The Republic of Iraq

# The Ahwar of Southern Iraq: Refuge of Biodiversity and the Relict Landscape of the Mesopotamian Cities

# The Management Plans of the Ahwar Property

January - 2014

The Ministry of Environment

# "The Ahwar" Marshlands of Southern Iraq

## The Consolidated Management Plan for the Protected Areas of:

- the Huwaizah Marshes
- the Central Marshes
- the East Hammar Marshes
- the West Hammar Marshes

January 2014

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# Section One: Introduction

## 1.1 This document

This document was prepared by the Iraqi Ministry of Environment for the Marshlands of Southern Iraq (the Ahwar) Protected Areas of the Huwaizah Marshes, the Central Marshes, the West Hammar Marshes and the East Hammar Marshes.

This document represents a consolidated and summarized version of the four management plans prepared for the Ahwar Protected Areas with the purpose to be to be presented as part of the World Heritage Nomination Dossier which is anticipated to be submitted to the World Heritage Center in January 2014. The plan incorporates the main structural Protected Areas of the standard Management Plan Document as defined in IUCN's guidelines on management planning best practices.

The four detailed management plans of the four protected areas were developed in Arabic to satisfy the national legal and institutional requirements and facilitate the access and utilization by the national team at the central and local levels. The Management Plan for the Central Marshes was developed and translated to English as a model for the rest of the management plans. The full plans for the rest of the protected areas are being translated to English language and can be made available to the World Heritage Centre soon upon request.

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## 1.2 The Marshlands as a potential World Heritage Site

The Marshlands of Southern Iraq are currently proposed for nomination under the World Heritage Convention as a National Serial Mixed World Heritage Site for culture and nature.

To develop the adequate legal and institutional arrangements for the management of the site, an inter-ministerial National World Heritage Committee was created in late 2013 by the Council of Ministers. It is within this body's mandate to be the highest national authority ensuring the protection, conservation and management at established and potential World Heritage properties in Iraq. The National World Heritage Committee is charged, among others, with periodic reporting to the World Heritage Committee on the state of conservation of the inscribed properties. The Committee, under the auspices of the Minister of Environment, includes representatives from the Ministry of Water Resources, the Ministry of Tourism and Antiquities, and the Ministry of Interior, in addition to several local and national civic society organizations as the primary stakeholders involved in the strategic and day to day management of the site.

The committee is mandated to set the policies, strategies and action plans needed for the implementation of effective management systems in the site and to assure the availability of required financial and human resources needed. Further, it will guide the process of management planning and monitoring of the various indicators set in the management framework.

Therefore, the management framework for the Ahwar provides that guidance will be sought from the National World Heritage Committee to ensure that the protection and management of the site meet World Heritage standards. Furthermore, Directors of Environment, Water Resources and Antiquities at the governorate level will report both to their direct ministerial authority and to National World Heritage Committee on the state of conservation of the Protected Area parts of the site under their jurisdiction.

Upon the foreseen successful submission of the complete nomination dossier, the first assignment of the National World Heritage Committee in 2014 will be to develop and adopt a site-wide strategic management framework with the following aims:

a. Set the overall vision for the management of the site as a World Heritage site.
b. Ensure the effective coordination and cooperation between all parties involved in the management and development of the site.
c. Facilitate the involvement of all key stakeholders, including local communities, in the planning, management and monitoring of the site from environmental, cultural, social and economic perspectives.
d. Coordinate with the international community on the management of the site in terms of funding, joint programming, monitoring and development.
e. Ensure that adequate levels of staffing and financial resources are made available by the government of Iraq to ensure the adequate levels of management under World Heritage standards.

f. Discuss and coordinate the collective national responses against pressures and threats facing the site.
g. Undertake the overall coordination on the recruitment and operational management of human resources allocated by each of the key institutions involved in the site.

## 1.3 Historical Background

Numerous studies have been carried out and theories have been developed to understand and explain the main events, conditions and factors which led to the formation of the Marshlands in southern Iraq. Such investigations address the key physical and climatic factors of earth tectonics, climate change, riverine hydrology, mineral deposition and sea level change. It has been established that factors related to climate change and sea level change have a prime effect on the quantity and quality of waters entering the Marshlands from the main and auxiliary river systems, as well as from sea level changes during different aridity levels.

It is proposed that the Indian Ocean had regressed by around 130m over 18,000 years, during which the Arabian Gulf was totally dry, while the alluvial plain was covered by sand, silt and clay, as well as gypsum, dolomite and palygorskite that indicated riverine, Aeolian and playa deposits under a semi-arid climate.

Around 9,000 years ago during the Early Holocene period, the sea transgressed towards the Al Basrah area. Further, within the alluvial plain, some playas deposited gypsum, dolomite and palygorskite due to high rate of evaporation.

During the Mid-Holocene (7,000 to 6,000 years ago), the transgression of the sea towards land continued to reach the arch between Al Amarah and An Nasiriyah during what is referred to as the 'great flood period'. By then, waters covered the area, hence initiating the formation of the marshlands while depositing sand, silt, clay and minor amounts of dolomite and Mg-calcite, in addition to mollusks and foraminifera, thus forming the Southern Delta of Iraq.

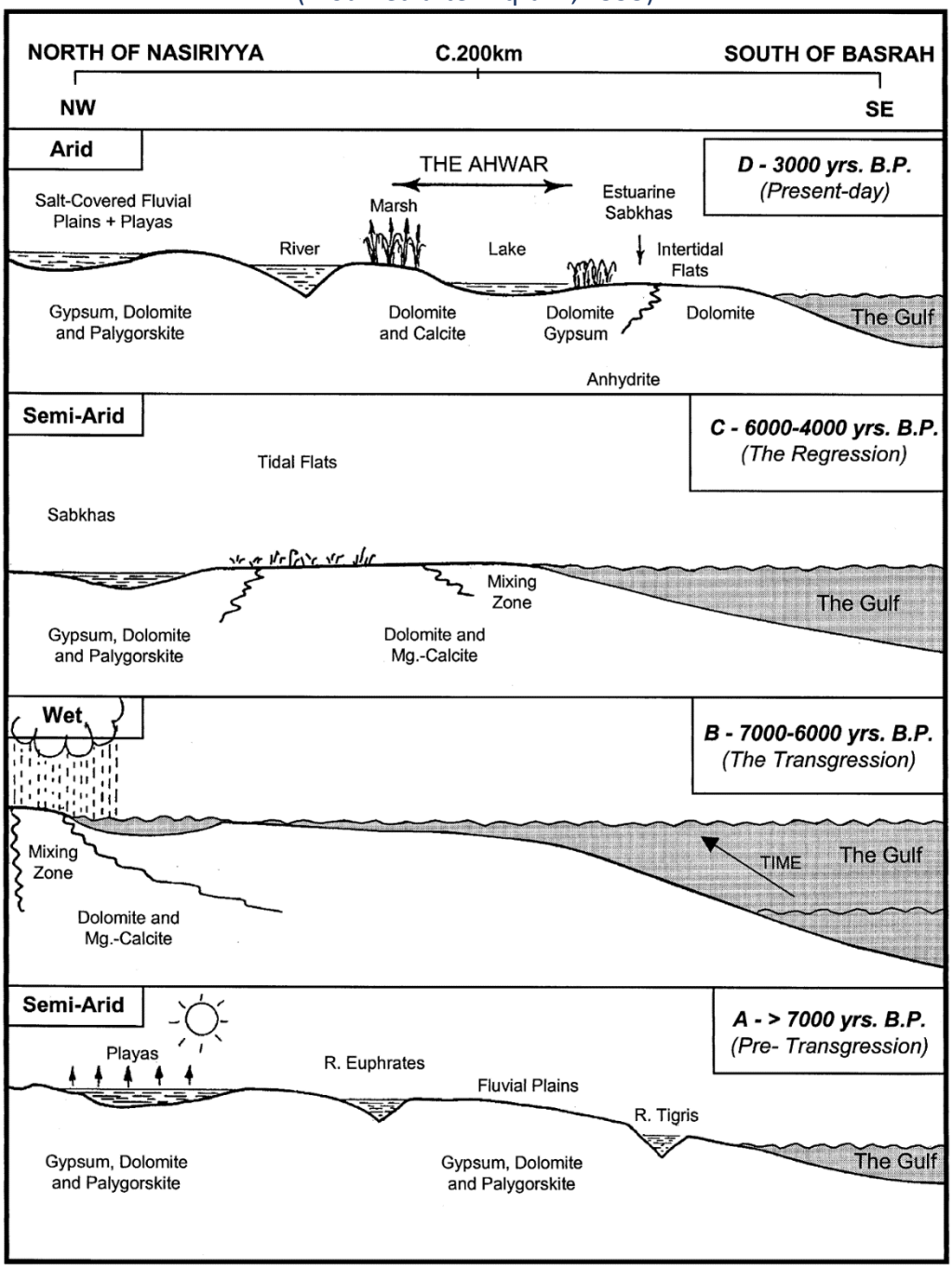
Later, the sea regressed towards the south and the tidal current covered the marshlands area from 4,000 years ago. This led to another climatic change towards a more arid environment. The main Protected Areas of the Marshlands (or Ahwar) as we know them today were formed during this period around 3,000 years ago within an arid climate.

In summary, the Marshlands witnessed four major climatic periods as follows:

a. 7,000 years ago: a semiarid period characterized by the formation of the Playa salt lakes in which gypsum, dolomite, and palygorskite (a clay mineral) were deposited.
b. 7,000 – 6,000 years ago: a wet period with abundant rains and an increase in marine water levels (the great flood).

c. 6,000 – 4,000 years ago: another semiarid period featuring a decrease in water levels and the reformation of marsh deposits such as gypsum, dolomite and palygorskite.
d. 3,000 – Current time: an arid period with the Marshlands as we see them today. (Aqawi 1995).

Figure 1-1: Schematic cross-sections showing various periods of the Holocene evolution of the Tigris–Euphrates Delta when various climatic conditions were dominant (modified after Aqrawi, 1995)



# Section Two: Information

## A. General Information

### 2.1 Location

"The Ahwar" Marshlands of Southern Iraq are located in the southern region of the Republic of Iraq. The Marshlands comprises four protected areas, namely, the Huwaizah, Central, East and West Hammar Marshes.

The northern, northeast and northwest parts of the protected areas are located within the governorates of Al Muthanna, Dhi Qar and Maysan in the proximity of the three main urban centers of the three governorates namely, As Samawah (Al Muthanna), An Nasiriyah (Dhi Qar) and Al Amarah (Maysan). To the south, the protected areas are located within the Al Basrah governorate towards the Shatt Al Arab River.

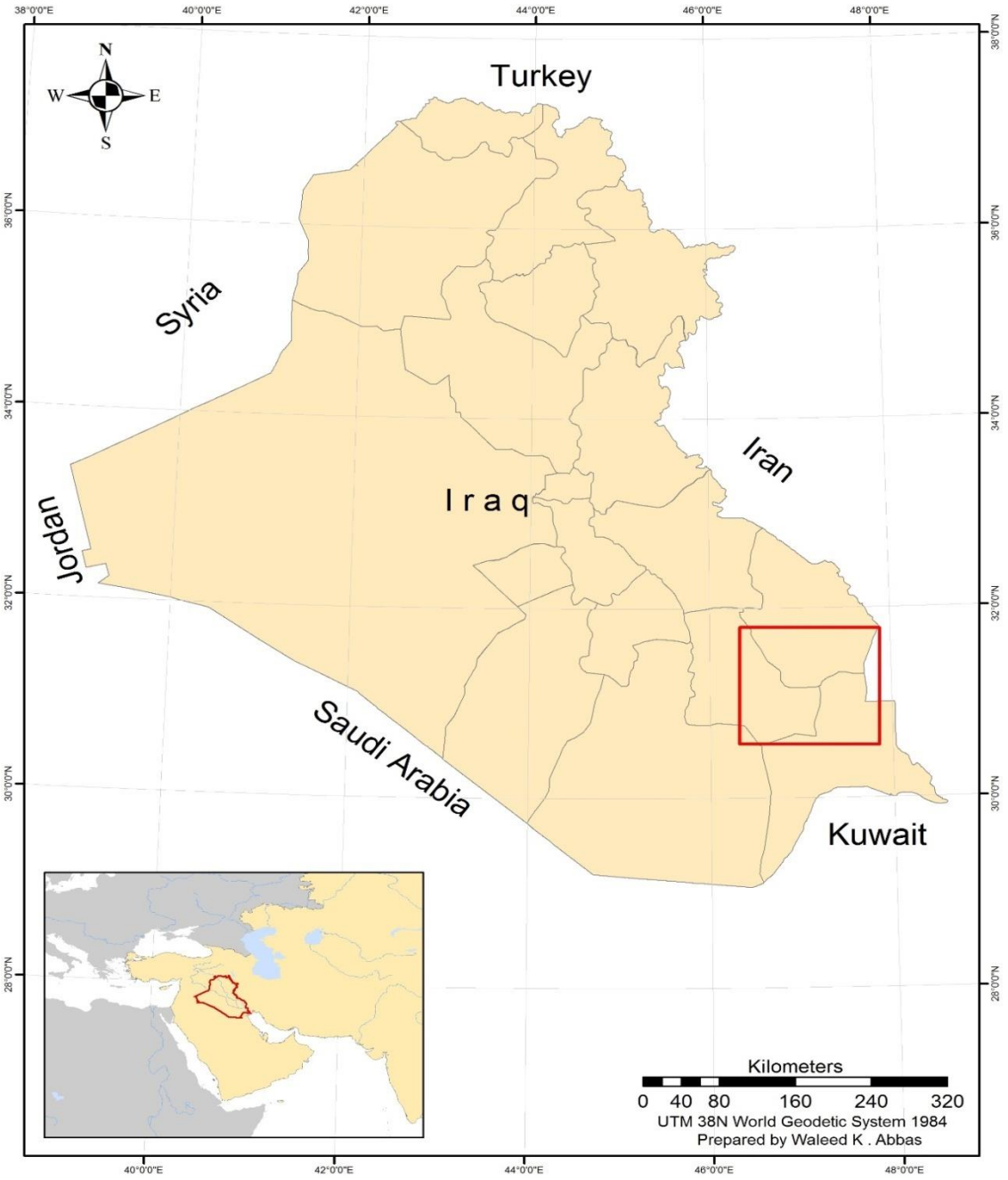
Specifically, the Huwaizah Marshes are located within the governorate of Maysan to the east of the Tigris River. The Huwaizah is bordered to the east and southeast by the international boundary with Iran, to the south and southwest by the Al Basrah Governorate's administrative boundary, and to the north and west by the administrative boundary of Maysan Governorate. The Huwaizah Marshes represent the northeast protected area.

The Central Marshes extend between the Governorates of Maysan and Dhi Qar between the Euphrates and Tigris Rivers. They are bordered by the Euphrates to the south, the Tigris and the administrative boundary of Al Basrah Governorate to the east (western Al Qurna), the city of Al Amarah to the north, and the city of An Nasiriyah (capital of the Dhi Qar Governorate) to the west.

The East Hammar Marshes are entirely located within Al-Basrah Governorate to the north of the city of Al Basrah. They are bordered to the east and northeast by the Shatt Al-Arab River, to the north by the Euphrates River, to the northwest by the West Hammar Protected Area and to the south and southwest by the Zubair Plateau.

The West Hammar Marshes lie fully within the Dhi Qar Governorate southwest of An Nasiriyah City. They are bordered to the north by the Euphrates River, to the east by the East Hammar Marshes and to the south by the Zubair Plateau and the general drainage channel separating it from the southern desert in the east. Maps (1-1) and (1-2) below show the general location of the four protected areas and their general topography respectively. Tables (1-1) and (1-2) detail the central coordinates of the four protected areas and their total areas in hectares.

Map 2-1: General Location Map of the Marshlands of Southern Iraq



Map 2-2: General Topographical Map of the Marshlands of Southern Iraq

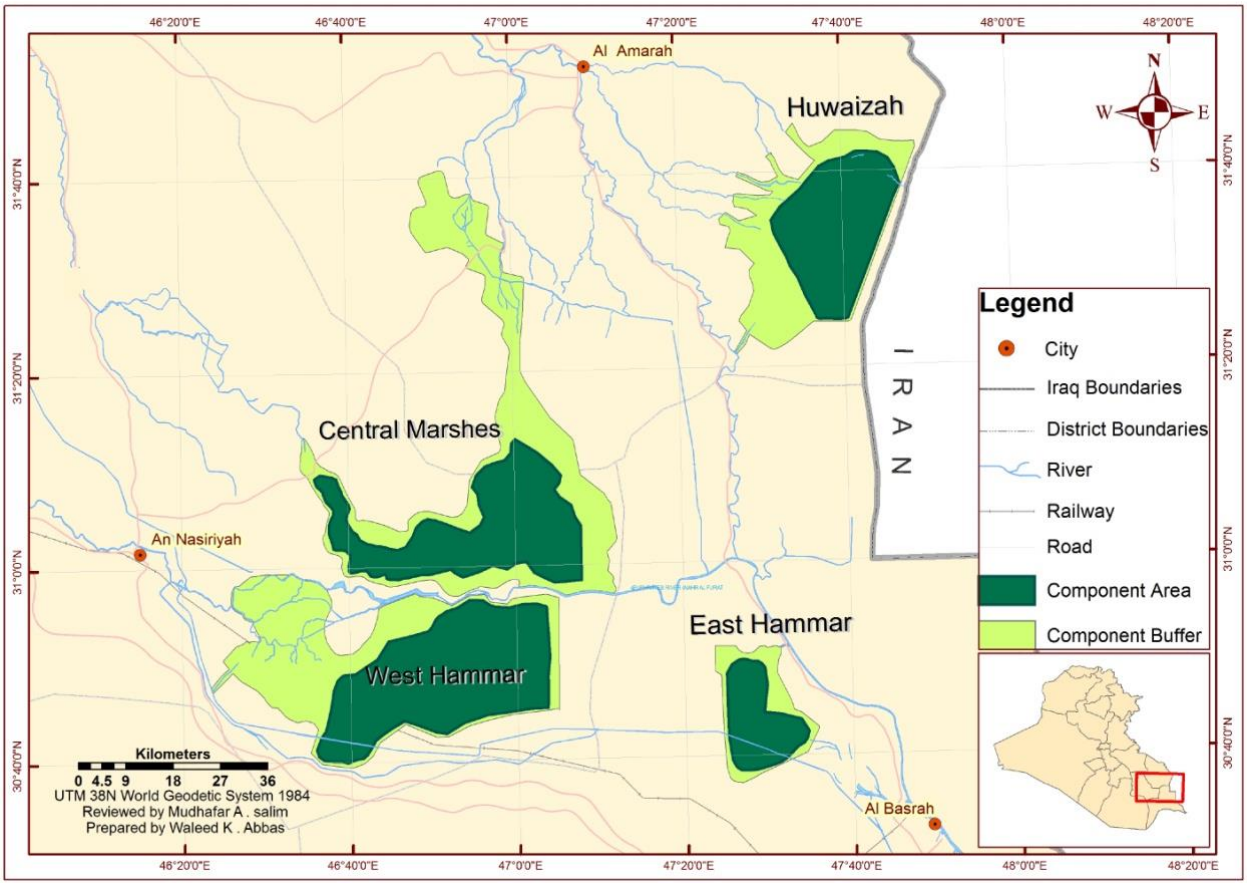


Table 2-1: Central Coordinates of the Four Protected Areas

| Id n° | Name of the Protected Area | Governorate(s) | Coordinates of the central point |
|---|---|---|---|
| 1 | The Huwaizah Marshes Protected Area | Maysan | N 31 33 44<br>E 47 39 28 |
| 2 | The Central Marshes Protected Area | Dhi Qar, Maysan | N 31 05 07<br>E 47 03 15 |
| 3 | The East Hammar Marshes Protected Area | Al Basrah | N 30 50 30<br>E 46 41 03 |
| 4 | The West Hammar Marshes Protected Area | Dhi Qar | N 30 44 21<br>E 47 26 19 |

Table 2-2: Total Areas of the Protected Areas

| Id n° | Name of the Protected Area part | Governorate(s) | Area of the Protected Area (ha) |
|---|---|---|---|
| 1 | The Huwaizah Marshes Protected Area | Maysan | 48,131 |
| 2 | The Central Marshes Protected Area | Dhi Qar , Maysan | 62,435 |
| 3 | The East Hammar Marshes Protected Area | Al Basrah | 20342 |
| 4 | The West Hammar Marshes Protected Area | Dhi Qar | 79,991 |

## 2.2 Land Tenure

All of the four protected areas are fully owned by the Iraqi treasury represented by the Ministry of Finance, and managed by the government of Iraq through its Council of Ministers.

In the four protected areas, traditional rights are prevalent, noting that the tribal system remains a very strong part of the land governance throughout Iraq. Traditionally the Marshlands were divided amongst tribes with somewhat clear boundaries and transaction systems, but this traditional land management system has not been officially recognized by the current governance system. Although land rights are recognized for respective tribes related to specific areas, the government may decide to change the land tenure without acquiring permission from the local population.

The land use by local communities living within and around the protected areas is generally traditional and historically extends back long periods under the above-mentioned tribal arrangement. Each of the tribes has specific landmarks recognized by others, and even if such landmarks are not conspicuous, areas are still recognized based on local knowledge and memory. Over time, numerous tribes have been forced to emigrate from their home areas. Reasons for this could be social or political, and those involved often end up living under the protection or custody of another larger or older tribe under a traditional mechanism called “Al-Kitba”. This is a contractual agreement which defines the rights of the incoming tribe within the lands of the host tribe, as well as its obligations and responsibilities (mainly in terms of respecting local values and traditions), and social and economic safeguards.

### 2.3 Overall Legal Arrangements

The current legislative frameworks effective in Iraq, along with those under development and supported by international conventions and treaties, address the strategic goal of protecting and sustaining the ecosystems and sites of significant cultural and natural heritage - including wetlands and archaeological sites - throughout Iraq.

Various laws, bylaws and regulations support the protection and sustainable management of the various Protected Areas of the protected areas through defining cooperation and coordination mechanisms between relevant agencies.

As regards ecosystem management, the aim of these mechanisms is to enhance the role of the executive bodies in the implementation of sound environmental management, and reduction of environmental pollution caused by wrong practices and over-utilization of resources. Each law has a specific field for which it is applicable and thus the laws are complementary and cover most legal protection needs for the Marshlands protected areas. The following summarizes the different legal instruments used in and relevant to the four protected areas.

<u>The Ministry of Environment Law No.37 of 2008</u>

This law aims to protect and improve the environment of Iraq, and to protect the general health of natural resources, biodiversity, and natural and cultural heritage; to assure sustainable development and achieve sought-after regional and national cooperation. In addition, the law addresses various Protected Areas of the environment and their enhancement, and the prevention of deterioration or pollution, or in some cases, the minimization of the impact of pollution. These are achieved through sets of measures and actions which mitigate the negative impacts – or their reduction to acceptable levels – in accordance with national guidelines and international standards.

As it relates to the Marshlands four protected areas, the law is of primary importance as a foundation to ensure the adequacy of conservation as well as the sound protection of the natural values, with particular emphasis on biodiversity conservation and reduction of pollution.

The Protection and Improvement of the Environment Law No.27 of 2009

This law aims to protect and enhance the environment through the removal and treatment of all damages caused by external factors. Further, the law addresses the general health, natural resources, biodiversity and natural and cultural heritage; to assure sustainable development and achieve sought-after regional and national cooperation. The law also contributes to the assurance of the maximum level of protection to the natural values of the protected areas through the articles associated with the protection of land against urban encroachment or other land use related pressures.

The law targets the reduction of damages and risks related to extractive industries, with particular focus on habitat destruction and pollution, as well as the protection of surface water resources against pollution. This is reflected through a set of articles addressing the management of pollutants and their drainage to water resources. It also targets habitat conservation by prohibiting illegal hunting or any other biodiversity related pressure factor, including the introduction of exotic plant and animal species unless duly authorized by relevant authorities.

The Protected Areas Establishment and Management Bylaw Draft

The bylaw was endorsed by the government of Iraq in November 2013. It addresses the guidelines and processes for the selection and establishment of protected areas as well as their legal designation and management arrangements. The legal instrument ensures the effective management of protected areas and the prohibition of violations.

The bylaw is considered of great importance as it directly supports the maintenance of the conservation status of the four protected areas by addressing pressure factors and adopting necessary measures for their mitigation. These measures include the prohibition of change of land category or the conduct of any harmful human activity such as agriculture or human settlements. It also controls the activity of hunting, including poaching and transport of aquatic and terrestrial wildlife, and the prohibition of the introduction of exotic species of plants and animals. The bylaw also adopts a set of articles addressing the early warning systems and response plans.

The Water Resources Protection Bylaw No.2 of 2001

The objective of this bylaw is to protect the water resources against pollution and improve their quality by eliminating pollutants from various sources (e.g. general facilities, private facilities, factories, workshops, and other agricultural or industrial practices in the various economic sectors). The bylaw supports the conservation of the natural values of the protected areas through its articles addressing the prohibition of all pollutant drainage or waste disposal into any

water resource, as well as adherence to the environmental safeguards, all unless authorized by relevant authorities.

The Ministry of Water Resources Law No.50 of 2008

This law addresses the planning for and investment in the water resources of Iraq, including ground and surface water, with the aim to ensure the most efficient use of the water resources, their development, enhancement, and usage. The protection of ground and surface water are central to this law, especially against pollution, with priority given to the environmental aspects associated with the rehabilitation and sustainability of the Marshlands as a key national water body.

The Wildlife Protection Law No.17 of 2010

This law is centered on the protection of wildlife as a national wealth through the control and organization of its hunting areas, as well as the procedures and measures related to licensing for hunting and the identification of permitted species, seasons, and localities. The law has the objective of eliminating the threat of extinction of species of particular conservation importance, hence contributing to safeguarding the natural values of the protected areas represented by its key species of birds, fishes, plants and animals, and the application of all necessary actions to ensure their viability and well-being.

## B. Physical Information

### 2.4 Topography and Geology

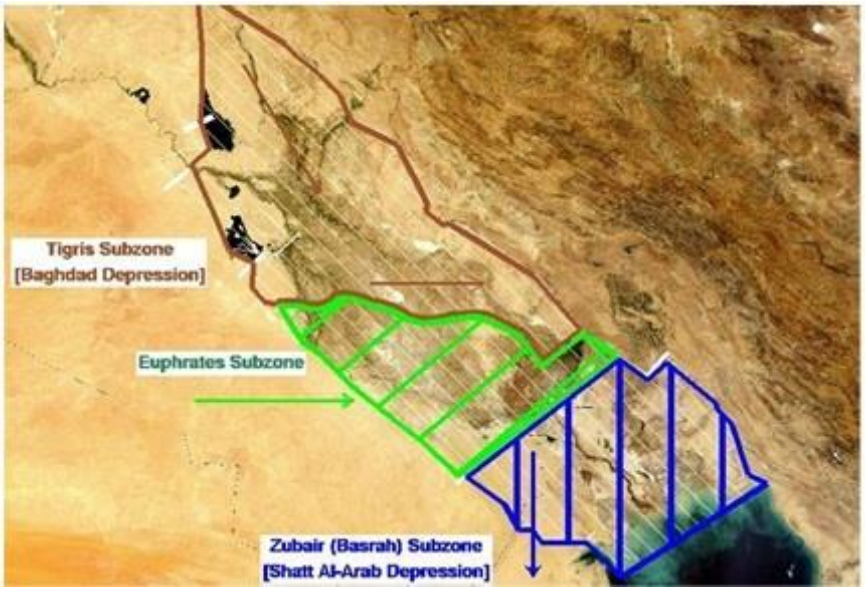
Iraq's topography is subdivided into three zones: the Folds zone, the Alluvial Plain zone and Al Jazirah and Western Desert zone. The Ahwar are located in the southern part of the alluvial plain. The plain is an extensive uniform flat area with minor slopes towards the Arabian Gulf. More specifically, the north-south slope of the Marshlands is of a very low incline with around 6-8 meters of elevation in the northern parts of the Central Marshes to less than 2 meters elevation in the southern most end of the West Hammar Marshes.

The Marshlands are covered by the thick quaternary period sediments, which were deposited by the Euphrates and Tigris Rivers and their tributaries and distributaries.Tectonically, the alluvial plain is part of the Zagros fold-thrust which developed from the collision between the Arabian and Iranian plates, forming an asymmetrical subsiding basin. Structural studies based on the modern tectonics confirmed the presence of a wide basin which includes the continental alluvial plain as well as the marine basin of the Arabian Gulf, separated by the Zubair Plateau. The average subsidence of the plain is approximately 1.4 cm every year, concurrent with merely 1.3 mm of deposition per year, and in recent years the latter has even declined to 0.4 mm per year.

The alluvial plain of the Marshlands was developed during the final phase of the alpine movement which constructed the Zagros fold-thrust from the end of the Pliocene to the early Pleistocene.

Figure 2-1: Mesopotamian Zone tectonic subunits. Arrows, hachures indicate tilt direction. L. Tharthar indicated for reference in comparison to Figure (Pournelle, 2003).

Figure 2-2: The Mesopotamian Zone geosyncline (white hachures) forms where the Arabian plate is forced below the Zagros Mountains. Image: NASA 2001b MODIS. (Pournelle, 2003)

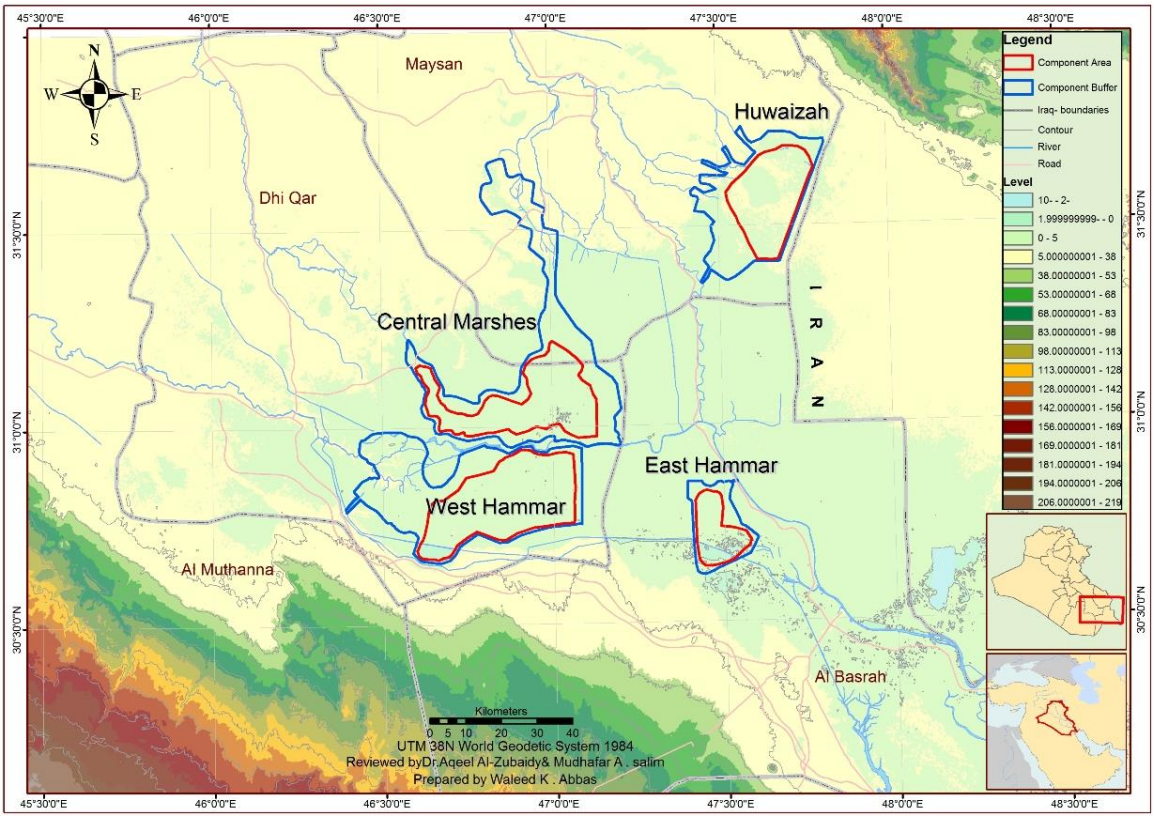



The plain is bordered to the east and northeast by the hills of Hamrin and to the west and southwest by the Arabian platform comprising high altitude limestone. The geological sequence in the middle and southern regions of Iraq is subdivided, from older to recent as follows: the Paleozoic of 5 km in thickness mostly comprised of siliciclastic rocks deposited in shallow sea; the Mesozoic of around 5 km in thickness mostly comprising evaporites, shale sand carbonate rock, the upper part of which shows succession of carbonates and sandstone which were deposited in shallow sea. The Cenozoic-Tertiary period comprising of carbonates which deposited in the open Paleogene sea, which later converted to the Neogene lagoon and evaporates facies of the restricted sea. Finally, geologic sequence includes the Cenozoic-Quaternary period which comprises gravel, sand, silt and clay sediments covering the alluvial plain.

Table2-3: The Geological timescale of the Marshlands

| Eon | Era | Period | | Epoch Start Date (mya) | |
|---|---|---|---|---|---|
| Phanerozoic | Cenozoic | Quaternary | | Holocene | 0.01 |
| | | | | Pleistocene | 1.64 |
| | | Tertiary | Neogene | Pliocene | 5.2 |
| | | | | Miocene | 23.3 |
| | | | Paleogene | Oligocene | 35.4 |
| | | | | Eocene | 56.5 |
| | | | | Paleocene | 65 |

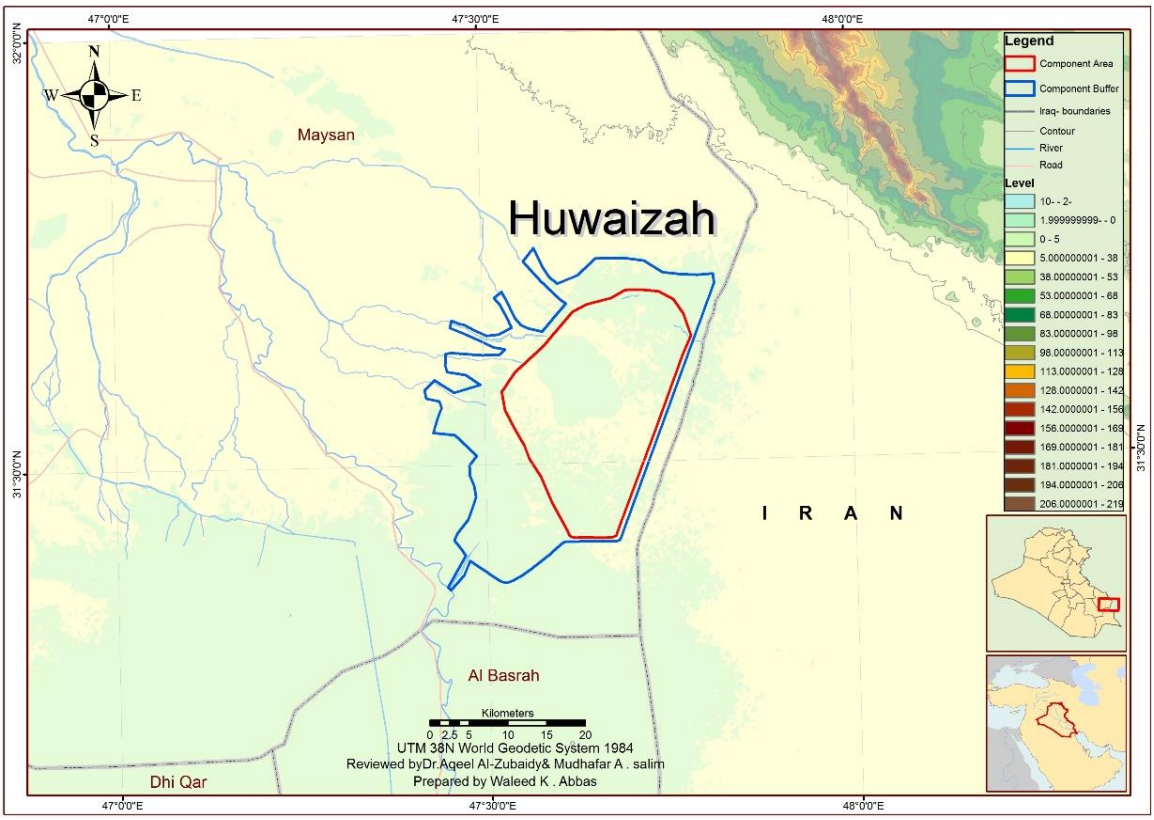
## Map 2-3: Topography of the Four Protected Areas



## Topography and Geology of the Huwaizah Marshes Protected Area

The Huwaizah Marshes are located within the alluvial plain and belong to the quaternary period. They are aligned in the north by the outcrops of the Bai Hassan formation of the Tertiary period. The Pliocene-early Pleistocene outcropping occurs on the southwest flank of the Hamrin fold near At Tib area with an approximate elevation of 100 m asl, then gradually declines towards the south and southwest to less than 10 m asl at the edge of the Huwaizah Marshes. The west is bordered by the natural banks of the Tigris River, the south by the outlets of Kassara and Swayb, and the east by the eastern borders of Iraq.

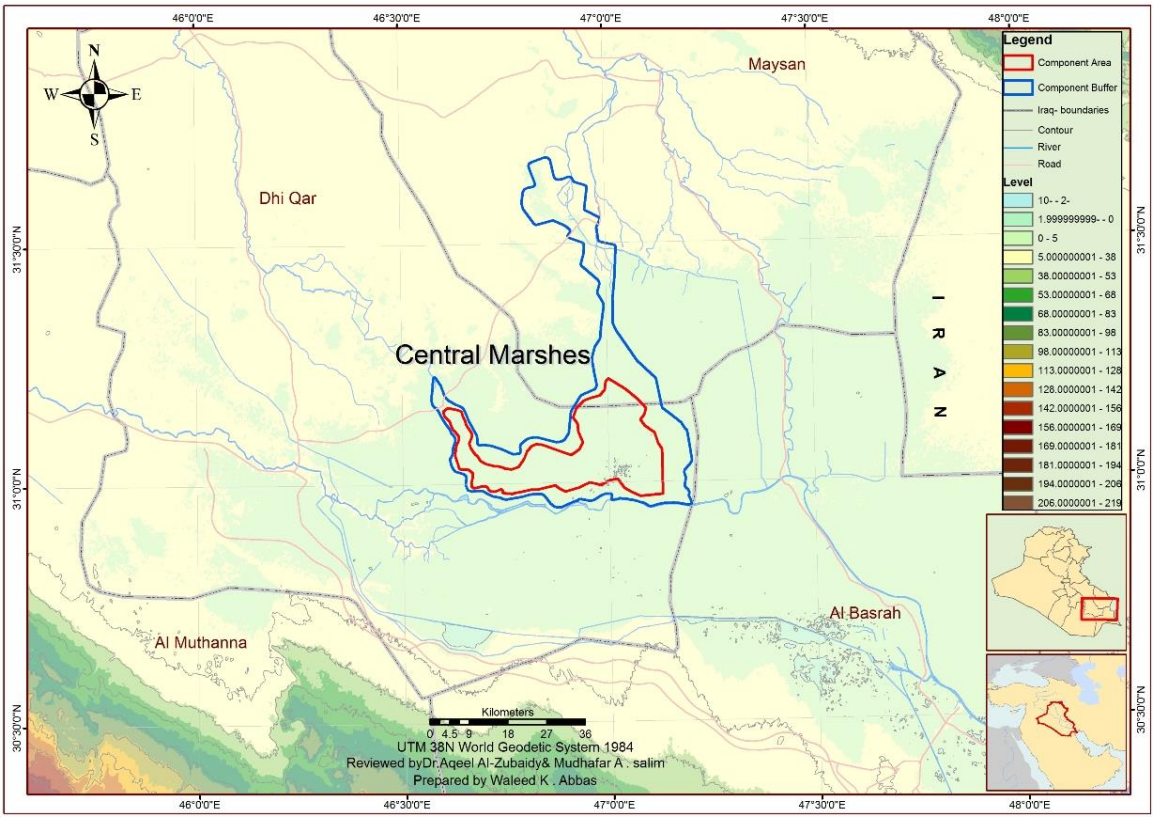
Map 2-4: Topography of the Huwaizah Marshes



## Topography and Geology of the Central Marshes Protected Area

The Central Marshes lie between the Tigris River to the east with 4 m high banks, and the Euphrates River to the south with 2-4 m high banks. They are affected in the north by the subsurface folds of Abu Amud and Ahdab, both ranging around 7 m high. The whole of the Central Marshes belongs to the quaternary period.

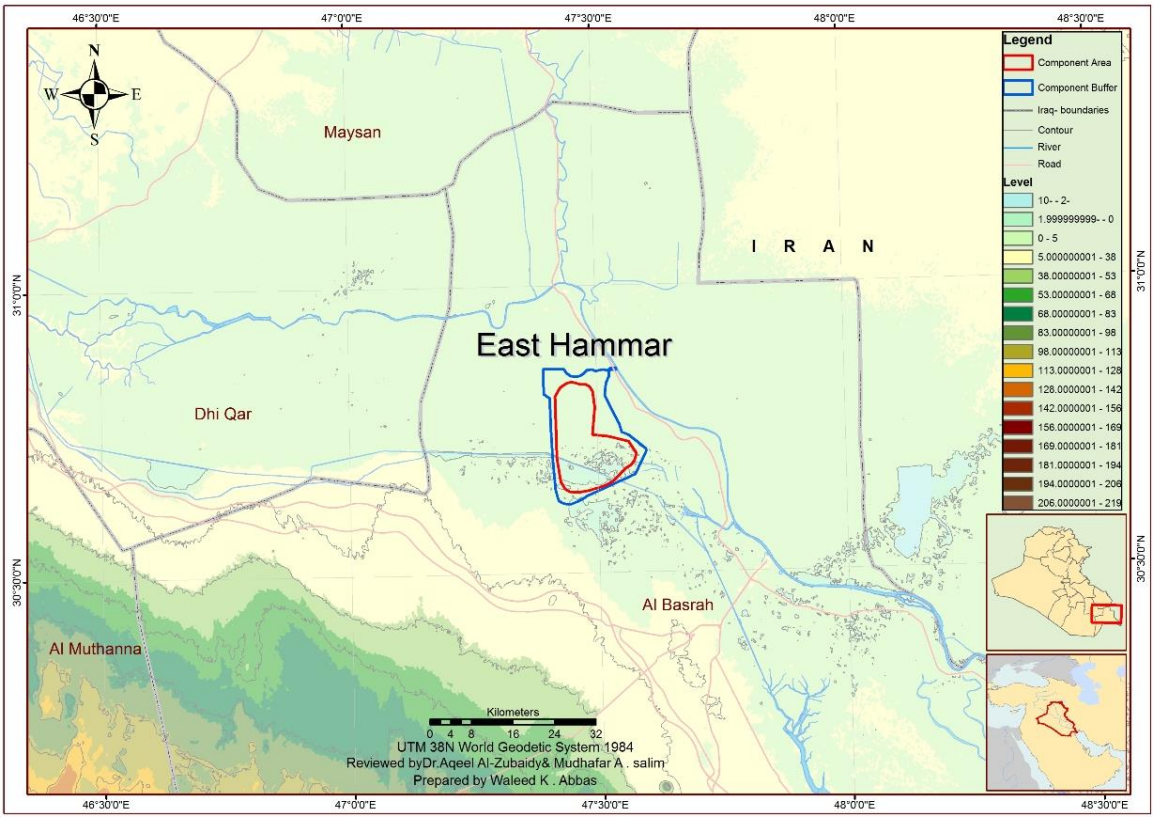
Map 2-5: Topography of the Central Marshes



## Topography and Geology of the East Hammar Marshes Protected Area

The East Hammar Marshes are bordered in the north by the banks of the Euphrates at around 5 m in height, in the east by the banks of the Shatt Al-Arab ranging between 4-6 m in height, and in the south by the Zubair Plateau which reaches almost 20 m in height and ascends to the southwest. The East Hammar Marshes represent an extension of the southern desert covered by the alluvial fan ascending from Hafr Al Batn region. This plateau is a result of the movement of the deep salt strata which pushed up the rock layers to form elongated folds that are characterized by extended width, and by short intervals in the north-south direction which do not appear on the surface. Typical of such fold systems are the Zubair and Rumaila.

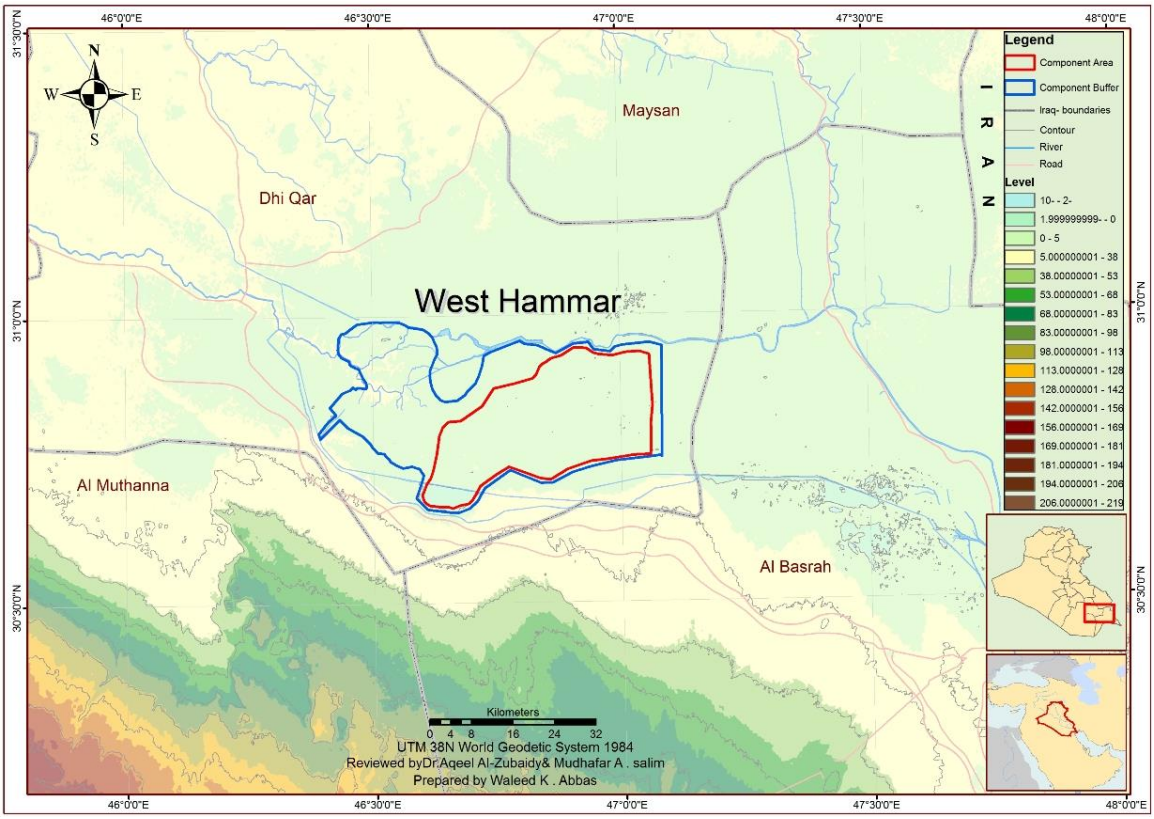
Map 2-6: Topography of the East Hammar Marshes



Topography and Geology of the West Hammar Marshes Protected Area

The West Hammar extends to the south of the Euphrates River where the banks range from 2-4 m in height, and is bordered in the north by the Zubair Plateau with 20 m high banks and ascends towards the southwest. Similar to the East Hammar, it is an extension of the southern desert and is covered by sand sediments belonging to the Debdeba sand formation from the Pliocene-early Pleistocene period. This plateau is a result of the movement of the deep salt strata which pushed up the rock layers to form elongated folds that are also characterized by extended width and short intervals in the north–south direction which do not appear on the surface. Typical of such fold systems are Zubair and Rumaila.

Map 2-7: Topography of the West Hammar Marshes




## 2.5 Climate of the Marshlands

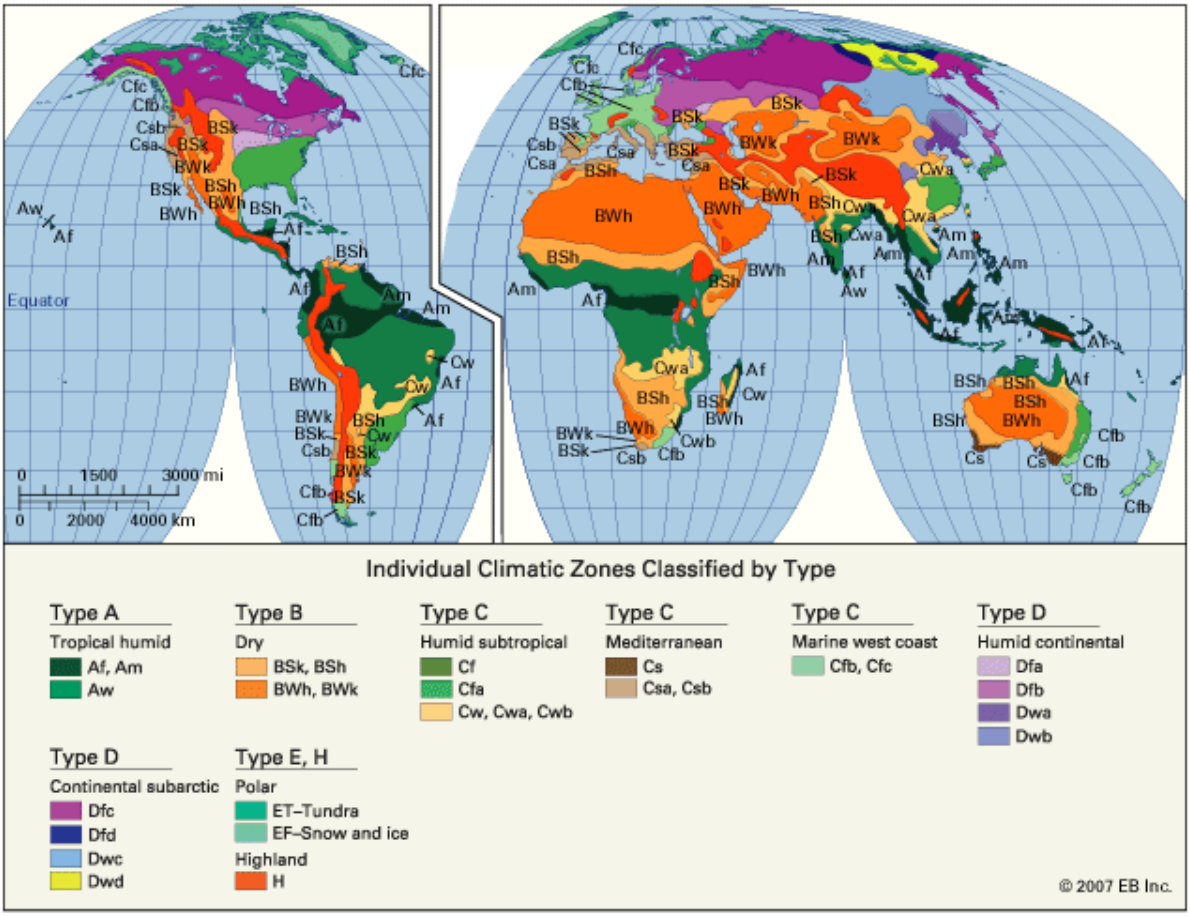
According to the Koppen (1936) classification of global climate, the Marshlands are located within the dry climate region, which is characterized by level of evaporation and transpiration as compared to long term average rainfall. This region extends between 20 and 35 degrees north-south of the equator and covers vast continental regions often belted by mountainous ranges. The region is further categorized into secondary sub-regions including the dry arid climate to which the Marshlands belong. This dry arid climate (see table 1) is unique for its true desert environment and covers around 12% of Earth's surface area (see figure 1). The region is

dominated by drought tolerant species and adaptive biodiversity within areas of very scarce water resources .

Table 2-4: Temperatures and average rainfall for the Iraqi governorates relevant to the Marshlands and their respective Koppen classification

| Station | Annual rainfall (mm) | Mean annual temperature ($^0$C) |
|---|---|---|
| Al Amarah | 185.42 | 25.6 |
| Baghdad | 154.94 | 22.2 |
| Al-Basrah | 152.4 | 25.0 |
| Al Bossayah | 42.3 | 27.2 |
| Ad Diwaniyah | 116.84 | 24.4 |
| Al Habbaniyah | 119.38 | 22.8 |
| Karbala | 55.6 | 23.9 |
| Al Kut | 137.16 | 25.0 |
| An Najaf | 68.58 | 24.4 |
| An Nasiriyah | 109.22 | 25.0 |

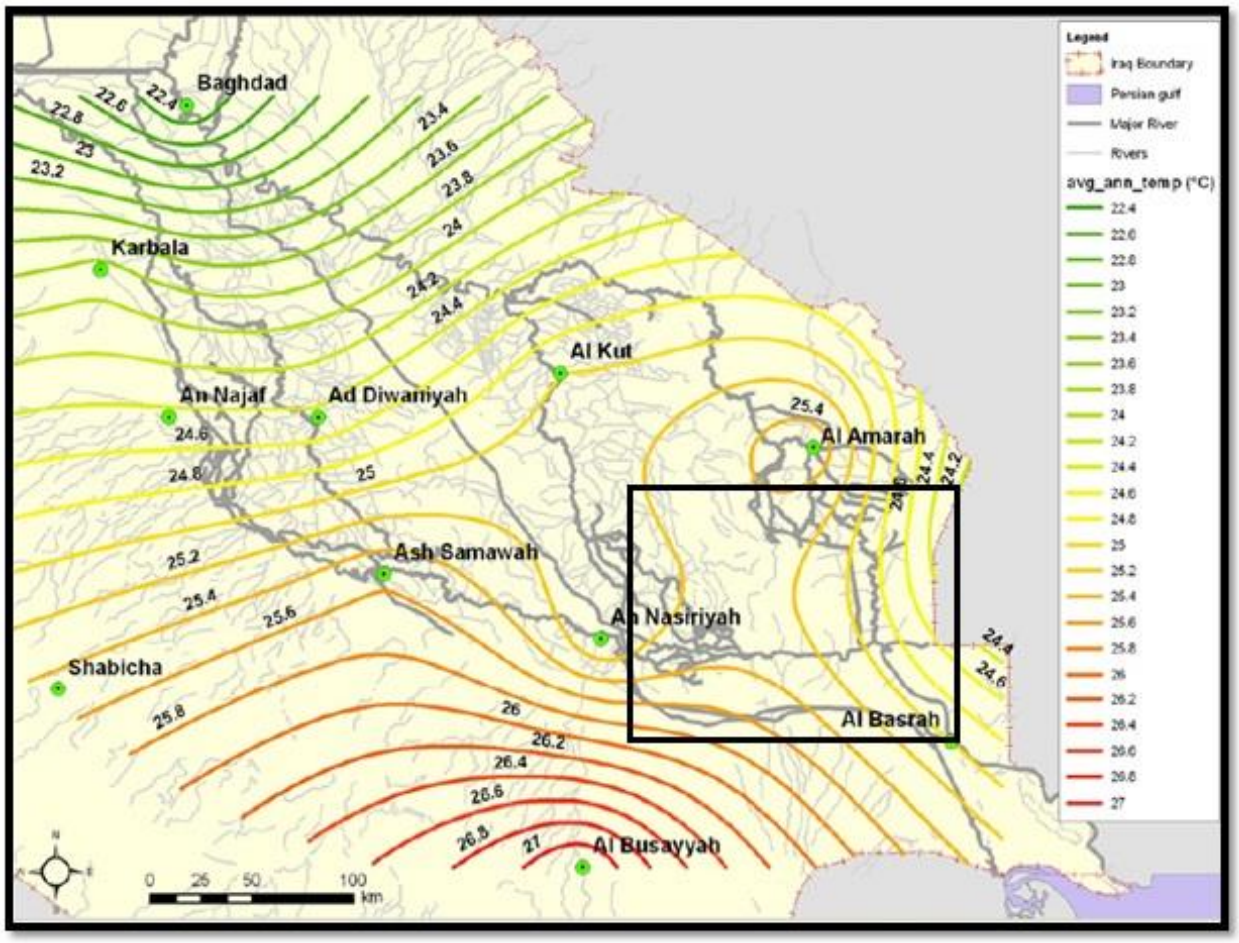
Figure 2-3: Koppen climate regions




Low levels of rainfall in the Marshlands, particularly in hot summer seasons, lead to excessive levels of evaporation and evapotranspiration. The factors of temperature and rain level are key in the determination of the environmental setting of the Marshlands, as they have a substantial effect on water availability and level in addition to water quality and distribution. A very particular feature of the Marshlands is the fact that they are embedded within a sea of scorching deserts while still embracing lush biodiversity and highly productive ecosystems .

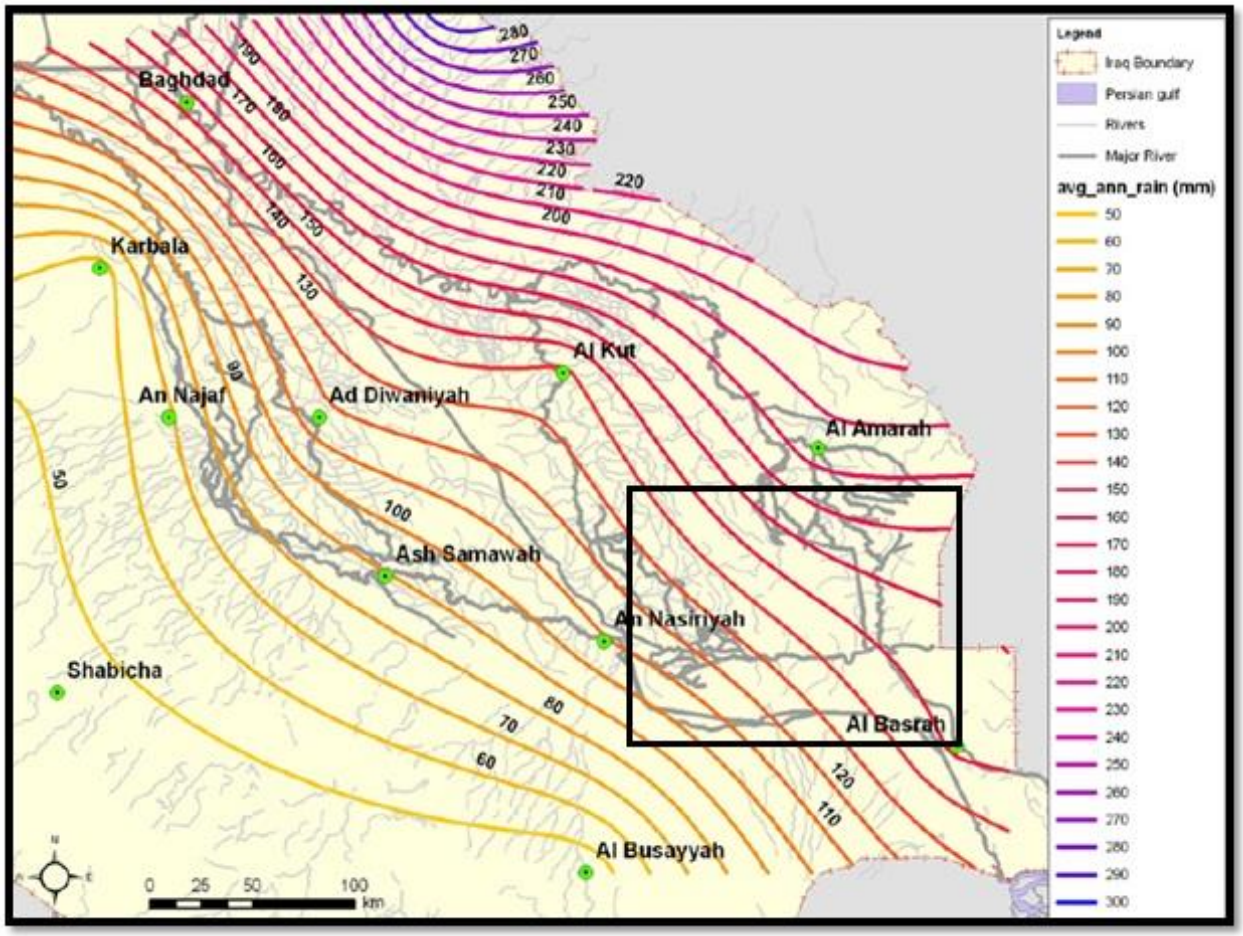
Daily temperature often exceeds 50°C in summer and can drop all the way to below zero on cold dry winter nights. Average temperatures range between 22.2°C and 27.2°C, with the highest average recorded at 36°C and the lowest at 11°C. The hottest months are June through August with monthly averages between 34°C and 36°C. In contrast, the coldest months are December through February with monthly averages between 8.8°C and 12.2°C.

