

# EGYPT

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Pharaoh Eagle-owl *Bubo ascalaphus*. (ILLUSTRATION: SHERIF BAHA EL DIN)

## GENERAL INTRODUCTION

The Arab Republic of Egypt occupies the north-eastern corner of the African continent, with a surface area of just over one million square kilometres (1,019,600 km<sup>2</sup>), equivalent to c.3% of the total area of Africa. The country lies at the centre of the largest and driest desert region on the globe. Average temperatures are high (mean: summer 20–30°C, winter 10–20°C) and the mean annual rainfall over most of the country is less than 10 mm.

Perhaps the most significant feature of Egypt's landscape is the Nile river, which is the largest and most important source of fresh water in the country. The Nile divides Egypt into two parts, east and west of the river. Egypt east of the Nile has much relief, including the country's highest mountain peaks; west of the Nile the landscape is generally featureless, largely made up of vast expanses of serir and sand desert, dotted with scattered oases.

Egypt enjoys a considerable diversity of habitat, despite its predominantly hyper-arid environment. Lying at the junction of four biogeographical regions—Saharo-Sindian, Irano-Turanian, Mediterranean and Afrotropical—Egypt has a unique mixture of vegetation-types, which support a corresponding diversity of faunal elements. The Saharo-Sindian elements are well represented in Egypt's vast deserts, while Mediterranean and Irano-Turanian elements occupy fairly small areas along the Mediterranean coast and in the Sinai highlands respectively. Egypt is tenuously connected with sub-Saharan Africa through the Nile river and the Red Sea, along both of which many African faunal and floral elements extend north, adding a further dimension to Egypt's biodiversity.

The Nile, with its enormous water resources, supports almost all of the country's major wetlands. Long coastlines on two seas with very different marine ecosystems and terrestrial environments, encompassing a wide variety of topographic features; ranging from the rugged mountains of South Sinai and the Eastern Desert (up to 2,641 m) to the Qattara Depression (134 m below mean sea-level), contribute to the diversity of Egypt's habitat-types.

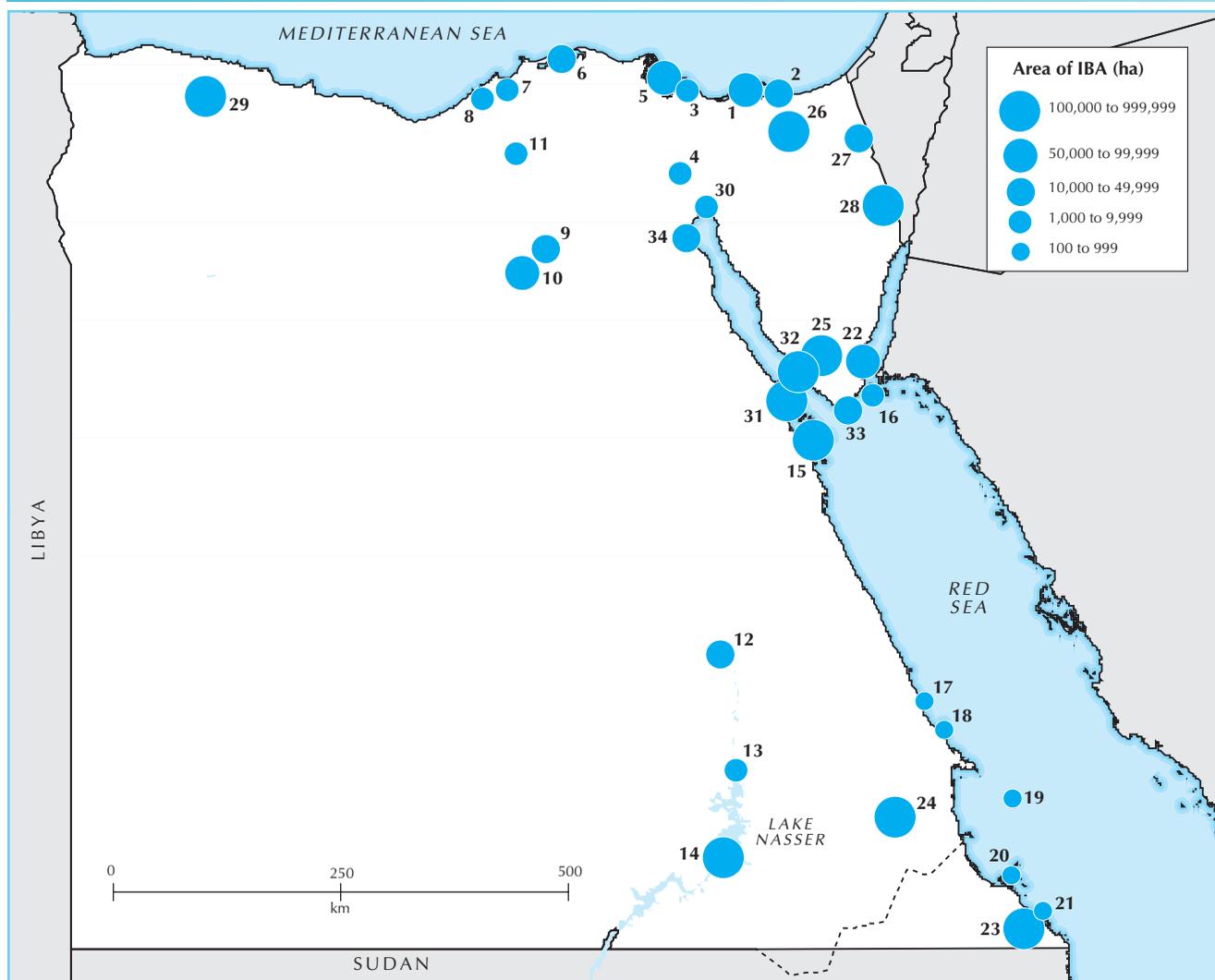
Wetlands are some of Egypt's most important habitats in terms of biodiversity (second only to the Red Sea's coral reefs), supporting both the greatest diversity and density of bird species. Most Egyptian wetlands have been degraded drastically during the past 50 years: drained, polluted, over-fished and over-hunted. It should be a conservation priority in Egypt to protect at least representative wetland habitats.

There are six major inland wetland areas in Egypt: the Bitter Lakes, Wadi El Natrun, Lake Qarun, Wadi El Rayan Lakes, Nile river and Lake Nasser. In addition, there are many smaller wetlands dispersed in the Nile delta and valley, and in oases in the Western Desert. Of the Mediterranean coastal wetlands, the most important are the six major coastal lagoons on the Mediterranean: Bardawil, Malaha, Manzala, Burullus, Idku and Maryut. The remainder of the Egyptian Mediterranean coast is of rather limited importance for birds. The Red Sea coastal habitats and wetlands include mudflats, reefs, mangroves and marine islands.

Desert habitats cover over 90% of Egypt's territory. The Mediterranean coastal desert receives the highest rainfall in the country (up to 200 mm annually), and has a fair amount of plant cover and the greatest floral diversity nationally. The influence of coastal rains extends up to 60 km inland. In contrast, the desert bordering the Red Sea is very dry. The vegetation is typical of that of the Eastern Desert, being largely restricted to the mouths of larger wadis and along the coast, where saltmarsh vegetation grows.

Wadis and mountains are characteristic of the landscape of much of the Eastern Desert and Sinai. Mountain habitats are of particular interest since they usually support unique faunal and floral elements. This is true of the mountain massif of South Sinai and the mountains of the Eastern Desert, particularly Gebel Elba. These regions and associated habitats contribute an important element to the country's biodiversity.

Open gravel and sand desert occupy the greater part of Egypt's land area. This, however, is the least productive of the country's habitats. Where rain is regular (as in sub-coastal deserts), plant cover is dispersed regularly over the landscape. In more arid inland

**Map 1.** Location and size of Important Bird Areas in Egypt.


regions, vegetation (if present at all) is scant and largely confined to depressions where sufficient rainwater accumulates or where groundwater reaches the surface (oases).

Oases are perhaps the most prominent features of the Western Desert. They are the only source of water and vegetation over much of this desert, which occupies about two-thirds of the country's area. The principal oases of the Western Desert are Maghra, Siwa, Wadi El Rayan, Bahariya, Farafra, Dakhla, Kharga, Kurkur and Dungul. Most of these are inhabited by people and some have been highly modified by man, such as Wadi El Rayan, parts of which have been inundated by excess agricultural drainage water from the Nile valley. There are also some smaller, largely uninhabited oases dispersed throughout parts of the Western Desert.

Oases in the Eastern Desert and Sinai are much smaller than most of those in the Western Desert. They do not completely fulfil the meaning of the term 'oasis', as they are usually well linked with other life-supporting habitats through wadi systems, where they are typically located (e.g. Feiran Oasis), or on their deltas near the coast (e.g. Ain Sukhna).

Almost all of the cultivated land in Egypt is in the Nile valley and delta. This is amongst the oldest cultivated land in the world, and has been subjected to man's manipulation for over 7,000 years. There are also small areas of cultivation in North Sinai and in Western Desert oases, which are irrigated with underground water. Urban centres are mostly concentrated along the Nile valley and in the delta, with smaller settlements in coastal areas.

## ORNITHOLOGICAL IMPORTANCE

More than 470 bird species are known from Egypt, most of which are non-breeding migrants, passing through the country or spending

the winter, and are of Palearctic origin. These wintering and transient bird populations, although not present in Egypt all or most of the time, are an important component of the country's biodiversity. About 150 species can be considered resident breeding birds, although some of these also migrate further south during the winter.

A total of 16 species of global conservation concern have been recorded in Egypt (Collar *et al.* 1994). However, the country is currently of significance for only six of these, namely *Aythya nyroca*, *Aquila clanga*, *Aquila heliaca*, *Falco naumanni*, *Crex crex* and *Larus leucophthalmus*. *Larus leucophthalmus* is the most important of these, for the Egyptian Red Sea islands hold the largest breeding population known in the world.

Egypt's native avifauna is of moderate significance in terms of global avian diversity. There are no endemic or restricted-range bird species, although *Larus leucophthalmus* is endemic to the Red Sea and there are several subspecies confined to unique Egyptian habitats, such as the Nile delta and valley. In addition, there are c.18 species with relatively small world distributions, for which Egypt constitutes an important part of their range. Perhaps the most important component of Egypt's native avifauna, in terms of global biodiversity, is the group of species that are restricted to the Sahara–Sindian biome. These species are adapted to life in arid environments, and are either widespread throughout the Egyptian deserts or confined to parts of them.

Because of Egypt's unique, strategic geographical position along migration routes of Palearctic birds wintering in Africa, many Palearctic species migrate through Egypt in internationally significant numbers. Many of these migrants congregate at bottlenecks. Soaring birds (such as many birds of prey and storks) are particularly known to concentrate at such localities, but also waterbirds have several migration bottlenecks in Egypt, e.g. the areas of Suez, Hurghada and Zaranik. In addition, vast numbers

of Palearctic migrants winter in Egypt, the most prominent of which are the waterbirds that spend the cold months in Egypt's extensive wetlands in internationally important numbers. Egypt has an important role in, and global responsibility for, the safe passage and survival of the vast numbers of migratory birds crossing its territory and visiting its various habitats.

As in many parts of the world, Egypt's birds and their habitats are faced with a multitude of threats and problems today. These are invariably related to the increasing human population and the associated growing demands on natural resources, and the misapplication of modern technology and its products. Outright habitat destruction at Important Bird Areas (IBAs) is caused by land-claim, urban encroachment and tourist development. Habitats at IBAs are degraded by overgrazing, excessive firewood-collection, unregulated use of off-road vehicles, road construction, solid-waste disposal, mining and quarrying. Pollution affects IBAs in the form of pesticides and fertilizers, domestic and industrial effluents, and oil pollution. Finally, the bird populations themselves at IBAs endure excessive mortality and disturbance due to unregulated sport-hunting and hunting for food and supplementary income, falcon-trapping, and improper pest-control practices.

## CONSERVATION INFRASTRUCTURE AND PROTECTED-AREA SYSTEM

The interest of the Ancient Egyptians in birds and other wildlife as cultural, religious and food-resources is well known and documented. Theirs was one of the earliest known civilisations to adopt some form of nature conservation. Ancient Egyptians issued

rules or decrees concerning hunting and the treatment of wild animals. Some species were considered to be sacred and were protected, such as *Threskiornis aethiopicus* and falcons. The killing of sacred species, except by lawful persons, was punishable by death.

The first modern wildlife protection laws, passed in May 1912, made it illegal to kill certain species of birds known to be beneficial to agriculture. Since the 1960s, a number of important steps have been taken to conserve Egypt's vulnerable wildlife populations and important habitats. Organizations were established for the protection of nature, including the Egyptian Wildlife Service (EWS) at the Giza Zoological Garden in 1979 and the Egyptian Environmental Affairs Agency (EEAA) in 1982, now the main component of the newly-established Ministry of State for Environmental Affairs.

The EEAA is the main government body responsible for nature conservation in Egypt, and the Nature Conservation Sector (NCS) is the sector within the EEAA entrusted with this responsibility. A Game Bird Hunting Management Committee was established in 1994, by decree of the Minister responsible for environmental affairs and chaired by the Executive Chairman of the EEAA, to advise the EEAA on bird-hunting matters, mainly in relation to waterbird hunting. Nowadays the EWS has a largely consultative role, relating principally to CITES implementation and wildlife-disease control and prevention.

Law 53/1966 prohibited hunting of birds and other wild animals considered to be beneficial and in need of protection. The passing of Law 4/1994 for the Environment was a significant step in Egypt's growing environmental protection and conservation movement. Although the law focuses largely on pollution abatement issues, it also addresses wildlife conservation, offering protection to threatened species listed by decrees and laws (mainly by the Ministry of

IBA code	Site name	Administrative region	Criteria (see p. 11; for A3 codes, see Table 2)						
			A1	A3 A01 A02		A4i	A4ii	A4iii	A4iv
EG001	Lake Bardawil	North Sinai	✓			✓			✓
EG002	Zaranik Protected Area	North Sinai	✓			✓			
EG003	El Malaha	Port Said				✓			✓
EG004	Bitter Lakes	Ismailiya				✓			
EG005	Lake Manzala	Port Said, Damietta, Daqahliya, Sharqiya, Ismailiya	✓			✓			✓
EG006	Lake Burullus Protected Area	Kafr El Sheikh	✓			✓			✓
EG007	Lake Idku	Beheira				✓			
EG008	Lake Maryut	Alexandria				✓			
EG009	Lake Qarun Protected Area	El Fayoum				✓			✓
EG010	Wadi El Rayan Protected Area	El Fayoum	✓			✓			
EG011	Wadi El Natrun	Beheira				✓			
EG012	Upper Nile	Qena, Luxor, Aswan	✓			✓			✓
EG013	Aswan reservoir	Aswan	✓						
EG014	Lake Nasser	Aswan	✓			✓			✓
EG015	Hurghada archipelago	Red Sea	✓			✓	✓		
EG016	Tiran island	South Sinai	✓			✓			
EG017	Wadi Gimal island	Red Sea	✓			✓	✓		
EG018	Qulân islands	Red Sea	✓			✓	✓		
EG019	Zabargad island	Red Sea	✓			✓	✓		
EG020	Siyal islands	Red Sea	✓			✓			
EG021	Rawabel islands	Red Sea	✓						
EG022	Nabq Protected Area	South Sinai			✓				
EG023	Gebel Elba	Red Sea			✓				
EG024	The Abraqa area	Red Sea			✓				
EG025	St Katherine National Park	South Sinai			✓				
EG026	Gebel Maghara	North Sinai	✓		✓				
EG027	Quseima	North Sinai			✓				
EG028	Wadi Gerafi	North Sinai			✓				
EG029	El Qasr desert	Matruh		✓					
EG030	Suez	Suez	✓						✓
EG031	Gebel Zeit	Red Sea	✓						✓
EG032	El Qa plain	South Sinai	✓						✓
EG033	Ras Mohammed National Park	South Sinai	✓						✓
EG034	Ain Sukhna	Suez	✓		✓				✓
Total number of IBAs qualifying:			21	1	8	19	4	7	5

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

<b>A01 – Mediterranean North Africa biome</b> (four species in Egypt; one site meets the A3 criterion)													
IBA code:	026	027	028	029									
<i>Ramphocoris clotbey</i>													
<i>Chersophilus duponti</i>													
<i>Eremophila bilopha</i>	✓	✓	✓	✓									
<i>Oenanthe moesta</i>													
Number of species recorded:	1	1	1	4									
<b>A02 – Sahara–Sindian biome</b> (22 species in Egypt; eight sites meet the A3 criterion)													
IBA code:	005	006	009	014	022	023	024	025	026	027	028	029	034
<i>Falco concolor</i>					✓	✓	✓	✓	✓	?	✓		
<i>Ammoperdix heyi</i>					✓	✓	✓	✓	✓	✓	✓		✓
<i>Pterocles lichtensteinii</i>					✓	✓	✓	✓			✓		
<i>Pterocles coronatus</i>					✓	✓	✓	✓	✓	✓	✓	✓	
<i>Pterocles senegallus</i>									✓	✓	✓		✓
<i>Strix butleri</i>					✓	✓	✓	✓	?	?	✓		
<i>Bubo ascalaphus</i>						✓	✓	✓	✓	✓	✓		✓
<i>Caprimulgus aegyptius</i>	✓	✓	✓	✓									
<i>Ammomanes cincturus</i>					✓	✓	✓		✓	✓	✓	✓	✓
<i>Ammomanes deserti</i>					✓	✓	✓	✓	✓	✓	✓		✓
<i>Alaemon alaudipes</i>					✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Hirundo obsoleta</i>					✓	✓	✓	✓	✓	✓	✓		✓
<i>Oenanthe leucopyga</i>					✓	✓	✓	✓	✓	✓	✓		✓
<i>Oenanthe monacha</i>					✓			✓	✓	✓	✓		✓
<i>Oenanthe lugens</i>					✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Cercomela melanura</i>					✓	✓		✓	✓	✓	✓	✓	✓
<i>Turdoides squamiceps</i>										?	✓		
<i>Turdoides fulvus</i>						✓							
<i>Scotocerca inquieta</i>					✓			✓	✓	✓	✓		✓
<i>Rhodopechys githaginea</i>					✓	✓	✓	✓	✓	✓	✓		✓
<i>Passer simplex</i>													
<i>Onychognathus tristramii</i>								✓					
Number of species recorded:	1	1	1	1	15	15	13	16	15	14	18	4	12

Agriculture). This is the country's most significant piece of legislation to control environmental degradation issued to date. The law defines the responsibilities of the EEAA and outlines a course of action to protect the environment in cooperation with other concerned bodies.

