1,500–4,500 (w)
	<i>Larus genei</i>	—	4,000 (w)
	<i>Larus cachinnans</i>	breeds	1,000–5,000 (w)
A4iii	More than 30,000 waterbirds have been recorded at this site.		

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The main threat is disturbance by fishermen.

Further reading

Azafzaf (1999a), Daly Yahia (1993), Kefi (1993), Meininger (1998), van Dijk *et al.* (1986).

Sebkhet Nouaïel

Admin region Kébili
Coordinates 33°29'N 08°52'E
Area 200 ha Altitude 50–100 m

TN039

A1, A4i
Unprotected

Site description

Sebkhet Nouaïel is a small salty depression situated 15 km west of the town of Douz, near the date-palm plantations of Nouaïel. This temporary wetland is fed by run-off from the oasis, and is surrounded by halophytic vegetation (*Arthrocnemum indicum*, *Hordeum* sp.). It dries out completely in the summer months.

Birds

See Box for key species. See under Ghidma (site TN042) for the ornithological importance of the small oasis wetlands near Douz. Nouaïel is also a wintering site for *Phoenicopterus ruber*, *Tadorna tadorna* and *T. ferruginea*. In addition, six species characteristic of the Sahara–Sindian biome have been recorded (see Table 2).

Key species

A1		Breeding (pairs)	Non-breeding
	<i>Marmaronetta angustirostris</i>		
A4i		breeds	40–250 (w)
	<i>Marmaronetta angustirostris</i>		

Other threatened/endemic wildlife

Among mammals, both *Gazella dorcas* (VU) and *G. leptoceros* (EN) have been recorded.

Conservation issues

Human disturbance and hunting are the major threats.

Further reading

Gaultier (1988a), Hughes *et al.* (1997).

Douz Laâla

Admin region Kébili
Coordinates 33°28'N 08°58'E
Area 100 ha Altitude 30–50 m

TN040

A1, A4i
Unprotected

Site description

Douz Laala is a small thickly vegetated depression, immediately to the south of Snam (site TN041), surrounded by oases and agricultural fields and bounded to the west by fixed sand-dunes. The water is fresh to brackish, and derives from drainage from the surrounding oasis and from winter rainfall, varying in depth, from c.1 m in winter to less than 30 cm in summer. The dominant plants are *Phragmites communis*, *Tamarix africana* and *Juncus* species.

Birds

See Box for key species. See under Ghidma (site TN042) for the ornithological importance of the small oasis wetlands near Douz. This site, with its thick vegetation, holds many of the species typical of the Douz oases. Waterbirds recorded include *Tachybaptus ruficollis*, *Egretta garzetta*, *Tadorna tadorna*, *Aythya nyroca*, *Fulica atra*, *Porphyrio porphyrio*, *Himantopus himantopus* and *Charadrius alexandrinus*. Between 5–10 pairs of *Aythya nyroca* were recorded breeding here in 1996. Many passerines, such as *Locustella luscinioides* and *Acrocephalus scirpaceus*, occur on spring migration and may stay to breed. In addition, six species of the Sahara–Sindian biome have been recorded at this site (see Table 2).

Key species

A1		<i>Aythya nyroca</i>	Non-breeding
	<i>Marmaronetta angustirostris</i>		
A4i		Breeds	120–200 (w)
	<i>Marmaronetta angustirostris</i>		

Other threatened/endemic wildlife

Both *Gazella dorcas* (VU) and *G. leptoceros* (EN) have been recorded.

Conservation issues

The site is privately owned and unprotected. Hunting of waterbirds, particularly ducks, and cutting of reeds are the main threats.

Further reading

Gaultier (1988a), Hughes *et al.* (1997).

Snam

Admin region Kébili
Coordinates 33°28'N 09°06'E
Area 120 ha Altitude 30–50 m

TN041

A1, A4i
Unprotected

Site description

Snam is a small reed-fringed lake, 10 km west of Douz alongside the road to Noueil. It is fed by water which runs off from the nearby oasis. Water depth is up to 1 m in winter, but in summer this wetland diminishes in size significantly. The vegetation is composed of *Phragmites communis*, *Tamarix africana* and *Juncus* species.

Birds

See Box for key species. See under Ghidma (site TN042) for the ornithological importance of the small oasis wetlands near Douz. This site, with Ghidma, is probably the most important of these small oasis wetlands, and is one of the most important sites in Tunisia for wintering *Marmaronetta angustirostris* and for other Palearctic ducks. The abundance of the reeds also makes this a good breeding site for a number of species. *Tachybaptus ruficollis*, *Nycticorax nycticorax*, *Ixobrychus minutus*, *Aythya nyroca* and *Rallus aquaticus* have all been recorded in July. In addition, six Sahara–Sindian biome species have been recorded (see Table 2).