Figure 2-4: Geographic distribution of average temperatures (Celsius) for the four Protected Areas (Al-Ansari and Knutsson, 2011)



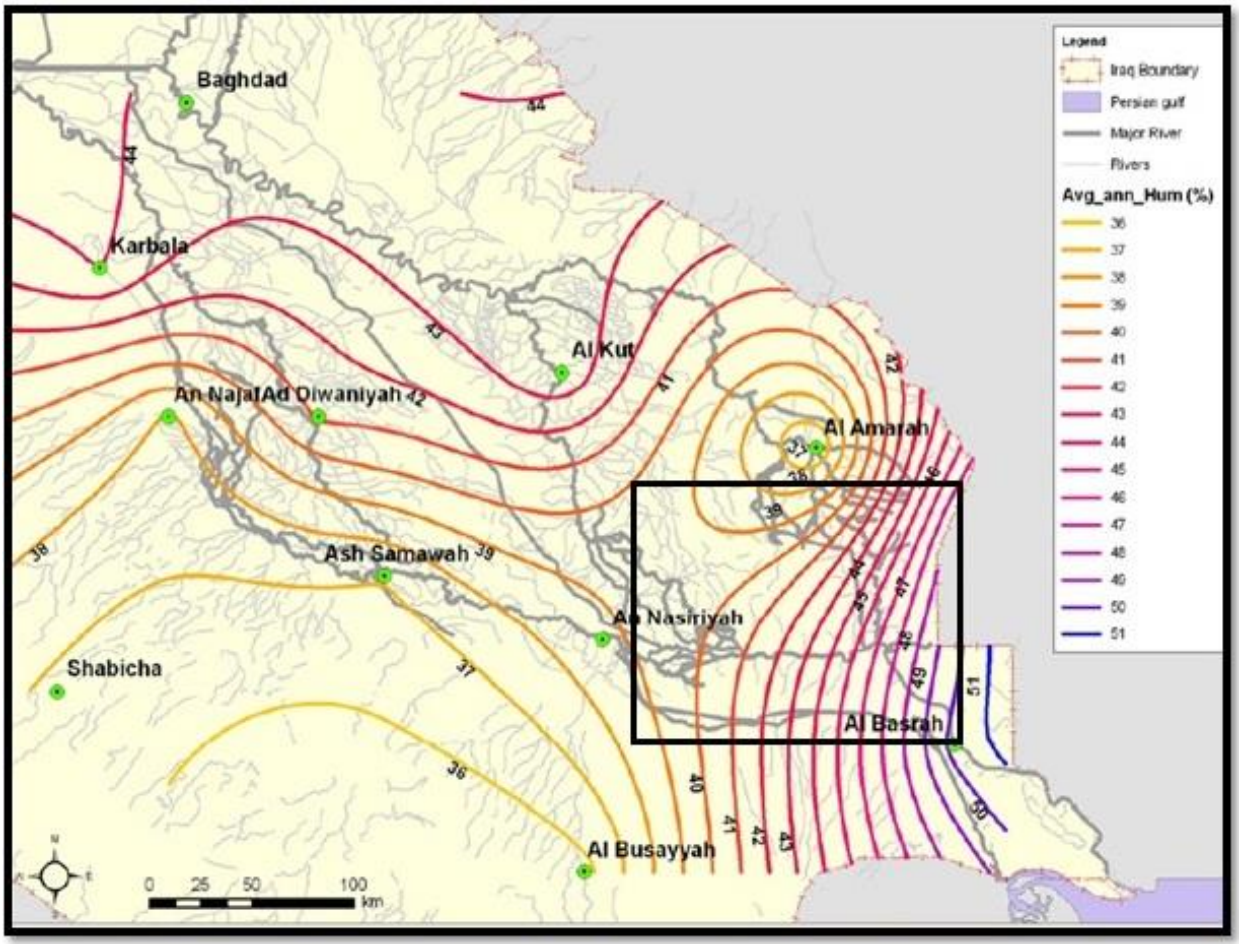

As for rainfall in the Marshlands, it is mainly seasonal with very low averages. Most precipitation takes place from January to March, ranging from 20 to 40 rainy days, with a daily average of 1 to 10 mm. Annual average rainfall ranges between 42 and 185 mm.

Figure 2-5: Rainfall distribution within the four Protected Areas (Al-Ansari and Knutsson, 2011)



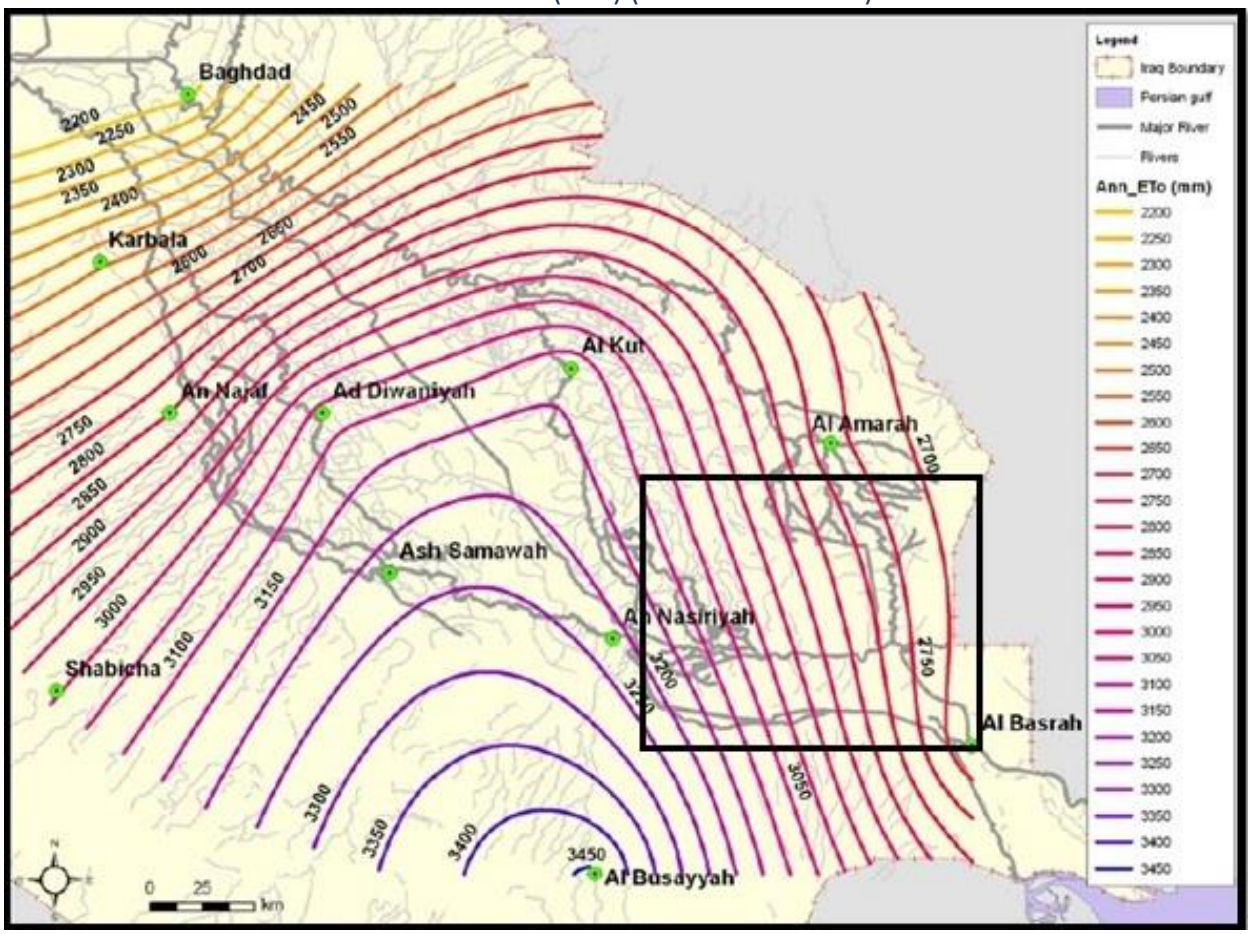

Relative humidity is another key physical characteristic of the Marshlands however there is no discernible uniformity across the region or during the seasons. Average relative humidity is approximately 34.5%, with the highest levels recorded in winter (67-80%) and the lowest in summer (40-45%).

Figure 2-6: Geographic distribution of relative humidity (%) for the four Protected Areas (Al-Ansari and Knutsson, 2011)




Evaporation levels are another key determinant of the Marshlands climate, with highest averages ranging between 1,455.1 and 1,251.2 mm, and lowest averages ranging between 205.6 to 155.7 mm. Annual averages for evapotranspiration typically range between 2,536.3 to 2,909.3 mm.

Figure 2-7: Geographic distribution of the annual average of evaporation for the four Protected Areas in ETO (mm) (see source above)




As elaborated above, the extreme climatic conditions of the Marshlands in terms of high average temperatures and low rates of precipitation are key factors dictating their biological diversity and its composition. The Marshlands are one of the driest areas in the world in which freshwater habitats are abundant and wildlife refuges flourish, thus fulfilling the physical and ecological requirements for a wide spectrum of species assemblages.

Further, the Marshlands represent an extended outdoor laboratory for species adaptation to harsh environmental conditions, and are natural wetland havens on the long migration route towards east Africa before entering the vast dry deserts of the Arabian Peninsula, hence providing the last stopover site along the very exhaustive journey across two continents .

Climate of the Huwaizah Marshes Protected Area

Climatic data for the Huwaizah Marshes is collected from Al Amarah Meteorological Station. Seasonal temperatures are variable in the Marshes with the highest average reaching 36.9°C in summer and the lowest falling to approximately 13.5°C in winter. The summer season is dry and

witnesses no rainfall. Highest occurrence of rain is recorded in winter with a maximum of 116.84 mm. Due to high average temperatures, evaporation levels are highest in summer with an average of 1,455.1 mm. The lowest records have been recorded in winter at 155.7 mm. Overall average evapotranspiration is approximately 2,536.3 mm. These factors influence relative humidity conditions in the Huwaizah Marshes, with a maximum record of 54% in winter and a lowest record of 18.1% in summer.

Climate of the Central Marshes Protected Area

Climatic data for the Central Marshes is collected from the meteorological stations of Al Amarah and An Nasiriyah. Seasonal temperatures vary in the Central Marshes with a high summer average of 36.9°C to 35.4°C and a low winter average of around 13.5°C. Summer in the Central Marshes is dry with no rainfall. Winter receives most of the annual rain with a high average ranging from 116.84 to 55.88 mm per annum. Due to high average temperatures, evaporation levels are highest during the summer season with an average ranging between 1,455.1 to 1,451.4 mm. The lowest records range between 155.7 and 205.6 mm during the winter season. Overall average evapotranspiration ranges between 2,536.3 and 2,856.4 mm. These factors influence relative humidity conditions in the Central Marshes with a maximum record ranging between 54% and 61.6% in winter and the lowest record ranging between 18.1% and 20.5% in summer.

Climate of the East Hammar Marshes Protected Area

Climatic data for the East Hammar Marshes is collected from the Al Basrah Meteorological Station. Seasonal temperatures are variable with the highest average reaching 34.6°C in summer and the lowest falling to approximately 14.1°C in winter. The summer season is dry and witnesses no rainfall. Highest rainfall is recorded in winter with a maximum record of 81.28 mm. Due to high average temperatures, evaporation levels are highest during the summer season with an average of 1,251.2 mm. The lowest records reach 187.7 mm in the winter season. Overall average evapotranspiration is around 2,909.3 mm. These factors influence relative humidity conditions of the East Hammar Marshes, with a maximum record of 69.2% in winter and the lowest record of 36.2% in summer.

Climate of the West Hammar Marshes Protected Area

Climatic data is collected for West Hammar Marshes from An Nasiriyah Meteorological Station. Seasonal temperatures are variable with the highest average reaching 35.4°C in summer and the lowest falling to approximately 13.5°C in winter. The summer season is dry and witnesses no rainfall. The highest rainfall is recorded in winter with a maximum record of 55.88 mm. Due to high average temperatures, evaporation levels are highest in the summer season with an average of 1,451.4 mm. The lowest records reach 205.6 mm in winter. The overall average evapotranspiration is around 2,856.4 mm. These factors influence relative humidity conditions in the West Hammar Marshes, with a maximum record of 61.6% in winter and lowest record of 20.5% in summer.

Table 2-5: Climatic parameters of key meteorological stations of the Marshlands

| N | Station | Average Temperatures | | | | Average Rainfall | | | | Average Evaporation | | | | Average Humidity (%) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Winter | Spring | Summer | Autumn | Winter | Spring | Summer | Autumn | Winter | Spring | Summer | Autumn | Winter | Spring | Summer | Autumn |
| 1. | Al Amarah Station | 13.5 | 25.4 | 36.9 | 26.9 | 116.84 | 45.72 | 0 | 22.68 | 155.7 | 568.6 | 1455.1 | 587.2 | 54 | 32.8 | 18.1 | 39 |
| 2. | An Nasiriyah Station | 13.5 | 25.4 | 35.4 | 26.9 | 55.88 | 40.64 | 0 | 17.78 | 205.6 | 765.6 | 1451.4 | 796.2 | 61.6 | 38.3 | 20.5 | 34.6 |
| 3. | Al Basrah Station | 14.1 | 25.4 | 34.6 | 26.7 | 81.28 | 43.18 | 0 | 27.94 | 187.7 | 594.9 | 1251.2 | 618.8 | 69.2 | 49 | 36.2 | 47.3 |

## 2.6 Soils of the Marshlands

The soils of the Marshlands are primarily made of recent nonconsolidated sediments comprised of fine sand and silt sediments which were deposited in the main channels of the rivers. The second deposition area is in the river overbanks in which silt, fine sand and clay are deposited. Thirdly, the floodplain area receives deposits mainly of clay with an active bioturbation processes taking place .

The 1 m section of alluvial sediments is composed of three types of soil as follows: the alluvial sandy surface layer rich with organic matter is approximately 7 cm in thickness, the shelly clayey silt layer includes a variety of mollusk shells and ranges between 7 and 30 cm in depth, and finally the clay and silty-clay layer ranges between 30-100 cm and includes a wide variety of microscopic marine organisms.

The organic matter in the first layer ranges from 2-20% and is often suitable for the formation of coal. It includes between 20-60% of lime in the form of calcite or chemically precipitated dolomite, and also intermittently includes the shells of microscopic organisms or even shells of larger organisms. The analysis of particle size revealed the composition to be approximately 62% silt, 21% sand, and 17% clay. The mineral analysis also revealed the presence of many clay minerals such as smectite, allite, palygorskite, kaolinite and chlorite in addition to non-clay minerals such as calcite at 43%, quartz at 21%, dolomite at 10%, feldspar at 9%, and authigenicgypsum at 5%.

Soils of the Huwaizah Marshes Protected Area

The Huwaizah Marsh soils are primarily of recent alluvial nonconsolidated nature with a high silt/high calcium ratio reaching 55%, in addition to the presence of quartz and other clay minerals. The calcite composition decreases towards the river which indicates a non-riverine origin, and thus is thought to be a result of high evaporation of open water bodies. The clay minerals in the water bodies resemble the riverine deposits in deltas and the alluvial plain, hence confirming the riverine origin. Often these deposits form dark gray to black layers reaching 50 cm in thickness, and are caused by remnant organic matter of plant origin (peat) or other organic matters mixed with silt. The Huwaizah soil also includes lime nodules and mollusk shells.

Soils of the Central Marshes Protected Area

Similar to the Huwaizah Marshes, the soils in the Central Marshes are recent alluvial depositions comprising silty clay deposits with high calcite content. Here, the 50 cm thick soil is also characterized by the gray to black color layer as a result of the peat, in addition to other organic matter mixed with the silt. It also includes the lime nodules and mollusk shells. The main minerals here are quartz, clay minerals and approximately 50% lime deposits; the latter typically represented by the Baghdadia-Zikri lake composition. Calcite composition decreases towards the river, indicating a non-riverine origin, and thus is thought to be a result of high evaporation of open water bodies. The clay minerals in the water bodies resemble the riverine deposits in deltas and the alluvial plain, hence confirming the riverine origin.

Soils of the East Hammar Marshes Protected Area

The deposits of the East Hammar are mainly made of sandy clay silt. The carbonate composition (lime and dolomite) represent the main Protected Areas of these deposits followed by quartz and feldspar. These deposits are transferred by rivers and wind and include the typical silt minerals mentioned above.

Soils of the West Hammar Marshes Protected Area

The soils of the West Hammar are highly comparable to the other marshes, and contain the dark to black soil layer with a composition mainly of sandy clay silt (70%). Carbonate particles represent the main silt minerals in addition to quartz, feldspar and the typical silt minerals. Quartz composition increases toward the south due to the gradual proximity to the Zubair Plateau. It is also notable here that the Marshlands gradually transform into salt mudflats towards their southern banks adjacent to the sand dunes covering the Zubair Plateau.

## 2.7 Hydrology of the Marshlands

The Marshlands are fed by the branches of the Tigris and Euphrates Rivers, in addition to rain-fed waters during the winter season and its consequent flooding period. The areas covered by

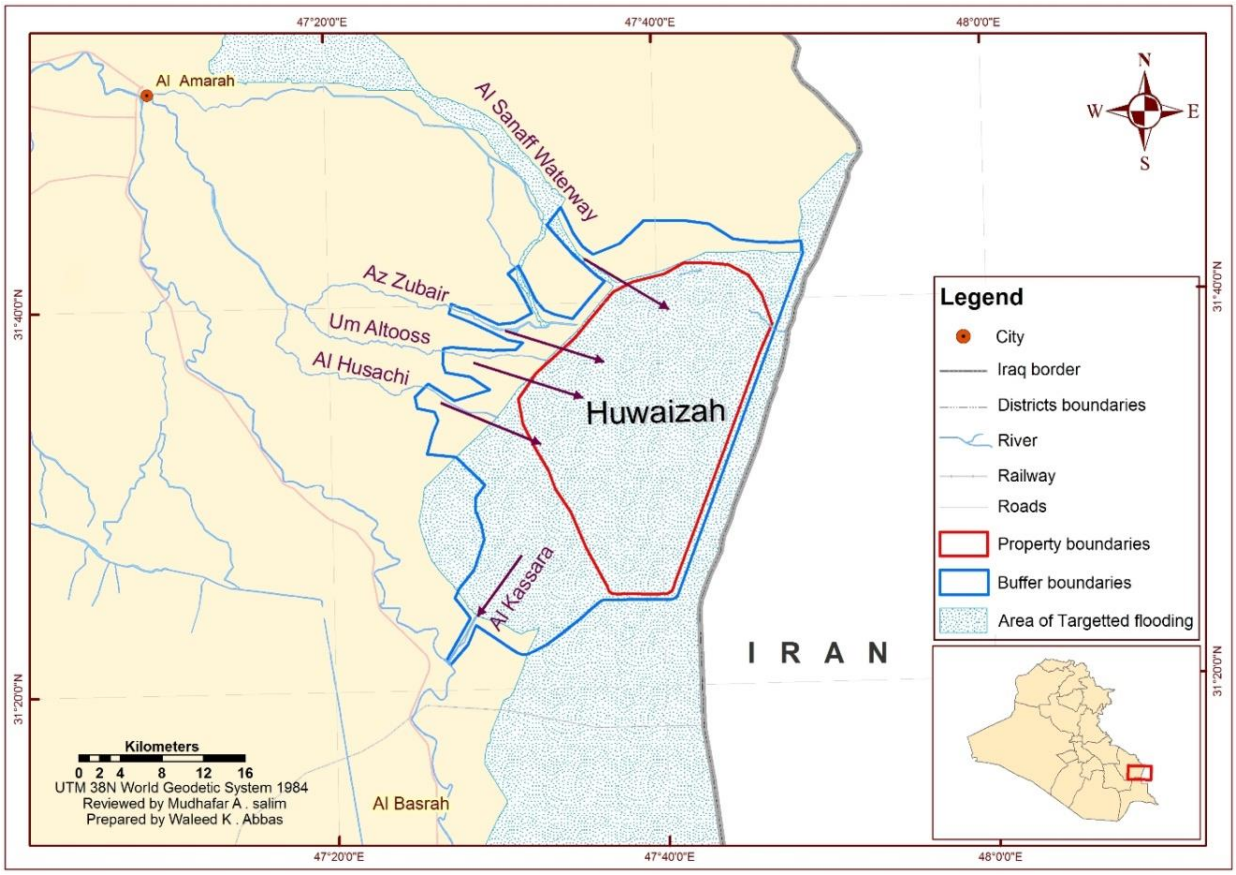
water fluctuate yearly and seasonally, however, waters are highest after the winter flooding and the spring snow melting from the mountain ranges in the north. The total water area is at its lowest during dry summers. This rather continuous and extensive variation in the water levels and water covered surface areas creates a highly variable physical environment which reflects organically on the habitat structures and composition, thus leading to more diversity in terms of ecosystems. This is of high significance when the Marshlands are compared to less dynamic water systems.

Hydrology of Al Huwaizah Marshes Protected Area

The size of the Huwaizah Marsh is 48,131 ha inclusive of the buffer zone. It is fed mainly from the rivers of Mashrah and Kahlah which branch from the river Tigris. The KaHlah River further branches into Ummu Zubair, Altous, and Husayji. Al KaHlah is also fed from the seasonal marsh of Sannaf which receives most of its waters from the rivers of Tayyeb and Dwarej in the northeast. The Kassara drainage is the main drain which actually reconnects with the river Tigris near the village of Kassara. Another outlet is the Swayb drain which pours into the Shatt Al-Arab to the south of the city of Al Qurna located outside the Protected Area.

In addition to the fact that the Huwaizah Marshes enjoy their independent hydrological system, they also feed from other large seasonal floods descending from the surrounding mountain ranges. This characteristic is unique to the Huwaizah, and as a result, had become a key factor maintaining stable levels of water quality and quantity in the Marshes during different seasons and climatic conditions .

Map 2-8: Hydrology of the Huwaizah Marshes




The Huwaizah Marshes stand out from the rest of the Iraqi marshes because they are the only ones that retain their water bodies throughout the year, even in spite of the period of man-induced upstream drainage. The Protected Area embraces a number of large deep ponds averaging between 4-6 m in depth. Further, the water quality of the Huwaizah Marshes is the highest among the rest of the marshes. This is due to the relative difference between sulphates and chloride when compared to the other marsh areas.

The water depths in the Huwaizah vary significantly as compared to the other Protected Areas, reaching maximum depth at Al Athim Lake, Umm Al Ne'aj and Sawda. The average range is from 4 to 6 meters deep, hence generating another factor provoking species diversity. For example, the open water bodies represent a suitable habitat for congregatory birds and their association with the abundance of fish in terms of numbers and species.

Hydrology of the Central Marshes Protected Area

The surface area of the Central Marshes is 146,393 ha inclusive of the buffer zone. These marshes receive their water mainly from the Tigris River through the Batira Gateway, the Grand Majar, and the Arid River. In addition, the western part of the Central Marshes is fed by Abu Zirq Marshes which are connected to the Gharaf River through the Islah Gateway. The south of the Protected Area is fed by the Euphrates via nine branches: the rivers of Khanziri, Abu Judhea', As Saba', Al

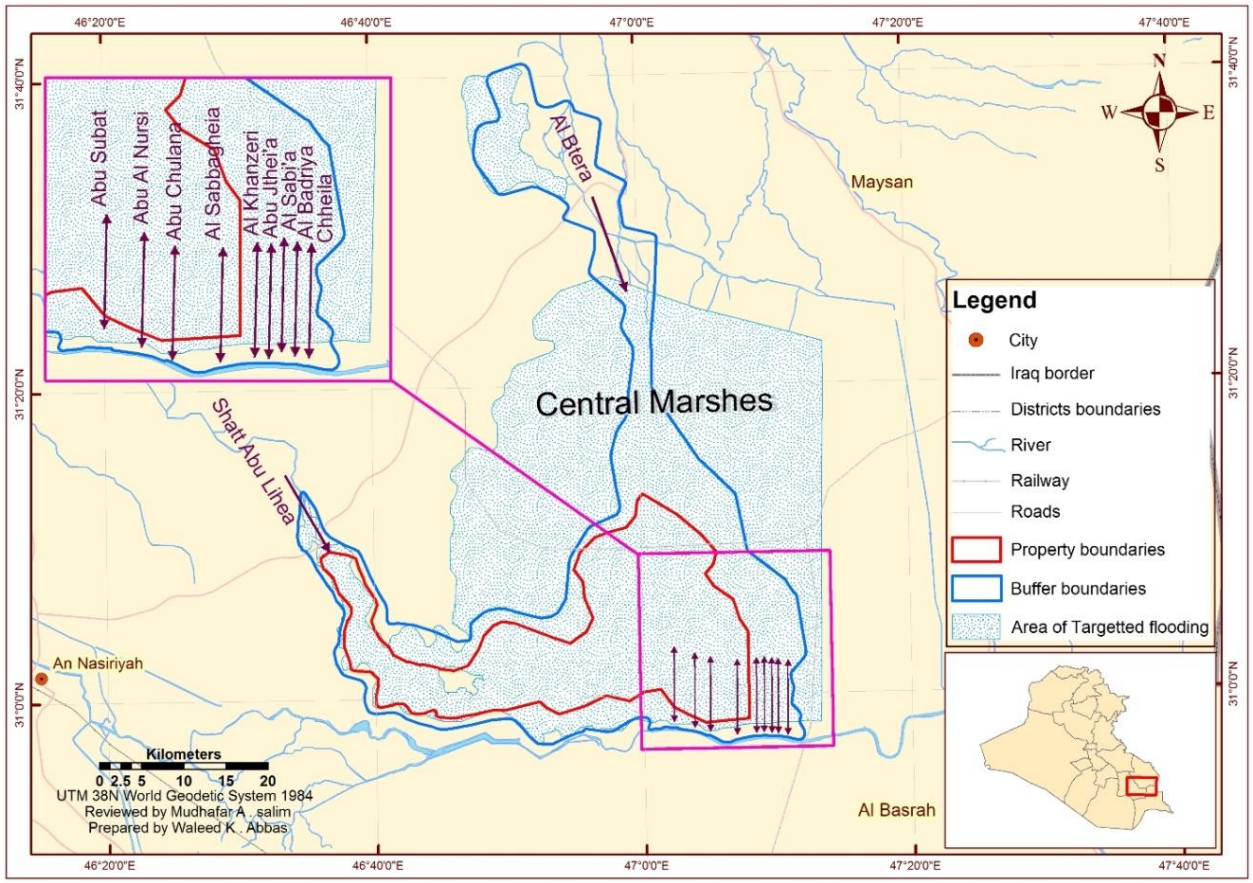
Badria, Hujaylah, Abu Nursi, Abu Sibat, Abu Juwaylanah and Sabagheah. These feeders alternately act as drainage channels for the Central Marshs dependent on the water levels in the Euphrates River and the marshes. Gateways have been established at the inlets of all these rivers to control the water levels.

The Central Marshes have suffered and still do as a result of the fluctuating water influx from the Tigris and Euphrates, in addition to other factors related to drought. A series of hydrological alternatives were adopted to rehabilitate the Central Marshes, and an agreement was reached to establish a dirt dam on the Euphrates River with the main purpose being to supplement water levels of the Central Marshes. The solution was adopted as a temporary one and is currently being monitored to be given a permanent status through the establishment of adequate gateways. So far the impacts of the management measure have been positive and been confirmed to have positive implications on the socioeconomic and ecological conditions of the area. This positive impact extends beyond the Central Marshes to the West Hammar Marshes which are also dependent on water levels of the Euphrates .

Further, the dirt dam triggered an increase in the water level of the Central Marshes, thus leading to more reed vegetation cover as well as an increase in fish numbers and diversity. The fluctuation and variation of water sources of the Central Marshes, the long periods of drought, and inadequate drainage policies have resulted in a dramatic change in the quality of the waters within the Protected Areas, with indications of higher relative salt and mineral concentrations. On the other hand, the Central Marshes are characterized by high reed densities intertwined with open water ponds of various sizes and depths. Some of these are Baghdadi Lake and the Big Hammara and Small Hammara lakes, in addition to some older lakes such as Zijri, Umm Al Bunni and Kubab.

The variation in the topography of the Central Marshes further enriches the biological productivity of the areas in terms of vegetative cover and wildlife numbers, an ecosystem service which contributes significantly to the local economy and sustainable livelihoods. Moreover, the rather reciprocal water feeding process between the Euphrates River and the Central Marshes, and the function of the water retention structures as feeders as well as drainage outlets, have led to the improvement of the water quality of the Central Marshes, particularly within their central and southern parts.

Map 2-9: Hydrology of the Central Marshes



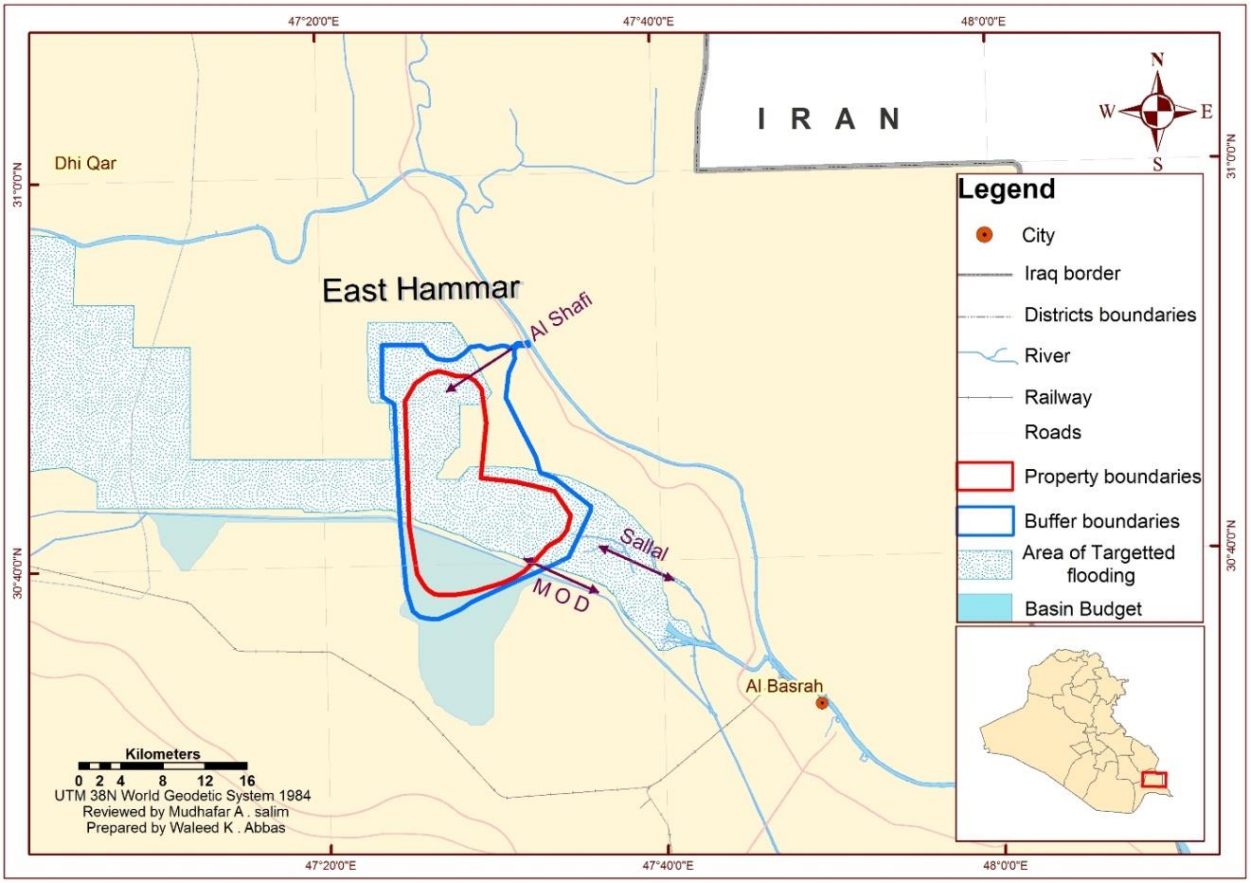

## Hydrology of the East Hammar Marshes Protected Area

The East Hammar Marshes have a particular hydrology, different from that of the other protected areas. They are highly affected by tidal movements from the Arabian Gulf through the Shatt Al-Arab and the Zubair Lagoon. The effect of the tidal waters in terms of quality and quantity vary across the Protected Area and result in the fluctuation of water levels even on a daily basis. This unique dynamic has a direct impact on the ecological constituents of the Protected Area as compared to the other protected areas Protected Areas. During the last few decades, a drought has led to an increase of the maritime tidal effect on the area, resulting in a higher salinity level, which has in turn led to the redistribution of key fauna and flora reflective of the water quality.

The surface area of the East Hammar Marshes is 33,062 ha inclusive of the buffer zone. These marshes are fed from the north by the Shaafi River which branches from the Shatt Al-Arab. The middle area of the East Hammar is supplied from the Mashab and Sallal Rivers which alternately act as drains depending on tidal movement. The southern areas of the Protected Area are fed through the General Drainage Channel which crosses through the southern parts of the Protected Area, carrying drained waters from areas far to the west through the Shatt Al Basrah Channel and Al Zubair Lagoon. The Shatt Al Basrah Channel is directly connected to seawater, increasing the

effect of tidal movement on the southern parts of the Protected Area and allowing the General Drainage Channel to act as both a feeder and a drainage system.

Map 2-10: Hydrology of the East Hammar Marshes




Hydrology of the West Hammar Marshes Protected Area

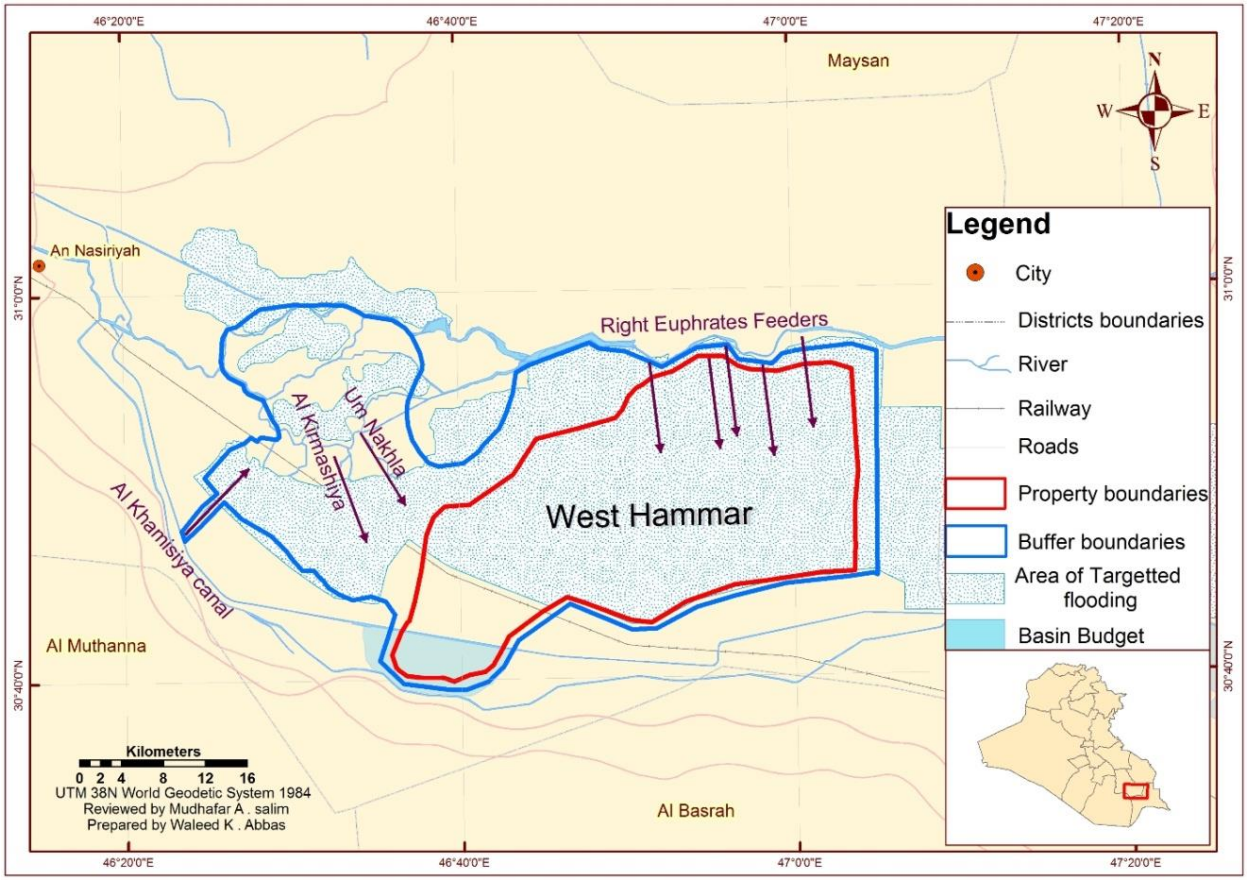
As a result of their southern location, the West Hammar Marshes are fed solely by the Euphrates. The eastern parts of these marshes are fed from between the cities of Suq Ash Shuyukh and Ach Chubaish. Recently, a measure was taken to address the issue of water shortage by connecting a secondary channel from the General Drainage Channel to the West Hammar. This is considered to be a temporary measure until a permanent solution is adopted.

The area of the West Hammar Marshes is 148,393 ha inclusive of the buffer zone. The southern and southeastern parts of these marshes are fed from a cluster of rivers and channels which originate from the Euphrates. Two important rivers to the West Hammar are Karmashea and Umm Nakhla which supply the northwest parts of these marshes all the way to the center. These primary feeders suffer from water shortage towards their southern extension due to exhaustion from irrigation use. It is important to note, however, that the post irrigation drainage water goes back to aquatic ducts which resupply the West Hammar Marshes with a relatively large quantity of water.

The water depth in the West Hammar slightly varies from 1.8 to 3 m, depending on the water quantities received from the main feeding channel from the Euphrates. This gradual change in water depth towards the middle and south of the marshes, along with their brackish water quality, represent key factors determining the marshes' level of species diversity and abundance.

The West Hammar Marshes were subject to a substantial water shortage in 2008 and beyond. As a result, an alternative was adopted by the government to enhance water supply through a branch from the General Drainage Channel in late 2009. This is the Khamaysea Canal which supplies an average of 20-50 $m^3$/sec. Despite the fact that the salinity of these marshes is now relatively high, due to the rather saline source, the Khamaysea supply has had a significant contribution to the increase in flooding levels. This has led to the return of much of the vegetation cover including reed and papyrus, and associated fish and bird species. Further, human settlers that had abandoned the area due to the drought have been increasingly returning to their traditional settlements.

Map 2-11: Hydrology of the West Hammar Marshes



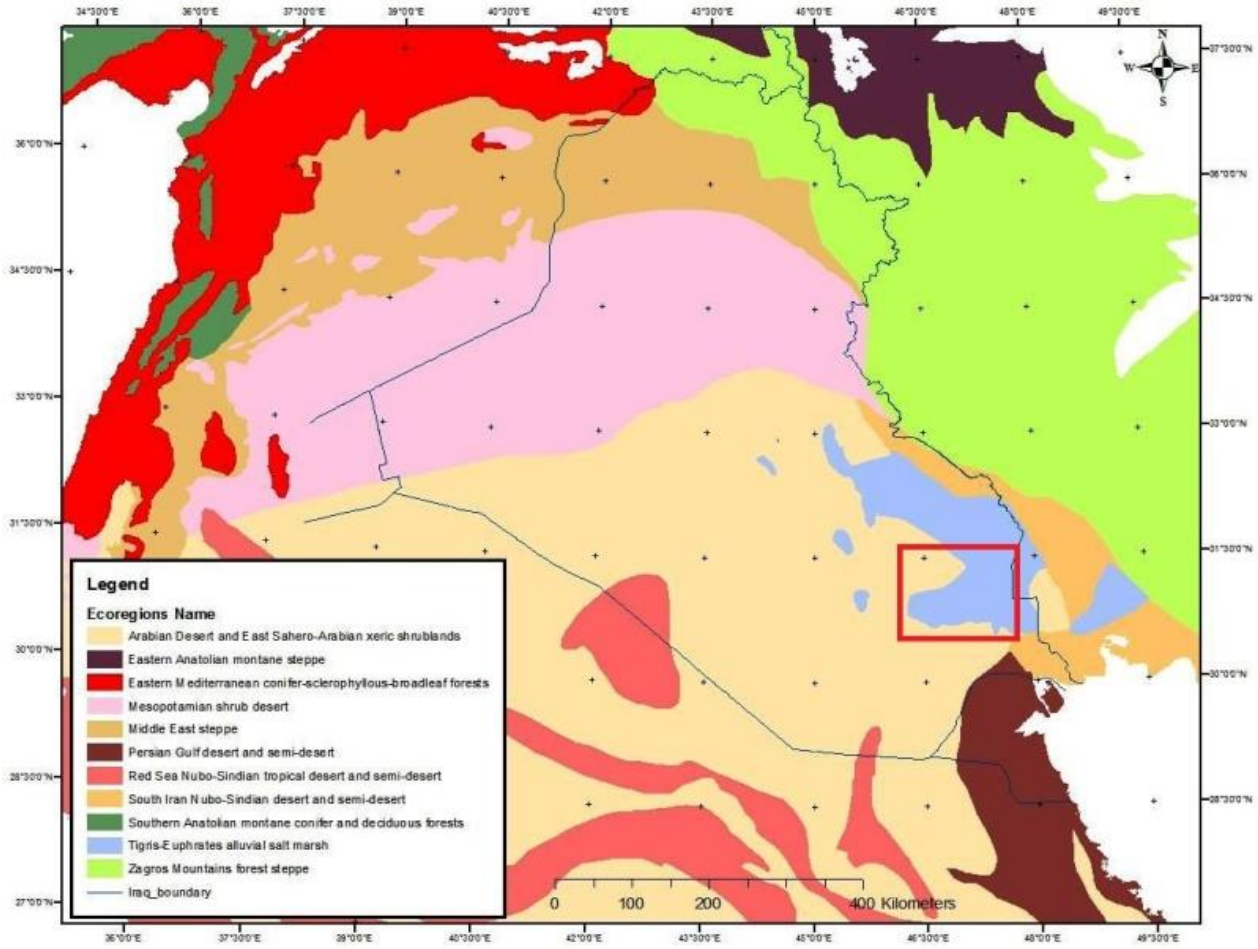
## C. Biological Information

### 2.8 Habitats of the Marshlands

The Marshlands are described as "internal wetland alluvial marshes' characterized by shallow fresh water, and are integral to the Tigris-Euphrates alluvial salt marsh.

The Marshlands are embedded in a vast semiarid desert environment which shapes the characteristics of their dry arid climate. Physical and natural factors interact here to produce a diverse biological mosaic of outstanding universal value.

Map 2-12: The Location of the Marshlands within the WWF Category System




The habitats of the Marshlands are divided into three primary categories, the water habitats, the marsh habitats and the terrestrial habitats as follows, (Fig 2-6):

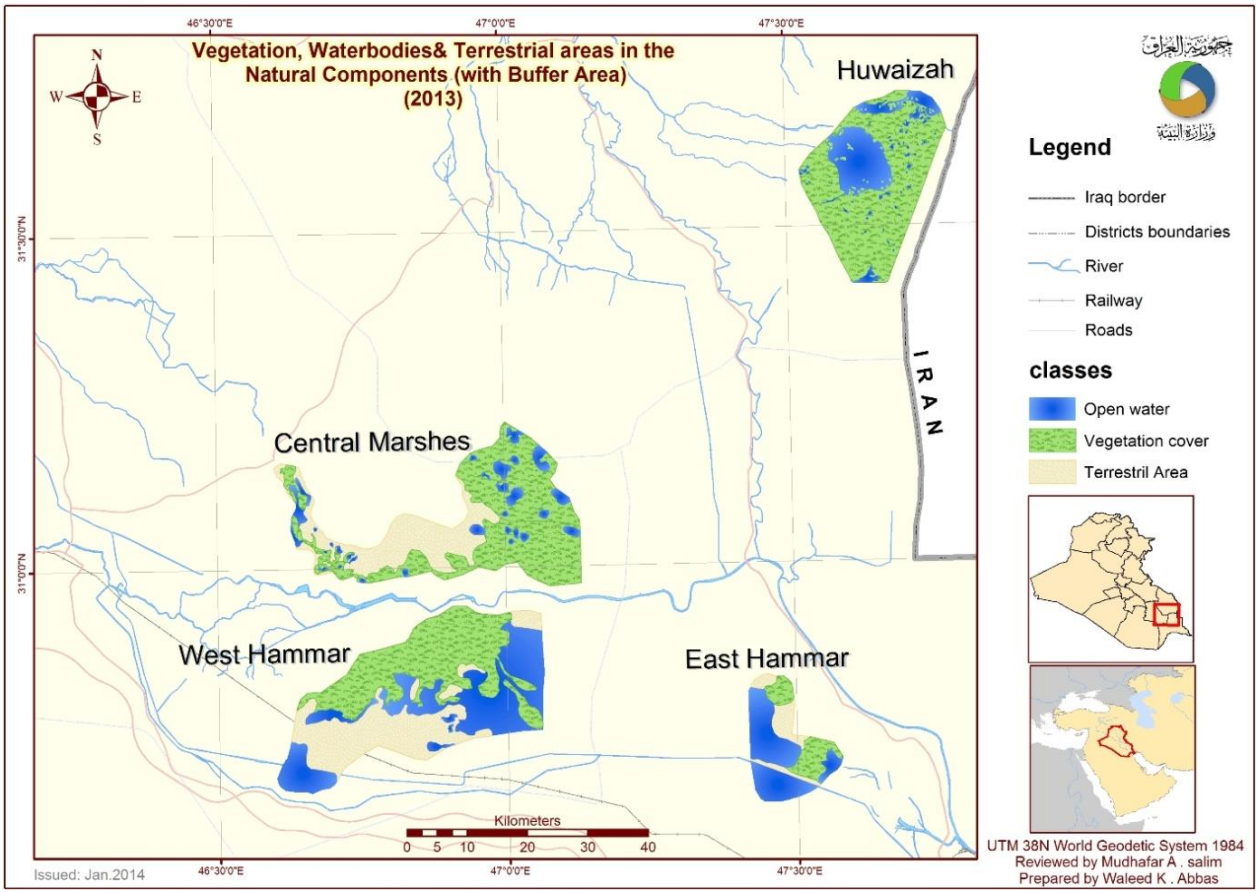
1. Water Habitats:
    a. Inland river or canal
        a.i. Unvegetated rivers and canals

a.ii. Submerged river and canal vegetation
a.iii. Riparian vegetation
b. Inland standing water
c. Unvegetated mudflat
d. Aquatic communities
d.i. Submerged aquatic vegetation
d.ii. Free floating vegetation
d.iii. Floating-leaved aquatic vegetation
e. Pond or lake – unvegetated standing water

2. Marsh Habitats
a. Permanent marsh
a.i. Herbaceous tall emerged vegetation (Helophytic vegetation)
a.i.1. Reed bed *Phragmitesaustralis*
*a.i.2.* Reed mace bed *Typhadomingensis*
*a.i.3.* *Schoenoplectus litoralis* bed
a.i.4. *Cladium mariscus* bed
a.ii. Woody vegetation
a.ii.1. Riparian willow *Salix* sp.
a.ii.2. Riparian poplar *Populus* sp.
b. Brackish or saltwater marsh vegetation
b.i. Salt pioneer swards with phanerogamic communities

3. Terrestrial Habitats
a. Desert
a.i. Desert shrub
a.ii. Unvegetated desert
b. Woodlands
b.i. Shrubs
c. Herbaceous vegetation
c.i. Sparsely vegetated land

Map 2-13: Habitats of the four Protected Areas




Habitats of the Huwaizah Marshes Protected Area

The habitats of the Huwaizah Marshes are primarily of two categories: aquatic and marsh habitats. The aquatic habitats are represented in the main branch of the Tigris River that enters the Huwaizah Marshes, also known as the inland river, or canal, which further divides into a number of secondary habitats.

In some cases, the river beds and water canals that are subject to high water velocity are free of flora species, and are described as non-vegetated rivers and canals. In contrast, the submerged plant species occur in rivers and water canals with less water velocity. This is described as submerged river and canal vegetation. The rivers cause the precipitation of sandy clay mud over the banks from the main runoff of the river, creating parallel shallow banks with lush riparian vegetation. These areas are considered extremely rich and are usually used for agriculture and usually colonized by various grass and shrub species. Another habitat system is the inland standing water habitat that is representative of the open water bodies with mainly silt deposits. Again, these include a number of secondary habitats.

During the flooding season, increased water levels cause the extensive plains areas to be covered with temporary water bodies which eventually dry out during the dry season. This is a seasonal

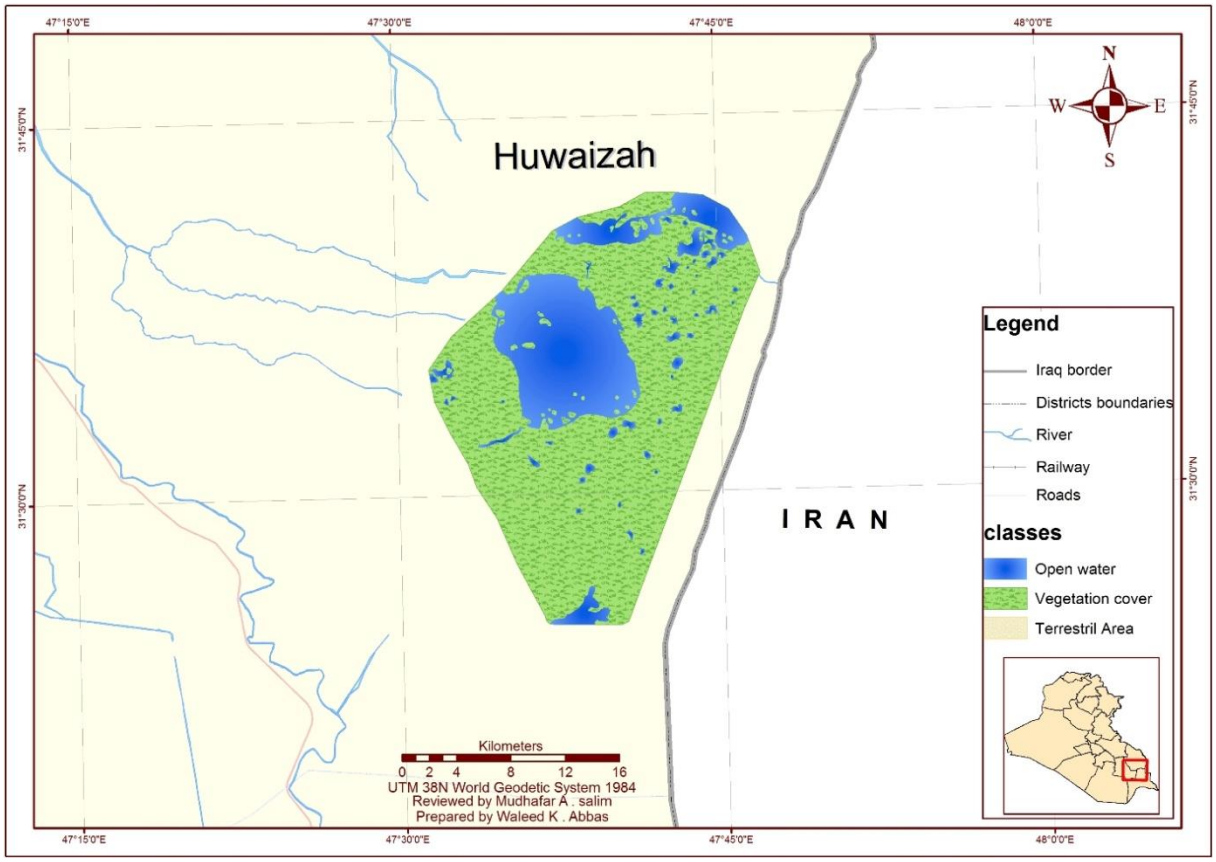
process and is very characteristic of the Marshlands. The transitional areas between the water bodies and the dry lands form a narrow strip of clay deposits which are highly influenced by the amount of water collected. This creates what is known as non-vegetated mudflat habitats. Further, the aquatic communities' habitats are secondary habitats with characteristics particular to shallow waters. These host a variety of plant types: submerged aquatic vegetation, free floating vegetation, and floating leafed aquatic vegetation.

There are more habitats that form in the northern parts of the Huwaizah Marshes where the permanent plant-free water ponds are established. These are called lake non-vegetated standing water. They are up to 4 m in depth and often include the "tahal" phenomenon, which are sturdy floating reed clusters.

The second type of primary habitats present in the Huwaizah Marshes is called the marsh vegetation habitat. This includes two secondary habitats. The permanent marsh habitat is dominant and characterized by dark deposits that reach to 50 cm in thickness. This habitat is unique for its helophytic vegetation and the dominant vegetation type of herbaceous tall emerged vegetation. The habitat is dominated by two plains species: the Reed bed, *Phragmites australus* and the Reed mace bed, *Typha domingensis*. In addition, woody vegetation cover is established on the marsh banks or in their proximity, and usually includes two types: the Riparian willow dominated by the *Salix* sp. and the Riparian poplar, mainly *Populus* sp.

The other secondary habitat is that of brackish or saltwater marsh vegetation which contains similar deposits as those of the permanent marshes, however, this habitat is characterized by the Salt pioneer swards which are usually present in the vicinity of the gateways of water level regulators. The occurrence of such vegetation is a result of osmosis and high temperatures which create suitable conditions for halophytic vegetation, including *Suaeda* sp. and *Tamarix* sp.

Map 2-14: Habitats of the Huwaizah Marshes

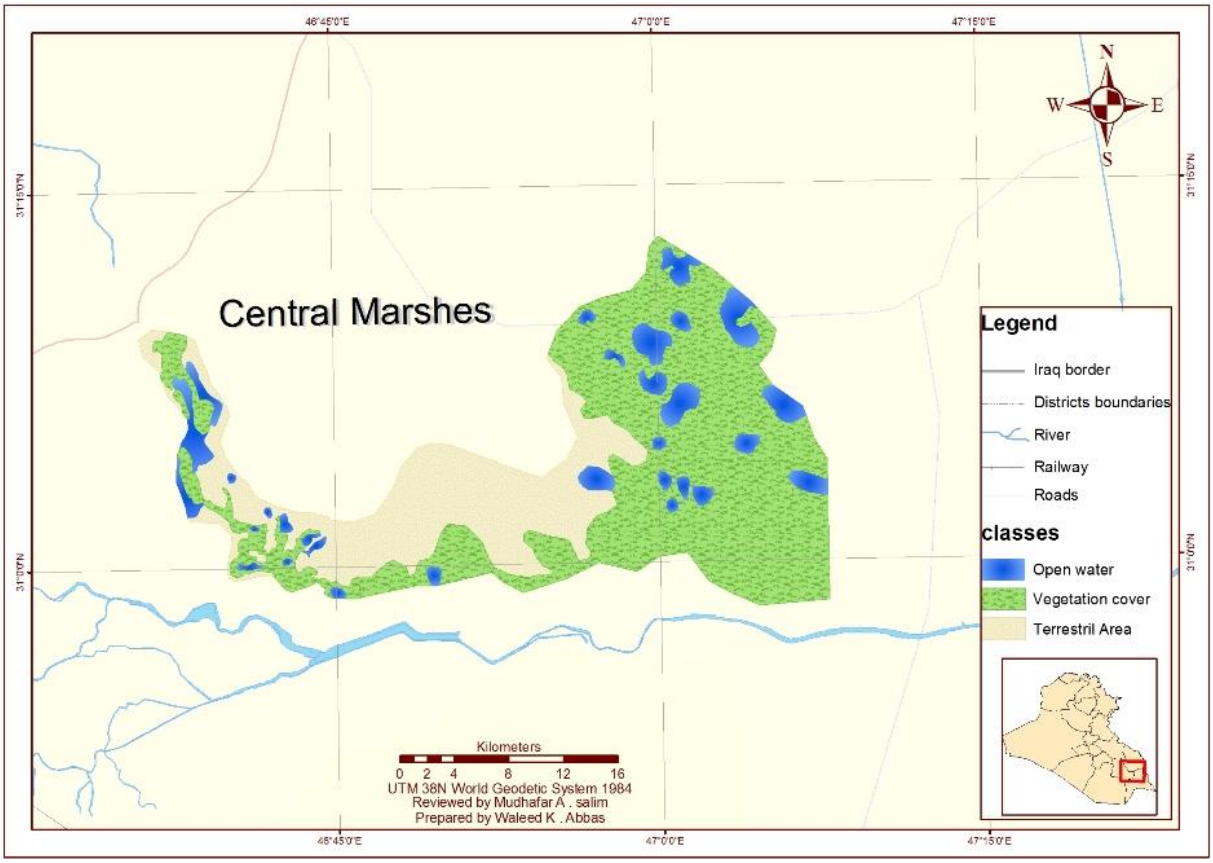



Habitats of the Central Marshes Protected Area

There are three types of habitats in the Central Marshes: the aquatic, marsh, and terrestrial habitats. The aquatic habitats follow the same description as those in the other protected areas (see the Huwaizah Marsh habitat description above). One difference, however, is the absence of the ”jepshat” phenomenon in the Central Marshes.The habitats of the Central Marshes are also typical of those in the other Protected Areas.

The terrestrial habitats found in the Central Marshes include three subcategories: the desert habitat, the desert shrub/woodland habitat and the herbaceous vegetation habitat. The desert habitat embraces permanent desert plant species with high temperature tolerance. These include *Capparis spinosa* and *Prosopis farcta*. The rest of the desert areas are usually unvegetated. The woodland habitat is dominated by shrub species such as *Tamarix* sp., and the herbaceous vegetation category is present in sparsely vegetated lands.

Map 2-15: Habitats of the Central Marshes

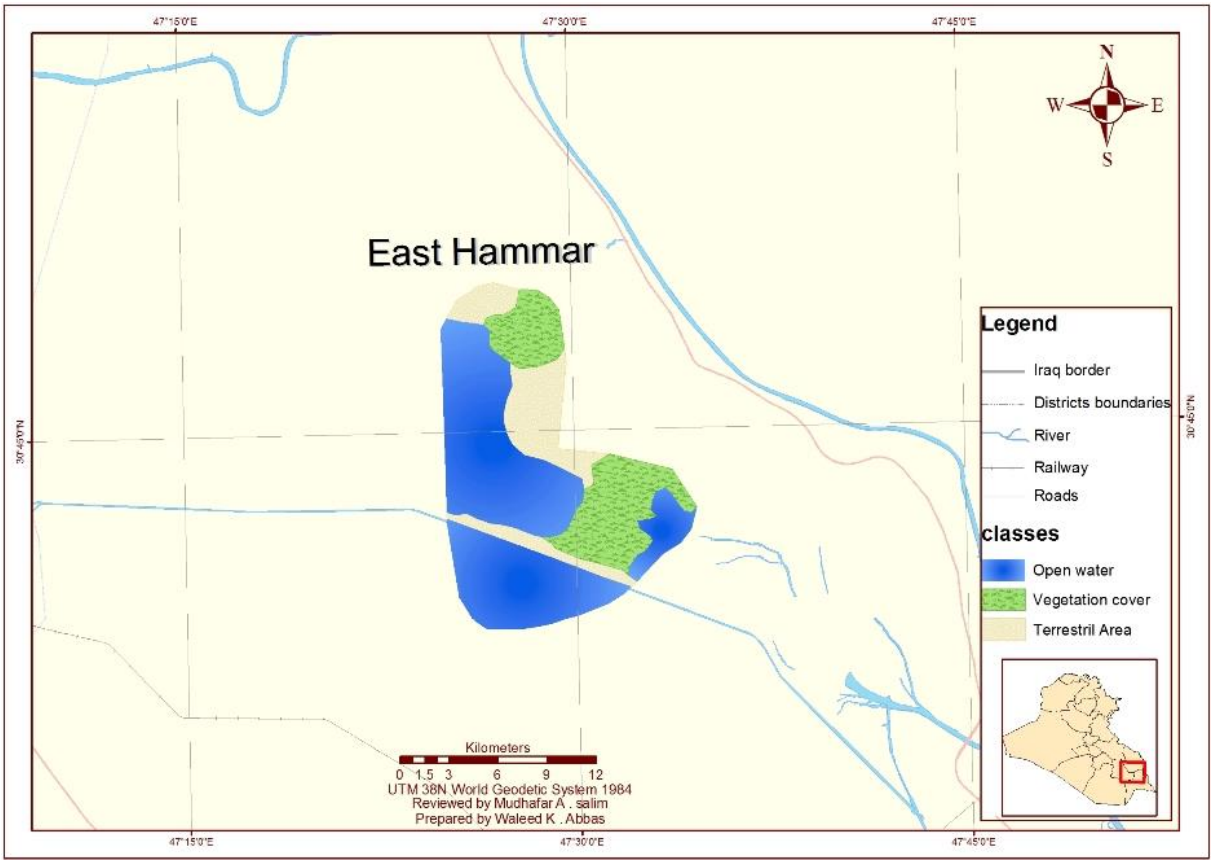



Habitats of the East Hammar Marshes Protected Area

The habitats of the East Hammar Marshes follow the same pattern as the Central Marshes. However, the aquatic habitats in the East Hammar are categorized with relatively high salinity, leading to the establishment of what is referred to as salt water habitats. These are evident in the southern parts of the Protected Area, and are dominated by halophytic plant species which belong to phanerogamic communities.

Further, the marsh vegetation is different from that of the Central and Huwaizah Marshes due to the inclusion of some carbonized organic matter of dark color, lime nodules, crystalline and non-crystalline gypsum, and mollusk shells. It is also noticeable in the East Hammar that the Salt pioneer swards extend to much larger areas as compared to the Huwaizah and Central Marshes. Further, the terrestrial habitats are similar to those of the Central Marshes except that *Lycium barbarum* is present here.

