

# LEBANON

## INTRODUCTION

**Area:** 10,450 sq.km.

**Population:** 2,701,000 (1990).

The Republic of Lebanon is a small country on the east coast of the Mediterranean Sea, bordered to the north and east by Syria, and to the south by Israel. It is 193 km long and a maximum of 56 km wide, and has a coastline of 225 km. Beirut, the capital, stands midway along the coast.

Lebanon comprises four distinct topographic regions. The narrow Mediterranean coastal plain rises gradually east over a distance of some 30 km to the Jebel Liban (Lebanon Mountain) range. This mountain range extends almost the entire length of the country, and covers more than a third of the area; the highest peaks include Qornet es Saouda at 3,087 m and Harf Sannine at 2,628 m. The arid eastern slopes of the mountains fall abruptly to the fertile Beka'a Valley which has an average elevation of about 900 m. This valley is the source of two rivers, the Asi (Orontes), which flows north into Syria, and the Litani (Leontes), which flows south between the two mountain ranges before turning west and discharging into the Mediterranean north of Sour (Tyre). Further east, the Jebel esh Sharqi (Anti-Lebanon) range rises to peaks at over 2,600 m, and forms the frontier between Lebanon and Syria.

The climate is Mediterranean with hot, dry summers and warm, moist winters. The average annual rainfall at Beirut is 920 mm, falling mostly during the winter months when Mediterranean depressions are frequent. Average temperatures at Beirut range from 13°C in January to 27°C in July. Inland, the Beka'a Valley and the Jebel ash Sharqi range are much drier; winters are cooler than on the coast, with frequent frost and snow. In general, precipitation decreases from west to east, the Beka'a Valley having an average annual rainfall of only about .380 mm.

The western slopes of the Lebanon Mountains, up to about 300 m, support evergreen maquis, with species of *Quercus*, *Ceratonia* and *Pistacia*. Remnants of pine forest (*Pinus halepensis* and *P. brutia*) occur from sea-level to 1,200 m, and the higher slopes were formerly covered with forests of pine *Pinus nigra*, cedar *Cedrus libani* and oak *Quercus calliprinos*, but these have been reduced to less than 5% of their original extent by wars, logging, charcoal production and collection of firewood. Large springs high up in the mountains support widespread cultivation on the slopes. The alluvial plains of the Beka'a Valley, to the east of the Lebanon Mountains, were formerly mostly swamp, but are now extensively cultivated. The Anti-Lebanon range supports *Amygdalus-Pistacia* scrub and fragmented deciduous forest on its western slopes, together with remnants of steppe-coniferous forests with *Abies cilicica*, *Cedrus libani* and *Juniperus excelsa*. Subalpine and alpine plant communities occur above 2,500 m. Overgrazing by sheep and goats and

poor agricultural practices have led to severe degradation of Lebanon's remaining forests, and to widespread deterioration of the soil and vegetation cover generally (Evans, 1994).

Before the outbreak of civil war in 1975, Lebanon was considered one of the most important commercial and financial centres in the Middle East. Industries included oil refining, the manufacture of cement, textiles and chemicals, food processing and service industries. International tourism was well developed. Agriculture, which accounted for about 9% of national income, was centred on the narrow coastal plain and fertile Beka'a Valley, the chief crops being citrus fruits, grapes, bananas, sugar-beet, olives and wheat. Severe civil disorder broke out in 1975, as rival political and religious factions sought to gain control, and the ensuing civil war severely damaged the country's economic infrastructure and dramatically reduced industrial and agricultural production. It is only within the last few years that peace has been restored to the country.

