

SOCIALIST PEOPLE'S LIBYAN ARAB JAMAHIRIYA

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Trumpeter Finch
Rhodopechys githaginea.
(ILLUSTRATION: SHERIF BAHHA EL DIN)

GENERAL INTRODUCTION

The Socialist People's Libyan Arab Jamahiriya, or Libya, lies on the north coast of Africa, between Egypt to the east, Tunisia and Algeria to the west and Niger, Chad and Sudan to the south; while to the north it is bounded by the Mediterranean Sea. It has an area of 1,759,540 km². The population in 1995 was 5,248,400, with an annual growth-rate of 3.7% and an average life expectancy of 64. The capital city is Tripoli, also known as Tarabalus, and the country is divided administratively into 25 regions. The vast majority of the population (97%) is Sunni Muslim. The average population density is only 3.0 persons/km², but this figure disguises the fact that the majority of the population live on the coastal plain while the vast desert interior is extremely sparsely populated.

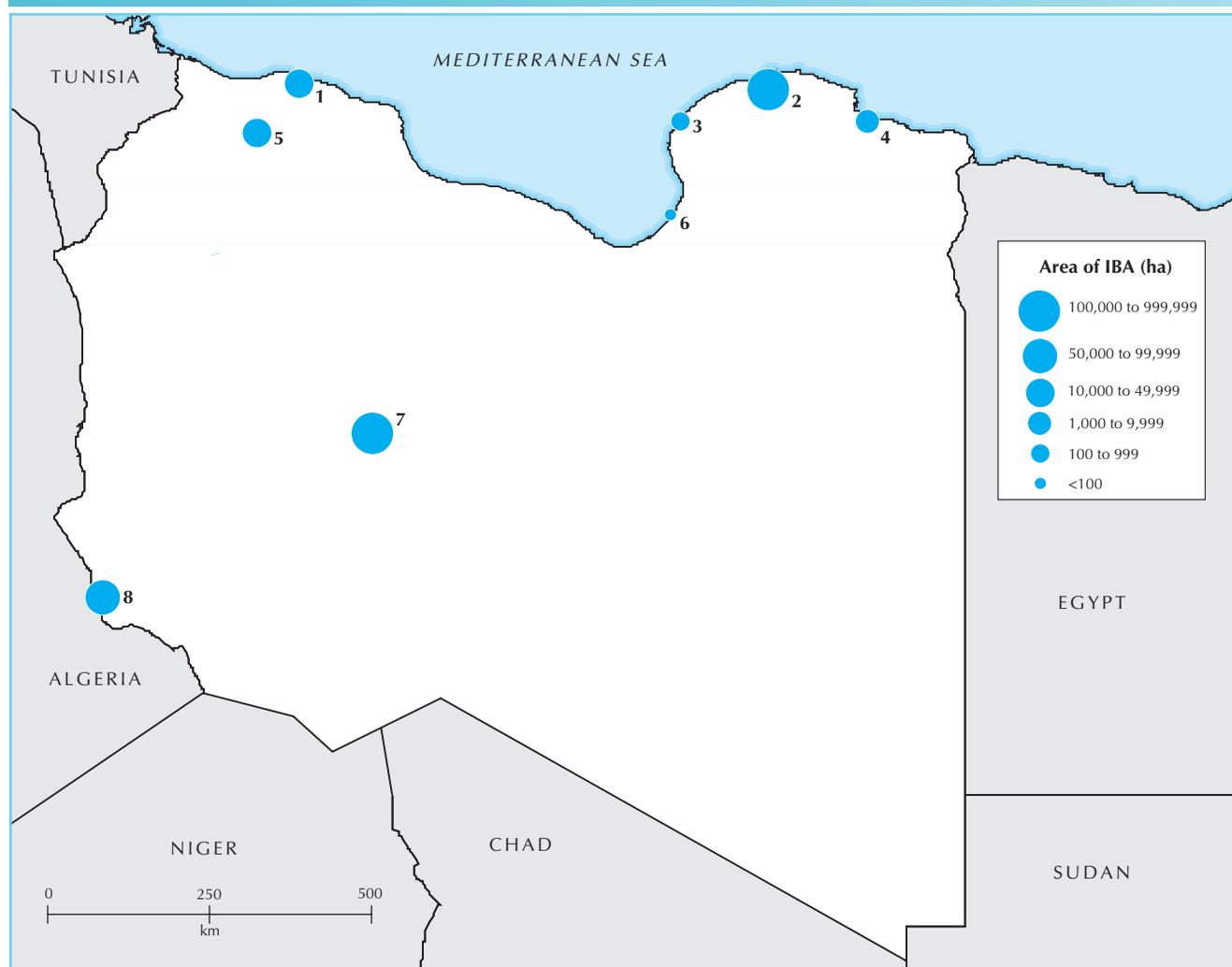
Libya gained its independence from Italy in 1951. It has an average gross domestic product of \$5,410 per capita (1990), based principally on the export of petroleum, natural gas and gypsum. The country's water resources are limited. The amount of irrigated land in Libya was only some 2,420 km² in 1989, and as much as 75% of the country's food is imported. However, there are vast underground aquifers in the Sahara which are being tapped by the 'Great Artificial River Project', reputed to be the world's largest engineering endeavour, which seeks to pipe water over vast distances from the interior to the populated coastal region.

