

Iraq (Republic of) (Irak)

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Location and area

Iraq is a republic in the Middle East, bordered on the north by Turkey, on the east by Iran, on the south by Saudi Arabia, Kuwait, and the Persian Gulf, and on the west by Jordan and Syria. Iraq has a total area of 437,072 km². The country's greatest axis, running from the Turkish border to the shores of the Gulf, is almost 1,000 km. (Scott 1995, Microsoft Encarta Encyclopedia 2002).

Topography

There are four major areas within Iraq:

- The mountain region with the high Zagros Mountains in the extreme northeast. Elevations range from 900 to 3,607 m at Jabal Ibrahim, the highest point in Iraq.
- The upper plains and foothills region, a steppic sub-montane belt that forms a transitional area between the highland areas and the desert plains.
- The great alluvial plains of the Tigris and Euphrates Rivers in central and southern Iraq, the ancient Mesopotamia, that comprise about 25% of Iraq's surface area. The whole area is extremely flat and for a large part regularly inundated. The triangle Basrah-Amara-Nasiriya in the southeast was in former times during the flood season one expanse of continuous marshland, while in the dry season there remained numerous large permanent lakes and extensive reed beds inter-connected by an intricate network of channels. In recent years, seasonal flooding has decreased substantially because of intensive water regulation by dams upstream on the Tigris and Euphrates and especially on the Euphrates in Turkey and Syria.
- The desert plateau region largely to the west of the Euphrates, that covers more than half of the country: on the southern border with Saudi Arabia is the Shamiya Desert; on the west, part of the Syrian Desert. Conditions grade from semi-desert (the upper Jazirah, especially the area between the Tigris and Euphrates in the north) to a more typical sandy desert in the far south and west. (Scott 1995, Microsoft Encarta Encyclopedia 2002).

Climate

Most of Iraq has a continental climate: the summers are long, hot, and dry and the winters short, and relatively cool and wet. Daily temperatures range between 20 and 40° C in summer, and between 5 and 15° C in winter. The average annual rainfall ranges from about 100 mm in the south to 300 mm on the upper plains and 1,000 mm in the mountains. The mountainous northeastern area has cool summers and cold, often snowy, winters. The Syrian Desert receives little or no precipitation (Scott 1995, Microsoft Encarta Encyclopedia 2002).

Water

Two great rivers, the Tigris and the Euphrates, both of which rise in the eastern mountains of Turkey and enter Iraq along its northwestern borders, traverse Iraq. After flowing for some 1,200 km through Iraq, these two rivers converge at Karmat Al, just north of Basrah, to form the tidal Shatt Al Arab waterway, which flows some 110 km to enter the Gulf. The Euphrates does not receive any tributaries within Iraq, while the Tigris receives four main tributaries, the

Khabour, Great Zab, Little Zab and Diyala, which rise in the mountains of eastern Turkey and northwestern Iran.

Wetlands

The wetlands in the middle and lower basin of the Tigris and Euphrates Rivers in Iraq were, until recently, the most extensive wetlands in the Middle East. The Mesopotamian Marshes in their lower courses comprised a complex of inter-connected shallow freshwater lakes, marshes, and seasonally inundated floodplains of 15,000 km². The largest wetlands within this complex are:

- the Haur Al Hammar and its associated marshes (3,500 km²) south of the Euphrates;
- the Central Marshes (3,000 km²), a vast complex of permanent lakes and marshes north of the Euphrates and west of the Tigris; and
- Haur Al Hawizeh and its associated marshes (2,200 km²) extending east from the Tigris into neighbouring Iran. These wetlands eventually drain southeastwards into the Gulf via the Shatt Al Arab waterway.

Other important natural wetlands in central Iraq include two large brackish to saline lakes, Shari Lake to the east of the Tigris north of Samarra, and Haur Al Shubaicha on the plains to the east of the Tigris southeast of Baghdad. A smaller saline lake, Sawa Lake, in the desert about 25 km west of Samawa, is fed by underground seepage from as far north as Razazah, and has no surface outlet.