Map 2-16: Habitats of the East Hammar Marshes



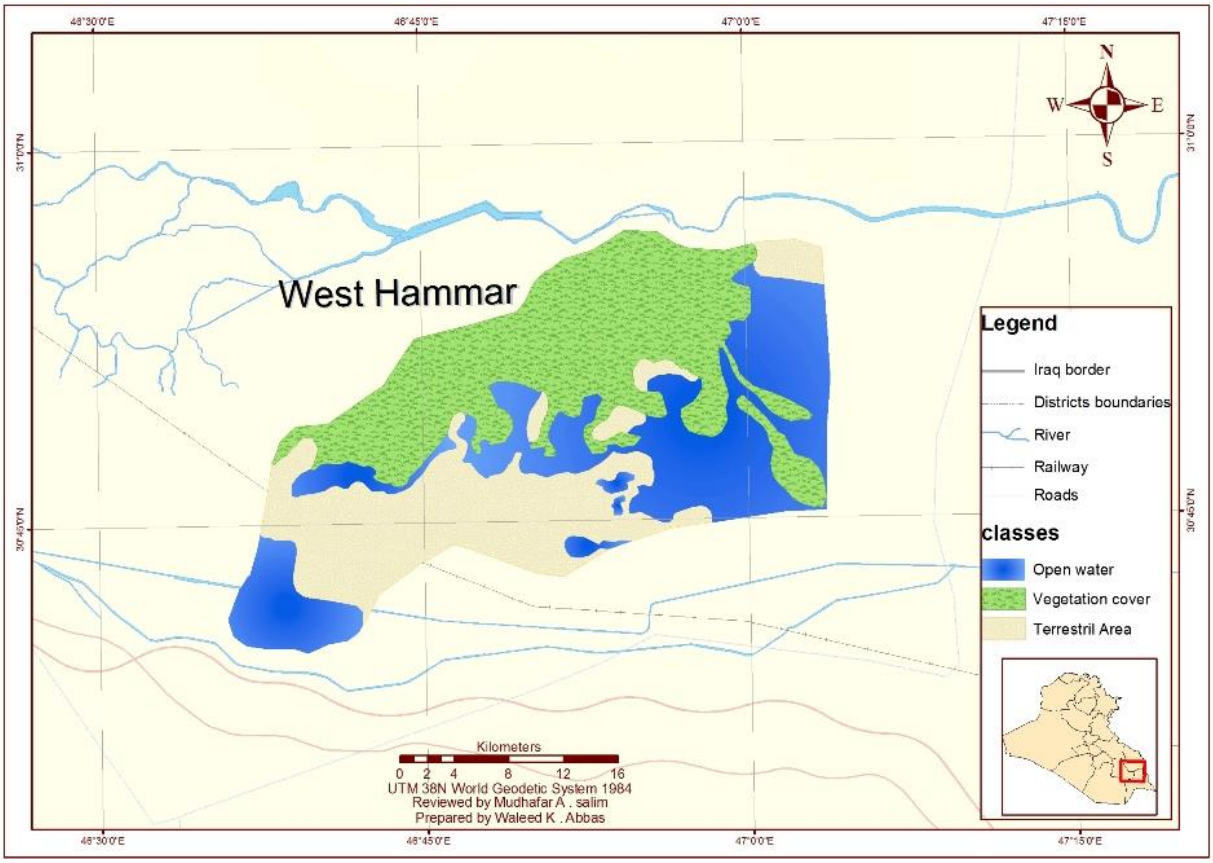

Habitats of the West Hammar Marshes

The habitat description of the West Hammar is almost identical to that of the East Hammar in regards to the water habitat category, with one difference related to the depth of the unvegetated still water which more resembles that of the Huwaizah Marshes. However, here there is an evident salt water habitat well demonstrated in the Al Rashed Marshes.

These marshes' vegetation habitats are also very similar to those of the other Protected Areas, except for the presence of the 50 cm dark deposit layer resulting from remnants of decomposed organic matter. Further, as for the habitats, the impact of inefficient drainage systems has affected the quality of water, and subsequently the composition of the various marshes.

The terrestrial habitats are similar to the rest of the Protected Areas with no particular mentionable difference.

Map 2-17: Habitats of West Hammar Marshes




## 2.9 Flora of the Marshlands

The vegetation cover in the aquatic and terrestrial habitats of the Marshlands represents a foundation for the ecological web on which the remaining biodiversity elements are dependent. Different plants form basic habitats needed for the reproduction of fish migrating from the sea to the protected area. The same is the case with regard to nesting endemic threatened and near-threatened bird species. Alwaan, in his 2006 report on the Marshlands, confirms the historic presence of 104 species of aquatic plants; while in 1977, Al Heely recorded 371 species (noting that the latter study was not limited to the Marshlands of southern Iraq).

Today there is confirmation of the presence of 86 species of plants belonging to 34 families. The family Cyperaceae forms the largest family within the Marshlands, and the species of *Ranunculus sphaerospermus* and *Nymphaea alba* are of regional importance (regionally threatened). There are ten different vegetation types in the Marshlands, and they represent the succession of vegetation cover across the three natural habitats (aquatic, marsh, and terrestrial). This succession was critical for enlisting the Huwaizah Marshes on the Ramsar Convention. Following is a brief description of each of these vegetation types:

1. Riparian vegetation: this vegetation type extends across the banks of the inland water bodies and running water streams, and mainly includes annual species and perennial shrubs such as *Tamarix* sp., *Capparis spinosa*, *Polygonum salicifolium*, *Bacopa monnieri*, *Cynanchum acutum*, *Panicum repens*, *Paspalum paspaloides*, *Aeluropus lagapoides*, *Cynodon dactylon*, and *Cressa critica*.
2. Submerged aquatic vegetation: this vegetation type is considered one of the most common to the aquatic environment of the marshlands. It dominates the inland water bodies, both stagnant and running, and includes the threatened species *Ranunculus sphaerospermus*. The vegetation type is characterized by species such as *Myrophyllum vercitillatum*, *Najas marina*, *Najas minor*, *Vallisneria spiralis*, *Potamogeton crispus*, *P. lucens*, *P. nodosus*, *P. pictinatus*, *P. perfoliatus*, and *Ceratophyllum demersum*.
3. Free floating vegetation: as the name indicates, this vegetation type floats on still water bodies, with a blooming period during spring and the beginning of summer. The vegetation type is represented by species such as *Lemna gibba*, *Lemna minor*, and *Salvinia natans*.
4. Floating leaved aquatic vegetation (rooted floating vegetation): like ”free floating vegetation” this type of vegetation also grows in the still inland waters, however, more in the open shallows. The plants of this type have leaves that float and lower vegetative parts that are submerged and anchored in the soil. Representative taxa include species such as: *Nymphaea alba*, and *Nymphoides indica* .
5. Herbaceous tall emerged vegetation (helophytic vegetation): this vegetation type is dominant in the marsh habitats and is widely spread across the marshlands. The vegetation type is dominated by *Phragmites australis*, *Typha domingensis*, *Schoenoplectus litoralis*, and *Cladium mariscus*. It is important to note that the reed plant is a natural symbol of the Marshlands, which is reflective of its abundance and significance to the marshlands.
6. Trees (woody vegetation): this vegetation type occurs in various areas of the Marshlands, mostly in the vicinity of dried water bodies. The vegetation type is represented by the genus *Salix* and *Populus*, noting that these are the only two native trees occurring on the marshlands.
7. Halophytic vegetation: this vegetation type spreads in the marsh areas bordering the water bodies, especially in areas with high soil salinity resulting from evaporation and osmosis. The family Chenopodiaceae is dominant here, represented by *Halocnemum strobilaceum*, *Salicornia herbacea*, *Suaeda* sp., and some *Tamarix* sp.

The above vegetation types represent both the aquatic and marsh habitats. The following three vegetation types are specific to terrestrial habitats of the Marshlands:

8. Desert shrub vegetation: this vegetation type is notable in the desert areas which are dominated by varying densities of desert shrubs. Heat tolerant plants are the main ones occurring here, such as *Lyceum barbarum*, *Capparis spinosa*, and *Prosopis farcta*.
9. Woodland shrub vegetation: this is represented by small shrubs mainly from the dominant taxa of *Tamarix* sp.

10. Sparsely vegetated land vegetation: this vegetation type is a fundamental Protected Area of the grassland habitat. It manifests itself in patchy green areas and is dominated by *Polypogon monspeliensis*.

Flora of the Huwaizah Marshes Protected Area

The Huwaizah Marshes are the richest in terms of plant life among the four Protected Areas. They embrace 32 families and approximately 68 species, with the highest number of species belonging to the family Cyperaceae (with 15 species). The Huwaizah include the seven main vegetation types representative of the marsh habitats. Three of these are dominant; the free floating vegetation with the floating leaved aquatic vegetation (14%), the submerged aquatic vegetation (29%), and the herbaceous tall emerged vegetation (26%). Key representative species of the Huwaizah Marshes include the species of *Phragmites australis*, *Typha domingensis*, *Salvinia natans*, *Lemna minor* and *Ceratophllum demersum*. In addition to these, the regionally threatened species *Ranunculus sphaerospermus* is also present.

Flora of the Central Marshes Protected Area

The Central Marshes have historically been the hub of plant diversity in the Marshlands. They include the three habitat types and representation from each of the ten vegetation types listed above. The Central Marshes host 28 plant families and 65 species. The highest number of species belongs to the family Poaceae, with eleven species. The submerged vegetation type is dominant in these marshes with 45%, and is represented by the genus *Potamogeton* and the species *Ceratophyllum demersum*. Second to that is the herbaceous tall vegetation, with approximately 22%, dominated by *Phragmites australis* and *Typha domingensis*. A mere 11% belong to the floating vegetation types and the final 22% is shrub vegetation.

The regionally threatened *Ranunculus sphaerospermus* is common to the Central Marshes. Sparse marshes also occur in the internal areas, providing adequate habitats for halophytic shrubs including *Salicornia herbacea*, *Halocnemum strobilaceum*, *Tamarix* sp., and *Suaeda* sp. The desert habitats of the Central Marshes host typical species of *Capparis spinosa*, *Lysium barbarum* and *Prosopis farcta*. Finally, there is a scattered occurrence of species representative of the shrub vegetation type.

Flora of the East Hammar Marshes Protected Area

17 families and 33 species have been recorded in the East Hammar Marshes. The family Poaceae again has the highest representation with seven species. The East Hammar is the least diverse in plant life as compared to the other Protected Areas, and contains seven of the ten vegetation types. A particular characteristic of these marshes is the salinity due to sea water, resulting in a domination of the submerged vegetation type at 48%. Herbaceous tall vegetation accounts for approximately 39%. The following species are dominant here: *Phragmites australis*, *Schenoplectus luteus*, *Potamogeton pectinatus*, *Meriophyllum verticillatum,* and *Ceratophyllum demersum*. The East Hammar are also characterized by the presence of internal salt marshes

which are a good habitat for halophytic species such as *Salicornia herbacea*, *Halocnemum strobilaceum*, *Tamarix* sp. and *Suaeda* sp. In the desert habitats (terrestrial), the perennial heat tolerant species dominate, including *Capparis spinosa*, *Lysium barbarum* and *Prosopis farcta*.

Flora of the West Hammar Marshes Protected Area

The West Hammar Marshes embrace 44 species of plants belonging to 25 families, with seven of the species belonging to the Poaceae family. This Protected Area includes representation from nine of the vegetation types. The submerged vegetation and herbaceous tall vegetation are dominant, with typical representation by *Phragmites australis*, *Typha domingensis*, and *Schenoplectus litoralis*. The species *Panicum repens* is another species dominating the banks of these marshes. Submerged vegetation is represented by *Ceratophyllum demersum* and the regionally threatened *Nymphaea alba*. Salt marshes are abundant here as well and are dominated by *Halocnemum strobilaceum*, *Suaeda* sp., *Salicornia herbacea* and *Tamarix* sp. In contrast, the desert habitats include the heat tolerant perennial species of *Capparis spinosa*, *Lysium barbarum*, and *Prosopis farcta*.

## 2.10 Fauna of the Marshlands

An Overview

The Marshlands of southern Iraq are home to 38 species of mammals, 264 species of birds, 21 species of reptiles and amphibians, and 44 species of fish. The Ahwar represent the natural habitats in which such species flourish and disperse over vast areas of aquatic, marsh and land habitats and ecosystems.

Of the vertebrates occurring in the Marshlands, there are 26 species and subspecies that are either endemic to the marshes or, in case of fishes, to the Euphrates-Tigris system. According to the IUCN Red List, 16 species of vertebrates that are recorded in the Marshlands are globally threatened in addition to 15 other species that are near threatened. Annexes of the nomination file include a full inventory of the species present.

The Marshlands support several criteria related to biodiversity which qualify them to be wetlands of high global importance. This recognition was initiated by the inclusion of the Huwaizah Marshes on the Ramsar List in 2006 under 5 criteria out of 9 adopted for the agreement.

Historically speaking, the Marshlands are a prime site for wintering water birds in the west of Eurasia. The Marshlands include seven important bird areas (IBAs) identified in 1995, which demonstrates their global caliber. A recent (to be published) study was undertaken by Nature Iraq to update the IBA list, and the addition of four new IBAs was proposed for within the Marshlands. Under the current study, each of the four protected areas represents a main IBA .

Furthermore, the Marshlands are considered to be the largest wintering and stop-over site within the dry/arid climate, as they are a global gateway for migrating birds on the Siberia-Caspian-Nile route. This is also the largest of three migration routes belonging to the Western Palearctic eco-region for duck species. In addition, the marshlands is part of the West Asia-East Africa migration route of waders and shorebirds (see figure 7).

The Marshlands are a natural refuge and critical resting area for millions of nesting and visiting bird species. It is evident that the Huwaizah and East Hammar Protected Areas are the wintering grounds for two thirds of the water birds of the Middle East, thus reconfirming their vital contribution to global biodiversity priorities .

Figure 2-8: Location of the marshlands (●) in relation to: 1) West Asia/East Africa migration route for waders (source: Boere & Stroud 2008) 2) West Asia/East Africa flyway for shorebirds (pale red shading) (Source: Boere & Stroud 2008).

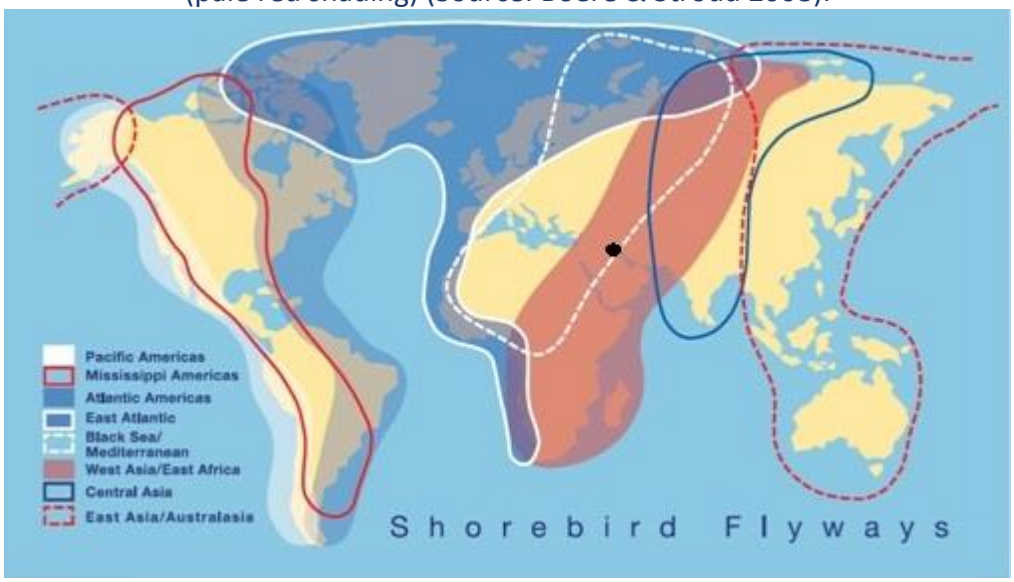
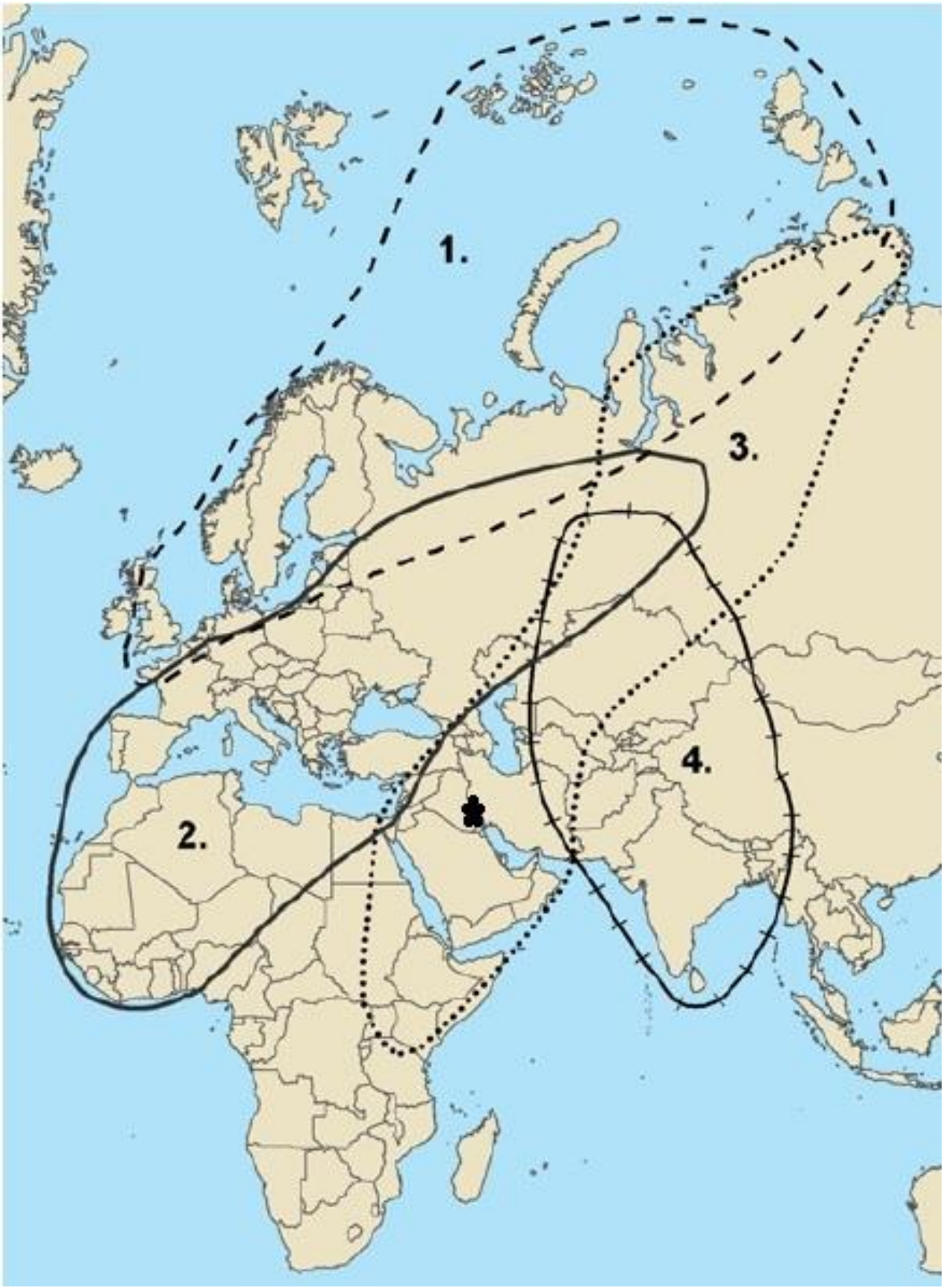


Figure 2-9: Location of the marshlands (●) in relation to the West Siberian/Caspian/Nile flyway for ducks (flyway 3)



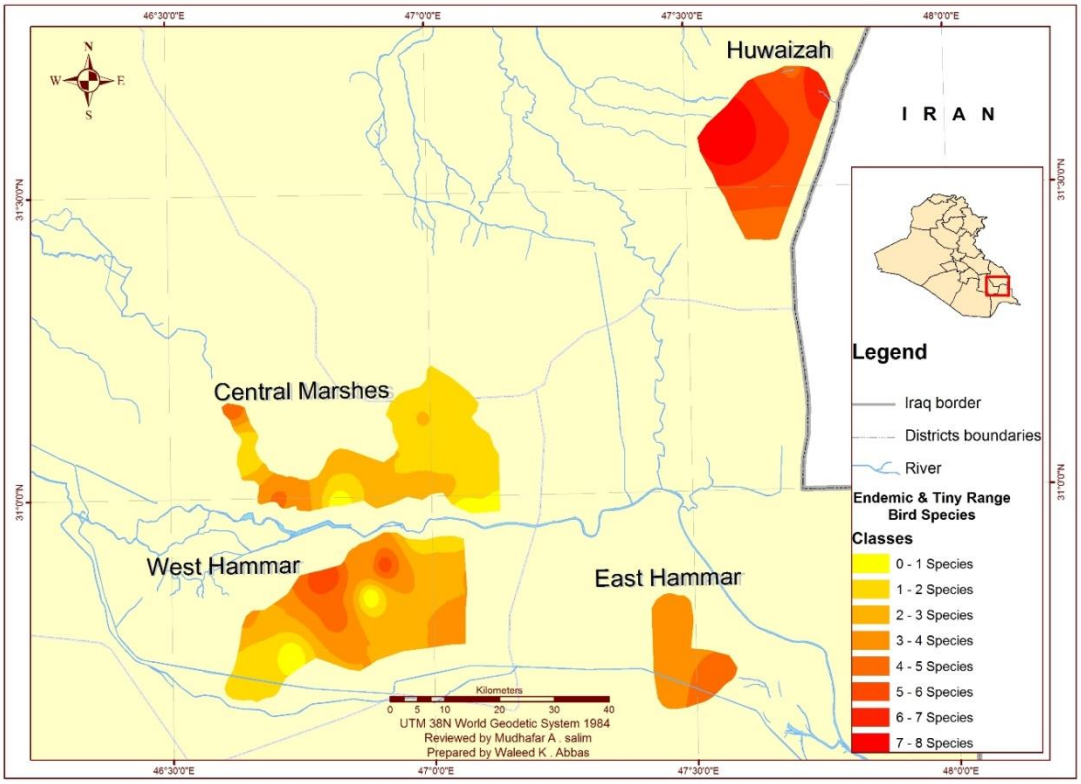
Birds of the Marshlands

The Marshlands are a critical habitat for 68 species of water birds as more than 1% of their global population is recorded in the area. 77 bird species have been recorded breeding in the Marshlands. Furthermore, the marshlands hosts over 10% of the world's population of approximately 35 species of migrating birds, and this percentage often reaches 50% in peak migration seasons. A prime example of the latter case is the Marbled Teal (*Marmaronetta angustirostris*) of which approximately 18,000-20,000 were observed wintering in the Marshlands of southern Iraq, representing about 40% of its global population. Another outstanding example is the Basra Reed-warbler (*Acrocephalus griseldis*) for which the Marshlands are the breeding grounds of more than 70% of the maximum estimate of its global population. The Marshlands are also home to twelve globally threatened species and another twelve near threatened bird species .

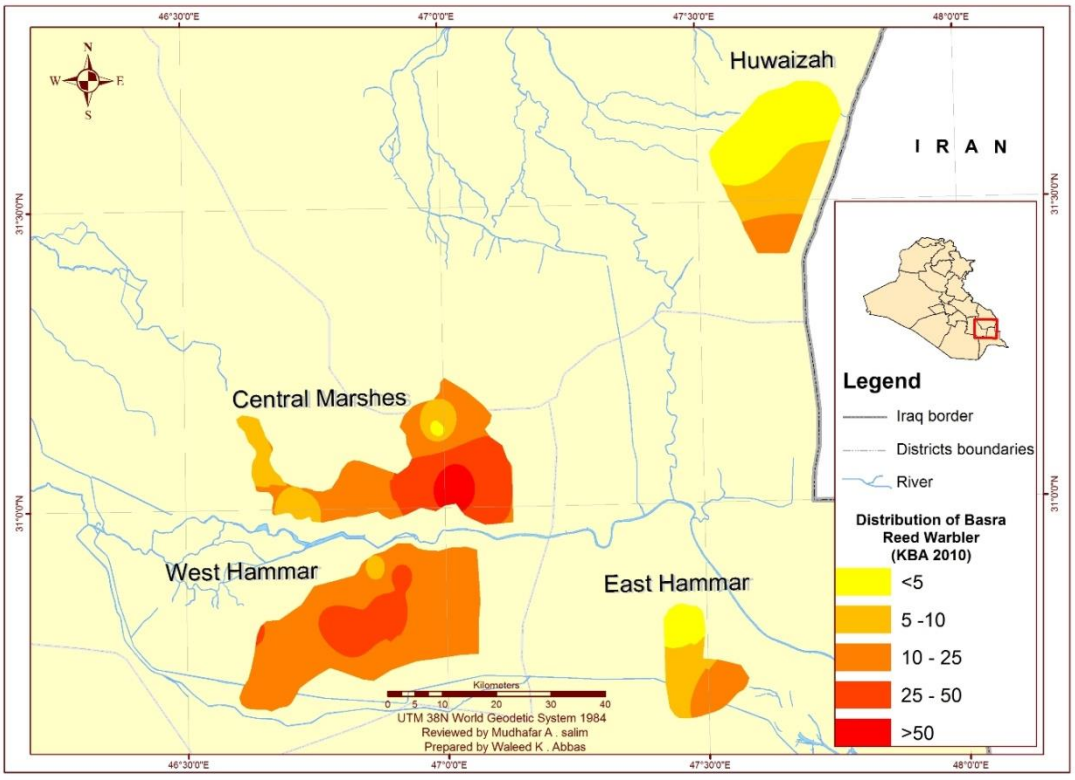
Table 2-6: Threatened and near threatened species occurring in the Marshlands

| No | Common Name | Scientific Name | IUCN Red List Status |
|---|---|---|---|
| 1. | Lesser White-fronted Goose | *Anser erythropus* | Vulnerable |
| 2. | Red-breasted Goose | *Branta ruficollis* | Endangered |
| 3. | Falcated Duck | *Anas falcata* | Near-threatened |
| 4. | Marbled Teal | *Marmaronetta angustirostris* | Vulnerable |
| 5. | Ferruginous Duck | *Aythya nyroca* | Near-threatened |
| 6. | White-headed Duck | *Oxyura leucocephala* | Endangered |
| 7. | Dalmatian Pelican | *Pelecanus crispus* | Vulnerable |
| 8. | Egyptian Vulture | *Neophron percnopterus* | Endangered |
| 9. | Cinereous Vulture | *Aegypius monachus* | Near-threatened |
| 10. | Greater Spotted Eagle | *Clanga clanga* | Vulnerable |
| 11. | Eastern Imperial Eagle | *Aquila heliaca* | Vulnerable |
| 12. | Pallid Harrier | *Circus macrourus* | Near-threatened |
| 13. | Red Kite | *Milvus milvus* | Near-threatened |
| 14. | Pallas's Fish Eagle | *Haliaeetus leucoryphus* | Vulnerable |
| 15. | Slender-billed Curlew | *Numenius tenuirostris* | Critically endangered |
| 16. | Eurasian Curlew | *Numenius arquata* | Near-threatened |
| 17. | Black-tailed Godwit | *Limosa limosa* | Near-threatened |
| 18. | Great Snipe | *Gallinago media* | Near-threatened |
| 19. | Black-winged Pratincole | *Glareola nordmanni* | Near-threatened |
| 20. | European Roller | *Coracias garrulus* | Near-threatened |
| 21. | Saker Falcon | *Falco cherrug* | Endangered |
| 22. | Basra Reed Warbler | *Acrocephalus griseldis* | Endangered |
| 23. | Semicollared Flycatcher | *Ficedula semitorquata* | Near-threatened |
| 24. | Cinereous Bunting | *Emberiza cineracea* | Near-threatened |

Map 2-18: Distribution of endemic bird species in the four Protected Areas




Map 2-19: Distribution of Basra Reed Warbler in the four Protected Areas



Map 2-20: Distribution of Marbled Duck in the four Protected Areas

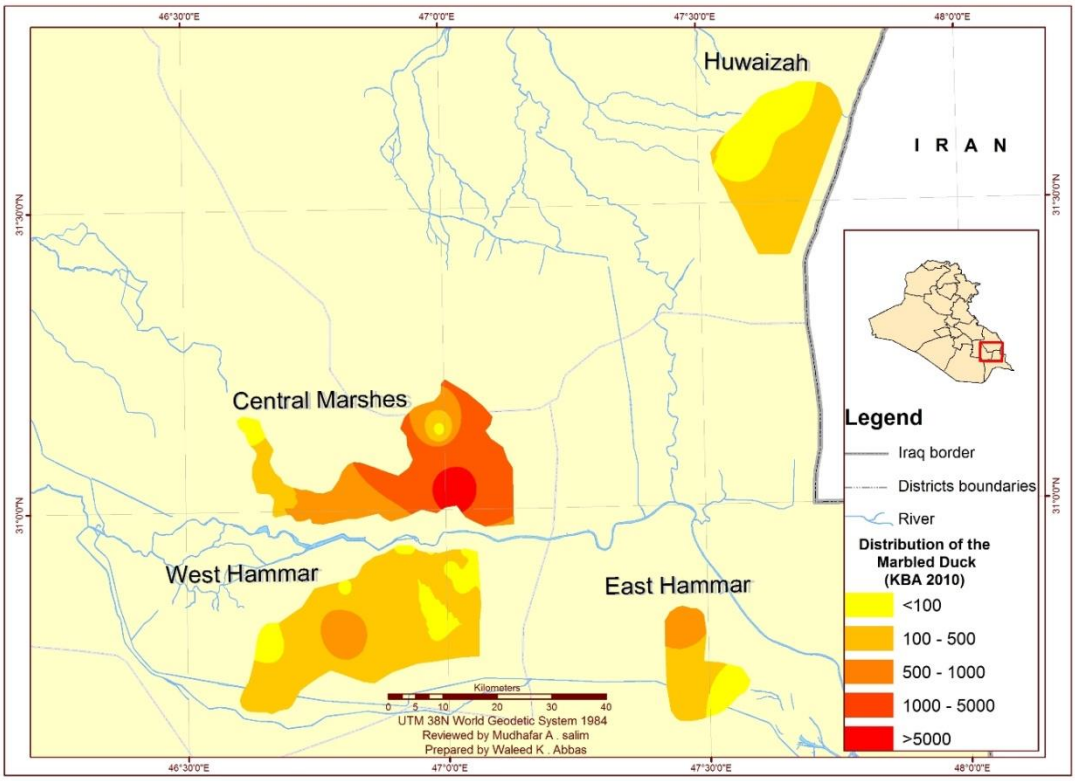



Table 2-7: List of regionally threatened species and subspecies occurring in the Marshlands

| No | Common Name | Scientific Name | IUCN Red List Status |
|---|---|---|---|
| 1 | Lesser White-fronted Goose | *Anser erythropus* | Critically endangered |
| 2 | White-headed Duck | *Platalea leucorodia* | Critically endangered |
| 3 | African Darter | *Anhinga rufa* | Critically endangered |
| 4 | Goliath Heron | *Ardea goliath* | Critically endangered |
| 5 | African Sacred Ibis | *Threskiornis aethiopicus* | Critically endangered |
| 6 | Greater Spotted Eagle | *Aquila clanga* | Endangered |
| 7 | Eastern Imperial Eagle | *Aquila heliacal* | Endangered |
| 8 | Eurasian Spoonbill | *Platalea leucorodia* | Endangered |
| 9 | Purple Swamphen | *Porphyrioporhyrio* | Endangered |
| 10 | Black-tailed Godwit | *Limosa limosa* | Endangered |
| 11 | Basra Reed Warbler | *Acrocephalusgriseldis* | Endangered |
| 12 | Black Francolin | *Francolinus francolinus arabistanicus*[1] | Vulnerable |
| 13 | Little Grebe | *Tahybaptusruficolis iraquensis*[1] | Vulnerable |
| 14 | Pygmy Cormorant | *Phalacrocorax pygmeus* | Vulnerable |
| 15 | White-tailed Lapwing | *Vanellus leucurus* | Vulnerable |

| | | | |
|---|---|---|---|
| 16 | Slender-billed Gull | *Larus genei* | Vulnerable |
| 17 | Whiskered Tern | *Chlydonis hybrid* | Vulnerable |
| 18 | White-winged Tern | *Chlidoniasleucopterus* | Vulnerable |
| 19 | Pied Kingfisher | *Cerylerudis* | Vulnerable |
| 20 | Graceful Prinia | *Prinia gracilis* | Vulnerable |
| 21 | Iraq Babbler | *Turdoides altirostris* | Vulnerable |
| 22 | Mesopotamian Crow | *Corvus corone capellanus*[1] | Vulnerable |

[1]The evaluation of these taxa was applied on the subspecies level.

There are three restricted range subspecies present in the Marshlands of southern Iraq (see table 20), and two subspecies that are near-endemic to the Mesopotamian region; Zitting Cisticola (*Cisticola juncidis* subsp. *neuroticus*) and Graceful Prinia (*Prinia gracilis* subsp. *irakensis*), as well as two endemic bird species, Iraq Babbler (*Turdoides altirostris*) and Basra Reed Warbler (*Acrocephalus griseldis*).

Table 2-8: Endemic subspecies of the Marshlands

| Scientific Name | Common Name | No |
|---|---|---|
| *Tachybaptus ruficollis iraquensis* | Little Grebe | 1. |
| *Francolinus francolinus arabistanicus* | Black Francolin | 2. |
| *Corvus corone capellanus* | Mesopotamian Crow | 4. |

Three more bird species occur as isolated populations within the Marshlands away from their African ranges; these are the African Darter (*Anhinga rufa*), African Sacred Ibis (*Threskiornis aethiopicus*) and Goliath Heron (*Ardea goliath*). The Marshlands represent the main population of the latter species outside of Africa. A recent regional assessment of the threatened species occurring within the Marshlands produced a total of 22 threatened species.

Mammals of the Marshlands

38 species of mammals are recorded in the four protected areas and the terrestrial areas immediately surrounding them (due to their ecological connection with the habitats within). A number of endemic and near-endemic species of restricted range can be found in the Marshlands. These include the Mesopotamian Gerbil (*Gerbillus mesopotamiae*), Bunn's Short-tailed Bandicoot Rat (*Nesokia bunnii*) and the subspecies of the Smooth-coated Otter (*Lutrogale perspicillata maxwelli*). In addition to these, six more mammal species of threatened and near threatened status also occur in the Marshlands and have been included in IUCN's Red List.

Table 2-9: Threatened and near threatened mammal species occurring in the Marshlands

| No | Common Name | Scientific Name | IUCN Red List Status |
|---|---|---|---|
| 1. | Long-fingered Bat | *Myotis capaccinii* | Vulnerable |
| 2. | Bunn's Short-tailed Bandicoot Rat | *Nesokia bunnii* | Endangered |
| 3. | Smooth-coated Otter | *Lutrogale perspicillata* | Vulnerable |
| 4. | Eurasian Otter | *Lutra lutra* | Near threatened |

| | | | |
|---|---|---|---|
| 5. | Striped Hyena | *Hyaena hyaena* | Near threatened |
| 6. | Euphrates Jerboa | *Allactaga euphratica* | Near threatened |

The recent regional assessment of various taxa of species in the Marshlands has produced two endangered species; Smooth-coated Otter (*Lutrogale perspicillata*) and Bunn's Short-tailed Bandicoot Rat (*Nesokia bunni*).

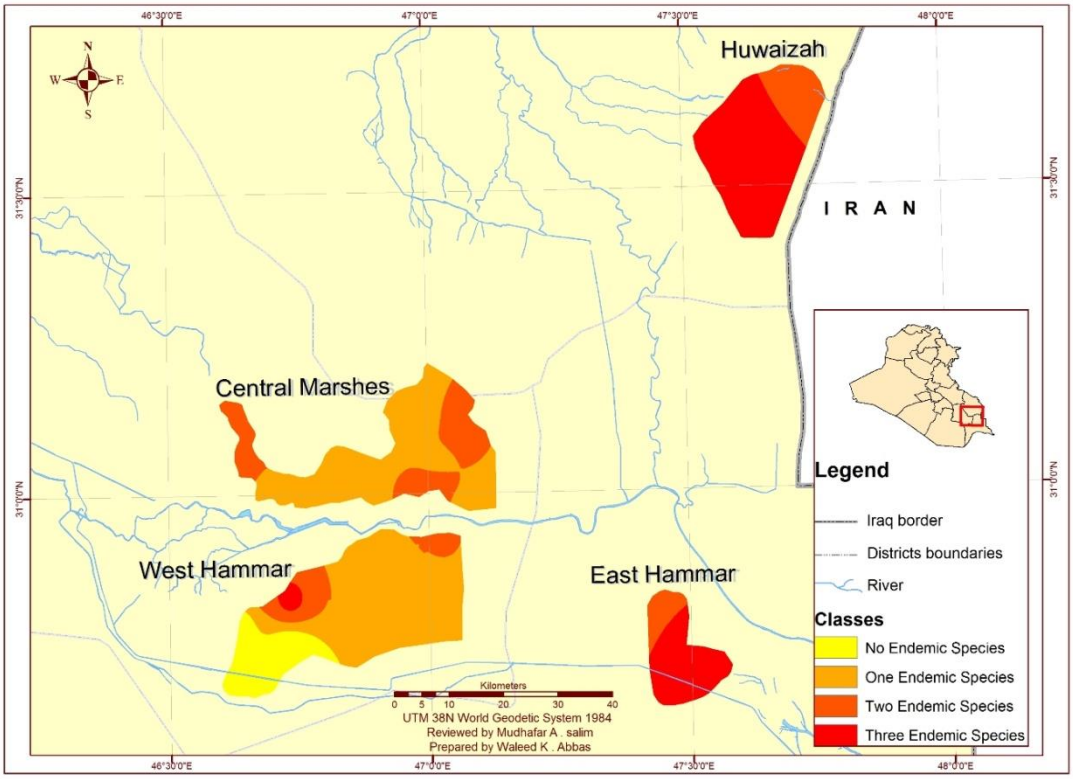
Fish of the Marshlands

The fish of the Marshlands include 44 species; 24 freshwater species and 20 marine species. 14 species are endemic to the Tigris-Euphrates basin, with six of these recorded in the Marshlands. These are *Luciobarbu sesocinus, Luciobarbus xanthopterus, Luciobarbus subquincunciatus, Mesopotamechthys sharpeyi, Cyprinion kais,* and *Silurus triostegus.*

A number of anadromous (living dually in salt and freshwater) fish breed in the intertidal areas of the Marshlands, which play a critical role in their life cycle; for breeding, rearing of young, and nutrition. Demonstrative examples of these species are *Tenualosa ilisha, Liza subviridis,* and *Thryssa whiteheadi*. Another key locally migrating species is the Bull Shark (*Carcharhinus leucas*) which has been a near threatened species on IUCN's Red List since 2010.

On the regional level, the Red List assessment has produced two endangered species; *Barbus grypus* and *Mesopotomechthys sharpeyi,* and a vulnerable species; *Tenualosa ilisha*.

Map 2-21: Distribution of endemic fish in the four Protected Areas



Reptiles and Amphibians of the Marshlands

Records confirm the presence of 21 species of reptiles and amphibians in the four protected areas and their adjacent areas. The only globally threatened species of reptiles recorded in the Marshlands is the Euphrates Soft-shell Turtle (*Rafetus euphraticus*) which occurs in each of the four Protected Areas and was evaluated as regionally vulnerable. Another key reptile species is Murray's Comb-fingered Gecko (*Stenodactylus affinis*), which is a highly restricted range species and was evaluated regionally (on the Marshlands level) to be data deficient.

Invertebrates of the Marshlands

The number of invertebrate species recorded in the Marshlands is limited. This is believed mainly to be due to fragmented research on this taxon rather than the richness of the area. Further research would definitely reveal additional species. Nevertheless, one particular anadromous crustacean *Metapeneus affinius* was recorded in the Marshland intertidal areas.

In the Order Odonata alone, 25 species were recorded from the Marshlands, including a species of global status.

Table 2-10: Threatened Odonata species occurring in the Marshlands

| Scientific Name | Red List Status |
|---|---|
| *Brachythemis fuscopalliata* | Vulnerable |

Fauna of the Huwaizah Marshes Protected Area

The Huwaizah Marshes have a unique biodiversity, which qualified them to be included on the Ramsar List. Regardless of the tremendous pressures exerted by the drainage period in the 1990s, the Huwaizah have continued to host significant numbers of key fauna and flora. These marshes are believed to have the capacity to be an ecological refuge for representative species of animals and plants. These species could act as an ecological reserve vitally needed for the self-rehabilitation and reconstruction of ecosystems and species populations, especially following severe conditions caused by humans or nature.

The Huwaizah Marshes are a large breeding site for approximately 165 bird species. The most common of these include the Pygmy Cormorant (*Phalacrocorax pygmeus*) (most common), Little Egret (*Egretta garzetta*), Little Grebe (*Tachybaptus ruficollis*), Common Gull (*Larus canus*), and Black-headed Gull (*Larus ridibundus*). The Protected Area is the sole refuge for some species such as the African Darter (*Anhinga rufa*). The Huwaizah Protected Area represents one of two known breeding sites for the Sacred Ibis (*Threskiornis aethiopicus*), of which 26 adult birds were recorded in 2005. These Marshes are also the prime breeding site for the famous Iraq Babbler (*Turdoides altirostris*) and the Basra Reed-warbler (*Acrocephalus griseldis*). Further, there are two globally threatened species that are exclusive to this part of the Marshlands; the Lesser White-fronted Goose (*Anser albifrons*) and White-headed Duck *(Oxyura leucocephala).*

Regarding mammals, the Protected Area hosts the endemic Mesopotamian Gerbil (*Gerbillus mesopotamiae*) and the near endemic and vulnerable Smooth-coated Otter (*Lutrogale perspicillata maxwelli*). The Eurasian Otter (*Lutra lutra)* is also present, and was historically common in the Huwaizah, however, today it is categorized on the IUCN Red List as near threatened. The decline of Otter numbers is due to over-hunting and to the severe drainage period which occurred the 1990s.

The fish of the Huwaizah are diverse with approximately 17 species, including *Luciobarbus xanthopterus, Silurus triostegus,* and *Mesopotamichthys sharpeyi;* the latter being categorized as regionally endangered. All fish species recorded in the Huwaizah are exclusively of the riverine type (freshwater fish species). A recent study conducted in 2008 revealed the common occurrence of the Euphrates Soft-shell Turtle (*Rafetus euphraticus*).

Fauna of the Central Marshes Protected Area

The relative richness of the Central Marshes with regard to fauna qualified it to be the first site in Iraq to be declared as a national park in 2013, reflecting its conservation value for the Marshlands and the country as a whole.

147 bird species breed in the Central Marshes, and these marshes host more than 1% of the global population of several bird species including the Great White Pelican (*Pelecanus onocrotalus),* Grey Heron (*Ardea cinerea),* and Caspian Gull (*Larus cachinnans).* Nine more bird species have a global status ranging from endangered to near threatened according to IUCN's Red List, including the Dalmation Pelican (*Pelecanus crispus),* Greater Spotted Eagle (*Aquila clanga),* Eastern Imperial Eagle (*Aquila heliaca),* Marbled Teal (*Marmaronetta angustirostris),* Ferruginous Duck (*Aythya nyroca),* White-headed Duck (*Oxyura leucocephala),* Black-tailed Godwit (*Limosa limosa),* and Basra Reed-warbler (*Acrocephalus griseldis).* Furthermore, the Central Marshes are part of the home range of an endemic subspecies, the Iraqi Little Grebe (*Tachybaptus ruficollis iraquensis).*

The Central Marshes are considered to be the richest Protected Area of the Marshlands with regard to mammals. Bunn's Short-tailed Bandicoot Rat (*Nesokia bunni*) was first described from this location. Additionally, the mammals of the Central Marshes include the Long-fingered Bat (*Myotis capaccinii*), Euphratic Jerboa (*Allactaga euphratica*), Mesopotamian Gerbil (*Gerbilus mesopotamiae*) and Smooth-coated Otter (*Lutrogale perspicillata maxwelli*).

Fish species recorded in the Central Marshes include *Mesopotamichthys sharpeyi* and *Barbus grypus*, which have both been evaluated as endangered on the regional level of the Marshlands. This Protected Area also represents a critical habitat for the globally threatened Euphrates Soft-shell Turtle (*Rafetus euphraticus*).

Fauna of the East Hammar Marshes Protected Area

110 bird species are recorded in the East Hammar Marshes, including the Black-headed Gull (*Larus ridibundus*), Slender-billed Gull (*Larus genei*), Common Gull (*Larus canus*), Little Tern (*Sterna albifrons*), and Little Egret (*Egretta garzetta*); with the latter being the most common. Species of global status include the Dalmatian Pelican (*Pelecanus crispus*), Greater Spotted Eagle (*Aquila clanga*), Marbled Teal (*Marmaronetta angustirostris*), Ferruginous Duck (*Aythya nyroca*) and Black-tailed Godwit (*Limosa limosa*). The Basra Reed-warbler (*Acrocephalus griseldis*) and Iraq Babbler (*Turdoides altirostris*) are also present, as these marshes represent a significant proportion of their breeding area.

The East Hammar Marshes is of prime importance for fish species. At least 32 species occur here in a unique ecological setting represented by tidal movement between the marshes and the sea. This attribute supports the prime function of the Protected Area as a fish nursery, feeding refuge, and ecological corridor for several marine species. There are more than 12 marine fish species which enter the East Hammar via tidal currents. Fish species of conservation importance recorded in these marshes include *Luciobarbus xanthopterus, Barbus grypus, Mesopotamichthys sharpeyi* and *Tenualosa ilisha*. *Silurus triostegus* comprises 6% of the total fish stock in this Protected Area.

Lastly, the Euphrates Soft-shell Turtle (*Rafetus euphratica*) is also common in the East Hammar despite its globally threatened status.

Fauna of the West Hammar Marshes Protected Area

The West Hammar Protected Area is considered to be the richest in the marshlands in number of bird species. 169 bird species have been recorded here, and this Protected Area hosts more than 1% of the global population of four species: Common Coot (*Fulica atra*), Common Teal (*Anas crecca*), Tufted Duck (*Aythya fuligula*) and Mallard (*Anas platyrhynchos*). Bird species of conservation status that winter in the area include the Eastern Imperial Eagle (*Aquila clanga*), Marbled Teal (*Marmaronetta angustirostris*), Ferruginous Duck (*Aythya nyroca*), Black-tailed Godwit (*Limosa limosa),* Basra Reed-warbler (*Acrocephalus griseldis*) and Iraq Babbler (*Turdoides altirostris*).

Although less prominent than the East Hammar Marsh Protected Area, this Protected Area's fish diversity is also influenced by the tidal movement between these marshes and the sea. Due to this feature, *Bathygobius fuscus* and *Tenualosa ilisha* are species that are frequently recorded here. Fish species that were evaluated as threatened on the regional level include *Mesopotamichthys sharpeyi, Tenualosa ilisha* and *Barbus grypus.* Similar to the other three Protected Areas, the Euphrates Soft-shell Turtle (*Rafetus euphraticus*) is recorded in the West Hammar Marshes.

## 2.11 Socioeconomic Setting of the Marshlands

This section summarizes socioeconomic information for the four protect areas, and reflects the long term relationship between the Marshlands and human use of their natural resources, which in turn influenced the level of services provided by the Marshlands to its inhabitants and the impacts of human presence on the natural values of the protected areas. All four protected areas are devoid of large human settlements due to their remoteness from urban centers and, for the Huwaizah, their vicinity to a national border. Long-time inhabitants of the Marshlands, the he Marsh Arabs or Ma'adan, today live in several villages and small size towns situated for the most part outside the protected areas and along the rivers that feed into its four Protected Areas (as shown in the maps below). The 2007 census indicates approximately 350,000 inhabitants living in the broader area of the Marshlands with approximately 5% of these living within the confines of the four protected areas. Another 60% live within the buffer zone.

Table 2-11: Survey on Demographic, Social and Economic Conditions of the Marshlands in the South of Iraq- UNEP Support for Environmental Management of the Iraqi Marshlands (2007)

| Governorate | | Population of the Sub-district | No. of Surveyed Villages | Population of the Surveyed Villages | Percentage of population in the Surveyed Villages |
|---|---|---|---|---|---|
| District | Sub-district | | | | |
| Thi-Qar Governorate | | | | | |
| Al-Chibayish | Al-Chibayish | 36,625 | 20 | 24,613 | 67% |
| | Al-Fihood | 41,537 | 16 | 22,240 | 54% |
| | Al Hammar | 8,029 | 2 | 7,000 | 87% |
| Sub-total | | 86,191 | 38 | 53,853 | 62% |
| Missan Governorate | | | | | |
| Al-Meimuna | Al-Salam | 58,730 | 16 | 15,200 | 40% |
| | Al-Meimuna | 38,167 | 21 | 23,450 | 40% |
| Al-Majar | Al-Majar | 87,430 | 6 | 5,695 | 7% |
| | Al-Kheir | 36,840 | 12 | 46,470 | 32% |
| | Al-Adeel | 47,425 | 14 | 11,910 | 98% |
| Qal'at Al-Salih | Al-Uzeir | 35,250 | 12 | 16,690 | 47% |
| Sub-total | | 303,842 | 81 | 119,415 | 39% |
| Basrah Governorate | | | | | |
| Al-Qurna | Al-Qurna | 110,100 | 5 | 13,450 | 12% |
| | Al-Theger | 40,220 | 15 | 32,790 | 82% |
| | Al-Deer | 80,200 | 14 | 33,030 | 41% |
| Al-Medeana | Al-Medeana | 126,400 | 14 | 35,425 | 28% |
| | Al-Haweer | 81,500 | 11 | 25,950 | 32% |
| | Telha | 42,220 | 6 | 19,300 | 46% |
| Basrah | Al-Hartha | 235,013 | 15 | 13,078 | 6% |
| Sub-total | | 715,653 | 80 | 173,023 | 24% |
| TOTAL | | 1,105,686 | 199 | 346,291 | 31% |

*Note: Percentages shown are rounded to whole numbers.*

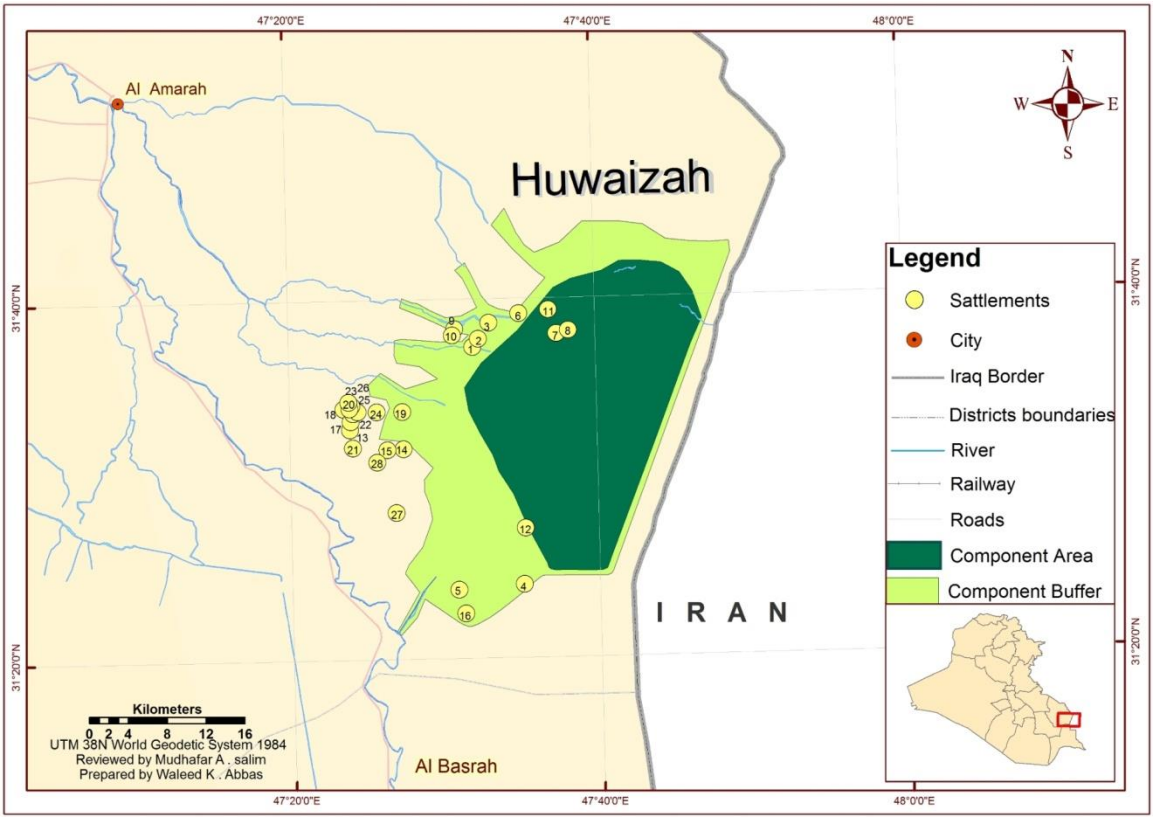
Human communities have adapted their settlement patterns to the diversity of the natural features of the Marshlands As a result, permanent villages and seasonal settlements are found in areas permanently or seasonally covered with water. Most settlements today occur on the edges of the Marshlands. However, until the 1980s, settlements were also common on ridges

emerging over the water and on floating islets which the Ma'adan created by mixing mud and reed. These manmade islets could be permanent or temporary and were particularly widespread on lakes in the Huwaizah. The Ma'adan used to live off a combination of cattle (mostly buffalo) rearing heavily dependent on reed fodder, fishing, hunting, and limited cultivation activities. They had developed a very specific culture and lifestyle in symbiosis with the marsh environment and resources. Their floating villages topped with reed huts, together with grand mudhifs used for the reception of guests where remarkable features of a material culture that had passed the test of time: representation of similar reed buildings was found on Sumerian seals and other pictorial artifacts. Marshlands inhabitants experienced a change in lifestyle starting in the 1950s with emigration to the large urban centers and the introduction of modern devices and materials in the marshes (such as motorboats, rifles, concrete, etc.). The process accelerated in the 1970-90s. During the 2000s, the Marshlands were drastically drained and the inhabitants brutally forced out for a mix of political and economic reasons. Vast numbers became internally displaced persons (IDPs) in other regions of Iraq. Those who managed to remain close to the marshes settled in villages which grew into small towns. Unable to rely on their traditional marsh-based activities, the Ma'adan have experienced impoverishment. Furthermore, the towns on the edges of the Marshlands are poorly served by government institutions with few schools or clinics. For the Ma'adan who still live in or around the Marshlands, one of the results of this accelerated process of socioeconomic change is that they are one of the poorest social groups in Iraq and have the highest rate of illiteracy, particularly among women. The social fabric and what used to be the iconic cultural landscape of the Marshlands were therefore dramatically affected over the past decades. Following the partial reflooding of the marshes starting in 2003, a limited number of individuals and families moved back to lake islets, for the most part on a seasonal basis. Others resumed buffalo rearing on the banks of the marshes. However, even in the prospect of a larger number of Ma'adan relying again on the resources provided by the Marshlands, it is highly unlikely that settlement patterns will be reverted in the near future as people now aspire to access to services and particularly education for their children, and new habitat styles including basis amenities. Men also tend to seek wage labor whenever possible. This is why communities are today mostly located on the edges of the four protected areas, although they use the marshlands' resources and some continue to use man-made islets on a temporary or seasonal basis.

People of the Huwaizah Marshes Protected Area

Economic activities within the Huwaizah Marshes are limited to the peripheries of the Protected Area. Most activities take place outside the protected areas with approximately 80% of the communities depending on cattle herding, fishing, game bird hunting, small scale agriculture, and reed and mace harvesting for fodder and the building traditional houses and guesthouses (mudhif). Around 85% of the livestock rearing is of buffalo .

Map 2-22: Human settlements in the Huwaizah Marshes

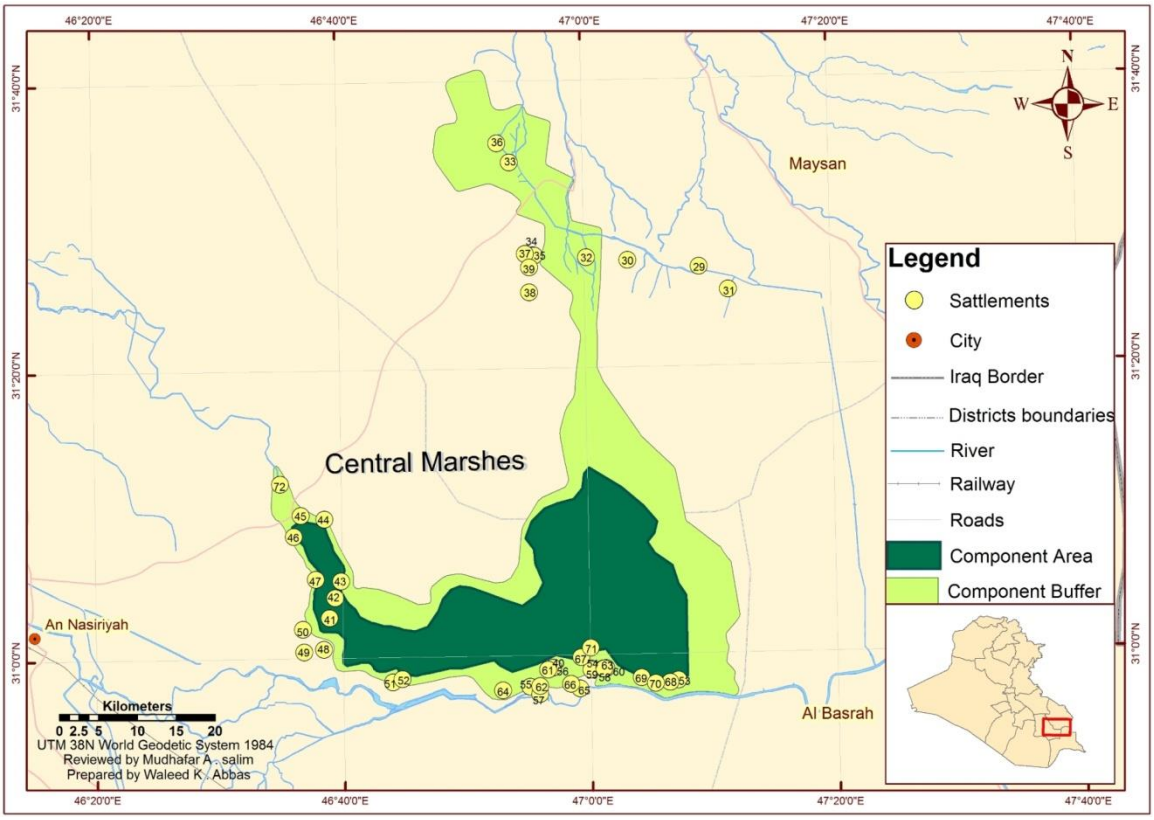



People of the Central Marshes Protected Area

The Central Marshes are also characterized by a limited number of people living within them. Communities are concentrated in a number of villages which are on the peripheries of the protected area or within a limited distance - mostly on the banks of the Euphrates and its feeding channels.

The Marshes also stand out for the wide distribution of floating islets (chibayesh) which are made of mud and reed and are used for temporary residence within the protected area's water bodies.

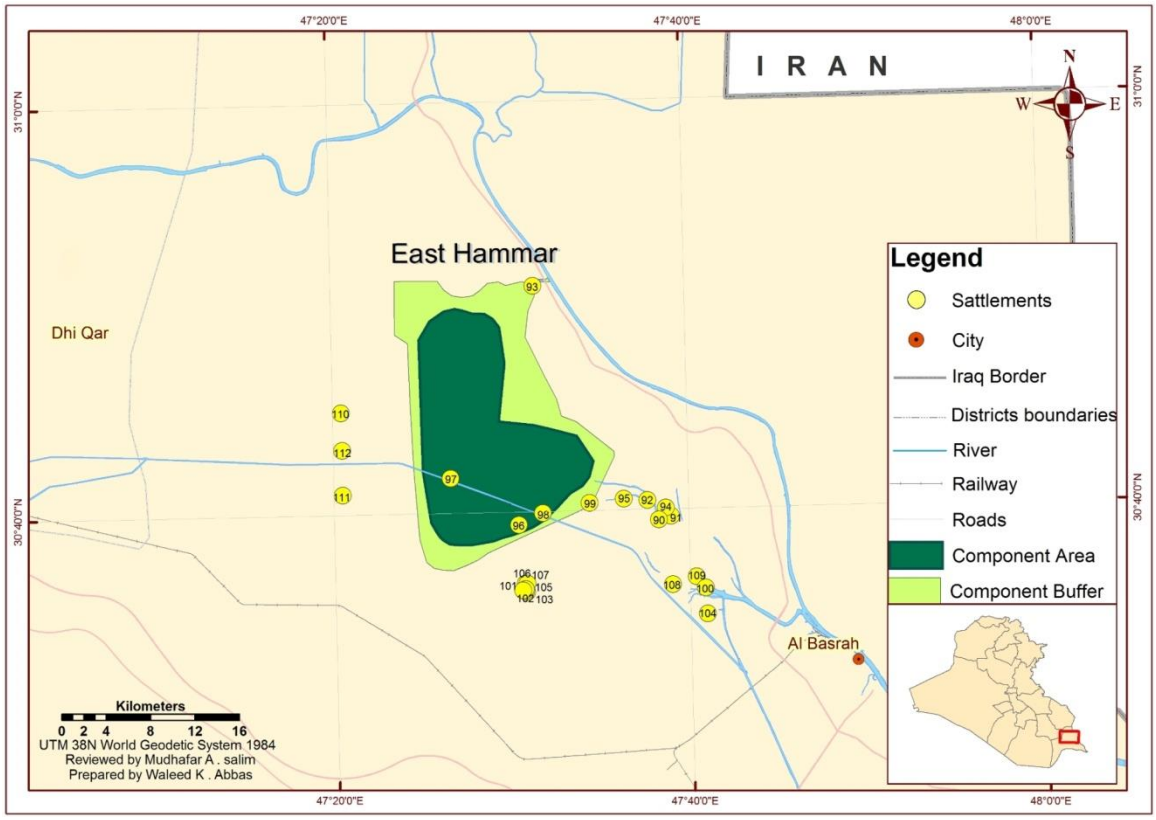
Map 2-23: Human settlements in the Central Marshes




People of the East Hammar Marshes Protected Area

The East Hammar Marshes are distinctive for the dependency of communities on government employment as compared to the other Protected Areas. This explains why the level of dependency on the natural resources for various economic activities is relatively less than in the other Protected Areas.