Libya's climate is influenced by the desert in the south as well as the Mediterranean Sea to the north. Winters in the coastal region can be cold, as may the Tibesti mountains in the south of the country, which can experience frosts. However, in summer months the whole country is hot. A hot, dust-laden wind, known locally as 'the ghibli', may reach the coast from the Sahara during any season but does so principally during spring and autumn. This can lead to dramatic temperature rises, with a peak of 58°C having been recorded on the coastal Jifarah (Gefara) plain. Libya is generally very dry, with droughts frequent in the coastal region and much annual variation in rainfall. There is a general decrease in rainfall from west to east along the coast, from an annual mean of 371 mm

at Tripoli, to 247 mm at Misratah and 113 mm at Bu'ayrat al Hasun, but then rainfall increases again to 260 mm at Benghazi and reaches 500 mm on the seaward heights of Jabal al Akhdar. Away from the coast, rainfall decreases rapidly, with 95% of the country receiving less than 100 mm annually, and much of it receiving below 40 mm.

Libya's coastline is 1,770 km long. The central coastal region is dominated by the Gulf of Sirt (Sirte, Sidra, Surt), where the continental shelf extends nearly 200 km offshore and whose shallow waters support the second-largest seagrass meadows in the Mediterranean. On the western side of the Gulf of Sirt the coastal plain is 50–70 km wide before rising gently towards Jabal Tarabalus, a limestone ridge 300–600 m high which extends away south-westwards towards the Tunisian border. North-west of Jabal Tarabalus the land descends again to the coastal Jifarah plain. South and south-east of the Gulf of Sirt the coastal plain merges into a vast area of some 200,000 km² below the 100 m contour, and an equal area below 200 m. To the east of the Gulf, however, the coastal plain narrows to 10–15 km wide, beyond which the land rises to Jabal al Akhdar, a plateau 400–600 m high and 70 km wide, which extends for 200 km parallel with and immediately inland of the coast. On its southern side it slopes down to the interior plain. Further east, towards the Egyptian border, the coastline is low-lying and backed by undulating land with sparse vegetation cover. Tides are weak along the Libyan coast, with a maximum amplitude of 40 cm west of Tripoli, where there are areas of mudflats and saltmarsh vegetation in the Bay of Bu Kammash, in the extreme west. Saline pans and marshes form in places where seasonal water flow from wadis collects in depressions behind the coastal dunes. These areas—'sabkhat'—support halophytic vegetation. Important examples include Sabkhat Tawargha, which runs parallel to the coast for some 100 km on the western side of the Gulf of Sirt, and a series of smaller salt pans on the Benghazi coast, from Qaminis to Tukrah (Al Aquriyah).

Away from coastal wetlands Libya has minimal surface water. There are no permanent rivers, but many wadis, watercourses of

Map 1. Location and size of Important Bird Areas in the Socialist People's Libyan Arab Jamahiriya.


temporary streams. These fill quickly after rains but dry out again almost as rapidly. Many wadis are fed by rainfall from upland areas and often feed into depressions in the surrounding desert to form ephemeral pools. In addition, surface water is present in oases where the water-table of the extensive underground aquifers breaks the surface in desert depressions, where capillary action brings water to the surface or where water is forced up under pressure into surface springs. There are three important groups of oases in Libya; around the town of Ghat in the extreme south-west of the country close to the Algerian border; in the region of Sabha in the central south-west; and those of Kufrah in the south-east. There are, in addition, several smaller groups of oases in central and eastern parts.

Permanent pools within oases are vegetated with emergents such as *Juncus* spp., *Phragmites australis*, *Scirpus holoschoenus* and *Typha capensis* and submerged species including *Ceratophyllum demersum*, *Potamogeton* spp. and *Chara* spp. Oases have enabled human habitation and development in the surrounding regions, based on the cultivation of barley, vegetables, fruits, cotton and, particularly, date-palms; all of which have largely replaced the original vegetation. Only small patches of the indigenous *Tamarix* bushes and *Hyphaene* palms remain.