All other large wetlands in central and northern Iraq are either man-made water storage reservoirs or wetlands, which have been extensively modified by man for flood relief or agricultural purposes.

The great bulk of the information available on the fauna, flora and ecology of the wetlands of Iraq was obtained prior to the onset of the Iran/Iraq war in 1980, when large areas of wetland, especially in Mesopotamia, remained more or less intact.

Peatlands

Markov et al. (1988) report the presence of “peatlands” along rivers like the Tigris and the Euphrates. According to Buringh (1969) the Marsh Region (> 35,000 km²) consists of extensive shallow marshes covered with reeds in which the groundwater is near or above the land surface. In the non-cultivated semi-marsh areas, a considerable amount of organic material, up to 25 cm thick, is left behind when flooding recedes. A common practise is (was?) to burn the organic matter in order to get better grazing land. Therefore there is no uniform deep peaty layer over large areas. Furthermore peaty layers have been and are covered by clastic deposits resulting from erosion. The drainage of marshes is old established in Iraq, some marshes were drained and reclaimed already in **Archeamenian** times and some organic material has been formed on top of the very wet soils.

According to Buringh (1960) 7,130 km² of Iraq consist of “marsh soils”, being hydromorphic, organic soils consisting of fluvial sediments “often with organic cover”. Furthermore small peatlands might be (have been) present in the northern and north-eastern uplands and mountains where a more humid climate (with up to 1000 mm annual precipitation) prevails, as Buringh (1960) observed hydromorphic soils in a few depressional areas and small valley bottoms in that area.

According to the interpreted World Soil Map (Van Engelen & Huting 2002) no histosols exist in Iraq and 75 km² of gley soils.

On the basis of data presented by Scott (1995) the following areas may partly consist of peatlands:

The **Haweija Marshes** (35° 15' N, 43° 55' E), a complex of marshes and lakes in the valley of the Little Zab River, about 50 km west-southwest of Kirkuk, Al Ta'mim Governorate. No recent information is available. It is likely, however, that much of the wetland has now been drained for agriculture.

The **Baquba Wetlands** (33° 55' N, 44° 50' E, c. 2,000 ha), the remnants of a once extensive complex of freshwater lakes and marshes in the Diyala Valley about 10-20 km north-northeast of Baquba and 70 km north-northeast of Baghdad, Diyala Governorate. The wetlands in the Baquba area formerly comprised a complex of shallow, freshwater lakes with extensive marshes and some dense reed-beds. The lakes were still in excellent condition until the late 1960s, but by the end of 1972, only one of them, Abu Abbas (500- 1,000 ha), remained more or less intact. The others have been largely or completely drained for agriculture (Koning & Dijkzen, 1973). The current status of the wetlands is unknown.

The **Wetlands of Lower Mesopotamia** (29° 55'-32° 45' N, 45° 25'-48°30' E; 1,500,000 - 2,000,000 ha) along the lower courses of the Tigris and Euphrates Rivers, from the region of Kut and Samawa in the west to the region of Basrah in the southeast. In Al Basrah, Al Muthanna, Dhi Qar, Maysan and Wasit Governorates.

In their lower courses, the Tigris and Euphrates rivers create a complex of interconnected, shallow, freshwater lakes, marshes and seasonally inundated floodplains extending from within 150 km of Baghdad in the northwest to the region of Basrah in the southeast.

Potential peatlands in the area include:

- Permanent freshwater lakes with a rich submergent growth of aquatic vegetation, and typically with a marginal zone of floating aquatic vegetation.

- Permanent freshwater marshes dominated by tall stands of *Phragmites*, *Typha* and *Cyperus*. An account of the vegetation of the marshes of southern Iraq has been published in Arabic by the University of Basrah (Akbar 1985). Throughout the wetlands, the emergent vegetation is dominated by *Phragmites australis*, *Typha angustifolia*, *Cyperus papyrus* and occasionally *Arundo donax*. *Scirpus brachyceras* dominates in temporarily flooded areas (Thesiger 1954). The deeper, permanent lakes support a rich submerged aquatic vegetation with *Ceratophyllum demersum*, *Vallisneria spiralis*, *Potamogeton lucens* and *P. pectinatus*, *Myriophyllum* sp., *Chara* sp., *Najas marina* and *N. armata*, and *Salvinia* sp. *Nymphoides peltata*, *N. indica*, *Nymphaea caerulea*, *Nuphar* sp., *Pistia stratiotes*, and *Lemna gibba* cover the surface of the smaller lakes and quieter backwaters.