### **Summary of Wetland Situation**

In medieval times, the central part of the Beka'a Valley was occupied by lakes, swamps and seasonally flooded marshes, but during the early part of the 20th century, most of these were drained for agriculture. The once extensive swamps on the coastal plain were also drained at this time, and later planted with eucalyptus plantations. The only large natural wetland which survives in Lebanon is Ammiq Swamp, a tiny remnant of the swamps along the Litani River in the Beka'a Valley. The wetland is unprotected and under threat from drainage schemes and indiscriminate and uncontrolled shooting of migratory birds. The only other significant inland wetlands are man-made lakes, notably Qaraoun Reservoir (1,000 ha), a large storage reservoir on the Litani River which is sufficiently large to attract numbers of migratory waterfowl, and the much smaller Tanayel Lake (6 ha) in the same valley.

The Mediterranean coastline consists mostly of rocky shores and narrow sandy beaches, and there are no significant estuarine systems or other coastal wetlands. There is one group of small offshore islands, the Palm Islands, off the coast of Tripoli in northern Lebanon. These consist of three flat, rocky islands of eroded limestone pavement with a little stunted maquis-type vegetation in gullies. Formerly of considerable importance for breeding seabirds, the islands are now much disturbed by tourists, hunters and fishermen, and no longer support any breeding seabirds.

### **Wetland Research**

Most research in Lebanon has been conducted under the patronage of the National Council for Scientific Research by independent universities or through international organizations. Most of the information available on the two main wetlands, Ammiq Swamp and the Palm Islands, was collected before the outbreak of civil war in 1975. The Faculty of Sciences at the University of the Lebanon conducted some studies of the breeding and migratory birds of Ammiq Swamp in the early 1970s (Tohme & Neuschwander, 1974), and the Palm Islands were investigated with a view to the establishment of a Marine Park (Haber *et al.*, undated; Tohme & Tohme, 1985).

## **Wetland Area Legislation**

Environmental policy and legislation have recently been summarized by IUCN (1992) and Evans (1994). There is no legislation specifically related to wetlands. National parks and protected areas are created in compliance with two legislative decrees, Decree No. 837 1 of December 1961 (Articles 17 and 19) and Decree No. 1631 of April 1984 (Articles 111 and 130), and specific enabling legislation for the establishment and naming of each protected area. Ministry of Agriculture Law 121 of March 1992 was used to declare the Palm Islands Marine Nature Reserve. New bird hunting legislation was ratified in March 1993 (Decree 1/64), banning all hunting in Lebanon between 15 March and 15 September.

At international level, Lebanon is a contracting party to the World Heritage Convention, but has not as yet designated any natural World Heritage Sites. It has also ratified the Convention for the Protection of the Mediterranean Sea against Pollution (the Barcelona Convention), and has adopted the Protocol Concerning Mediterranean Specially Protected Areas. One site, the Palm Islands Marine Reserve, has been designated as a Mediterranean Specially Protected Area in accordance with this Protocol. Lebanon participates in the UNESCO Man and the Biosphere Programme and established a MAB committee in 1990. One site, Bental National Park, has been proposed as a Biosphere Reserve. Lebanon has signed the Biodiversity Convention, but is not a party to either the Ramsar Convention or the Bonn Convention.

## **Wetland Area Administration**

The Ministry of Agriculture and the Ministry of Environment are jointly responsible for the management of protected **areas**. The Society for the Protection of Nature and Natural Resources in the Lebanon (SPNL) is responsible for the management of National Parks in cooperation with the Ministry of Agriculture. The Palm Islands were declared a Marine Nature Reserve in 1992, and are under the jurisdiction of the Ministry of Environment in cooperation with local municipalities and environmental NGOs. The Ministry of Environment, SPNL, IUCN and the United Nations Development Programme (UNDP) are currently collaborating in the development of a Department of Protected Areas and Wildlife within the Ministry of Environment.

## **Organizations involved with Wetlands**

### Ministry of Agriculture

Jointly responsible (with the Ministry of Environment) for the management of protected areas and hunting. The Department of Forests and Natural Resources is responsible for the administration and management of the remaining forests.

### Ministry of Environment

Responsible for environmental issues throughout the country, and jointly responsible (with the Ministry of Agriculture) for the management of protected areas and hunting. The Environmental Protection Committee, through its councillors to the Ministry, has specific interests in environmental protection.