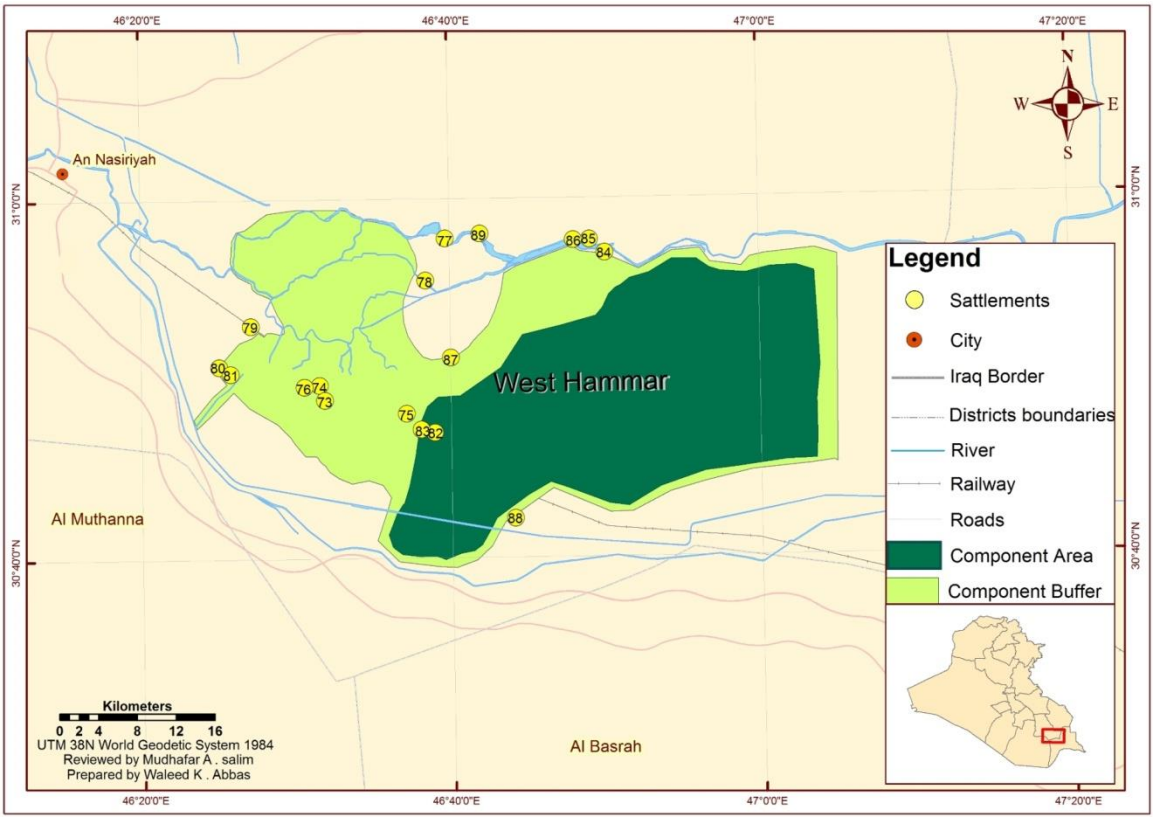
Map 2-24: Human settlements in the East Hammar Marshes




People of the West Hammar Marshes Protected Area

Most inhabitants within and near the West Hammar Marshes are concentrated in the mini towns of Suq Ash Shuyukh, Karmat Bani Sa'ad, Okaika, and Hammar, which are actually located outside the protected area. The West and East Hammar share many of their socio economic specificities, as historically they were considered as one coherent Marsh area.

Map 2-25: Human settlements in the West Hammar Marshes



# Section Three: Factors and Objectives

## 3.1 Factors Influencing Management

### Recent Events which Shaped the Contemporary Marshlands

Pre-drainage of the Marshlands

Before 1970, the Marshlands were characterized by a very complicated network of natural water channels which formed the internal delta of the rivers Euphrates and Tigris. The Marshlands embodied a stable ecosystem comprising various habitats of primary importance to wintering bird populations during their migrations. There are several records of the description of the Marshlands, including the famous description by Thesiger in 1954, which documented the outstanding vegetation and bird diversity including various species of ducks and other migrating birds. In his book, Thesiger wrote: "I was profoundly charmed by the endless flocks of geese and ducks sweeping the horizon, then echoing back their calls through the cool breeze as they descended down to earth ."

Drainage of the Marshlands

Water management projects in the basins of the Tigris and Euphrates date back 6,000 years. In the more recent past, a well recorded undertaking took place in the 1950s, when Turkey and Syria began to establish upstream dams and conveyors on the river Euphrates while Iraq and Iran did the same for the basin of the river Tigris. These unilateral actions signaled the start of the catastrophic drainage of the Marshlands. The water flow of the Tigris and Euphrates rivers had been approximately 2,600 $m^3$/sec between 1973 and 1983, but by the year 1998, flow had severely declined to less than 830 $m^3$/sec. This was a direct impact of the newly established water retention structures .

Another phase of the Marshland drainage occurred immediately after the Iraqi-Iranian war ended in 1988, when a mega-program was initiated by the government to establish dams, roads and other infrastructure. As a result, the Marshlands totally dried up, with the climax reached during the second Gulf war in 1991. The government diverted the natural river channels and their branches for military and political reasons, while justifying the actions as land rehabilitation programs .

Periodic satellite imagery taken of the Marshlands demonstrates the catastrophic impacts of the drainage crisis. In 1970, the area of the Marshlands would fluctuate between 15,000 to 20,000 sq. kilometers (see figure 8). By the year 2000, the Marshland area had severely declined to less than 1,297 sq. km. Drainage continued until 2003 (see figure 9) causing the loss of more than 65% of the Huwaizah Marshes, 95% of the Hammar Marshes and 97% of the Central Marshes; resulting in an overall decline of approximately 90% of the total Marshland area .

This tragic event tremendously altered the physical and biological environment of the Marshlands; soils were affected by the formation of vast salt lakes, relative temperatures increased due to the degradation of vegetation cover, and there was an almost total destruction of ecological networks and processes. This, in turn, led to a dramatic loss of the plant and animal life of the Marshlands and their connectivity across the various Protected Areas. 22 species of plants were completely lost, leading to a major alteration in the structure and content of the vegetation cover. New drought and salt tolerant plants emerged, including the infamous *Tamarix* sp. Further, many animal species suffered severe decline; a poignant example being that of the Smooth coated Otter which has become nearly extinct from the Marshlands with no proven records for many years.

Figure 3-1: Marshland Area in 1970 (source: New Eden Master Plan 2005)

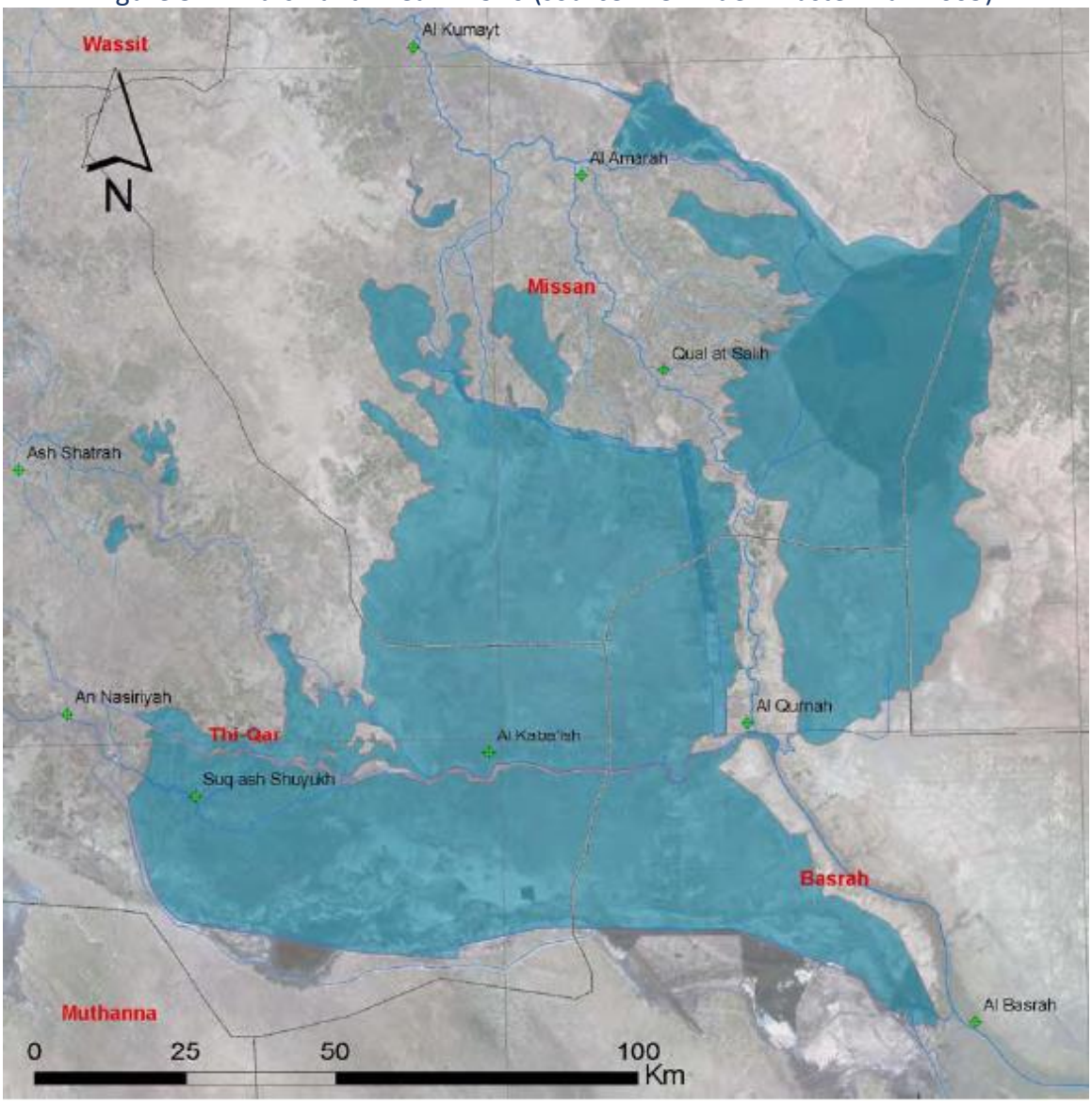
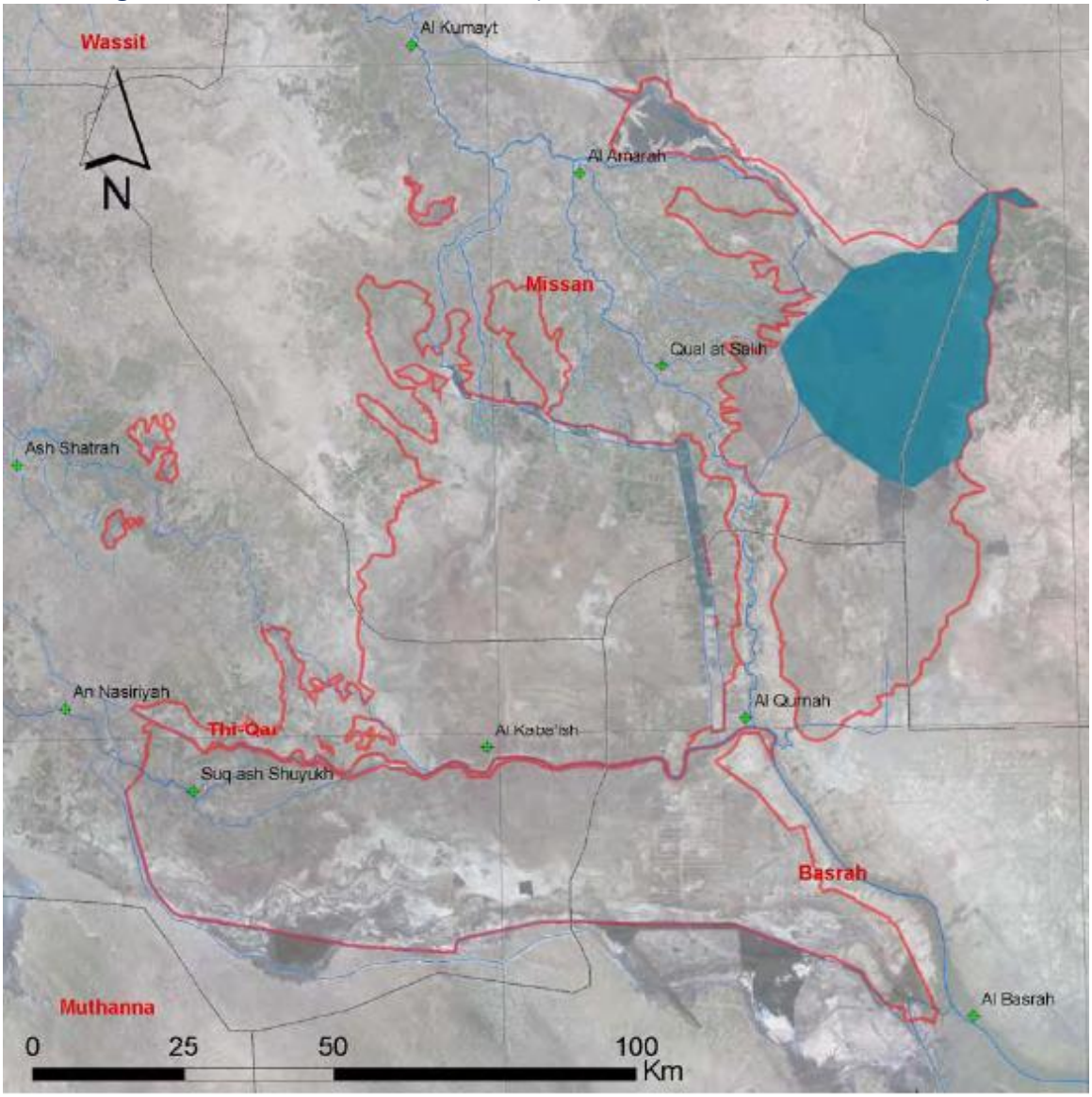


Figure 3-2: Marshland Area in 2002 (source: New Eden Master Plan 2005)




Re-flooding of the Marshlands

After the political transformation in 2003, communities living in the Marshlands undertook a major effort to destroy and eliminate water retention structures upstream from the marshes. The process was not a planned endeavor however it helped to restore significant amounts of water back to the Marshlands. UNEP has estimated an average annual increase of 900 sq. km in the size of the Marshlands since 2003.

In 2003 alone, the Marshlands regained 10% of their 1970 area, and in 2005 the Huwaizah and Hammar Marshes retained 50% of their 1970 size. The total area of the Marshlands was estimated to be around 3,000 sq. km by 2005 - approximately 41% of the 1970 reference. The

area approached almost 4,950 sq. km in 2008, and the most recent records show that by 2013, the reflooding process has resulted in the increase of the area of the Marshes to 65% of their 1970 size.

## 3.2 Sites' Evaluation

Field research which has been undertaken periodically since 2003 has confirmed the restoration of key values and attributes of the biodiversity of the Marshlands. This demonstrates their tremendous ability to restore after major threats and pressures. Today's Marshlands are once again a major global biodiversity site for the wintering of migrating birds, the migration of sea water fish to and from the Marshlands, and the embracing of endemic species which were at the verge of extinction after the drainage period. The ecological mosaic of the Marshlands is gradually coming back to its historical status of being a highly productive, diverse, and sustainable ecosystem that supports people and nature together.

Table 3-1: Key documented threats to the Marshlands

- Water quantity
- Water quality
- Agriculture expansion and infrastructure development
- Occurrence of exotic and invasive species of plants and animals
- Overgrazing
- Land conversion to agricultural lands
- Overfishing and illegal hunting
- Pollution
- Potential oil-related activities
- Transport infrastructure and freight activities
- Climate change

The following part summarizes factors affecting each of the four Protected Areas individually:

<u>The Huwaizah Marshes Protected Area</u>

- Development Pressures:
    - Infrastructure Development: this factor is non-existent in the Huwaizah as the local populations live in small scattered villages or households outside the protected area.
    - Modification of Natural Systems: this factor is associated with the water quantity as a result of the establishment of dams and diversion channels. It is considered of high concern for the Huwaizah, especially noting the excessive drainage activities in the 80s and 90s, however, the Huwaizah Marshes were able to self-restore the majority of their water systems and biodiversity during the last ten years. Despite the above, the following are key measures to address this problem:
        - full control over the water resources and assurance of adequate water shares
        - elimination of constraints obstructing the water cycle in the Marshes
        - continuous maintenance of the river beds feeding into the Marshes
        - adoption of modern irrigation technologies to ensure high water efficiency

- Agriculture Expansion: there are no agriculture activities within the Huwaizah Protected Area; however, small farms do exist to the west of its boundaries within the buffer zone and use water from a water canal not related to the Protected Area, hence the impact on the Marsh is limited.
- Mining: there are no mining activities within the Huwaizah Protected Area; however, to the south of its boundaries exists the Majnoon oil field. It has been ratified that this activity has no impact on the Huwaizah Protected Area, however, close coordination and communication is and will be maintained with relevant government agencies and private corporations involved to prevent any negative effect on the Protected Area.

- Pressures on the Natural Environment:
  - Water Pollution: the Huwaizah Protected Area is considered to have the least pollution level due to the limited human activities within and around it, nonetheless, limited pollution is caused by the influx of sewage water into the inlets coming from the city of Al Amarah.
  - Solid Waste: this is limited problem mainly concerning plastic waste left behind by visitors or community members.
  - Climate Change: there are no adequate studies on the impact of climate change on the Huwaizah Marshes, however it is thought to influence the intensity of fluctuation in water levels.
  - Desertification: the Huwaizah Protected Area does not suffer from any indicators of desertification.
  - Hunting and Fishing:
    - Fishing: fishing is a very common activity in the Huwaizah Protected Area, and when compared to other human activities, it is considered to have the highest. The current fishing levels are not considered fully sustainable. A program is put in place to monitor the species, numbers, distribution and techniques used for fishing.
    - Bird hunting: this is an active factor with particular pressure exerted on water birds in the winter season and much lower levels documented in summer. Many hunters come to the Huwaizah during the hunting season (winter). However, it is categorized of medium impact due to the remoteness of the area and strong control by the border police.
  - Grazing: grazing intensity is the lowest in the Huwaizah as compared with the other Protected Areas due to the low number of livestock. When it occurs, it takes the form of free grazing, meaning there is no shepherd involved, and is limited to a small number of buffalo and cattle herds. The activity is also limited by the abundance of deep water which is inaccessible to livestock.
  - Invasive and Exotic Species: there is evidence of the occurrence of a low number of exotic and introduced species to the Huwaizah, however, their impact has not yet been studied. There is a definite need to extend research to assess ecological dynamics and implications of such species.

- Natural Catastrophes: The Huwaizah Protected Area has not been subject to any natural catastrophes or extreme events in recent times.

- Tourism and Visitor Pressure: The Huwaizah receives a very limited number of visitors every year, thus this activity is considered of least concern to the well-being of the Marshes.

The Central Marshes Protected Area

- Development Pressures:
    - Infrastructure Development: this factor does not represent a high concern to the protected area boundaries except over some areas along the southern parts of the buffer zone. Some settlements exist in the western parts near Abu Zirq Marshes, with only a few households located within the protected area. Generally speaking, most of the settlements lie within the center of Al Chibaish. The master plan of this administrative region does not overlap with the Central Marshes boundaries, however it does overlap with parts of the buffer zone towards the southern areas.
    - Modification of Natural Systems: the issue of fluctuating water levels as a result of upstream dams and river diversion outside the protected area is considered to be a key pressure factor. During the 1980s and 1990s, the Central Marshes endured the highest level of deterioration due to over-drainage. Nevertheless, a major proportion of the hydrological and ecological systems and values were restored right after the reflooding took place in 2003. Several measures are being implemented to address this issue as follows:
        - The improvement of control over water resources and the effective allocation of the water budget including the adequate utilization of the control infrastructures (nine infrastructures) which were constructed to secure sufficient feeding and recycling of water into the Protected Area. A good example of this is the Euphrates soil dam which contributes significantly to feeding waters into the southern parts of the Protected Area.
        - The adoption of an effective monitoring system which deals with any water obstructions and ensures continuous maintenance of the feeding channels.
        - The adoption of modern irrigation techniques ensuring high water efficiency.
    - Agriculture Expansion: there are no large scale agriculture activities within the Central Marshes. However, there are a number of scattered agricultural areas to the west and north of the Protected Area (some of which lie within the buffer zone). This factor does not represent a major threat.
    - Mining: the Central Marshes are safe from all mining and extractive industry activities. Some mining areas lie to the east of the protected area as Al Qurna oil field, but the delineation is such that the activities pose no threat to the protected area. However, continuous coordination and cooperation with relevant agencies and corporations remains needed to ensure close monitoring of any future impacts and to make sure no future plans will pose any threat to the protected area.

- Pressures on the Natural Environment:

- Pollution: the Central Marshes are considered to have very low pollution levels. The extensive size of the Marshes and the relative absence of human settlements in most of its regions keeps it in a rather low-pollution state, however, where settlements are concentrated to the south, the issue of solid and liquid wastes is recorded to be relatively high compared to other areas. A particular problem is the water pollution coming from the cities of Islah and Maymunah.
- Climate Change: there is no sound research done on climate change impacts to the area, however, general impressions are that the water fluctuation is associated with climate change factors.
- Desertification: the Central Marshes face no pressure of desertification.
- Hunting:
    - Fishing: fishing is considered to be the most common natural resource use in the Central Marshes, and highest when compared to the other three Marshland Protected Areas. If the fishing pressure is to continue at its current pace, it would definitely represent a major impact on key fish species in terms of numbers and distribution. Many of the fishing techniques are ecologically harmful (e.g. using electricity) and only a few fisherman use traditional fishing methods today.
    - Game hunting: this is a very active pressure in the Central Marshes, especially in winter. Large numbers of hunters come into the area for game hunting with a focus on water birds and ducks. Although high, game hunting is not considered the prime pressure on the Central Marshes when compared to reed harvesting activities. The presence of hunters and human settlements further cause disturbance to wild animals and birds, especially in the Southern regions.
    - Grazing: grazing is considered a significant factor influencing the diversity of the Central Marshes. It is addressed as a key threat in the management plan, especially in regard to the activity of reed harvesting. The pressure level coincides with the relatively high human population residing near the Protected Area and who hold the majority of the buffalo herds in the region. Grazing takes two forms: the first is free grazing of buffalo in the Marshes and the second is based on reed collection to be transported outside the protected area for cattle consumption as fresh fodder. The latter form is dominant in shallow areas on the peripheries of the Protected Area, however, it often occurs in core areas as well.
    - Exotic and Invasive Species: there are records of limited numbers of exotic introduced species in the Central Marshes. No comprehensive research has been done to evaluate their impact, however this is considered in the implementation of the newly approved plan of management.

- Natural Disasters: the Central Marshes have not been subject to any form of natural disasters, and no historical records of such events are available.

- Tourism and Visitor Pressure: relatively speaking, the Central Marshes receive the highest numbers of visitation, especially in the vicinity of the town of Al Chibaish. Most of the visitors are domestic and arrive for day recreational visits from neighboring areas. Other visitors include small numbers of journalists and researchers. The issue of tourism is not considered to be a current pressure factor, however may become so as the site becomes better known and in light of adopted plans to develop ecotourism and encourage visitation.

The East Hammar Marshes Protected Area

- Development Pressures:
    - Infrastructure Development: East Hammar does not include any infrastructure or settlements except for a few scattered small villages or households on its boundaries and in the buffer zone thus it does not represent an area of high concern.
    - Modification of Natural Systems: the same case applies here as to the West Hammar, where the fluctuation of water caused by upstream dams and diversion represents a major pressure. East Hammar is no exception to the 1980s to 1990s drainage crisis, and like the rest of the Protected Areas, it has managed to self-restore many of its physical and biological values. The restoration process is still on-going. Further adopted measures to address this issue include:
        - improved control over water resources and secured water budget
        - elimination of obstacles related to water reach and maintenance
        - adoption of improved irrigation techniques with high water efficiency
    - Agricultural Expansion: there are no agricultural activities within this Protected Area with the exception of very small agricultural lands located in the north-eastern part and extending into the buffer zone. East Hammar receives its waters from Al Shafi and Al Mashab Rivers. Overall, this issue is not of high concern.
    - Mining: all mining and extracting activities are outside the Protected Area, however, some major oil extraction industry is taking place to the south of the protected area within the Romaila oil field and to the west at the West Qurna oil field. The current impacts of this factor are limited, however, plans are in place to maintain and improve communication and coordination with relevant agencies and corporations to ensure long-term protection and impact monitoring for the site.

- Pressures on the Natural Environment:
    - Pollution: East Hammar has the lowest pollution levels relative to the other Protected Areas, however some water contamination is caused by sewage water from the Shatt Al Arab settlement. Further, the waters received from Main Outfall Drain are of somewhat high salinity, especially in the summer. In addition to the above, solid waste represents another minor concern.
    - Climate Change: no sufficient research is available on climate change however hypotheses suggest it is connected with water fluctuation and dynamics.
    - Desertification: East Hammar has no signs of desertification.
    - Hunting and Fishing:

        - Fishing: fishing is a very common activity in East Hammar and is considered of medium effect compared to the other Protected Areas. Current fishing levels are not sustainable as they affect numbers of species and their distribution within the Protected Area. The threat level is also amplified by the recent use of non-traditional fishing methods.
        - Game Hunting: this is another active practice, especially in regard to wintering water birds. Many hunters come from outside the area targeting water birds and ducks. This is a rather high-pressure factor in regard to the relatively small surface area of the Protected Area, and its resilience to impact must be considered when compared to the other Protected Areas.
    - Grazing: this is another common practice with mainly buffalo owned by local communities. However, in regard to other cattle and livestock, the numbers are very small and limited to the agricultural lands outside the Protected Area. The Ma'adan uses both forms of grazing; free grazing within the Marshlands, and cut and carry of the reeds. This factor is concentrated on the peripheries of the protected area or within areas of limited water depth.
    - Invasive and Exotic Species: the case here is similar to other Protected Areas, as several invasive and exotic species have been introduced during different periods of time however studies and research on the topic are not sufficient. It is planned to incorporate them into the upcoming management planning exercise.

- Natural Disasters: East Hammar is not subject to any form of natural catastrophes within available knowledge.

- Tourism and Visitor Pressure: East Hammar receives very few visitors, mostly local picnickers, researchers or journalists. There is a potential for future tourism development activities, a subject which is well anticipated in the new management plan of the Protected Area.

<u>The West Hammar Marshes Protected Area</u>

- Development Pressures:
    - Infrastructure Development: West Hammar has no active infrastructure so development here does not represent a pressing factor. The existing human settlements are dispersed in the form of small villages or scattered households mostly around the protected area and rarely inside it. There is a potential that such settlements could expand toward the protected area in the west and north, however not in the mid future.
    - Modification of Natural Systems: the issue of water shortage and fluctuation caused by the establishment of water collection structures is a primary pressure factor on the West Hammar Marshes. Like the rest of the Marshes, the drainage periods in the 1980s and 1990s were detrimental to site biodiversity. Outstandingly, the West Hammar was able to restore most of its values as a result of the reflooding started in 2003. Key measures are adopted as part of the management interventions as follows:

        - Ensuring control over water resources and achieving the allocated water budget.
        - Working on the provision of additional water quantities to the southern areas of West Hammar from the main drainage channel with a proposal to treat it before its utilization.
        - Finishing the West Hammar water outlet.
        - Eliminating constraints which obstruct the water-flow while ensuring continuous maintenance to feeding channels.
        - Adopting modern irrigation techniques aimed towards higher water efficiency.
    - Agriculture Expansion: there are no large scale agricultural activities in the West Hammar. Small scattered agricultural areas occur in some of the northern and western parts of the protected area however they are mostly in the buffer zone and are not considered a major threat to the protected area.
    - Mining: the West Hammar includes no mining or extractive industry activities within its boundaries. The closest oil field lies far to the west of the Protected Area and is considered of minor concern to its values. The need to maintain strong communication and coordination with relevant agencies and corporations remains a key proactive measure for any future developments.

- Pressures on the Natural Environment:
    - Pollution: the West Hammar is subject to very low levels of pollution due to limited human activities within its boundaries. Potential for increasing sewage water pollution could be foreseen from the cities of Karmashea and Umm Nakhla. It is important to note here the high relative salinity of the southern area of West Hammar Marshes, especially in summer, due to high evaporation. Solid waste is also a minor problem, with specific management measures included in the management plans.
    - Climate Change: climate change is not well studied in the West Hammar, similar to the other Protected Areas.
    - Desertification: there is no evidence of desertification processes taking place in West Hammar.
    - Hunting and Fishing:
        - Fishing: this is a common practice in the West Hammar and is considered to be high when compared to the other Protected Areas. Current levels are not sustainable and would lead to detrimental effects on the fish species in the Marshes. It is important to note that this is considered a top management priority and efforts have been put into place to turn it into a more sustainable activity.
        - Game hunting: like fishing, game hunting is a key activity in the West Hammar area and takes place mostly in winter. Most of the hunters come from outside the Marsh with little consciousness or awareness of their potential impacts. Game hunting is the highest in West Hammar as compared to the other Protected Areas. This is due to its remoteness and abundance of birds. The anticipated management plan will address this threat as a top priority.

    - Grazing: grazing is an activity of moderate level in the West Hammar as it contains lesser numbers of cattle and livestock. The grazing pattern follows the same patterns as the other Marshes. Grazing is concentrated on the peripheries of the Marshes and seldom in core areas.
    - Invasive and Exotic Species: the same case applies here as to the situation in the Huwaizah and Central Marshes. The impacts of the invasive and introduced species will be integral to the upcoming management plan.

- Natural Disasters: the same case applies here as to the Central and Huwaizah Marshes.

- Tourism and Visitor Pressure: the West Hammar receives very few visitors; mostly domestic or researchers and journalists coming for short periods. The number of visitors might increase in the foreseen future, leading to the installation of a proper management response.

## 3.3 Logical Framework and Objectives

The Overall Objective of the Management of the Marshlands

To ensure the long term protection and conservation of the Marshlands biodiversity and their associated cultural values as a site of global importance for nature and culture, while promoting the sustainable utilization of their natural resources for the wellbeing of their people.

The Huwaizah Protected Area Management Objectives

The Huwaizah Protected Area is located to the east of the Tigris River and is shared by the governorates of Maysan and Al Basrah. It is bordered by the eastern borders of Iraq to the east, by Al Sheeb region and the seasonal Sannaf Marshes to the north, by the city of MashraH to the west, and by the administrative borders of Al Basrah to the south. The area of the Protected Area is 48,130 ha, surrounded by approximately 42,560 ha of buffer zone. The Huwaizah Protected Area represents a natural drainage system to the rivers of Tayeb, Duwareeg and Karkha descending from Iran, and to the left branches of the Tigris River, specifically Al MashraH and Al KaHla'. The Marshes extend from the lower drainage of the Sannaf seasonal Marshes to the south through the Suayb River, representing a key outlet of the Marshes.

The Huwaizah Protected Area is the first wetland in Iraq recognized as a Ramsar Site and is affected by several human induced and natural factors which dictate its management framework. The management plan addresses the protections and enhancement of the primary ecological processes as well as the abundance of plant and animal life. It also aims to maintain the goods and services provided to local communities by the ecosystem along with their sustainable utilization.

The main factors influencing the Huwaizah management are:

- The quantity and quality of waters entering the Protected Area
- The level of effectiveness of the legislative frameworks and mechanisms
- The level of institutional coordination and collaboration
- The available funding used in management
- The local traditions and systems and their role in achieving the hoped for sustainable utilization of natural resources.

The Huwaizah management plan adopts the following key objectives:

i. To ensure the allocation of sufficient water quantities for the Protected Area through the effective control of incoming waters and monitoring of the allocated water budget while maintaining the infrastructure that provides it.
ii. To ensure adequate quality of the water coming into the Marshes through an effective water quality monitoring system.
iii. To promote the sustainable utilization of natural resources along with enhanced understanding and appreciation of its conservation and proper enforcement of regulations such as those related to hunting.

iv. To develop and maintain a comprehensive database for the fauna and flora of the Marshes and the establishment of a research station for the preservation and maintenance of specimens.
v. To enhance the level of institutional cooperation leading to effective long-term management.
vi. To provide adequate financial allocations by the central and local governments to implement priority interventions and projects.
vii. To utilize local traditional knowledge for the establishment of a long-term balance between resource use and conservation while ensuring enhanced local participation in decision making.

The Central Marshes Protected Area Management Objectives

The Central Marshes are shared between the Maysan and Dhi Qar governorates within the central area between the rivers Tigris and Euphrates. The southern boundaries of the Protected Area follow the river Euphrates drainage system while the river Tigris establishes the eastern boundary. To the east of the Protected Area is the Al Basrah governorate (West Qurna). The area of the Protected Area is 83,958 ha enveloped within 146,393 ha of a buffer zone belt. The Central Marshes are fed naturally from the River Tigris through its branches of Batira, 'Arid, and Majar, as well as Ghraff coming from the city of Kut through the shoreline of Abu Lehya which is a main feeding source of the Abu Zirq Marshes of the Protected Area. The Central Marshes are the first site declared as a National Park and are foreseen to play the model role for the establishment of protected areas and as a learning case for future programs. The Protected Area also includes a number of archaeological sites which have an associated cultural value. The management plan is based on the National Park goals.

The Central Marshes are affected by several human induced and natural factors which dictate its management framework. The management plan addresses the protection and enhancement of primary ecological processes as well as the abundance of plant and animal life. It also aims at ensuring the protection, conservation and study of the archaeological sites within its boundaries. Finally, it aims to maintain the goods and services provided to local communities by the ecosystem along with their sustainable utilization.

The main factors influencing the Central Marshes management are:

- The quantity and quality of waters entering the Protected Area and level of impact on the hydrological conditions achieved by using alternative flooding sources
- The variation and diversity of the water resources supplying the Protected Area
- The level of effectiveness of the legislative frameworks and mechanisms, especially after the Protected Area's designation as a national park
- The level of institutional coordination and collaboration
- The available funding used in management
- The local traditions and systems and their role in achieving the hoped for sustainable utilization of natural resources.

The Central Marshes management plan adopts the following key objectives:

i. To ensure the allocation of sufficient water quantities for the Protected Area through the effective control of incoming waters and monitoring of the allocated water budget, while maintaining the infrastructure that provides it - taking into consideration the supply it receives from the Euphrates dam.
ii. To ensure the adequate quality of the water coming into the Marshes through an effective water quality monitoring system.
iii. To promote the sustainable utilization of natural resources along with enhanced understanding and appreciation of its conservation and proper enforcement of regulations such as those related to hunting, particularly in light of its recent designation.
iv. To develop and maintain a comprehensive database to provide better understanding of the impacts of human activities such as reed collection, buffalo grazing and species introduction. This is to be handled by a research station mandated to preserve and protect the specimens of the fauna and flora of the Marshes and the establishment of a research station for the preservation and maintenance of specimens.
v. To ensure the protection, conservation and study of the archaeological sites.
vi. To enhance the level of institutional cooperation leading to effective long-term management, especially in light of its recent designation as a national park.
vii. To provide adequate financial allocations by the central and local governments to implement priority interventions and projects which would support the site's management as a World Heritage Site.
viii. To utilize local traditional knowledge for the establishment of a long-term balance between resource use and conservation while ensuring enhanced local participation in decision making, particularly towards the emerging importance of the area as a national park.

The East Hammar Protected Area Management Objectives

The East Hammar Protected Area is located within the Al Basrah governorate to the north of the city of Al Basrah. It is bordered by the Shatt Al-Arab to the east and north east, by the river Euphrates to the north, by the West Hammar Protected Area to the west, and by Al Zubair Plateau to the south. The area of the Protected Area is 79,990 ha surrounded by a buffer zone of 68,402 ha. The East Hammar Protected Area is considered to be the richest Protected Area in terms of number of fish species, especially those of marine origin. Its proximity to the Gulf provides a unique case of the Marshlands influenced by tidal movement, leading to a particular set of ecological processes. This uniqueness is reflected in its water quality and associated biodiversity, especially in regard to fish and crustacean migrations which utilize the Protected Area as a refuge during part of their life cycle. The East Hammar also includes a number of archaeological sites which have an associated cultural value.

The Protected Area is fed primarily from the Shatt Al-Arab by the Shaafi River and Musahab River. Its southern areas are also supplied from the Main Outfall Drain which follows the southern part of the Protected Area towards the east until reaching the Shatt Al-Arab channel.

Similar to the other Protected Areas, the East Hammar Protected Area is influenced by a number of factors dictating the management framework. The management plan addresses the protection and enhancement of the primary ecological processes as well as the abundance of plant and animal life. It also aims at ensuring the protection, conservation and study of the archaeological sites within its boundaries. Finally, it aims to maintain the goods and services provided to local communities by the ecosystem along with their sustainable utilization.

The main factors influencing East Hammar management are:

- The quantity and quality of waters entering the Protected Area
- The level of effectiveness of the legislative frameworks and mechanisms
- The level of institutional coordination and collaboration
- The available funding used in management
- The local traditions and systems and their role in achieving the hoped for sustainable utilization of natural resources.

The East Hammar management plan adopts the following key objectives:

i. To ensure the allocation of sufficient water quantities for the Protected Area through the effective control of incoming waters, including tidal, and monitoring of the allocated water budget while maintaining the infrastructure that provides it.
ii. To ensure the adequate quality of the water coming into the Marshes through an effective water quality monitoring system.
iii. To promote the sustainable utilization of natural resources along with enhanced understanding and appreciation of its conservation and proper enforcement of regulations such as those related to hunting.
iv. To develop and maintain a comprehensive database for the fauna and flora of the Marshes and the establishment of a research station for the preservation and maintenance of specimens.
v. To ensure the protection, study and conservation of the archaeological sites.
vi. To enhance the level of institutional cooperation leading to effective long-term management.
vii. To provide adequate financial allocations by the central and local governments to implement priority interventions and projects.
viii. To utilize local traditional knowledge for the establishment of a long-term balance between resource use and conservation while ensuring enhanced local participation in decision making.

<u>The West Hammar Marshes Protected Area Management Objectives</u>

The West Hammar Protected Area is fully located within the governorate of Dhi Qar some 36km to the west of the city of Nassirya. The river Euphrates borders this Protected Area in the north near the Central Marshes, the buffer zone of the east Hammar Protected Area lies to the east, and to its south lies the Zubair plateau. The area of the Marshes is 210,898 ha, surrounded by a buffer zone of 207,643 ha.

The West Hammar Protected Area is characterized by a vast surface area embracing a wide spectrum of natural habitats and land forms. This is greatly reflected in its abundance of birds, and its unique characteristic of relative salinity. Further, the Marshes create a border between the Marshlands and the Western Desert, hence presenting a distinctive case of transition in ecosystems regarding species adaptation and resilience. This Protected Area also includes the largest number of archaeological sites of all the four protected areas, including several sites dating to various Mesopotamian periods. The associated cultural values are therefore important.

The water supply for the north and west areas of the West Hammar Protected Area comes directly from the River Euphrates, and recently, another feeding channel was established from the main drainage channel to provide for the south and east parts.

Similar to the other Protected Areas, the West Hammar Protected Area is influenced by a number of factors dictating its management framework. The management plan addresses the protection and enhancement of the primary ecological processes as well as the abundance of plant and animal life. It also aims at ensuring the protection, conservation and study of the archaeological sites within its boundaries. Finally, it aims to maintain the goods and services provided to local communities by the ecosystem along with their sustainable utilization.

The main factors influencing the East Hammar management are:

- The quantity and quality of waters entering the Protected Area
- The level of effectiveness of the legislative frameworks and mechanisms
- The level of institutional coordination and collaboration
- The available funding used in management
- The local traditions and systems and their role in achieving the hoped for sustainable utilization of natural resources.

The West Hammar Protected Area management plan adopts the following key objectives:

i. To ensure the allocation of sufficient water quantities for the Protected Area through the effective control of incoming waters and monitoring of the allocated water budget while maintaining the infrastructure that provides it. Special attention is given to the Main Outfall Drain as an alternative water source for this Protected Area.
ii. To ensure the adequate quality of the water coming into the Marshes through an effective water quality monitoring system.

iii. To promote the sustainable utilization of natural resources along with enhanced understanding and appreciation to its conservation and proper enforcement of regulations such as those related to hunting.
iv. To develop and maintain a comprehensive database for the fauna and flora of the Marshes and the establishment of a research station for the preservation and maintenance of specimens.
v. To ensure the protection, study and conservation of the archaeological sites.
vi. To enhance the level of institutional cooperation leading to effective long-term management.
vii. To provide adequate financial allocations by the central and local governments to implement priority interventions and projects.
viii. To utilize local traditional knowledge for the establishment of a long-term balance between resource use and conservation while ensuring enhanced local participation in decision making

## Section Four: Management Actions

This section of the management plan details the main management actions adopted under each of the management objectives for the four protected areas. The management actions are tabulated to facilitate the performance tracking and monitoring as well as to give a sense of comparative intervention among the four protected areas. Nonetheless, the actions here are mostly shared by the four protected areas hence, allowing the management team to standardize the management framework of the Marshlands as a whole while leaving the identification of protected area-specific priority interventions to the management team of each protected area within a well-coordinated and communicated planning and management process adopted for the whole of the Marshlands.

| Operational Objective One |
|---|
| To ensure the allocation of sufficient water quantities for the Protected Area through the effective control of incoming waters and monitoring of the allocated water budget while maintaining the infrastructure that provides it. Special attention is given to the Main Outfall Drain as an alternative water source for this Protected Area. |
| Anticipated Outputs |
| - Water resources of the Marshes fully controlled according to allocated water budget.<br>- Obstacles facing the water cycle overcome.<br>- New irrigation approaches and techniques adopted and enforced. |
| Proposed Management Actions |
| 1.1. The completion of the water control infrastructure at the Marshes entrances/exits.<br>1.2. Negotiate the enhancement of the water allocation for the ecosystem flow with the ministry of water resources.<br>1.3. Undertake periodic maintenance of the marshes feeding channels according to rivers' respective capacities.<br>1.4. Design, negotiate, agree and enforce a water resources utilization process for all protected marshes. |

| Operational Objective Two |
|---|
| To ensure the adequate quality of the water coming into the Marshes through an effective water quality monitoring system |
| Anticipated Outputs |
| - An effective water quality monitoring systems is in place.<br>- Obstacles facing the water cycle overcome.<br>- Better understanding of the traditional water uses achieved. |
| Proposed Management Actions |
| 2.1. Start/complete the establishment of the hydraulic monitoring stations on the entrances and exits of all marshes. |

2.2. Establish and maintain a comprehensive database for the monitoring of water quality and quantity.
2.3. Design and implement a water quality monitoring system in coordination with key water users.
2.4. Undertake periodic surveys of traditional and nontraditional water uses in all marshes.
2.5. Develop and implement an awareness raising program on water conservation for all marshes.

| Operational Objective Three |
| --- |
| To promote the sustainable utilization of natural resources along with enhanced understanding and appreciation to its conservation and proper enforcement of regulations such as those related to hunting |
| Anticipated Outputs |
| - Marshlands biodiversity and their conservation status are well understood.<br>- A sustainable fishing activity is achieved.<br>- A game bird control systems is achieved.<br>- A sustainable reed collection systems is achieved.<br>- Environmental laws enforcement is strengthened and maintained.<br>- Socio-economic alternatives for local communities developed and applied. |
| Proposed Management Actions |
| 3.1. Complete the biodiversity inventory of all marshes on key habitats and species.<br>3.2. Implement and maintain a comprehensive scientific research program in collaboration with academia and other interest groups.<br>3.3. Develop and organize knowledge events, workshops and activities among all relevant partners and stakeholders.<br>3.4. Design and implement an awareness program targeting fishermen, game hunters and reed collectors.<br>3.5. Design and enforce a hunting control systems on all marshes.<br>3.6. Design and implement a socio-economic package on alternative livelihoods for key target groups.<br>3.7. Devise and implement a law enforcement system in collaboration with the environment police.<br>3.8. Develop periodic series of publications and materials on awareness raising, regulations and scientific research results. |

| Operational Objective Four |
| --- |
| To develop and maintain a comprehensive database for the fauna and flora of the Marshes and the establishment of a research station for the preservation and maintenance of specimens |
| Anticipated Outputs |
| - Sufficient raw data is collated for the database. |

- A specialized center for inventories established.
- Local uses of the marsh flora well understood.
- Endangered species identified and studied.

Proposed Management Actions

4.1. Design and implement a field research program to support the maintenance of the database and assess the status of biodiversity.

4.2. Continue/complete the plant species inventory of the marshes.

4.3. Establish a proper herbarium for plant species specimens' preservation.

4.4. Undertake periodic assessments the impacts of the local land uses on the marshes biodiversity.

Operational Objective Five

To ensure the protection, study and conservation of the archaeological sites

Anticipated Outputs

- Cultural values of the marshes well understood.
- Cultural values incorporated in the protection and law enforcement processes and mechanisms.

Proposed Management Actions

5.1. Identify key cultural values associated with the marshlands.

5.2. Devise and implement a law enforcement scheme for the cultural sites in the marshes.

5.3. Develop information, materials and publications on the cultural values of the marshes as part of the various knowledge and awareness related initiatives.

Operational Objective Six

To enhance the level of institutional cooperation leading to effective long-term management

Anticipated Outputs

- The effective management of the marshes is achieved.
- Participation and active involvement of all stakeholders are ensured at all levels and stages of management.

Proposed Management Actions

6.1. Establish and maintain bilateral and multilateral coordination mechanisms with all key stakeholder groups.

6.2. Formalize the management related coordination mechanisms with all key stakeholders.

6.3. Develop a specific outreach program for the Ministry of Oil (The South Oil Company).

Operational Objective Seven

To provide adequate financial allocations by the central and local governments to implement priority interventions and projects

Anticipated Outputs

- Adequate fiscal budget is secured for the marshlands from local and central government.

| |
|---|
| - A cluster of infrastructure and technical project is well developed and executed.<br>- Local teams capable of effective project management and monitoring. |
| Proposed Management Actions |
| 7.1. Secure government approval of adequate levels of national financing of the marshlands management.<br>7.2. Develop and implement a strategic projects portfolio for the marshlands.<br>7.3. Devise and implement adequate training for local teams on project development, management and monitoring.<br>7.4. Develop new innovations for sustainable financing of protected areas in cooperation with private sector and partners. |

| Operational Objective Eight |
|---|
| To utilize local traditional knowledge for the establishment of a long-term balance between resource use and conservation while ensuring enhanced local participation in decision making |
| Anticipated Outputs |
| - Local communities and stakeholders fully engaged in the management of the marshlands.<br>- Local and traditional knowledge on resource uses well documented and disseminated.<br>- Local communities are integral to the decision making process. |
| Proposed Management Actions |
| 8.1. Establish and maintain a representative advisory committee for each protected area.<br>8.2. Develop a cluster of knowledge products (e.g. films, posters, brochures, booklets…etc.) on the marshlands biodiversity and conservation suitable to local culture and capabilities.<br>8.3. Devise and implement a community outreach program linking knowledge exchange to capacity building and decision making.<br>8.4. Adopt an annual plan for the facilitation of local community access to basic needs in response to their development priorities (e.g. roads, drinking water, sanitation, health and education). |

# Management Plans of the Cultural Components

Site management plans for Uruk, Ur, and Tell Eridu are in preparation by the Ministry of Tourism and Antiquities and will be implemented by the end of 2014. These plans address the issues of the preservation of the sites' values through a concerted set of actions involving stakeholders and the local community. Interpretation and presentation to visitors are also addressed, together with institutional coordination to ensure an effective implementation of the management plan's recommendations. Below are the outlines of the three management plans.

## The Uruk Archaeological City Management Plan

### Historical Background

Uruk (modern name Warka) lies about 80 km northwest of ancient Ur and 30 km east of modern As Samawah, the administrative center of the Governorate of Al Muthanna. The boundaries and buffer zone of the component follow the official boundaries and buffer zone of the archaeological site, and encompass the whole of the archaeological remains of this component. The property covers c. 541 ha. The buffer zone covers an additional c. 292 ha. The maximum extent of the property is 3 km north-south and 2.5 km east-west.

Uruk's history covers four millennia from the end of the Ubaid period (c. 3800 BCE) to the late Sassanid period (7$^{rd}$ century CE). Uruk is the place where fundamental features of Mesopotamian urban civilization developed and was the forerunner of the urbanization process in southern Mesopotamia. It was a top political, cultural and religious center in the historical periods, but its critical influence on Mesopotamian and world history dates back to the 4$^{th}$ millennium BCE, the so called Uruk period (c. 4000-3000). In its maximal expansion, dated to the end of the 4$^{th}$ millennium, the city covered a surface of around 230 ha and was known for its large population and monumental buildings. During the first half of the 3$^{rd}$ millennium, it was surrounded by a double circular mudbrick wall of 9.8 km restored several times. Uruk continues to be an important city under the Assyrian, neo-Babylonian, Parthian and Persian empires but it is never again a primary political center after 2000 BCE. The city was finally abandoned shortly before or after the Islamic conquest.

The city was formed when two smaller Late Ubaid period settlements merged c. 3800 BCE. The temple complexes at their cores became the Eanna District and the Anu District dedicated to the goddess Innana and the god Anu respectively (see maps of the Anu and Eanna Districts in the Annexes). The Anu District was originally called “Kullaba” prior to merging with the Eanna District. Kullaba dates to the Eridu period when it was one of the oldest and most important cities of Sumer.

The Eanna District was composed of several buildings with spaces for workshops, and it was walled off from the city. By contrast, the Anu District was built on a terrace with a temple at the top. The rest of the city was composed of typical courtyard houses, grouped by profession of the occupants, in districts around Eanna and Anu. Uruk was extremely well

penetrated by a canal system recently identified through magnetometry and which archaeologists have described a “Venice in the desert.” This canal system flowed throughout the city connecting it with the maritime trade on the ancient Euphrates River as well as the surrounding agricultural belt within and around lowland marshes.

## Factors Affecting Conservation

*Development Pressures*

The archeological site of Uruk is fenced with barbed wires that only mark the boundaries of the property. A dig house in cement blocks and mud building housing the site warden and his family are located inside the property. A small station of the Antiquity and Heritage Police, situated in the buffer zone, plays an efficient role to protect the site from trespassers and looters. There is no electricity or water network inside the site. Electricity for the modern buildings is provided by generators, and water delivered by tanks. The site has not experienced any war-related damage. An agricultural village is situated just outside of the buffer zone however no activities are encroaching inside the buffer zone.

Uruk is not inhabited and its ownership by the state is not challenged by the traditional system of land use and rights.

*Environmental pressure*

Erosion caused by rain (rain and flash floods which can occur during the short rain season), humidity, wind and dust storms (which are becoming more frequent) are the most serious threats to the conservation of the historic remains included in the component.

Due to erosion, the Mosaic Temple requires consolidation due to missing bricks and mosaic cones whereas the Anu ziggurat displays limited cracks. Conservation interventions are prioritized at both buildings in the new management plan for the property and will be conducted in 2014. On this site too, adequate protective structures will be built above the buildings most affected by erosion.

*Visitor Pressure*

Very few visitors are currently recorded and there is no visitor facility which will have to be developed together with a visitor management plan.

## Present Management Context

Uruk is registered in the Official Gazette n° 1465 of 17 October 1935 as an archaeological site and protected under article 7 of the Iraqi Law of Antiquities and Heritage n°55 of 2002. This Law aims to protect, conserve and manage all archaeological sites in Iraq. The law is enforced by the State Board of Antiquities and Heritage under the Ministry of Tourism and Antiquities. The law is further concerned with surveying, excavating and documenting all archaeological sites in Iraq and presenting them the local and international public.

The Law of Antiquities and Heritage provides for penalties (fines and incarceration) in case of trespassing on archaeological sites either with agricultural or construction activities. Illegal excavations are also punishable. By law, any development activity (residential, agricultural, commercial, industrial, etc.) is forbidden inside the legal boundaries archaeological site and their buffer zones.

The Iraqi Constitutions further provides for requesting a permit from the State Board of Antiquities and Heritage for any public or private development (residential, agricultural, commercial, industrial, etc.) anywhere in the country even outside archaeological sites and their buffer zones. The Department of Antiquities at the governorate level delivers these permits and establishes requirements for development projects, including height and size of buildings. It can also deny permits if the planned activity is deemed unsuitable in the vicinity of an archaeological site. This applies to the archaeological sites such as those in the marsh areas of the proposed property for which boundaries and buffer zones are not yet determined officially.

At the governorate level, the Directorates of Antiquities of Al Muthanna is directly responsible to ensure the conservation, management and monitoring of the component.
The Directorate includes five units which are the local extensions of national-level departments within the State Board of Antiquities and Heritage. These include:

1. Restoration and Conservation
2. Investigations and Excavations
3. Museums

Unit heads report to their respective Director of Antiquities who reports to the Chairman of the State Board of Antiquities and Heritage.

The State Board of Antiquities and Heritage includes a World Heritage Section (under the Department of Investigation and Excavations) charged with conservation and monitoring at World Heritage properties.

An Antiquity and Heritage Police unit was created in 2007 under the Ministry of Interior.
In Uruk, there is one station of the Antiquity and Heritage Police at the entrance of the site together with patrols. One full time civilian warden employed by the Al Muthanna Department of Antiquities lives permanently on the site with his family.

**Values**

Uruk – originally situated southwest of the ancient Euphrates River bed, now dry, and on the edges of a marsh – was the biggest settlement in ancient Iraq and the main force of urbanization in southern Mesopotamia in the 4$^{th}$ millennium BCE. Its archaeological remains illustrate the several phases of the city's growth and decline, the architectural evolution and sophistication of public buildings, and the spatial organization of a vast and complex city with its sacred precincts encircling monumental temples – including two

ziggurats, residential quarters organized by professions, and a canal system that recently earned the city the name of "Venice in the desert". Uruk developed a full-time bureaucracy, military, and stratified society where writing first came about. The earliest texts known to humanity were found in the Eanna, the temple precinct of the goddess Inanna. *The Gilgamesh Epic*, the earliest literary text, also originated in Uruk, likely as a reflection of the city's power and influence which extended to the whole Mesopotamian world and far beyond.

Furthermore, the remains of the ancient city of Uruk best exemplify the impact of the unstable deltaic landscape of the Tigris and Euphrates upon the rise and fall of large urban centers in southern Mesopotamia. Testimonies of this relict wetland landscape are found today in the cities' topography as dry waterways and canal beds, and settlement mounds formed upon what were once islets surrounded by marsh water.

**Objectives and Strategic Axes**

A management plan for Uruk is being developed by involving institutional stakeholders and the civil society in order to produce a feasible action plan based on the long term protection of the site's values. This is achieved through meetings, surveys, interviews, discussion of proposals, and collaborative activities (such as documentation and detailed assessments) that raise awareness among stakeholders about the numerous issues related to the preservation of cultural values, and produce data for the generation of shared policy statements and strategies for the implementation of the plan.

The management plans adopts the following key objectives:

A. Ensure that the protection of Uruk is integrated in local and regional development plans.
B. Define the mechanisms of implementation of the management plan and of coordination at the sites, and at regional and national levels.
C. Ensure that personnel in charge of the implementation is given the opportunity to receive adequate training and capacity building in order to properly carry out their responsibilities.
D. Ensure the long term preservation of the site and of its values, limiting negative impacts.
E. Encourage the population to be a partner in protecting the site and the surrounding environment, and allowing them to benefit from visitation and tourism activities.
F. Provide a quality visiting and educational experience according to international standards.

Several thematic headlines have been identified to help with the definition of the management strategy, as follows:

1. Legal and institutional framework:

a. Definition of the management structure, coordination between the State Board of Antiquities and Heritage, Directorate of Antiquities, National World Heritage Committee, and other concerned governmental institutions.
b. Staffing and required skills and levels of expertise.
c. Regulations for site use.

2. Facilities, infrastructures and services:
    a. Management office (structure and location).
    b. Visitor center, site museum and visitor services (cafeteria, washrooms, bookshop/souvenir shop, preferably built outside the site's buffer zone).
    c. Conservation laboratories and research/documentation center (including accommodation for excavation teams/researchers).
    d. Accommodation for site guards.
    e. Access roads, parking structures, paths for visitors, methods for movements of visitors within the site.
    f. Signage on site.
    g. Security control.
    h. Pollution control, including visual pollution (such as electric poles and buildings just outside buffer zone).
    i. Guards and police activities.

3. Conservation, maintenance and monitoring:
    a. Conservation issues and methodological approach.
    b. Risk preparedness measures.
    c. Conservation guidelines.
    d. Monitoring strategies and methods (what to monitor, with which frequency, by what method).
    e. Maintenance actions and frequency/cycles.

4. Documentation and Research:
    a. Definition of priority areas for new research.
    b. Definition of obligations for new research permits (excavation methodology, conservation of exposed materials).
    c. Recommended research priorities.
    d. Creation of a documentation center and of related activities (data collection, archiving)

5. Visitation and interpretation:
    a. Methods for visitor control and security (monitoring devices, CCTV, etc).
    b. Movements of tourists within site (paths, provision of transportation, etc).
    c. Definition of areas to be closed to visitation.
    d. Rules and regulations concerning visitor and vehicle movements.
    e. Training of tourist guides.
    f. Preparation of narratives for visitor center and signage displays.

6. Public awareness and community participation:

a. Involvement of local teachers and students in activities on site.
b. Promotion of awareness activities at the local and regional level (site days, festivals, cultural events).
c. Promotion activities, such as brochures and advertisements.
d. Encouraging private enterprise in tourism related activities such as handicrafts.

7. Investments, marketing and funding:
   a. Preparation of business plans.
   b. Management of governmental financial assistance.
   c. Marketing strategies for site promotion.

## The Ur Archaeological City Management Plan

### Historical Background

Ur (modern Tell Al Muqayyar) is situated 17 km south-west of An Nasiriyah, the administrative center of the Dhi Qar Governorate, and 200 km north of Al Basrah and the Arabian Gulf. The boundaries of the property follow the lower topographical contours of the archaeological mound (Tell Al Muqayyar) which encompasses all the most important archaeological remains of the Sumerian period. The buffer zone coincides with the boundaries of the official archaeological site and the ancient city walls. The component covers 71 ha, and its buffer zone covers 317 ha .

Now well inland, Ur was once the most important Sumerian port located on a branch of the Euphrates with access to the sea. The city's inhabitants maintained an extensive system of canals, on the average two miles long, and used boats for moving supplies up and down the Euphrates. The excavated artifacts from the Royal Tombs of Ur (First Dynasty of Ur, c. 2600 BCE) can be considered as emblematic of the wealth, power, and sophistication of the Sumerian civilization. At the end of the 3rd millennium BCE, the city controlled a vast empire known as Ur III state and connected southern Mesopotamia with trade partners in the Arabian Gulf, India and northern Mesopotamia. The Ur III administration used written records on an unprecedented scale: more than 80,000 cuneiform tablets have been uncovered to date, giving a unique insight into the Sumerian world and highlighting the importance of the wetland environment for Sumerian economy, belief system and literature. Ur remained one of the most prominent administrative, intellectual and religious centers in Mesopotamia until the Hellenistic period.

The archaeological site is surrounded by a mudbrick wall of oval shape. Inside, an almost rectangular *temenos* or sacred precinct (400 x 220 m) built of fired bricks with the external facades covered with glaze encircles a number of religious, royal and public buildings. The ziggurat is the most outstanding building with remains clearly visible. Excavations conducted outside the sacred precinct, that is in the area included in the buffer zone of the component of the property, uncovered extensive residential areas from the Paleo-

Babylonian, Kassite and Neo-Babylonian periods of which parts of walls are still visible on the site.

**Factors affecting conservation**

*Development Pressures*

On the site, electrical poles and wires run along the paved road from the site main entrance to the foot of the ziggurat. The road was built in 1960s over an excavated area which used to be the enclosure of the ziggurat. A dig house and warden house are located after the entrance of the site about 350 m from the ziggurat to the North East. Another dig house, hosting international archaeological missions, is located 450 m from the ziggurat. A laboratory adjacent to the living quarters of the wardens and their families is situated 275 m northeast of the ziggurat. All modern buildings are within the buffer zone of the property. They are built of cement blocks and equipped with septic tanks but are not connected to a running water network. Trucks deliver water and empty septic tanks. Barracks are used as a temporary visitor center and will be removed from the property as soon as the new visitor center planned for in the new management plan is completed.

This component is surrounded by villages and agricultural lands belonging to local tribes to the north and west, and by a military base and Al Makir railways station presently disused to the south and east. The ziggurat suffered limited damage during the recent conflict in the form of some impact of mortar shell on the modern outer shell. It is possible that fighter jets flying to and from the US military base (Camp Ader) situated 300 m away from the official boundaries of the archaeological site (that form the buffer zone of the proposed property) threatened the stability of some of the buildings on the site. However structural studies need to verify this fact and propose adequate conservation intervention. Furthermore, US soldiers visiting the site left numerous graffiti on the walls of several buildings. However, the presence of military forces also protected the site from illegal excavations. The military base was returned to the Iraqi army in 2009 and there is at present very limited military activities that do no threaten the property. The property is fenced with barbed wires to mark its boundaries however the fence does not prevent trespassing.

*Environmental Pressure*

Erosion caused by rain (rain and flash floods which can occur during the short rain season), humidity, wind and dust storms (which are becoming more frequent) is the most serious threats to the conservation of all the historic remains included in the component.

Due to erosion, some of the subterranean Royal Tombs are in need of consolidation, stabilization and repair against pressure from the above ground and water infiltration. In the Lower Temple of Nannar and the Temple of Shulgi localized areas of mud brick exposed during excavations are heavily eroded. The E-dub-lal-mah is most affected because of the cement capping laid by archeologist L. Woolley. By bearing heavily on the walls, it created the possibility of erosion and even collapse due to water infiltration (coving under the

walls), dust storms, temperature differences, losses such as bricks falling off the walls. The core of the ziggurat needs to be properly drained to limit erosion. These are all structural issues which are prioritized for conservation intervention in the new management plan for the property with work scheduled to be conducted over 2014-2015.

During a second stage of conservation intervention, non-compatible material will be replaced with compatible one such as gypsum, and adequate protective structures will be built above the buildings most affected by erosion.

*Visitor Pressure*

Ur receives a noticeable number of visitors, although this number is very relative and difficult to estimate. Wardens on site sell tickets, however most visitors come with official invitations or in school tours and enter free of charge. No systematic record of the number of visitors is kept.

There is mostly domestic tourism (people from An Nasiriyah and Al Basrah, officials, school children and university students). International tourists are employees of the oil companies operating in the south of Iraq, some journalists and researchers, and a limited number of Christian pilgrims for whom Ur bears a religious significance as the birth place of Abraham according to the Bible. The wardens estimate that the site has received less than one thousands visitors per year on average in the past four years (since the withdrawal of the US army at the nearby airbase). Before the 2003 war, the number of visitors was slightly higher.