BirdLife International has identified the Mesopotamian marshes of Iraq as an "Endemic Bird Area," *i.e.* an important concentration of bird biodiversity where habitat destruction would cause disproportionately large numbers of species extinctions (ICBP, 1992). The marshes qualify as one of only 221 Endemic Bird Areas in the world, and one of only 11 which are wholly or largely nonmarine wetlands, because they support almost the entire world population of two species, the Basrah Reed Warbler (*Acrocephalus griseldis*) and Iraq Babbler (*Turdoides altirostris*).

Within the marshes, the principal activities are buffalo rearing, fishing, hunting, rice cultivation, and mat-weaving. Fishing occurs throughout the wetlands, and accounts for over 60% of the inland fish catch in Iraq. Waterfowl hunting is also very important in the local economy, with enormous numbers of waterfowl being harvested on a commercial basis each year, and providing a livelihood for hundreds of people (Alnoori 1976, Salim 1962, Al-Robaee **in press**). Reeds are used in the construction of floating islands for villages and, when woven, provide pliable coverings used in housing, fencing and packaging. Reeds are also harvested commercially to provide pulp for a paper factory near Basrah.

The wetlands of Mesopotamia are sufficiently large and have been isolated from other comparable wetland areas for a sufficient length of time to allow for the evolution of several forms of animals, which are unique to these wetlands. These include two species of mammals (*Erythronesokia bunnii* and *Gerbillus mesopotamiae*), one subspecies of mammal (*Lutra perspicillata maxwelli*), two species of birds (*Turdoides altirostris* and *Acrocephalus griseldis*), two subspecies of birds (*Tachybaptus ruficollis iraquensis* and *Anhinga rufa chantrei*), and several species and subspecies of fish, notably *Barbus sharpeyi*, *Leuciscus cephalus orientalis*, *Caecocypris basimi* and *Typhlogarra widdowsoni*. Lions (*Panthera leo*) survived in riverine thickets of the marshlands into the 20th century, but were finally exterminated when the Marsh Arabs acquired modern rifles during the First World War. The Leopard (*Panthera pardus*) is likewise extinct in lower Mesopotamia; there is only one record from the marshlands - an individual shot in 1945 just above Kut by the River Tigris. Large mammals which are still regularly encountered in the marshes include the Asiatic Jackal (*Canis aureus*), Red Fox (*Vulpes vulpes*) and Small Indian Mongoose (*Herpestes auropunctatus*). Various other mammals, notably Grey Wolf (*Canis lupus*), Honey Badger (*Mellivora capensis*), Striped Hyaena (*Hyaena hyaena*), Jungle Cat (*Felis chaus*), Goitred Gazelle (*Gazella subgutturosa*) and Indian Crested Porcupine (*Hystrix indica*), have been recorded in and around the marshes in the past, but all had become rare by the 1980s, and it is thought likely that most are now extinct in the area. Small mammals recorded in and around the marshes include a recently (1980) described and probably endemic species of bandicoot rat *Erythronesokia bunnii* and an endemic species of gerbil *Gerbillus mesopotamicus*. *G. mesopotamiae* is known only from the vicinity of wetlands in lower Mesopotamia and adjacent Khuzestan in southwestern Iran.

Of the 278 species of birds which have been recorded in lower Mesopotamia, 134 are species which are to some extent dependent on the wetland habitats and occur in Mesopotamia in significant numbers. Two of these species, the Iraq Babbler *Turdoides altirostris* and Basrah Reed Warbler *Acrocephalus griseldis*, are known to breed only in this area. The populations of two species of waterfowl, almost confined to the wetlands of Lower Mesopotamia, have been described as distinct subspecies: the Little Grebe *Tachybaptus ruficollis iraquensis*, a common and widespread breeding bird in the wetlands of southern Iraq, and African Darter *Anhinga rufa chantrei*, now confined to the marshes of Lower Mesopotamia and is probably close to extinction, if not already extinct.