#### National Council for Scientific Research

Oversees scientific research in Lebanon, and undertakes environmental studies including research on fauna, flora and pollution.

#### National Hunting Council

Concerned with hunting and game management in coastal sites, deserts, forests and wetlands, as well as law enforcement.

#### Faculty of Sciences, University of the Lebanon

Has conducted research at Ammiq Swamp and on the Palm Islands

#### Society for the Protection of Nature and Natural Resources in the Lebanon

The principal non-governmental organization concerned with nature conservation in Lebanon. The SPNL was created in 1984 and officially recognized by legislation in 1986. Its main aims include conservation education, environmental planning, and the establishment and subsequent management of a system of national parks and protected areas.

## WETLANDS

Site description for Ammiq Swamp compiled by Assad A. Serhal of the Society for the Protection of Nature and Natural Resources in Lebanon (SPNL); site description for the Palm Islands compiled from the literature, principally Evans (1994).

**Wetland Name:** Ainmiq Swamp

**Country:** Lebanon

**Coordinates:** 33°43'N, 35°46'E

**Location:** In the western Beka'a Valley south of the main Beirut to Damascus highway, 10 km south-southwest of Qabb Elias town and about 35 km southeast of Beirut.

**Area:** 280 ha.

**Altitude:** 865 m.

**Overview:** Ammiq Swamp is the only major swamp in Lebanon. As recently as 1911, the swamp covered most of the central Beka'a Valley, but about 90% of the swamp has since been drained for agriculture. Although unprotected and subject to heavy hunting pressure, the swamp remains important as a staging and wintering area for migratory waterbirds en route between Europe and Africa.

**Physical features:** Ammiq Swamp is situated in the Beka'a Valley, a fertile section of the Rift Valley enriched by eroded soils from the Lebanon Mountains to the west and Anti-Lebanon Mountains to the east. It comprises the remnants of a large area of lakes, swamps and seasonally flooded marshes which formerly covered at least 3,500 ha. The swamp is fed by the El Rhabe stream which rises at a spring under the ruins of Qalaat El Moudiq (965 m) in the foothills of Jebel Barouk in the Lebanon Mountains. It is bordered to the south by the straight-cut, channelized Nahr El Riachi stream (which also rises at Qalaat El Moudiq), and to the north by the Houjier River. The El Rhabe and Nahr El Riachi streams flow into the Houjier River which almost immediately joins the Litani River to the east. The swamp is usually inundated in late December or early January. Snow-melt from the nearby mountains raises the water level in spring, and flooding reaches its maximum in March and April, when most of the fields around the swamp are also flooded, particularly to the northeast near Tell El Akhdar. The water level then falls throughout the summer, and the wetland usually dries up completely between August and November. The surface soil is alluvial, of calcareous origin, and is underlain by water-retaining clay layers through which water flows into the marsh.

The average annual precipitation was about 600-800 mm in the 1940s, but in recent years has averaged only about 400 mm. Snow falls are occasional in winter. Average temperatures range from about 0°C in winter to 30°C in summer.

**Ecological features:** The vegetation is dominated by reed-beds of *Phragmites* sp. and *Typha* sp. interspersed with open fields of coarse pasture. Willows *Salix babylonica*, which colonized the area in the past, had nearly died out by the late 1970s, except for a small number of trees along the roads. Poplars *Populus* sp. and cypress *Cupressus* sp. have been introduced. The surrounding area is under cultivation for cereal crops, potatoes, onions and other vegetables.

**Land tenure:** The swamp is privately owned by the Skaff and Edeh families.

**Conservation measures taken:** None. Ammiq Swamp was identified as a wetland of international importance by Carp (1980), and has been identified as an Important Bird Area by BirdLife International (Evans, 1994).