Law 102/1983 concerning protected areas is the other important legislation in the field of nature conservation in Egypt. The Law established a legal framework for the creation and management of protected areas in the country. These are to be areas of land or water known for their flora, fauna or geological formations and having cultural, scientific, touristic and aesthetic values. According to the Law, human activities are to be strictly controlled in the protected areas; hunting in these areas is prohibited. Protected areas are declared upon the issuing of Prime Ministerial Decrees, based upon the recommendations of the EEAA, the competent authority responsible for the implementation of the law.

Much of the nature conservation effort in Egypt has focused on establishing this network of protected areas, with the objective of protecting the country's best-known sites of outstanding natural value. Since the passage of Law 102/1983, 21 protected areas have been declared in Egypt, totalling an area of some 78,000 km<sup>2</sup> and encompassing several of the country's main physiographic regions and habitats.

This network represents about 8% of Egypt's total land surface. The Government of Egypt has a stated objective of protecting 15% of the country's territory. According to IUCN, the optimal size of a national protected-area system is 10% of a nation's surface area. However, biodiversity components in arid environments, on average, need larger territories to survive and hence would require placing larger areas under protection.

## INTERNATIONAL MEASURES RELEVANT TO THE CONSERVATION OF SITES

Since 1936, Egypt has been party to a number of international and

regional conventions concerning nature conservation. Nearly all of these conventions have provisions for the protection and sustainable use of wildlife resources. Some conventions are more active and effective than others. According to Article Number 151 in the Egyptian Constitution, any international convention to which Egypt is a party becomes the law of the land in Egypt and takes precedence over Egyptian law.

According to Law 4/1994, the EEAA is the competent national authority for overseeing compliance with international and regional environmental conventions. It is empowered to undertake the necessary measures to join international and regional conventions related to the environment and to draft the necessary legislation and decrees to ensure the local implementation and follow-up of these conventions.

The main international and regional environmental conventions with emphasis on nature conservation that Egypt has signed and ratified are the African Convention on the Conservation of Nature and Natural Resources, the Ramsar Convention, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on the Conservation of Migratory Species of Wild Animals (CMS), the Convention on Biological Diversity (CBD), the African-Eurasian Migratory Waterbird Agreement (AEWA) and the World Heritage Convention. Egypt is also a party to the Convention to Combat Desertification and the Convention on Climate Change.

## OVERVIEW OF THE INVENTORY

A total of 34 Important Bird Areas (IBAs) have been identified in Egypt, all of which meet one or more of the selection criteria for globally Important Bird Areas (Map 1, Table 1). The total area covered by IBAs in Egypt is some 35,000 km<sup>2</sup>, or about 3.5% of Egypt's territory. All of Egypt's avian habitats are represented within the identified network of IBAs, although not equally so. Wetland habitats (both inland and coastal) are the best-represented,

occurring in 25 IBAs (74%). Wetland habitats also occupy a large area within the IBAs, over 10,000 km<sup>2</sup>, or 28% of the total IBA area. Mountain-and-wadi desert and desert-plains are represented in a smaller number of IBAs (13, or 38% of IBAs), but the area they occupy is much greater, estimated at c.20,000 km<sup>2</sup>, or 55% of the total IBA area. Coastal deserts, on the other hand, are represented in six IBAs (18% of the total) and occupy c.5,000 km<sup>2</sup>, or 14% of the total IBA area, mostly in one IBA (El Qasr Desert, EG029). Oases and agricultural landscapes each contribute a small fraction to the total area of IBAs in Egypt.

The majority of IBAs in Egypt are in the eastern portion of the country, largely east of the Nile, which clearly indicates the great poverty of the Western Desert in avian habitats. This is not a result of lack of information from this vast and desolate region, but a verified fact. Recent extensive surveys of the natural heritage resources of the Western Desert by the EEAA, have confirmed the lack of any habitats or sites that qualify as IBAs in that region. On the other hand, Sinai holds a disproportionately large number of IBAs (29% of Egypt's IBAs) which, although it represents only 6% of Egypt's territory, reflects its diversity of habitats, as well as the unique biogeographic location of the region.

Most Egyptian IBAs qualify for categories A1 and A4, while none qualify for category A2, as no endemic or restricted-range birds breed or are resident in Egypt (Table 1). Eighteen IBAs qualify for two categories of criteria, while 15 IBAs qualify for a single category, and only one for three categories. A total of 24 IBAs qualify under the A4 criterion, making a total of c.14,000 km<sup>2</sup> or 39% of the total IBA area. Most of these IBAs are wetlands holding large congregations of wintering waterbirds, or bottlenecks for soaring migrants.

In contrast, there are only nine IBAs that qualify under the A3 criterion, alone or in conjunction with other categories, comprising a total of 22,000 km<sup>2</sup>, or 61% of the total IBA area (Tables 1 and 2). The larger area encompassed by A3-qualifying IBAs reflects the fact that desert and steppe avifaunas (of which the Sahara–Sindian and Mediterranean North Africa biome-restricted assemblages are comprised) have ecological and behavioural requirements that entail the utilization of extensive areas of land.

The IBAs that qualify under the A1 criterion support a variety of bird species of global conservation concern (most prominently *Larus leucophthalmus*), with a wide spectrum of ecological requirements. IBAs selected solely for the A1 criterion include only those sites known to be of unquestionable importance for the species concerned. *Larus leucophthalmus* is the threatened species for which Egypt has the greatest conservation significance and for which the largest number of A1-qualifying IBAs have been identified. Qualification under the A1 criterion, based on species occurring on passage, was only considered in conjunction with qualification for other categories and only where these species occur in a regular and predictable fashion.

IBAs selected for the A3 criterion are the most subjectively chosen. Basically, sites that support the highest number of biome-restricted species are selected. However, the intactness of the site, its uniqueness, its qualification under other IBA criteria, its importance for other fauna and flora, its geographic position and its protection status are all factors that are taken into consideration during the selection process. Table 2 shows the different degrees of representation of biome-restricted species in the A3-qualifying IBAs, as well as the extent to which each species is represented in the IBAs. It might be interesting to note that the largest IBA, El Qasr Desert (7,500 km<sup>2</sup>; EG029), selected under the A3 criterion, has the lowest number of biome-restricted species (eight). These, however, include 100% of those species inhabiting Egypt that are characteristic of, and restricted to, the North African component of the Mediterranean biome. This is also the only IBA where three species of this assemblage are represented in Egypt. Here, site selection was also based on the uniqueness of the habitat, its intactness and the degree of threat faced by the site, in addition to the ecological requirements of the species involved. Wadi Gerafi (EG028), on the other hand, has the highest number of A3 species (19), reflecting its diverse habitats and unique biogeographic position.

The biome-restricted species that are best represented in the IBA network are *Pterocles coronatus*, *Alaemon alaudipes* and

*Oenanthe lugens*, which are present in all eight A3-qualifying IBAs (Table 2). This reflects the species' wide distribution in the country. Some A3 species are, however, represented in only a small number of IBAs, because their distribution in Egypt is limited; one example is *Turdoides fulvus*. *Passer simplex*, a species restricted to the Sahara–Sindian biome, is not represented in any IBA because its occurrence in Egypt is erratic and it is limited to a very small area of Gebel Uweinat. Although *Caprimulgus aegyptius* is not represented in any A3-qualifying IBAs, it is present in at least four IBAs that qualify under other criteria (see Table 2).

The selection of IBAs according to the quantitative criteria of category A4 is reasonably straightforward and includes all sites where the A4i 1% population thresholds are exceeded, particularly with regard to wintering waterbird populations, which are fairly well-known in Egypt. Migration bottlenecks are less easy to assess. Many areas in the eastern part of Egypt could, in theory, qualify under criterion A4iv, since well over 20,000 birds of prey and other soaring birds pass through them on an annual basis. However, the sites have been selected only where birds are known to regularly land (to drink, rest or roost) or to fly at low altitudes, and hence come in close contact with potential hazards.

Fifteen IBAs, or c.44% of the total, representing c.39% of the total IBA area, fall entirely within the existing protected-area network. This is much greater than the proportion of protected IBAs in the Middle East, where only about a quarter of the identified sites have some form of protection. A further four IBAs are partially protected (i.e. only parts of them fall within the boundaries of existing protected areas). In addition, there are three sites, identified here as IBAs, which are unprotected, but which are being proposed as future additions to the protected-area network of Egypt. Two of these proposals have developed as a direct outcome of the IBA programme in Egypt.

However, this relatively high degree of protection of IBAs in Egypt is more apparent than real. Only six of Egypt's IBAs (17% of the total) can be said to be located in areas receiving adequate protection. The fact is that many protected areas in Egypt are still only 'nominally protected' (i.e. have little effective enforcement or management). This is changing though, as the capacity of the country in the field of protected-area management (in terms of both human and financial resources) is increasing, and there is a growing interest in, and effort to, introduce practical and effective protection for these areas in the near future.

Egypt is divided into 27 Governorates, of which 18 have IBAs. Some IBAs are shared by more than one Governorate. The Red Sea Governorate has the most, with nine IBAs, followed by the North Sinai and South Sinai Governorates with five each. This reflects the importance of these regions for biodiversity in general. The majority of the Governorates that have no IBAs are small in size and are located in the densely populated and intensely cultivated Nile valley and delta.

It is realized that, in a large country like Egypt, even with its fairly simple set of ecosystems and habitats, many of the less accessible and less well-known regions may hold areas of importance for birdlife that are not reported here. The size and significance of such potential sites is, however, thought likely to be small. It is estimated that at least 90% of all IBAs in Egypt have been identified by the IBA programme to date. Regions that could hold potential IBAs are the oases of the Western Desert (wetland habitats) and the southern Red Sea coastal zone (coastal habitats and near-shore islands).

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## GLOSSARY

**ain** spring.  
**bughaz** inlet on sea or lake shore.  
**EEAA** Egyptian Environmental Affairs Agency.  
**EU** European Union.  
**EWS** Egyptian Wildlife Service.  
**feddan** 0.42 hectare.  
**gebel** mountain.  
**GEF** Global Environment Facility.  
**khor** winding narrow inlet.  
**MedWet** the Mediterranean Wetlands Initiative.  
**sabkha** saltflats.  
**serir** flat pebble or gravel desert.  
**wadi** dry river course.

## SITE ACCOUNTS

### Lake Bardawil

Admin region North Sinai

Coordinates 31°09'N 33°00'E

Area 59,500 ha

Altitude 0–10 m

EG001

A1, A4i, A4iii

Protected Area, Ramsar Site,  
Unprotected

#### Site description

Lake Bardawil is a shallow (50–300 cm deep), hyper-saline lagoon occupying much of the Mediterranean coast of Sinai. It is separated from the sea by a sandbar that varies in width between 100 m and 1 km. The lake shore is mainly bare sand, with scattered saltmarsh and mudflats. The sandy lake-bottom is covered by scattered patches of algae *Ruppia*.

Originally, Bardawil was connected to the sea via one small natural inlet at its eastern extremity (Bughaz Zaranik), usually becoming inundated with seawater only during winter when storms often breached the unstable sandbar. During summer, most of the lake was isolated from the sea and water evaporated, leaving behind large areas of sabkha. Several man-made inlets have been dredged along the sandbar since 1905 in an effort to allow the permanent inundation of the lagoon and maintenance of salinity levels suitable for the development of fisheries. Today, there are two man-made inlets (Bughaz I, II), which are continually being blocked through sedimentation. Bardawil is the source of an important local fishery, producing over 2,500 tonnes annually (1987 figure), mostly of the high-value saltwater fish *Sparus auratus* and *Mugil* sp., and employing some 3,000 fishermen. Fishing is suspended between January and May, in order to allow fish stocks to recuperate.

#### Birds

See Box for key species. Lake Bardawil is of moderate importance for wintering waterbirds. A total of 26,968 waterbirds were counted in the winter of 1989/90 (a proportion of these were counted within the limits of Zaranik Protected Area, IBA EG002). Only *Phalacrocorax carbo* and *Phoenicopterus ruber* winter in significant numbers. Up to 30,000 of the former species were estimated to be present at Bardawil in winter 1993. The importance of Bardawil as a stop-over and staging site has not been investigated thoroughly, but there are indications that at least a portion of the massive numbers of migrants passing through Zaranik, particularly in autumn, utilize some of the habitats available at the lake. Diversity of breeding species is very low. However, two of the six species known to breed in the immediate vicinity of the lake, *Sterna albifrons* and *Charadrius alexandrinus*, occur in internationally important numbers.

#### Key species

A1	<i>Circus macrourus</i>	<i>Crex crex</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Phalacrocorax carbo</i>	—	5,000–30,000
	<i>Phoenicopterus ruber</i>	—	13,000
	<i>Sterna albifrons</i>	1,200	—
	<i>Charadrius alexandrinus</i>	1,900	—
A4iii	More than 20,000 waterbirds occur.		

#### Other threatened/endemic wildlife

Reptiles: The Mediterranean shore of the lake is of potential importance for the nesting of two sea-turtles, *Caretta caretta* (EN) and *Chelonia mydas* (EN). Islets and dunes adjacent to the lake represent some of the last remaining habitats where extremely small populations of the tortoise *Testudo kleinmanni* (EN) might still exist. Mammals: *Vulpes zerda* (DD) still inhabits adjacent dunes in low density.

#### Conservation issues

Bardawil is a Ramsar Site, although no protection has been granted at the national or local level. However, the eastern extremity of the site lies within the Zaranik Protected Area.

*Phalacrocorax carbo* causes substantial damage to fisheries in Bardawil—one estimate suggested that 6% of Bardawil's fish production was lost to the species in the winter of 1989/90. It appears that the numbers of this bird wintering at Lake Bardawil, as well as at other Egyptian wetlands in the northern delta, are growing.

In an attempt to reduce the damage, the fisheries authority has arranged shooting parties over the past few years to try to control *Phalacrocorax carbo* populations on a regular basis and attempted to allow fishing throughout the winter, in order to increase disturbance to the birds. These measures apparently did not prove effective in resolving the problem, meanwhile causing increased disturbance and many casualties amongst non-target species, as well as a severe decline in the fish productivity of the lake.

Bird-catching is widespread during the autumn, when tens of kilometres of trammel nets are set up along the Mediterranean coast of North Sinai, including much of Bardawil's sandbar. The main target species is *Coturnix coturnix*, although large numbers of many other non-target species are also caught, including *Crex crex*, a species of global conservation concern. It was estimated that 205,000 *Coturnix coturnix* and 30,000 non-target species (including 1,100 *Crex crex*) were caught in North Sinai during the autumn of 1990. Shooting of migrating waterbirds takes place on a small scale along the Mediterranean, as well as on the shores of Lake Bardawil. Falcon catching is also widespread. In autumn 1990 over 1,000 birds of prey were caught in North Sinai. Disturbance by fishermen and coastguard personnel reduces the breeding success of waterbirds.

The North Sinai Agriculture Development Project (NSADP) is a large-scale development scheme aiming, ultimately, at claiming for irrigation 400,000 acres in North Sinai, using water from the Nile river. The NSADP, which has already entered its initial phases, will completely change the landscape of Bardawil. The lake will potentially become increasingly brackish as agricultural drainage water reaches it, either through direct discharge or through seepage. Although this, in itself, may not have a negative impact for most birds, it is expected that a drastic growth in human population will occur, increasing urban encroachment pressures and introducing pollution problems hitherto unknown in the area. In addition to land claim, land is being sold along the lake shore for tourism development, particularly at the western end of the lake.

#### Further reading

Baha el Din (1994), Baha el Din and Salama (1991), Dunnet *et al.* (1986), Meininger and Atta (1994), Varty *et al.* (1990).

**Zaranik Protected Area**

Admin region North Sinai

Coordinates 31°07'N 33°25'E

Area 25,000 ha Altitude 0–10 m

**EG002**

 A1, A4i  
Protected Area

**Site description**

Zaranik Protected Area is located at the eastern end of Lake Bardawil and encompasses an eastern extension of that lake: the Zaranik Lagoon. The lagoon is shallow, with numerous small islets scattered throughout it, most of which are covered with dense saltmarsh vegetation. Extensive mudflats and saltmarshes are found along the lagoon's shores, merging into sabkha and sand-dunes further inland. A saltworks was established at Zaranik in the early 1980s, prior to its declaration as a protected area, consisting of a pumping station, extensive evaporation pools and salt pans. The facility only became active in 1997.

**Birds**

See Box for key species. Zaranik's importance is primarily as a bottleneck area for migrant Palearctic waterbirds. Every autumn, hundreds of thousands of waterbirds flying along the eastern Mediterranean coastline concentrate at Zaranik or pass through the area, many landing to rest and feed before resuming their journey southwards across Sinai or westwards to the Nile valley.

The maximum counts (seasonal totals) of some of the most numerous autumn migrants recorded during four seasons between 1979 and 1992 at Zaranik are as follows: *Pelecanus onocrotalus* (2,122), *Ixobrychus minutus* (4,162), *Nycticorax nycticorax* (2,742), *Ardeola ralloides* (5,487), *Casmerodius albus* (4,239), *Ardea cinerea* (6,194), *Ardea purpurea* (5,349), *Anas querquedula* (221,616), *Recurvirostra avosetta* (6,828), *Glareola pratincola* (490), *Charadrius hiaticula* (1,909), *Charadrius alexandrinus* (5,687), *Charadrius leschenaultii* (197), *Calidris alba* (5,776), *Calidris minuta* (15,503), *Calidris alpina* (8,134), *Limosa limosa* (1,254), *Larus genei* (2,011), *Sterna hirundo* (12,433), *Sterna albifrons* (1,810), *Chlidonias hybridus* (950) and *Chlidonias leucopterus* (18,436).

Vast numbers of passerines and near-passerines also arrive at the coast, as they do everywhere along the Egyptian Mediterranean shoreline, but here hunting and persecution is illegal and controlled. Some 270 bird species have been reported in Zaranik. Only 10 species are known to breed in the Protected Area, of which *Sterna albifrons* and *Charadrius alexandrinus* are the most numerous and prominent. Zaranik is also the only locality in Egypt where *Recurvirostra avosetta* is known to breed on a regular basis (five pairs in summer 1994), and large numbers also winter (up to 700, December 1998).

**Key species**

Key species			
A1	<i>Circus macrourus</i>	<i>Crex crex</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Phalacrocorax carbo</i>	—	5,000
	<i>Phoenicopterus ruber</i>	—	10,000
	<i>Larus genei</i>	—	2,000

**Other threatened/endemic wildlife**

Reptiles: *Caretta caretta* (EN) was recently found to have its largest breeding concentration along the Egyptian Mediterranean in the Protected Area. *Chelonia mydas* (EN) is suspected of breeding locally and *Dermochelys coriacea* (EN) has been recorded once. Islets and littoral dunes fringing the southern margins of the Zaranik Lagoon and adjacent sabkha are said to have held a small population of *Testudo kleinmanni* (EN). *Trapelus savignii*, endemic to the Isthmic Desert and the western Negev, is found throughout the sandy habitats of the region. Mammals: the rare *Vulpes zerda* (DD) has been recorded.