Eleven species of birds listed in the 1994 IUCN Red List of Threatened Animals (Groombridge, 1993) have occurred in the marshes of lower Mesopotamia, including *Pelecanus crispus*, *Phalacrocorax pygmaeus*, *Anser erythropus*, *Marmaronetta angustirostris*, *Oxyura leucocephala*, *Haliaeetus leucoryphus*, *H. albicilla*, *Aquila heliaca*, *Vanellus gregarius*, and *Numenius tenuirostris*. The lakes and marshes of lower Mesopotamia are one of the most important wintering areas for migratory waterfowl in western Eurasia. No accurate estimate will ever be available for the number of waterfowl which once wintered in the Mesopotamian marshlands. It seems likely, however, that the waterfowl populations must have numbered in the many millions. In a recent analysis, Scott and Evans (1993) concluded that in the 1970s, and perhaps even more recently, the marshlands of lower Mesopotamia were of international significance for at least 68 species of waterfowl.

Haur Umm Al Baram (32° 32' N, 46° 07' E, 5,000 ha) and **Haur Al Abjiya** (32° 25' N, 46° 03' E, 5,000 ha), two shallow freshwater lakes with extensive marshes on the plains to the south of the Tigris River and east of Shatt Al Gharraf, 20-25 km east and southeast of Kut town, Wasit Governorate.

Haur Al Hachcham and **Haur Maraiba** (32° 05' N, 46° 12' E, 8,000 ha), small haurs largely overgrown with *Phragmites* reeds on the plains to the east of the Shatt Al Gharaf, about 10 km southeast of Hai, Wasit Governorate.

Haur Uwainah (31° 22' N, 46° 25' E; 32,500 ha), a complex of large haurs and associated marshes with extensive reed-beds on the plains to the east of the Shatt Al Gharraf, about 20 km east and southeast of Shatra, Dhi Qar Governorate. Large parts have been drained since 1972.

Haur Sarut (32° 07'-32° 31' N, 46° 46' E), a long narrow haur, largely overgrown with reeds, on the east bank of the Tigris River, east and southeast of the town of Ali Gharbi, Maysan Governorate.

Haur Chubaisah Complex (31° 53' N, 47° 18' E; c.27,500 ha); a group of large haurs with extensive marshes on the plains on the east bank of the Tigris River between Amara and Al Halfaya, about 20 km northeast of Amara, Maysan Governorate.

Haur Al Rayan and Haur Umm Osbah (31° 35' N, 47° 02' E; .25,000 ha), a complex of shallow lagoons and vast reed-beds with areas of sedge marsh, between the villages of Maymund and Salam, about 20 km south-southwest of Amara, Maysan Governorate.

Central Marshes (30° 50'-31° 30'N, 46° 45'-47° 25' E; 300,000 ha) a vast complex of mostly permanent freshwater marshes with scattered areas of open water to the west of the Tigris River and north of the Euphrates River, in a triangle with Qalit Salih at the northern apex, Fuhud in the southwest and Qurna in the southeast. In Maysan, Dhi Qar and Al Basrah Governorates. Almost the entire area is covered in tall reed-beds of *Phragmites* and *Typha*. Almost the entire area has been drained since the mid-1980s as a result of intensive hydrological engineering activity.