**Conservation measures proposed:** In the early 1970s, the University of the Lebanon proposed to the owners that the swamp be made into a Nature Reserve with a biological station and tourist facilities, but no action was taken and the proposal was shelved at the outbreak of civil war. The SPNL and sister non-governmental organizations have recently entered into negotiations with the owner concerning the establishment of a Bird Sanctuary at the site.

**Land use:** Although the land is privately owned, access is unrestricted. Local people and visitors from elsewhere in Lebanon use the area for outdoor recreation (*e.g.* picnicking), especially at weekends, and there is a considerable amount of hunting of waterfowl and other birds. As the wetland dries out in summer, domestic livestock, mainly sheep and goats, are allowed to graze on the marsh vegetation. There was some fishing and frog-catching in the marshes in the past. Water is pumped from boreholes to irrigate agricultural land in the surrounding area.

**Possible changes in land use:** Drainage for agricultural purposes (see below).

**Disturbances and threats:** Ammiq Swamp formerly covered most of the central and western Beka'a Valley north to Zahle. Much of the swamp had already been drained by 1970, when a new project was launched, with the assistance of FAO, to drain the remainder for agricultural purposes. Ditches were dug to carry the water to the Litani River to the south, and part of the wetland was destroyed. Drainage operations were halted at the outbreak of civil war in 1975, but it is possible that the project will be revived now that peace has been restored. Water supplies are being diverted for irrigation purposes, and groundwater is being pumped from boreholes at an alarming rate. There is heavy overgrazing of marsh vegetation by sheep and goats during the dry season, and the trees are deliberately burnt off by farmers. Hunting and trapping of birds occur at high levels throughout the year and without restriction as to species. Other problems include the dumping of rubbish and introduction of non-indigenous flora and fauna.

**Hydrological and biophysical values:** No information.

**Social and cultural values:** The wetland is a popular area for outdoor recreation.

**Noteworthy fauna:** Ammiq Swamp was formerly a very important breeding area for waterbirds, and still supported populations of a number of species in the 1970s, including Little Grebe *Tachybaptus ruficollis* (6 pairs), Little Bittern *Ixobrychus minutus*, Marsh Harrier *Circus aeruginosus* (occasional), Water Rail *Rallus aquaticus*, Moorhen *Gallinula chioropus* (10 pairs) and various marsh-dwelling passerines such as Savi's Warbler *Locustella luscinioides*, Moustached Warbler *Acrocephalus malanopogon*, Reed Warbler *A. scirpaceus* and Great Reed Warbler *A. arundinaceus* (Carp, 1980; Evans, 1994). Ferruginous Ducks *Aythya nyroca* may have bred in 1974, as one or two birds were present in June. No recent information is available on the breeding birds.

The Beka'a Valley lies on one of the main bird migration routes through the Middle East, and in former times the extensive swamps were of great importance as a staging and wintering area for migratory waterbirds on their way between breeding areas in Europe and West Asia and wintering areas in Africa. The swamp remains important for waterbirds during the migration seasons, and also supports substantial numbers of wintering waterfowl, especially in late winter when the water level is high and the fields

around the swamp are flooded. In the 1970s, regular wintering species included Great Bittern *Botaurus stellaris*, Little Egret *Egretta garzetta*, Great Egret *Casmerodius albus*, Grey Heron *Ardea cinerea*, Common Teal *Antis crecca*, Hen Harrier *Circus cyaneus*, Eurasian Coot *Fulica atra*, Northern Lapwing *Vanellus vanellus*, Common Snipe Gallinago gallinago, Jack Snipe *Lymnocyptes minimus* and Common Kingfisher *Alcedo atthis*. A Pygmy Cormorant *Phalacrocorax pygmaeus* was present in November 1954, and a Purple Swamphen *Porphyrio porphyrio* was recorded in February 1977. Regular passage migrants included Black-crowned Night Heron *Nycticorax nycticorax*, Squacco Heron *Ardeola ralloides*, Purple Heron *Ardea purpurea*, Black Stork *Ciconia nigra* (up to 7 in May), Pintail *Anas acuta*, Shoveler *A. clypeata*, Garganey *A. querquedula* (common), Spotted Crake *Porzana porzana*, Little Crake *P. parva*, Corncrake *Crex crex*, Great Snipe *Gallinago media*, Green Sandpiper *Tringa ochropus*, Wood Sandpiper *T. glareola* and Ruff *Philomachus pugnax*. Due to the swamp's position on the Rift Valley migration route, large numbers of White Pelicans *Pelecanus onocrotalus*, White Storks *Ciconia ciconia* and birds of prey pass overhead in spring and autumn.