Three quarters of Libya is covered by sand desert, broken only by oases and a number of isolated mountainous regions. The latter include the Hammadah al Hamra, a vast rocky plateau covering 49,000 km² at an altitude of 600–700 m and lying adjacent to the Algerian border, to the south of the coastal Jifarah plain. Jabal Tarabalus represents the northern edge of this region. It is characterized by extensive gravel-plains, sparsely vegetated with scattered bushes. The Tassili mountains extend into the south-west corner of Libya from Algeria, the Tibesti mountains of Chad reach northwards into Libya, and Jabal al Aawaynat (1,893 m) marks the meeting point of the borders of Libya, Sudan and Egypt. In the centre of the country, east of Sabha, the volcanic mountain of Al Haruj al Aswad rises to 1,200 m from the surrounding sand-plain.

Libya's coastal region has a Mediterranean vegetation, particularly well developed in the north-east. Thus, in the mountains and gorges of Jabal al Akhdar there are relict wooded communities characterized by *Quercus*, *Juniperus*, *Cupressus*, *Pinus* and *Cedrus* spp., as well as thickets of *Olea* spp. and *Pistacia lentiscus*. The total wooded area of the country is approximately 6,800 km². The Mediterranean zone is fringed by semi-desert grassland or steppe vegetation, particularly on the Jifarah plain behind Tripoli. Across the majority of the country the sand desert supports little vegetation. On some fixed dunes there grow a few perennial species which form

Table 1. Summary of Important Bird Areas in the Socialist People's Libyan Arab Jamahiriya. 8 IBAs covering 2,865 km²

IBA code	Site name	Administrative region	Criteria (see p. 11; for A3 codes, see Table 2)		
			A1	A3 A01 A02	A4i
LY001	Karabolli	Tarabalus		✓	
LY002	Jabal al Akhdar	Al Jabal al Akhdar, Darnah	✓	✓	
LY003	Benghazi	Benghazi			✓
LY004	Geziret al Elba–Ayn al Ghazalah Bay	Tubruq		✓	✓
LY005	Nefhusa	Gharyan		✓	✓
LY006	Geziret Garah	Ajdabiya			✓
LY007	Zallaf	Sabha, Ash Shati, Awbari		✓	✓
LY008	Ghat oases	Awbari		✓	✓
Total number of IBAs qualifying:			1	6	3

a sparse cover. Two species commonly found are the grass *Stipagrostis zitelli* and *Cornulaca monacantha*, a prickly-leaved shrub.

ORNITHOLOGICAL IMPORTANCE

The most recent review of the avifauna of Libya is that of Bundy (1976). He listed 317 species, of which 92 were then known to breed. Of the remainder, 145 species were regular non-breeding migrants and a further 80 were only known as occasional or accidental visitors.

Five species of global conservation concern are known to occur in Libya, of which one, *Falco naumanni* (VU), is known to breed regularly. While there are a couple of breeding records of *Aythya nyroca* (VU), it occurs more commonly as a non-breeding winter visitor. The remaining three species, *Circus macrourus* (NT), *Tetrax tetrax* (NT) and *Larus audouinii* (CD), are known as non-breeding visitors only. No species of restricted range are known, but the country holds a number of species that are restricted to two particular biomes. The Mediterranean North Africa biome (A01) extends in a narrow strip along the Libyan coast, and holds (in Libya) 12 of the 17 species restricted to this biome. The Sahara–Sindian biome (A02) covers the rest of the country and holds 14 of the 22 species of this biome. There are important breeding colonies of terns (Sternidae) along the Libyan coast, and a number of oases in the southern desert are important for migrants.

CONSERVATION INFRASTRUCTURE AND PROTECTED-AREA SYSTEM

Statutory responsibility for conservation in Libya lies with the General Secretariat of Agricultural Reclamation and Land Reform.

This organization is divided into a number of committees including the Technical Committee of Wildlife and National Parks, which oversees the administration of Kouf, Heshha and Karaboli National Parks. The Forestry Department of the General Secretariat is responsible for forestry issues. Also within the General Secretariat of Agricultural Reformation and Land Reform is the Technical Centre for Environment Protection, established in 1986 to work as a consulting agency for the resolution of environmental problems, as well as to monitor violations of the law by other organizations, both private and governmental, and to disseminate information to increase environmental awareness.

Research into environmental and conservation issues is promoted and undertaken by the Secretariat of Scientific Research of the Environmental Protection Programme, the National Academy for Scientific Research, the Agricultural Research Centre and a number of universities. The Arab Centre for the Study of Arid Zones and Drylands was involved in the establishment of Kouf National Park.