Haur Al Hammar (30° 35'-31° 00'N, 46° 25'-47° 45'E; at least 350,000 ha), a vast expanse of shallow open water with reed-beds and reed islands, south of the main channel of the Euphrates River from about 20 km east of Nasiriya in the west to the region of Basrah in the east. In Dhi Qar and Al Basrah Governorates. By January 1975, a large part in the southeast had been cut off from the main wetland by an embankment 10 km long and was being drained (Carp, 1975a & 1975b). By January 1979, much of this area was criss-crossed by a network of embankments constructed by the State Petroleum Company for oil exploration (Scott & Carp, 1982). Over 80,000 ha of marsh at the northeastern end of Haur Al Hammar had been drained by 1985 to facilitate exploitation of the West Qurna oilfield (Evans, 1994). Satellite images reveal that between 1984 and 1991/92 large areas of wetland along the southern shore of Haur Al Hammar and at its extreme eastern end near its outflow into the Shatt Al Arab were drained. The total loss of wetland habitat in the Haur Al Hammar system during this period has been estimated at over 60,000 ha (Maltby, 1994). Intensive hydrological engineering activity throughout Lower Mesopotamia since 1991 has caused further major changes to the system, and it seems likely that very little of the original wetland habitat still remains intact (see general account of wetlands of Lower Mesopotamia).

Suweid Marshes (31° 45' N, 47° 25' E; c.15,000 ha), a large wetland of extensive *Typha* reed-beds with many areas of open water on the Al Kahala (Chahala) River to the east of the Tigris River, 30 km southeast of Amara, Maysan Governorate. Much of this area has been drained and converted into agricultural land (Evans, 1994).

Haur Al Hawizeh (31° 00'-31° 45'N, 47° 25'-47° 50'E; c.220,000 ha), a wetland with extensive *Phragmites* reed-beds alternating with open sheets of water to the east of the Tigris River between Amara and Qurna, extending east to the Iranian border. In Maysan and Al Basrah Governorates. The Haur Al Hawizeh marshes were badly damaged during the Iran/Iraq war (1980-88). Several of the largest battles occurred in and around these marshes, and involved heavy bombing and shelling, extensive burning and the use of chemical weapons. Large areas of reed-bed were cut or burned in the search for rebels after the 1980-88 war and also after the 1990-91 Gulf War. A satellite image taken in August 1992 reveals that large areas of the northwestern, western and southern shores have been drained, using river control and dyke-building, apparently for security reasons. It has been estimated that the total

wetland area was reduced by about 33% during the period 1984/85 to 1991/92 (Maltby, 1994). However, the haur does not appear to have been drastically affected by the recent massive river diversion projects and drainage schemes which have devastated the Central Marshes and Haur Al Hammar, since it receives much of its water from the Karkheh and other rivers rising in Iran. Haur Al Hawizeh was, and probably still is, one of the most important wetlands in Iraq for breeding and wintering waterfowl.

Shatt Al Arab Marshes (31° 00' N, 47° 25' E to 29° 55' N, 48° 30' E); from the confluence of the Tigris and Euphrates at Qurna to the head of the Gulf at Fao, Al Basrah Governorate. The Shatt Al Arab flows for some 165 km from the confluence of the main branches of the Tigris and Euphrates Rivers at Qurna to the head of the Gulf. Along the lower 80 km of its length, the waterway forms the international border between Iraq and the Islamic Republic of Iran. There are some significant marshes on the banks of the waterway, mainly between Qurna and Basrah. (Scott 1995).

Mire and peatland losses

Throughout Iraq, the level of exploitation of wetlands is high. The economy of many of the peoples living in the region has been intimately involved with wetlands for at least 6,000 years. Civilization was well established in Mesopotamia by the 4th millennium BC, and a sophisticated irrigation system developed at that time. In the vast reed-beds of Mesopotamia, marsh-dwelling communities were almost totally dependent on reeds for their construction needs. Large numbers of domestic livestock, particularly water buffalo, graze on wetland vegetation, and aquatic plants were harvested to provide fodder during the winter months. Waterfowl hunting occurred commonly at wetlands throughout Iraq, and in Mesopotamia, large numbers of waterfowl were harvested on a commercial basis, providing a livelihood for hundreds of people (Alnoori, 1976; vant Leven, 1968).

In central and northern Iraq, most of the natural freshwater lakes and marshes have long since been drained for agricultural purposes, although significant remnants still survive in the Haweija (Huweija) Marshes in the Little Zab Valley and around Baquba in the Diyala Valley. The valleys of the Tigris and Euphrates themselves have been extensively modified for agricultural purposes.