**Conservation issues**

Zaranik is protected by Prime Ministerial Decree 1429/1985. An administrative building and visitor centre have recently been opened. There is an ongoing GEF–MedWet–EEAA project to develop the management and infrastructure of the reserve.

Zaranik shares many of the same problems as Lake Bardawil (IBA EG001). Due to the growing coastal tourist development activity in North Sinai, the value of land in the area has risen sharply in the past few years. This has led local politicians, under pressure from native inhabitants who claim ownership of the land within the Protected Area,

to dispute the protection status and boundaries of Zaranik. Considerable pressure is being exerted to reduce the eastern boundaries of the reserve along the Mediterranean Sea. Traditional land-ownership in the Protected Area is a sensitive issue that needs to be addressed in an effective and fair manner.

The saltworks in Zaranik have caused large-scale, ecological changes in the Zaranik Lagoon, none of which appear to have had a negative impact on birds; in fact, they seem to have been largely positive. The production of salt has caused limited disturbance so far. The effectiveness of the Protected Area in preventing bird-catching activities (primarily during autumn) has been fairly high. However, violations still take place regularly. Falcon-catching activities have proven particularly difficult to control.

**Further reading**

Baha el Din (1996b, 1997).

**El Malaha**

Admin region Port Said

Coordinates 31°13'N 32°19'E

Area 3,500 ha Altitude 0–10 m

**EG003**

 A4i, A4iii  
Unprotected

**Site description**

Malaha was formerly the easternmost extension of Lake Manzala, from which it was cut off when the Suez Canal was constructed in the 1800s, and was further diminished by the construction of the Port Said bypass in the 1980s. Today, Malaha is composed of two shallow hyper-saline lagoons, the size and shape of which are variable; they reach their maximum size during winter and become nearly dry in summer. The lagoons are connected to the Mediterranean via Bughaz El Kala (eastern lagoon) and El Malaha (western lagoon). To the south and east lies the Tina Plain, which is a broad, barren, salt-encrusted sabkha, fringed at its southern edge by a large saltmarsh dominated by *Nitraria* bushes. The lagoons are separated from the Mediterranean by a sandbar that varies in width between 100 and 500 m, and which is covered in many areas with dense halophytic vegetation. Malaha supports a fishery of modest production. The catch in 1977 was 631 tonnes. The lagoon is manipulated to maximize fish production.

**Birds**

See Box for key species. Despite its fairly small size, Malaha is one of the most important wetlands in Egypt for waterbirds, and holds some of the greatest densities and numbers of both wintering and breeding waterbirds in the country. In winter 1989/90, a total of 52,700 waterfowl was counted, and in winter 1994, 6,500 *Phoenicopterus ruber* were counted in the eastern lagoon alone. The site's relative isolation from human activity, and its highly productive habitats, make it attractive for several breeding waterbird species. In spring 1990, a large breeding colony of *Larus genei* was found here (about 5,700 nests). *Phoenicopterus ruber* is known to breed as well, but numbers and breeding success vary from year to year, and in some years breeding is not attempted. In 1986, some 750–1,000 adults with 350–400 chicks were counted. Breeding also took place in 1993 and 1994. *Sterna albifrons* and *Sterna hirundo* also breed in smaller numbers, Malaha being the only known breeding locality of the latter species in Egypt.

**Key species**

Key species	Breeding (pairs)	Non-breeding
A4i		
<i>Phalacrocorax carbo</i>	—	5,300
<i>Phoenicopterus ruber</i>	375–500	6,500
<i>Anas clypeata</i>	—	8,200
<i>Recurvirostra avosetta</i>	—	8,910
<i>Charadrius alexandrinus</i>	—	3,290
<i>Larus genei</i>	5,700	—
A4iii	More than 20,000 waterbirds occur.	

**Conservation issues**

Malaha suffers from several management-related problems that adversely affect its ecology and birdlife. However, all of these are dwarfed by the recent advent of the “East of the Bypass Project”, launched in 1998 to establish a port and an industrial zone located precisely where the Malaha lagoons are. Work has already started on

the infrastructure of the project. Land claim for the North Sinai Development Project and fish-farming are also taking place in the vicinity. Unfortunately, these human activities could entail the very rapid, complete and permanent disappearance of this important wetland.

Bird-catching takes place during autumn all along the Mediterranean coast of this region. As in the rest of North Sinai, *Coturnix coturnix* is the chief target species of this activity. The impact on waterbirds is thought to be small.

#### Further reading

Goodman and Meininger (1989), Meininger and Atta (1994).

### Bitter Lakes

Admin region Ismailiya

Coordinates 30°20'N 32°15'E

Area 6,000 ha Altitude 0–10 m

EG004

A4i

Unprotected

#### Site description

Before the construction last century of the Suez Canal, the Bitter Lakes were relatively small, hyper-saline inland lakes, with a salinity of up to 161 g/l, surrounded by salt-encrusted sabkha. After the lakes were connected with both the Mediterranean and the Red Seas by the Suez Canal, they became a single marine body, their size increased and salinity decreased, reaching between 43 and 46 g/l in 1972. The northern, wider end of this water-body is known as the Great Bitter Lake, while the southern, narrower part is known as the Little Bitter Lake. The bottom is sandy and scantily covered with vegetation. Agricultural land, tourist developments and scattered areas of saltmarsh border the lakes on the western side, while the eastern side is mostly sandy desert. Drainage from recent agricultural development on the Sinai side of the Suez Canal has created a fairly large *Typha* and *Phragmites* marsh at the north-western corner of the Great Bitter Lake. There are a number of low sandy islets and spits in the Little Bitter Lake and scattered along the eastern side of the lakes.

#### Birds

See Box for key species. Although there has not been a comprehensive systematic count of birds at the Bitter Lakes, they are known to be of limited importance for wintering and migratory waterfowl. *Larus genei* is the only species that is known to winter in internationally important numbers. The species most likely breeds locally, as evidenced by the presence of birds throughout the year, especially juveniles in summer. The species may breed on some of the islets and sandy spits on the eastern side of the lakes. *Sterna albifrons*, *Charadrius alexandrinus* and *Vanellus spinosus* also breed in good numbers.

#### Key species

Key species	Breeding (pairs)	Non-breeding
A4i <i>Larus genei</i>	—	3,065

#### Conservation issues

Oil pollution from ships passing through the Suez Canal is always a potential threat to waterbirds in this small body of water. Rapid urban expansion, mainly for tourism, which is occurring particularly along the western shores of the lake, is threatening to eliminate much of the natural vegetation around the lake and will lead to increased disturbance.

#### Further reading

Meininger and Atta (1994), Vadiya and Shenuda (1985).

### Lake Manzala

Admin region Port Said, Damietta,

Daqahliya, Sharqiya, Ismailiya

Coordinates 31°17'N 32°04'E

Area 77,000 ha Altitude 0–10 m

EG005

A1, A4i, A4iii

Protected Area, Unprotected

#### Site description

Lake Manzala, the largest of Egypt's Mediterranean wetlands and the most productive for fisheries, is located in the north-eastern corner of the Nile delta. Manzala is generally rectangular in shape, about

60 km long and 40 km wide, and has an average depth of 1.3 m. It is separated from the Mediterranean Sea by a sandbar, through which it is connected to the sea by three channels (bughaz). The salinity in the lake varies greatly; while it is low near drain and canal outflows in the south and west, it is high in the extreme north-west. Brackish conditions predominate over much of the remainder of the lake. Over 1,000 islands of varying sizes are scattered throughout the lake.

The three main habitats are reed-swamps, saltmarshes and sandy areas. The reed-swamps of *Phragmites* and *Typha*, with associated submerged water-plants (e.g. *Potamogeton* and *Najas*), are found extensively in the less saline portions of the lake in the south and west and fringing many islands. Saltmarshes of *Juncus* and *Halocnemum* occur on the northern (coastal) margins of the lakes and some islands. Sand formations are occupied by several plant communities, e.g. coastal dunes. Open water and mudflats are also important habitats for birds. Large areas in the north-west of the lake have been turned into fish-farms, while much of the southern part of the site (south of 31°10'N) has been divided into large plots and drained, in preparation for its conversion to agricultural use.

A total of 3.7 km<sup>3</sup> of fresh water (mostly from agricultural drainage) flow annually into Lake Manzala from nine major drains and canals. The most important of these are Faraskur, Al Sarw, Baghous, Abu Garida and Bahr El Baqar. Of all the drains discharging into Lake Manzala, the Bahr El Baqar drain is the most polluted. It carries a mixture of treated and untreated waste-water originating from Cairo and contributing much to the deteriorating water quality of the lake. Bughaz El Gamil is the main connection between the lake and the Mediterranean. Several other less important sea connections have recently been enlarged.

#### Birds

See Box for key species. Manzala is by far the most important wetland for wintering waterbirds in Egypt, holding a total of 233,901 waterbirds in winter 1989/90. This represented c.40% of all waterfowl counted throughout Egypt's wetlands that winter and included the world's largest concentrations of wintering *Larus minutus* and *Chlidonias hybridus*. There were also up to 36,180 waders present in spring 1990, indicating the great importance of the wetland for populations of passage migrants, especially of *Recurvirostra avosetta*, *Calidris minuta*, *Calidris alpina* and *Philomachus pugnax*. No similar counts are available for autumn, but the lake is likely to be as important in that season. Manzala is also of importance for a number of breeding waterbirds and wetland species. About 35 species are known to breed, including *Ixobrychus minutus*, *Egretta garzetta*, *Ardeola ralloides*, *Porphyrio porphyrio*, *Sterna albifrons*, *Charadrius alexandrinus*, *Vanellus spinosus*, *Glareola pratincola*, *Caprimulgus aegyptius*, *Ceryle rudis* and *Acrocephalus stentoreus*. For some of these species, Manzala is one of the most important breeding areas in the entire western Palearctic region.

#### Key species

Key species	Breeding (pairs)	Non-breeding
A1 <i>Circus macrourus</i>	—	—
A4i <i>Phalacrocorax carbo</i>	—	22,500
<i>Egretta garzetta</i>	—	1,073
<i>Casmerodius albus</i>	—	528
<i>Ardeola ralloides</i>	300	—
<i>Anas clypeata</i>	—	12,021
<i>Porphyrio porphyrio</i>	500	—
<i>Recurvirostra avosetta</i>	—	8,981
<i>Charadrius hiaticula</i>	—	563
<i>Charadrius alexandrinus</i>	—	4,323
<i>Charadrius pecuarius</i>	—	35
<i>Vanellus spinosus</i>	300	—
<i>Tringa totanus</i>	—	3,247
<i>Larus minutus</i>	—	47,316
<i>Larus ridibundus</i>	—	45,080
<i>Larus genei</i>	—	2,269
<i>Larus armenicus</i>	—	358
<i>Sterna albifrons</i>	1,500	—
<i>Chlidonias hybridus</i>	—	39,331
A4iii	More than 20,000 waterbirds occur.	

#### Other threatened/endemic wildlife

Reptiles: The Mediterranean shore of the lake is a potential breeding site for endangered marine turtles. *Caretta caretta* (EN) is the species

most likely to breed in the area. Mammals: *Felis chaus* is still known to occur in good numbers.

### ■ Conservation issues

The lake is unprotected, apart from Ashtum El Gamil Protected Area (declared by Prime Ministerial Decree 459/1988), which encompasses a small area (c.35 km<sup>2</sup>) located along the sandbar at Bughaz El Gamil, the largest connection between the lake and the sea, near Port Said. The main purpose for creating this protected area was the protection of gravid fish and fry during their passage in and out of Manzala, through Bughaz El Gamil. Ashtum El Gamil includes no suitable waterfowl habitat, nor is it large enough to be of any significance for the conservation of the vast majority of Manzala's resident and transient avifauna. However, there is a proposal to increase the size of this protected area to encompass larger, more important parts of Lake Manzala.

At the beginning of the century the lake covered some 1,698 km<sup>2</sup>. However, ambitious land-reclamation projects had reduced the size of the lake to 905 km<sup>2</sup> by 1981 and to 770 km<sup>2</sup> by 1988. It is predicted that existing reclamation plans will reduce its area further to 469 km<sup>2</sup>. Encroachment from adjacent urban centres is threatening to reduce the area of the lake even further. Since the construction of the High Dam and the almost complete cessation of sedimentation, the coasts of the eastern delta have altered from predominantly accretional to erosional. The rapid erosion of the coast of Lake Manzala and encroachment of the sea in a region which, during the late Holocene, had been expanding northwards at an average rate of about 10 m per year, is of concern.

The implementation of the El Salam Canal project and the NSADP will require the annual diversion of c.1.27 km<sup>3</sup> of water from the delta (currently mostly destined for Manzala). This is expected to lead to a significant increase in the salinity of the lake from the current 3 g/l to 8 g/l, consequently changing its whole ecology. The present Bughaz El Gamil will be far too small to safeguard the present water-level. Without large infrastructural works, it can be expected that much of the lake will turn into a very shallow brackish marsh, with much of the extensive reed-swamp (and associated avifauna) declining sharply or disappearing altogether.

The pollution problem is very severe and is caused by many factors. Municipal waste-water is, perhaps, the most serious source of pollution, as much of the raw and treated sewage from Cairo, Port Said and Damietta ends up in Manzala. Industrial waste-water is also discharged into the lake from various sources, including industrial areas north of Cairo. Sewage-treatment projects for Cairo, once online, should help to alleviate some of the pollution. In addition, agricultural drainage water, which makes up most of the fresh water entering the lake, has high concentrations of fertilizers and pesticides. Solid waste from adjacent urban centres is regularly dumped into the lake and used for land-fill.

Highly organized bird-catching activities take several tens of thousands of waterfowl every year, mainly ducks, *Fulica atra*, *Gallinula chloropus* and waders. In spring 1990 a total of 11,709 birds (presumably, mostly from Manzala and its environs) were found for sale in bird markets in Port Said and Damietta. The impact of these activities on waterfowl populations is not known. It is probably a less significant threat than that posed by the deterioration and eventual loss of Manzala's habitats.

### ■ Further reading

Abu El Izz (1971), Ayyad *et al.* (1993), Baldwin *et al.* (1992), Meininger and Atta (1994), P. Lane Ltd. (1992).

## Lake Burullus Protected Area

Admin region Kafr El Sheikh

Coordinates 31°29'N 30°50'E

Area 46,000 ha Altitude 0–10 m

EG006

A1, A4i, A4iii

Protected Area, Ramsar Site

### ■ Site description

The Protected Area is composed primarily of Lake Burullus, a large, shallow, fresh-to-brackish coastal lagoon located between the two Nile branches forming the delta. It is elongate in shape extending for c.54 km from east to west with a width of 6–21 km and an estimated average depth of 75–100 cm. The lake is separated from the sea by a broad, dune-covered sandbar, which varies in width from a few hundred meters

in the east to 5 km in the west. There are some 50 islands scattered throughout the lake with a total area of 0.7 km<sup>2</sup>. On average, 50–70 million m<sup>3</sup> of slightly saline, nutrient-rich water enters the lake annually from the south via six drains. Bughaz El Burullus, located in the north-east corner of the lake, is the only direct connection between Burullus and the Mediterranean. Salinity in the lake decreases towards the south and west as the distance from the Bughaz increases, becoming fresh near the outflows of drains and canals that flow into the lake from the south. Consequently, the north shores of the lake are dominated by saltmarshes and mudflats, while the southern shore is bordered by an extensive fringe of reed-swamps (mainly *Phragmites* and *Typha*), which currently covers more than 25% of the lake area. Lake Burullus has abundant submerged vegetation, dominated by *Potamogeton*, which is densest in the southern portion of the lake. Burullus is by far the least disturbed and damaged of the delta wetlands and its environs still retain some aspects of wilderness, which have been lost throughout most of the delta.

### ■ Birds

See Box for key species. Burullus is one of Egypt's most important wetland for wintering waterfowl, holding a total of 98,887 in winter 1989/90, the second-largest concentration recorded in Egypt that winter. The lake supports the largest numbers of some wintering waterfowl in the country, including *Anas penelope*, *Anas clypeata*, *Aythya nyroca*, *Aythya ferina*, *Fulica atra* and *Tringa totanus*. Burullus is one of the most important wintering grounds for *Aythya nyroca* in the eastern Mediterranean. Because of its relative isolation, Burullus is also an important breeding site for several waterbirds and wetland species. About 35 species of birds are known to breed, of which the most prominent are *Tachybaptus ruficollis*, *Ixobrychus minutus*, *Porphyrio porphyrio*, *Sterna albifrons*, *Charadrius alexandrinus*, *Vanellus spinosus*, *Glareola pratincola*, *Caprimulgus aegyptius*, *Ceryle rudis*, *Centropus senegalensis* and *Acrocephalus stentoreus*. The endemic delta subspecies of *Calandrella rufescens* (*Calandrella rufescens nicolli*) probably has its largest population in the vicinity of Burullus.

#### Key species

A1	<i>Aythya nyroca</i>	Breeding (pairs)	Non-breeding
A4i	<i>Anas penelope</i>	—	24,997
	<i>Anas clypeata</i>	—	15,427
	<i>Recurvirostra avosetta</i>	—	2,949
	<i>Porphyrio porphyrio</i>	500	—
	<i>Glareola pratincola</i>	2,000	—
	<i>Tringa totanus</i>	—	3,378
	<i>Larus minutus</i>	—	3,906
	<i>Sterna albifrons</i>	600–800	—
	<i>Chlidonias hybridus</i>	—	3,530
A4iii	More than 20,000 waterbirds occur.		

### ■ Other threatened/endemic wildlife

Reptiles: the Mediterranean shore of the lake is a potential breeding site for endangered marine turtles—*Caretta caretta* (EN) is known to breed locally. Mammals: *Felis chaus* is known to occur in numbers.

### ■ Conservation issues

Burullus is protected by Prime Ministerial Decree 1444/1998 and is a Ramsar Site. There is an ongoing GEF–MedWet–EEAA project to develop the management and infrastructure of the Protected Area. Burullus covered 588 km<sup>2</sup> in 1913. An estimated 37% of the open-water area and 85% of the marsh area have been lost during the past 40 years, largely as a result of ongoing drainage and reclamation of the lake's eastern, western and southern margins, and also due to the proliferation of emergent and submerged vegetation. It is anticipated that Burullus, along with other coastal delta wetlands, will be further reduced in area as a result of landward migration of coastal sandbars. This is a consequence of severe coastal erosion, from which the northern coast of the delta has suffered since the closure of the High Dam in 1964, and the subsequent impoundment of over 98% of the Nile sediment behind it.

Despite being the least polluted of the northern delta lakes, increasing quantities of agricultural drainage-water with heavy fertilizer and pesticide loads are being released into Burullus, contributing significantly to the eutrophication and pollution of the lake. Local fishermen complain that the combination of occasional siltation and closure of the Bughaz and increased drainage-water leads to the

reduction of the salinity of the lake and the expansion of reed-swamps and reduces fishing opportunities. The large number of fishermen on the lake cause continuous disturbance to waterbirds, forcing them to utilize less optimal habitats or sites.