The most significant piece of legislation for conservation and the environment in Libya is the Environment Protection Law No. 2 of 1982 which provides for the protection of areas of both land and sea. The types of designation include:

- Fishing Zone: allows for the regulation of fisheries and the prohibition of access to marine areas.
- Forest Reserve: for the protection of remaining wildlife, the re-establishment of woodland cover, the reintroduction of fauna and provision of education and recreational facilities.
- Hunting Reserve: in which hunting or shooting may be prohibited.
- Nature Reserve: established to protect remaining native wildlife and ecosystems.
- Protected Area: no information is available.

In addition, the legislation to create a network of National Parks was established by the National Park Decree of the Council of Ministers of 1978. National Park status allows for the prohibition of grazing, hunting and fishing, building development, agriculture, mining, pest control and access. Three National Parks, two Nature Reserves and one Protected Area have been legally established, covering 173,000 ha, and some 20–30 further sites have been recommended for some form of protected status.

INTERNATIONAL MEASURES RELEVANT TO THE CONSERVATION OF SITES

Libya has ratified the Convention to Combat Desertification, the Convention on Climate Change, the World Heritage Convention (under which five archaeological, but no natural, sites have been designated, to date), the Ramsar Convention on Wetlands (with two designated sites) and has signed, but not ratified, the Convention on Biological Diversity (CBD). Libya is also party to the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean. Kouf National Park is listed in the Protocol concerning Mediterranean Specially Protected Areas, a Protocol of the Barcelona Convention.

OVERVIEW OF THE INVENTORY

A total of eight Important Bird Areas (IBAs) have been identified, covering 2,865 km², equivalent to c.0.16% of Libya’s total land area (Map 1, Table 1). This relatively low total reflects the lack of available data on birds in Libya. There have been some recent studies in coastal areas, but little is known of the birds of the country’s vast interior as yet. Four of the eight IBAs have protected-area status, one is partially protected and the other three are unprotected.

Only one site qualifies under the A1 criterion for the regular and significant presence of species of global conservation concern, on the basis of numbers of breeding *Falco naumanni*. It is probable that other sites holding significant colonies of *F. naumanni* exist, but have yet to be identified. The remaining species of global conservation concern, all migrants or non-breeding visitors, are not currently known to occur regularly or in significant numbers at sites. Three coastal wetlands have been identified for

Table 2. The occurrence of biome-restricted species at Important Bird Areas in the Socialist People’s Libyan Arab Jamahiriya. Sites that meet the A3 criterion are highlighted in **bold**.

A01 – Mediterranean North Africa biome (12 species in Libya; six sites meet the A3 criterion)							
IBA code:	001	002	004	005	007	008	
<i>Alectoris barbara</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 deserticola</i>					✓		
Number of species recorded:	3	2	3	6	4	3	
A02 – Sahara–Sindian biome (14 species in Libya; three sites meet the A3 criterion)							
IBA code:	001	002	004	005	007	008	
<i>Falco concolor</i>					✓	✓	
<i>Pterocles senegallus</i>					✓	✓	
<i>Pterocles coronatus</i>							
<i>Bubo ascalaphus</i>		✓					
<i>Ammomanes cincturus</i>						✓	
<i>Ammomanes deserti</i>				✓		✓	
<i>Alaemon alaudipes</i>					✓	✓	
<i>Hirundo obsoleta</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:	1	1	1	3	7	8	

congregatory waterbirds, including two offshore islands holding breeding colonies of terns (Sternidae). No wetland is known to hold more than 20,000 waterbirds.

Six sites qualify under the A3 criterion for species characteristic of the Mediterranean North Africa biome, between them holding nine of the 12 species known from Libya. Three sites similarly meet the A3 criterion for the Sahara–Sindian biome, holding 11 of the 14 species in Libya, with two of the three remaining species occurring at other IBAs. A number of the selected sites are currently known to hold relatively few of the species of the biome, but this is thought to be due, at least in part, to inadequate knowledge of the sites, and more biome species may be expected to occur. However, as well as further surveys at selected sites, additional IBAs also need to be identified.

SITE ACCOUNTS

Karabolli

Admin region Tarabalus
Coordinates 32°45'N 13°35'E
Area 15,000 ha Altitude 0–20 m