During the US occupation of the area, a considerable number of American soldiers visited the site. Not all of them were respectful of the antiquities and instances of vandalism were recorded, particularly graffiti on the reconstructed walls of the ziggurat and the removing and/or stealing of bricks. Iraqi school groups visiting today are also said to remove bricks from the top of the ziggurat and walk over antiquities. Efforts are needed to raise the awareness of their teachers to supervise them better during visits, and more generally visitor awareness.

There is a path partially covered with wooden planks, equipped with some shaded shelters that lead visitors around the main building remains. The Royal Tombs are fenced off with a door to prevent visitor access except under the control of a warden. The path and tombs door were installed by the US army to ensure some degree of visitor control.

Tourism is not currently a pressure factor and is unlikely to become so in the next two to five years even in the prospect of the inscription of the property on the World Heritage list as it will take more time and effort from the part of the Iraqi Government and international tourism industry to improve the image of Iraq as a safe destination for international tourism. However, the power of attraction of Ur for international visitors is high. The coming few years will allow the concerned national and local authorities to develop suitable visitor infrastructure at the site, including signage and interpretation, together

with an adequate visitor management system that will ensure that visitation, even to increased levels, remains responsible.

The approach taken to responsible and sustainable visitation of the archaeological components of the property is to design the visitor experience of the Mesopotamian cities and their relict marshland landscape as centered on the site of Ur. The site will be adequately developed and protected to receive a large number of visitors, and will include an attractive and informative interpretation center providing information (including in a visual form) on all cultural (archaeological and other) components of the property.

**Present Management Context**

Ur is registered in the Official Gazette n° 1465 of 17 October 1935 as an archaeological site and protected under article 7 of the Iraqi Law of Antiquities and Heritage n°55 of 2002. This Law aims to protect, conserve and manage all archaeological sites in Iraq. The law is enforced by the State Board of Antiquities and Heritage under the Ministry of Tourism and Antiquities. The law is further concerned with surveying, excavating and documenting all archaeological sites in Iraq and presenting them the local and international public.

The Law of Antiquities and Heritage provides for penalties (fines and incarceration) in case of trespassing on archaeological sites either with agricultural or construction activities. Illegal excavations are also punishable. By law, any development activity (residential, agricultural, commercial, industrial, etc.) is forbidden inside the legal boundaries archaeological site and their buffer zones.

The Iraqi Constitutions further provides for requesting a permit from the State Board of Antiquities and Heritage for any public or private development (residential, agricultural, commercial, industrial, etc.) anywhere in the country even outside archaeological sites and their buffer zones. The Department of Antiquities at the governorate level delivers these permits and establishes requirements for development projects, including height and size of buildings. It can also deny permits if the planned activity is deemed unsuitable in the vicinity of an archaeological site. This applies to the archaeological sites such as those in the marsh areas of the proposed property for which boundaries and buffer zones are not yet determined officially.

At the governorate level, the Directorates of Antiquities of Dhi Qar is directly responsible to ensure the conservation, management and monitoring of the component. The Directorate includes five units which are the local extensions of national-level departments within the State Board of Antiquities and Heritage. These include:

1. Restoration and Conservation
2. Investigations and Excavations
3. Museums

Unit heads report to their respective Director of Antiquities who reports to the Chairman of the State Board of Antiquities and Heritage.

The State Board of Antiquities and Heritage includes a World Heritage Section (under the Department of Investigation and Excavations) charged with conservation and monitoring at World Heritage properties.

An Antiquity and Heritage Police unit was created in 2007 under the Ministry of Interior. In Ur, this unit has three stations, the main one at the entrance of the site, as well as three mobile patrols. In addition, three full time civilian wardens employed by the Dhi Qar Department of Antiquities live permanently with their families on the site.

Urban master plans are revised on a yearly basis. The master plan for the city of An Nassiriyah, which borders the archaeological site of Ur, is sent for approval to the Dhi Qar Department of Antiquities. At present, the municipality of An Nasiriyah has put forth a plan to build a road which will connect Ur directly to the An Nasiriyah-Baghdad road and will avoid the city center. This road will include a resting area and other visitor facilities. In the context of the planned development of the site for visitation, the plan also includes the building of a high standard hotel in the city center and a bridge on the Euphrates. However none of these developments are in the vicinity of the archaeological site of Ur.

Governorate level master plans for regional infrastructure development are also revised on a yearly basis and submitted to the concerned Department of Antiquities for approval.

**Values**

Ur, compared in a Sumerian religious hymn to “a bull standing in the wet reeds”, was the most important Sumerian port on the Arabian Gulf connecting southern Mesopotamia with trade partners as far as India. The capital of Sumer during the 3rd millennium BCE, Ur evolved the most centralized bureaucratic administration the world had yet known and used written records on an unprecedented scale. The more than 80,000 cuneiform tablets uncovered to date on the site give a unique insight into the Mesopotamian world and highlight the importance of the wetland environment for the economy, belief system and literature. Objects from the Royal Tombs of Ur and the city's monumental architectural remains – particularly its famed ziggurat, but also temples, royal palaces and tombs – stand as emblems of the wealth, power, and sophistication of the Sumerian civilization at its height which continued to be remembered and celebrated by the Babylonians and the Assyrians.

Furthermore, the remains of the ancient city of Uruk– today in the desert but originally situated near freshwater marshes which receded or became saline before drying up – best exemplify the impact of the unstable deltaic landscape of the Tigris and Euphrates upon the rise and fall of large urban centers in southern Mesopotamia. Testimonies of this relict wetland landscape are found today in the cities' topography as traces of shallow depressions which held permanent or seasonal marshes, dry waterways and canal beds, and settlement mounds formed upon what were once islets surrounded by marsh water.

**Objectives and Strategic Axes**

A management plans for the Ur components of the property is being developed by involving institutional stakeholders and the civil society in order to produce a feasible action plan based on the long term protection of the site's values. This is achieved through meetings, surveys, interviews, discussion of proposals, and collaborative activities (such as documentation and detailed assessments) that raise awareness among stakeholders about the numerous issues related to the preservation of cultural values, and produce data for the generation of shared policy statements and strategies for the implementation of the plan.

The management plan adopts the following key objectives:

G. Ensure that the protection of the site is integrated in local and regional development plans.
H. Define the mechanisms of implementation of the management plan and of coordination at the sites, and at regional and national levels.
I. Ensure that personnel in charge of the implementation is given the opportunity to receive adequate training and capacity building in order to properly carry out their responsibilities.
J. Ensure the long term preservation of the site and its values, limiting negative impacts.
K. Encourage the population to be a partner in protecting the site and the surrounding environment, and allowing them to benefit from visitation and tourism activities.
L. Provide a quality visiting and educational experience according to international standards.

Several thematic headlines have been identified to help with the definition of management strategies, as follows:

1. Legal and institutional framework:
   e. Definition of the management structure, coordination between the State Board of Antiquities and Heritage, Directorate of Antiquities, National World Heritage Committee, and other concerned governmental institutions.
   f. Staffing and required skills and levels of expertise.
   g. Regulations for site use.

2. Facilities, infrastructures and services:
   a. Management office (structure and location).
   b. Visitor center, site museum and visitor services (cafeteria, washrooms, bookshop/souvenir shop, preferably built outside the site's buffer zone).
   c. Conservation laboratories and research/documentation center (including accommodation for excavation teams/researchers).
   d. Accommodation for site guards.
   e. Access roads, parking structures, paths for visitors, methods for movements of visitors within the site.
   f. Signage on site.

g. Security control.
h. Pollution control, including visual pollution (such as electric poles and buildings just outside buffer zone).
i. Guards and police activities.

3. Conservation, maintenance and monitoring:
    a. Conservation issues and methodological approach.
    b. Risk preparedness measures.
    c. Conservation guidelines.
    d. Monitoring strategies and methods (what to monitor, with which frequency, by what method).
    e. Maintenance actions and frequency/cycles.

4. Documentation and Research:
    a. Definition of priority areas for new research.
    b. Definition of obligations for new research permits (excavation methodology, conservation of exposed materials).
    c. Recommended research priorities.
    d. Creation of a documentation center and of related activities (data collection, archiving)

5. Visitation and interpretation:
    a. Methods for visitor control and security (monitoring devices, CCTV, etc).
    b. Movements of tourists within site (paths, provision of transportation, etc).
    c. Definition of areas to be closed to visitation.
    d. Rules and regulations concerning visitor and vehicle movements.
    e. Training of tourist guides.
    f. Preparation of narratives for visitor center and signage displays.

6. Public awareness and community participation:
    a. Involvement of local teachers and students in activities on site.
    b. Promotion of awareness activities at the local and regional level (site days, festivals, cultural events).
    c. Promotion activities, such as brochures and advertisements.
    d. Encouraging private enterprise in tourism related activities such as handicrafts.

7. Investments, marketing and funding:
    d. Preparation of business plans.
    e. Management of governmental financial assistance.
    f. Marketing strategies for site promotion.

# The Tell Eridu Archaeological Site Management Plan

## Historical background

Tell Eridu (also transliterated Eridug, and known under its modern name of Tell Abu Shahrain) is located 40 km south-west of An Nasiriyah, the administrative center of Dhi Qar Governorate, and 12 km to the southwest of Ur. The site is only accessible through a 10 km dirt road. Eridu, today in a desert environment, was surrounded by a marshy lagoon and a canal was connecting it to Ur. The settlement developed during the Ubaid period (c. 5000 BCE) in a unique environment, that of the transitional zone between sea and land with its shifting watercourses, small islands, and deep reed thickets. The settlement was built upon a hillock (or turtleback) within a depression about 6 meters below the level of the surrounding land which allowed the subterranean waters to collect together. This swampy place can still become a sizable lake during the rainy season. The earliest Mesopotamian texts (early third millennium) underline the importance of this lagoon: the features of the landscape – a large body of freshwater at the edges of the desert – was seen as a manifestation of the divine. On this basis, Eridu was developed by the Ubaid culture as a major cultic center.

The earliest settlement grew into a substantial city of mudbrick and reed houses by c. 2900 BCE, covering 8-10 ha and still supporting an agricultural community around a temple. The city also included an extensive cemetery apparently serving a population larger than that of the settlement. Even in later periods, the urban nucleus of Eridu remained the temple. The temple was rebuilt seventeen times on top of the original shrine, each time with enlargement and additional architectural and decorative features, until Amar-Sin, third rule of Ur III (c. 2047 – 2039 BCE), had the first stepped ziggurat erected using a mudbrick core and a case of fired bricks set in bitumen. This process can be first observed in Eridu thus making the remains of its ziggurat and the sacred mound that underlies the most ancient and best documented testimony of the development of religious architecture and sacred cities in southern Mesopotamia.

The encroachment of neighboring sand dunes, together with the rise of a saline water table, set early limits to Eridu's agricultural base and, by c. 2050 BCE, the city had declined; there is little evidence of occupation after that date. The shrine was abandoned for long periods but, in honor of its earliest history, it was rebuilt or restored under the Isin Dynasty (2000-1800 BCE), and then again under the neo-Babylonian king Nebuchadnezzar II (middle of the first millennium). The ziggurat was finally deserted and allowed to fall into ruin in the 6$^{th}$ century BCE.

Tell Eridu is a typical cone-shaped tell, half a kilometer in diameter, rising some 25 meters above the plain. The boundaries of the property follow the lower topographic contours of the Tell. Six smaller tells are dotted around Tell Eridu indicating that the population center moved throughout time, perhaps in accordance with the lagoon's shifting shoreline. Five of these smaller mounds and the depression where the original lagoon formed are included in

the buffer zone of the property which coincides with the official boundary of the Eridu archaeological site and is marked on the ground by a sand berm. The component covers 33 ha, and the buffer zone c. 1069 ha.

The ruins of the ziggurat, dated from the reign of King Amar-Sin (c. 2047 – 2039 BCE) of the Third Dynasty of Ur, stand on top of the tell and are considered the oldest example of this building type. The remains of the ziggurat are a mudbrick mound heavily eroded and compacted culminating at 9.5 m. The ziggurat is the only structure visible today on the site and dominates an archaeological site otherwise covered with sand dunes and surrounded by a dramatic desert landscape.

**Factors affecting conservation**

*Development Pressures*

Tell Eridu is uninhabited and only accessible through a 10 km dirt road and otherwise surrounded by the desert. Except for a metal observation tower erected by archaeologists, there is no modern construction or infrastructure on the site, which is visited daily by a warden. There are instances of exploded and unexploded mines in the buffer zone that is in need of demining however the main access road to the mound and the ziggurat is completely cleared. This ownership of the site by the state is not challenged by the traditional system of land use and rights.

*Environmental Pressure*

Erosion caused by rain (rain and flash floods which can occur during the short rain season), humidity, wind and dust storms (which are becoming more frequent) is the most serious threats to the conservation of the historic remains included in the property.

*Visitor Pressure*

Visitation levels are insignificant and there are no plans for making them more accessible. On the one hand, their remoteness makes them more difficult to develop for visitors and to protect, and visitation would cause unnecessary threats to their conservation. On the other hand, they are of limited visual interest for non-specialized visitors.

**Present Management Context**

Eridu is registered in the Official Gazette n° 1465 of 17 October 1935 as an archaeological site and protected under article 7 of the Iraqi Law of Antiquities and Heritage n°55 of 2002. This Law aims to protect, conserve and manage all archaeological sites in Iraq. The law is enforced by the State Board of Antiquities and Heritage under the Ministry of Tourism and Antiquities. The law is further concerned with surveying, excavating and documenting all archaeological sites in Iraq and presenting them the local and international public.

The Law of Antiquities and Heritage provides for penalties (fines and incarceration) in case of trespassing on archaeological sites either with agricultural or construction activities. Illegal excavations are also punishable. By law, any development activity (residential, agricultural, commercial, industrial, etc.) is forbidden inside the legal boundaries archaeological site and their buffer zones.

The Iraqi Constitutions further provides for requesting a permit from the State Board of Antiquities and Heritage for any public or private development (residential, agricultural, commercial, industrial, etc.) anywhere in the country even outside archaeological sites and their buffer zones. The Department of Antiquities at the governorate level delivers these permits and establishes requirements for development projects, including height and size of buildings. It can also deny permits if the planned activity is deemed unsuitable in the vicinity of an archaeological site. This applies to the archaeological sites such as those in the marsh areas of the proposed property for which boundaries and buffer zones are not yet determined officially.

At the governorate level, the Directorates of Antiquities of Dhi Qar is directly responsible to ensure the conservation, management and monitoring of the component. The Directorate includes five units which are the local extensions of national-level departments within the State Board of Antiquities and Heritage. These include:

1. Restoration and Conservation
2. Investigations and Excavations
3. Museums

Unit heads report to their respective Director of Antiquities who reports to the Chairman of the State Board of Antiquities and Heritage.

The State Board of Antiquities and Heritage includes a World Heritage Section (under the Department of Investigation and Excavations) charged with conservation and monitoring at World Heritage properties. One civilian warden employed by the Dhi Qar Department of Antiquities and living 20 km from the site conducts daily inspection visits.

An Antiquity and Heritage Police unit was created in 2007 under the Ministry of Interior. The unit stationed at Ur (17 Km from Eridu) conducts regular patrols.

**Values**

Eridu, which Mesopotamian tradition considered the oldest city in the world predating the Flood, developed in a small depression around a temple built on an islet surrounded by a lagoon. Throughout Mesopotamian history, its temple complex, which later developed into a ziggurat, remained a major religious center and provided the mythical paradigm for the divine foundation of cities around a temple built over a body of freshwater, and for the function of cities as primarily cultic centers. Eridu, which name stood for its E-abzu temple to the freshwater god Enki-Ea, was considered by the Sumerians as the place where kingship originated, and remained a source of knowledge and wisdom into late

Mesopotamian Antiquity. Perched on the tell, the remains of the ziggurat and the sacred mound that underlies it, where eighteen successive temples were built over a period of 3,000 years, represent the most ancient and best documented testimony of the origin and development of sacred cities and religious architecture in southern Mesopotamia.

The remains of Tell Eridu – today in the desert but originally situated near freshwater marshes which receded or became saline before drying up – best exemplify the impact of the unstable deltaic landscape of the Tigris and Euphrates upon the rise and fall of large urban centers in southern Mesopotamia. Testimonies of this relict wetland landscape are found today in the site's topography as traces of shallow depressions which held permanent or seasonal marshes, and the archaeological tell formed upon what was once an islet surrounded a freshwater lagoon.

**Objectives and Strategic Axes**

A management plans for the Tell Eridu component of the property is being developed by the Ministry of Tourism and Antiquities and the Dhi Qar Governorate.

The management plan adopts the following key objectives:

M. Ensure that the protection of the site is integrated in local and regional development plans.
N. Define the mechanisms of implementation of the management plan and of coordination at the sites, and at regional and national levels.
O. Ensure that personnel in charge of the implementation is given the opportunity to receive adequate training and capacity building in order to properly carry out their responsibilities.
P. Ensure the long term preservation of the site and its values, limiting negative impacts.

Several thematic headlines have been identified to help with the definition of management strategies, as follows:

1. Legal and institutional framework:

h. Definition of the management structure, coordination between the State Board of Antiquities and Heritage, Directorate of Antiquities, National World Heritage Committee, and other concerned governmental institutions.
i. Staffing and required skills and levels of expertise.
j. Regulations for site use.

2. Facilities and infrastructures:
    a. Management office (structure and location).
    b. Accommodation for site guards.
    c. Access roads and parking structures, paths for visitors, methods for movements of visitors within the site.
    d. Signage on site.
    e. Security control.

f. Guards and police activities.

3. Conservation, maintenance and monitoring:
    a. Conservation issues and methodological approach.
    b. Risk preparedness measures.
    c. Conservation guidelines.
    d. Monitoring strategies and methods (what to monitor, with which frequency, by what method).
    e. Maintenance actions and frequency/cycles.

4. Documentation and Research:
    a. Definition of priority areas for new research.
    b. Definition of obligations for new research permits (excavation methodology, conservation of exposed materials).
    c. Recommended research priorities.
    d. Creation of a documentation center and of related activities (data collection, archiving)

5. Limited visitation and interpretation:
    a. Methods for visitor control and security (monitoring devices, CCTV, etc).
    b. Movements of tourists within site (paths, provision of transportation, etc).
    c. Definition of areas to be closed to visitation.
    d. Rules and regulations concerning visitor and vehicle movements.
    e. Training of tourist guides.
    f. Preparation of signage displays.

# DRAFT MANAGEMENT PLAN FOR THE MESOPOTAMIA MARSHLANDS NATIONAL PARK

# PART 2

# Contents

# Foreword

This document represents the second phase of a three year program that started in April 2006. The New Eden Team worked throughout in partnership with the Iraqi representatives of the Ministry of Environment, Ministry of Public Works, Ministry of Water Resources and Nature Iraq experts.

The broad scope was to provide the southern marshes of Iraq with a plan to guarantee the restoration and protection of the environment and the cultural heritage while ensuring a sustainable development of the territory and increasing the values of its unique features.

The Feasibility Study presented in April 2007 constitutes the preparatory phase of the whole plan. Its main deliverables have been the basis for drawing up the prosecution of the project.

The management plan here proposed has been drawn up in a preliminary form to provide the matters for an "Operational Program" to implement during the last year of the project.

During its development a series of activities will be led to involve the local communities to participate to the Park features definition.

The main purpose is to create a strong consistent connection between the objectives of the protection of environmental and cultural heritage and the actions to promote a sustainable socio-economic development improving the locals' quality of life.

The final version of the Plan will be delivered in April 2009, revised and upgraded taking into account the recommendations, the experiences and the findings gathered during the implementation of the Operational Program.

# Executive Summary

The body of this Management Plan is divided into two parts:

**Part One** is mainly composed by the feasibility study deliverables, updated and completed with recent data. It focuses on the description of the site and provides the information and assessment on its Physical, Ecological and Socio –economic characteristics.

**Par Two** is the proper management plan. It is the document that defines the features of the Park, the Vision and objectives to achieve and the consequent strategies, projects and actions to implement for the development and the management of the Park's area.

The contents of the report are divided into six main sections:

**WATER, REEDS & PEOPLE** set out the Vision, the guiding principles and the Overall Purposes that are:

- To restore, conserve and enhance the unique wildlife and natural beauty of the National Park, taking management decisions based on the best available knowledge, supported by a wide range of research, including integrated scientific monitoring activities;
- To establish the long term maintenance of the NP environmental features ensuring, both the conservation of their cultural heritage and the development of sustainable activities within and near the park area through a participatory approach of the local communities;
- To plan in order to realise an increasing eco-tourism exploitation of the National Park values, ensuring the financial accountability of the Park and an additional means of incomes for the surrounding inhabitants of the area.

**"THE PARK FEATURES"** section describes the Park: The extension is of 141,615 hectares and includes three governorates: Thi-Qar, Missan and Basrah. The zoning system identifies a Core Area of 23,882 hectares and an extent of 117,733 hectares divided into three buffer zones dedicated to Research, Reserve, Traditional and Recreational activities. For each zone features, extension and regulation are listed. Three IUCN categories are comprised: Cat. II, IV and V.

***Broad Objective:***
The zoning of the National Park area is aimed at defining appropriate strategies and development plans according to the different needs addressed to natural protection and traditional uses of the land and of the natural resources:

- Develop the assets that are required for the establisment of the National Park
- Set up an operable program to promote the establishment of land tenure regulation

**"THE PARK AND ITS VALUES"** section deals in detail with the strategies to manage the Park's values identified and assessed in the Part One.
They include: Water Environment, Habitats & Wildlife, Archaeology Heritage, Landscape and Cultural Distinctiveness.

***Broad Objectives:***

- The main environmental objective of the National Park is the protection and enhancement of biodiversity and the recovery of the marshes ecosystems
- On a wider scale, the promotion of the establishment of ecologic corridors between the marshes and the creation of a sound management system for the Mesopotamia marshlands
- All the identified archaeological sites will be restored and protected in accordance with the directive of the General Directorate of Antiquities
- The National Park will retain a rich interlacing of the cultural and natural environment, reflecting the living and working marshlands landscape .

**"THE PARK & THE PEOPLE"** explains how the activities that will be developed inside the Park such as educational and training programs and research, will be useful to increase the quality of

life and the economic aspects of the local communities and the people in general.

*Broad Objective:*

- To create a Mesopotamia Marshlands Research Centre (MMRC) with two interconnected key functions at local level and at national/international level

**"THE PARK & ITS VISITORS"** suggests the strategies to start up, encourage and support ecotourism, planning a development in line with the increasing ability of the territory to host a growing number of visitors.

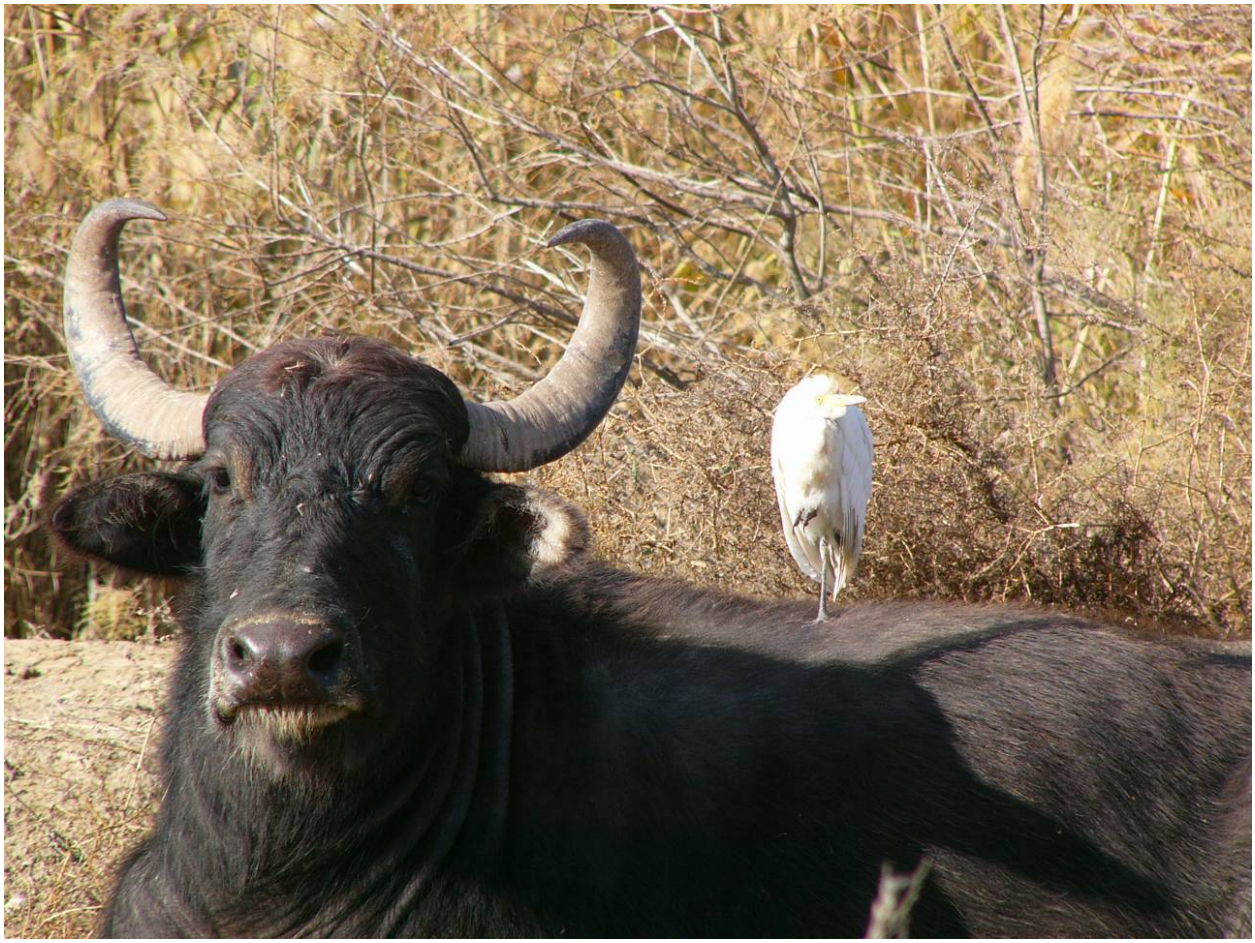
*Broad Objectives:*

- Plan for the development of tourism at international level
- Develop a Tourism Management Plan and a related Business Plan;
- Plan adequate facilities and hospitality and recreational infrastructure;
- Create a national net of historical, archaeological sites, protected areas, museums, visitors and interpretative centers;

**"THE PARK & ITS SURROUNDING AREAS"** deals with the strategies to promote coordination and to support the sustainable traditional and innovative activities

*Broad Objective:*

- Enhance economic activities for improving standards of living and develop the skills of the population of the Surrounding Areas by balancing needs and economical growth with environmental sustainability.



# Project Team

The Mesopotamia National Park Management Plan developed within the framework of a 3 year National park Project.
The work was carried on by an interdisciplinary workgroup composed by representatives of Iraqi national and local authorities and by a NP project team made of experts from Nature Iraq and Italian consultants.

**Iraqi Ministries involved in the National Park Project:**

- **Ministry of Environment**
  - The Minister of Environment Ms. Narmeen Othman
  - Focal Point for New Eden Projects Kamal Hussin
  - Focal Point of the Ministry of Environment for the NP project .Nahla Mohammed Ridha
- **Ministry of Water Resources**
  - The Minister of Water Resources Abd Al Lateef
  - Focal Point for New Eden Projects Furat Abd Al Satar Haider
  - Focal point for NP project Samira Abd Al Muhee
- **Ministry of Municipalities and Public Work**
  - The Minister of Municipalities and Public Work Raid Gareeb
  - Focal Point for New Eden Projects Mohamed Al Shabender
  - Focal Point for NP project Haithem Obaid

**National Park Project team:**
Azzam Alwash – Project Leader
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# Water, Reeds & People

**Introduction**

**A Vision for Change**

**Guiding Principles**

**Overall Purposes**

**Management Plan**

# Introduction

For millennia people inhabited the marshes learning how to survive in a wide extent formed only by reeds and water. The strong connection between people and wetlands developed wise uses of natural resources, traditions, beliefs and knowledge: an unrepeatable balance between human and environmental needs.
The water diversion between 1991 and 2000 has caused a huge environmental damage, drying the 97% of the marshes. Rice paddies and fishing grounds are gone, global migrations have been disrupted, water buffalo breeders have to migrate to save their animals.
Now that the water floods again and the waterfowls are returning people are coming back.
The National Park establishment is conceived to restore this unique cultural and natural heritage and to preserve it for present and future generation.

## This Document

The management plan here proposed has been drawn up in a preliminary form to provide the matters for an "Operational Program" to implement during the last year of the project.

The main purpose is to create a strong consistent connection between the objectives of the protection of natural and cultural heritage and the actions to promote sustainable socio-economic development and to improve the locals' quality of life.

Lessons learned from similar situations all around the world demonstrate that the active involvement of the local population is the only way to ensure the successful establishment of protected areas.

Furthermore, the Iraqi complexity of the current situation is also reflected on the Iraqi legislative framework inhibiting the coordination among the Ministries. An additional period of time is therefore necessary to ensure the assessment of the competences concerning the management of the territory, related especially to the environmental issues.

During the course of the Operational Program four types of complementary activities will be led:

- activity of environmental awareness;
- demonstration activity through pilot projects;
- research activities;
- communication activities;

In the same period some focused socio-economic surveys will be conducted to secure information and data necessary for the drafting of the financial appraisal.

### Final Version

The final version of the Plan will be delivered in April 2009, revised and upgraded taking into account the recommendations, the experiences and the findings gathered during the implementation of the Operational Program and the participation of local communities.

The main documents will include

- Description of the site
- Management Plan
- Work Plan
- Models, Method & Recommendations
- Financial Appraisal
- Annexes

### The Feasibility Study

The Feasibility Study presented in April 2007 constitutes the preparatory phase of the whole plan. Its main deliverables have been the basis for drawing up the Management Plan.
They are:

- identification of the site
- extent and boundaries of the selected area
- first classification of environmental and socio-economic features
- the long term vision, the guiding principles and the overall purposes.

To better explain the possible development of the Park, three scenarios were drawn up as final recommendation of the report.

Every stage of the study was developed with the active participation of the experts of the Iraqi Ministries of Environment, Water Resources and Municipalities & Public Works. The report was definitively approved in July 2007.

## A Vision for Change

The vision is a tool to help people to imagine the future in a comprehensive and shared way.
It leverages on local values and links together environmental, economic and human development, highlighting the opportunities they can offer if managed with coordinated programs. It shows to all the stakeholders a prospective view to achieve.

**The Mesopotamia Marshlands environment and cultural heritage are a special, vibrant mix of qualities incomparable in Iraq or around the world.**

**The Mesopotamia Marshland National Park shall restore again this historical balance between Nature and Human needs.**
**Sustainable use of natural resources guided by scientific research and environmental education will grant the restoration of its unique values.**

**Visitors from all the countries will appreciate the exclusive Marshlands landscapes, the archaeological sites, typical villages and scenic view of thousands waterfowls.**
**They will glide by boat along the channels and will experience the simple and traditional way of life of the marsh dwellers.**

## Guiding Principles

### Sustainability

The concept of Sustainability leads all decisions affecting the MMNP**.**

### Flexibility and principle of acceptable change

A Management plan is a working document that is always evolving as it is based on an iterative process: a feedback loop among analysis, evaluation, decisions, actions, monitoring and consequent adjustment and new decisions.

### Accountability & Equity

To consider the locals as the first beneficiaries of the national park establishment, giving priority to the need of the communities, and preventing possible negative impacts on their quality of life.

### People and the environment are inseparable

Places are not islands, but are part of larger ecosystems and cultural landscapes. Every effort has to be made to find solutions able to take account of the close relationship between people and the environment.

### Public Involvement

Public involvement is a basis of policy, planning and management practices to build public understanding and a consequent positive participation to the park life.

### Collaboration & Cooperation

To achieve, whenever possible, mutually compatible goals and objectives, with the participation of a broad range of institutions at each level, the private sector, NGOs, groups, and key individuals.

## Overall Purposes

The purposes are designed to address the 'big issues' of the Park and move towards the Vision. They state what should be achieved in the National Park from the medium to the long term:

1. To restore, conserve and enhance the unique wildlife and natural beauty of the National Park, taking management decisions based on the best available knowledge, supported by a wide range of research, including integrated scientific monitoring activities

2. To establish the long term maintenance of the NP environmental features ensuring, both the conservation of their cultural heritage and the development of sustainable activities within and near the park area through a participatory approach of the local communities;

3. To plan in order to realize an increasing eco-tourism exploitation of the National Park values, ensuring the financial accountability of the park and an additional means of incomes for the surrounding inhabitants of the area.

## Management Plan

### Functions

The Management Plan of the Park defines the strategies, projects and actions to implement for the development and management of the Park's area necessary for achieving the stated vision.

It takes into account the results of the consultation process with the local population, and it focus in particular on:

- the general asset of the territory, focusing on the main features that characterize the area (territorial asset, hydrological regime, water quality, natural habitat conditions, flora and fauna, socio-economic asset);
- the internal zoning of park's area;
- the identification of the significant environmental and socio-economic aspects that need to be protected with specific provisions;
- limitations and regulations, public and private land use, implementation rules;
- accessibility (access points, paths, facilities);
- guidelines and criteria for actions on flora, fauna and natural environment;
- facilities and provisions for the management and the social functions of the Park

### Structure of this Report

The main body of this Management Plan is divided into six sections, comprising the present one covering the contents of the MMNP Vision, Guiding Principles and Purposes.
These partition derive from the scenarios proposals evaluated and accepted during the Feasibility Study. They are:

- **Water, Reeds & People**
  The Vision, the guiding principles and the Overall Purposes;

- **The Park Features**
  Data and Information on the Park's area;

- **The Park & its Values**
  Strategies to manage the Park's values;

- **The Park & the People**
  Strategies to manage how people will use the Park and how the Park will be useful for the people;

- **The Park & the Visitors**
  Strategies to start up, encourage and support ecotourism and its side activities;

- **The Park & its Surrounding Areas**
  Strategies to manage coordination and sustainable traditional and innovative activities.

Under each section a set of objectives that represents the centre of this management plan is proposed. They are, when possible, identified as Long or Medium or term. When necessary a list of focused activities to implement during the operational program is added.

# Park Management

The management structure here described is only a proposal suggested taking in account the recommendations and the lessons learnt during the "MedWetCoast Project" development and recorded in the reports available in Med Wet Coast web site.

*"The MWC project objective is to conserve globally endangered species and their habitats, recognising wildlife conservation as an integral part of sustainable human development while improving capacity of government agencies to tackle biodiversity conservation issues.*

*The Project addresses biodiversity conservation in 15 Mediterranean coastal and wetland sites of global importance, situated in Albania, Egypt, Morocco, Tunisia, Lebanon and Palestinian Authority.* "

### Site Management Committee

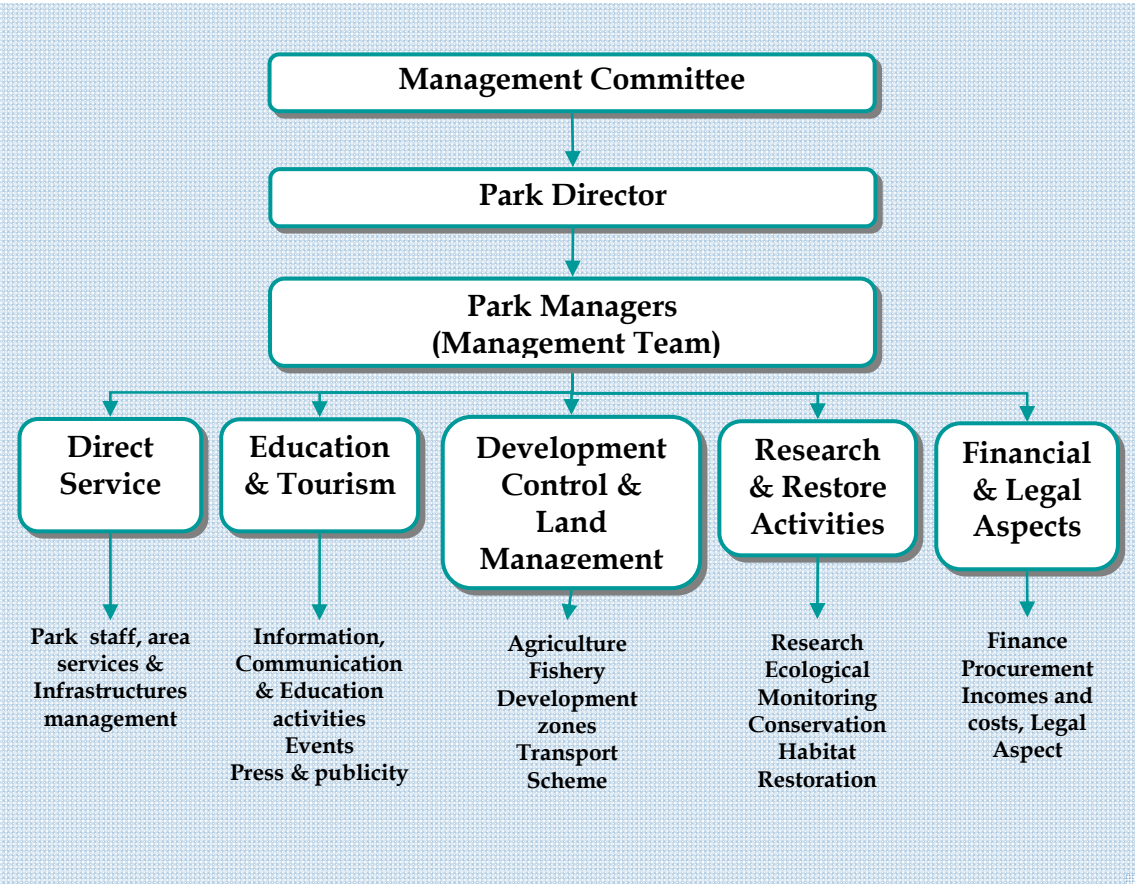
A Management Committee comprising of a range of representatives drawn from the relevant ministries, local government levels, community and interested parties will administer the protected area.

An important consideration in establishing the Site Management Committee will be the need to ensure that the broad range of interests which are evident in the site are represented at Board level, especially important is the representation of local community interests, since the Committee will effectively act as the 'official' point of contact between the site's inhabitants and the protected area administration.

The structure of the Management Committee will also need to be balanced in that no one interest group becomes dominant.
In order that balanced decisions can be made, it is recommended that an independent non political 'Chairperson' who has no financial interests in the Park is chosen to chair the committee.
This appointment should be made on a biannual basis with the incumbent chairperson not being permitted to sit for two consecutive terms.

The responsibilities of the Site Management Committee should include:

- Responsibility for the Protected Area financial matters regarding the income from PA entrance, services and activities.
- Determining at local level, the site's management policies and responsibility for their implementation and monitoring.
- Be responsible for the monitoring of the site activities.
- Be responsible for approving the work programmes and operation of the site executive committee.
- Have the power to make local legal regulations that concern the protection, conservation Management and recreational management of the protected area.
- Manage on a day-to-day basis land that falls directly within the ownership of the PA.




- Be responsible for the first level of development control activities in the site, reporting to the competent Ministries/ Council for Territory Adjustment in accordance with the Country relevant legislation.
- Be responsible for appointing the PA Director and the Manager Team.

To avoid criticism from the local community and other stakeholder groups, and to maintain transparency from the beginning, it is considered essential that the Management Committee is established immediately and prior to the appointment of the Park Director and his management team.

### Staffing Structure and Duties

The Park administration will be headed by a Director, who will report directly to the PA's Management Committee. It is most important that the person appointed to this position be a progressive thinking environmental manager, who is able to accept new ideas and change.

The Director will be supported by a management team composed by six managers: an economic expert will be responsible for financial and legal matters pertaining to the PA, two ecologists will be in charge of research and protection activities on terrestrial and wetland ecology, a land manager will also be responsible for development control matters, an expert on communication will attend to tourism and education projects development and the sixth manager will be the responsible for the direct services, the staff activities and for the management of all the infrastructures of the Park.

A number to define of park rangers will be fully or part-time employed to serve for the park area.

### Implementing & Monitoring

The management plan become effective only when the implementing phase starts, when proposed actions are translated into realized actions, otherwise it is useless.

As previously suggested in the guideline principle "Flexibility & Acceptable Change" the management plan is a process. It foresees the evolving chains of causes and effects and provides methods and mechanisms to solve the issues with stated procedure to control the planned activities and their results.

Therefore the possibility of monitoring has to be planned before the start of each action defining: the person in charge, results to achieve, parameters, timing, methods and procedure,

priority, costs, and list of related side component of the system that can be affected by the activity.

### The Annual Report

The site director, in partnership with the management team, will have to submit an annual report to the management (steering) committee which should include the following items:

- tasks allocated to the year ;
- progress status of each task;
- temporary and/or permanent constraints which caused delay or failure;
- proposals to solve them ;
- evaluation of the performance of the management team;
- a detailed financial statement including all forms of expenditure and revenue.

The management committee evaluate the achievements, agree the most appropriate procedure to overcome constraints and difficulties, review all financial aspects, and draws new directives to the site manager including the re-scheduled plan of action for the following year.

### The Review of the Management Plan

Usually, at the conclusion of the first five years of the duration of the management plan, an overall review of the progress made is necessary.
Considering that, at present, the process of re-flooding and of environment restoring is still in place, to evaluate the plan progress a period of five years could be too long.
At the time of final version approval it will be decided if put the revision of the management plan and its consequent re-scheduled version in three or five years.

# The Park Features

**Park Description**

**The Park's Special Qualities**

**Main Threats & Constraints**

**Objectives to Achieve**

**Criteria for Defining the Park Boundaries & Internal Zoning**

**Park Zoning System**

**Park's Infrastructures**

**IUCN Categories**

**UNESCO Man and Biosphere Reserve**

# Park Description

## Location

The Mesopotamia Marshlands National Park is a wetland complex located in south Iraq, on the area situated North of Euphrates River and West of Tigris and Glory channel before their confluence in the Shatt al- Arab River.
Its irregular form comprises most of the former Central Marsh and the southern part of Abu Zirig Marsh.

*Figure 1 Location of the National Park inside Iraq (green area)*

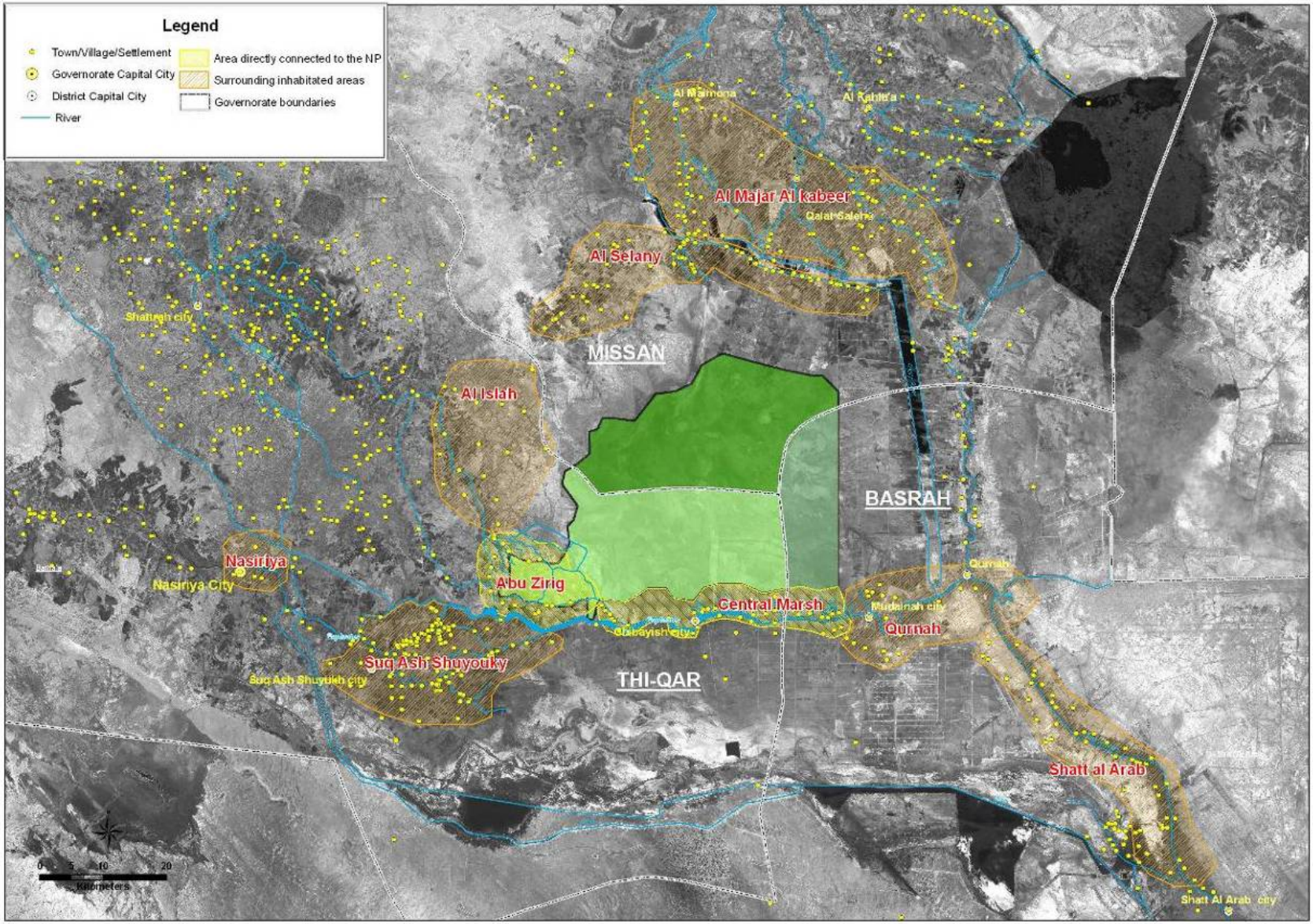

## Administrative Limits

The Park area comprises land from three Governorates and five districts: Missan in the North (districts of Al Majar Al Kabeer and Al Maimona), Thi-Qar in the West (districts of Nassiriyah and Chibayish), and Basrah in the East (district of Mudainah).

## Extent

The area covers an extent of 141,555 hectares (566,220 donums): 45% in Thi-Qar Governorate, 46% in Missan and 9% in Basrah Governorate, with a maximum length of 51 km and a width of 36 km.
The Core Area measures 23,882 hectares (95,528 donums) and the buffer zone around it 117,673 (470,692 donums).
At present there are no inhabited settlements within the Park's boundaries but only ruins of abandoned villages.

*Figure 2 Extent and surroundings of the National Park*



### Surrounding Population

The local population somehow linked to the National Park (population encompassed in a radius of about 75 km from its center) amounts to about 2,400,000 inhabitants.
At the same time, the assessment of the types of economic activities performed in each zone permits to individuate that approximately only 100,000 local dwellers, that live along the Euphrates river and the edge of the Abu Zirig marsh, are involved by the establishment of the Park (see Figure 2).

# The Park's Special Qualities

### Summary of Natural Main Qualities

The peculiar bio-geographical situation of the lower Mesopotamia Marshlands provides a kind of bridge between the African region (the so-called "Arabic region of the African plate") and Eurasian region (e.g. through the Miocene-Pliocene-Pleistocene fusion of Angara with Paleoeurope).
This situation explains the presence of many endemic species in the Iraqi territory as well as the high ecological value of the lower Mesopotamia wetlands, both at regional and international level.

**Endemic and Endangered Species**

Among the Iraqi endemic species we find many important species of aquatic and terrestrial fauna and flora, of which some are unique to this area: bird species like *Tachybaptus ruficollis iraquensis; Anhinga rufa chantrei; Acrocephalus Griseldis; Turdoides Altirostris*, mammals like *Lutra perspicillata maxwelli, Erythronesokia bunnii* and *Gerbillus mesopotamiae*, fish species like *Barbus Sharpeyi*.

As for birds, the comparison of the lists of the rare/endangered species results in the following:

- 9 species are listed in the IUCN's Red List of threatened species – 2007"
- 83 species listed in the Bern Convention (1979)
- 82 species listed AWEA agreement (1995)
- 42 species listed in the European Birds Directive (Directive 79/409/CEE)
- 5 species listed in the Bonn Convention (1979)
- 6 species listed in the Barcelona Convention (1995)

The most endangered species are:
*Pelecanus crispus (VU), Phalacrocorax pygmeus, Anhinga melanogaster, Geronticus eremita, Anser erythropus, Branta ruficollis, Marmaronetta angustirostris* (VU), *Aythya nyroca* (NT), *Oxyura leucocephala* (EN), *Limosa limosa* (NT), *Haliaeetus leucoryphus, Aegypius monachus, Circus macrourus, Aquila clanga* (VU), *Aquila heliaca* (VU), *Falco naumanni, Crex crex, Otis tarda, Tetrax tetrax, Glareola nordmanni, Vanellus gregarius, Gallinago media, Numenius tenuirostris* (CR), *Acrocephalus paludicola, Acrocephalus griseldis* (EN), *Emberiza cineracea.*

### Summary of the Socio-cultural Qualities

Although currently within the park there are no villages, before the drainage the marshlands were densely populated and natural resources of the territory used for the livelihood of a population that, it is estimated, was around 500,000 inhabitants.

Therefore all of lakes, ponds and canals that the process of reflooding are recreating, are again identified by the locals with their former names. The existence of important tribes that exercise their customs on precise areas of the territory, the use of traditional natural resources handed down from generations, the legends and the historical facts related to particular sites are part of a heritage strongly shared and supported.

**Archaeological sites**

The presence of archaeological sites still unexplored gives an historic importance throughout the area that, although still to assess, will certainly exert great interest for all the international community.

# Main Threats & Constraints

The main threats on the environment that have to be controlled inside the Park's area are:

- Uncontrolled hunting (migratory birds, endemic and endangered species);
- Uncontrolled fishing (exploitation of fish stock, capture of endemic and endangered species, use of dangerous chemicals, introduction of exotic species);
- Uncontrolled increase of reeds harvesting and buffalos breeding;
- Uncontrolled development of settlements and infrastructures.

Outside the Park's area there are:

- Hydrological assets and water regulation devices (dams, dykes, regulators)
- Water resources management (local and regional conflicts for water allocation to different uses);
- Uncontrolled development of urban areas and transport infrastructures;
- Urban and industrial pollution (wastewater discharge, waste dumping);
- Intensive agriculture (land drainage, nutrient load from fertilizers, use of pesticides, introduction of exotic/invasive species) ;
- Oil field activities pollution.

## Objectives to Achieve

Considering the Vision stated, the past history and the aforementioned values and threats, the following objectives to achieve with the management plan are:

**Primary objectives:**

- Restoration of the marshland ecosystem (restoration of 75% of 1970's total extent);
- Conservation and enhancement of the marshlands biodiversity;
- Conservation of thousand year local traditions and cultural heritage;
- Ensure sustainable activities for local communities;
- Development of a balanced relationship between the park and its surrounding inhabited areas;
- Promote an integrated management of lower Mesopotamia wetland system.

**Side objectives:**

- Restoration of marshlands habitats;
- Protection and re-introduction of endangered native/endemic species;
- Education and environmental awareness;
- Active involvement of local population;
- Scientific research;
- Environmental monitoring;
- Applied research;
- Development of sustainable economic activities;
- Development of sustainable tourism.

## Criteria for Defining the Park Boundaries & Internal Zoning

The baseline assessment of the region defined a good picture of the environmental status providing the framework for the delimitation of the park's area and its internal zoning.
The criteria that were used for the delimitation were of four types based on:

**1. The territorial features of the study area, namely:**

- land cover map;
- hydrology of the marshes;
- ground elevation model (DEM);
- monitoring of marshlands reflooding progress (UNEP-IMOS weekly maps, 2005-2006);
- provisions of the marshlands restoration project (New Eden Project – Water Management Plan).

**2. The socio-economic situation of the study area, namely:**

- location of towns and villages and current trend of urban development;
- paths of main transport infrastructures (roads, railway, waterways);
- location of strategic areas of different economic sectors (oilfields, areas of planned agriculture, areas of planned industrial areas);

**3. The necessity to provide suitable spaces to locate scientific and applied research and tourism infrastructures, namely:**

- location of facilities for environmental research on biodiversity and habitats and ecosystems of the marshes, for applied research facilities and pilot projects;
- location of a wildlife conservation and veterinary facilities;
- location of sheltered observation points for the observation of wild animals in their natural environment;
- paths of touristic itineraries and location of touristic facilities;
- location of education, information and training centers.

**4. The strategic view of the rehabilitation of the entire marshlands system:**

- the connection between Abu Zirig and Central marsh is maintained, as so as a direct link to the Euphrates river;

- a possible future junction with other marshes both in Eastern and in Southern areas has been considered.

The stated vision, the broad objectives and the necessity to foresee the possible threats derived from the land use of bordering areas have driven the identification of the priorities.

For the identification of the internal zones, the maps based on the information adopted for the Park's boundaries delimitation were overlapped, and, according to the key principles of the Park: "People and the environment are inseparable" the information of two main maps have been fundamental:

- The faunistic value map of the internal areas, a forecast method based on the connection between the land cover map and the presence of rare species;

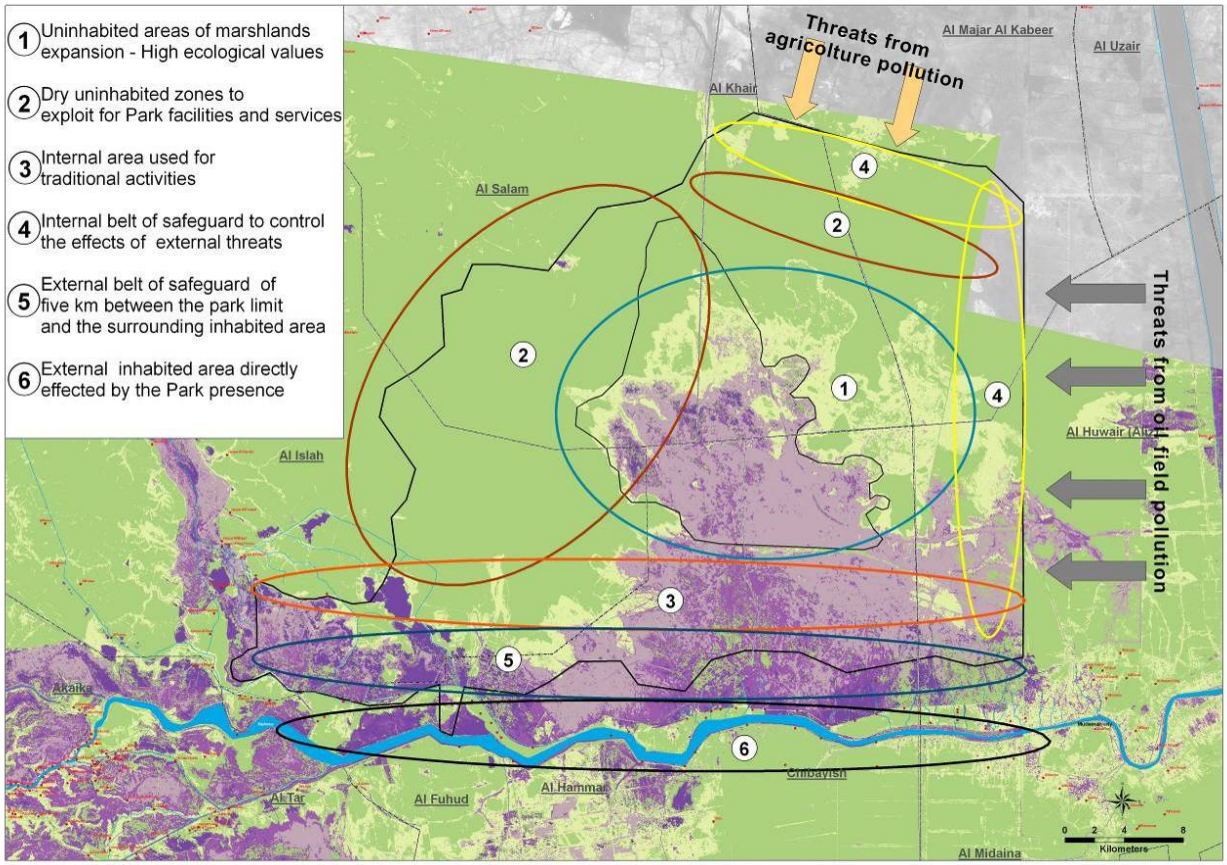
- the extension of the areas where locals perform their daily activities (buffalo breeding, reed harvesting, fishing).

The main topics taken into account for the final delineation of the park's area are identified in the following Figure 3.

## The Park Zoning System

The result of a process that combined the analysis of all the aforementioned features, described in detail in the Part I – Site Description of this Management Plan, has defined the draft purpose for the external and internal limits of the park and is presented in Figure 4.

*Figure 3 Main topics considered for the Park Zoning System*



### The Core Area

The Core Area is the inner portion of the Park, where the natural ecosystems are rapidly developing and expanding with minimum pressure from human activities. In this area (23,882 hectares- 95,528 donums) the variety of natural habitats and the potential for biodiversity enhancement is maximum.
The Core Area will be dedicated to the recovery of marshlands ecosystems.

In this area human activities will be limited to scientific research, environmental monitoring, reintroduction of endangered wildlife, educational activities.
Traditional activities will be regulated and planned according to the defined priority of enhancing free ecological evolution, nature protection and biodiversity conservation.
Hunting will be prohibited.

### The Buffer Area

The Park's buffer area around the Core area is distinguished into three main zones:

- Research Zone – 39,852 hectares (159,408 donums)
- Reserve Zone – 46,360 hectares (181,440 donums)
- Tradition Zone – 32,461 hectares (129,844 donum)

The management guidelines and protection rules will be the same for the whole buffer area and will concern the allowed activities, the activities regulated by detailed procedures and the list of prohibited activities.
All these items have to be assessed through a process that provides a consensus-based agreement by all stakeholders on how the resources will be managed for conservation and wise use.
In the same time, additional environmental information gathered with monitoring surveys, mainly connected with the situation of habitats, vegetation species and mammal species, will ensure the possibility to identify a more detailed internal zoning and related specific management actions and protection.

Therefore, the differences among the three zones here stated are due to the different types of proposed activities that will be developed inside them, with particularly references to the facilities and services needed for the tourism development of the park.

### The Research Zone

The Research zone is dedicated to scientific research and environmental studies on the environmental characteristics of permanent and seasonal marshes and of terrestrial environments, which are subjected to some degree to human influence.
The final objective is the assessment of the carrying capacity of the marshes ecosystems, of their functions and economic values, and of the potential, innovative but sustainable use of the natural resources.
As in the other zones, traditional activities will be regulated and planned. Educational and tourist activities will be developed with the active involvement of local population. Hunting will be limited to selected species and carefully planned.

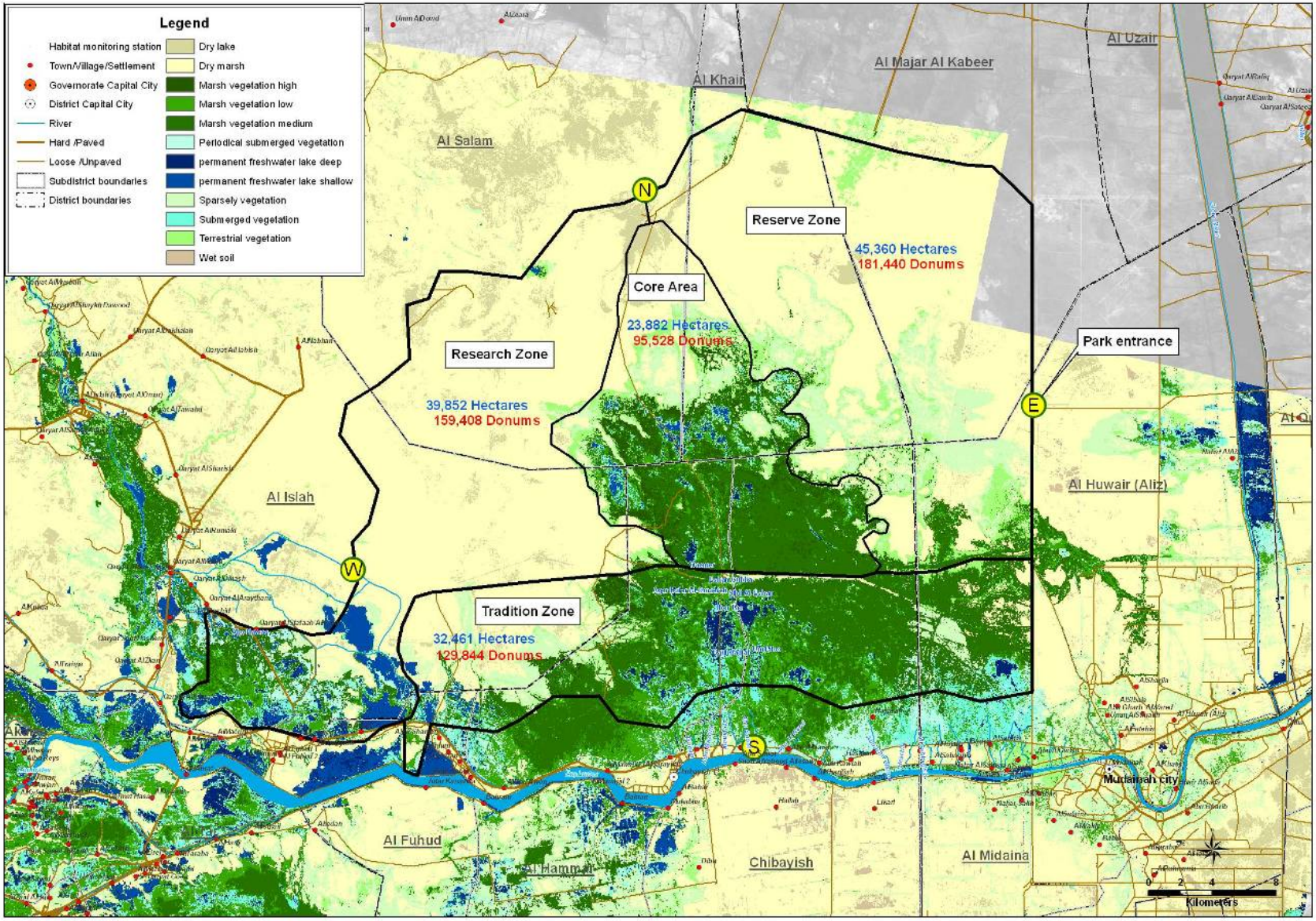
### The Reserve Zone

Inside the dry area, in the northern part of the park where the re-flooding process will hardly arrive, a breeding centre for endangered or locally extinct wildlife will be developed. As described in the next chapter, the aim is to reintroduce animals such as some carnivores: Cheetah (*Acinonyx jubatus*); Otters (*Lutra lutra seistanica* and *Lutra (Lutrogale) perspicillata maxwelli*); and Artiodactyls, as Mesopotamian Fallow Deer (*Dama dama mesopotamica*), Arabian Oryx (*Oryx leucoryx*) and Gazelles (particularly *Gazella subgutturosa* and *Gazella dorcas*).