Waterbird-catching is widely practised on the lake in winter. Quail nets, shotguns and lime are used along the sandbar to catch thousands of migrants in the autumn.

A coastal highway running along the entire northern coast of the delta, designed to link the Egyptian Mediterranean coastal regions west and east of the delta, is near completion. The highway, which runs through the sandbar north of Lake Burullus, has dramatically increased accessibility and hence, coastal development pressures on this, the last wilderness of the delta.

#### Further reading

Baha el Din (1991), Meininger and Atta (1994), Stanley and Warne (1993), van Pelt *et al.* (1992).

#### Lake Idku

Admin region Beheira

Coordinates 31°14'N 30°11'E

Area 7,000 ha Altitude 0–10 m

EG007

A4iii

Unprotected

#### Site description

A shallow coastal wetland located west of the Rosetta Nile branch. Three main drains discharge into the lake, while Bughaz El Maadia provides a connection with the sea. The water in the lake is mainly fresh, but increases in salinity towards the Bughaz and during the summer. Most of the lake margins are covered with dense growths of *Typha* and *Phragmites*, which cover about 50% of the lake's area. Saltmarshes, salinas and high dunes, as well as some orchards, are found on the sandbar separating the lake from the Mediterranean. Lake Idku supports a fishery of moderate importance.

#### Birds

See Box for key species. Lake Idku is of moderate importance for both wintering and breeding waterbirds. In winter 1989/90, a total of 22,549 waterbirds was counted. The lake probably also supports important numbers of breeding birds associated with reed-swamps, such as *Porphyrio porphyrio*, *Ixobrychus minutus* and *Centropus senegalensis*.

#### Key species

A4iii More than 20,000 waterbirds occur

#### Conservation issues

Lake Idku suffers from the same ailments that affect other delta wetlands: drainage and land-claim, pollution, disturbance, waterbird-catching, etc. Habitat loss through land-claim is certainly the most serious of these threats. Lake Idku has been reduced to less than half its original size.

#### Further reading

Meininger and Atta (1994).

#### Lake Maryut

Admin region Alexandria

Coordinates 31°07'N 29°54'E

Area 6,000 ha Altitude -3--3 m

EG008

A4i

Unprotected

#### Site description

Lake Maryut is the westernmost of the northern delta wetlands, although its history and origin are different. Formerly, the lake was fairly large, but late in the nineteenth century the western half was cut off by a railway embankment and transformed into an extensive salina, now known as Malahet Maryut, which is seasonally flooded (usually during winter). Today, the remaining part of this lake is made up of several fragments, dissected by roads and embankments, and lies practically within the boundaries of greater Alexandria and its sprawling suburbs. What remains of the lake proper is brackish, receiving agricultural drainage-water through several drains (the most important of these is the Qala Drain), as well as large quantities of municipal and industrial

effluent from the city of Alexandria. The lake has no direct connection with the Mediterranean, and is maintained at a level of c.2.8 m below sea-level by a pumping station at El Max. Much of the lake shore is fringed by extensive *Typha/Phragmites* marshes. The lake still supports a fishery, with *Tilapia* sp. making up most of the production.

#### Birds

See Box for key species. The importance of Lake Maryut for birds has diminished greatly over the last two or three decades, due to habitat loss, ecological changes and increased disturbance and hunting pressure. Numbers of wintering waterbirds are modest; in winter 1989/90, a total of about 10,000 waterbirds was counted. Little is known about the lake's importance for staging of migrants. Several waterbirds are known to breed, including *Tachybaptus ruficollis*, *Porphyrio porphyrio*, *Gallinula chloropus*, *Ixobrychus minutus*, *Charadrius alexandrinus* and *Sterna albifrons*. Little is known, also, about the numbers involved, but it is not expected that there would be any significant concentrations, with the exception of the population of *Sterna albifrons*, which is in the order of 150 pairs.

#### Key species

A4i	Breeding (pairs)	Non-breeding
<i>Casmerodius albus</i>	—	348
<i>Larus minutus</i>	—	866

#### Conservation issues

Lake Maryut has been reduced by more than 75% from its original area, and is still shrinking. The main causes for the diminishing area today are urban encroachment and solid-waste dumping from the rapidly growing city of Alexandria. The lake is eutrophic and is the most polluted wetland in Egypt. Agricultural drainage-water, discharged into the lake, is heavily contaminated with pesticides and fertilizers, as are the huge quantities of largely untreated municipal and industrial waste water. The level of disturbance is particularly high because of the very close proximity of Alexandria's urban and industrial sprawl. The outlook for the future of this wetland is rather grim.

#### Further reading

Abu El Izz (1971), Meininger and Atta (1994).

#### Lake Qarun Protected Area

Admin region El Fayoum

Coordinates 29°28'N 30°38'E

Area 25,000 ha Altitude -43--43 m

EG009

A4i, A4iii

Protected Area

#### Site description

Lake Qarun occupies the deepest part of the Fayoum Depression, located some 220 km south of the Mediterranean. In 1992, the elevation of the lake surface was 43.5 m below sea-level and mean water depth was 4.2 m. The lake is bordered by agricultural land to the south and desert to the north. There are several lagoons and bays along the southern and northern shores of the lake, some of which hold mud- or saltflats of various sizes. El Qarn, the only sizeable island in the lake, covers almost 2 km<sup>2</sup>. Formerly, Qarun was a much larger freshwater lake, with dense marsh vegetation along its shores. The main source of water for the lake is drainage from irrigated land, which it receives through two major drains: El Batts and El Wadi. With the intensification of cultivation and irrigation since the early part of this century, the salt load of the water reaching Qarun has increased significantly. As the only outflow for the water is evaporation, salinity is continually increasing. Today, Lake Qarun is slightly more saline than seawater (about 40 g/l) and salinity increases at the rate of 0.5 g/l annually (Euroconsult 1992b). The highest salinity is recorded in the west and north of the lake, while swamp and marsh vegetation is now restricted to the vicinity of drain outlets, on the eastern and southern shores of the lake. Nilotic aquatic fauna has mostly disappeared, being replaced by many marine species that have been introduced from the Mediterranean to restock the ecologically modified lake. Between 1980 and 1990, Lake Qarun produced an average of 956 tonnes of fish and shrimps annually, of which 40% was *Tilapia* sp. and 36% shrimps.

#### Birds

See Box for key species. Lake Qarun holds large numbers of waterfowl

in winter, e.g. 32,665 were present in the winter of 1989/90. Grebes are particularly abundant, and there are also large numbers of *Anas crecca*, *Aythya fuligula* and *Fulica atra*. At least 10 species of waterbird are known to breed, the most prominent of which are *Bubulcus ibis*, *Vanellus spinosus*, *Charadrius alexandrinus*, *Sterna albifrons* and *Larus genei*. The last species started breeding at Lake Qarun in the early 1990s, and in summer 1998 an estimated 1,000 pairs nested on El Qarn island.

Key species		
A4i		Breeding (pairs) Non-breeding
	<i>Podiceps nigricollis</i>	— 3,516
	<i>Larus genei</i>	1,000+ 2,000
	<i>Vanellus spinosus</i>	150+ —
A4iii	More than 20,000 waterbirds occur.	

### Conservation issues

Lake Qarun was declared a Protected Area by Prime Ministerial Decree 943/1989. The increasing salinity of the lake is constantly changing its ecology, and is likely to become too high for many life forms to continue to exist. This will ultimately reduce its importance as a habitat for most waterbird species. Currently there are plans under consideration which entail the division of the lake into several segments, where salinity in at least some parts of the lake (near sources of fresh water), could be maintained at favourable levels, while other parts would be sacrificed.

Unregulated tourist developments, particularly along the southern shores of the lake, are destroying the best waterbird habitats, particularly mudflats and saltmarshes, and will lead to increased disturbance to birds. El Fayoum has traditionally been a popular site for European hunting parties visiting Egypt in winter. Although there have been recent attempts to control and regulate hunting, evidence indicates that there are many violations, both by foreign hunting parties and by natives who kill many protected species and cause much disturbance to both wintering and breeding birds.

In the summer of 1998, some 3,000 fledgling *Larus genei* were found dead on El Qarn island. Despite statements by Ministry of Agriculture experts that starvation and parasites caused the mass death, it is almost certain, because of the scale and suddenness of the incident, that the birds were poisoned, probably by local fish-farmers. This illustrates the type and scale of the conflicts that arise between man and wildlife in many of Egypt's wetlands.

### Further reading

Euroconsult (1992b), Meininger and Atta (1994).

## Wadi El Rayan Protected Area

Admin region El Fayoum

Coordinates 29°13'N 30°22'E

Area 71,000 ha Altitude -20--5 m

EG010

A1, A4i

Protected Area

### Site description

Wadi El Rayan was originally an arid desert depression located to the south-west of Fayoum, with an average elevation of 43 m below sea-level and a maximum depth of 64 m below sea-level. As of 1973, excess drainage water from Fayoum was diverted into the depression, flooding large parts of it. Two large lakes were formed as a result. The first lake reached its current level of 5 m below sea-level in 1978. The second lake, which lies at a lower elevation, has a current estimated water-level of 20 m below sea-level and is still in the process of filling. It is expected that the water-level in the lake will be allowed to reach 13 m below sea-level. About 0.25 km<sup>3</sup> of drainage-water reaches the lakes of Wadi El Rayan annually (salinity 1 g/l). This is carried through a canal and a tunnel, which link the first lake and El Wadi Drain and flows from the first lake to the second via a shallow, swampy canal and a small waterfall. Because water-levels in the first lake have been stable for a considerable length of time, a very dense growth of *Phragmites* and *Tamarix* has developed along the shores of this lake. In contrast, the second lake has scant cover along its shores because of the constantly, though slowly, rising level of water in it. Salinity is also rising slowly in the second lake (which has no outflow) as a result of evaporation. The salt-level in the lake is currently about 2.5 g/l, but it is only a matter of time before it becomes as saline as Lake Qarun. Salinity is expected to remain stable in the first lake, since it is constantly flushed.

The lakes of Wadi El Rayan produced an average of 477 tonnes of fish annually between 1980 and 1990, composed mostly of *Tilapia* sp. and *Mugil* sp.

To the west of the lakes of Wadi El Rayan is a further, shallower, sandy depression that supports three natural springs and extensive desert scrub. A limestone escarpment surrounds the depression on all sides except the east, where it is closed off by a series of high longitudinal dunes. The vegetation is dominated by shrubs of *Alhagi*, *Nitraria*, *Calligonum* and *Tamarix*. This is an excellent and rare example of an undeveloped Saharan oasis.

### Birds

See Box for key species. The lakes of Wadi El Rayan have become fairly important wintering grounds for waterbirds and appear to be increasing in importance. A total of 12,600 waterbirds were counted in January 1995. Most numerous were *Podiceps cristatus*, *Podiceps nigricollis*, *Aythya fuligula*, *Aythya ferina* and *Fulica atra*. The second lake holds more waterbirds than the first, because of its larger size and its greater isolation. The second lake also supports a substantial breeding population of *Porphyrio porphyrio*. Other breeding species include *Tachybaptus ruficollis*, *Ixobrychus minutus*, *Egretta garzetta*, *Gallinula chloropus* and *Acrocephalus stentoreus*. The desert habitats of Wadi El Rayan spring area also hold a number of Sahara-Sindian biome restricted species. At least four of these species are known or are expected to breed in the area. These are *Falco concolor*, *Bubo ascalaphus*, *Oenanthe lugens* and *Alaemon alaudipes*.

Key species		
A1	<i>Aythya nyroca</i>	
A4i		Breeding (pairs) Non-breeding
	<i>Porphyrio porphyrio</i>	100 —

### Other threatened/endemic wildlife

Mammals: four threatened mammals are found in the desert habitats of Wadi El Rayan. *Gazella leptoceros* (EN) occurred until the mid-1980s, but has probably become locally extirpated. *Gazella dorcas* (VU) is still found in the area in small numbers, but is rapidly declining. Both *Vulpes zerda* (DD) and *Vulpes rueppelli* (DD) are scarce and are also declining due to illegal hunting.

### Conservation issues

Wadi El Rayan was declared a Protected Area by Prime Ministerial Decree 943/1989. There is an ongoing, Italian-funded project, in cooperation with the EEAA, to develop the management and infrastructure of the protected area, and this is addressing many of the conservation issues. The greatest threat to the area comes from a land-claim project (in progress) which aims at cultivating 15,000 feddan of desert, right in the centre of Wadi El Rayan Protected Area. Fish-farming, taking place in and around the lakes, is a potential source of water-pollution. In addition there is a possibility that water flow to the lakes will be severely reduced in the future as part of the drainage-water recycling policy the government is applying to conserve water. This would lead to a great reduction in the size of the second lake or its complete disappearance. The salinity of the second lake is likewise increasing and this is likely to diminish its importance for waterbirds. Illegal hunting and especially falcon-catching are still evident, despite the efforts of the EEAA to control the problem. The growing number of fisherman and fish-farms is causing increased disturbance to wintering waterbirds. The recently established tarmac road, encircling the two lakes of Wadi El Rayan, has made the area more accessible, drastically increasing the opportunities for illegal hunting and habitat destruction.

### Further reading

Euroconsult (1992b).

## Wadi El Natrun

Admin region Behaira

Coordinates 30°28'N 30°16'E

Area 2,000 ha Altitude Below sea level

EG011

A4i

Unprotected

### Site description

An elongate, narrow depression, about 50 km long, with an average

width of 8 km, oriented from south-east to north-west and situated west of the Nile delta, c.90 km south of the Mediterranean. It contains a series of nine small lakes (total area over 200 km<sup>2</sup>), scattered along its general axis. The water in the lakes originates from two main sources: from seepage and from springs in the bottoms of some lakes. As the depression is hydrostatically linked with the delta, lateral seepage is generally from the north-east, resulting in the creation of wet saltmarshes on the north-eastern shores of the lakes while, in contrast, the southern and western shores are distinctly barren. Water in the lakes is hyper-saline, fluctuating seasonally according to the depth of the water-table. *Typha* swamps occur at localities along the shores of the lakes where there is a plentiful freshwater supply. *Juncus* and *Cyperus* dominate the wet saltmarshes on the waterlogged eastern shores. The latter species carpets most of the marsh areas in a dense cover that does not exceed a few centimetres height because of severe grazing pressure. This, however, creates one of the most characteristic and attractive habitats for waterbirds in Wadi El Natrun. Mudflats and salt-encrusted sabkhas fringe parts of the lake's shores.

#### ■ Birds

See Box for key species. Wadi El Natrun is of modest importance for waterbirds. In winter 1989/90 a total of c.7,700 waterbirds was counted. Wadi El Natrun is known to hold some of the largest winter concentrations in Egypt of *Tadorna tadorna*, *Gallinago gallinago*, *Numenius arquata*, *Calidris minuta* and *Charadrius alexandrinus*. However, with the exception of the latter, none are known to occur in internationally significant numbers. The area is also of moderate importance for migrant waterbirds; in spring 1990 a total of c.7,800 waders was counted (including some resident species). The area might be more important for staging migrants during autumn. *Grus grus* is known to pass through and rest in significant numbers during spring and autumn. Some 12 species of waterbirds are known or expected to breed in Wadi El Natrun, including the largest breeding population of *Charadrius pecuarius* known in Egypt. *Marmaronetta angustirostris* previously bred in Wadi El Natrun, at least until 1912. There is no recent indication of breeding. The last observation of the species in Wadi El Natrun was in 1986 and it is unlikely that it will breed again unless disturbance and hunting pressure are curbed.

Key species	Breeding (pairs)	Non-breeding
A4i		
<i>Charadrius alexandrinus</i>	—	1,120
<i>Charadrius pecuarius</i>	50–100	45
<i>Vanellus spinosus</i>	150	—

#### ■ Other threatened/endemic wildlife

Flora: *Typha elephantina*, one of the prominent components of marsh flora in Wadi Natrun, is known nowhere else in Egypt. After being considered extinct in Egypt, *Papyrus Cyperus papyrus* was rediscovered in Wadi El Natrun at Lake Um Risha in 1971, where the only remaining wild stand in the country is reported. Reptiles: this is the only known locality where the rare *Philochortus zolli* is found in Egypt. Mammals: *Gazella leptoceros* (EN) has occurred in the desert habitats of Wadi El Natrun, but has become extirpated from the region during the past three decades. The apparently rare endemic shrew, *Crocidura floweri* (EN), was last recorded from Wadi El Natrun.

#### ■ Conservation issues

Land-claim and fish-farming are taking place in and around the lakes, transforming the wetlands. Rapidly expanding, groundwater-dependent agricultural projects, in and around Wadi El Natrun, are threatening to lower the water-table significantly. These will (if uncontrolled) eventually dry up the lakes of Wadi El Natrun. Increased grazing pressure and reed-cutting (for various domestic uses) are threatening the remaining reed-swamps with extermination. The growing population, along with an increase in tourism and industrial development, is leading to greater urbanization, pollution, disturbance and hunting pressure.

#### ■ Further reading

Boulos (1995), Goodman (1985b), Goodman and Meininger (1989), Meininger and Atta (1994), Osborne and Helmy (1980), Täckholm (1974), Zahran and Willis (1992).

Upper Nile	EG012
Admin region Qena, Luxor, Aswan	
Coordinates 25°09'N 32°43'E	A1, A4i, A4iii
Area 15,000 ha Altitude 100 m	Protected Area, Unprotected

#### ■ Site description

The site comprises a portion of the Nile river extending some 190 km between Luxor and Kom Ombo. The river forms an elongate wetland that meanders through the densely populated agricultural landscape of the Nile valley. Since the closure of the High Dam in 1964, the Nile down stream from Aswan experiences water-level changes of only small amplitude. This has allowed dense swamp vegetation, mainly *Phragmites* and *Typha*, to become established in many places along the riverbanks, which were previously largely devoid of vegetation. Bare sandy or muddy banks come into existence seasonally, depending on the water-level, which is lowest in winter. A number of islands are found along this stretch of the river, many of which hold good reed-swamp vegetation. About 40% of the arable land in this section of the Nile valley is cultivated with sugar-cane. Other crops are date-palms, maize, wheat and alfalfa. Fishing probably provides important income to many families inhabiting the region. In 1990, 589 boats and 1,178 fishermen were active on the Nile in Aswan Governorate.

#### ■ Birds

See Box for key species. This is the stretch of the Nile river with the highest concentrations of wintering waterbirds in Egypt. In the winter of 1989/90, 21,100 waterbirds were counted in this region. The river immediately above the Isna Barrage appears to hold the largest numbers of waterbirds within the site. The islands are particularly attractive to resting waterbirds. *Aythya nyroca* winters in internationally important numbers. *Netta rufina* winters regularly in small numbers, while *Marmaronetta angustirostris* is an irregular and rare winter visitor, last recorded from the area in 1983. This section of the Nile valley is likely to be of importance for staging waterbirds and other migrants, such as *Ciconia ciconia*, during the migration seasons.