LY001

A3 (A01)
National Park

Site description

Karabolli (Garabulli, Qarabulli) is situated in north-west Libya on the Mediterranean coastal plain. It is located some 50 km east of Tripoli and 2 km north of the town of Al Garabulli (Al Qarabulli). The park is approximately rectangular in shape and is bounded by the Wadi Ramal in the west, Wadi Turghat in the east and extends up to 7 km inland from the coast. A third watercourse, the Wadi Al Mashid, runs through the site. These perennial streams are spring-fed and are generally slow-flowing except after rain. Wadi al Mashid is particularly slow and meandering and is surrounded by muddy areas and wet flushes. Wadi Ramal feeds into a small (1 ha) saline lagoon just behind the beach. The site consists of rolling continental sand-dunes, with sandy beaches and rocky shores backed by low, eroded sandstone cliffs. There are extensive seagrass *Poseidonia oceanica* beds in the marine zone. The dunes are sparsely vegetated with marram grass *Ammophila arenaria* and *Tamarix* spp. and there is a natural scrub vegetation and areas of open pasture in some of the interdune basins while, beyond the dunes, there are open grass plains with low thorn scrub. Communities of *Typha* and *Juncus* spp., along with *Phragmites australis* reedbeds, interspersed with the shrubby *Tamarix* spp., occur beside springs and ponds in the wadis. In Wadi Turghat reedbeds extend for 2 km from the river mouth. However, most of the vegetation within the reserve is introduced, with sand-stabilizing plantations of *Acacia* and *Eucalyptus* spp. the most widespread habitat. In addition, tamarisk *Tamarix* spp., poplar *Populus* spp., pine *Pinus* spp., *Acacia tortilis*, fig *Ficus indica* and date-palm *Phoenix dactylifera* have also been planted.

Birds

See Box and Table 2 for key species. To date, some 99 species have been recorded. More than 45 *Larus audouinii* were present in 1982. The site is particularly important for Palearctic passage migrants. In addition, one species of the Sahara–Sindian biome (A02) has been recorded (see Table 2).

Key species

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

Other threatened/endemic wildlife

Mammals of global conservation concern include *Hyaena hyaena* (LR/nt).

Conservation issues

The area was designated a National Park in 1992. Clearance of the original coastal woodland led to serious soil erosion. To counter this exotic *Acacia* and *Eucalyptus* spp. were planted to stabilize the dunes. This provides poor habitat for wildlife and, as the stabilized soils are colonized by native plants, the introduced vegetation should be cleared. The remaining natural vegetation is threatened by sheep-grazing and

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GLOSSARY

erg sand desert.

jabal mountain or hill.

sebkha saltflat.

wadi desert valley, usually dry except after heavy rainfall.

cultivation is encroaching on the site. Hunting bans have been instituted in the past, but the current situation is unknown. The introduction or reintroduction of a number of mammal species has been proposed.

Further reading

Child (1978), Hufnagl (1972), Scott (1982, 1983b, c).

Jabal al Akhdar

Admin region Al Jabal al Akhdar, Darnah
Coordinates 32°40'N 21°40'E
Area 100,000 ha Altitude 0–850 m National Park, Unprotected

LY002

A1, A3 (A01)

Site description

The site includes Kouf National Park which lies 150 km north-east of Benghazi, next to the town of Al Bayda (Beida). The park includes a 20 km stretch of coast and extends southwards into the Jabal al Akhdar massif. The main Benghazi–Tubruq (Tobruk) road traverses the park. The coastal section of the park consists of sandy beaches interspersed with rock outcrops and coastal cliffs. Behind the beach is a disjunct band of sand-dunes which are fringed on the landward side by shallow, seasonal brackish lagoons. The coastal strip and dunes are covered with the grasses *Ammophila arenaria* and *Agropyron junceum* together with scattered shrubs. The woody plants *Limoniastrum monopetalum* and *Tamarix nilotica* are also common on the dunes. Species found on the seasonal mudflats include the halophytes *Suaeda fruticosa* and *Cakile maritima*. The edges of permanent water are lined with *Phragmites australis*.

Also included is a large section of Jabal al Akhdar, a limestone massif reaching 850 m. Wadis up to 200 m deep cut steep-sided gorges into the limestone. The vegetation is mainly dense maquis shrubland, in which *Juniperus phoenicia* is common. The maquis grades in places into garrigue with abundant herbaceous communities. Associated with the juniper are *Cupressus sempervirens*, *Pistacia lentiscus* and *P. atlantica*; along with *Myrtus communis*, *Olea europaea* and *Rhamnus* spp. The vegetation of the rocky slopes includes *Cichorium spinosum*, *Alkanna tinctoria*, *Urginea maritima* and grasses. *Cupressus sempervirens* grows in the gorges along with *Quercus coccifera* trees up to 10 m high in the more sheltered areas. The shrubs *Smilax aspera*, *Viburnum tinus* and *Pistacia lentiscus* are also common amongst the rocks. There is no permanent water except for small springs by the sebkha lagoon of Ayn al Shaqiqh while the wadis carry water only for short periods following heavy rains, mainly during November to February; annual rainfall is in the range 300–700 mm.

Birds

See Box and Table 2 for key species. At least 27 pairs of *Falco naumanni* were recorded breeding in 1998. It is likely that more species of the Mediterranean North Africa biome will be found to occur. In addition, one species of the Sahara–Sindian biome (A02) has been recorded (see Table 2). Breeding species include *Aquila chrysaetos*, *Alectoris barbara*, *Pterocles* spp. and *Chlamydotis undulata*. The brackish lagoons are important for herons, ducks and waders as well as *Ciconia nigra* and *C. ciconia*.