The increasing utilization of the waters of the Tigris and Euphrates for irrigation in Turkey, Syria and northern and central Iraq has caused a considerable loss of wetland habitat in lower Mesopotamia during the 20th century. Wetland drainage has been taking place on a large scale since the 1950s and, by the end of the 1980s, had already resulted in the conversion of vast areas of former wetland habitat into agricultural land. As early as 1954, Wilfred Thesiger expressed concern at the future of the marshes and the welfare of their human inhabitants. In an article in the *Journal of the Royal Geographical Society*, he remarked that “in the next few years the marshes will be drained and the marshmen as I have known them will disappear” (Thesiger, 1954).

In the last 20 years, the wetlands of lower Mesopotamia and neighbouring Iran have come under considerable pressure from regional conflicts. Much of the fighting during the prolonged Iran-Iraq War (1980-88) took place in and around the wetlands, and caused considerable damage to the marsh ecosystems. Several of the greatest battles of the war took place in these marshes, and involved extensive burning, heavy bombing and shelling, and widespread use of chemical weapons. Large areas of reed-beds were deliberately destroyed by Iraqi troops during searches for deserters; heavily armoured boats were used to crash through reed-beds, special reedcutting machines were used, and large areas were simply set on fire. Similar methods were used after the 1991 Gulf War to search for anti-government rebels. In other respects, however, the Gulf War seems to have had relatively little impact on the

Mesopotamian marshes. Wetland vegetation in the Khuzestan lowlands of neighbouring southwestern Iran was damaged by acidic “black rain” from the burning oil well-fields in Kuwait, and it seems likely that similar damage occurred in the wetlands around Basrah, only a short distance to the west. The type and magnitude of the damage is not known, but is likely to have been temporary and reversible.

In the summer of 1991, the Iraqi Government embarked upon a massive programme of hydrological control and wetland drainage in Lower Mesopotamia, in an area that is roughly delineated by the triangle of Amara, Nasiriya, and Basrah. Officially, the engineering schemes are designed to reduce salinisation problems, to reclaim new land for food production, and to increase the amount of water available for irrigation. As a result of engineering works, a large part of the Central Marshes has been drained, and it is now uncertain if any water from the Tigris is allowed to enter the marshes. A Landsat satellite image showed that more than one third of the Central Marshes had dried out by August 1992, while later reports indicated that about two-thirds of the marshes were dry by mid-1993. Many commentators now argue that the immediate aim of many of these engineering works has been to drain the marshes for military and political purposes. In any event, there can be no doubt that the greater part of the Central Marshes and much of the Haur Al Hammar marshes have now been drained, with disastrous ecological, social and human consequences for the region.



(source: www.uwmc.uwc.edu/geography/110/marsh_arabs.htm)

Scott and Evans (1993) concluded that drainage of the wetlands of Lower Mesopotamia on this scale would almost certainly result in the global extinction of *Lutra perspicillata maxwelli* and *Erythronesokia bunnii*, the extinction in the Middle East of *Anhinga rufa* and *Threskiornis aethiopicus*, and the extinction in Iraq of *Phalacrocorax pygmaeus* and *Ardea goliath*. Loss of these wetland habitats would also cause catastrophic declines in the world populations of *Turdoides altirostris* and *Acrocephalus griseldis* and in the regional population of *Pelecanus crispus*, possibly threatening them with extinction, and would cause perhaps as much as a 50% reduction in the world populations of *Gerbillus mesopotamiae*, *Tachybaptus ruficollis iraquensis* and *Marmaronetta angustirostris*. Drainage of these wetlands would also

have an adverse effect on the populations of about 40 species of birds which occur in the marshes in internationally significant numbers, and would cause major declines in the regional populations of *Pelecanus onocrotalus* (30-60%), *Ardea purpurea* (>10%), *Ixobrychus minutus* (>10%), *Plegadis falcinellus* (>10%), *Aythya fuligula* (>20%), *Circus aeruginosus* (>10%), *Porphyrio porphyrio* (>50%) and *Fulica atra* (10-20%). Migratory populations of waterfowl would be affected over a very wide area from the West Siberian tundra to southern Africa, as one of the major staging and wintering areas in the West Siberian/Caspian/Nile flyway is lost. Clearly, as far as wildlife is concerned, the ongoing drainage of the wetlands of Lower Mesopotamia constitutes an ecological catastrophe of unprecedented proportions in Western Eurasia.