Key species	Breeding (pairs)	Non-breeding
A1		
<i>Aythya nyroca</i>		
A4i	—	730
<i>Aythya nyroca</i>		
A4iii	More than 20,000 waterbirds occur.	

#### ■ Conservation issues

All the islands in the Nile river were declared a Protected Area by Prime Ministerial Decree 1969/1998. Disturbance caused by a growing number of fishermen and tourist cruises is increasing. There is a substantial water-pollution problem caused by untreated discharge from sugar, phosphate and dairy factories, as well as from urban areas. Erosion of the Nile banks has become a problem since the construction of the High Dam. As a mitigating measure, long stretches of the Nile banks are being encased with rocks. This will alter the natural condition of this part of the Nile and potentially reduce its importance for waterbirds. Reed-control programs are likewise reducing vital waterbird habitat.

#### ■ Further reading

Aswan Governorate (1993), Goodman and Meininger (1989), Meininger and Atta (1994).

Aswan reservoir	EG013
Admin region Aswan	
Coordinates 24°00'N 32°54'E	A1
Area 1,500 ha Altitude 200 m	Unprotected

#### ■ Site description

The Aswan reservoir is the segment of the Nile located between the old Aswan Dam (completed in 1920) and the High Dam. It is 7 km in length and ranges between 1.5 and 4 km in width. The shores are very steep and rocky, with many inundated desert wadis (khors), most of which are on the eastern side. Several small granite islands (part of the First Cataract) are found in the northern section of the reservoir. The water in the reservoir is maintained at a fairly stable level, allowing

a narrow fringe of vegetation to grow. *Ceratophyllum* and *Potamogeton* are the dominant aquatic plants.

### ■ Birds

See Box for key species. *Aythya nyroca* winters in internationally important numbers. Over 6,000 waterbirds were counted in winter 1989/90, while c.3,000 were counted in February 1995. The most numerous birds were *Anas penelope*, *Aythya ferina*, *Aythya fuligula* and *Fulica atra*. Characteristic breeding birds include *Gallinula chloropus*, *Vanellus spinosus* and *Ceryle rudis*. *Egretta garzetta* and *Ardeola ralloides* breed in the vicinity of the reservoir.

#### Key species

A1 *Aythya nyroca*

### ■ Conservation issues

Urban encroachment on neighbouring shores, and resultant pollution and disturbance, are threatening to diminish the value of this area as a waterbird habitat. Shooting of waterbirds, particularly by visiting European hunters, is reported to take place regularly during winter.

### ■ Further reading

Meininger and Atta (1994), Springuel (1985a).

## Lake Nasser

Admin region Aswan

Coordinates 23°06'N 32°44'E

Area 540,000 ha Altitude 150–180 m Protected Area, Unprotected

EG014

A1, A4i, A4iii

### ■ Site description

Lake Nasser was formed as a result of the construction of the High Dam, first closed in 1964 and completed in 1969. It is an elongate body of water some 496 km long, 196 km of which are in Sudan (Lake Nubia), with an average width of 15 km. The water volume in the lake fluctuates greatly, seasonally and from year to year, depending on the net annual volume of water it receives. The highest water-level of 181.3 m (above sea-level) was reached in November 1998, while the lowest level recorded so far was 150.6 m in July 1988.

In autumn 1996, water entered the Tushka Spillway for the first time, inundating parts of the Tushka Depression in the Western Desert and creating a huge temporary wetland, which lasted for almost a year. In 1998, the depression was inundated again, creating an even larger wetland. The spillway was built as a safety measure to divert water from behind the High Dam when water exceeded the maximum planned level of 178 m.

Seasonal fluctuation in water-level ranges between 5 m and 10 m, with the level being highest in autumn then gradually receding to its lowest level in summer, depending on the amount of water released downstream from the dam, evaporation and the amount received from upstream.

Lake Nasser is one of the world's largest man-made lakes. It is of vital importance for the country, representing Egypt's main reservoir of fresh water. Lake Nasser and the region adjoining it are seen by some of Egypt's planners and scientists as the future food-basket for the country. To date, the region is still largely uninhabited by man. The irregular and huge fluctuations in water-level of the lake, poor soils, steep shoreline and inaccessibility are some of the factors that have led to the failure of almost all development efforts along the lake shores.

However, this situation is changing rapidly. A huge and ambitious agricultural development project (known as the South Valley or Tushka Project) was initiated in 1996 to reclaim and cultivate several hundred thousand *feddans* of the Western Desert using water from Lake Nasser. The project involves the installation of the world's largest pumps, which will carry water from the lake into a 300 km long canal. It was envisaged that the canal would extend all the way to Kharga Oasis in the heart of the Western Desert, and possibly beyond. Work on the project has already progressed substantially and it is planned that the pumps will be operational by 2002.

Perhaps one of the most outstanding features of Lake Nasser is the very complex nature of its shoreline, composed of numerous khors, which are, essentially, inundated desert wadis. Most are narrow and meander into the desert for long distances, although some are very wide. There are some 85 major khors, 48 on the eastern side of the lake and

37 on the western side. Allaqi, Kalabsha and Tushka are the three largest khors in Lake Nasser, making up a large part of its total area. Khors support the richest habitats in the lake. Their shallow waters support aquatic flora and provide good breeding grounds for fish; and their often gently sloping shores allow vegetation to grow. Much of the rest of the lake's shores are steep and rocky with little vegetation. A vast number of islands of various sizes, representing the tops of former hills, are scattered throughout the lake. The number, location and size of these varies greatly with fluctuations in lake-level.

The vegetation of the lake banks is largely dominated by *Tamarix*, which grows in thin bands along the lake's shoreline, forming dense growths at favourable habitats, usually in khors. Only a few plant species tolerate the continual alternation between flooding and desiccation, which dominates the ecology of the lake shores. When the lake-water recedes, extensive areas of waterlogged land are exposed and rapidly become colonized by dense *Tamarix* growths. Conversely, when the water-level rises, vast areas of *Tamarix* bush are inundated, creating swamp-like microhabitats that provide excellent feeding grounds for waterbirds. Dominant aquatic vegetation in the shallow margins of the lake includes water-lilies *Najas*.

Lake Nasser is one of the most important sources of freshwater fish in Egypt, contributing from 25% to 40% of the total inland fisheries production. In 1992, the catch amounted to about 26,000 tonnes, and the number of fishermen was nearly 3,000. *Tilapia* dominate the fish catch from the lake, contributing about 97–98% of the total. Other commercial fish species include *Bagrus bajad* and *Lates niloticus*.

### ■ Birds

See Box for key species. Lake Nasser has become increasingly important as a wintering area for migratory Palearctic waterbirds. During January and February 1995, over 56,000 waterbirds were counted on about 20% of the lake. Thus, the total number of waterbirds wintering in the entire lake could be in excess of 200,000, making it one of the most important wetlands in Egypt. Most abundant of these were *Podiceps nigricollis*, *Pelecanus onocrotalus*, *Aythya fuligula*, *Aythya ferina*, *Anas clypeata*, *Anas penelope* and *Larus ridibundus*. Characteristic breeding birds include *Alopochen aegyptiacus*, *Milvus migrans*, *Burhinus senegalensis*, *Charadrius pecuarius*, *Vanellus spinosus*, *Galerida cristata* and *Prinia gracilis*. This is the only area where *Rynchops flavirostris* and *Motacilla aguimp* are known to breed in Egypt. During the summer months there is a significant influx of *Mycteria ibis* and *Pelecanus rufescens* into Lake Nasser.

#### Key species

A1	<i>Aythya nyroca</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Podiceps nigricollis</i>	—	5,811
	<i>Pelecanus onocrotalus</i>	—	1,157
	<i>Aythya fuligula</i>	—	19,281
	<i>Anas clypeata</i>	—	9,437
A4iii	More than 20,000 waterbirds occur.		

### ■ Other threatened/endemic wildlife

The newly established habitats in and around Lake Nasser have become of great importance for several species that have lost most of their habitats elsewhere in Egypt. Reptiles: the lake holds the only remaining populations of *Crocodylus niloticus* in Egypt, which is found in substantial numbers. Good populations of *Varanus niloticus* and *Trionyx triunguis* also inhabit the lake. Mammals: the shores of Lake Nasser probably now support one of the largest populations of *Gazella dorcas* (VU) in Egypt, a species that is rapidly declining throughout the country.

### ■ Conservation issues

Wadi Allaqi, declared a Protected Area by Prime Ministerial Decree 945/1989, encompasses a section of Khor Allaqi (part of Lake Nasser). The adoption of inappropriate development strategies and techniques in this unique and vital region, Lake Nasser being the main reservoir of fresh water in Egypt, could be ecologically disastrous. Mismanagement of agricultural pests and over-use of pesticides are potentially very grave problems for wildlife and the environment along the shores of Lake Nasser. Species such as *Alopochen aegyptiacus*, *Galerida cristata* and even *Gazella dorcas* are considered pests around Lake Nasser and have been persecuted by many means, including poisoning. This has led, in many instances, to the killing of vast numbers of other, non-target wildlife. Already, workers, at the South Valley Development Project have been

reported in the press as ‘purifying’ newly settled desert areas of ‘vermin’ by poisoning. Victims are reported to be mostly foxes and rodents.

Shooting of waterbirds is reported to take place regularly during winter, particularly by visiting European hunters, who take both game and non-game (protected) birds. Illegal hunting, collection and trade in protected species (mainly *Crocodylus niloticus*, *Varamus niloticus* and *Gazella dorcas*) is widespread.

Development has increased in the south-eastern part of the lake, as a result of the Tushka Reclamation Project. While this has led to increased disturbance to birds and their habitats at Lake Nasser, new wetland habitats are being created in the desert, benefiting waterbirds.

#### Further reading

Aswan Governorate (1993), Entz (1976), Springuel (1985b), Yaseen (1999).

### Hurghada archipelago

Admin region Red Sea

Coordinates 27°28'N 33°49'E

Area 150,000 ha Altitude 0–300 m

EG015

A1, A4i, A4ii

National Park, Unprotected

#### Site description

An archipelago of 22 uninhabited islands, plus a handful of very small islets, scattered from the Straits of Gubal (at the mouth of the Gulf of Suez) to Hurghada. Most are small or medium-sized and fairly flat coralline islands, such as Tawila and Ashrafi, but some are quite large and hilly. Shadwan is the largest of the Egyptian Red Sea islands, being c.56 km<sup>2</sup> in area and reaching some 300 m at its highest point. The area of the IBA includes adjacent marine waters.

Many of these islands have an igneous core ringed by fossil coral reefs that were raised and exposed by uplifting of the core. The igneous core is visible at the centre of many of the larger islands. Typically, the islands have elevated rocky shores on their north-eastern sides and gently sloping sandy shores on the south-western sides. This is most probably a result of erosion by prevailing north-easterly winds and currents. Extensive intertidal flats (coral table) fringe some of the islands, particularly on the southern and western shores, while deep waters surround others.

Vegetation is sparse and consists mainly of saltmarsh, including *Halocnemum*, *Arthrocnemum* and *Nitraria*. The islands of North Qeisum, Abu Mingar, Ashrafi and Shadwan have small- to medium-sized stands of mangrove *Avicennia*.

#### Birds

See Box for key species. The Hurghada Archipelago holds the largest known breeding population of *Larus leucophthalmus* in the world. A total of 6,500 adults was counted attending the sprawling Hurghada city rubbish-dump in May 1996. It is almost certain that all these birds breed on the Hurghada archipelago and, probably, represent only part of the local breeding population. The fact that all birds counted were adults in breeding plumage indicates that the total population of the area, if immatures and juveniles are accounted for, should be much larger than the previous estimate of 1,500–2,000 pairs. The current estimate made here for the Hurghada archipelago is of at least 3,000 breeding pairs, or a total population of some 10,000 birds. In addition, the Hurghada archipelago supports a considerable diversity of other breeding seabirds and waterbirds. At least 15 species are known to breed or to have bred: *Sula leucogaster*, *Phaethon aethereus*, *Butorides striatus*, *Egretta gularis*, *Platalea leucorodia*, *Pandion haliaetus*, *Falco concolor*, *Charadrius alexandrinus*, *Larus hemprichii*, *Sterna caspia*, *Sterna bergii*, *Sterna bengalensis*, *Sterna anaethetus* and *Sterna repressa*. A large colony of the last species (c.1,150 pairs) was discovered in July 1996 on an islet off Tawila island. These islands also appear to play an important role as a stepping-stone for some soaring migrants crossing the mouth of the Gulf of Suez, with some birds landing on the islands.

#### Key species

A1	<i>Larus leucophthalmus</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Larus leucophthalmus</i>	3,000	—
	<i>Sterna repressa</i>	1,500+	—
	<i>Sterna caspia</i>	200	—
	<i>Sterna bengalensis</i>	500	—
A4ii	<i>Falco concolor</i>	44+	—

#### Other threatened/endemic wildlife

Marine: The coral reefs found in this area are some of the richest in the world, supporting a diversity of life including endemic and endangered species. Flora: The mangroves found on the islands are among the most extensive in the northern Red Sea. Reptiles: *Eretmochelys imbricata* (CR) and *Caretta caretta* (EN) have been found breeding on several islands of the archipelago. Mammals: *Dugong dugon* (VU) is still reported to inhabit some shallow protected waters where there are sea-grass beds. This species has virtually vanished from the area, because of catching pressure and disturbance by fishermen and tourists and, undoubtedly, has suffered from the chronic oil pollution in the region.

#### Conservation issues

The islands south of 27°15'N are protected as part of the Elba National Park, declared by Prime Ministerial Decree 450/1986, adjusted by Prime Ministerial Decree 1186/1986 and Prime Ministerial Decree 642/1995. Islands further north are not protected, but are proposed for protection. EEAA, with support from USAID, is developing the management and infrastructure of the island protectorates from Hurghada southwards and will expand their programme to the north once those islands are protected.

During the past decade the Hurghada region has witnessed an unprecedented development boom; from a quaint little town with two hotels, to a sprawling, densely populated city with tens of hotels and holiday resorts. Now, tourist developments extend from about 30 km north of Hurghada nearly all the way to Safaga. All this development has taken place with little regard for the natural environment, obviously with severe negative impact, particularly on littoral and marine habitats. There is, likewise, increasing pressure for tourism development on the islands. Two eco-facilities have been established for day use on Giftun Kabir island and others are planned. There has been a request to establish a hotel on one of the islands at the mouth of the Gulf of Suez.

Breeding success on offshore islands is probably severely compromised by increased tourist activity in the vicinity. Tourists landing on the islands during the breeding season cause disturbance to seabird colonies. Egg- and chick-collection by local fishermen is known, but is thought not to be widespread, although the impact could be considerable. There is a constant threat of inappropriate activities on the islands; for example, the use of dune buggies for recreational purposes has been reported from many islands.

Oil pollution is a chronic problem in this region of the Red Sea and one of the most serious for wildlife. Badly operated oil-production facilities contribute the most, although the busy shipping lanes of the Gulf of Suez are an important source of oil pollution, as well as solid waste.

The use of dynamite in submarine oil-exploration and fishing was a common practice in the past and might still be practised in some parts of the Red Sea today. The impact of this destructive technique on the marine environment is devastating. Feral cats have been introduced on several islands by army personnel stationed there. The impact of these and other introduced fauna on nesting birds is not known, but could be very destructive.

#### Further reading

Frazier and Salas (1984), Goodman and Meininger (1989), Jennings *et al.* (1985).

### Tiran island

Admin region South Sinai

Coordinates 27°56'N 34°33'E

Area 3,100 ha Altitude 0–524 m

EG016

A1, A4i

National Park

#### Site description

A large, crescent-shaped island situated at the mouth of the Gulf of Aqaba. The northern part of the island is flat, while the southern, larger part is fairly hilly. A fairly large stand of mangrove *Avicennia* is found on the northern shore of the southern part of the island. Extensive coral reefs fringe the island on the north and east, while the western shore overlooks the Straits of Tiran.

#### Birds

See Box for key species. Seven waterbird species are known to breed on Tiran island: *Egretta gularis*, *Butorides striatus*, *Platalea leucorodia*,

*Larus leucophthalmus*, *Sterna repressa*, *Sterna bengalensis* and *Sterna caspia*. In addition, *Pandion haliaetus* is a widespread breeder. Tiran's population of this species (15–20 pairs) is the largest in the country. Three or four pairs of *Falco concolor* also breed on the island.

#### Key species

A1	<i>Larus leucophthalmus</i>		
A4i	<i>Larus leucophthalmus</i>	Breeding (pairs)	Non-breeding
		50+	—

#### Other threatened/endemic wildlife

Reptiles: *Chelonia mydas* (EN) has bred on the island. Mammals: The shallow waters east of Tiran are said to have sea-grass beds that are important grazing habitat for *Dugong dugon* (VU).

#### Conservation issues

Tiran is part of the Ras Mohammed National Park, which was declared by Prime Ministerial Decree 1068/1983, adjusted by Prime Ministerial Decree 2035/1996. Oil pollution from passing vessels is a serious threat to the birds of Tiran, particularly during the breeding season, when chicks of *Larus leucophthalmus* and other seabirds typically congregate along shores where they become exposed to contamination by floating oil. Growing tourist activity in the vicinity of Tiran is threatening to increase disturbance on the island and to degrade its habitats. However, the presence of landmines on some parts of the island deters many from visiting. Military personnel stationed on the islands are reported to have introduced feral cats that could potentially prey on fledging seabirds.

#### Further reading

Frazier and Salas (1984), Goodman and Meininger (1989).

### Wadi Gimal island

Admin region Red Sea  
Coordinates 24°40'N 35°10'E  
Area 200 ha Altitude 0–20 m

**EG017**

 A1, A4i, A4ii  
National Park

#### Site description

A small coralline island, fringed by coral reefs to the north-east, with good sea-grass beds offshore to the south-west. A small mangrove stand is located in an isolated pool in the middle of the island, and another occurs on the south-west shore, which slopes very gently, forming extensive mudflats. A moderate-sized saltmarsh is found along the inland fringe of the coastal mangrove, and many isolated halophytic shrubs are scattered over the rest of the islands.

#### Birds

See Box for key species. Nine bird species are known to breed on Wadi Gimal island: *Phaethon aethereus*, *Butorides striatus*, *Egretta gularis*, *Platalea leucorodia*, *Pandion haliaetus*, *Falco concolor*, *Larus hemprichii*, *Larus leucophthalmus* and *Sterna caspia*. The smaller number of breeding birds on this, and other southern Egyptian Red Sea islands, is probably due to the limited ornithological coverage of this region, rather than to a lack of birds or suitable breeding habitats.