Mammals which are still known to occur in the area include Common Vole *Microtus arvalis*, Jackal *Canis aureus*, Red Fox *Vulpes vulpes*, Wild Boar *Sus scrofa* and Common Hare *Lepus capensis*, but the Common Otter *Lutra lutra*, which once occurred in the swamp, is now locally extinct. Reptiles and amphibians include a soft-shelled turtle *Tryonix* sp., Whip Snake *Coluber gemonensis*, Grass Snake *Natrix natrix*, Common Tree Frog *Hyla arborea*, Fire-bellied Toad *Bombina* sp., Painted Frog *Discoglossus* sp. and Marsh Frog *Rana ridibunda*. Fish include *Phoxinellus libanicus* and *Cobitis* sp. Molluscs are abundant, notably *Melanopsis* sp., *Limnaea* spp., *Bithynia tentaculata*, *Neritina fluviatilis* and *Planorbis* sp.

**Noteworthy flora:** The wetland still supports a diverse aquatic plant community, now rare in this part of the Middle East.

**Scientific research and facilities:** In 1973, a team from the Faculty of Sciences at the University of the Lebanon initiated long-term studies on the breeding and migratory birds of the area (Tohme & Neuschwander, 1974), but these studies were interrupted by the outbreak of civil war in 1975.

**Conservation education:** In recent years, the SPNL and other NGOs have conducted field trips to the swamp with members of school Environment Clubs.

**Recreation and tourism:** The swamp is a popular area for outdoor recreation, especially at weekends.

**Management authority and jurisdiction:** The owner, Mr George Skaff (a Member of Parliament) has control over management; the Ministry of Environment has legal jurisdiction.

**References:** Carp (1980); Evans (1994); Kumerloeve (1962); Macfarlane (1978); Tohme & Neuschwander (1974); Vere Benson (1970).

**Reasons for inclusion:** 1d, 2b & 3b. The only significant freshwater swamp between the deltas of southern Turkey and Huleh Swamp in Israel; an important staging and wintering area for migratory waterbirds.

**Source:** Assad A. Serhal.

**Wetland Name:** Palm Islands

**Country:** Lebanon

**Coordinates:** 34°30'N, 35°46'E

**Location:** 13 km offshore, northwest of Tripoli, North Lebanon.

**Area:** c.500 ha.

**Altitude:** Sea level to 6 m.

**Overview:** A group of three small limestone islands (Palm, Ramkin and Sanani) 13 km offshore in the eastern Mediterranean; formerly of considerable importance for breeding seabirds including the globally threatened *Larus audouinii*, but now much disturbed by tourists, hunters and fishermen.

**Physical and ecological features:** The Palm Islands (Iles des Lapins) are a group of three flat, rocky islands of eroded limestone pavement rising to 6 m above sea level. Palm Island (Jazirat al-Nakhl or Ile du Palmier), covering about 20 ha, is the largest, and has a sand beach on its north and east sides and a central depression where rainwater accumulates in winter. There are also some small ponds, boggy areas and stands of reeds *Phragmites* sp. Stunted maquis-type vegetation occurs in clefts in the limestone, but otherwise the islands are relatively bare except in spring when they become carpeted in flowers. Parts of the islands are flooded with seawater during storms. There is a freshwater well on Palm island, as well as some half-built concrete buildings and ancient ruins.