Lower Mesopotamia is the legendary site of the Garden of Eden, and possesses a number of ruined cities of great antiquity such as Ur and Babylon. Civilization was well established in this region by the 4th millennium BC, and a sophisticated irrigation system developed at that time. The Mesopotamian marshes have provided a home for the Ma'dan or Marsh Arabs for at least five thousand years. Their reed houses are built on artificial islands made from layers of mats, reeds and mud, and, until recently, virtually all of their needs were obtained from the surrounding lakes and marshes. The lifestyle of the Ma'dan has been described in some detail by Thesiger (1954 & 1964), Maxwell (1957), Salim (1962), Young and Wheeler (1976), Spencer (1982), and Young (1989).

The most serious threat to wetlands in Iraq has been the drainage of wetlands and diversion of water supplies for agricultural purposes and for military reasons. Dam-building on the Euphrates in Turkey and Syria and the increasing utilization of the waters of the Tigris and Euphrates for irrigation in upper and middle Iraq have greatly reduced the extent of seasonal flooding in the wetlands of lower Iraq, and facilitated drainage of large areas for cultivation and the exploitation of oil resources. Within the last decennium, major hydrological engineering activities in and around the wetlands of Lower Mesopotamia have resulted in the drying out of vast areas of wetland in the Central Marshes and Haur Al Hammar. According to the then Iraqi Government these hydrological engineering works aimed at increasing agricultural production. Several international analyses have, however, argued that the primary purpose is to control dissidents taking refuge in the marshes. The Marsh Arabs, or Ma'dan, who have existed in the marshes for at least 5,000 years, have been particularly affected by these actions.

No measures have been taken by the Iraqi government to conserve the wetland ecosystems or their fauna and flora, and, in general, the government has given low priority to nature conservation. There is no national conservation strategy in Iraq, and no legal protection has been given to any part of the wetlands. The few conservation laws issued by the government (*e.g.* restrictions on hunting and fishing) exist on paper only and have never been implemented or enforced. At international level, Iraq is a contracting party to the World Heritage Convention, but has not designated any natural World Heritage Sites. There is a National Committee of the UNESCO Man and the Biosphere Programme, but no Biosphere Reserves have been established. Iraq is not a contracting party to the Ramsar, Bonn or Biodiversity Conventions.

There are many "National Parks" in Iraq, but these are mainly state-owned areas for public recreation, with no specific management for wildlife.

A recent environmental and ecological study of the marshlands of Mesopotamia has summarized available information on the faunal, floral, ecological, economic and cultural values of the wetlands, and has examined the changes which have taken place and are likely to take place in the wetlands as a result of engineering and other developments in the

Tigris/Euphrates basin. The study attempts to assess the environmental impact of past, ongoing and proposed developments on the system, and makes a number of recommendations for the conservation of remaining wetland habitats and restoration of degraded areas (Maltby 1994).

The destruction of the wetlands of Lower Mesopotamia continues at an accelerating pace, and their continued survival as one of the finest and most extensive natural wetland ecosystems in western Eurasia is now in grave doubt (Scott 1995). Water diversion through dykes and a drainage canal has decreased the area of marshes by 90% since 1972 (http://news.bbc.co.uk/1/hi/english/sci/tech/newsid_1332000/1332128.stm). Their survival as one of the finest and most extensive natural wetland ecosystems in western Eurasia is now in grave doubt. (Spiers 1999). For this reason, Scott (1995) describes his inventory “more as an historical account of the wetlands of Iraq than as a review of the current status of the wetlands”.

According to the AMAR report “The Iraqi Marshlands: A Human and Environmental Study,” (2002), based on satellite photos spanning over two decades, the marshes have been reduced to 15 percent of what they once were (<http://usinfo.state.gov/regional/nea/iraq/text/0424mrsh.htm>).