#### Key species

A1	<i>Larus leucophthalmus</i>		
A4i	<i>Larus leucophthalmus</i>	Breeding (pairs)	Non-breeding
		75+	—
A4ii	<i>Falco concolor</i>	10	—

#### Other threatened/endemic wildlife

Reptiles: *Chelonia mydas* (EN) has been reported nesting on the island. Mammals: the marine pastures surrounding the island are probably a good grazing habitat for *Dugong dugon* (VU), as well as for *Chelonia mydas*.

#### Conservation issues

The island is part of the Elba National Park, which was declared by Prime Ministerial Decree 450/1986, adjusted by Prime Ministerial Decree 1186/1986 and Prime Ministerial Decree 642/1995. Pollution, particularly by oil, and disturbance by an increasing number of tourists and fishermen, who occasionally collect the eggs and young of breeding birds, are the

main threats to birds on the island. The expanding tourist development taking place along the coast in this vicinity is leading to increased human disturbance and other threats to the island and its birdlife.

#### Further reading

Frazier and Salas (1984).

### Qulân islands

Admin region Red Sea  
Coordinates 24°22'N 35°23'E  
Area 300 ha Altitude 0–5 m

**EG018**

 A1, A4i, A4ii  
National Park

#### Site description

A small archipelago composed of four small coralline islands: Siyul, Showarit, Um Ladid and Mahabis, mentioned in ascending order of size. The islands are flat and sandy, usually with an elevated rocky northern shoreline, and a sloping southern shore. Showarit island has a small mangrove stand. A fringe of living coral reef surrounds all the islands.

#### Birds

See Box for key species. Eight bird species have been found breeding on the islands: *Phaethon aethereus*, *Butorides striatus*, *Egretta gularis*, *Platalea leucorodia*, *Falco concolor*, *Larus hemprichii*, *Larus leucophthalmus* and *Sterna caspia*.

#### Key species

A1	<i>Larus leucophthalmus</i>		
A4i	<i>Larus leucophthalmus</i>	Breeding (pairs)	Non-breeding
		50+	—
A4ii	<i>Falco concolor</i>	10	—

#### Other threatened/endemic wildlife

Reptiles: *Caretta caretta* (CR) has been reported nesting on three of the islands.

#### Conservation issues

The islands are part of the Elba National Park, which was declared by Prime Ministerial Decree 450/1986, adjusted by Prime Ministerial Decree 1186/1986 and Prime Ministerial Decree 642/1995. As with Wadi Gimal island (EG017), oil pollution and floating solid waste are an increasing problem along the shoreline. Because of the proximity of the islands to the mainland, they are fairly accessible and are being disturbed by an increasing number of tourists and fishermen, who occasionally collect the eggs and young of breeding birds.

#### Further reading

Frazier and Salas (1984).

### Zabargad island

Admin region Red Sea  
Coordinates 23°37'N 36°12'E  
Area 450 ha Altitude 0–235 m

**EG019**

 A1, A4i, A4ii  
National Park

#### Site description

Zabargad (or St John) is small triangular island rising abruptly from deep water in the Red Sea to about 235 m, some 60 km south-east of Ras Banas. It is geologically unique, amongst the Red Sea islands, in being composed of uplifted mantle and lower crustal metamorphic rocks. Vegetation is scant and mainly limited to halophytic flora.

#### Birds

See Box for key species. Eight bird species have been found breeding: *Sula leucogaster*, *Platalea leucorodia*, *Falco concolor*, *Larus leucophthalmus*, *Sterna caspia*, *Sterna bengalensis*, *Sterna anaethetus* and *Sterna repressa*. In October 1994, about 150 pairs of *Falco concolor* were found breeding on the island, representing a significant proportion of the world population.

#### Key species

A1	<i>Larus leucophthalmus</i>
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Key species ... continued			
		Breeding (pairs)	Non-breeding
A4i	<i>Larus leucophthalmus</i>	50+	—
A4ii	<i>Falco concolor</i>	150	—

### Other threatened/endemic wildlife

Marine life: The island is surrounded by some of the most spectacular coral reefs in the Egyptian Red Sea. Reptiles: Remains of ‘hundreds’ of marine turtles were found in December 1997, which probably come to the island to nest, most likely involving *Chelonia mydas* (EN).

### Conservation issues

Zabargad is part of the Elba National Park, which was declared by Prime Ministerial Decree 450/1986, adjusted by Prime Ministerial Decree 1186/1986 and Prime Ministerial Decree 642/1995. The number of tourists visiting this island and its surrounding reefs increased dramatically in the past few years and started to degrade the coral reefs in the area and increase disturbance to nesting birds on the island. This led the EEAA, in collaboration with the coast guard, to close the area to visitors for about a year until better controls on human activities were in place.

### Further reading

Coleman (1993), Frazier and Salas (1984).

Siyal islands		EG020
Admin region	Red Sea	A1, A4i National Park
Coordinates	22°47'N 36°11'E	
Area	200 ha Altitude 0–5 m	

### Site description

Three small, flat, sandy, coralline islands, the largest of which is Siyal El Kabir. Coral reefs and shallow waters surround the islands.

### Birds

See Box for key species. Five bird species have been found breeding: *Pandion haliaetus*, *Larus leucophthalmus*, *Larus hemprichii*, *Sterna caspia* and *Sterna repressa*.

Key species			
		Breeding (pairs)	Non-breeding
A1	<i>Larus leucophthalmus</i>		
A4i	<i>Larus leucophthalmus</i>	70+	—

### Other threatened/endemic wildlife

Reptiles: *Eretmochelys imbricata* (CR) and *Chelonia mydas* (EN) breed in significant numbers on Siyal El Kabir island. *Dermochelys coriacea* (EN) might also breed locally.

### Conservation issues

The islands are part of the Elba National Park, which was declared by Prime Ministerial Decree 450/1986, adjusted by Prime Ministerial Decree 1186/1986 and Prime Ministerial Decree 642/1995. Local fishermen collect turtle eggs, and probably do the same with bird eggs.

### Further reading

Goodman (1985a).

Rawabel islands		EG021
Admin region	Red Sea	A1 National Park
Coordinates	22°25'N 36°32'E	
Area	Less than 100 ha Altitude 0–5 m	

### Site description

Two small, flat, coralline islands with scattered salt-tolerant vegetation, including shrubs of *Nitraria* and *Tamarix*. The islands are surrounded by coral reefs and shallow waters.

### Birds

See Box for key species. Four bird species have been found breeding:

*Pandion haliaetus*, *Larus leucophthalmus*, *Larus hemprichii* and *Sterna caspia*.

Key species	
A1	<i>Larus leucophthalmus</i>

### Other threatened/endemic wildlife

Reptiles: *Eretmochelys imbricata* (CR) or *Chelonia mydas* (EN) probably breed.

### Conservation issues

The islands are part of the Elba National Park, which was declared by Prime Ministerial Decree 450/1986, adjusted by Prime Ministerial Decree 1186/1986 and Prime Ministerial Decree 642/1995.

### Further reading

Goodman (1985a), Goodman and Meininger (1989).

Nabq Protected Area		EG022
Admin region	South Sinai	A3 (A02) Protected Area
Coordinates	28°16'N 34°26'E	
Area	60,000 ha Altitude 0–500 m	

### Site description

The Nabq Protected Area encompasses a wide variety of ecosystems and habitat-types. The majority of the Protected Area is occupied by mountain and wadi desert habitats. Wadi Kid is the largest wadi in the area draining into the Gulf of Aqaba, where it forms a wide delta of alluvial gravel, small sand-dunes and scrub. Along the sea front of the delta there is an extensive stand of mangrove *Avicennia*, known as Shorat El Manqata. The mangroves are scattered along some 7 km of shoreline, forming, in places, very dense and extensive groves that contain fairly large trees.

### Birds

See Box and Table 2 for key species. The desert habitats of the protected area support a significant number of Sahara–Sindian biome-restricted species. The mangroves of Shorat El Manqata are of special importance for breeding waterbirds in the Gulf of Aqaba region. *Platalea leucorodia*, *Butorides striatus*, *Egretta gularis* and *Pandion haliaetus* have all been found breeding in this mangrove stand. In April 1990 a single *Numenius tenuirostris* was reported from the Nabq area.

Key species	
A3 (A02)	Sahara–Sindian biome: 15 of the 22 species of this biome that occur in Egypt have been recorded at this site; see Table 2.

### Other threatened/endemic wildlife

Flora: 134 plant species are known from the protected area. Nabq is one of the most northerly mangrove stands in the world and the largest in the northern Red Sea. Further south, along the Red Sea coast proper, between Hurgada and Marsa Alam, mangrove distribution is sparse. South of Marsa Alam it becomes a more prominent and widespread feature of the coastal landscape. In Egypt, the mangrove is surviving at the very edge of its ecological requirements. The complex web of life that is built around the mangrove thus maintains a rather precarious existence that is very susceptible to environmental deterioration. Mammals: A small number of *Gazella dorcas* (VU) inhabit the desert wadis and plains. *Vulpes rueppelli* (DD) is fairly common. *Capra nubiana* (EN) is a prominent mammal species, found in the mountainous areas.

### Conservation issues

The site was declared a Protected Area by Prime Ministerial Decree 1151/1992. The EU, in cooperation with the EEAA, has been involved in the development of the management and infrastructure of this protected area. Wall-to-wall tourism development has occurred south along the coast, up to the reserve’s boundaries. While management of the area has greatly improved, there are concerns that the expected increase in visitors will result in growing disturbance to birds and other wildlife in their breeding and feeding grounds (particularly those animals which need isolated and secure conditions, such as birds of prey). Cars and their tracks render large areas of wadi bed devoid of

vegetation and break up the soil surface, reducing (often quite severely) the available feeding and nesting habitats for many bird species. The problem has become especially acute in recent years, with the increase in the number of desert safari tours using four-wheel-drive vehicles.

#### Further reading

Goodman and Meininger (1989).

### Gebel Elba

Admin region Red Sea

Coordinates 22°15'N 36°19'E

Area 500,000 ha Altitude 0–1,435 m

EG023

A3 (A02)

National Park

#### Site description

The Gebel Elba area encompasses a cluster of coastal mountains overlooking the Red Sea, immediately to the north of the political border with Sudan. Most prominent are Gebel Elba (1,435 m), Gebel Shellal (1,409 m), Gebel Shendib (1,911 m) and Gebel Shendodai (1,526 m). These are the southernmost of the Egypt's Red Sea mountains. A 25 km wide coastal plain separates the mountains from the Red Sea coast to the north and east. To the west lie the bleak sand-plains and hills of the Eastern Desert. A network of numerous small, deeply cut wadis drain the mountains into several major wadis, which flow towards the Red Sea or the Nile valley. The most important of these are Wadi Akwamtra, Wadi Aideib and Wadi Serimtai.

Gebel Elba itself enjoys higher precipitation than any of the other mountains in the region, even the higher ones, primarily because of its closeness to the sea and its favourable position in the face of moisture-laden north-easterly winds. Average annual rainfall in the region is less than 50 mm, although orographic precipitation on Gebel Elba itself amounts to as much as 400 mm. The summit of Gebel Elba is a 'mist oasis' where a considerable part of the precipitation is contributed in the form of dew or mist and clouds, which often shroud the mountaintop. Aridity increases notably from the north-east to the south-west.

The relative abundance of moisture, which is some of the highest in Egypt, allows a diverse flora to exist. Some 458 species of plants are known from Gebel Elba. Ferns, mosses and succulents are fairly common in the mist-zone at higher altitudes, where trees of *Acacia*, *Moringa* and *Dracaena* are dominant. At lower altitudes, in mountain wadis and foothills, there is dense parkland, dominated by *Acacia* and *Delonix*. The density of this vegetation is particularly high in the northern and north-east regions of Gebel Elba. This mid-altitude zone has the greatest biotic diversity. The undulating coastal plain is interspersed with shallow wadis and covered with scattered bushes and trees dominated by *Acacia* and *Balanites*. Saltmarsh vegetation and mangroves fringe long stretches of the coast.

#### Birds

See Box and Table 2 for key species. Because of the abundance of moisture, altitudinal effects and geographic position, Gebel Elba supports a rich biodiversity unparalleled in any other, similar, desert habitat in Egypt. Many Afrotropical elements have their northern limits at Elba, including several avian species.

Some 41 bird species are known or thought to breed in the immediate vicinity of Elba. Of the Sahara–Sindian biome-restricted species, *Turdoides fulvus* is not represented in any other IBA in Egypt. *Terathopius ecaudatus*, *Oena capensis*, *Caprimulgus nubicus*, *Eremopterix nigriceps*, *Nectarinia habessinica*, *Sylvia leucomelaena*, *Rhodophoneus cruentus*, *Lonchura cantans* and *Passer luteus* are Afrotropical species that, in Egypt, are largely confined to Gebel Elba. Other species, such as *Struthio camelus* and *Torgos tracheliotos*, which have disappeared from most of their former North African/Middle Eastern range, can still be found in the Gebel Elba area, although they have both been greatly reduced in number during the past decade. The area also holds breeding populations of several birds of prey that are rare, or have sharply declined, throughout the remainder of their range in Egypt: *Gypaetus barbatus*, *Neophron percnopterus*, *Aquila verreauxii* and *Hieraetus fasciatus*.

#### Key species

A3 (A02) Sahara–Sindian biome: 15 of the 22 species of this biome that occur in Egypt have been recorded at this site; see Table 2.

#### Other threatened/endemic wildlife

Flora: *Biscutella elbensis* is endemic to Gebel Elba (Boulos 1995). Several other plant species, rare elsewhere in Egypt, are also found here. Reptiles: *Ophisops elbaensis* was thought to be endemic, but has been found recently in south-west Arabia. Mammals: *Vulpes rueppelli* (DD) is fairly common. If *Panthera pardus* still exists, it is very rare. *Gazella dorcas* (VU) and *Capra nubiana* (EN) are declining, but are still found in small numbers, while *Ammotragus lervia* (VU) is, apparently, still present in very small numbers.

#### Conservation issues

Gebel Elba is part of the Elba National Park, which was declared by Prime Ministerial Decree 450/1986, adjusted by Prime Ministerial Decree 1186/1986 and Prime Ministerial Decree 642/1995. The total area of the Elba National Park is 3,560,000 ha.

Hunting is perhaps the most serious threat that birds and other wildlife face in the Gebel Elba region. Hunters, either well-to-do Egyptians, Gulf Arabs or military personnel, tend to shoot vast numbers of animals in an indiscriminate, uncontrolled manner, which has particularly devastated gazelle populations. Among birds, the larger species are usually the most affected, particularly *Struthio camelus* and large birds of prey such as *Torgos tracheliotos*.

Increased disturbance by hunters, military personnel and development activities, especially in the coastal zone, is driving wildlife further inland towards more arid and less favourable habitats.

Initiatives are underway to settle the local Bishari, transforming these traditional communities and their ways of life. Local Bisharin Bedouins have traditionally produced charcoal made solely of dead *Acacia* trees and branches. According to tribal laws it was forbidden to cut living trees. However, in recent years these laws have been increasingly overlooked, because of the growing demand for charcoal in the Nile valley, and the growing financial needs of the local people. Today, green trees are often felled to be turned into charcoal. This, combined with the severe grazing pressure, is working to reduce the vegetation cover, so increasing the aridity of the region.

The area from Berenice south is currently closed to visitors, except those with permission. Most recently, the area between Marsa Alam and Shalateen has been opened to tourists. If large-scale tourism were to take place at Gebel Elba itself, it would be highly detrimental to this relatively untouched wilderness.

#### Further reading

Baha el Din (1997), Boulos (1995), Goodman (1985a), Goodman and Meininger (1989), Kassas and Zahran (1971), Osborne and Helmy (1980).

### The Abraq area

Admin region Red Sea

Coordinates 23°25'N 34°48'E

Area 100,000 ha Altitude 300–400 m

EG024

A3 (A02)

National Park

#### Site description

The Abraq area encompasses a complex network of steep sandstone hills and winding sandy wadis, the best known of which are Wadi Naam, Wadi Abraq and Wadi Abu Saafa, which drain eastwards into Wadi Hodein, and thence into the Red Sea. There are a number of perennial springs in the region, of which Bir Abraq and Bir Abu Saafa are the most famous. The area is part of the extremely arid Nubian (southern) section of the Eastern Desert, and is unique in that it represents an enclave of sandstone located east of the Red Sea–Nile valley hydrological divide of the Eastern Desert Mountains. At least 107 plant species are known. The area has moderate vegetation cover, which is largely confined to wadi beds and dominated by *Acacia*, *Zilla* and *Aerva*.

#### Birds

See Box and Table 2 for key species. The Abraq area supports a breeding avifauna that includes a large proportion of Egypt's Sahara–Sindian biome-restricted species. The area also probably still holds breeding populations of several declining or rare birds of prey in Egypt, including *Gypaetus barbatus*, *Neophron percnopterus* and *Hieraetus fasciatus*. The springs in the area are important watering stations for large populations of sandgrouse *Pterocles*. Both *Pterocles lichtensteinii* and *Pterocles coronatus* use the water resources of the area extensively.

**Key species**

A3 (A02) Sahara-Sindian biome: 13 of the 22 species of this biome that occur in Egypt have been recorded at this site; see Table 2.

**Other threatened/endemic wildlife**

Reptiles: No fewer than 20 reptile species occur, including good populations of the declining *Uromastix ocellata*. Mammals: *Gazella dorcas* (VU) and *Capra nubiana* (EN) are known from the area.

**Conservation issues**

This area is part of the Elba National Park, which was declared by Prime Ministerial Decree 450/1986, adjusted by Prime Ministerial Decree 1186/1986 and Prime Ministerial Decree 642/1995. Overgrazing, hunting, disturbance, firewood-collection and, particularly, charcoal production, are all activities that are threatening the integrity of the site. However, the area is still fairly inaccessible and thus severe human and development pressures remain relatively small.

**Further reading**

Kassas (1993).

**St Katherine Protectorate**

Admin region South Sinai

Coordinates 28°20'N 33°55'E

Area 435,000 ha Altitude 100–2,641 m

**EG025**

A3 (A02)

National Park

**Site description**

The St Katherine Protectorate occupies much of the central part of South Sinai, a mountainous region of Precambrian igneous and metamorphic rock, which includes Egypt's highest peaks: Gebel Katherina (2,641 m), Gebel Um Shomar (2,586 m), Gebel El Thabt (2,439 m), Gebel Musa (2,280 m) and Gebel Serbal (2,070 m). These mountains are intersected by a complex network of deeply cut wadis, draining eastward to the Gulf of Aqaba and westward to the Gulf of Suez. The most important of these are Wadi Feiran, Wadi Hibran, Wadi Isla, Wadi Nasb and Wadi Zaghra.