Key species

A1 *Falco naumanni*
 A3 (A01) Mediterranean North Africa biome: Two of the 12 species of this biome that occur in Libya have been recorded at this site; see Table 2.

Other threatened/endemic wildlife

The seal *Monachus monachus* (CR) has been reported in the past, but its current status is unknown. Other marine mammals recorded offshore include *Tursiops truncatus* (DD). The sea-turtle *Caretta caretta* (EN) nests on beaches in the park. Among the flora, notable North African endemics include *Arbutus pavarii* (V), *Arum cyrenaicum*, *Thapsia garganica sylphium*, *Ornithogalum barba-carprae*, *Origanum cyrenaicum*, *Athamanta della-cellae*, *Crocus boulosii* (V) and *Cyclamen rohlfsianum* (V). Approximately 90% of Libya’s flora has been recorded from the park.

Conservation issues

The site includes Kouf National Park which was first designated a Nature Reserve in 1978 and became established as a National Park in 1979. The park originally covered 32,122 ha, but has reportedly become restricted to only 9,000 ha. Jabal al Akhdar is the second-most populous region of Libya and has been inhabited for many centuries. However, the natural vegetation of the site appears not to have been cleared in historic times. There are at least 229 sites of archaeological importance in the area. In 1984, 2,500 people were living within the park; their livelihoods were based on pastoralism and the cultivation of olives and barley. At least until recently the park suffered from excessive grazing, timber exploitation, hunting and illicit woodland fires. There is also concern over the introduction of exotic animal species and the misuse of firearms and agricultural chemicals. In addition, there is heavy pressure from tourists, with 100,000 visiting the site in 1980, rising to 300,000 in 1985. The park is seen as a key resource for national and international tourism as well as for education and the conservation of wildlife.

Further reading

Abou Jaafer (1984), ACSAD (1979), Armsby (1980), Baker (1979, 1980, 1984), Bundy (1976), Child (1978), Gryn-Ambroes (1980), Hemsley (1981), Kettaneh (1980), Massa (1999).

Benghazi

Admin region Benghazi
 Coordinates 32°11'N 20°06'E
 Area c.500 ha Altitude 0–5 m

LY003

A4i

Nature Reserve

Site description

The reserve is situated 15 km north-east of the city of Benghazi. The site includes the Ayn Zayanah lagoon and a stretch of coastal shoreline. The lagoon is 1.5 km long by up to 3–4 km wide and is connected by a channel at the northern end to the sea. The lagoon is fed by 10 underground springs arising from deep aquifers. The spring water has a salinity of 10‰ whilst that of the rest of the lagoon ranges from 18–22‰ in summer to 15–34‰ in winter. Water temperatures range from 14 to 28°C. The lagoon is surrounded by shallow marshland which is covered by water at high tide, especially to the east of the lake. Vegetation includes *Salicornia* spp., with *Tamarix* spp. on the dunes.

Birds

See Box for key species. The site is important for migratory waterbirds, particularly *Phoenicopterus ruber* and *Charadrius alexandrinus*. *Sterna bengalensis* has also been recorded and the site may prove to be used regularly by this species. At least 60 pairs of *Himantopus himantopus* breed. It is suspected that the number of waterbirds using the site during winter months is higher than in July, when the only known count took place.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Phoenicopterus ruber</i>	—	1,000–1,500 (1993)
<i>Charadrius alexandrinus</i>	—	700–1,500 (1993)

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Threats include hunting (for which several hides have been built), disturbance and construction, resulting in the filling-in of parts of the wetland. The area is also used as a rubbish-dump. The beach near the lagoon is an important recreational area. A number of fishermen use the site.

Further reading

Beaufort and Czajkowski (1986), Kerambrun (1986), Meininger *et al.* (1994a, 1996).

Geziret al Elba–Ayn al Ghazalah Bay
LY004

Admin region Tubruq
 Coordinates 32°13'N 23°18'E
 Area c.1,000 ha Altitude 0–2 m

 A3 (A01), A4i
 Unprotected

Site description

Ayn al Ghazalah Bay is situated in the south of the Gulf of Bumbah (Bomba), between the towns of Darnah and Tubruq. In the mouth of the bay lies the island of Geziret al Elba, 2 km from the coast. The island is 2.5 km by 1 km, reaching only 1.5 m at the northern, rocky end, from where it slopes gradually into a saltmarsh at sea-level at the southern end. The saltmarsh consists primarily of *Salicornia fruticosa* and *Halimione portulacoides*. The coastline of Ayn al Ghazalah Bay also contains some areas of saltmarsh and coastal lagoons backed by desert.