### The Tradition Zone

In the Tradition Zone the aim is to achieve the economic sustainable development of traditional activities within the marshlands ecosystems.
In this area the active involvement of local population is essential for the development of a consensus vision for the wetland based on what the stakeholders would like to see in the future.
The tradition zone constitutes a laboratory, where major focus is placed on the interrelation among education and environmental awareness, applied research, tourism activities, development of pilot projects and initiatives for the application of the best available knowledge and environmentally sound technologies.
Traditional activities are allowed, with appropriate regulation stated through a participatory approach, and their effects on the environment are monitored.

*Figure 4: National Park boundaries and internal zoning*



# Park's Infrastructures

Because of the size of the Park four entrances are scheduled at the four cardinal points. This is also due to its location among three governorates and the predictable expansion of the transportation system.
This choice has been made in accordance with a complete development of the tourism activities.

Each entrance gives access to a zone with specific characteristics. Therefore it is thought to be provided with the fundamental services needed for the park staff as offices, warehouses and services, and basic tourist services and information points plus additional facilities that will described in the section 5 (dedicated to tourism.)

Here below they are listed considering the priority of their execution:

### The South Entrance

It is the first one that needs to be developed and it is the access to the Euphrates Zone. It is few kilometres from Chibaiysh city, reachable from the road that goes from Nassiryiah to Qurnah, along the most important channel that feeds the Central Marsh from the Euphrates.
The entrance is inside the populated areas and therefore the infrastructures, in addition to the headquarter, will be of small extension and mostly dedicated to kids and teachers' education, and to supporting activities such as veterinary and training centre for locals.

### The West Entrance

The second one is located on the western side, in a central position between Central and Abu Zirig Marsh. The site is actually reachable from a secondary road. It is far from the settlements and could develop in the future large parking areas and infrastructures that can accommodate a consistent number of visitors. It will be the main access to the research infrastructures and to the environmental facilities for ecotourists.

### The East Entrance

The third is on the East side, on the road that divides the park from the oil field area and directly joints the districts of Al Midaina to Al Majar Al Kabeer, crossing Al Huwair. This entrance might be opened when (and if) the former Zichry and the Umm al Binni lake will be reflooded adding a wide water extent that could attract visitors because of their environmental and recreational values. It will be the main access to a recreational area, with facilities for sailing and fishing.

### The North Entrance

The forth entrance on the North side will be probably the last to be built because actually is located in a empty area and its realization is directly connected to the development transportation system. When it will be opened might become, if well provided of tourist services and facilities, a strong attraction point to catch the attention of the visitors from the Missan governorates and other northern regions.

### Sustainable Infrastructures Design

To draw all the infrastructure, e.g., the Park headquarter, warehouses, but also interpretive trails, internal roads, bird hides, camping platforms, ecolodges and associated support systems, an expert who is experienced in designing ecotourism projects is needed

In this case the application of guiding principles of sustainability together with the integration between human needs and environmental needs and the attention to scientific knowledge and innovation, produces a balance between traditional and innovative practices. When needed, the use of natural and local materials improved with high– technology techniques will be applied.
.
This Approach minimizes the environmental impacts, and gives a strong message about the importance of nature and a practical example to imitate. This is done by generating its own energy from renewable sources such as the sun or the wind.

# IUCN Categories

Considering the features of the planned zones, the Park embraces areas corresponding to the IUCN Category II, IV and V as follows:

| | |
|---|---|
| Core Area | Cat. II |
| Reserve Zone | Cat. IV |
| Research Zone | Cat. IV |
| Tradition and Zichry Zone | Cat. V |

Hereafter, the IUCN description of the three categories.

**CATEGORY II**
**National Park: protected area managed mainly for ecosystem protection and recreation**

**Definition**
Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

**Objectives of Management**
- To protect natural and scenic areas of national and international significance for spiritual, scientific, educational, recreational or tourist purposes;
- to perpetuate, in as natural a state as possible, representative examples of physiographic regions,
- biotic communities, genetic resources, and species, to provide ecological stability and diversity;
- to manage visitor use for inspirational, educational, cultural and recreational purposes at a level which will maintain the area in a natural or near natural state;
- to eliminate and thereafter prevent exploitation or occupation inimical to the purposes of designation;
- to maintain respect for the ecological, geomorphologic, sacred or aesthetic attributes which warranted designation; and
- to take into account the needs of indigenous people, including subsistence resource use, in so far as these will not adversely affect the other objectives of management.

**Guidance for Selection**
The area should contain a representative sample of major natural regions, features or scenery, where plant and animal species, habitats and geomorphologic sites are of special spiritual, scientific, educational, recreational and tourist significance.

The area should be large enough to contain one or more entire ecosystems not materially altered by current human occupation or exploitation.

**Organizational Responsibility**
Ownership and management should normally be by the highest competent authority of the nation having jurisdiction over it. However, they may also be vested in another level of government, council of indigenous people, foundation or other legally established body which has dedicated the area to long-term conservation.
*Equivalent Category in 1978 System*
National Park

**CATEGORY IV**
**Habitat/Species Management Area: protected area managed mainly for conservation through management intervention**

**Definition**
Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.

**Objectives of Management**
- to secure and maintain the habitat conditions necessary to protect significant species, groups of species, biotic communities or physical features of the environment where these require specific human manipulation for optimum management;
- to facilitate scientific research and environmental monitoring as primary activities associated with sustainable resource management;
- to develop limited areas for public education and appreciation of the characteristics of the habitats concerned and of the work of wildlife management;
- to eliminate and thereafter prevent exploitation or occupation inimical to the purposes of designation; and
- to deliver such benefits to people living within the designated area as are consistent with the other objectives of management.

**Guidance for Selection**
The area should play an important role in the protection of nature and the survival of species, (incorporating, as appropriate, breeding areas, wetlands, coral reefs, estuaries, grasslands,

forests or spawning areas, including marine feeding beds).
The area should be one where the protection of the habitat is essential to the well-being of nationally or locally-important flora, or to resident or migratory fauna.
Conservation of these habitats and species should depend upon active intervention by the management authority, if necessary through habitat manipulation (c.f. Category Ia).
The size of the area should depend on the habitat requirements of the species to be protected and may range from relatively small to very extensive.

**Organizational Responsibility**
Ownership and management should be by the national government or, with appropriate safeguards and controls, by another level of government, non-profit trust, corporation, private group or individual.

**CATEGORY V**
**Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation**

**Definition**
Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.

**Objectives of Management**
- To maintain the harmonious interaction of nature and culture through the protection of landscape and/or
- seascape and the continuation of traditional land uses, building practices and social and cultural
- manifestations;
- to support lifestyles and economic activities which are in harmony with nature and the preservation of the social and cultural fabric of the communities concerned;
- to maintain the diversity of landscape and habitat, and of associated species and ecosystems;
- to eliminate where necessary, and thereafter prevent, land uses and activities which are inappropriate in scale and/or character;
- to provide opportunities for public enjoyment through recreation and tourism appropriate in type and scale to the essential qualities of the areas;
- to encourage scientific and educational activities which will contribute to the long term well-being of resident populations and to the development of public support for the environmental protection of such areas; and
- to bring benefits to, and to contribute to the welfare of, the local community through the provision of natural products (such as forest and fisheries products) and services (such as clean water or income derived from sustainable forms of tourism).

**Guidance for Selection**
The area should possess a landscape and/or coastal and island seascape of high scenic quality, with diverse associated habitats, flora and fauna along with manifestations of unique or traditional land-use patterns and social organizations as evidenced in human settlements and local customs, livelihoods, and beliefs.
The area should provide opportunities for public enjoyment through recreation and tourism within its normal lifestyle and economic activities.

**Organizational Responsibility**
The area may be owned by a public authority, but is more likely to comprise a mosaic of private and public ownerships operating a variety of management regimes.
These regimes should be subject to a degree of planning or other control and supported, where appropriate, by public funding and other incentives, to ensure that the quality of the landscape/seascape and the relevant local customs and beliefs are maintained in the long term.

# UNESCO Man and Biosphere Reserve

Given the importance that exists between human activities and the environment, the park has all the characteristics to be part of the UNESCO Program: Man and Biosphere Reserve.
At present there are over 525 biosphere reserves in over 110 countries (updated December 2006). They are internationally recognized, nominated

by national governments and remain under sovereign jurisdiction of the states where they are located.

### The MAB Functions

They facilitate the countries to implement the concepts of the Convention on Biological Diversity and its Ecosystem Approach, serving as "living laboratories" where the sustainable development at regional scale is tested and monitored.
As the same name underlines, in fact, the Biosphere reserves focus is the relationship of man with his environment. The inter-connected functions of Biosphere reserves are three and clearly defined by UNESCO as follows:

- a conservation function - to contribute to the conservation of landscapes, ecosystems, species and genetic variation;
- a development function - to foster economic and human development which is socio-culturally and ecologically sustainable;
- a logistic function - to provide support for research, monitoring, education and information exchange related to local, national and global issues of conservation and development.

Biosphere reserves are essentially supported by national initiatives and UNESCO can act as a neutral agent to help mobilize support (donor countries, GEF, UNDP).

### The Zones

The practical transference of these three basic functions determine the organization of the territory through a zonation system that encompass three type of interrelated zones, described in the Statutory Framework as follows:

- a legally constituted core area or areas devoted to long-term protection, according to the conservation objectives of the biosphere reserve, and of sufficient size to meet these objectives;
- a buffer zone or zones clearly identified and surrounding or contiguous to the core area or areas, where only activities compatible with the conservation objectives can take place;
- an outer transition area where sustainable resource management practices are promoted and developed.

### Flexibility and Simple Rules

This zonation scheme description is simple enough to allow its application in many diverse ways, to conciliate the different relationship that link, in the real world, local communities needs, development and nature protection.

As the matter of fact, flexibility and simple rules are the basic concepts of the entire biosphere programs.
Flexibility permits creativeness in planning, possibility to implement pilot projects and learn by doing, increasing the function of the other programs' feature, the biosphere world network.
Within this network, in facts, exchanges of personnel, information, co-operative activities, including scientific research and monitoring, environmental education and training are fostered and facilitated.

### International Cooperation

The cooperation is with the major Conservation Conventions as The CBD, CITES, CCD, the Ramsar Convention, the World Heritage Convention, etc. and the Major NGO such as IUCN, ISSC, CI and WWF.
MAB gives priority to interdisciplinary training of specialists in developing countries and to capacity building for young people, supporting projects as follows:

- Eco-job training for young people helps young people find an eco-job.
- The MAB Young Scientist Award
- Sultan Qaboos Prize for environmental preservation recognizes outstanding contributions in the management or conservation of the environment.

### The Regional Network

The regional and sub-regional networks supported by the MAB program are:
**EuroMAB**, founded in 1987, with 42 European and North American countries and 212 biosphere reserves;
**IberoMAB,** promoting co-operation amongst the countries of Latin America, Spain and Portugal.
**REDBIOS** (Réseau Est Atlantique des Réserves de Biosphère), a joint effort of coastal biosphere reserves of Cap-Vert, Morocco, Senegal and Spain.
**AfriMAB**, amongst African countries, created in 1996.
**ArabMAB**, amongst Arab countries launched in 1997.

**East Asian Biosphere Reserve Network (EABRN),** amongst China, the Democratic People's Republic of Korea, Japan, Mongolia, the Republic of Korea and the Russian Federation.

### The Designation Procedure

The designation procedure and the supporting documentation are simpler than the ones necessary for the UNESCO world heritage. The Statutory Framework for Biosphere Reserves, composed by 10 articles, is the main document that each country is committed to apply.

The UNESCO Secretariat operates as a coordinator and it is the responsibility of each country, through its MAB National Committee or Focal Point, to guarantee that the biosphere reserves respond to the criteria and function properly.

UNESCO does not require any change in law or ownership: each biosphere reserve has its own system of governance to ensure its meets, its functions and objectives.

In the same way, it is not required to ratify special national legislation for biosphere reserves but rather to use the existing legal frameworks for nature protection and land/water management.

The governing body of MAB is the International Co-ordinating Council (ICC), composed by 34 Member States that meet every 2 years.

It is responsible for guiding and supervising the MAB Programme and delegates its authority to the MAB Bureau in between meetings. The MAB Bureau is comprised of 6 members from each of UNESCO's geopolitical regions.

### Ten Years Period Review

As defined in the Statutory Framework, art. 9 "The status of each biosphere reserve should be subject to a periodic review every ten Years.

The valuation procedure is based on a report prepared by the concerned authority. The report will be considered by the Advisory Committee for Biosphere Reserves for recommendation to ICC. ICC will examine the periodic reports from States concerned. If ICC considers that the status or management of the biosphere reserve is satisfactory, or has improved since designation or the last review, this will be formally recognized by ICC.


White–breasted Kingfisher, Halcyon smyrnensis
Photo: A.F.Omar – Dec 2006

# The Park & Its Values

**Restoration of Wetland Functions**

**Water Environment**

**Water Inflow and Internal Circulation**

**Lower Mesopotamia Marshlands System and Ecologic Corridors**

**Vegetation Surveying and Habitat Mapping**

**Wildlife Recovery and Habitat Restoration**

**Archaeology Heritage**

**Landscape**

**Cultural Distinctiveness**

# Restoration of Wetland Functions

The wetlands constitute a complex natural system, in which the principal elements, water, soil, nutrients, plants and animals, interact and allow for numerous functions, producing resources of great interest, even economical, as the wetlands are the richest biodiverse areas of the whole planet.

Their primary functions are:

- ecological function: there is a high variety and abundance of species both for the fauna and vegetation, due to the great productivity of this type of environment;
- contribution to the preservation of the biodiversity, being an exclusive habitat of many animal and plant species;
- their regulating action assuming a fundamental role in the water balance of the relevant territory: in some areas they act as natural reservoirs that can expand during the floods, can perform a useful thermo regulating function affecting the micro-climate of the surrounding land, can regulate the ground water table, and can defend from the outcropping of salt shims.
- the strengthening action of the vegetation that grows on riverbanks and sea coasts, reducing the crash of waves and currents, while the roots retain the sediments. At the same time they improve the water quality, retaining sediments, nutrients and toxic substances that are taken in by the vegetation.
- the absorption of large amounts of carbon, especially in the peat bogs, which helps to reduce $CO_2$ emissions into the atmosphere, principal cause of global warming.
- the economic importance of the wetlands is due to the considerable primary production (i.e. organic material) which is highly productive and important substratum for an intense animal life.

Besides these vital functions for the life on the planet, the wetlands give a substantial contribution to human activity, as they help create considerable economic resources. Many of the wetlands' species can in fact be used for commercial and food purposes, like fish, molluscs, shellfish, palustrine vegetation (material for mats and other manufactures), tourist and recreation purposes (exploiting the great naturalist, landscape and cultural assets).

Their great ecological complexity (like the presence of fresh, brackish and salt water that vary in deepness, speed, temperature and chemical composition throughout the seasons), the large marginal areas between land and water, the typical vegetation, the large amount of nutrients and hence the great productiveness (especially of the lagoons, marshes and lakes) make this area a indispensable stopover and feeding place for waterfowl during their migration between breeding and wintering places.

The survival of many mammals, fish and amphibians (including several threatened and disappearing species as otters and spotted Salamander) is strictly connected with the wetlands and its well-preserved environment with clean and well-oxygenated water and vegetation.

### Economic benefits of wetlands

As hinted before, wetlands are amongst the Earth's most productive ecosystems. Their hydrological and chemical cycle is important for purification of the environment, and they are characterized by an extensive food web and rich biodiversity. People may exploit the components of the system directly as products (e.g. fish, timber, wildlife) or they may benefit indirectly from the interactions between the components expressed as functions (e.g. groundwater recharge, storm protection). People may use also just appreciate wetlands for their mere existence (if they are part of their cultural heritage) without directly using them.

The goods and services, expressions of the economic value, include recreation and tourism, plant and wildlife habitat, genetic resources, water supply, protection against natural disasters, and so on. Many of these goods and services are not traded on commercial markets and therefore have no evident market value.

The assessment of the total economic value (TEV) is used to determine the total contribution of ecosystems to the local or national economy and human well-being. The TEV of wetlands is

defined as the total amount of resources that individuals would be willing to forego for increased amount of wetland services. The TEV is a widespread and useful framework for identifying the various values associated with protected areas and it is divided into **Use Value** and **Non-use Value**.

**Use Value** involves some interaction with the resource, either directly or indirectly:

- Direct use values: involves human interaction with the ecosystem itself rather than via the services it provides. They are benefits derived from fish, agriculture, fuel wood, recreation, wildlife harvesting, fruits, dyes, etc.
- Indirect use value: they are the indirect benefits derived from the wetlands functions like nutrient retention, groundwater recharge, external ecosystem support, micro-climate stabilization, etc.

**Non-use Value** is associated with benefits derived simply from the knowledge that the ecosystem is maintained. By definition, it is not associated with any use of the resource or tangible benefit derived from it, although users of a resource might also attribute non-use value to it. It can be split into three basic components:

- Existence value: derived simply from the satisfaction of knowing that ecosystems continue to exist, whether or not this might also benefit others (also associated with 'intrinsic value').
- Bequest value: associated with the knowledge that ecosystems and their services will be passed on to descendants to maintain the opportunity for them to enjoy it in the future.
- Altruistic value: derived from knowing that contemporaries can enjoy the goods and services ecosystems provide.

Finally, another category not immediately associated with the initial distinction between use value and non-use value includes:

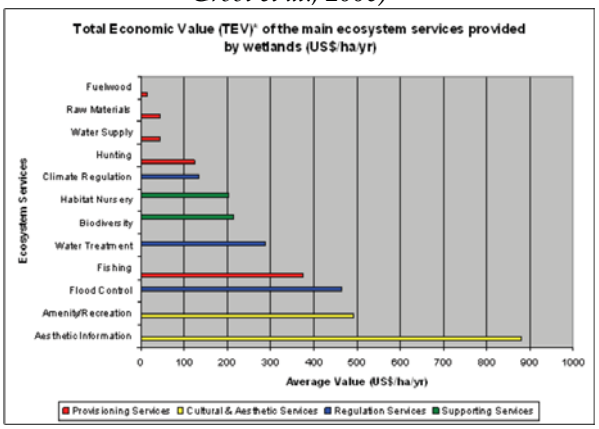
**Option value**: an individual derives benefit from ensuring that ecosystem services will be available for his or her own use in the future. In this sense it is a form of use value, although it can be regarded as a form of insurance to provide for possible future use (often associated with the potential of genetic information inherent in biodiversity to be used for research, e.g. pharmaceuticals).

The relative importance people attach to many of the values listed in the sections above, and their associated wetland services, can be measured using money as a common denominator. Monetary or financial valuation methods fall into three basic types, each with its own repertoire of associated measurement issues:

1) direct market valuation;
2) indirect market valuation; and
3) survey-based valuation (i.e., contingent valuation and group valuation).

The monetary valuation methods are extensively discussed in Valuing Wetlands (De Groot et al. 2006). The following Figure 1 is taken from the above mentioned Technical Report: it actualizes the TEV of the main ecosystem services provided by wetlands as US$/ha/yr. All figures are average global values based on sustainable use levels from over 200 case studies. The overall total for the services assessed is 3,274 US$/ha/year, but this total does not include services such as ornamental and medicinal resources, historic and spiritual values, sediment control and several others, and so it is certainly an underestimation.

*Figure 5: The Total Economic Value (TEV) of the main ecosystem services provided by wetlands (De Groot et al., 2006)*




## Benefits of Mesopotamian Marshlands

The benefits associated with the reintroduction of the Iraqi wetlands are hence numerous and varied. They affect hydrology, water quality, soil quality, and wildlife. These effects can be

directly related to benefits for human health, agriculture, and other primary industries.

Others, such as social New Eden Master Plan Benefits of the Marshlands Restoration organization and ecological restoration, are more indirect and related to overall sustainability and quality of life. The key to the important benefits of the marshlands is an understanding that they are an integral part of the hydrodynamic cycling of the Mesopotamian plain and are responsible for many of the key environmental factors that provide this area with the carrying capacity that it enjoyed for thousands of years. The draining of the marshlands interrupted this cycle, leading to degradation in water and soil quality. By reinstating the marshlands, the watersheds of the Tigris and Euphrates Rivers will see an increase in both aquatic and agricultural productive capacity, as well as an increase in the capacity to withstand the impacts of intensive human use the Iraqi Marshlands. Furthermore, the New Eden study recommends a relatively conservative scenario (50-75% restoration of the marshes of 1973) that does not result in significant changes in the current land use: very limited areas would be converted into field agriculture, and no existing or planned agricultural land is proposed for marshland restoration. No areas that are currently used for petroleum production are proposed to be converted to marshland. This methodology will help to defuse any conflicts between proposed land uses and result in the best and wisest land use decisions for Iraq as a whole.

The transposition of the already mentioned marshlands values into economic terms is necessary and the population of the interested area must realize the economic importance of the marshland ecosystem: it is fundamental to make them realizing, further than their global ecological importance, also that a sustainable and multi-functional use of the wetlands is economically profitable.

# Water Environment

The trophic level of the waters comprised in the National Park area was examined applying one of the Carlson's trophic state indexes (1977; 1981, Table 1) either based on chlorophyll data (CHL), or total P, as described below.

**TSI(CHL) = 9.81 ln(CHL) + 30.6**

**TSI(TP) = 14.42 ln(TP) + 4.15**

*Table 1: Trophy assessment based on TSI scores*

| TSI | Trophy assessment |
|---|---|
| < 30 | **Oligotrophy**: Clear water, oxygen throughout the year in the hypolimnion |
| 30-40 | Hypolimnia of shallower lakes may become anoxic |
| 40-50 | **Mesotrophy**: Water moderately clear; increasing probability of hypolimnetic anoxia during summer |
| 50-60 | **Eutrophy**: Anoxic hypolimnia, macrophyte problems possible |
| 60-70 | Blue-green algae dominate, algal scums and macrophyte problems |
| 70-80 | **Hypereutrophy**: (light limited productivity). Dense algae and macrophytes |
| >80 | Algal scums, few macrophytes |

### Central (Qurnah) Marshes

The chemical-physical surveys carried out by Nature Iraq staff between the winter of 2005 and the summer of 2007 show that:

- a strong variability of some of the monitored parameters. The electrical conductivity in particular, meaning the amount of ionizable salts dissolved in water that indicates the level of mineralization, is subject to strong variations ranging from 1800 µS/cm (winter 2005) to 5000 µS/cm (summer 2005).
- the concentrations of nutrients (N-NO3 and P-PO4) are relatively low in winter (e.g. compared to Al-Hammar marsh water concentrations, see Richardson and Hussain 2006), and higher values during summers: the nitric nitrogen varies from 1 µg/l (winter 2007) to 528 µg/l (summer 2006); the phosphate, from 3 µg/l (winter 2007) to 27,70 µg/l, (summer 2005).
- on the other hand, the trophic levels referred to Chlorophyll a and expressed by the trophic state index show an apparently overlapping pattern: from eutrophic or even hypertrophic conditions during summers towards mesotrophic or oligotrophic conditions in winter (higher nutrients discharges e.g. from agriculture but also higher water evaporation).
- trophic levels referred to total Phosphorus (TP) data, available only as from summer 2007, generally reveal even higher trophic levels compared with those derived by Chlorophyll a concentrations during the same period (from mesotrophy/eutrophy to eutrophy/hypertrophy).
- water temperatures vary significantly less than air temperatures during the year, from 10° C in winter to 30° C (summer) in shallower waters (≤ 1 m); where water is deeper, temperature range seems to be narrower (19-29° C).

### Abu Zirig

The available analytical data refer to the period between winter 2005 and summer 2007. The chemical-physical characteristics that were found show that:

- the behaviour of the main constituents is not so homogeneous as it seemed in the Central Marshes: e.g. a decided electrical conductivity and pH fluctuation in some stations - ranging from 1170 µS/cm to 3300 µS/cm and from 7,5 (summer 2006) and 8,7 (winter 2006) – whereas in other sites there are no significant variations of the same parameters during the year.
- the nutrient pattern seems different in Abu Zirig: there would be a descending trend of the trophic status in the period 2005-2007 for sites with relatively stable conductivity and pH: from hypertrophy towards mesotrophy and even oligotrophy; sites with higher conductivity and pH fluctuations would be more "stabilized" on low trophic values.

**Broad Objective**

- **Ensure water quality**

**Objectives to Be Achieved During the Duration of the Management Plan**

- Water quality control
- Survey of water sanitation facilities in the external Transition area
- Monitor the impact of human activities on water quality (buffalo breeding, settlements, pollution)

**Proposed immediate actions:**

- Water quality monitoring (NP monitoring program)
- Map of buffalo grazing areas and main paths
- Map of villages and temporary settlements inside the Central Marshes and Abu Zirig

# Water Inflow and Internal Circulation

While the reflooding and presence of adequate water is critical to marsh restoration, the restoration of wetland functions requires also the proper water hydroperiod (period of time water is at or near the surface), hydropattern (distribution of water over the landscape), and good water quality.

These conditions are complex in nature. Restoration projects that do not take this complexity into account can at first seem to be successful, but they are later recognized as failures because conditions promoting important ecosystem functions have not been adequately restored (Zedler and Calloway 1999, Richardson and Nunnery 2001). For example, in historic times the pulsed flow of water, sediments, and nutrients into the Iraqi marshes came via the spring melt. Massive flooding was the most common condition during this period, with marsh expansion from 15,000 to 20,000 km², followed by a decrease in marsh area by as much as 30% to 50% during the summer as a result of high evaporation rates (> 200 cm per year; Buringh 1960). During the summer, the Marsh Arabs planted their rice and barley crops at the marsh edges and used the annually rejuvenated marsh soils to produce their crops. The water flow was continuous through the year, and it was this flow that kept the salinity concentrations low and prevented the buildup of potentially toxic elements, such as selenium and salts.

### Water inflow

The flow of water into Abu Zirig and Central Marshes from the Tigris (Butairah and Gharaf rivers) and from the Euphrates is the key issue for the success of the restoration of marshlands ecosystem: vital in this sense would be the reopening of the Butairah river inflow at the Central Marsh northern side (See Error! Reference source not found.).

The seasonal flood regime is of critical importance to the ecological dynamics of the marshlands, governing not only the physical extent of the marshes but also the range and distribution of flora and fauna they support; Marshes consequently need particular hydroperiods[1][2], changing water levels but also an effective through-flow to thrive. Inlet flow regulation is one of the factors contributing to recreate a hydroperiod (seasonal and multi-yearly fluctuations of water level).

*Figure 6: Water inlet in Abu Zirig marshes (Al Fhood)*

The spring peak of discharge (mainly produced by snowmelt and consequent Tigris high waters), lost as a consequence of intensive upstream damming in the last forty years, should be recreated by mechanically releasing water, thus replicating the natural system as much as possible.

There is a great biological sensitivity for the frequency and duration of the flooding (but also for the frequency and duration of the droughts).

On a regional scale, in the mid-term a water agreement with Iran, Syria and Turkey for upstream water releases should be contracted, to negotiate more water for the Marshes; on a local scale, concerning water resources management and competing uses (agriculture, industry, navigation, drinking water etc.) there is a need to find a strategy to find a justifiable point of co-existence between different water consuming activities.

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[1] *In particular, it was demonstrated both generally and locally that the structure and functioning of estuarine (tidal) marshes is largely controlled by the patterns of overbank flooding. Therefore, it is clear that understanding and predicting marsh structure and function depends largely on understanding […] hydraulics well enough to accurately predict water surface elevation (especially at high water levels) and the amplitude, frequency, and consistency of elevation variation over time (Malamud Roam, 2000).*

[2] *The minimum number of flooding days in the growing season for land to be a wetland ranges from 7 to 21 days ( hydrologic conditions for a 'jurisdictional' wetland in the USA, Zhang & Mitsch, 2005).*

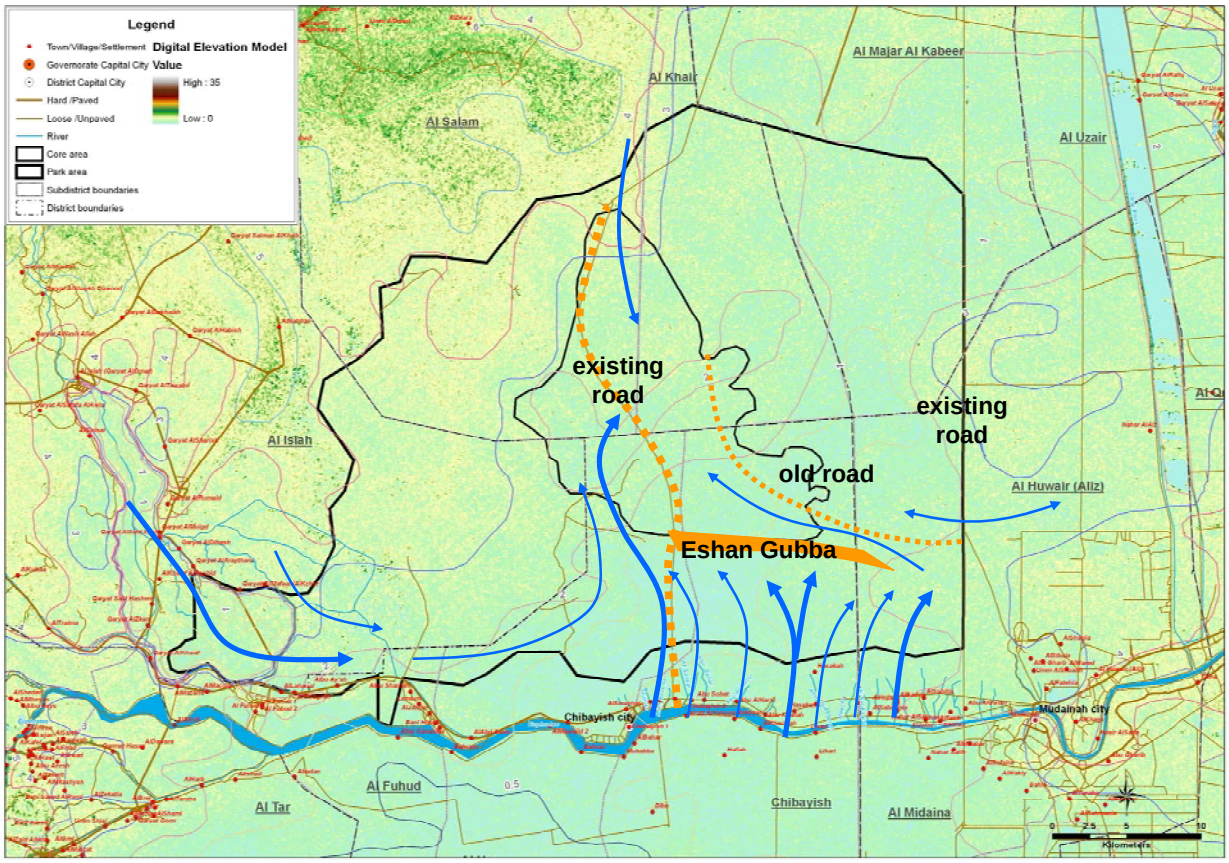
In the last decades, water coming from upstream lacks some amounts of sediments, nutrients etc. In the same period there has been a significant increase of toxics, salts, and other harmful substances: for example water from the Main Outfall Drain (M.O.D.) which could be usefully employed for feeding the Marshes, has some heavy metals contamination problems; for these issues a pre-treating step of incoming waters by means of constructed wetlands could be a viable choice. Constructed wetlands could be also built at the northern border of the National Park, for preventing the flooding of agricultural areas by Marshes high waters and defending at the same time the water quality of the Marshes from agriculture drainage waters.
In conclusion, it would be advisable (Mitsch 2007, personal communication) to carry out systematic water budget analysis by installing monitoring gauges at marshes inlets and outlets (at least weekly frequency).
Further investigations should encompass data loggers measuring stages, pan evaporation measurements, precipitation gauges, calibrated outflow weirs, and other instruments to allow the calculations of complete hydrologic budgets.

The main issues related to water resources management are:

- Inlet flow regulation and creation of an hydroperiod (seasonal and multi-yearly fluctuations of water level)
- Water resources management (use of water for agriculture, industry, drinking water)
- minimize existing obstacles to water circulation within the Central Marshes (old road now submerged, existing roads and embankments, the island of Eshan Gubba)
- the need of maintaining the existing water circulation patterns within the marshes, and creating new circulation patterns and artificial ponds to avoid water stagnation in the summer period.

*Figure 7: Submerged road in the Central Marshes*

*Figure 8 Water flow in Abu Zirig and Central Marshes and main obstacles to water circulation*




**Broad Objective**

- **Ensure water flow into the Central Marshes and internal water circulation**

**Objectives to Be Achieved During the Duration of the Management Plan**

- Ensure appropriate water quantity flow into the marshes and create an hydroperiod
- Minimize obstacles to water circulation in the marshes
- Create new circulation patterns and artificial ponds to avoid water stagnation in the summer period
- Maintenance of embankments and roads
- Maintain open water areas and canals
- Survey of traditional activities that influence water circulation patterns in the marshlands:

**Proposed immediate actions:**

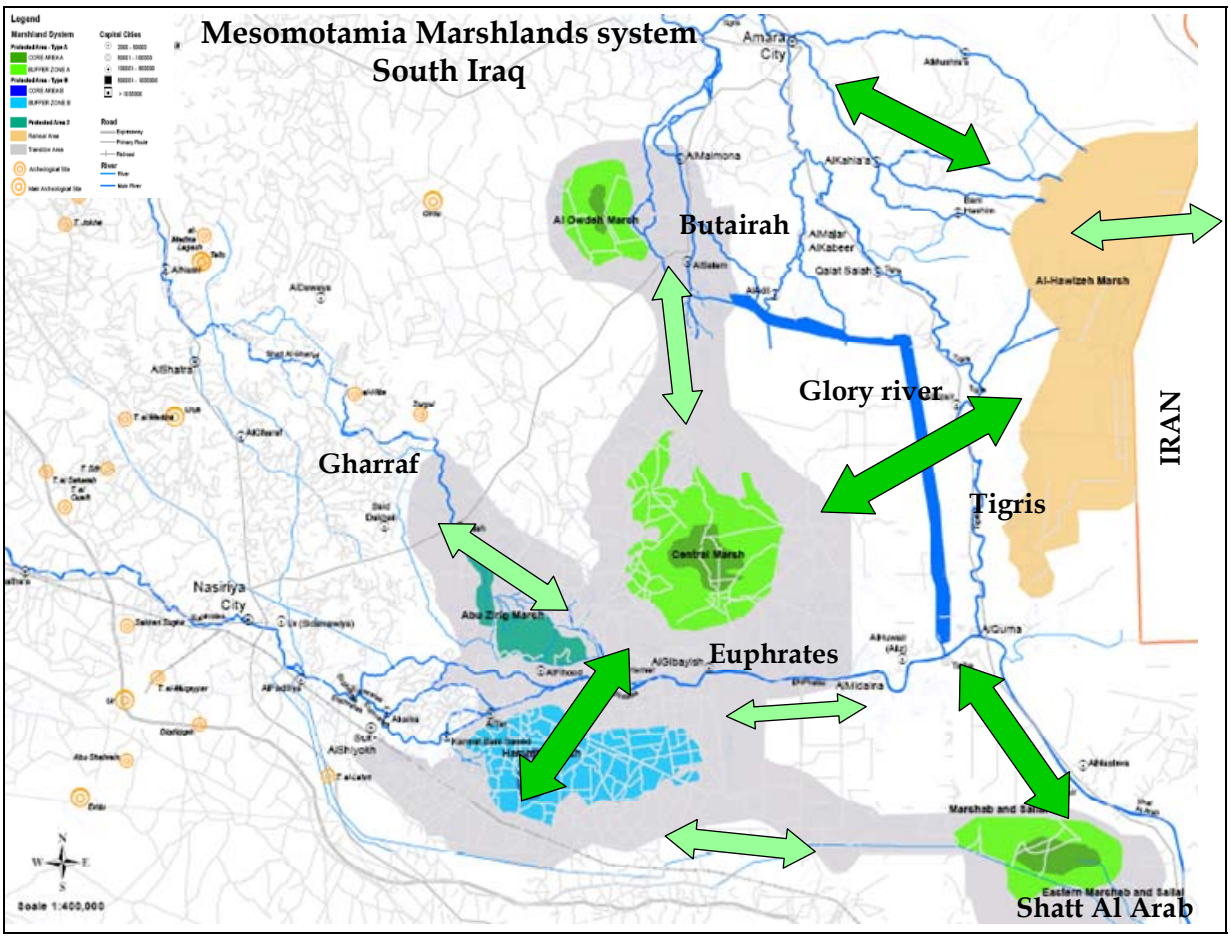
- Detailed topographic survey of the NP area
- Create a detailed map of hydrological network in the NP area
- Create a map of minor roads and temporarily submerged roads within the NP area
- Create openings below the road embankment (underground pipes) to allow water circulation between different areas of the marshes
- Map of buffalos grazing paths and of areas of reed harvesting

# Lower Mesopotamia Marshlands System and Ecologic Corridors

The wetland system of lower Mesopotamia plain maintains some connections between the main marshes that are a residual of the ancient wetlands system originally formed by the Tigris and Euphrates rivers at their confluence into the Shatt al Arab River.

The flow from the Butairah from the north, the flow from the Gharraf and from the Euphrates from the west and the south, and the recent connection with the Glory River on the east provide a network of potential ecologic corridors that

Maintaining the interconnections between the main marshes and creating a sound water management and spatial planning strategy at regional level is a key issue that assume a very high strategic importance for the entire area of the Gulf.




**Broad Objective**

- Promote the Mesopotamia marshlands system and ecologic corridors

**Objectives to Be Achieved During the Duration of the Management Plan**

- Restore potential connections between the marshes
- Promote the establishment of wildlife corridors between other southern marshes in Iraq and International agreements for wetland conservation (Iran, Gulf Countries) to facilitate reestablishment of wildlife as part of regional sustainable development planning and an integrated management strategy

**Proposed immediate action:**

- Propose the Core Area of the National Park as a Ramsar site

# Vegetation Surveying and Habitat Mapping

The map of land cover constructed through remote sensing elaboration of satellite imagery represents the basic document for vegetation mapping. Land cover must in any case involve a field component of validation and monitoring of homogenous polygons through specific vegetation surveys, aimed at the creation of a map detailing vegetation cover within representative areas. It would be opportune to subject each phototype identified to field verification.

To acquire more information on present communities, it is necessary to perform vegetation surveys within stations that have already been identified.

Generally, within each station it is possible to identify vegetation populations, based on physiognomic aspects, such as the dominance of one or a few species or a given biological form.

The method used the most for vegetation surveys is the phytosociological method, which consists in estimating the percentage of ground cover of each individual species.

All surveys are used to obtain a vegetation profile that will be a reference for vegetation types included in the wetlands and to integrate or complete the habitat classification system.

*Figure 9 Vegetation survey (Nature Iraq, 2007)*

*Figure 10 Salvinia natans (photo by Nature Iraq, 2007)*

**Broad Objective**

- Study of flora and vegetation communities of the marshlands

**Objectives to Be Achieved During the Duration of the Management Plan**

- Establishing a vegetation survey program for a comprehensive phytosociological study of the marshlands and the assessment of the progress of marshlands recovery in comparison to the situation before desiccation
- Draw a checklist of the flora of the marshlands
- Draw a map of vegetation in he NP area
- Create an herbarium to collect and preserve plant specimens of the marshlands
- Assessment of the impacts of human activities on vegetation (reeds harvesting, buffalo grazing, introduction of invasive plant species)

**Proposed immediate actions:**

- Start a vegetation survey and mapping program
- Environmental study on traditional uses of vegetation in the NP area (socioeconomic)

# Wildlife Recovery and Habitat Restoration

### Birds

The lack of detection, during the monitoring processes and in particular in the marshland area, of more sensitive groups of species, or in any case groups of species that are more connected to environments that are still developing, should be noted: the grey-type wild geese and the aquatic species that are strictly divers or that prefer deep water. Considering the absence in the records of the so called "grey" ducks, known in the past for being present in great numbers, they could possibly feel the effects of human disturbance more than a real lack of natural habitat.
For the so-called "grey" geese, noted here in the past for their conspicuous numbers, connected to wetland environments and calm in the over wintering phase, they could be affected more by the possible anthropical disturbance rather than solely by the lack of habitat.

Concerning the so called "diving" species, which usually visit deeper waters, such as Grebes (*Podiceps* sp. pl.) and Pelicans (*Pelecanus onocratalus* and *P. crispus*) and diving ducks (*Aythia* sp. pl.), an explanation for their absence/reduced presence could be that the restored aquatic environments are still slowly reaching the original water levels and that the major lakes, once famous for their depth and abundance of fish, have not been filled as they were. Future actions for restoration of such habitats will be addressed to reshaping the lake beds, and recreating also those elements of the landscape related to deeper waters (at least between one and three meters).
Considering species such as Pelicans (*P. onocratalus* and *P. crispus*) and *Anhinga rufa*, the fluctuating water level constitutes a major threat for the nests of many colonial waterbirds: it would be possible to encourage the nesting activity by means of artificial floating platforms.

Another important absence is that of *Ardea goliath*, a species present mainly from East Africa to Senegal, which was represented here by a resident relic population and which probably could still be present in the wetlands of nearby Iran; if this is confirmed, its presence here would just be a matter of time.

This Heron *Ardea goliath,* which was still missing at the time of writing the National Park Feasibility Study (2006-2007), has been recently confirmed as "probably breeding" in the Marshlands, demonstrates that some habitats are naturally re-establishing: so the presence of several species could be, and actually is simply a matter of time.

*Figure 11:* Ardea Goliath

Many species of herons prefer a particular stage of woodland growth (10-15 years or plus) for their nesting sites: also in this case the first action would consist of building artificial breeding sites for tree-nesting herons (*Ardea goliath, Ardea cinerea, Threskiornis aethiopicus, Platalea leucorodia, Phlacrocorax pygmeus etc).*

Many species of gulls and waders prefer to nest into the land near the water: various artificial sites could be created, similar to sandbank areas, river beds, dunes and islands. Species involved are *Larus sp. pl., Sterna sp.pl., Chlidonias sp.pl., Himantopus himantopus, Recurvirostra avosetta, Glareola pratincola/nordmannii etc.*

A decided effort in terms of identification training and further field experience has to be made for the continuous improvement and upgrading of the field recognition capacities. For example a highly endangered bird species such as *Numenius tenuirostris*[3] (Slender-billed Curlew) is

[3] *At the second half of the 19th century and until 1920, Slender-billed Curlew was an abundant bird, often exceeding in population density its two relative species, Curlew (Numenius arquata) and Whimbrel (Numenius phaeopus).*

very difficult to recognize and distinguish from other species of the Genre Numenius, such as *Numenius arquata or Numenius phaeopus*.

### Mammals

Mammals are a separate matter, in particular those endemic species that have been reported for the area before the marshes desiccation: *Nesokia (Erythronesokia) bunni, Gerbillus mesopotamicus, Lutra lutra seistanica and Lutra (Lutrogale) perspicillata maxwelli*.

*Figure 12: Lutra perspicillata*

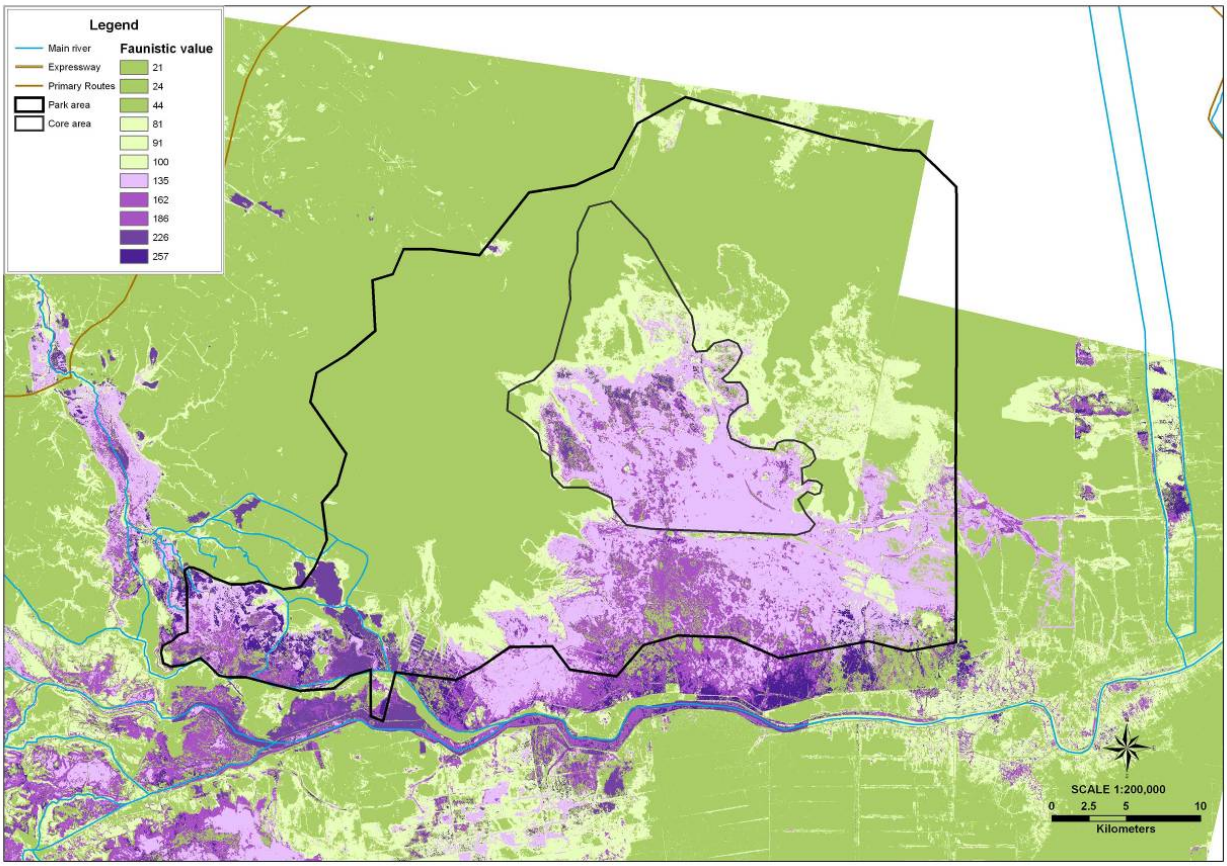
During the recent surveys (2005-2008), such species were not reported, probably due either to the fact that they have possibly not been comprehended within specific research protocols or that they require dedicated specialists for their potential confirmation. Anyhow these species are of outstanding scientific and ecologic importance.
Continuing with the discussion on mammals, in the perspective of recovering the original ecosystem functions of the wetlands included between the Tigris and the Euphrates and to create a large protected area in the form of a National Park, the possibility of reintroducing various species that have essentially disappeared should not be underestimated.
It is the case of the big mammals, such as some carnivores: Cheetah (*Acinonyx jubatus*); otters (*Lutra lutra seistanica* and *Lutra (Lutrogale) perspicillata maxwelli*); and Artiodactyls, as Mesopotamian Fallow Deer (*Dama dama mesopotamica*), Arabian Oryx (*Oryx leucoryx*) and Gazelles (*Gazella subgutturosa* and *Gazella dorcas*, in particular).

*Figure 13: Oryx leucoryx*

Indeed, with a view to gradually recovering a large part of the functions historically performed by the "marshland" environment, the reintroduction of many of the original faunal components, especially in light of the possible creation of a National Park, represents one of the many activities aimed at the overall recovery of the local area.
If the proposal regarding otters seems dictated mainly by those aspects linked to their particular ecology, strictly connected to the wetlands in question, the possible introduction of artiodactyls is dictated by the fact that their future presence could contribute to creating new opportunities, both in terms of ecology (given their particular habitat, which can be included within the area in question, in the parts that are not recovered or that cannot be recovered as wetlands) and in terms of economics (the presence of wild herbivores, besides contributing to the diversification of habitats, could also offer new possibilities of production and wildlife hunting in the future).
Finally, the reintroduction of the Cheetah, which should be studied only as a future possibility and under the conditions that first a certain herbivore load be established, will also contribute to qualitatively increase biological diversity, to improve the image itself of the area, and to regulate the wild populations of herbivores.

*Thenceforth, for no known reason, its population started to decline rapidly, and during the last 20 years, the decline was so dramatic, that today Slender-billed Curlew is the rarest curlew in the world, with a world population of few hundreds of birds, probably no more than 50-200 birds.*

*Figure 14: Map of the faunistic value (birds species) of the National Park's Area*




**Broad Objective**

- Protection of wildlife of the marshlands

**Objectives to Be Achieved During the Duration of the Management Plan**

- Establish a comprehensive faunistic study program for the assessment of the progress of the marshlands recovery compared to the situation before desiccation
- Draw a checklist of the fauna of the Iraqi marshlands
- Identification of important breeding colonies to assess protection measures
- Assessment of the potential for the reintroduction of important fauna species
- Assessment of the threatening factors and of the impacts of human activities on wildlife (hunting of wildlife and of undesired species, habitats reduction, breeding of domestic animals, human activities and settlements)
- Establishment of biological reserves for the most endangered species
- Create a Wildlife Centre for wildlife breeding and scientific research
- Develop an educational programme on wildlife protection
- Prohibit hunting inside the Core area and regulation of all wildlife hunting in the Park buffer and transition area, with training programs and guidelines and promoting the involvement of hunting associations

**Proposed immediate actions:**

- Create a veterinary facility for wildlife treatment
- Faunistic study on terrestrial and aquatic fauna in the NP area
- Investigation on hunting activities
- Contact local Authorities and local NGOs for the creation of a Wildlife Centre and veterinary facility in the NP

## Archaeology Heritage

The presence of archaeological sites has been scheduled by a survey conducted in 2007. The recorded sites are 36, 13 of them are within the Park's boundaries with a total extent of 320 hectares and are mainly of the Parthian, Sasaned and Islamic period. Four of them, which belong also to the New Babylonian period, have been ranked of international importance.
Others 7 sites are in a radius of 20 kilometers from the Park's boundaries, they measure a total extent of 80 hectares. The most part of them belongs to the Parthian, Sasaned and Islamic period.
For safety reasons all data recorded cannot be published without the permission of the General Directorate of Antiquities, Baghdad.

## Landscape

The marshes before the drainage were entirely populated by the Marsh Arab, which used to build their floating islands and slight reed houses inside the marsh, developing entire villages linked by a net of main and minor channels.

As described by W. Thesinger in its book "The Marsh Arabs": "***It is a large village in the heart of the Marshes where the reeds for mudhjf came from. At Qabáb you will see how the Madan live; nothing but buffaloes, reeds and water. You can only go about in a canoe. There is no dry ground anywhere.*** "

### Two Types of Landscape

At present the inhabited villages are the ones along the edges of the reflooded areas, mostly along the Euphrates river. Therefore the landscape inside the park area might be divided in two main types: the area near the villages defined as cultural landscape which is marked by the daily human way of life, and the natural one that encompass the region far from the inhabited areas .

### Cultural Landscape

The Significant features of the area near the villages are the numerous channels that enter the Central Marsh with well maintained mud banks.

These feature an extensive network crowded by mashufhs, the traditional type of boat.
The mashhufhs enable to travel around women, young people and those who do not posses other means of transport.
Herds of water buffalos travel up to 10 kilometers from the villages. With their day by day walking they contribute to maintain the minor channels free from vegetation.
Grass and reed gathers with their daily job regulate the growth of reeds preserving ponds and lakes useful for fishing and populated by waterfowls.

### The Euphrates River Presence

Speaking about cultural landscape it is impossible not to mention the Euphrates and the villages along it. In fact, although the river is not inside the park, its presence is too important to ignore.
All the channels spring from it as it is the main source of the marsh water. Palm trees are common along its banks and are the only vertical signal that interrupts the flatness of the reed and water extent.
The most common houses are traditionally built using reeds, or mud bricks. Almost every village has a mudhif, the guest house that represents the elegant symbol of the marsh dwellers' wit and capacity to use the local natural resources to build.

### Natural Landscape

The natural landscape is a fascinating labyrinth of lakes, ponds, channels and reeds, populated by hundreds of birds.
Silence and remoteness could be mentioned as an additional and important characteristic that makes these sites special. The safeguard of the natural landscape is of course the direct results of the habitat and wildlife restoring process.
The extension of the reflooded area and the return to the former status of the two most famous lakes of the marshes, the Zichry and the Umm al Binni, will depend on the future decisions about the hydrology assets of the south Iraq region. This is inevitably out of the national park's competences.

# Cultural Distinctiveness

The people and the culture of the Mesopotamia Marshlands are a fundamental part of what makes this area special.
The local communities have developed throughout history unique customs and traditions in response to the local environment, creating a strong link between people and nature.

Due to the displacement that most of the inhabitants experienced during the past regime, the traditional way of life with its knowledge and skills is in danger of being lost.

Traditions associated with buffalos breeding, mat weaving, mudhifh building, boat construction, which have been passed from generation to generation and still endure could be overwhelmed by the adoption of new way of life.
The park will act as a promoter to celebrate and remember the fundamental characteristics of the region. Local communities together with their cultures, knowledge, skills and their traditional way of rural life will be sustained as fundamental characteristics of the region.

NGOs and key individuals will be engaged to record the social history of the most representative villages.
A vibrant choice of traditional handicraft skills will be supported with training and capacity building held by local teachers.

The Mesopotamia Marshland National Park Brand will be created to be used to highlight and support the traditional genuine handicraft and rural products.

**Broad Objectives**

**Set up an operable program to promote the establishment of land tenure regulation**

- Identify the traditional tribal system and rules of ownership and occupation of lands;
- Map the traditional division of Marshlands Area among the local tribes in Abu Zirig and the north part of the National Park.

- All the identified archaeological sites will be restored and protected in accordance with the directive of the General Directorate of Antiquities.
- The National Park will retain a rich interlacing of the cultural and natural environment, reflecting the living and working marshlands landscape.

**Objectives to be achieved during the duration of the Management Plan**

- 17,000 hectares of territory which correspond to part of the Tradition Zone will be treated as cultural landscape. In particular:
  - the rich net of channels will be maintained,
  - an appropriate number of water buffalos will be allowed in the area,
  - the traditional date palm plantation will be restored or created in the surrounding area,
  - the distinctive settlement pattern and the traditional use of local material will be protected and fostered in accordance with the necessity of the communities' wellbeing.

**Proposed immediate actions**

- Contacts the Ministry of Culture to plan an excavation program
- Promote the recording of any kind of material related to the Mesopotamia marshland past history
- Analyze the issues of the abandoned villages inside the future Park area

# The Park & The People

**Introduction**

**Scientific Research**

**Education & Environmental Awareness**

**Traditional Activities Inside the Park**

# Introduction

Within the borders of the park area there are no settlements. The Park is surrounded by urban centers, mostly represented by villages where the population is used to exploit the natural resources both for livelihood and small economic activities.
The meaning of management is to regulate and plan how the park area can be used by people. As stated in the Vision "to recreate and maintain the balance between nature needs and human needs is the first and biggest challenge".

To achieve this purposes, education, environmental awareness, scientific research and traditional activities based on natural resources are included in the same section, this because the they are fully interconnected.
The scientific research is necessary to provide knowledge and innovation in order to combine environmental issues and resources exploitation. In the mean time the promotion of educational and capacity building programs have the basic function to communicate the information to the various involved stakeholders: a virtuous circle that the management of MMNP might drive acting as coordinator.

# Scientific Research

Since 2003, the process of re-flooding the Mesopotamia marshlands has been at the centre of the environment scientists and experts' attention. Monitoring surveys, field researches, conferences and workshops all over the world have given their contributes to define the current status of the area, assessing how the environment is reforming and indicating the major issues to face and the constraints to avoid.

Consequently the NP may become an area of fundamental importance to all the international scientific community, due to the importance of the site before the drainage, the extent of the currently re-flooded part and the international debates on wetlands values and their wise uses.

### Two Function

The objective of the project is therefore to create a Mesopotamia Marshlands Research Center with two interconnected key functions.

### Local Function

A local function to reach in short term is to develop effective capacity among key individuals from the region, in wetland management planning, recording & monitoring program, impacts of natural resources exploitation and their sustainable use.

The focus is on the economic aspect of the wetland, encouraging a willingness to experiment the new and different potential use offered by wetland resources to take full advantage of the economic opportunities.

The Centre will develop pilot projects and researches on the ground both to monitor, test and improve the existing traditional practices and to discover and experiment new possibilities. This is done by leveraging on science findings and shared experiences from other similar situations. Therefore it might play a crucial role in promoting sustainable development practices in the country through the building of local small entrepreneurs.

Periodical cycles of environmental training courses will be run. This is done to enable NGOs and individuals interested, to become part of the park authorities or to collaborate with them as staff member, rangers or visitors. The training courses will extent (the center's) positive effectual influence for the region.

The Laboratories field and the pilot projects of the research centre will be used as educational resources to support the educational program for schools.

### National & International Function

The medium long–term objective is to organize and host work shops and congress. This is done to develop interdisciplinary research and collaborations with corporate bodies and international institutes on the base of the environmental and historical unique characteristics of the area and the surrounding territory.

The potential is huge as the park area offers many research opportunities for a wide range of disciplines while its central location among the whole south provinces increases the chance to become a point of attraction as congress centre.

# Education & Environmental Awareness

In south Iraq the population under 14 years corresponds to 41%. This means about 410,000 units, of which 260,000 aged 5-14 only. The data concerns the Central and the Abu Zirig Marsh, and the areas referred to the relatively adjacent areas of Suq Ash Shuyukh and Qurnah.

Therefore, achieving to engage in an educational program the current school population means lay the foundations for a broad environmental knowledge able to influence the choices of the future decision makers on socio-economic matters.

### The Park as an open air laboratory

MMNP can offer the first opportunities to use other places than schools as educational areas considering, for example, the Park as an open air laboratory.
Such learning experiences for all ages could therefore become a stimulating resource accessible to the communities around the Park, with the prospective to contact a wider audience including the populations of larger cities as Basrah, Samawa, Amarah.

### Communication Material

Thanks to the development of the communication material and guided itinerary by foot and by boat, it is possible to promote understanding not only of the natural environment but also of ancient and past history, traditions and customs that influenced and still influence the Mesopotamia Marshlands.
This increases the comprehension of the relationship between the environment and the people that use it. According to the guiding principles of Cooperation the program will link in a second stage other cultural initiatives in the region. This will include a net of museums, archaeological sites and other protected areas in order to extend the audience to higher education students, teachers, and youth organizations.

# Traditional Activities

In past, as already highlighted in the historic site description, the typical islands villages of Madan tribes populated all the Central marsh. The area was an incredible ensemble of water, reeds and people and it was internationally known for having one of the most fascinating human landscapes. The presence of dwellers in deepest areas of the marshes determined that the whole extent was subject to human utilization.
At present there are no inhabited settlements within the Park's boundaries, only the rests of abandoned villages.

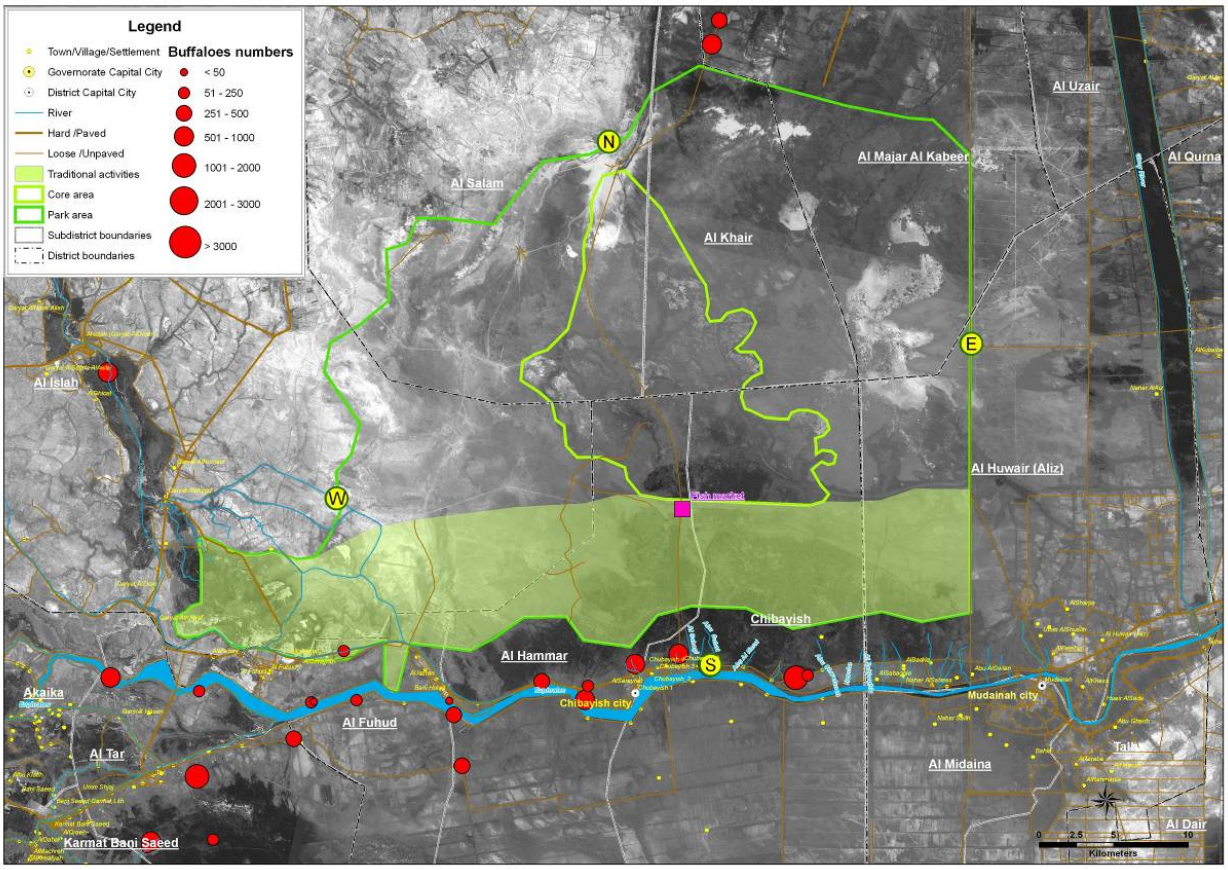
Therefore the park areas mainly used by local populations as fundamental resource of subsistence are those close to the populated places in the southern part of Abu Zirig and in the part of Central Marsh that borders the left bank of the Euphrates river.