Mean annual rainfall is 62 mm, falling mostly in spring and autumn. Precipitation occasionally exceeds 300 mm in areas above 1,600 m, where it falls mostly as snow. In winter, temperatures fall as low as -10°C at higher elevations. This relatively high precipitation gives rise to a diversity of plant and animal life, making the high mountains of central South Sinai one of the richest terrestrial areas for biodiversity in the country.

This relatively mountainous environment supports a diverse and unique assemblage of plants. About 1,000 plant species, representing almost 40% of Egypt's total flora, are found in this region. These include many Irano-Turanian relicts and several endemic species. The dwarf shrub *Artemisia* is perhaps the most prominent floral component of the landscape of the St Katherine area, being dominant or co-dominant in almost all plant communities at higher altitudes.

Four primary avian habitat-types can be identified in the National Park: mountains, wadis, plains and oases. Mountain habitat includes hilly country and slopes, as well as narrow small wadis, gullies and ravines. These are usually poorly vegetated at lower elevations, although higher up very thin vegetation cover shrouds the mountain slopes and diversity is fairly high. Wadis contain much of the vegetation in the region. However, frequent flash floods render many of the narrow wadis and torrent beds plantless. Several plains and plateaus are found at high altitude. Elwat El Agramya is one of the largest. Some wadi beds, particularly at lower elevations, are very wide and plain-like. The largest and best-known oasis is Feiran. Many orchards and small areas of cultivation are scattered in wadis, particularly at higher elevations. They form an important part of the region's landscape.

The National Park has many outstanding cultural and religious landmarks. The Monastery of St Katherine and Mount Sinai (Gebel Musa) are the most famous.

**Birds**

See Box and Table 2 for key species. The resident bird community of the St Katherine Protectorate includes the majority of Egypt's Sahara-

Sindian biome-restricted species. Many of these species are not well represented or are not present at all in any other IBA in Egypt.

The St Katherine region is an outpost for several species that have larger ranges elsewhere. These are *Aquila verreauxii*, *Onychognathus tristramii*, *Corvus rhipidurus* and, most remarkably, *Carpodacus synoicus*, which has its main area of distribution in Central Asia. *Gypaetus barbatus*, *Hieraetus fasciatus* and *Aquila chrysaetos* probably still breed in very small numbers, although there is no recent evidence of nesting.

**Key species**

A3 (A02) Sahara-Sindian biome: 16 of the 22 species of this biome that occur in Egypt have been recorded at this site; see Table 2.

**Other threatened/endemic wildlife**

Flora: Nearly half of the 33 known Sinai endemics are found in the St Katherine area; many are rare and endangered. Insects: the butterflies *Satyrnum jebelia* and *Pseudophilotes sinaicus* are endemic to the region, generally in areas above 1,800 m. Reptiles: *Coluber sinai* and *Telescopus hoogstraali* are two snakes endemic to South Sinai and the Negev. Mammals: *Canis lupus* still occurs in very small numbers. *Vulpes cana* (DD) has recently been discovered, but is rare. *Vulpes rueppelli* (DD) is fairly common. *Panthera pardus* probably became locally extirpated earlier this century, but there are recent indications that a few individuals might still exist. *Gazella dorcas* (VU) has declined sharply and is subject to heavy persecution. *Capra nubiana* (EN) is a prominent mammal species, which can still be seen regularly.

**Conservation issues**

The site is a Protected Area, declared by Prime Ministerial Decree 613/1988, and has been proposed as a World Heritage Site. The EU, in cooperation with the EEAA, has an ongoing project to develop the park management and infrastructure.

At the heart of all problems facing the avifauna and the natural habitats in the St Katherine area is the increase in the number of people utilizing the area in an unregulated and haphazard manner. In recent years there has been a dramatic increase in the number of tourists and tourist developments, along with an associated growth in the local population. This uncontrolled human activity, which has suddenly struck the tranquil mountains of South Sinai, is threatening to destroy the very fragile ecosystem of the area.

The drastic expansion in construction works in the St Katherine area has been completely unregulated and very badly planned. Perhaps, one of the most significant problems facing the St Katherine area is solid-waste management and disposal. Solid waste is mostly disposed of haphazardly and 'on site'. Plastic bags and paper can now regularly be seen attached to vegetation at altitudes of up to 2,500 m, dispersed by wind action from open dumps. With the increased demand in St Katherine for water for municipal use, the output of liquid waste has soared in the past few years. Waste-water is disposed of by means of septic tanks, from where the waste-water leaches into the aquifer. At certain localities these tanks have been overburdened and waste-water is being released directly onto the surface of the soil. A sewerage system is under construction, but has not become functional yet. Overgrazing and collecting of firewood are degrading the vegetation cover in the St Katherine area, reducing the quality and quantity of feeding and nesting habitats of birds and other wildlife in the area.

Bird-catching is practised on a local and infrequent basis in the St Katherine area. The main targeted species are *Ammoperdix heyi* and *Alectoris chukar*, which are trapped for food. The numbers involved and impact of this activity on the birds' populations are not known. Bird hunting using air rifles has been reported. Small birds are presumably the main targets. Bird-trapping occurs, with as many as 20 *Carpodacus synoicus* being collected by one child in one day. In addition, Bedouins of the Jabaliya tribe consider birds such as *Alectoris chukar*, *Ammoperdix heyi* and *Onychognathus tristramii* to be agricultural pests and, as such, persecute them. Larger firearms are readily available to locals, particularly in remote areas (where they are used to protect illegal cannabis plantations) and are, undoubtedly, used to shoot larger birds, including birds of prey, as well as other large wildlife. The hunting of animals other than birds could have a negative impact on bird-of-prey populations. Dab lizards *Uromastix*, hares *Lepus*, hyrax *Procapra capensis* and young ibex *Capra nubiana* are all potentially important prey-items for larger birds of prey. Their

decline or disappearance would directly impact the populations of these birds.

Since 1997 the St Katherine Protectorate development project, funded by the EU, has been instrumental in curbing and resolving many of the threats that are endangering the future of this unique region.

#### Further reading

Ayyad *et al.* (1993), Boulou (1995), Goodman and Meininger (1989), Hobbs (1994), Larsen (1990).

### Gebel Maghara

**EG026**

Admin region North Sinai

Coordinates 30°45'N 33°33'E

Area 100,000 ha Altitude 75–735 m

A1, A3 (A02)

Unprotected

#### Site description

This site includes much of Gebel Maghara and the adjoining plains east to Risan Aneiza. Gebel Maghara itself is one of several domes which characterize north-central Sinai. It is the largest Jurassic exposure in Egypt, being dissected by several wadis, the largest of which flows eastwards into a large sand and gravel-plain. The North Sinai dune-fields, composed of large dunes of aeolian sand, encroach upon the northern part of Maghara and the adjoining plains. The area receives between 50 and 100 mm of rain annually, allowing fairly good vegetation cover of considerable diversity to grow on open plains, as well as in wadis. Dwarf shrubs (*Fagonia*, *Anabasis*) and grasses (*Stipagrostis*, *Panicum*) dominate the vegetation on the gravel-plain. *Artemisia* is common and widespread on fine sandy substrates. Substantial stands of *Acacia* trees are found in the larger wadis. The vegetation on the hills of Maghara includes many Mediterranean relicts, such as *Juniperus phoenicea*, which grows on the north-facing slopes and is found nowhere in Egypt outside the hills of north-central Sinai.

#### Birds

See Box and Table 2 for key species. Because of its great diversity of land forms and desert habitats, the Gebel Maghara area holds a unique combination of avian species, including a large proportion of Egypt's Sahara–Sindian biome-restricted species. This IBA also has the greatest diversity of breeding larks in the country, seven species in all: *Ammomanes cincturus*, *Ammomanes deserti*, *Alaemon alaudipes*, *Eremalauda dumni*, *Eremophila billopha*, *Calandrella brachydactyla* and *Galerida cristata*. The declining *Chlamydotis undulata* winters in the region in small numbers and might still breed when conditions permit.

#### Key species

 A1 *Circus macrourus*

A3 (A02) Sahara–Sindian biome: 15–16 of the 22 species of this biome that occur in Egypt have been recorded at this site; see Table 2.

#### Other threatened/endemic wildlife

Flora: The area holds many endangered, rare and endemic plants. Reptiles: Good populations of the endemic *Trapelus savignii* and the declining *Uromastix aegyptia* are still found in the sand and gravel habitats of this region. *Testudo kleinmanni* (EN) might still exist in the northern parts of the area. Mammals: small populations of *Capra nubiana* (EN) still remain on Gebel Maghara, while *Gazella dorcas* (VU) has most probably been locally extirpated. *Gerbillus floweri* (CR) is probably found in the area.

#### Conservation issues

The site has been proposed for protection as a Protected Area. The North Sinai Agriculture Development Project, in its third stage, aims at cultivating large areas of the open flat desert of the region south and east of Gebel Maghara, including a large part of the IBA identified herein. Overgrazing and ploughing both have extensive, negative impact on the vegetation of the area. Extensive quarrying for gravel takes place in a haphazard manner, completely altering the landscape and destroying habitats in very large areas of the open plain. Disturbance and uncontrolled use of vehicles are contributing to further a deterioration in the natural conditions and habitat quality

in the area. Hunting by Gulf Arabs in the area during winter is unregulated. *Chlamydotis undulata* is the main quarry.

#### Further reading

Ayyad *et al.* (1993), Baha el Din (1990), Hadidi *et al.* (1992).

### Quseima

**EG027**

Admin region North Sinai

Coordinates 30°39'N 34°22'E

Area 20,000 ha Altitude 100–509 m

A3 (A02)

Unprotected

#### Site description

A region of rolling limestone hills dissected by numerous wadis. The most important of the latter is Wadi El Gedeirat, a narrow, winding wadi bounded by steep hills. To the north is Gebel El Ain (509 m). A small, perennial creek flows from the spring of Ain El Gedeirat, creating an elongate oasis with dense swamp vegetation dominated by *Phragmites* and *Tamarix*. Old olive-groves and cultivated fields cover most of the wadi bed. Some water from Ain El Gedeirat is piped further downstream to irrigated fields and orchards near the village of Quseima. The surrounding desert is formed of hills interspersed with medium-sized gravel-plains with good vegetation cover. The flora of the region has a strong Irano–Turanian influence. *Thymelaea* is a prominent plant in this landscape. The ruins of the ancient fortress of Qadesh Barnea are found in the centre of the wadi. Ain Qadis is a further, smaller spring located c.7 km south-east of Ain El Gedeirat. This spring flows only a short distance into the desert and lacks the vegetation cover that Ain El Gedeirat supports.

#### Birds

See Box and Table 2 for key species. This unique area holds a diverse avian community, including many of Egypt's Sahara–Sindian biome-restricted species. Ain El Gedeirat and Ain Qadis are two very important drinking-water sources for three sandgrouse species; *Pterocles senegallus*, *Pterocles coronatus* and *Pterocles orientalis*. *Pterocles alchata* is also known from the area, but in smaller numbers. Several hundred of these birds come from a vast area of desert, including the western Negev, to drink at the springs, although the latter two species generally visit the area only during autumn and winter. This is also the only known site in Egypt where *Aquila chrysaetos* regularly breeds.

In addition, the area falls within one of the most important flyways for soaring birds, particularly birds of prey. Although the migration here is on a rather broad front, large numbers are regularly seen over Wadi El Gedeirat during the spring and autumn migrations. Many birds are attracted to the water and vegetation and descend to drink and roost.

#### Key species

A3 (A02) Sahara–Sindian biome: 14–17 of the 22 species of this biome that occur in Egypt have been recorded at this site; see Table 2.

#### Other threatened/endemic wildlife

Flora: Many Irano–Turanian floral elements, of limited distribution in Egypt, are found here. Crustacea: the perennial creek in Wadi El Gedeirat is the only known locality in which the freshwater crab *Potamon potamios palaestinensis* is found in Egypt. Reptiles: The rare *Walterinnesia aegyptia* is known from the area. Mammals: A small population of *Capra nubiana* (EN) still remains in adjacent hills.

#### Conservation issues

The site has been proposed for protection as a Protected Area. Hunting takes place on a regular basis. Target species are largely sandgrouse *Pterocles* and *Alectoris chukar*, but other species are also taken. The population of the latter species has sharply declined in recent years (it is also regarded as an agricultural pest in the region). Nests of *Aquila chrysaetos* have been raided regularly, and the few local pairs might have ceased nesting. Falcon-catching is prevalent throughout the region, as is the case in most parts of North Sinai in autumn. Many non-target birds of prey fall victim to this practice. Overgrazing has degraded much of the desert habitats in the vicinity.

#### Further reading

Baha el Din and Salama (1991).

## Wadi Gerafi

Admin region North Sinai

Coordinates 29°55'N 34°40'E

Area 100,000 ha Altitude 200–400 m

EG028

A3 (A02)

Unprotected

### Site description

An extensive wadi system in eastern-central Sinai. The wadi's catchment area extends from the El Tih Plateau in the south and the Israeli border in the east, to a ridge of hills in the north and west that separate this watershed from that of Wadi El Arish. The wadi and its numerous tributaries cut through slightly undulating gravel-plains and low-lying limestone country with scattered hills. The main tributaries that flow into Wadi Gerafi include Wadi Tamarani and Wadi El Beida. This wadi system flows north-east, eventually reaching Wadi Araba in the Negev. Vegetation is largely restricted to runnels, depressions and wadis, although wide torrent-beds are largely devoid of vegetation. A fairly dense growth of large *Acacia* trees lines the main wadi and its major tributaries, forming open parkland. *Retama* forms dense, bushy cover along the fringes of wadis and in depressions. Other dominant flora includes *Hammada*, *Panicum* and *Fagonia*. Bedouins, who have scattered settlements and cultivation along the wadi system, sparsely inhabit the area.

### Birds

See Box and Table 2 for key species. Wadi Gerafi and its tributaries hold nearly all of Egypt's Sahara–Sindian biome-restricted species, more than any other IBA in the country. This reflects the exceptional diversity of habitat and landscape features, and the location of the area at the meeting point of the distributional boundaries of several avian species. The area is one of the very few remaining locations in Egypt where *Chlamydotis undulata macqueenii* breeds occasionally and still winters regularly in moderate numbers. In addition, the region falls within a major migration route for soaring birds, which pass through on a rather broad front. Many of these birds roost in the area.

#### Key species

A3 (A02) Sahara–Sindian biome: 18 of the 22 species of this biome that occur in Egypt have been recorded at this site; see Table 2.

### Other threatened/endemic wildlife

Reptiles: *Coluber sinai* and *Telescopus hoogstraali* are two snakes that are endemic to South Sinai and the Negev. The former was found in one of the southern tributaries of Wadi Gerafi, while the latter almost certainly occurs in the area. Mammals: *Canis lupus* probably inhabits the area in very small numbers. *Vulpes rueppelli* (DD) is uncommon. *Gazella dorcas* (VU) is still found in small numbers, but is declining as a result of excessive hunting.

### Conservation issues

The site has been proposed for protection. Large livestock populations are continually overgrazing the vegetation of the area and disturbing large parts of it. Gulf Arab hunters have targeted this region in pursuit of *Chlamydotis undulata*, their preferred quarry. These hunters also kill other wildlife, especially gazelles, and cause extensive damage to vegetation and the important desert topsoil.

### Further reading

Hadidi *et al.* (1992).

## El Qasr desert

Admin region Matruh

Coordinates 31°05'N 26°35'E

Area 750,000 ha Altitude 50–200 m

EG029

A3 (A01)

Unprotected

### Site description

A vast, flat, sand-and-gravel plain, with scattered clay pans, which forms part of El Diffa Miocene Plateau. Several low limestone ridges run east–west across the plain and gradually raise the flat landscape to an elevation of 200 m. Fairly dense desert scrub is dominated in the northern part by *Thymelaea* and in the south by *Anabasis* and *Hamada*, with scattered *Lycium* bushes. Annual rainfall is fairly high,

averaging about 140 mm near the coast. Rainfall and density of vegetation decrease steeply southwards, and severe desert conditions prevail more than 70 km from the coastline.

The area represents a fairly undisturbed example of a unique and restricted habitat in Egypt: the Mediterranean coastal steppe, a habitat that is being lost and degraded very rapidly.

### Birds

See Box and Table 2 for key species. The area falls on the boundary between the Mediterranean and Sahara–Sindian biomes; thus, it supports species restricted to both biomes. It is the only IBA in Egypt selected on the basis of the occurrence of Mediterranean North Africa biome-restricted species. Four species, representing all of Egypt's Mediterranean North Africa biome-restricted species, are found in this IBA. On the other hand, the four Sahara–Sindian biome-restricted species found in the area represent only 19% of Egypt's assemblage of these species.

Ornithologically, this is one of the least known regions of Egypt. In the past few years *Ramphocoris clotbey* was found breeding in the area, for the first time in Egypt. Very large and previously unrecorded breeding populations of *Calandrella rufescens* were discovered. A small, hitherto unknown, breeding population of *Oenanthe lugens* (apparently of the race *halophila*) was also discovered. Other species known from the area include: *Cursorius cursor*, *Oenanthe deserti*, *Galerida cristata* and *Corvus ruficollis*. *Ramphocoris clotbey*, *Chersophilus duponti* and *Oenanthe moesta* do not occur in any other Egyptian IBA. A flock of about 150 *Charadrius morinellus* was seen in the area in spring 1994, indicating that potentially large numbers of this species might winter in the region. The area held good numbers of the nominate, North African race of *Chlamydotis undulata* until recently, but the local population has been decimated by Arab hunters. The species still occurs, but breeding is localized and rare.

#### Key species

A3 (A01) Mediterranean North Africa biome: four of the 17 species of this biome that occur in Egypt have been recorded at this site; see Table 2.

### Other threatened/endemic wildlife

Reptiles: small numbers of *Testudo kleinmanni* (EN) may still exist in the region. Mammals: *Allactaga tetradactyla* (EN), *Jaculus orientalis* (LR/nt) and *Eliomys melanurus* (LR/nt) are present in the more densely vegetated coastal region. *Gazella dorcas* (VU) used to be common in this region, but has declined sharply as a result of excessive hunting.

### Conservation issues

The site has been proposed for protection as a Protected Area. The whole coastal desert of the Mediterranean, west of Alexandria, is severely overgrazed, and is subjected to intensive rain-based cultivation and development pressures. Large areas of desert are ploughed and cleared of their vegetation cover in order to grow winter cereals. After the crop is harvested in spring or early summer, the desert is left barren, devoid of any cover. Overgrazing further compounds the problem by degrading remaining patches of natural vegetation.

Hunting and falconry, mostly by Gulf Arabs, has had a profound impact on all wildlife in the region. Gazelles and *Chlamydotis undulata* have been the worst affected, as they are the main quarries for these hunters. Off-road vehicle use by hunters, the military and Bedouins, is contributing in a major way to the degradation of natural habitats in this region.

### Further reading:

Baha el Din (1996b, 1997, 1998).