Birds

See Box and Table 2 for key species. Other breeding species on the island include *Sterna albifrons* (25 pairs), *Larus cachinnans* (10 pairs), *Charadrius alexandrinus* (few pairs) and *Galerida cristata* (10 pairs). The bay may be important for migrant waterbirds. It is probable that further species of the Mediterranean North Africa biome will be found in the mainland part of the site. In addition, one species of the Sahara–Sindian biome (A02) has also been recorded (see Table 2).

Key species

A3 (A01)	Mediterranean North Africa biome: Three of the 12 species of this biome that occur in Libya have been recorded at this site; see Table 2.	
A4i	Breeding (pairs)	Non-breeding
<i>Sterna bengalensis</i>	40 (1993)	—

Other threatened/endemic wildlife

The mainland coast of the Ayn al Ghazalah Bay is an important breeding site for the sea-turtle *Caretta caretta* (EN).

Conservation issues

Fishermen occasionally land on the island to repair their nets, but there appears to be no serious disturbance to the tern colony.

Further reading

Meininger and Wolf (1994), Meininger *et al.* (1994a and b).

Nefhusa

Admin region Gharyan
 Coordinates 32°00'N 12°50'E
 Area 20,000 ha Altitude c.30–500 m

LY005

 A3 (A01, A02)
 Protected Area

Site description

The Nefhusa (Nafusah) Protected Area is situated in Jabal Nefhusa, north and east of the town of Gharyan (Garian), some 70 km south-south-west of Tarabulus. It includes a section of the Jabal Nefhusa escarpment, from the peaks at 500 m down to the coastal plain, including the foothills and a section of the plain. Three wadi systems are included. Areas of natural vegetation remain and there is a complex of small springs with old *Pistacia* trees, date-palms and thick scrub below the crags at Abu Gharyan. A dam on the Wadi Ghan in the eastern portion of the reserve, built to provide water for irrigation of the adjacent plains, has created a reservoir some 12.5 km long when full. The level of the reservoir fluctuates greatly. Rainfall on the peaks allows a lush vegetation, with *Tamarix* spp., old *Pistacia* spp. trees

and self-regenerating date-palm *Phoenix dactylifera*. On the lower slopes and foothills there are pockets of natural vegetation, consisting of spiny cushion plants and *Juniperus* spp. and *Pistacia* spp. woodland, surrounded by extensive plantations of introduced *Acacia* spp., *Pinus* spp. and *Eucalyptus* spp. Average annual rainfall is about 400 mm.

■ Birds

See Box and Table 2 for key species. There have been no full surveys, but at least 46 species are known to occur.

Key species

- A3 (A01) Mediterranean North Africa biome: Six of the 12 species of this biome that occur in Libya have been recorded at this site; see Table 2.
 A3 (A02) Sahara-Sindian biome: Three of the 14 species of this biome that occur in Libya have been recorded at this site; see Table 2.

■ Other threatened/endemic wildlife

The fauna includes the North African endemic gundi *Ctenodactylus gundi*.

■ Conservation issues

The site was established as a Protected Area in 1978/79. The area is populated by the Nefhusa Berber people. Overgrazing by sheep and goats has led to the loss of much of the natural vegetation of the area which has resulted in soil erosion. Exotic tree species have been planted in attempts to combat further erosion. Where grazing has been excluded the regeneration of natural vegetation has been rapid. The site is easily accessible from numerous adjacent towns and recreation, centred on the reservoir, is a significant land-use. The dam has affected seasonal water flow in Wadi Ghan.

■ Further reading

Abou Jaafar (1984), Bundy (1976), Child (1978), Hufnagl (1972), Scott (1983a).

Geziret Garah

Admin region Ajdabiya
 Coordinates 30°48'N 19°54'E
 Area 5 ha Altitude 0–8 m

LY006

 A4i
 Unprotected

■ Site description

Geziret Garah is a small, sandstone island lying 12 km offshore in the Gulf of Sirt (Surt, Sirte), some 20 km west-south-west of the town of Azzuwaytinah (Zuwaytinah). It measures some 150 x 300 m. On the northern, western and eastern sides there are low cliffs resulting from wave erosion. The southern side is more sheltered and slopes gradually to the sea, with some small sandy beaches. The island is sparsely vegetated with low, scattered bushes.

■ Birds

See Box for key species. The colony of *Sterna bengalensis* on the island represents 95% of the breeding population of the species in the Mediterranean. The only other species that breeds on the island is *Larus cachinnans*.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Sterna bengalensis</i>	1,700 (1993)	—

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The fishing areas for terns from the colony appear to lie not only in the waters immediately surrounding the island, but also in areas at some distance from it. Protection of the island and the seas adjacent to it may not, therefore, be sufficient to ensure the protection of the colony. The island lies within sight of a large oil-processing plant which presents a serious potential risk of pollution. There is no evidence of direct human disturbance on the island.