**Land tenure:** State owned.

**Conservation measures taken:** The Palm Islands were declared a Marine Nature Reserve in March 1992 (Ministry of Agriculture Law 121), and the reserve has recently been designated as a Mediterranean Specially Protected Area under the Barcelona Convention. The islands were identified as a wetland of international importance by Carp (1980), and have been identified as an Important Bird Area by BirdLife International (Evans, 1994).

**Conservation measures proposed:** None known.

**Land use:** The islands are commonly visited by picnickers, tourists, hunters, school parties and fishermen. There is a lighthouse on Ramkin Island.

**Possible changes in land use:** There was a proposal in the early 1970s to make use of the half-built concrete buildings on Palm Island to develop the islands for tourism.

**Disturbances and threats:** Although declared a Marine Nature Reserve in March 1992, the law is not enforced. Critical problems include extremely high levels of disturbance to breeding birds by all visitors, direct persecution of birds by large numbers of illegal hunters, and (formerly) collection of the eggs and young of nesting seabirds for human consumption. Dynamite fishing has been frequent offshore in the last decade, and oil and garbage pollution from Tripoli are problems. Some exotic species of fauna and flora have been introduced onto the islands.

**Hydrological and biophysical values:** No information.

**Social and cultural values:** The islands are popular for outdoor recreation, and there are some ruins of archaeological interest.

**Noteworthy fauna:** In the 1890s, the Palm Islands supported large breeding colonies of Common Tern *Sterna hirundo* and Little Tern *S. albifrons*, and smaller numbers of Audouin's Gull *Larus audouinii* (15 pairs), Yellow-legged Gull *L. cachinnans* and Lesser Crested Tern *Sterna bengalensis* (at least two pairs). However, by 1956, the terns and *L.*

*audouinii* had disappeared, almost certainly because of the high levels of human disturbance and persecution by hunters and egg-collectors, and only 80-90 pairs of *L. cachinnans* were still breeding on the islands. By 1975, the population of *L. cachinnans* had declined to about 15 pairs, and in April 1993, no birds were present. The globally threatened *L. audouinii* was occasionally seen around the islands until at least the early 1970s (e.g. 18 adults present in April 1973), but there have been no records since then. Because of their location, the islands attract a wide variety of birds during the migration seasons, although mostly in small numbers; over 300 species of migrants had been recorded on the islands by 1974 (Evans, 1994).

The globally threatened Monk Seal *Monachus monachus* is known to have occurred in the area in the past, and perhaps as recently as the 1960s. There are old records of Green Turtles *Chelonia mydas* and Loggerheads *Caretta caretta* nesting on the sandy beaches.

**Noteworthy flora:** Some of the wild flowers occurring on the islands are nationally endangered or extinct along the mainland coast, or otherwise unusual, e.g. *Euphorbia pithyusa* and *Cressa cretica*.

**Scientific research and facilities:** The avifauna of the islands was studied in the 1970s, but little information has become available since then. The islands would be an excellent site for an observatory for monitoring the large, visible migration of waterbirds along the coast, and for the observation and ringing of passerine migrants.

**Conservation education:** None known.

**Recreation and tourism:** Uncontrolled outdoor recreation on and around the islands has seriously compromised the nature conservation values of the site. Any future developments would have to be undertaken with strict regard for the requirements of the native fauna and flora, especially the breeding seabirds, if the islands are to be restored to anything like their former state.

**Management authority and jurisdiction:** Ministry of Environment in cooperation with local municipalities and environmental NGOs.

**References:** Baccar (1977); Carp (1980); Evans (1994); Haber *et al.* (undated); Kumerloeve (1962); Tohme & Tohme (1985); Tohme & Neuschwander (1974).

**Reasons for inclusion:** 1a; formerly 2a, 2b and possibly 3c. One of the few groups of small offshore islands near the eastern end of the Mediterranean Sea; formerly important for breeding seabirds, notably *Larus audouinii* and *Sterna bengalensis*.

**Source:** See references.

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