## Suez

Admin region Suez

Coordinates 29°58'N 32°33'E

Area 5,000 ha Altitude 0–800 m

EG030

A1, A4iv

Unprotected

### Site description

The city of Suez is located at the head of the Gulf of Suez, the northernmost point of the Red Sea. It overlooks the southern entrance to the Suez Canal and the Bay of Suez to the east and south-east. To

the south-west a wide plain separates the city from Gebel Ataqa (871 m) and the Isthmic Desert plains lie to the north-east. A freshwater canal and a narrow band of cultivated land extend along the western bank of the Suez Canal and reach the northern suburbs of the city. The Bay of Suez once had some of the largest and richest intertidal mudflats in the Egyptian Red Sea; today only small fragments remain. Suez has a busy port and a growing number of industries consisting, primarily, of petrochemical and fertilizer factories. The human population of Suez numbers around 250,000.

### ■ Birds

See Box for key species. Because of its unique position on the only land-bridge between Eurasia and Africa, the Isthmus of Suez is one of the most important bottlenecks in the world for migrating soaring birds, particularly birds of prey. Maxima of 134,000 and 125,000 birds of prey were counted in autumn 1981 and spring 1982 respectively. The commonest birds of prey recorded on passage at Suez are *Aquila nipalensis*, *Buteo buteo*, *Aquila pomarina* and *Circus gallicus*. *Ciconia ciconia*, *Ciconia nigra*, *Pelecanus onocrotalus* and *Grus grus* also occur regularly in large numbers on migration. Although most soaring birds pass over Suez at fairly high altitudes without stopping, large numbers occasionally roost in the vicinity of the city or land to drink and feed en route, particularly during the hotter parts of the migration seasons. This can expose large numbers of some species to serious dangers. Suez also falls on an important migration flyway for many waterbirds, and is still of importance for some wintering waders, which utilize the shrinking mudflats of the Bay of Suez.

#### Key species

A1	<i>Aquila heliaca</i>	<i>Falco naumanni</i>
	<i>Aquila clanga</i>	<i>Larus leucophthalmus</i>
	<i>Circus macrourus</i>	
A4iv	More than 20,000 migrants regularly pass during migration.	

### ■ Conservation issues

Many of the activities and structures present in the bustling industrial city of Suez pose a real and serious threat to the hundreds of thousands of birds that pass over, or through, the region. For this reason special attention should be given to future developments in the Suez region and to evaluating their potential impact on migrating birds in this, one of the world's most important migration bottlenecks.

Suez suffers from severe pollution problems. Perhaps the most serious is oil pollution, a chronic problem in the Bay of Suez originating from both onshore and offshore sources. Other water-pollution problems include improper dumping of chemical waste (from petrochemical and fertilizer factories) and pesticides into exposed canals. Because, invariably, thousands of migrating birds descend to rest and drink at Suez, water-borne pollution will, potentially, affect vast numbers of waterbirds, as well as birds of prey. Sick, oiled and dying birds of prey are not unusual sights at Suez during the migration seasons.

The newly established sewage-treatment facility at Suez provides an illustrative example of how even small design oversights can pose a major risk to migrating birds. Because sludge-drying lagoons in the new facility were built with vertical (not sloping) sides, birds attempting to drink from the lagoons fall into the sludge and drown. It is estimated that hundreds of birds of prey succumb to this trap every year.

Much of the natural habitat in the vicinity of the city has vanished in recent years. Over 50% of the mudflats in the Bay of Suez have been filled and claimed for the purpose of urban expansion. Reed-swamps, formerly found to the north of the city, have been drained and built on. Although hunting is not widespread, the potential damage done by a single hunter could be enormous.

High-tension powerlines are numerous in the Suez region and pose a serious threat to flying birds. An exceptionally hazardous powerline was erected in 1998, suspended about 250 m over the Suez Canal some 15 km north of Suez. This powerline stands immediately in the flight path of the majority of soaring migrants concentrated at Suez, and could have a devastating impact on these birds, especially during unusual weather conditions, such as sand-storms, which occur in the spring.

### ■ Further reading

Bijlsma (1983), Wimpfheimer *et al.* (1983).

## Gebel El Zeit

Admin region Red Sea

Coordinates 27°51'N 33°30'E

Area 100,000 ha Altitude 0–457 m

EG031

A1, A4iv  
Unprotected

### ■ Site description

This site consists of a narrow, 100-km-long strip extending along the Gulf of Suez/Red Sea coast, from Ras Gharib in the north to the bay of Ghubbet El Gemsa in the south. Gebel El Zeit itself is an isolated, elongate mountain that reaches up to 457 m and overlooks the southern end of the Gulf of Suez. The eastern flank of the mountain falls steeply to the sea, while the western flank slopes more gently and merges with a 20-km-wide plain that separates Gebel El Zeit from the rest of the Red Sea hills further west. To the north there is a wide coastal plain fringed near the shore by several areas of sabkha, the largest of which is Sabkhet Ras Shukheir. This contains several pools of hyper-saline water and large patches of saltmarsh. To the south are Ghubbet El Zeit and Ghubbet El Gemsa, two large shallow bays with extensive intertidal mud and sandflats. Numerous small wadis drain the mountains of the area and dissect adjacent plains. These are lined with scattered *Acacia* trees.

### ■ Birds

See Box for key species. The Gebel El Zeit area is a very important migration corridor for soaring migrants, particularly birds of prey and storks. Because of the geography of the Gulf of Suez as a whole and the micro-geographic configuration of the Gebel El Zeit area, which is the narrowest point in the southern part of the Gulf of Suez, over 250,000 *Ciconia ciconia* and many other migrant soaring birds are funnelled through this stretch of coast on both spring and autumn journeys. Birds of prey, storks and pelicans migrate through and usually land, rest or roost near the coastline and on the surrounding desert plains and hills. Resting and roosting storks, especially, utilize the two bays of Ghubbet El Zeit and Ghubbet El Gemsa and the saltmarsh at Sabkhet Ras Shukheir.

Gebel El Zeit itself serves as a stepping-stone for birds that make the crossing between the western coast of the Gulf of Suez and south Sinai in spring. Many of the birds observed at Elat, and further north in Israel, most probably pass through this area. For example, c.16,000 birds of prey belonging to 18 species and 20,000 *Ciconia ciconia* were counted in two weeks of observations spread over three spring seasons. The most numerous birds of prey are *Aquila nipalensis*, *Buteo buteo*, *Pernis apivorus* and *Accipiter brevipes*.

In autumn the area is especially critical as many birds, after crossing the Gulf of Suez, arrive tired, flying at low altitudes and often land in large numbers. Almost all of the vast numbers of *Ciconia ciconia* that migrate over South Sinai in the autumn (most of the world population) pass through the Gebel El Zeit area. A one-day count on 7 September 1998 produced a total of 56,000 *Ciconia ciconia*. Up to 100,000 birds cross the Gulf of Suez in this region in a single day. *Ciconia nigra*, *Pelecanus onocrotalus* and many species of birds of prey also pass through the area in huge numbers.

Moderate numbers of waterbirds utilize Ghubbet El Zeit and Ghubbet El Gemsa, particularly during migration. Some of the large flocks of ducks seen migrating far offshore, during spring and autumn, rest on the sheltered waters of these bays. Also, large numbers of seabirds from breeding colonies on neighbouring islands feed regularly in the sea off Gebel Zeit.

#### Key species

A1	<i>Aquila heliaca</i>	<i>Falco naumanni</i>
	<i>Circus macrourus</i>	<i>Larus leucophthalmus</i>
A4iv	More than 20,000 migrants regularly pass during migration.	

### ■ Other threatened/endemic wildlife

Marine: There are seven species of sea grass in the bay of Ghubbet El Zeit forming one of the most diverse and extensive sea-grass beds in the northern Red Sea. These beds are potential feeding grounds for *Dugong dugon* (VU) and endangered marine turtles.

### ■ Conservation issues

Sabkhet Ras Shukheir has been proposed for protection. Oil pollution from onshore and offshore oil facilities, as well as from passing vessels,

is one of the most serious threats to birds in this area. The uncoordinated tourist developments spreading north from Hurghada are rapidly consuming all natural habitats and are threatening to completely alter the landscape of the region in the near future. Associated pollution and man-made obstacles (such as powerlines, windmills, airports, etc.), could pose unforeseen threats to vast numbers of migrant birds. Development in this region should be carried out with very careful consideration of migratory bird requirements.

Falcon-catching is an illegal activity that has expanded in recent years in Egypt, especially along the coast of Gulf of Suez and the rest of the Red Sea. This activity is carried out in the autumn.

#### Further reading

Celmins (1998), Goodman and Meininger (1989), Grieve (1996).

### El Qa plain

Admin region South Sinai

Coordinates 28°10'N 33°40'E

Area 200,000 ha Altitude 0–100 m

EG032

A1, A4iv  
Unprotected

#### Site description

The site is a wide plain that flanks the South Sinai mountain massif on the west and separates it from the Gulf of Suez. It is elongate, with a north-west to south-east axis, being more than 100 km long and 20 km wide. The IBA is mostly concerned with the coastal portion of the plain, and extends from Wadi Feiran in the north to Ras Mohammed in the south, where migratory birds tend to concentrate and often land in vast numbers. The plain is dissected by many wadis that flow from the mountains of Sinai into the Gulf of Suez. To the north of El Tor a narrow mountain range separates the plain from the Gulf of Suez. This mountain, immediately overlooking the Gulf, is thought to be a very important departure point for many of the soaring birds that attempt to cross the Gulf of Suez in autumn. Sparse scrub vegetation and scattered *Acacia* trees cover sizeable sections of the plain. The town of El Tor is located within the area of concern and is the only major human settlement in the region.

#### Birds

See Box for key species. This IBA has a similar role and importance to migratory soaring birds as that of Gebel El Zeit (IBA EG031). The area is a major corridor for hundreds of thousands of migratory soaring birds in both autumn and spring. Almost 70% of *Ciconia ciconia* counted at Ras Mohammed in autumn 1998 actually make the crossing over the Gulf of Suez further north towards the town of El Tor. In a study of bird migration across the Middle East, all *Ciconia ciconia*, monitored by means of satellite transmitters, were observed to make the critical crossing of the Gulf of Suez over the El Qa Plain. The area probably holds one of the largest remaining breeding populations of *Chlamydotis undulata macqueenii* in Egypt.

#### Key species

A1	<i>Aquila heliaca</i>	<i>Falco naumanni</i>
	<i>Circus macrourus</i>	
A4iv	More than 20,000 migrants regularly pass during migration.	

#### Other threatened/endemic wildlife

Mammals: *Gazella dorcas* (VU) is present in small numbers, probably representing the largest remaining population in Sinai.

#### Conservation issues

Development, especially for tourism, is planned for the coastline along the El Qa plain and could cause disturbance and pose a threat to migrating birds. Of most concern is the construction of powerlines near the coast, which could lead to avian collisions, especially in the spring when birds tend to fly at low altitudes as they come ashore after crossing the Gulf of Suez.

#### Further reading

Celmins and Baha el Din (in prep.).

### Ras Mohammed National Park

Admin region South Sinai

Coordinates 27°44'N 34°15'E

Area 48,000 ha Altitude 0–73 m

EG033

A1, A4iv  
National Park

#### Site description

Ras Mohammed is a headland at the southernmost tip of the Sinai Peninsula, overlooking the juncture of the Gulfs of Suez and Aqaba. It is composed of uplifted coral reefs, which in places rise steeply from the sea forming high cliffs. These are interspersed with sandy bays and some intertidal flats. A stand of mangrove *Avicennia* is found at the southern end of Ras Mohammed. Coral reefs fringe the headland in almost all directions. Although Ras Mohammed is primarily a marine park, its boundaries encompass a considerable diversity of desert habitats, including sandstone mountains, gravel-plains, wadis, and sand-dunes.

#### Birds

See Box for key species. Ras Mohammed's primary importance is as a bottleneck for migratory soaring birds, which concentrate in the area in large numbers and regularly stop to rest. *Ciconia ciconia* is the most numerous and prominent soaring bird occurring at Ras Mohammed. In autumn, birds of this species tend to concentrate in southern Sinai, where huge flocks build up at Ras Mohammed. A total of 275,743 individuals was counted over 27 days in August and September 1998, but the actual number of birds passing through was estimated to be 390,000–470,000. Many of the birds congregating in the area descend to rest on the sandy beaches, particularly on the western side of the peninsula, overlooking the Gulf of Suez. Smaller numbers also rest on higher ground in the surrounding desert. An estimated daily average of 12,000 birds rests at Ras Mohammed during peak autumn migration. After resting for some hours, the birds attempt to make the crossing to the western side of the Gulf of Suez. However, it appears that most of the birds seen at Ras Mohammed cross the Gulf further north near El Tor. Other prominent migrants concentrating at Ras Mohammed regularly include *Pelecanus onocrotalus*, *Ciconia nigra*, *Milvus migrans*, *Buteo buteo* and *Accipiter brevipes*. Spring migration is much less pronounced and no significant concentrations have been noted. Notable breeding species include *Egretta gularis*, *Falco concolor*, *Pandion haliaetus* and *Charadrius alexandrinus*.

#### Key species

A1	<i>Aquila heliaca</i>	<i>Falco naumanni</i>
	<i>Circus macrourus</i>	<i>Larus leucophthalmus</i>
A4iv	More than 20,000 migrants regularly pass during migration.	

#### Other threatened/endemic wildlife

Marine life: Ras Mohammed is primarily important for its marine life and unique coral reefs that are considered to be some of the most spectacular in the world. Reptiles: both *Chelonia mydas* (EN) and *Eretmochelys imbricata* (CR) occur off Ras Mohammed regularly, and the latter breeds locally.

#### Conservation issues

Ras Mohammed was declared a National Park by Prime Ministerial Decree 1068/1983, adjusted by Prime Ministerial Decree 2035/1996. This is Egypt's oldest protected area. Since 1989, the EEAA, with support from the EU, has been developing the park management and infrastructure, making it the country's most famous and best-managed protectorate. Storks have been colliding with the wires of the communication tower in the park. The main threat to migrating birds is to the east, at Sharm El Sheikh, a rapidly expanding tourism resort along the southern Sinai coast. Garbage, waste-water and green areas are attracting birds from the main migration route to land at Sharm El Sheikh, where they are subject to a variety of man-made threats. Thousands of storks die at Sharm and others may die while migrating further south, from injuries or illness sustained while in the vicinity of this site.

#### Further reading

Celmins (1998), Celmins and Baha el Din (in prep.).

**Ain Sukhna**

Admin region Suez

Coordinates 29°35'N 32°20'E

Area 15,000 ha Altitude 0–1,274 m

**EG034**

A1, A3 (A02), A4iv

Unprotected

**Site description**

Ain Sukhna is a warm, brackish spring located about 50 km south of Suez at the north-eastern foot of Gebel El Galala El Bahariya, overlooking the Gulf of Suez. The name, however, has traditionally been used in reference to a much larger region, roughly encompassing the wide coastal plain wedged between Gebel Ataqa in the north and Gebel El Galala El Bahariya in the south, and including the coastal portion of the latter mountain range. In the immediate vicinity of the spring there is a dense growth of salt-tolerant vegetation, composed primarily of *Juncus*, *Tamarix* and *Nitraria*. To the north and west there is a large sand-and-gravel plain, intersected by several large, shallow wadis with good vegetation cover, dominated by *Hammada* and *Zilla*, with numerous, scattered trees and bushes of *Acacia*, *Tamarix* and *Calotropis*. Gebel El Galala El Bahariya rises abruptly from the shallow waters of the Gulf of Suez, up to 1,274 m. Several small springs and oases are found in the deep wadis that drain the steep coastal (eastern) flanks of the mountain.

**Birds**

See Box and Table 2 for key species. Ain Sukhna is situated along a major flyway for Palearctic migrant birds. Large birds of prey (passive flyers) concentrate in significant numbers, particularly in spring. Most prominent of these are *Milvus migrans*, *Buteo buteo*, *Aquila nipalensis*, *Aquila pomarina*, *Hieraaetus pennatus* and *Neophron percnopterus*. Although no systematic counts have been carried out at Ain Sukhna, numerous single-day counts indicate that well over 100,000 large birds of prey and storks may pass through the area every year. Most birds congregate on the north-eastern ridges of Gebel El Galala El Bahariya to gain altitude before gliding north across flat country. Many birds are attracted to the springs of Ain Sukhna, particularly during the hotter part of the migration season, and fairly large numbers descend to drink and roost in the vicinity. A significant passage of *Grus grus* is also known from the area. These birds regularly roost in large numbers on the wide coastal plain.

The desert habitats of the area support a good diversity of characteristic Sahara–Sindian species. Small numbers of *Larus leucophthalmus* are regularly seen offshore in the Gulf of Suez, particularly in winter. Other prominent waterbirds include *Larus genei*,

*Larus fuscus* and *Larus cachinnans*, all of which are migrants or winter visitors.

**Key species**

A1	<i>Aquila heliaca</i>	<i>Falco naumanni</i>
	<i>Aquila clanga</i>	<i>Larus leucophthalmus</i>
	<i>Circus macrourus</i>	
A3 (A02)	Sahara–Sindian biome: 12 of the 22 species of this biome that occur in Egypt have been recorded at this site; see Table 2.	
A4iv	More than 20,000 migrants regularly pass during migration.	

**Conservation issues**

Oil pollution is perhaps the most serious threat to migrating birds in this area. The Ain Sukhna oil terminal (an offloading and storage facility located in the heart of this site), often causes minor spills in the Gulf of Suez. Oil from the storage facility has also been released onshore on several occasions and has contaminated freshwater pools where birds of prey and other species regularly come to drink and bathe. High-tension powerlines have been erected in the area for some time. Their impact on birds is not well known, but does not appear to be a threat. There are concerns about the construction of new powerlines and other tall structures, depending upon the location. A large cement factory located some 30 km to the north-west of Ain Sukhna has been active for a number of years now and spews out tonnes of dust every day, killing all desert vegetation within a radius of 15 km around the facility. During north-westerly winds (the prevailing wind in the region) visibility at Ain Sukhna deteriorates drastically. The impact of this on the migration of soaring birds is not known. Fast-growing tourist developments, overgrazing, misuse of off-road vehicles, land reclamation, unregulated quarrying and solid-waste dumping are all causing rapid degradation of the natural habitats of the region.

In 1998 a massive development project was launched at Ain Sukhna to establish a shipping port, an airport and a heavy industry zone. The port is nearing completion and a number of factories have been constructed and are operating. This project could jeopardize migratory birds concentrating in this area, if special attention is not paid to ensure that no developments harmful to birds and other wildlife are established. The airport component would pose an exceptionally high risk to both birds and aircraft operating in the airspace over the region. Waste-water and solid waste could attract birds and likewise pose a risk. Careful impact assessment of all development activity in this region is a top priority.

**Further reading**

Baha el Din (1996), Zahran and Willis (1992).

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