Many of these activities at present cannot be a serious threat for the environment, as they are at small scale. On the contrary they act as maintenance of the net of channels and ponds while they represent the only means of income for the villages' inhabitants.
These activities may become potential threats in the future, as they may increase due to the demographic growth, the security situation improvement and the economic improvement. In fact development, natural resources exploitation, income increasing, well being improvement constitute a reinforce system, to be monitored by the research centre.

## Double Acting Strategy

Therefore the strategy adopted is double acting. A 32,461 ha (129,844 donums) buffer zone, named "Tradition Zone", is let available for all the usual activities as buffalos grazing, reed and grass gathering, traditional fishing and hunting.
Due to the difficult employment situation and the lack of alternatives, the renounce of dangerous habits and negative practices (electricity – use of poison) will be encouraged by targeted environmental awareness programs reinforced by a parallel implementation of economic development assistance to the local communities

*Figure 15: Buffalos' breeding distribution and Tradition Zone in the Park area and surroundings*



**Broad Objective:**

**To create a Mesopotamia Marshlands Research Centre (MMRC) with two interconnected key functions:**

- To develop pilot field/research, monitoring studies, trainings, capacity building courses in wetland management planning, recording & monitoring programmes, impacts of natural resources exploitation, alternative and sustainable uses of natural resources.
- To organize and host work shops and congress for developing interdisciplinary research and collaborations with corporate body and international institutes on the base both of the environmental and historical unique characteristics of the area and the surrounding territory.

**Objectives to be achieved during the duration of the Management Plan:**

**The Park Authority will act as an open air class room to spread general knowledge on environment, on wetlands and on the Iraqi Marshlands particularly:**

- Construct an interpretive centre near the Park Entrance in Abu Subat with appropriate learning tools to make an understanding of Mesopotamia marshlands significant values with attention also to history and local traditions. A set of educational resources about MMNP will be available on-line.

**Along the inhabited areas retain a "Tradition Zone" of 32,461 ha (129,844 donums) to consent a regulated exploitation of the natural resources**

- Study on the traditional uses of vegetation (construction material, cattle feed, mats waving, food, medicinal plants) and related economic activities
- Plan a program with defined parameters and timing to monitor the effects of the tradition activities on the environment

**Proposed immediate actions**

- Plan an Environmental educational program for secondary schools.
- Produce education and communication materials.
- Contact local NGOs to implement the education program
- Construct a mudhif as first educational centre
- Construct two Educational- recreational itineraries

# The Park & The Visitors

**Introduction**

**New Development with Tourism**

**Recreation & Enjoyment**

**Information, Communication & Branding**

# Introduction

The big jump in international tourism leads many Middle East countries to prioritize tourism development in economic planning. Such policy aims to join one of the world's most dynamic sectors and to diversify away from export of raw materials or manufactured goods.
Many countries see international tourism as a partial alternative to standard rural development and industrialization, especially since they possess tourist attractions and comparative or absolute advantages in the export of tourism services.

Due the environmental values of the MMNP, the ecotourism is the main kind of tourism that it may host and encourage within its boundaries.

Fortunately, the positive trend towards the ecotourism marketing is present throughout all the countries. "This trend has become one of the fastest growing sectors of the tourism industry growing annual 10-15% worldwide (Kamuaro, 2007). "

Responsible ecotourism includes programs that reduce the negative impacts of conventional tourism on the environment, and highlights the cultural integrity of local people.
Therefore, in addition to evaluating environmental and cultural assets, ecotourism encourages recycling, energy efficiency, water

conservation, and creation of economic opportunities for the local communities.

Another characteristic is that the ecotourism experience is marketed to a different lifestyle from large scale tourism. Consequently the development of facilities and infrastructure does not need to obey the rules of corporate Western tourism standards, and can be much simpler and at small scale.

This fundamental aspect helps the park management to start building visitor facilities with small initiative and proceed step by step enlarging the investment as experience and skills improve and the number of visitors increases.

Tourism actually is the only direct mean of income for protected areas and represents also a great opportunity for local communities, generating a synergic multiplier effect on the economy thanks to local products, materials, and labor used. If carefully managed it may generate a strong, positive link between the two entities.

This form of tourism may require private/foreign investment for promotion or start up while embracing at the same time activities depending on different sectors. It is crucial to develop a Tourism Management Plan and a related Business Plan.
In this way practicable short, medium and long projects are planned and an equity shearing of benefits among all the stakeholders ensured.

## New Development with Tourism

The possibility to enjoy the park's environmental beauty is determined by the range of tourism attractions, infrastructures, facilities and services offered to visitors.

The Park management has to define objectives useful to respond to the various tourists' demands and expectative considering the interests that feature the various kinds of eco-tourists.

The theory of Kreg Lindburg, in fact, distinguishes 4 groups of tourists who visit natural areas, described as "four types of ecotourists":

- **"Hard-core" ecotourists**. They are scientific researchers and special interest groups, such as biologists, botanists, ornithologists and so on. They are highly educated visitors, who explore natural areas either individually or on a small package scale basis. Researchers, scientists and school groups can be part of this group.

- **"Dedicated" ecotourists**. This group incorporates people who set out especially to gather aesthetic experiences in unspoilt natural areas and who wish to learn about nature and its plant and animal life. They also travel on a small basis scale that can be packaged or otherwise. The level of education is generally high too.

- **"Common" ecotourists**. These are people who end up in a natural area because they want to enjoy an unusual holiday. Their primary concern is not nature but the special experience.

- **"Accidental" ecotourists**. They wind up more or less accidentally in a natural area. They may be people who are staying in the region and want to take one or more daytrips to a natural area.

Only planning a very focused and multifaceted range of proposals it is possible for the Park management both to promote the enjoyment of the Park's special qualities and to safeguard the vulnerable sites from disturbance and threats.

# Recreation & Enjoyment

The stated Park's vision pictures a tourism scenario taking in account the possible development exploiting the opportunities that the area could offer once the re-flooded process will be terminated.
Therefore the hereafter pattern describes all the objectives to achieve in long term from which, consequently, it is easy deduct a set of focused projects to complete in short term. First realizable steps to implement once the Park's establishment will be adopted.

### Environmental and Cultural Attractions

As previously described in section 2, The Park encompasses the Core area and a buffer zone divided in three parts, each one with specific features that might grant, from a tourist point of view, diversified opportunities of enjoyment.

**The Core Area**: At the centre of the park, 23,875 hectares (95,500 donums) of rich feeding and resting area for waterbirds. The environment looks very healthy with beautiful permanent lakes as Al-Hemara Al-Saghera and Al-Hemara Al-Kabeera, a network of water pathways being narrowed and broadened repeatedly, closed by giant reeds which reach height of about 5-6m from the bottom of the water. As the Core area is dedicated to the recovery of marshland ecosystem the visits are regulated by a seasonal calendar and the tours are possible only with the presence of the park authorized guards.

**The Tradition Zone**: More than 32,500 hectares (130,000 donums) of open access marshlands, where local activities endure. The zone verges the populated area along the left Euphrates river bank and it is possible to reach it passing through one of the eight channels that feed the central marsh.
Starting from the south entrance of the park, an area of almost 17,000 hectares (68,000 donums) will be improved with the development of amenities and facilities. Tourists can roam around by boat and observe the aquatic way of life of the marsh dweller: the reed gathers, the fish market situated near Eshan Al-Gubba, the thin island close to Bargat Al- Baghdadiya lake, the breeders of water buffaloes that seasonally use to bring their herds inside the marshes on small ground island called "Daar", to find better place for grazing .

**The Research Zone,** easily accessible from the West entrance. Almost 39,750 hectares ( 159,000 donums) of composite dry and marshlands areas that encompass the Abu Zirig southern part,

known for its scenic view, two permanent lakes destined to research on aquaculture and traditional activities and the complex of Research and Congress centre with the possibility of easy parking.
Almost 20,000 hectares (80,000 donums) enhanced with additional facilities will highlight the research activities of the Park. An interpretive center especially dedicated to birds and marshlands habitats, observation platform reachable through water path from which will start the guided itineraries to the Core area, will make this zone as the most interesting for the bird watching specialist.
The first ecolodge might be located here, to intercept also the tourists interested to the archaeological sites excavation, both the minor ones inside the Park and the most important at international level as Ur, Eridu or Uruk.

**The Reserve Zone near the North entrance:** this area of more than 45,375 hectares (181,500 donums) could remain mostly dry or seasonally flooded in some areas. It is a wild area perfectly suitable to host a breeding centre **f**or endangered or locally extinct wildlife.
A reserve to reintroduce some of the most rare species of animals that once where common in the south Iraq, as Oryx, ostriches, gazelles, Fallow deer, and onagers. Breeding programs will follow, as already done in Jordan and Qatar, aiming at rebuilding their populations and reasserting their presence in safe area, protected from hunting and habitat destruction.
The centre, if well fitted out with tourism infrastructure, information points, access, parking, signage and basic services, may represent an attraction point reachable by car or by horse through planned paths that link it with other significant sites and observation points near the edge of the core area.

**Inside the Reserve Zone,** near the East entrance**,** the former Zichry lakes, when reflooded, might constitute 17,000 hectares (68,000 donums) of permanent water and surrounding area, for sailing and fishing activities, also with the chance to try traditional ancient techniques.
Easy access and a broad "protection area" between the lake and the road permits the development of parking, boat guiding services, shops, restaurants, facilities and infrastructures for fishermen and anglers, provided by small local entrepreneurs.

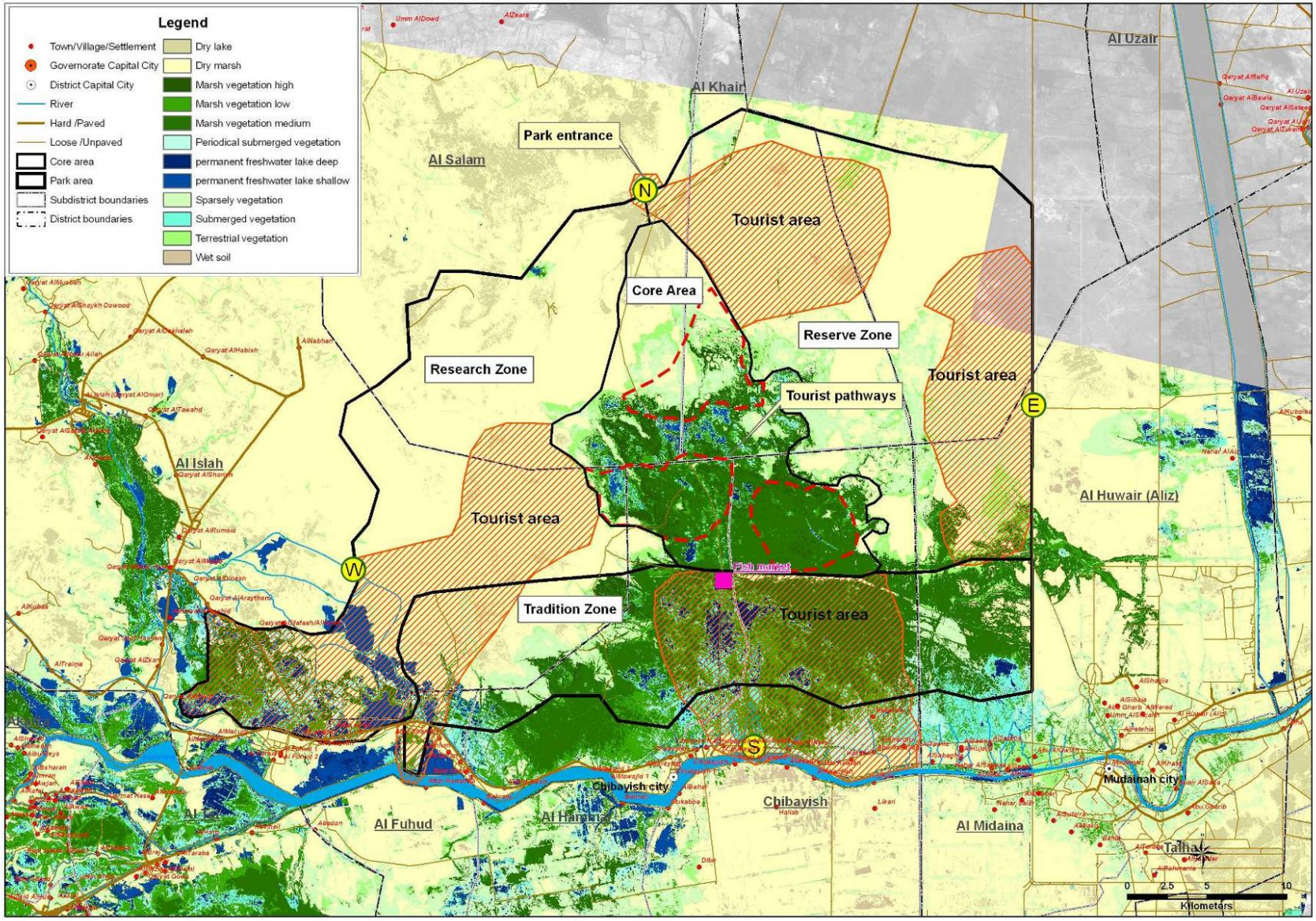
**The archaeological sites** are present in many places around the entire park area. Once the safety situation permit to start their excavation, it will be clear their importance and they could become a strong attraction and source of findings to be collected in an apposite interpretative centre dedicated to the Mesopotamia history.

### Facilities & Infrastructures

The following list describes the necessary facilities to allow tourists to visit and enjoy the attractions of the Park. The final objective is to offer a wide range of possibilities in a way to keep the tourists inside the park for several days and increase the economic benefit for the Park and for the locals:

- Four observation blinds in the marsh providing cover for bird watching, photographing and studying marsh wildlife.
- Foot paths along the marshlands hedge;
- Water trails and guided boat tours;
- Riding schools for riding trips;
- Boat ramps available near the park entrances for shallow watercraft such as flat-bottom boats, canoes and kayaks or traditional boats, as the elegant tadara or the more simple mashoofs or the bigger shakhtoora, conducted by locals;
- Starting from the park dock on Euphrates, an interpretive boat trips towards Abu Zirig marsh and towards Qurnah;
- Primitive camping platforms located throughout the marsh, near abandoned Ma'dan villages, to reach by boat and serve as place to rest and observe the marshland life;
- Many sites dedicated to the fishermen reachable either by foot or by boat;
- Seasonally, at the South entrance, an hot air balloon tour will allow the viewers to ascertain the uniqueness of the meandering channels, the vastness of the wetlands and the peculiarity of the its surroundings;
- Two interpretive centers, one dedicated to Mesopotamia History and tradition, one to the environmental values;
- An educational centre dedicated to kids and schools;
- An ecolodge near the Research and congress Centre;
- Parking areas near the tourist information points.

*Figure 16: Tourist zones*



# Information, Communication & Branding

Information and communication are the basic tools to deliver the National Park purposes and to reach out to a diverse audience.
This objective has to be archived using a wide range of media expressly selected to contact targeted segments of tourists.

The communication strategy has to be developed in parallel not only with the capacity of the management to increase the Park facilities but also with the improvement of the basic infrastructure of the surrounding areas and the skills of local employees and small entrepreneurs.

The first stage will be focused on a local level such as schools and local communities to raise public awareness and appreciation of the Park special qualities and to explain its potentiality as driver of communities' wellbeing and economic source. This phase mostly coincides with the educational program activities.

The second stage could refer to the national and international scientific community and "fanatic" bird watching. These are visitors that appreciate environmental values and don't care too much about other kinds of attractions. A detailed and well constructed web site constitutes an additional tool to develop for this stage.

An international campaign has to be developed to reach the wider and most wealthy ecotourist group, previously informed by a market analysis to test trends and competitors. Value to the offers may be added involving not only the National Park but others nearby tourism attractions so as to create a varied tourist product able to attract tour operators all over the world.

At this third stage most of the infrastructure has to be ready. The brand of the Park has to be created and marketed to add values to local products. The objectives to achieve are long stay visitors and economic advantage spread around the surrounding areas. Otherwise the efforts of the promotions would be invalidated by short rests and few incomes.

### Broad Objective

**Plan for the development of tourism at international level**

- Develop a Tourism Management Plan and a related Business Plan;
- Plan adequate facilities and hospitality and recreational infrastructure;
- Create a national net of historical, archaeological sites, protected areas, museums, visitors and interpretative centers;

### Objectives to be achieved during the duration of the Management Plan

**Plan for developing domestic tourism focused on the environmental values**

- Realization of simple tourism infrastructure, facilities etc. at local level: visitors centers, tourist information points, basic transportation and services;

**Raise the awareness of the significance of the archaeological, historical, natural sites to key stakeholders**

- Initiate an education public campaign in order to foster a greater sense of pride and awareness among local communities in the importance of archaeological, historical and cultural heritage.
- Provide programs for increasing the access to students, teachers and university researchers;

**Increase the local communities' skills in tourism sector**

- Provide Capacity building: Techniques for the assessment and prioritization of sites and buildings; Heritage conservation; Visitors management; Tourism management; Site guards;

**Increase the handicraft sector capacity to deliver products and services that match the needs and requirements of the visitors**

- Establish a brand leverage strategy to maximize exposure through signage, media partnerships and corporate sponsorship alliances.

### Proposed immediate actions

Construct:

- 1 blind bird observation
- 1 platform inside the marsh to host researchers
- 2 water trails

Increase the communication material of the Park Mudhif to receive local tourists

# The Park & its Surrounding Areas

**Introduction**

**Community Well-being**

**Land Management**

**Traditional Economic Activity**

**New Economic Activities**

# Introduction

Wetlands have been part of the system for a long time; hence, there is a strong interdependence between the wetlands and the surrounding society. This interdependence has led to the need and opportunity for business and economic development.
In general, the communities and businesses of the National Park shall provide the skills and economic engine needed to maintain and enhance many aspects of Mesopotamian wetlands' special qualities. They also need to be able to meet their own needs and to strengthen community vitality and cohesion in harmony with area's designation as a National Park.

Besides the vital functions for the life on the planet, setting the National Park will give the opportunity to:

- Demonstrate sustainable living.
- Help in creating considerable economic resources by developing local economies resulting from fishes, handcrafts, buffalo breeding and, as hinted in the previous chapter, the tourist and recreation activities.
- In a long term, lead the way in meeting broader sustainability objectives in terms of natural resource protection, reduced energy consumption and the increased sustainability of individual communities.

The instauration of the National Park is a precious opportunity for improving the skills and standards of living of the population of the marshes. In fact, if properly managed the sustainable and multi-functional use of the wetlands is economically profitable.

Objectives of the NP to people and businesses should be:

- to find new ways of maintaining the viability of marshland's activities both through the development of new economic opportunities and through new support mechanisms linked to sustainable land management and the delivery of wider public benefits;
- to increase the economic performance of activities that keep money in the local economy and help conserve and manage Mesopotamia wetlands' special qualities, for example, through sustainable tourism initiatives, development of local food chains and support for the skills base in traditional crafts;
- to meet the needs of local communities, maintaining community vitality, increasing environmental awareness, and encouraging more sustainable living, while conserving the sense of place of individual settlements.

Noteworthy that the aim of a National Park Management Plan is not to provide a detailed economic analysis of the different sectors/activities: a further specific study should be tendered and prepared with this aim. In the following, a general profile of the economic activities existing in the Marshlands and the potentialities for development will be outlined.

## Community Well-being

Quality of life is strongly affected by the availability of local services and in the marsh area there is lack of basic services as health care, adequate housing, schools, potable water; sewage system; energy supply (electricity). Other problems related to the social life are connected with the land tenure, the lack of urban planning and women emancipation.

The intervention of a virtuous cycle connected with the implementation of the National Park strategy can provide the resources to cover the area with the needed services. The people pulled in by the Park (visitors, tourists) will booster the local economy giving resources for improving the living conditions of the residents.

Subsidies and funds possibly attracted by the Park's constitution could give a further chance for developing the area.

There is a real challenge to provide opportunities to empower people at a community level to develop more socially and environmentally sustainable ways of living that, amongst other things, respond to the issues raised by climate change (day by day more important matter in developed countries).

## Land Management

The environment of the NP area has been extensively discussed across the previous chapters.

It is evident that the local economy is strictly connected with the environment resulting in a subsistence economy. Nevertheless, it remains central to the identity of many marsh communities, both as fishermen, grass collectors, handicraftsmen (reeds), buffalo breeders that have formed the backbone of living activities of the area and which have the potential to make a greater contribution to the local economy.
Government policies must recognize the need to provide financial support to family businesses and small enterprises based on those local activities and resources (otherwise less and less viable). Individuals must be encouraged to adopt environmentally beneficial management practices.

Living in and around the marshes has traditionally been based around the above mentioned activities which require land and which survives from utilizing and selling 'gathered products' (fish, grass, reeds, milk). The continuation of traditional forms of living is essential for the maintenance of many of Mesopotamian Marshland's special qualities.

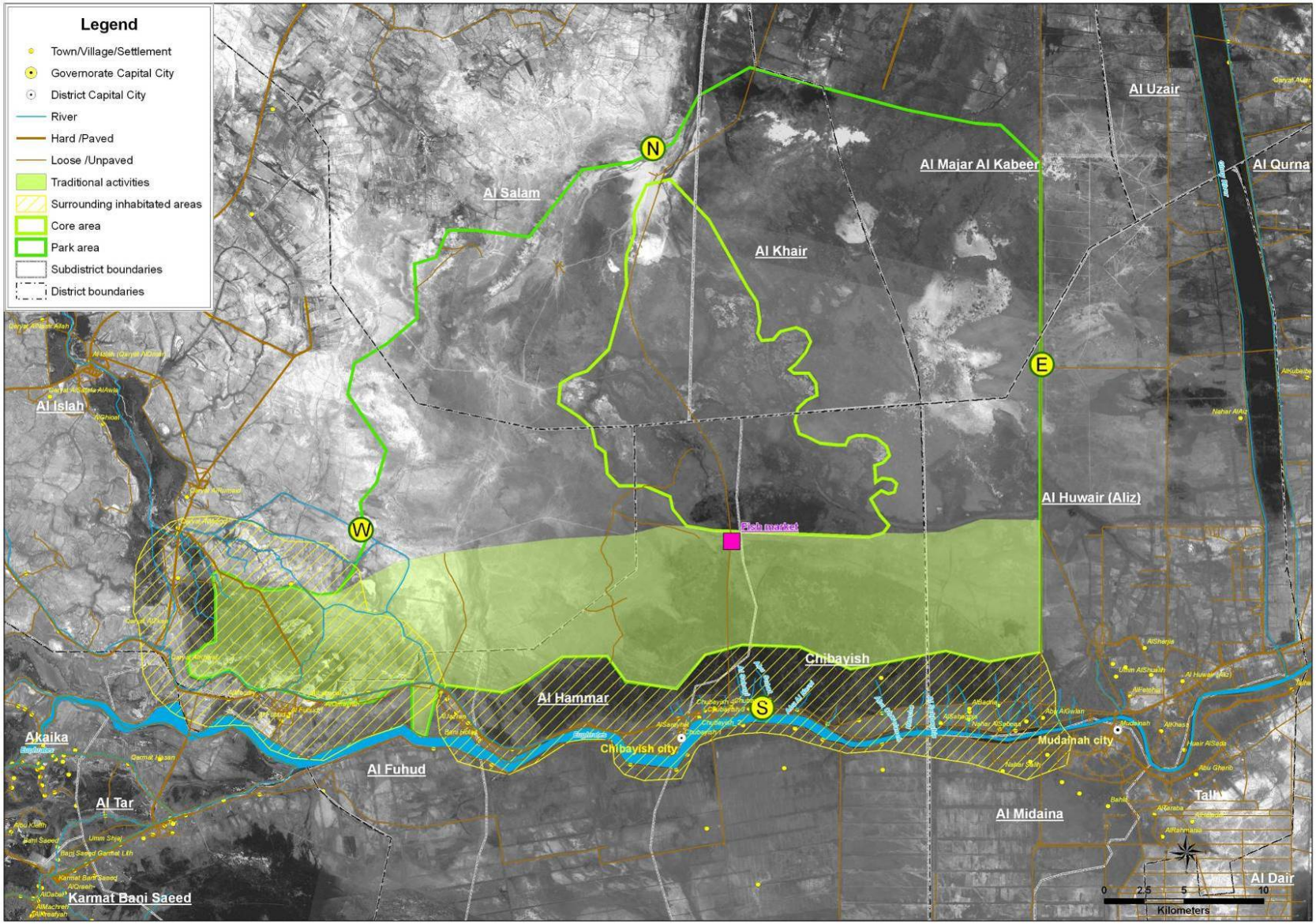
The viability of these activities must not drop but should be enhanced and strengthened by the creation of the Park. The same 'no-decline' should come out for the inhabitants actively exercising their activities of grazing, fishing, gathering, and manufacturing while a brand of the park would group and make stronger businesses connected with the area.

## Traditional Economic Activity

Employment and business are essential parts of life in the National Park, particularly those activities such as fishing, buffalo breeding and reeds/grass collection that, requiring great natural outdoors, support its special environmental qualities.

The different activities should be preserved and protected while the zoning of the Park must be respected. The following map shows the present situation as far as the different activities and relevance of each sector of employment concern. The zone highlighted in green is the Tradition Zone (within the National Park borders) where economic activities, when well regulated, can be exploited.

*Figure 17: Traditional activities exploitation and inhabited areas in the Park and its surroundings.*



Tourism will soon cater for the visitors who will come to enjoy the marshes. The predominance and correlation of one product/activity to another have also to be considered by the light of the impacts on environment and sustainability.

Local businesses have the opportunity to take advantage of the demand will come from high quality food (mainly dairy products) or handmade products (mats and baskets) and to explore tourism potential to help support the core business. The increase in consumer demand for locally produced diary products, handworks, fish and the links that can be made between these products and the high quality environment they come from present special opportunities to the inhabitants of the area. Alone, any one of these enterprises might not be considered to be significant, but together and because of where they are located, they in total are extremely important and significant. A widely recognized and credible marketing identity for these products, used by locals working together, will be needed to take advantage of the predictable growing demand.

The Research Center of the Park will be the hub for creating new opportunities for both economical and environmental sustainable business development. In this infrastructure, different approaches to buffalo breeding and fishing can be investigated and reemployment of craftsmen in similar activities (connected with the excellence of the locals to weave reeds and handmade works in general) can be exploited.

The production of milk and dairy products could be increased and improved (always in compliance with the principles of sustainability) through proper management and business plans.

The dairy products can be brought near high quality standard production without going into purely industrialized processes which would make the Mesopotamian Marshlands' special qualities fading. The great availability of grass and reeds ensured and preserved by the National Park will continue to provide resources for both the buffaloes and the handicraftsmen even if (and exactly because) regulated by the Park rules.

The reeds products could renovate by entering innovating ideas in the production chain as different shapes, new artifacts, decorated or colored elements.

The fishing, abandoning the electric shock and toxic compounds utilization and respecting the breeding seasons, can play on the traditional way of fishing (harpoons and fish nets) and the traditional way of preparing food linked with the forcefulness of an old-fashioned "taste of the past". The idea of the Park as an unpolluted and low human pressured area is normally a reason of selling's increase. The aquaculture can be investigated and pilot projects on intensive production have already been started.
Finally, the boat construction/repair sector other than to respond to contingent local needs can be organized and its development can be planned basing its strength on both tradition, elegant design and accurate engineering (like Gondolas in Venice) that characterize the *Mashoof, Tadara* and *Shakhtoora*.

Building close economic links between these businesses and with local consumers ensures that money is retained in the local economy, local services are supported, and the economy has the opportunity to become more self reliant. Creating clusters of collaborating businesses and shortening supply chains are important goals in the economic strategy. Furthermore, this approach would allow to influence or regulate the specific business in areas such as pricing, total supplies, production quotas, product quality.

### New Economic Activities

Where new economic activities start in the surroundings of the National Park it is important that they are of high quality in harmony with the character of the area and, wherever possible, uses locally sourced traditional materials like mats and other reed handmade artifacts. There will also be a need for craftsmen and women who have the knowledge and experience to make appropriate use of these materials. Traditional skills can also be used to support modern sustainable initiatives. The Research Center of the Park can make a start on this work which will need to continue in partnership with others, particularly the tourism sector. As an example, the activities connected with the traditional construction are also easily exploited into elements of interest for the tourist trade. Guided tours to traditional buildings, villages, fishing sites, etc. can be organized by walk or boats. A guided tour into the laboratories for reeds or boat construction and the visit to small museums with old tools and boats are usually of interest for the tourists.

The increasing number of visitors attracted by the Park will involve more and more locals as both internal staff and in the service sector. Land managers and "users" will need business skills and information to be able to respond to new challenges and markets. The increasing consumer interest (recorded in all the National Parks created around the world) in purchasing locally distinctive goods and services from local producers will create openings for businesses to capitalize on Mesopotamian Marshlands' special character, focusing on goods and services of high quality and value. To support this activity, a great function is carried by the development of an accredited Mesopotamian Marshlands brand that will enable consumers to identify and support products that have strong associations with the National Park and its special qualities.

For ease of characterizing the nature of the potential Mesopotamian Marshlands National Park 'industry', we can recognize four primary sectors around which specialized businesses can develop (adapted from B. G. Warner, *2003*):

1 Products and Manufacturing Sector (i.e. those enterprises focused on collecting and selling the raw materials from wetlands or transforming wetland materials into some value-added products):
   - work towards adopting an industry policy on the wise use, management and protection of wetland resources
   - adopt an industry product certification program
   - develop an industry long-range resource plan for the wise-use, management and protection for wetland resources and more detailed marketing plans for specific sub sectors
   - assess the potential feasibility of adopting a resource utilization levy for reinvestment into the management and protection of future wetland resources
2 Supplies and Distribution Sector (businesses that supply, market, distribute and/or

transport the products and goods produced by the manufacturing sector):

- probably similar to recommendations given for the Products and Manufacturing Sector

3 Services Sector (businesses specializing in wetlands management, environmental and engineering consulting services, recreational and tourist activities):

- compile a directory of businesses in the services sector
- support the training and accreditation of wetland professionals
- have wetland resources recognized and governments take on responsibilities for wetland resources.

4 Knowledge Sector (universities, colleges, governments and private organizations involved in various aspects of research and development on wetlands; training of wetland specialists and entrepreneurs):

- support the compilation and publication of a volume on state-of-the-art information on Marshland's wetland resources
- continue with exploration, assessment and inventory of the whole wetland resource in the area
- opportunities for Research & Development business partnerships between the NP Research center and specific sectors of the wetland industry should be identified, prioritized and funded.

Finally, it may be appropriate to create a government agency with a mandate whose role would focuses on the regulation, management and protection of existing and future wetland resources: the whole activities and ways of utilizing the assets must be tuned together with the NP Entity in a manner for which there is equilibrium between human pressure driven by the economy and nature recovery/protection.

**Broad Objective**

Enhance economic activities for improving standards of living and develop the skills of the population of the Surrounding Areas by balancing needs and economical growth with environmental sustainability

**Objectives to be achieved during the duration of the Management Plan**

- Make aware both policy makers and opinion formers on the vital role of the traditional activities in maintaining the environment and cultural identity of the Mesopotamian Marshlands
- Consent a regulated exploitation of the natural resources in the "Tradition Zone" (17,000 ha)
- Enter the Tradition Zone under active schemes of management in which grass, reeds, baskets, fish, and dairy products are processed and marketed locally
- Develop the Products&Manufacturing, Supplies&Distribution, Services, and Knowledge sectors
- Increase the handicraft sector capacity to deliver products and services that match the needs and requirements of the visitors
- Increase the value of businesses connected with the NP that relate either directly or indirectly to achieving national park purposes
- Establish a brand leverage strategy to maximize exposure through signage, media partnerships and corporate sponsorship alliances.
- Promote a marketing brand as part of the National Park Project that accredits land-based producers who are actively conserving Mesopotamia Marshlands' special qualities
- Study for a Park Logo

**Proposed immediate actions**

- Localize and map the areas connected to fishing, breeding, handcrafts, grass, and reeds activities
- Pilot project on Buffalo Breeding
- Development of a dairy value chain and related activities
- Continuation of the pilot project on fisheries (fish cages) and pilot project on "fish&rice"
- Restoring of traditional date palm plantation in the surrounding area
- List the possible local businesses to be involved in the MMNP brand (trademark)

# Summary of the Management Plan's Objectives

| PARK'S THEME | BROAD OBJECTIVE | OBJECTIVES TO BE ACHIEVED DURING THE DURATION OF THE MANAGEMENT PLAN |
|---|---|---|
| **The Park & Its Values** | **A. Ensure water quality** | 1. Water quality control<br>2. Survey of water sanitation facilities in the external Transition area<br>3. Monitor the impact of human activities on water quality (buffalo breeding, settlements, pollution)<br>4. Water quality monitoring (NP monitoring program)<br>5. Map of buffalo grazing areas and main paths<br>6. Map of villages and temporary settlements inside the Central Marshes and Abu Zirig |
| | **B. Ensure water flow into the Central Marshes and internal water circulation** | 7. Ensure appropriate water quantity flow into the marshes and create an hydroperiod<br>8. Minimize obstacles to water circulation in the marshes<br>9. Create new circulation patterns and artificial ponds to avoid water stagnation in the summer period<br>10. Maintenance of embankments and roads<br>11. Maintain open water areas and canals<br>12. Survey of traditional activities that influence water circulation patterns in the marshlands: |
| | **C. Promote the Mesopotamia marshlands system and ecologic corridors** | 13. Restore potential connections between the marshes<br>14. Promote the establishment of wildlife corridors between other southern marshes in Iraq and International agreements for wetland conservation (Iran, Gulf Countries) to facilitate reestablishment of wildlife as part of regional sustainable development planning and an integrated management strategy |
| | **D. Study of flora and vegetation communities of the marshlands** | 15. Establishing a vegetation survey program for a comprehensive phytosociological study of the marshlands and the assessment of the progress of marshlands recovery in comparison to the situation before desiccation<br>16. Draw a checklist of the flora of the marshlands<br>17. Draw a map of vegetation in he NP area<br>18. Create an herbarium to collect and preserve plant specimens of the marshlands<br>19. Assessment of the impacts of human activities on vegetation (reeds harvesting, buffalo grazing, introduction of invasive plant species) |

| PARK'S THEME | BROAD OBJECTIVE | OBJECTIVES TO BE ACHIEVED DURING THE DURATION OF THE MANAGEMENT PLAN |
|---|---|---|
| | **E. Protection of wildlife of the marshlands** | 20. Establish a comprehensive faunistic study program for the assessment of the progress of the marshlands recovery compared to the situation before desiccation<br>21. Draw a checklist of the fauna of the Iraqi marshlands<br>22. Identification of important breeding colonies to assess protection measures<br>23. Assessment of the potential for the reintroduction of important fauna species<br>24. Assessment of the threatening factors and of the impacts of human activities on wildlife (hunting of wildlife and of undesired species, habitats reduction, breeding of domestic animals, human activities and settlements)<br>25. Establishment of biological reserves for the most endangered species<br>26. Create a Wildlife Centre for wildlife breeding and scientific research<br>27. Develop an educational programme on wildlife protection<br>28. Prohibit hunting inside the Core area and regulation of all wildlife hunting in the Park buffer and transition area, with training programs and guidelines and promoting the involvement of hunting associations |
| | **F. Set up an operable program to promote the establishment of land tenure regulation** | 29. Identify the traditional tribal system and rules of ownership and occupation of lands;<br>30. Map the traditional division of Marshlands Area among the local tribes in Abu Zirig and the north part of the National Park. |
| | **G. All the identified archaeological sites will be restored and protected in accordance with the directive of the General Directorate of Antiquities** | |
| | **H. The National Park will retain a rich interlacing of the cultural and natural environment, reflecting the living and working marshlands landscape.** | 31. 17,000 hectares of territory which correspond to part of the Tradition Zone will be treated as cultural landscape. In particular:<br>a. the rich net of channels will be maintained,<br>b. an appropriate number of water buffalos will be allowed in the area,<br>c. the traditional date palm plantation will be restored or created in the surrounding area,<br>d. the distinctive settlement pattern and the traditional use of local material will be protected and fostered in accordance with the necessity of the communities' wellbeing. |

| PARK'S THEME | BROAD OBJECTIVE | OBJECTIVES TO BE ACHIEVED DURING THE DURATION OF THE MANAGEMENT PLAN |
|---|---|---|
| **The Park & The People** | **I. Create a Mesopotamia Marshlands Research Centre (MMRC) with two interconnected key functions:**<br>▪ Develop pilot field/research, monitoring studies, trainings, capacity building courses in wetland management planning, recording & monitoring programmes, impacts of natural resources exploitation, alternative and sustainable uses of natural resources.<br>▪ Organize and host work shops and congress for developing interdisciplinary research and collaborations with corporate body and international institutes on the base both of the environmental and historical unique characteristics of the area and the surrounding territory. | 32. The Park Authority will act as an open air class room to spread general knowledge on environment, on wetlands and on the Iraqi Marshlands particularly:<br>33. Construct an interpretive centre near the Park Entrance in Abu Subat with appropriate learning tools to make an understanding of Mesopotamia marshlands significant values with attention also to history and local traditions. A set of educational resources about MMNP will be available on-line.<br>34. Along the inhabited areas retain a "Tradition Zone" of 32,461 ha (129,844 donums) to consent a regulated exploitation of the natural resources<br>35. Study on the traditional uses of vegetation (construction material, cattle feed, mats waving, food, medicinal plants) and related economic activities<br>36. Plan a program with defined parameters and timing to monitor the effects of the tradition activities on the environment |

| PARK'S THEME | BROAD OBJECTIVE | OBJECTIVES TO BE ACHIEVED DURING THE DURATION OF THE MANAGEMENT PLAN |
|---|---|---|
| **The Park & The Visitors** | **J. Plan for the development of tourism at international level**<br>**K. Develop a Tourism Management Plan and a related Business Plan;**<br>**L. Plan adequate facilities and hospitality and recreational infrastructure;**<br>**M. Create a national net of historical, archaeological sites, protected areas, museums, visitors and interpretative centers;** | 37. Plan for developing domestic tourism focused on the environmental values<br>38. Realization of simple tourism infrastructure, facilities etc. at local level: visitors centers, tourist information points, basic transportation and services;<br>39. Raise the awareness of the significance of the archaeological, historical, natural sites to key stakeholders<br>40. Initiate an education public campaign in order to foster a greater sense of pride and awareness among local communities in the importance of archaeological, historical and cultural heritage.<br>41. Provide programs for increasing the access to students, teachers and university researchers;<br>42. Increase the local communities' skills in tourism sector<br>43. Provide Capacity building: Techniques for the assessment and prioritization of sites and buildings; Heritage conservation; Visitors management; Tourism management; Site guards;<br>44. Increase the handicraft sector capacity to deliver products and services that match the needs and requirements of the visitors<br>45. Establish a brand leverage strategy to maximize exposure through signage, media partnerships and corporate sponsorship alliances. |
| **The Park & its Surrounding Areas** | **N. Enhance economic activities for improving standards of living and develop the skills of the population of the Surrounding Areas by balancing needs and economical growth with environmental sustainability** | 46. Make aware both policy makers and opinion formers on the vital role of the traditional activities in maintaining the environment and cultural identity of the Mesopotamian Marshlands<br>47. Consent a regulated exploitation of the natural resources in the "Tradition Zone" (17,000 ha)<br>48. Enter the Tradition Zone under active schemes of management in which grass, reeds, baskets, fish, and dairy products are processed and marketed locally<br>49. Develop the Products&Manufacturing, Supplies&Distribution, Services, and Knowledge sectors<br>50. Increase the handicraft sector capacity to deliver products and services that match the needs and requirements of the visitors<br>51. Increase the value of businesses connected with the NP that relate either directly or indirectly to achieving national park purposes<br>52. Establish a brand leverage strategy to maximize exposure through signage, media partnerships and corporate sponsorship alliances.<br>53. Promote a marketing brand as part of the National Park Project that accredits land-based producers who are actively conserving Mesopotamia Marshlands' special qualities<br>54. Study for a Park Logo |

# Summary of the Proposed Immediate Actions

| PARK'S THEME | ACTIONS |
|---|---|
| **The Park & Its Values** | 1) Water quality monitoring (NP monitoring program)<br>2) Map of buffalo grazing areas and main paths<br>3) Map of villages and temporary settlements inside the Central Marshes and Abu Zirig<br>4) Detailed topographic survey of the NP area<br>5) Create a detailed map of hydrological network in the NP area<br>6) Create a map of minor roads and temporarily submerged roads within the NP area<br>7) Create openings below the road embankment to allow water circulation between different areas of the marshes<br>8) Map of buffalos grazing paths and of areas of reed harvesting<br>9) Propose the Core Area of the National Park as a Ramsar site<br>10) Start a vegetation survey and mapping program<br>11) Environmental study on traditional uses of vegetation<br>12) Create a veterinary facility for wildlife treatment<br>13) Faunistic study on terrestrial and aquatic fauna in the NP area<br>14) Investigation on hunting activities<br>15) Contact local Authorities and local NGOs for the creation of a Wildlife Centre and veterinary facility in the NP<br>16) Promote the recording of any kind of material related to the Mesopotamia marshland past history<br>17) Analyze the issues of the abandoned villages inside the future Park area<br>18) Contacts the Ministry of Culture to plan an excavation program |
| **The Park & The People** | 19) Plan an Environmental educational program for secondary schools.<br>20) Produce education and communication materials.<br>21) Contact local NGOs to implement the education program<br>22) Construct a mudhif as first educational centre<br>23) Construct two Educational- recreational itineraries |
| **The Park & The Visitors** | 24) Construct:<br>▪ 1 blind bird observation<br>▪ 1 platform inside the marsh to host researchers<br>▪ 2 water trails<br>25) Increase the communication material of the Park Mudhif to receive local tourists |
| **The Park & its Surrounding Areas** | 26) Localize and map the areas connected to fishing, breeding, handcrafts, grass, and reeds activities<br>27) Pilot project on Buffalo Breeding<br>28) Development of a dairy value chain and related activities<br>29) Continuation of the pilot project on fisheries (fish cages) and pilot project on "fish&rice"<br>30) Restoring of traditional date palm plantation in the surrounding area<br>31) List the possible local businesses to be involved in the MMNP brand (trademark) |

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- Pycnonotus leucogenys: http://www.oiseaux.net/birds/white-cheeked.bulbul.html
- Passer moabiticus : http://www.birdlife.org/datazone/sites/index.html?action=SpcHTMDetails.asp&sid=8373&m=1
- Turdoides altirostris : http://www.netfugl.dk/pictures.php?id=listpictures&species_id=716
- US Census Bureau - IDB Summary Demographic Data for Iraq: http://www.census.gov/cgi-bin/ipc/idbsum.pl?cty=IZ; 04/2007

# Development of a Management Planning Framework for Ecosystem Management and Biodiversity Conservation in the Iraqi Marshlands

## Management planning framework report

May 2012

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## List of Acronyms

.Acronyms from languages other than English are spelled out in their English translation for this list

| | |
|---|---|
| CBO | Community based organization |
| DCS | Desired conservation state |
| IRBM | Integrated River Basin Management |
| IUCN | International Union for Conservation of Nature |
| IWRM | Integrated Water Resource Management |
| MMNP | Mesopotamian Marshlands National Park |
| MoE | Ministry of Environment |
| MSP | Multi-stakeholder process |
| NBSAP | National Biodiversity Strategy and Action Plan |
| NGO | Non-governmental Organization |
| NI | Nature Iraq |
| NRM | Natural Resources Management |
| OG | Operational Guidelines |
| OUV | Outstanding Universal Value |
| PA | Protected area |
| PAMP | Protected Areas Management Planning |
| ROWA | IUCN) Regional Office for Western Asia) |
| UNESCO | UN Educational, Scientific and Cultural Organization |
| WCPA | World Commission on Protected Areas |
| WHC | World Heritage Convention |

# 1 Executive Summary

The UNEP-UNESCO initiative "Natural and Cultural Management of the Iraqi Marshlands as a World Heritage" aims to promote sustainable management practices in the Iraqi Marshlands through application of the World Heritage Convention as a tool to develop and implement a sustainable management framework, including for ecosystems and biodiversity.

As part of this initiative, IUCN ROWA – under a contract with UNEP's Division of Technology, Industry and Economics, International Environmental Technology Centre – is carrying out a work package on various aspects of biodiversity and protected areas management in Iraq and particularly the Iraqi Marshlands, including training on Red Listing and the application of GIS to protected area management planning.

One component of this work package is drafting of a management planning framework – i.e. a methodology and roadmap for the management planning process – to be used and developed by the site stakeholders to develop a management plan for a protected area in the Marshes, with particular emphasis on the provisions of the World Heritage Convention. This document is the main output of this component.

The draft management planning framework is based on (1) the 2011 Operational Guidelines of the World Heritage Convention (World Heritage Centre 2011), (2) a screening study on biodiversity and ecosystem management in the Iraqi Marshlands (Garstecki & Amr 2011) and (3) the adaptation and critical application of international best practice in protected areas and wetland management planning from IUCN (Thomas and Middleton 2003), the Ramsar Convention Secretariat (2010a, b) and UNESCO (2012, in press). This approach was discussed with national experts and feedback was collected from them at a workshop in February 2012. The framework is designed in a way that makes it compatible with a future natural/mixed World Heritage nomination of the Iraqi Marshes but can be used independent of such a nomination, as a more generic protected areas management planning methodology.

The draft framework provides guidance to the Ministry of the Environment of Iraq on the implementation of a comprehensive, participative management planning process for the Marshes, which builds on earlier initiatives and activities. It consists of 46 specific actions organized in nine broader management planning steps, from the pre-planning phase to the approval of the draft management plan. Particular attention is paid to (1) broad stakeholder engagement and participation, (2) the re-evaluation and filling of previously identified knowledge gaps and (3) the boundary setting of the property in accordance with the World Heritage Convention. A draft Table of Content of the management plan is also suggested. The overall management planning process will need an estimated 30 months to complete and cost an estimated minimum of US$ 421,330.

The document also provided instructions for the development of an interim management plan in accordance with Paragraph 116 of the World Heritage Convention's Operational Guidelines.

## 2 Introduction

The United Nations Environment Programme, represented by Division of Technology, Industry and Economics, International Environmental Technology Centre (hereafter UNEP-DTIE-IETC), together with the United Nations Educational, Scientific and Cultural Organization (hereafter UNESCO) have developed a joint initiative entitled "Natural and Cultural Management of the Iraqi Marshlands as a World Heritage" This project addresses the priority needs to promote sustainable management practices of the Iraqi Marshlands, by reflecting the unique historical, cultural, environmental, hydrological, and socio-economic characteristics of the area, in particular utilizing the World Heritage inscription process as a tool to develop and implement a management framework.

The project aims to establish a long-term sustainable management regime for the cultural and natural heritage in this ecologically sensitive area, in accordance with the World Heritage Convention, to identify and implement some key sustainable development practices on a pilot basis, and to build capacity and raise awareness among the local population to ensure their participation for the site preservation and sustainable ecosystem management.

While UNESCO is responsible for the overall guidance for the World Heritage inscription process and conservation of cultural diversity and landscape, UNEP-DTIE-IETC is taking the lead in the development of management and preservation plan of environmental-natural resources for a potential future World Heritage site within the Marshes, which will include ecosystem management and biological diversity, in consultation with the Ministry of Environment.

Since 2003, international and national entities have carried out researches, studies and projects for the restoration of the Iraqi Marshlands in the field of hydrology, socio-economy, and environment. While the results of those efforts contributed towards more sustainable management of the Marshlands in the post-conflict period, it is now necessary to take a more integrated approach to develop and implement a concrete and longer-term protected areas management plan for the area.

The development of such plan needs to be based on credible and verifiable historical data, and developed through a stepwise, in-depth participative process in consultation with institutions and individuals with extensive knowledge in/of the area as well as the overall country. Such a process essentially needs to be driven by the commitment, expertise and initiative of the Iraqi stakeholders themselves, particularly the Ministry of the Environment.

Therefore, the management planning framework that is introduced in this document is not a management plan itself. It is a roadmap that will direct the Ministry of the Environment and its management planning team in developing a protected areas management plan that corresponds both to the specific situation in the Marshes and to international best practice in protected areas management planning, with particular focus on the World Heritage Convention. This is also reflected in the IUCN-UNEP agreement:

"Based on the available data, a frame work management plan will be prepared by an external consultant who will collect the available data, and draft a plan framework to be used and developed by the site stakeholders who are supposed to receive an advance training that enable them to finalize the plan."

In addition, Iraq has acceded to Multilateral Environmental Agreements such as the Convention of Biological Diversity, UN Framework Convention on Climate Change and the Convention of Wetlands of International Importance (the Ramsar Convention). The longer-term management plan for the World Heritage inscription therefore aims to ensure that strategies, approaches and operational tools are

complementary and compatible with relevant MEAs relating to the protection of cultural and natural heritage, as articulated in the World Heritage Operational Guidelines.

This activity package for strengthen technical and institutional capacities of ecosystem management and biodiversity conservation for the Iraqi Marshlands, carried out under the terms of this SSFA by International Union of Conservation of Nature Regional Office for West Asia (hereinafter IUCN ROWA), entails an initiation of the national Red List Assessment, development of GIS-based platform for management and planning of the protected area, in the context of World Heritage inscription process as a tool. Together with these outputs, the current management planning framework is expected to contribute to development of the comprehensive management plan of the Iraqi marshlands.

The development of this management planning framework has also shown that a successful long-term management plan for the Marshes and the corresponding sustainable management strongly relies on the wide consensus and support of all Iraqi stakeholders – including Ministries, local and regional Government, businesses and Civil Society – to agree on the necessary water allocations and to jointly promote sustainable ecosystem and biodiversity management in the Marshes and throughout the Euphrates-Tigris basin.

# 3 Participatory management planning methodology for a 5-year first management plan

The overall basis for the management planning process in the Iraqi Marshlands are the provisions of the 2011 Operational Guidelines (OG) of the World Heritage Convention (WHC). Paragraph 110 of these guidelines acknowledges that management systems of potential World Heritage sites may vary, depending on the characteristics of the property involved. As far as natural properties particular in relation to WH criteria ix and x are concerned, the specific guidance on natural World Heritage management planning by IUCN (2008) suggests that the management planning process for these sites should follow general protected areas management planning principles, while particularly focusing on safeguarding the Outstanding Universal Value (OUV) of the potential site. In any case, all elements of the OUV would need to be shown to be present if a potential World Heritage nomination, in order for such a nomination to be successful. A management plan alone cannot guarantee that these preconditions are met.

This conclusion is supported by the findings of the screening study on a potential World Heritage nomination of the Marshes (Garstecki & Amr 2011), which recommends to use the IUCN/WCPA "Guidelines for Management Planning of Protected Areas" (Thomas and Middleton 2003) as the backbone for the management planning process for this area. While following this overall recommendation, the following questions need to be addressed in the process of designing a management planning methodology for a 5-year first management plan:

- What other international best practice methodologies of potential relevance to the Marshes are available, and could be used to complement the Thomas and Middleton (2003) guidelines?
- How can the IUCN/WCPA guidelines be adapted to the specific requirements of the Marshes management planning process?
- How exactly will each of the planning steps be implemented?
- How can the management planning processes for the natural and cultural values of the Marshes be integrated?
- How can this participatory process contribute to the creation of an enabling legal and institutional environment to support the implementation of the management plan?

This section defines a management planning methodology for the Marshes and thereby provides answers to these key questions, based on the findings of Garstecki & Amr (2011).

## 3.1 International best practice in wetland protected areas management planning

Besides the widely applied IUCN/WCPA management planning guidelines (Thomas & Middleton 2003), the following tools and methodologies of particular potential relevance to the Marshes are being widely used on a global scale currently:

- The IUCN (2008) publication "Management Planning for Natural World Heritage Properties - A

Resource Manual for Practitioners"

- The 2010 Ramsar Handbook on the wise use of wetlands No. 18 "Managing wetlands: Frameworks for managing Wetlands of International Importance and other wetland sites" (Ramsar Convention Secretariat 2010b)
- The more specific Ramsar handbook No. 10 "Guidelines for the allocation and management of water for maintaining the ecological functions of wetlands" (Ramsar Convention Secretariat 2010a)
- The joint draft guidelines on "Managing Natural World Heritage" of the World Heritage Centre and the Advisory Bodies, which are due to be published in 2012 (UNESCO 2012 in press)

The Management Planning Framework for the Iraqi Marshes aims to combine all relevant international best practice. Therefore, the applicability and added value of each of these guidelines to complement the IUCN/ WCPA methodology in designing a management planning framework for the Marshes is analyzed below.

### 3.1.1 Management Planning for Natural World Heritage Properties (IUCN 2008)

This publication shares the observation of the Operational Guidelines that natural/mixed World Heritage sites differ and that their management plans hence have to differ as well. The key management planning steps and suggested content are similar to those of Thomas & Middleton (2003). In addition, the publication focuses on the following aspects of relevance to the management planning process of potential natural/mixed World Heritage sites and particularly the Marshes:

- **WHC Operational Guidelines and OUV as foundation of management planning:** While all PA management planning systems set out from an analysis of the values that are to be safeguarded by a given protected area, potential natural/mixed World Heritage management needs to put particular emphasis on the management of the OUV of the property, while also maintaining other identified values at the local, national or global scale. This also implies that the management of such sites has to strictly follow the WHC Operational Guidelines. These peculiarities of natural World Heritage management will be observed during the Iraqi Marshes management planning process, irrespective of whether the other prerequisites for OUV are met.
- **Need for a clear plan preparation statement that sets out the process leading to the management plan:** The guidelines stress that when embarking on a World Heritage management planning process, there is a need to define the steps towards the management plan and to also define who will be involved in the planning process and responsible for its various component activities.
- **Minimum content of interim management plans:** According to § 115 of the WHC Operational Guidelines, it is possible to submit an interim management plan with a possible nomination of properties for which a comprehensive management plan is still under preparation. The IUCN (2008) publication gives detailed guidance on the minimum scope and content of such interim management plans, which will be followed – to the extent practicable - in the

template for a draft interim management plan included as Section 9 of this document.

- **Emphasis on precautionary principle and "Limits of Acceptable Change" concept:** The publication pots particular emphasis on the application of the precautionary principle (cf. Cooney 2004) and on the concept of "Limits of Acceptable Change" in World Heritage management planning. This may be applicable to some aspects of the Marshes' management plan.

- **Need for clear commitment and financial provisions for implementation:** In contrast to normal PA management plans, which are made exclusively in the interest of the site and of fulfilling national legislation, management plans for World Heritage sites are a prerequisite for a successful nomination. Therefore, a clear commitment of the State Party to their implementation and a clear allocation of the corresponding responsibilities are particularly important elements of World Heritage management plans. This will also be true for the Marshes' management plan.

- **Need for integration with other plans, policies and strategies:** Because of the global importance of World Heritage sites, the 2008 IUCN publication highlights the need to develop the management system for them not only in isolation, but in conjunction with an overall enabling framework including policies, legislation and plans. This is particularly relevant to the Iraqi Marshes, because of the multiple interests centered upon this area. A corresponding analysis and steps to improve the overall enabling framework for ecosystem management and biodiversity conservation will therefore be included in the management planning process.

- **Management planning for serial and trans-boundary properties:** It is possible that the Iraqi Marshes will be nominated as a serial property, while the location of Al-Hawizeh Marsh on the Iranian border also leaves open the theoretical possibility of a transboundary nomination. The IUCN (2008) management planning guidelines provide know-how on management planning for both particular types of World Heritage sites, which will be used in the management planning process for the Marshes. There is also specific guidance for the management of transboundary PAs (Sandwith et al. 2001).

### 3.1.2 Managing Natural World Heritage (UNESCO 2012)

The resource compilation "Managing Natural World Heritage" (UNESCO 2012), which is currently in press, does not introduce a management planning methodology for sites that are considered as potential World Heritage sites. Instead, it is complementary to the above toolbox in that it takes a broader look at the various dimensions and areas of natural World Heritage management. Among the guidance most relevant to the management planning process for the Marshes is the following:

- **Inclusion of a set of indicators that can be used for the development of the monitoring system for a future Marshes World Heritage site:** The publication includes a list of 20 suggested indicators, which will be adapted to the Marshes and used as the backbone for the development of an integrative monitoring system as part of the management programme.

- **Emphasis on the development of financial and institutional capacity as a key**

**prerequisite for successful natural World Heritage management:** In contrast to other management planning tools that focus exclusively on management policies and actions themselves, the publication highlights the need to create a solid legislative/policy, institutional and financial framework in order to support sustainable management of natural World Heritage, and gives some guidance on how this can be achieved. This guidance has been integrated into the management planning methodology for the Marshes.

- **Detailed guidance on the inclusion of sustainable use and communication/ interpretation into natural World Heritage management:** Sustainable natural resource use and communication/interpretation development are management areas that are often of particular relevance to potential natural/mixed World Heritage sites. This is reflected in the detailed advice of the 2012 publication on management principles for these areas. This advice has been adapted to be used in the management planning process for the Marshes.

### 3.1.3 Managing Wetlands (Ramsar Convention Secretariat 2010)

The fact that the Iraqi Marshes are wetlands means that the ample available guidance on wetland (not only Ramsar site) management may be a useful complement to the generic PA management guidelines in the process of its WH management planning. 20A key publication in this context is the Handbook No. 18 of the Ramsar Convention Secretariat on "Managing Wetlands – Frameworks for managing Wetlands of International Importance and other wetland sites" (Ramsar Convention Secretariat 2010b). The following aspects of this publication are particular relevant to the management planning process for the Marshes:

- **More explicit guidance on integration of hydrological management (e.g. river basin management) and ecosystem management:** The Marshes are a prime example of a wetland ecosystem, the ecological character of which depends on the provision of water in sufficient quantity and quality. The Ramsar Handbook and supplementary guidance are useful because they explain how wetland management can address this link in a rational way (see also 3.1.4 below). The relevant parts will be used in the management planning process for the Marshes.

- **Emphasis on sustainable use and need to include local socio-economic values into evaluation of wetland sites:** Many Ramsar sites are not strictly protected, but subject to sustainable use. This reflects their multiple local use values (Appendix 1). The Ramsar Handbook provides guidance on how to including local use values into the evaluation of wetland sites and how to reconcile conservation and sustainable use interests affecting them. The applicability of this guidance to the Marshes will be considered during the management planning process.

- **Concept of "ecological character" in connection to concept of "favorable conservation status" as a key property of wetlands:** The definition of a "favorable conservation status" in relation to the "ecological character" of a wetland, which is developed and promoted by the Ramsar Guidelines, will be useful for defining management indicators and vision for the Marshes, particularly in relation to ecosystem management (World Heritage criterion (ix)).

- **Guidance on wetland risk assessment/management as one part of wetland management:** In contrast to generic PA management planning tools, Ramsar Handbook No. 18 goes into more detail regarding the assessment and management of risks to the ecological integrity of wetlands. The application of this approach to the Marshes should be considered by the national drafting team.

### 3.1.4 Ramsar water allocation guidelines (Ramsar Convention Secretariat 2010a)

The Screening Study on Biodiversity and Ecosystem Management in the Iraqi Marshlands (Garstecki & Amr 2011) has shown that lack of water has been the key driving force of the deterioration of the ecological character of the Marshes until their re-flooding, and that water scarcity remains the main pressure on most ecological values of the area relevant to World Heritage criteria vii, ix and x. This also means that management of water supply to the Marshes will be a key management area to safeguard their integrity and ecological functionality. Although hydrological management planning is explicitly excluded from the scope of this management planning framework, it is recommended to refer to the Ramsar "Guidelines for the allocation and management of water for maintaining the ecological functions of wetlands" (Ramsar Convention Secretariat 2010). These guidelines state that

"However, since these wetland ecosystems, especially inland wetlands, are integral parts of a larger catchment basin system, it is not sufficient to set management objectives for the maintenance of the ecological character of only the wetland ecosystem itself: it is absolutely necessary to identify linkages between the particular wetland ecosystem and the other water resources in the catchment which are in hydraulic or ecological connectivity with that wetland ecosystem, as indicated in the Ramsar Convention's guidance on wetland management planning (Resolution VIII.14). Management objectives must be set also for the hydrologically-linked water resources, and these objectives must be consistent with and integrated with the objectives set for the specific wetland ecosystem being managed."

Following form these general observations, the guidelines include the following key points relevant to the management of the Marshes:

- **Need to define desired ecological character of wetlands in terms of the water regime:** For any wetland ecosystem, the desired conservation state (or desired level of integrity of ecosystem function, in World Heritage terms) also needs to be defined in hydrological terms, and necessary water allocations (in terms of quantity, quality and spatial/temporal distribution) need to be understood. This is also true for the Marshes and needs to be achieved through the management planning process. Hydrologists and ecologists will need to cooperate closely to achieve this, building on the scenarios developed by CIMI (2010) and New Eden Group (2006), and on the National Water Master Plan under development by the Ministry of Water Resources.