Key species

A1	<i>Marmaronetta angustirostris</i>		
A4i	<i>Marmaronetta angustirostris</i>	Breeding (pairs) breeds	Non-breeding 50–150 (w)

Other threatened/endemic wildlife

The ungulate *Gazella dorcas* (VU) has been recorded.

Conservation issues

The major threats are intensive hunting and the harvesting of reeds.

Further reading

Gaultier (1988a), Hughes *et al.* (1997).

Ghidma

Admin region Kébili
Coordinates 33°26'N 08°48'E
Area 100 ha Altitude 20–40 m

TN042

A1, A4i
Unprotected

Site description

This semi-permanent wetland is situated 15 km west of Douz, 5 km from Douz Laâla (TN040), and consists of a depression holding brackish water. It is bordered to the east by the Ghidma oasis and by sand-dunes to the west and south. The site is fed with water by drainage from the nearby oases, and possibly from freshwater springs. Water depth varies from 1 m in winter to less than 30 cm in summer. *Phragmites communis* and *Tamarix africana* are found along the shores, and it has some of the densest vegetation of any of the Djerid oases.

Birds

See Box for key species. Ghidma—like Sebket Nouaïel (site TN039), Douz Laâla (TN040) and Snam (TN041)—is a small wetland adjoining the small oases near the Chott Djerid south of Kebili. These wetlands (often called 'guelta' rather than 'sebkha' by local people) are normally small and situated just outside the oases. They are fed by run-off of artesian, fairly saline, oasis-water after it has been used for irrigation. In some cases, this artesian water is apparently supplemented by local springs, so that the water is fresher and the vegetation thicker, and water may last throughout the summer; in most however, the water evaporates and the site becomes dry in summer. These sites are very

important nationally for wintering waterbird populations: in particular, it seems that the Tunisian breeding population of *Marmaronetta angustirostris* winters in these oasis sites, together with good numbers of *Aythya nyroca*, *Plegadis falcinellus*, and a variety of waders, notably such species as *Charadrius dubius*, *Tringa glareola* and *Philomachus pugnax*, which generally cross the Sahara in winter. The sites are of major importance in spring for northward-moving trans-Saharan migrants of all kinds, which need food and drink after their desert crossing. In some years, especially wet ones, the sites may also be of importance for breeding species, including *Tadorna ferruginea* and *Marmaronetta angustirostris*. In addition, six species of the Sahara–Sindian biome have been recorded in and around these small wetlands (see Table 2).

Ghidma is a particularly good example of this kind of wetland. It is a breeding site for *Tadorna ferruginea* and *Fulica atra*. Other waterbirds include *Casmerodius albus*, *Ardea purpurea*, *Himantopus himantopus*, *Gallinula chloropus*, *Charadrius dubius* and *C. alexandrinus*.

Key species

A1	<i>Marmaronetta angustirostris</i>	<i>Aythya nyroca</i>	
A4i	<i>Marmaronetta angustirostris</i>	Breeding (pairs)	Non-breeding
		60	150–200 (w)

Other threatened/endemic wildlife

Both the ungulates *Gazella dorcas* (VU) and *Gazella leptoceros* (EN) have been recorded.

Conservation issues

The site is privately owned and unprotected. Hunting of waterbirds and sandgrouse *Pterocles*, the cutting of reeds for making animal shelters and invasion by sand are the main threats.

Further reading

Gaultier (1988c), Hughes *et al.* (1997).

Jbil

Admin region Kébili
Coordinates 33°14'N 09°26'E
Area 150,000 ha Altitude 50–220 m

TN043

A3 (A01, A02)
National Park

Site description

Jbil is the largest National Park in Tunisia. It is situated nearly 100 km south of the town of Kebili. It is an area of the Sahara comprising part of the Great Eastern Erg and a 200-m-high hill. The vegetation is typically Saharan and includes species such as *Rhanterium suaveolens*, *Arthrophytum schmittianum*, *Aristida pungens*, *Retama raetam*, *Calligonum arich* and *C. azel*.

Birds

See Box and Table 2 for key species. This is only IBA in Tunisia from where *Passer simplex* has been recorded and one of only two at which *Ramphocoris clotbey* occurs. In addition, Jbil holds a breeding population of *Chlamydotis undulata*, very rare in Tunisia.

Key species

A3 (A01)	Mediterranean North Africa biome: 10 of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.
A3 (A02)	Sahara–Sindian biome: Eight of the 13 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

The mammals *Gazella dorcas* (VU) and *G. leptoceros* (EN) both occur, but *Acinonyx jubatus* (VU) probably no longer does so.

Conservation issues

Jbil was created a National Park in 1994. Poaching (of gazelles *Gazella*, sandgrouse *Pterocles* and *Chlamydotis undulata*) is the main threat affecting the site.

Further reading

Chibani (1980), GTZ (1994), Nabli (1989), Nouria and Blanc (1993), Ozenda (1991).