■ Further reading

Meininger and Wolf (1994), Meininger *et al.* (1994a, b), Moltoni (1938).

Zallaf

Admin region Sabha, Ash Shati, Awbari
 Coordinates 27°32'N 14°50'E
 Area 100,000 ha Altitude 390–435 m

LY007

 A3 (A01, A02)
 Nature Reserve

■ Site description

This site is situated in the interior of Libya, almost due south of Tripoli and north and west of the oasis town of Sabha. It consists of gently rolling sand-dunes of the Ramlat Zallaf (Azzallaf) system at the eastern end of the great Awbari (Aubari) Erg. Wetlands form in depressions where the water-table is close to the surface, including sebkha saltmarshes and permanent standing pools. Around damp areas and on pool-edges grow *Phragmites australis* and *Juncus* spp. with *Ammophila* spp. grasses in drier parts. The flora is entirely Saharan in character and dominant species include *Calligonum comosum*, *Nitraria retusa*, *Anabasis articulata*, *Acacia* spp., *Euphorbia* spp. and *Fagonia* spp., along with date-palm *Phoenix dactylifera*, *Zizyphus lotus* and *Tamarix africana*.

■ Birds

See Box and Table 2 for key species. There are two breeding records of *Aythya nyroca* from a pool near Askhikah, to the east of the town of Birak (Brak), and up to 100 have been recorded wintering in the area in the past. There have been no avifaunal surveys of the reserve since its notification and its importance therefore requires confirmation. However, there are detailed records from its vicinity from habitats represented within the reserve. The valleys of the area are also important for resting migratory birds, including passerines and waterfowl.

Key species

- A3 (A01) Mediterranean North Africa biome: Four of the 12 species of this biome that occur in Libya have been recorded from or near this site; see Table 2.
 A3 (A02) Sahara-Sindian biome: Seven of the 14 species of this biome that occur in Libya have been recorded from or near this site; see Table 2.

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The site was declared a Nature Reserve in 1978 and has been recommended as a National Park. Much of the natural vegetation of the oases within the site has been replaced by date-palm plantations. Areas around the oases are subject to heavy grazing while uncontrolled, motorized hunting has led to the extinction of large mammals.

■ Further reading

Abou Jaafer (1984), Bundy (1976), Child (1978), Cowan (1982, 1983, 1985), Erard and Larigauderie (1972), Ledant *et al.* (1985).

Ghat oases

Admin region Awbari
 Coordinates 24°58'N 10°11'E
 Area c.50,000 ha Altitude 640 m

LY008

 A3 (A01, A02)
 Unprotected

■ Site description

The site consists of a series of spring-fed lakes, pools and swamplands, together with surrounding habitats, centred around the town of Ghat, close to the Algerian border in the south-west of the country. The town is situated under the western slopes of Jabal Akakus, an eastern outlier of the Tassili mountains stretching from Algeria into southern Libya. There are three permanent, spring-fed lakes at Tin Djeraben, one at Habschat, and three at Feuet and numerous pools and areas of natural swampland at Al Birket (Al Barcat), 12 km south of Ghat. There is also a large sebkha which holds water after rainstorms. The pools and swamps of Al Birket support many emergent plants such as *Juncus* spp., *Phragmites australis*, *Scirpus holoschoenus* and *Typha capensis*, as well as submerged and floating species including *Ceratophyllum demersum*, *Potamogeton* spp. and *Utricularia* spp. Several species of *Chara* are abundant in the pools. Away from the areas of surface water there is transition to thorn scrub and open rocky

and sandy desert. Much of the natural vegetation in these areas of transition have been cleared for agriculture.

■ Birds

See Box and Table 2 for key species. In addition, *Aythya nyroca*, *Circus macrourus* and *Falco naumanni* have been recorded on passage.

Key species

- A3 (A01) Mediterranean North Africa biome: Three of the 12 species of this biome that occur in Libya have been recorded at this site; see Table 2.
- A3 (A02) Sahara-Sindian biome: Eight of the 14 species of this biome that occur in Libya have been recorded at this site; see Table 2.

■ Other threatened/endemic wildlife

Three species of fish occur naturally in the pools: *Barbus deserti* (type-locality), *Clarias lazera* and *Hemichromis bimaculatus*.

■ Conservation issues

There is great pressure on the remaining areas of natural vegetation of the oasis as a result of expanding agriculture, particularly date-palm plantations.

■ Further reading

Bundy (1976), Hughes and Hughes (1992).

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