Bibane

Admin region Medenine

Coordinates 33°00'N 11°15'E

Area 23,000 ha Altitude 0–10 m

TN044

A4i, A4iii

Unprotected

Site description

Also known as Bhiret el Bibane (the Sea of Bibane), the site is situated on the south-eastern coast, 10 km north of Ben Guerdane, 20 km south of Zarzis and 15 km from the Libyan border. It is a coastal lagoon 32 km long and up to 10 km wide, with an average depth of 4 m. It is linked to the sea by a series of small channels, the largest of which is 800 m wide.

Birds

See Box for key species. It is an important wintering and passage site for waterbirds including *Anas penelope*, *A. acuta*, *A. clypeata*, *Grus grus*, *Numenius arquata*, *N. phaeopus*, *N. tenuirostris* (a group of 32 was reported in 1979), *Larus melanocephalus*, *L. minutus*, *L. ridibundus*, *L. genei*, *L. fuscus*, *L. cachinnans*, *Sterna nilotica* and *S. caspia*. *Larus cachinnans*, *Sterna hirundo* and *S. albifrons* all breed.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Phalacrocorax carbo</i>	—	3,000–10,000 (w)
<i>Phoenicopterus ruber</i>	—	1,000–3,000 (w)
A4iii	Up to 35,000 waterbirds have been recorded at this site.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Traditional fishing is the main human activity in the lagoon and may be a cause of disturbance to waterbirds.

Further reading

Denizot and Guelorget (1981), Gaultier (1988a), Gretton (1991), Hughes *et al.* (1997).

Sidi Toui

Admin region Medenine

Coordinates 32°44'N 11°22'E

Area 6,315 ha Altitude 30–178 m

TN045

A3 (A01, A02)

National Park

Site description

Sidi Toui National Park is situated in the south-east of the country, 54 km south of the town of Ben Gardane. The site includes a low hill, Djebel Sidi Toui (172 m), surrounded by an extensive plain composed of small dunes, sebkhas and dry sandy wadis. The area as a whole is representative of the eastern Sahara region of Tunisia. In the north the vegetation is dominated by *Rhanterium suaveolens* and *Stipa lagascae*. Around Djebel Sidi Toui, the vegetation is more shrubby, with *Periploca laevigata*, *Rhus tripartitum* and, in sandy areas, *Retema raetam*.

Birds

See Box and Table 2 for key species. *Chlamydotis undulata* is known to breed in the area. Large numbers of migratory raptors and passerines move through this area on spring passage; *Circus macrourus* is regularly observed during this period.

Key species

A3 (A01) Mediterranean North Africa biome: Eight of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

A3 (A02) Sahara–Sindian biome: Five of the 13 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

The ungulate *Gazella dorcas* (VU) has been recorded.

Conservation issues

Although the site has been declared a National Park, the legislation has not yet been enacted. Poaching of gazelles *Gazella* and *Chlamydotis undulata* in particular, though limited, is the main threat to the area.

Further reading

Chibani (1980), GTZ (1994), Ozenda (1991).

El Feidja

Admin region Jendouba

Coordinates 36°31'N 08°19'E

Area 2,632 ha Altitude 550–1,150 m

TN046

A3 (A01)

National Park

Site description

The site is situated in the extreme north-west of Tunisia, 49 km north-west of Jendouba and 17 km north-west of Ghardimaou. El Feidja National Park represents the best-preserved area of mountainous Mediterranean sclerophyllous forest in the Khroumirie. The vegetation is dominated by oak forests of *Quercus suber* and *Q. canariensis* and Mediterranean maquis shrubland, with *Cistus monspeliensis*, *Erica arborea*, *Myrtus communis* and *Arbutus unedo*. The flora is very rich; more than 700 plant species have been recorded. There are several springs and watercourses in the park. Annual rainfall varies between 1,200 mm and 2,000 mm and snow is recorded almost annually.

Birds

See Box and Table 2 for key species. Over 70 bird species have been recorded. Several typical bird species are Palearctic species at the southern limits of their distribution in Tunisia: *Columba palumbus*, *Dendrocopos major*, *D. minor*, *Picus vaillantii*, *Turdus viscivorus*, *Erithacus rubecula*, *Certhia brachydactyla*, *Coccothraustes coccothraustes* and *Garrulus glandarius cervicalis*. Of the many raptors that occur, *Hieraaetus pennatus*, *Milvus migrans*, *Circus gallicus*, *Accipiter nisus*, *Falco tinnunculus* and *F. subbuteo* breed regularly. *Scolopax rusticola* also occurs.

Key species

A3 (A01) Mediterranean North Africa biome: Seven of the 16 species of this biome that occur in Tunisia have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

Some 417 ha of the park are set aside as a special protected reserve for the deer *Cervus elaphus barbarus* (LR/nt).

Conservation issues

El Feidja was declared a National Park in 1990. Human disturbance and fire are the main threats.

Further reading

Amari *et al.* (1995), Gaultier (1988a), GTZ (1994), Heim de Balsac and Mayaud (1962), Pottier-Alapetite (1979, 1981).

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