- **Mainstreaming the importance of wetlands across sectors to ensure a broad consensus for necessary water allocations:** Since there are multiple use interests affecting water allocations throughout the Euphrates/Tigris system, there is a need to address the necessary water allocation for the Marshes at the overall water allocation level. Therefore, these is a need for consistent, transparent, scientifically based and equitable decision making processes on water allocation at the river basin level, and at the national level by all the relevant Ministries of Iraq.

- **Need for hydrological monitoring of wetlands:** Hydrological indicators will need to be included in the monitoring system of a potential natural/mixed World Heritage site in the Marshes, in order to facilitate adaptive long-term hydrological management.

- **Need for supportive enabling policy/legal framework to support sustainable water allocation:** In order to achieve a sustainable water allocation and adequate decision making process for any wetland ecosystem, a supportive policy and legal framework is needed. This is also true for the Marshes and should therefore be addressed during the management planning process, to the extent possible.

- **IWRM/IRBM and need for long-term participative planning:** Because of the intimate interaction of the Marshes with the entire Euphrates/Tigris river basins, Integrated Water Resource Management (IWRM), Integrated River Basin Management (IRBM) and generic participatory planning approaches should be applied during hydrological management planning.

- **Need for valorization of wetland ecosystem services:** In order to support securing the necessary water allocations to wetlands, the value of ecosystem services provided by them to their wider environment, as well as arising socio-economic benefits, need to be communicated and understood by all stakeholders. The planning aimed at successful management of the Marshes needs to include activities aimed at such a valorization.

- **Need to use a wide range of supply side and demand side measures to achieve necessary water allocation:** While implementing multi-stakeholder decisions on water allocations and IWRM/IRBM measures, there will be a need to employ a wide range of measure, including environmental impact assessment and strategic environmental assessment procedures, technical measures such as use and/or modification of existing hydrological infrastructure, and management of off-stream water allocations (e.g. agricultural practices, such as replacement of sprinkler by drip irrigation)

The two main recurrent themes in the guidance from internationally established best practice methods on management planning for a potential natural/mixed World Heritage site in a wetland setting are (a) that such a process needs to be accompanied by a strong mainstreaming effort to muster the necessary inter-sector support for a large sustainably managed wetland, and (b) that hydrological management and particularly a sufficient water allocation (in terms of quantity and quality) is key to any sustainable management regime.

In addition to the publications analyzed in detail above, the management planning team should consider a number of more specific IUCN/WCPA guidelines on PA management planning which are available online, such as those on local participation (Borrini-Feyerabend et al. 2004), application of IUCN PA Categories (Dudley et al. 2007), and KBA analysis (Langhammer et al. 2007). There are also additional planning guidelines available from the Ramsar Convention Secretariat.

## 3.2 Adaptation of the management planning methodology for the Marshes

For the purpose of this management planning framework, the chosen generic management planning methodology of Thomas & Middleton (2003) has been adapted by integrating both additional international best practice approaches and the lessons learned from an analysis of existing management plans for parts of the Marshes.

The publications discussed in Section 3.1 contain a wide variety of international best practice approaches and tools which need to be fitted into the overall management planning process, each at its appropriate stage. Table 1 shows where exactly in the management planning process according to Thomas & Middleton (2003) each specific piece of guidance will be implemented, and how this will lead to an adaptation of this generic management approach to the specific conditions of the Marshes.

The ways in which the requirements listed in Table 1 will be implemented during the management planning process are described into more detail in the discussion of individual management planning steps in Section 3.3 of this management planning framework.

In addition to the information that can be sourced from international best practice, the in-depth analysis of existing management plans for parts of the Marshes that was conducted as part of the screening study "Biodiversity and Ecosystem Management in the Iraqi Marshlands" (Garstecki & Amr 2011) yielded a number of possible improvements of such plans. The screening study also provided a detailed list of standards to increase the quality of future management plans (Table 2). These criteria will also be further discussed under the individual management planning steps to which they pertain (Section 3.3).

**Table 1.** Integration of international best practice approaches from the UNESCO, the IUCN World Heritage Programme and the Ramsar Convention Secretariat into planning stages of the overall management planning process for the Iraqi Marshes.

| **Management planning step** | **Specific guidance from:** | | | |
|---|---|---|---|---|
| | **IUCN (2008)** | **UNESCO (2012)** | **Ramsar Convention Secretariat (2010a)** | **Ramsar Convention Secretariat (2010b)** |
| **1. Pre-planning** | . use of WHC Operational Guidelines as basis for MP process<br>. elaboration of a clear plan preparation statement including defined responsibilities | | | |
| **2. Data gathering** | . research and understand policy & legal framework for management | . collect data on sustainable use | . hydrological data gathering | |
| **3. Evaluation of information** | | . evaluate sustainable use values | . evaluate local values | . valorization of ecosystem services of the Marshes |
| **4. Identification of constraints & opportunities** | . identify policy/ legal constraints & opportunities of Marsh management | . identify financial and institutional capacity constraints | . identification of hydrological constraints to Marsh management | |
| **5. Visioning & setting of objectives** | . financial objective setting<br>. policy/legal objective setting | . setting of financial and institutional capacity objectives | . hydrological objective setting | . hydrological objective setting<br>. policy/legal framework related objectives |

| | | | | |
|---|---|---|---|---|
| **6. Development of actions & options for meeting objectives** | . application of serial/ trans-boundary planning tools if appropriate<br>. budget and fundraising activities<br>. policy and legislation related activities | . activities for improved financial and institutional capacity<br>. monitoring programme based on UNESCO indicators<br>. management of sustainable use within property | . hydrological management activities<br>. inclusion of hydrological indicators in monitoring system | . actions aimed at improving policy & legal framework<br>. inclusion of IWRM and IRBM in management where appropriate |
| **7. Compilation of draft MP** | | | | |
| **8. Consultation** | . mainstreaming of sustainable management of Marshes | | . mainstreaming of IWRM/IRBM in support of Marshes | . mainstreaming of IWRM/IRBM in support of Marshes |
| **9. Revision of MP based on consultation** | | | | |
| **10. Approval & endorsement** | | | | |
| **11. Implementation** | . ensure adequate financing, legal and policy framework | . particular emphasis on management of sustainable use | | |
| **12. Monitoring & Evaluation** | | . implementation of WH monitoring system | . hydrological monitoring | . hydrological monitoring |
| **13. Revision and updating** | | | | |

**Table 2.** Meeting the criteria of a sound management plan in the planning process for any future World Heritage Site in the Marshes (source: Garstecki & Amr 2011).

| Criterion | Steps to meet criterion |
|---|---|
| **1. Description and evaluation of area and its values** | . Section 4 of this report describes and evaluates relevant values of Marshes in relation to natural World Heritage criteria. Once the identified knowledge gaps are closed, this information can be used as the descriptive/evaluation MP section |
| **2. Vision and management objectives** | . The vision should describe, in general terms, the state of the identified potential OUV and its associated conditions of integrity as well as other values at a specified time (e.g. in 20-30 years)<br>. Objectives (for implementation during the plan's duration, e.g. within 5 or 10 years) should be deduced from the current state of the identified values, the pressures/threats that effect them, and their desired state |
| **3. Stakeholder support during planning phase** | . A stakeholder analysis (including the mandate, role, interest and capacity of key stakeholders in relation to the site) should be conducted early during the planning process, with a focus on local stakeholders<br>. Participatory planning techniques should be employed throughout the planning process, if possible<br>. A formal local citizen advisory panel or similar structure should be involved throughout the planning process<br>. International best practice guidelines on stakeholder participation should be followed (see criterion 6) |
| **4. Logical framework** | . MP Objectives should have a clear hierarchical logic, i.e. concrete management activities should combine to meet management objectives and management objectives should combine to meet overall goals. Generally, each activity should be specific to a management objective (cross-cutting activities are possible) |

| | |
|---|---|
| **5. Quality of objectives** | . Objectives should be SMART and designed for monitoring<br>. An explicit monitoring plan should be included |
| **6. Best practice** | . The MP planning process should be based on the general guidance of IUCN (2008), Thomas & Middleton (2003) and possibly Ramsar Convention Secretariat (2010b), as well as related more specific guidelines if appropriate |
| **7. Boundary setting** | . Boundary setting should be based on the spatial distribution of features that are of potential OUV (consider application of KBA analysis – Langhammer et al. 2008), the hydrologically sustainable marshland size, and the feasibility/manageability of candidate areas<br>. If necessary for the safeguarding of the integrity of OUV, buffer zones should be planned |
| **8. Framework awareness** | . Legal implications and legislation needs as well as jurisdictions and competencies related to the establishment of a World Heritage site need to be assessed and decided early during the planning process<br>. The political feasibility of proposed boundary setting and management interventions (e.g. water allocation) needs to be assessed early during the planning process<br>. Land tenure issues including traditional use rights need to be clarified and solutions that maximize community stewardship identified during the planning process<br>. The consistency of the plan with other plans relevant to the area and the possible need of coordination mechanisms need to be assessed<br>. Financial needs and the possible packaging of the management plan implementation into donor funded projects should be assessed during planning<br>. Options for the institutional setup of a management authority for the property should be developed early, and discussed with all stakeholders<br>. An institutional capacity development plan for the management authority should be developed |
| **9. Implementation** | . If Criteria 1-8 are met and implementation funding is sourced successfully, then the implementation outlook of the plan will be significantly improved. |

## 3.3 Management planning steps

The screening study "Biodiversity and Ecosystem Management in the Iraqi Marshlands" (Garstecki & Amr 2011) used the generic PA management planning guidelines of Thomas & Middleton (2003) to suggest the following principal steps of the management planning cycle for the Iraqi Marshes:

1. Pre-planning: decision to prepare a management plan, appointment of planning team, scoping of the task and defining the process to be used
2. Data gathering: identification of features, pressures, threats and consultation
3. Evaluation of data and information
4. Identification of constraints and opportunities
5. Development of management vision and objectives

6. Development of options for achieving the vision and objectives, including zoning and required human and financial resources.

7. Preparation of draft management plan

8. Public consultation of draft management plan

9. Approval and endorsement of management plan

10. Implementation

11. Monitoring and evaluation including management effectiveness assessment.

12. Decision to review and update the management plan; accountability considerations.

This section discusses each of the management planning steps in this sequence (steps 19-) into more detail, taking stock of what has been done already to complete them, referencing relevant available information and giving specific guidance how the standards which are listed in Tables 1 and 2 should be implemented by the management planning team at each step.

The above steps 1-4 have already been initiated thought the UNEP/UNESCO World Heritage Initiative and the efforts of the Iraqi Ministry of the Environment and its national partners. Likewise, the foundations for many of the other management planning steps have been established to varying degrees already.

For each of the management planning steps above, this management planning framework lists specific actions that the management planning team or in some cases the MoE will need to take in order to take each step. Each of the actions is also integrated into the timetable for the management planning process and reflected in the draft indicative budget (Section 4).

### 3.3.1 Pre-planning

Pre-planning consists of the decision to prepare a management plan, appointment of planning team, scoping of the task, defining the process to be used. The decision to prepare a management plan for a possible natural/mixed World Heritage site in the Iraqi Marshes has already been taken by the Ministry of Environment, in communication with the UNEP/UNESCO World Heritage Initiative. A National Committee for Protected Areas for the management plan (Table 3) and a drafting team for the World Heritage nomination have been appointed by the Iraqi Government (Table 4).

**Table 3. Member of the Iraqi National Committee for Protected Areas**

| | **Affiliation** |
|---|---|
| **Dr. Ali Abdul.Zahra AL-Lami** | Advisor to the Minister / Ministry of Environment |
| **Dr. Mohammed Kadhim Mohammed** | Ministry of Higher Education & Scientific Research |
| **Dr. Aqeel Abbas Ahmed** | Ministry of Higher Education & Scientific Research |
| **Mr. Hassan Hameed Gatiea** | Ministry of Water Resources |
| **Mr. Kareem Mozan Mousa** | Ministry of Science and Technology |

| | |
|---|---|
| **Ms. Inam Ibrahim Mohammed Ali** | Ministry of Municipalities and Public Works |
| **Mr. Jawad Kadhem Hassan** | Ministry of State for Tourism and Antiquities |
| **Ms. Hanan Jasim Nashat** | Ministry of Agriculture |
| **Mr. Asaad M.Buzrg** | Ministry of Education |
| **Mr. Nadhair Abbood Fezea** | Nature Iraq Organization |
| **Mr. Imad Obaid Jasim** | Ministry of Environment |
| **Ms. Nahlah Rida Hussein** | Ministry of Environment |
| **Ms. Dalal Ali Qais** | Ministry of Environment |
| **Ms. Ruaa Fakhery Mohammed** | Ministry of Environment |

**Table 4. Participants of the drafting team of the World Heritage nomination for the Marshes**

| | **Affiliation** |
|---|---|
| **Dr. Ali Abdul-Zahra Al-Lami*** | |
| | Advisor to the Minister of Environment (Head of drafting team) |
| **Dr. Mohammed Kadhim Mohammad*** | Ministry of Higher Education - Baghdad University / Research Center and the Natural History Museum |
| **Dr. Aqeel Abbas Ahmed*** | Ministry of Higher Education - Baghdad University / Research Center and the Natural History Museum |
| **Dr. Kareem Mozan Mousa*** | Ministry of Science and Technology |
| **Ms. Aseel Adel Fattah** | Ministry of Planning |
| **Ms. Inam Ibrahim Mohammed Ali*** | Ministry of Municipalities and Public Works |
| **Ms. Shaima Obaid Kream** | Center for Restoration of the Iraqi Marshlands (CRIM) - Ministry of Water Resources |
| **Mr. Mudhafr Abdalbagi Salem** | Nature Iraq Organization |
| **Mr. Hussein Jawad Kazem** | Dep. of Marshes and Wetlands - Ministry of Environment |
| **Ms. Dalal Ali Qais*** | Dep. of Marshes and Wetlands - Ministry of Environment |
| **Mr. Khader Abbas Salman** | Maysan Directorate of Environment - Ministry of Environment |
| **Mr. Ahmed Mohammed Razak** | Thi Qar Directorate of Environment - Ministry of Environment |
| **Mr. Hadi Abdul Hussain Khadir** | Basrah Directorate of Environment - Ministry of Environment |
| **Mr. Baqer Abdul Hameed** | Information Technology Center - Ministry of Environment |
| **Mr. Mustafa Salim Rashid** | Department of Biological Diversity - Ministry of Environment |
| *Member of the National Committee for Protected Areas | |

This management planning framework defines the scope of the management planning process and the methodology to be used. Taken together, these accomplishments mean that the first step in the management planning sequence has almost been completed already. The following actions and requirements still need to be completed before this step can be concluded:

- **Action 1.1** (responsible: Ministry of Environment of Iraq – hereafter MoE): Commit officially to prepare a management plan for ecosystem management and biodiversity conservation, as part of the preparation for a possible intended natural/mixed World Heritage nomination in the Iraqi Marshes.

- **Action 1.2** (responsible: MoE): Establish a management planning team headed by a senior MoE representative, and also including a range of national experts as detailed in Table 5. An expert or representative of an institution dealing with climate change will also need to be involved in the team. Alternatively, this responsibility could be taken by the National Committee for Protected Areas of Iraq. Explicitly state the responsibilities of each institution and individual drafting team member involved in the drafting team for the Marshes' World Heritage management plan.

**Table 5. Proposed organizational framework in the National Committee for Protected Areas and the Drafting team of World Heritage nomination file for the Marshes**

| Institution | Subdivision |
|---|---|
| Ministry of Environment | Senior staff of Ministry of the Environment (Head of management planning team) |
| | Department of Biological Diversity |
| | Maysan Directorate of Environment (depending on final demarcation) |
| | Thi Qar Directorate of Environment (depending on final demarcation) |
| | Basrah Directorate of Environment (depending on final demarcation) |
| | Dep. of Monitoring marshes and wetlands |
| | Legal Department/Section (?) |
| Ministry of Water Resources | National Center for Water Management |
| | CRIM |
| Ministry of Higher Education | Baghdad University / Research Center and the Museum of Natural History |
| | Basrah University / Marine Science Centre |
| | Thi Qar University / Marsh Research Centre |
| Ministry of Planning | Policy Department or similar |
| Ministry of Municipalities and Public Works | Policy Department or similar |
| Basrah Governorate Council | Marshlands Committee |
| Maysan Governorate Council | Marshlands Committee |
| Thi Qar Governorate Council | Marshlands Committee |
| Nature Iraq | Marshland expert(s) |
| National or international management planning expert | Tbd |

- **Action 1.3** (responsible: management planning team): Decide which of the external experts and resource persons identified by Section 7 of the screening study (Garstecki & Amr 2011), the planning workshops in February 2012 or through other means will be invited to which specific step of the management planning process.

- **Action 1.4** (responsible: management planning team): Study the Operational Guidelines of the World Heritage Convention and regularly check that their overall guidance is adhered to at

each management planning step.

- **Action 1.5** (responsible: MoE): Raise the necessary funds to conduct the management planning process (see Section 4.2 for draft budget), taking into account opportunities such as the UNEP-UNESCO World Heritage Initiative for the Marshes, Preparatory Assistance from the World Heritage Fund, funds from the State Budget of Iraq and other appropriate sources.

- **Action 1.6** (responsible: management planning team): Develop a stakeholder engagement campaign to accompany the management planning process by adequate stakeholder communication and cooperation, as detailed in Section 10 of this management planning framework.

The MoE and other stakeholders involved may also chose to publicize their decision to initiate the management planning process, to start building a broad support and participation in the process.

### 3.3.2 Data gathering: identification of features, pressures, threats

The screening study "Biodiversity and Ecosystem Management in the Iraqi Marshes" (Garstecki & Amr 2011) has already gathered a comprehensive body of information on the Marshes' features, pressures and threats, particularly in relation to World Heritage criteria ix and x. This information generally provides a strong basis for the management planning process. It has also been circulated to various national stakeholders and experts in Iraq, who have provided feedback for consideration during the further planning process.

However, the screening study has also identified a series of knowledge gaps that need to be closed in order to make meaningful management related decisions possible. Section 7 of this document re-evaluates the available information and prioritizes remaining knowledge gaps. Section 8 provides specific recommendations on how to fill high-priority knowledge gaps.

In addition to these gaps, Tables 1 and 2 highlight the need for an in-depth analysis of the policy, legislative and socio-economic framework for ecosystem management and biodiversity conservation in the Marshes, for a better understanding of current patterns of natural resource use and ecosystem services provided by the Marshes, and for an improved understanding of the hydrological functioning of the Marsh system. This is necessary since any management framework for the Marshes needs to be fully in accordance with Iraqi policy and legislation, needs to take into account existing natural resource use (which may constitute important values of the Marshes in addition to its possible Outstanding Universal Value as a natural/mixed World Heritage site), and needs to build on sound water allocations and hydrological management.

Taken together, these requirements mean that the following actions need to be taken to complete the data gathering step:

- **Action 2.1** (responsible: management planning team): Critically review the screening study "Biodiversity and Ecosystem Management in the Iraqi Marshes" and update/correct any outdated/wrong information. Involve additional national stakeholders and experts as identified in Section 7 of the screening study in this activity, in their respective fields of expertise.

- **Action 2.2** (responsible: management planning team): Initiate or commission studies to

close existing high-priority knowledge gaps in relation to the Marshes not mentioned below, in accordance with Section 8 of this document.

- **Action 2.3** (responsible: management planning team): Commission an analysis of the policy, legal and institutional framework for biodiversity conservation and ecosystem management in the Marshes, with the support of national experts, and including the following elements.

    - Compilation and analysis of national policies and plans (including on oil exploration) with relevance to the Marshes, including constraints and opportunities arising for biodiversity management and biodiversity conservation. The output of this analysis will be a report with a concise list of framework conditions for the establishment of a sustainable ecosystem and biodiversity management in the Marshes (e.g. realistic water allocation, national plans for natural resource use, planned infrastructure development within the possible area of the property etc.), which will give a clearer understanding where the property could feasibly be located and how strict a management regime could be achieved against the background of the current legal, policy and planning framework.

    - Identification of all national Ministries and agencies, Governorate level institutions, business companies, tribal leaders and other formal and informal institutional stakeholders with their specific stakes in the Marshes, and development of an engagement strategy for each of them following Section 10 of this document.

    - Elaboration of recommendations to the MoE on how to influence the policy, legal and institutional framework of the Marshes so as to make it more conducive to sustainable ecosystem management and biodiversity conservation.

- **Action 2.4** (responsible: management planning team): Commission an analysis of current natural resource use patterns and ecosystem services provided by the Marshes, with the support of national experts, and including the following elements.

    - Analysis of current natural resource use patterns including their livelihood and socio-economic significance, as well as constraints, opportunities and synergies with sustainable natural resources management and biodiversity conservation, based on existing publications (desk study) and field surveys if possible.

    - Analysis of the extent and relevance of traditional natural resource use in the Marshes (e.g. reed, water buffalo, fishing) to the World Heritage criterion v and hence a possible mixed nomination, including its ecosystem and biodiversity dependence.

    - Analysis of ecosystem services provided by the Marshes and derivation of possible ways of their valorization, following existing Ramsar and UNAMI-UNCT checklists (see Appendix 1) and IUCN best practice guidelines (e.g. Smith et al. 2006).

- **Action 2.5** (responsible: management planning team): Commission a desk study and action plan on minimum water allocations and hydrological management options for the maintenance of key ecosystem and biodiversity values of the Marshes, in accordance with Section 6.4.1 and particularly Box 6.6 of Garstecki & Amr (2011), building on published and existing information

and scenarios (e.g. CIMI 2010, New Eden Group 2006) to the extent possible. This study could be commissioned to CRIM.

- **Action 2.6** (responsible: management planning team): Continue to monitor the scientific literature and websites of relevant organizations to continuously update the knowledge base of the management planning process for the Marshes. (timing: continuously; budget: not applicable)

Data gathering and analysis are as important for management planning as they are for a successful World Heritage nomination. Therefore, the MoE and other key stakeholders need to ensure close collaboration (including ideally engagement of the same staff) and free information flow between the nomination drafting team and the management planning team for the Marshes.

### 3.3.3 Evaluation of data and information

The description of the site in the previous step does not automatically show why the Marshes are important. In order to understand this, the management planning team will need to evaluate the various features of the property and establish what types of values are represented there. This evaluation needs to include values from the global, national and local perspective. Outstanding Universal Value is an example of a value at a global scale, while for instance the economic/livelihood importance of some marsh areas for grazing of water buffalo would be a value at the local scale.

The management planning process for the Marshes requires evaluation of two interrelated types of values: On the one hand, the natural values for which the property might be nominated – i.e. particularly the ecosystem and biodiversity values potentially corresponding to World Heritage criteria ix and x – need to be appraised and their potential OUV needs to be documented through global comparative analysis.

On the other hand, **additional values of the area,** which do not contribute to its OUV but are nevertheless of importance for one or several stakeholder groups, also need to be understood and considered during management planning.

- **Evaluation of intrinsic values of the Marshes relevant to the natural World Heritage criteria:** The screening study (Garstecki & Amr 2011) already goes a long way in defining the values of the Marshes in relation to World Heritage criteria vii-x. Apart from the identified knowledge gaps that are discussed in Section 7 and 8 of this document, it is already quite clear in which features and processes the potential OUV in relation to the natural WH criteria lies – if there is OUV at all. For the World Heritage nomination itself, the question if the identified values pass the threshold of OUV needs to be answered through a global comparative analysis, as part of the preparation of the nomination document. Guidance for this analysis can be found in Badman et al. (2008a, b) and IUCN (2008), with some specific recommendations also included in Garstecki & Amr (2011). However, the OUV question is not as important for the management planning process as the identified values can used as a target for PA management planning irrespective of the question if they qualify as OUV or not. Therefore, the evaluation of the key natural values of the Marshes included in Garstecki & Amr (2011) already provides a sufficient basis for the subsequent fmanagement planning steps, and merely needs to be checked, completed and updated by the management planning team.

- **Evaluation of additional values of the Marshes:** Among the additional values of the Marshes, there are use values (direct, indirect and optional) and non-use values (other intrinsic natural values and additional cultural, spiritual and aesthetic values).

    - **Direct use values** are typically based on provisioning ecosystem services of an area and comprise natural resources (e.g. reed, pasture, and fish in the case of the Marshes). It is ecologically and economically crucial to define sustainable maximum levels for the exploitation of direct use values.

    - **Indirect use values** are typically based on regulatory ecosystem services of an area and consist of economic benefits to agriculture, public health (e.g. climate regulation and water purification), disaster risk reduction, within and around (e.g. downstream) the Marshes. Sustainable management of the Marshes should aim at optimizing the sustainable realization of these values.

    - **Option values** are use values or other values that are currently not realized but offer a potential for realization. In the case of the Marshes, these may be tourism, education, science and research (which are currently only conducted at a very moderate level) and potentially other uses. Like for direct use values, the definition of maximum sustainable exploitation levels is needed if there are plans to realize the potential of some of these options.

    - **Intrinsic natural values** below the OUV threshold may well be present in the Marshes. They also need to be used to inform management. However, if a viable management regime for the identified biodiversity and ecosystem values of potential OUV is established in the Marshes, it is very likely (but needs to be checked) that this management system will also result in maintaining additional values of this type.

    - **Other intrinsic values (cultural/spiritual/aesthetic)** will also be explored during the nomination process (aesthetic values through the OUV evaluation in relation to WH criterion vii and cultural values through the evaluation of potential cultural OUV). Garstecki & Amr (2011) contains a first analysis of potential Marsh values in relation to criterion vii and (in Section 6.4.4.2) in relation to criterion v. The evaluation of these values during the management planning process should build on the work of the nomination drafting team. Since aesthetic values relevant to criterion vii largely depend on biodiversity and ecosystem values, they can be managed indirectly by effectively managing the latter. Some additional precautions (e.g. avoiding large scale infrastructure development that visually impairs the beauty of Marsh landscapes) may be necessary if aesthetic values of the Marshes are prioritized for management.

A more detailed instruction how to evaluate all these values of the Marshes is given below. It is obvious that a final evaluation of the additional (non-OUV) values of the potential natural/mixed World Heritage site will only be possible once the exact boundaries are known and the main stakeholders have been consulted.

In practice, the following steps need to be taken by the management planning team to assess the various values of the Marshes:

- **Action 3.1** (responsible: management planning team): Convene a national expert/stakeholder workshop (jointly with Action 3.2) to critically review the key natural values of the prospective property in relation to World Heritage criteria vii, ix and x, as identified by the screening study "Biodiversity and Ecosystem Management in the Iraqi Marshes" and update/correct any outdated/wrong evaluations (jointly with Action 3.5). Involve additional national stakeholders and experts as identified in Section 7 of the screening study, in their respective fields of expertise.

- **Action 3.2** (responsible: drafting team, workshop participants): Use the national expert workshop (Action 3.1) to conduct a rapid analysis of the status of values of the Marshes following a table adapted from Garstecki et al. (2011), based on already available information, the IUCN-CMP threat taxonomy (IUCN-CMP 2010) and as a prerequisite for action planning (see Table 6).

- **Action 3.3** (responsible: management planning team): Collaborate with the World Heritage nomination's drafting team to ensure full consistency between a potential cultural OUV statement and the natural values statement for the management planning process.

- **Action 3.4** (responsible: management planning team): Evaluate in a participatory way the direct (including natural resource use), indirect (including ecosystem services) and optional use values of the possible World Heritage site for the relevant local stakeholders, building on **Action 2.4** as well as Appendix 1, and using an analytical framework such as that shown in Table 7. Conduct a series of up to 6 local stakeholder workshops (two in each Governorate covered by the prospective property) in the Marshes to support this process.

- **Action 3.5** (responsible: management planning team): Compare the draft statement of potential cultural OUV (particularly in relation to criterion v) prepared by the nomination's drafting team to the outcomes of the screening study and Action 3.3 and identify potential overlaps, synergies or contradictions with the identified natural and use values.

## Table 6. Analytical table for determining the state of Marsh values.

| Identified value | Pressures and threats affecting value | Verbal summary of state of values | Assessment |
|---|---|---|---|
| **Explanation:** Copy in identified values of the Marshes, either those contributing to potential OUV or others. | Use checklist of IUCN-CMP (2010) to identify and enter pressures and threats affecting each identified value, in order of importance. | 12- sentence summary of the status of values in relation to the identified threats | Assess as either good, low concern, high concern or critical, based on the definitions in Garstecki et al. (2011) |
| **Example:** Populations of globally threatened mammals including Lutrogale perspicillata, Allactagus euphraticus, Nesokia bunnii and Myotis cappucinii | 7.2 Dams & Water Management/Use<br>5.4 Hunting & Collecting Aquatic Animals<br>6.2 War, Civil Unrest & Military Exercises | The populations of these mammals are extinct or on the brink of extinction, principally because of the draining of the Marshes and secondarily because of hunting and the consequences of war and civil unrest. | Critical |
| **Add additional lines for all values ..** | … | … | … |

## Table 7. Analytical table for assessing the importance of direct, indirect and optional use values of the Marshes.

| Use value | Main users | Socio-economic dependency on use values | Assessment |
|---|---|---|---|
| **Explanation:** Identify main use values based on the UNAMI-UNCT checklist (Appendix 1) | Identify main user groups including size (number of people) and location of their use. | Determine the relative importance of the resource to the socio-economy and livelihoods in the area | Assess as either not important, moderately important, very important or critical |
| **Example:** Grazing of marsh areas by water buffalo | X heads held by Y families in municipality Z. | Average contribution to family income/livelihood 20% in municipality Z. | Very important |
| **Add additional lines for all values ..** | … | … | … |

### 3.3.4 Identification of constraints and opportunities

Management steps 1-3 will provide the information and evaluation necessary to inform visioning and objective setting for the management of a potential Marshes World Heritage site. However, before planning can proceed to these steps, it is important to conduct a "reality check" to take into account all factors affecting the feasibility of effective biodiversity and ecosystem management in the Marshes. This includes constraints and opportunities resulting from the following factors:

- the legal, policy and institutional framework as well as institutional and financial governance capacity for sustainable development, biodiversity and ecosystem management in the Euphrates-Tigris basin, in Iraq and particularly in the Marshes (concerning national consensus development visions for the marshes and on water allocations, but also for instance the types of PA designations possible under Iraqi law)

- national development strategies of Iraq, which may not always give highest priority to sustainable Marsh management (relevant e.g. to water allocation)

- strong economic interests on land and water for uses constraining the scope for sustainable management in the Marshes (e.g. agriculture, oil exploitation, urbanization along the margins of the Marshes)

- lack of security in the Marshlands area due to sectarian violence, unexploded ordnance, crime and smuggling (UNAMI-UNCT 2011)

- potential conflicts with the legitimate interests of natural resource users in the Marshes (e.g. need to improve compliance with restrictions to the use of some natural resources such as water birds)

- constraints arising from the trans-boundary location of parts of the Marshes, which are shared with Iran, and from the trans-boundary watershed of the Euphrates and Tigris rivers (e.g. new dam projects in Turkey)

- potential conflicts/constraints with the management of identified cultural values of the Marshes (e.g. regarding intangible cultural values of the Marshes relevant to WH criterion v which are not considered ecologically permissible anymore, such as poisoned bait)

- Opportunities arising from the national and international interest and support to the sustainable management of the Marshes (e.g. international funding opportunities)

- Opportunities arising from existing PAs in the Marshes that might form part of a potential future natural/mixed World Heritage site there (e.g. Al-Hawizeh Ramsar site, Mesopotamian Marshes National Park)

These constraints and opportunities for sustainable biodiversity and ecosystem management in the Marshes need to be analyzed systematically, in order to work out a feasibility envelope for the future management regime – i.e. the range of objectives and activities that are considered feasible given the above constraints and opportunities. In order to compile this analysis, the following actions will need to be taken by the management planning team:

- **Action 4.1** (responsible: management planning team): Convene a national policy workshop to identify constraints and opportunities for sustainable biodiversity and ecosystem management in the Marshes that arise from the policy, legislative and institutional framework in Iraq, based on the analysis provided by **Action 2.3**.

- **Action 4.2** (responsible: management planning team): Liaise with the Ministry of Water Resources and other key stakeholders to identify the likely available water allocation (quantity, quality, spatial/temporal distribution, water allocation), in comparison to the outcomes of **Action 2.5**.

- **Action 4.3** (responsible: MoE): Identify geographical areas that would need to be excluded from a future World Heritage site because of high priority national interests other than biodiversity/ ecosystem conservation (e.g. oil exploitation).

- **Action 4.4** (responsible: drafting team – see also Section 10): Assess the strength of local support to the PA establishment plans in the Marshes (particularly among tribes) and necessary alleviative communication measures if needed, based also on natural resource use interests as identified in **Action 2.4**.

- **Action 4.5** (responsible: MoE): Assess the feasibility of engaging the relevant authorities of Iran to commit to a minimum water allocation and other necessary supportive actions to Al-Hawizeh Marsh, in order to safeguard this essentially trans-boundary area, which is likely to harbor the best remaining biodiversity and ecosystem values.

- **Action 4.6** (responsible: MoE): Estimate the achievable institutional and financial capacity of (a) future management authority or authorities for the Marshes and consequences for the possible extent of a potential natural/mixed World Heritage property in the Marshes.

The remaining constraints and opportunities for sustainable biodiversity and ecosystem management can be addressed through regular liaison with the mixed nomination drafting team, with UNESCO/ UNEP/IUCN and with the MoE representatives responsible for the planning/management of the other above mentioned PAs in the Marsh area. Whether the inclusion of existing PAs such as the Al-Hawizeh Ramsar site and the Mesopotamian Marshlands NP into a possible natural/mixed World Heritage site presents an opportunity of added value depends on the final assessment of the distribution of potential OUV throughout the Marshes (Section 6).

By completing this step, the management planning team will reach a better understanding of the range of outcomes that could realistically be achieved by the potential natural/mixed World Heritage site in the Marshes. The next question will be which of the realistic possibilities within this range the management planning team and national stakeholders intend to achieve.

### 3.3.5 Development of management vision and objectives

The management vision for the Marshes will be a vision of the desired state (in terms of biodiversity and ecosystem values, as well as cultural, aesthetic and socio-economic values in the medium-term future (e.g. in 20 or 30 years). Vision statements for PAs and natural World Heritage sites are often relatively short and general, but should encapsulate the specific, distinguishing values of a property as identified in Garstecki & Amr (2011).

Objectives are more concisely described targets that shall be achieved within the lifespan of the management plan (in this case, within 5 years) and which specifically address the various identified values of the site. The objectives of the management plan should combine to initiate a process during its lifespan that is consistent with the medium-term vision.

Two major types of objectives can be distinguished:

- **Objectives that describe a desired state of an identified value of the site at the end of the lifespan of the management plan** – i.e. five years after the onset of implementation of the management plan for a potential World Heritage site in the Marshes. Objectives should be specific for each identified value, and can be quite detailed. For instance, the objective for an endemic or globally threatened species contributing to the potential OUV of the Marshes under WH criterion x could read: "After five years, the population of species XY within the Marshes will be at least x mature reproducing individuals, and the rate of population increase will be at least y%/year". For the hydrological state of the property, an objective could read: "After five years, the water allocation to Marsh area XY will be billion m3/year, the extent of flooded areas will be increased to 75% of the 1973 value, and the extent of reed areas will be increased by z% in comparison to Year 0 of the plan". Similarly concise objectives need to be defined for all identified values.

- **Objectives concerning the activities, programmes and institutional frameworks** of the PA constituting a potential World Heritage site in the Marshes. This may focus on the development of institutional and financial capacity or the design of interpretative, participatory, or tourism programmes. For instance, an objective on the human resources development of the site's administration could read: "After five years, there will one central administration of the PA to be nominated as World Heritage site, with x staff per 1000 ha of the PA who have been trained for at least one month each, according to the IUCN best practice guidance of Kopylova & Danilina (2011)". An objective on interpretation could read: "After five years, there is an established interpretation programme including a programme document, a visitor centre, x dedicated staff, an interpretative trail of y km, z interpretative boards …". Tourism objectives could be expressed in terms of visitor numbers or capacity.

The objectives of the management plan for a potential natural/mixed World heritage site in the Marshes need to be **SMART**, i.e. specific, measurable, attainable, relevant and time-specific:

- **Specific** means that they the target state of the variable or development target should be concisely and unambiguously defined.

- **Measureable** means that at the end of the lifespan of the plan, it should be possible to clearly decide whether the objective has been met or not.

- **Attainable** means that, on the basis of the analysis of constraints and opportunities described above, it should be possible to meet the objective within the defined timespan.

- **Relevant** means relevant to the identified values of the property and the long-term vision.

- **Time specific** means that is should be explicitly stated by when the objective will be met – either at the end of the management plan or earlier.

The SMART objectives standard is widely used in project management and may appear trivial, but the analysis of Garstecki & Amr (2011) showed that the vast majority of the objectives in existing management plans for parts of the Marshes were not SMART. In fact, many failed to meet any of the five component criteria above. Therefore, the challenge appears to be applying rather than knowing the SMART Objective standard.

Objectives should not be phrased as activities – i.e. they should describe outcomes, final project or desired states of the values of the property, not how to meet them. Options for how to meet the objectives of a management plan will be defined in the next step (see Section 3.3.6 below).

Based on the preliminary value analysis of Garstecki & Amr (2011) and the international best practice guidance summarized in Table XY, it appears that the management planning team (with the support of the MoE) will need to develop 5-year objectives (one or several each) focusing on the following thematic areas:

**Main drivers of ecosystem conservation status of the property:**

1. A set of objectives for the water allocation to the property (quantity/discharge, hydroperiod, quality, spatial-temporal distribution – relevant to all World Heritage criteria).

2. The desired extent of Marsh areas (flooded areas and reed areas) within the possible World Heritage site after 5 years, to the extent possible given the natural variability of water supply (how much of which Marsh areas – relevant to all World Heritage criteria).

3. Key statements of the national policy, legal and planning framework affecting water and land allocations to a possible World Heritage site inside the property.

**Conservation status of the marsh ecosystem:**

4. Desired overall conservation status of the Marsh ecosystem inside the property (completeness of vegetation and habitat types, standing stock, reed cover, diversity of higher plants and vertebrates in comparison to pre-draining – relevant to all World Heritage criteria, particularly criterion ix).

5. Desired state of the property as a resting and wintering site for migratory waterbirds (in terms of abundance, diversity, key species etc. - relevant to WH criteria ix and x).

6. Desired conservation status of the populations of diadromous fish and shrimps inside the property (in terms of abundances, occurrence of key species, diversity etc. - relevant to WH criteria ix and x).

7. Desired visual impression of the landscapes within the property, including banned types of infrastructure to avoid visual impairment of natural beauty (potentially relevant to WH criterion vii).

8. Desired status of the key provisioning and regulatory ecosystem services provided by the Marsh areas inside the property.

**Conservation status of biodiversity:**

9. Desired conservation status of endemic and globally threatened plant species inside the property (relevant to WH criterion x).

10. Desired conservation status of endemic and globally threatened fish species inside the property (relevant to WH criterion x).

11. Desired conservation status of the Euphrates Softshell Turtle Rafetus euphraticus inside the property (relevant to WH criterion x).

12. Desired conservation status of endemic and globally threatened bird species and subspecies inside the property (relevant to WH criteria ix and x).

13. Desired conservation status of endemic and globally threatened mammal species and subspecies inside the property (relevant to WH criteria ix and x).

14. Desired conservation status of known endemic and globally threatened invertebrate species inside the property (relevant to WH criteria x and potentially ix).

**Formal establishment of a management regime for the property:**

15. Objective to achieve final site selection and official demarcation of the property according to Section 6 of this document, including a decision regarding a serial vs., single site and the establishment of a buffer zone.

16. Objective on the establishment of one or several PAs according to Iraqi law comprising the chosen site(s) of the property.

17. Objective on the legal establishment of a management authority (or, if this is not possible, several management authorities) for the entire property.

18. Objective on the establishment of infrastructure and equipment for the management authority (buildings, vehicles, scientific equipment, office equipment).

19. Objective on the training of management staff of the property's management authority.

20. Set of objectives on the establishment of a first (for establishment) and operational budget for the management authority of the property, and a business and sustainable financing plan.

**Establishment of an effective stakeholder participation policy and mechanism:**

21. Objective on the establishment of a permanent stakeholder consultation policy and mechanism, with particular focus on local stakeholders and resource users.

22. Objective on the establishment of participatory sustainable natural resources use programmes within and around the property.

23. Set of objectives for the establishment of an interpretation, communication, education and public awareness programme aimed at local stakeholders.

**Specific programmes and policies to be run by the management authority:**

24. Objective on the establishment of a regular monitoring mechanism for the values of the property, based on the objectives of the management plan, the generic WH indicators of UNESCO (2012) and standard PAME tools such as the World Bank's PAME tracking tool (Stolton et al. 2007).

25. Objective on the development of a scientific research policy and programme focused on filling remaining knowledge gaps in the Marshes.

26. Objective on the development of a sustainable tourism and visitation policy and plan plan for the property.

The analysis of available information, evaluation of associated values and setting of objectives build on each other. The management planning team will rely on the input of all relevant national experts to formulate these objectives. The following actions need to be taken to define these objectives:

- **Action 5.1** (responsible: management planning team): Identify and engage a lead national expert from the list provided by Garstecki & Amr (2011) or other relevant sources to recommend a first draft of the objective(s) within each of the 26 thematic areas identified above, together with a short rationale and following the guidance above.

- **Action 5.2** (responsible: management planning team): Compile a first consolidated draft of the objectives of the management plan from the individual submissions, following quality and consistency control of the individual experts' submissions in relation to standards of SMART objectives.

- **Action 5.3** (responsible: management planning team): Conduct and protocol an objectives discussion workshop with all national experts and additional national, regional and local stakeholders to discuss the draft objectives section and to ensure consistency between the individual sections (e.g. between the water allocation and conservation objectives, o between administration staffing and financing).

- **Action 5.4** (responsible: management planning team): Finalize the Objectives session of the draft management plan, based on the draft objectives and on the submissions during the objectives discussion workshop.

The finalized version of the Objectives section of the management plan can be directly inserted into the draft management plan. The procedure for its elaboration as detailed above has the added advantage that there is already an extensive expert and stakeholder involvement at the formulation stage. This will make the subsequent public consultation of the entire draft management plan less conflictive.

Once the steps derived above have been taken, based on all available information and expertise, there will be a clear and widely shared understanding on what the planned natural/mixed World Heritage property aims to achieve. The next question will be how these objectives can be achieved.

### 3.3.6 Development of options for achieving the vision and objectives

By running through the process described in 3.3.1 – 3.3.6 above, the management planning team and its client – the MoE and the stakeholder constituency – will have gained an understanding of what the Marshes' values are, in which state they are currently and into which state they aim to bring them – both long-term (vision) and by the end of the first management plan after five years (objectives). It will also be clear what institutional setup will be established for the management of the potential natural/mixed World Heritage property in the Marshes.

The key remaining question then will be how the property can develop from its current state to the desired state as defined in the objectives, within the 5-year lifespan of the management plan. In order to answer this question, specific activities for reaching each objective will need to be designed.

- For the objectives concerned with the desired state of the values of the Marshes, activities should be designed by alleviating key pressures, threats and their root causes affecting each of the values in question (based on the analysis conducted as Activity 3.2). This may happen through improvement of the water allocation, use and access restrictions, promotion of alternative livelihood bases which put less pressure on the values of the property, ecosystem restoration or other measures.

- For the objectives concerned with the institutional establishment of a management authority for the property, the activities should follow international best practice (e.g. …) and the example of comparable properties elsewhere (e.g. in the Danube Delta).

- Typically, there will be several activities necessary to reach each objective.

Although there will be at the same time many activities in the management plan that contribute to more than one objective, the management planning team should first design a specific set of activities for each individual objective, and only then simplify the management plan by lumping activities that have been listed in relation to more than one objective. In other words, **each activity should be designed specifically to contribute to reaching one or several objectives,** and this should be documented in the activities description. This can be compared to a logical framework approach, although a full logical framework will not be necessary as part of a management plan for the property.

**Ecosystem restoration** activities (other than simple steps to improve the water allocation to the Marshes and to manage its hydrology) should be integrated into the activities of the management plan only after an in-depth check of their feasibility and cost effectiveness. Ecosystem restoration schemes are often poor values for money, and are only feasible if the factors (pressures/drivers) that lead to a deterioration of the values of a property are not affecting it anymore.

One of the instruments to achieve the objectives of the property will be **a demarcation and zoning** that optimizes synergies between the various objectives and overall value conservation. Zoning typically

aims to minimize conflict between management objectives by separating them into distinct zones (e.g. strict conservation zones for biodiversity conservation, tourism zones for tourism development and sustainable use zones for natural resource use. Although demarcation and zoning are often discussed as part of the activity setting methodology, it is discussed in a separate section of the current management planning framework (see **Section 6**).

The SMART standard (see Section 3.3.5) should be applied to the activities of the management plan in the same way as to its objectives. The description of each activity in the management plan will need to contain the following information, using a tabulated format:

- What exactly will be done where exactly inside or near the property;
- At which stage during the 5-year lifespan of the first management plan the activity will be implemented (an initial precision of months is sufficient for planning activities);
- The objective(s) to which the activity will contribute;
- Who (or which institution) will be responsible and who (if applicable) will contribute to the activity, in addition to the person or institution responsible;
- The estimated costs of the activity and information on whether these will recur or will be limited to the first 5-year management plan, plus an assessment of options for ensuring the sustainable financing required for effective management;
- Additional information, e.g. regarding legal and policy basis, synergies with other activities etc.

In order to plan the activities necessary for reaching all objectives of the management plan, the following actions should be implemented by the management planning team, with support from the MoE and the stakeholder community of the Marshes:

- **Action 6.1** (responsible: management planning team): Task lead national experts from the list provided by Garstecki & Amr (2011) or other relevant sources to draft the activities for the objective(s) for within they were responsible in relation to Action 5.1.
- **Action 6.2** (responsible: management planning team): Compile a first consolidated activity plan and budget, following the lumping of redundant activities submitted for the various objectives, and quality control of the individual experts' submissions in relation to standards of SMART activities.
- **Action 6.3** (responsible: management planning team): Conduct and protocol an activity planning workshop with all national experts and additional national, regional and local stakeholders to discuss and finalize the draft activities section and to ensure consistency between the individual sections (e.g. between the water allocation and conservation objectives, or between administration staffing and financing).
- **Action 6.4** (responsible: management planning team): Finalize the Activities session of the draft management plan, based on the draft activities and on the submissions during the activities discussion workshop.

It is important to look at all activities in conjunction, in order to arrive at a consistent set of activities. For instance, certain management activities may require specific technical capacities, the development of which needs to be included in the activities on staff training in for the management authority for the property. Further guidance on developing specific management activities from Thomas & Middleton (2003) is given in Appendix 2.

The **time schedule** for the management plan can be synthesized from the sequence of activities in the plan, and can be laid down as a Gantt Chart (see Section 4 for an example). Activities that lay the institutional foundation for sustainable biodiversity and ecosystem management, and activities that address the root causes of pressures and threats on the values of the property should be prioritized for early implementation during the plan's lifespan.

Likewise, **the overall required budget for the first management plan** (broken down by years and months) can be pieced together from the individual estimated budgets for each activity plus the estimated running costs of the property's administration. Therefore, the management plan's budget will be compiled as part of the action planning for the property.

The description and evaluation of the possible natural/mixed World Heritage site's values, the analysis of constraints, the derivation of a vision and objectives and the definition of specific activities and a time schedule and budget for the management of the property during the first five years of the management plan constitute the content of the draft plan.

### 3.3.7 Preparation of draft management plan

With all the content for the management plan prepared through steps 3.3.1 - 3.3.6 above, the next step will be to put together the actual draft planning document. A draft Table of Content is suggested in Section 5. Thomas & Middleton 2003 compare a few alternative structures for management plans, which the management planning team may wish to consider. Apart from the overall structure of the plan, there are a few additional principles that the management planning team should follow in order to produce an effective and user-friendly planning document:

- **Clear reference to the statement of potential OUV:** Since the property in question is may be submitted for nomination as a natural/mixed World Heritage site, the OUV statement used in a possible nomination should also be used as the central value statement of the management plan, and it should be linked to the requirements to maintain the conditions of integrity as required in the Operational Guidelines for the implementation of the WHC..

- **Alignment with legal requirements for management plans under Iraqi law:** The management plan needs to fulfill all the requirements for such plans under Iraqi law (e.g. under the soon-to-be-adopted draft Regulation on Protected Areas management, Establishment and Generation of the MoE of Iraq), so that it can be legally endorsed after Government approval.

- **Clarity and readability:** The management plan should be written in a clear language, both in Arabic (for implementers, national stakeholders and legal purposes) and in English (for submission with a potential World Heritage nomination).

- **Focus on the essential:** The management plan should be as brief as possible and should focus on the management vision, objectives and activities, plus the way in which these are informed by the state of the property's values, as well as pressures and threats affecting

them with their indirect root causes. Excessive descriptive information should be annexed or referenced but excluded from the plan itself, for instance by referencing Garstecki & Amr (2011) or an updated, and actualized version of it.

- **Documentation of the planning process and criteria used**: In order to enable all stakeholders to understand how the description, evaluation, vision, objectives and activities of the management plan were derived, a short description of the process as documented in this management planning framework should also be included with the management plan.

Based on the above guidance and on consideration of the recommended Table of Content (Section 5), the management planning team needs to implement the following actions in order to arrive at the final draft management plan for consultation:

- **Action 7.1** (responsible: management planning team): Compile the elements of the draft management plan as listed in Section 3.3.13.3.6- above and following the recommended Table of Contents in Section 5 of this document, taking into consideration the criteria for management planning above.

- **Action 7.2** (responsible: management planning team): Subject the draft management plan to internal review including the entire management planning team, the national experts, the MoE, the Ministry of Water Resources and other relevant ministries if appropriate and integrate the received comments and additions.

- **Action 7.3** (responsible: management planning team): Translate the draft management plan into English if consultation with international stakeholders or experts is planned. In any case, a complete Arabic version of the draft management plan is needed for the national consultation process.

- **Action 7.4** (responsible: management planning team): Print at least 100 copies of the Arabic language draft management plan in preparation for public consultation.

Once the draft management plan has been completed and printed, it is ready to undergo the public consultation stage.

### 3.3.8 Public consultation of draft management plan

Thomas & Middleton (2003) recommend a public consultation after the production of the draft management plan only. However, with a management plan for an area as large and as intensely used as the Marshes, it is advisable not to wait for this stage and to start engaging key local and national stakeholders at an earlier stage already. The stakeholder engagement strategy explained in **Section 10** of this management planning framework and the various local and national stakeholder and expert workshops included in **Actions 3.1, 3.2, 3.4, 4.1, 5.3**. and **6.3**.

Therefore, the public consultation of the draft management plan described in this section is only one element of the stakeholder engagement activities that are being carried out during the introduction of sustainable biodiversity and ecosystem management in the property, and should be understood as one rather specific part of these wider efforts.

The public consultation of the draft management plan will be a two-way process, i.e. it will not only inform stakeholders and the general public about the plans to establish the property, but also convene discussions to collect their opinion on these plans. It will be the responsibility of the management planning team and the MoE to publicize the draft management plan, and to develop targeted presentation and discussion formats that focus on the various stakes of the main stakeholder groups involved. In order to achieve this, the following actions will need to be implemented:

- **Action 8.1** (responsible: management planning team): Decide with which stakeholders (as identified through the stakeholder analysis the process of which detailed in Section 10) the management plan needs to be consulted. These are likely to be key Ministries, State agencies as well as nature conservation NGOs and conservation experts at the national level, the relevant Governors and their administrations at the Governorate level, and local municipalities, agricultural and resource users' associations, tribes, CBOs, informal community leaders etc. at the local level. Businesses with significant stakes in the Marshes (e.g. oil industry) should also be consulted. This decision needs to be documented.

- **Action 8.2** (responsible: management planning team): Develop a set of introductory presentations and digests of the draft management plan for each main stakeholder group (e.g. one for national, Governorate level and local stakeholders each). These materials should also highlight the considerable benefits of sustainable Marshes management to all stakeholders, as summarized e.g. by UNAMI-UNCT (2011).

- **Action 8.3** (responsible: management planning team): Publish a press release on the plans to establish the property and on the draft management plan and engage national and regional media (particularly those which reach the inhabitants of the Marsh area) to report about the plans.

- **Action 8.4** (responsible: management planning team): Publish the draft management plan on the web site of the MoE, together with an email address for submission of comments (comments received through this mechanism should be verified by contacting the submitting persons).

- **Action 8.5** (responsible: management planning team): Convene an information event in each municipality, Governorate administration, major relevant business and national Ministry adjacent/relevant to the property to explain the overall plans for the natural/mixed World Heritage site and the consultation procedure.

- **Action 8.6** (responsible: management planning team): Leave a sufficient number of copies of the draft management plan with a responsible stakeholder representative and invite stakeholders to peruse it at an agreed location (e.g. municipality office, tribal leader's house) and to submit written comments with the agreed stakeholder representative.

- **Action 8.7** (responsible: management planning team): Convene a consultation workshop at each location where an initial information workshop was conducted (Action 8.5). Collect and document written and oral comments, suggestions etc. regarding the draft management plan.

- **Action 8.8** (responsible: management planning team): Synthesize the submissions received through the online consultation and the series of meetings in a draft consultation report.

- **Action 8.9** (responsible: management planning team): Conduct an internal consultation analysis workshop with senior MoE staff to decide which comments and recommendations are implemented and how the draft management plan is changed as a result. Document the outcome of this meeting in the final consultation report.

- **Action 8.10** (responsible: management planning team): Publish the consultation report online and send one copy to each stakeholder representative involved in Actions 8.5 – 8.7, together with the revised final management plan.

All the formal consultation stages as listed above will need to be accompanied by an intensive informal communication and consultation process with key stakeholder representatives. While the views of all stakeholders should be taken into account, stakeholders will not be invited to challenge the overall decision to establish a sustainable biodiversity and ecosystem management regime in the Marshes according to Iraqi legislation and – as planned – to the prescriptions of the World Heritage Convention.

In order to deal with the submissions during the consultation process in a consistent and transparent way, criteria for comments/submissions that result in changes to the draft management plan need to be defined. These criteria should include the following:

- Factual mistakes or omissions in the information on which the draft management plan is based,

- Objections proving that the management plan as drafted does not comply with Iraqi law or accepted customary law in the Marshes area,

- Objections showing that livelihoods would be lost without alternative if the plan is implemented as drafted,

- Suggestions for management activities that are arguably more effective in reaching their corresponding objectives than those drafted,

- Objections that clearly show that the management plan could not be implemented as drafted, due to overwhelming opposition among important stakeholders.

The management planning team and MoE may agree additional criteria for the decision on an inclusion of comments or changes in the draft management plan. These criteria should be published jointly with the outcomes of the consultation process in the consultation report.

Once the consultation process is finalized and the draft management plan has been revised based on the submissions received, it is ready for approval by the relevant State institutions of Iraq (the Council of Ministers, according to the draft PA regulation).

### 3.3.9 Approval and endorsement of management plan

The approval and endorsement of the designation of a PA (possibly to be nominated as natural/mixed World Heritage site) and its management plan needs to follow the relevant legal provisions of Iraq. According to the draft Regulation on Protected Areas Management, Establishment and Generation of the MoE, the relevant State Institution for approval of the plan will be the **Council of Ministers**.

Given the multiple stakeholder interests that are likely to be centered on the property, it will be key to gain approval and endorsement from as high as possible, and at the same time to continue building the ownership and support of local stakeholders and tribes to the project.

The management plan of a property submitted with a World Heritage nomination should include a statement of commitment of the State Party, to ensure that it will be implemented as planned. This statement could be made at the draft management stage or following approval.

- **Action 9.1** (responsible: management planning team): Obtain an official statement of commitment of the Council of Ministers to the site designation and management plan and enclose it with the management plan submitted with the nomination file, if and when a nomination of the property is submitted to the World Heritage Commission.

Once the management plan is finalized, published and approved, the management planning phase is over and the implementation phase of the first management plan for the property begins.

### 3.3.10 Post approval implementation and further development of the plan

This management planning framework only covers the planning process and not the implementation of the plan, its monitoring and evaluation and the eventual review and updating of the plan – either after its 5-year lifespan or earlier, if the developments of the property make this necessary.

Nevertheless, it should be kept in mind that the management plan is not an end in itself, but a guiding tool to develop a functioning Marsh management system in practice. In order to ensure this function, the MoE and national stakeholders will need to pay particular attention to the following issues:

- **Monitoring:** Objectives and activities for the design and implementation of a monitoring system for site management will be developed in following thematic area 24 in Section 3.3.5 of this planning framework, and should be implemented as a matter of priority. It will be crucial that this monitoring system focuses on the implementation of the plan and not just on the overall status of biodiversity in the property.

- **Adaptive management:** The management of a system as large, stressed and variable as the Marshes will face unexpected situations and challenges that may necessitate a revision of the first management plan. If monitoring results and internal review show that individual objectives or activities are not attainable or relevant any more, then the plan should be officially revised to accommodate these changes.

- **Staff and capacity development:** A key prerequisite for effective management of the site will be the development of the management capacity of the management authority of the property, both in terms of staff qualification and in terms of institutional capacity. The MoE will need to allocate considerable funds for reaching the management plan's objectives under thematic areas 18 and 19 in Section 3.3.5.

- **Sustainable financing:** Many protected areas manage to raise international donor funds for their establishment and management planning phase, but then fail because a continuous sustainable financing cannot be secured. The MoE and stakeholder community should take particular efforts to implement the objective(s) under thematic area 20 in Section 3.3.5, in order to secure a sustainable operational funding of the property. One potential way of achieving this might be a trust fund from voluntary compensatory payments from extractive industries active in the area.

- **Continued stakeholder participation and communication:** Stakeholder participation must not finish with the completion of the first management plan, but should continue through regular activities aimed at the objective(s) under thematic areas 2123- of Section 3.3.5.

- **Evaluation workshop after 5-year lifespan of first management plan:** It is recommended that a relatively large workshop similar to those under Actions 5.3 and 6.3 of this management planning framework is conducted to evaluate implementation of the plan and jointly decide on revisions prior to the second 5-year management period of the plan.

## 3.4 Integration of the management planning for natural and cultural values

This management planning framework focuses on the management planning for the natural values of a potential natural/mixed World Heritage site in the Marshes. However, if it is decided to indeed submit a mixed nomination and a management plan for both natural and cultural values, then it needs to be decided how management for these two sets of values can be combined, and how this can be reflected in the joint management plan.

Combining both types of management plans is generally not complicated: The management plan for a mixed World Heritage site can be conceived as the sum of a natural and a cultural management plan. However, in order to make both parts match each other, a number of prerequisites need to be met.

The following steps should be taken by the management planning teams for natural and cultural values in the Marshes to ensure full compatibility between the two management regimes:

- **Compatible structure of management plan sections of natural and cultural values:** If the structures of the management plan's sections on natural and cultural values management are generally compatible, then both sections can be developed in parallel and combined at the final stage. In order to achieve this, the suggested Table of Contents for the natural values management plan presented in Section 5 also contains section headings on the cultural values of the management plan. The natural and cultural drafting teams should jointly decide if this structure can be followed by the management plan or needs to be modified.

- **Establishment of a coordination mechanism to identify and resolve inconsistencies and contradictions between the draft management plans for natural and cultural values:** Even if the structures of natural and cultural management plans are complementary, it is possible that inconsistencies or contradictions arise from conflicting objectives. For instance, the management regime for the Marshes's biodiversity values (World Heritage criterion x) might exclude natural resource use to reduce pressures on these resources, a certain type of traditional natural resource use (e.g. use of reed to construct houses) might actually in itself represent an intangible cultural value relevant to a potential nomination of the property under World Heritage criterion v. In such cases, it will be paramount to jointly develop solutions (i.e.

jointly agreed management prescriptions) that are as consistent with the overall objective of sustainable management of both natural and cultural values as possible. To this end, the draft management plans for natural and cultural values should be exchanged between the natural and cultural drafting teams at the evaluation, objective setting and activity setting stages, and joint meetings of both drafting teams should be adjourned at each of these occasions.

- **Integration of two parallel management planning processes at the level of the draft or final management plan:** If a general joint structure for the management plan can be agreed between the natural and cultural drafting teams and if potential inconsistencies and contradictions at the evaluation, objective and activity stage can be resolved, then it will be possible to join the natural and cultural parts of the management plan either at the draft management plan stage or at the final management plan stage. The latter might be easier since the consultation for both parts of the management plan will probably address different stakeholders and use different consultation formats.

- **Separate but coordinated management authorities for the natural and cultural values of the property:** The management of natural and cultural values requires different institutional setups and expertise. Therefore, the natural and cultural values of the property should be managed by separate management authorities, yet in a closely coordinated manner. A regular (monthly) mechanism for the communication and coordination of the activity of both authorities needs to be established.

# 4 Timetable and budget for the management planning process

This section provides further detail regarding the timeline and budgeting of the management planning process that is set out in Section 3.3 of this management planning framework. It is important to note that these are for the management planning process only – the timeline and budget for the actual site management need to be decided by the management planning team during the planning process. All estimates are indicative and should be discussed and adapted by the management planning team, based on their local and national experience and expertise.

## 4.1 Timetable for the management planning process

A timetable (Gantt Chart) for the management planning process for the marshes is suggested in Table 8. The minimum estimate for the overall management planning process including public consultation of the draft management plan is 30 months, which is more than initially planned but rather short in comparison to management planning processes for similar sites. This is a minimum estimate because of the complex history and multiple stakeholder interests affecting the Marshes, and because of the lack of experience of the relevant authorities with similar management planning processes in the past. The following additional considerations are needed in relation to the management planning process:

- If the fundraising step (Action 1.5) for the management planning can be completed earlier than indicated in the Gantt Chart (earlier than within four months), then the subsequent steps can be initiated earlier and the overall management planning phase can be shortened.

- If any of the necessary field studies to fill knowledge gaps and inform the management planning process (Action 2.2) take longer than six months (e.g. if a full seasonal cycle is needed for any of them), then the subsequent management planning steps need to be postponed by up to six months and the overall time needed to complete the planning cycle will increase to 36 months.

The relatively long process will not delay a possible World Heritage nomination of the property because since the site is not listed on the Tentative List of Iraq yet (and needs to be listed one year before nomination, according to the WHC OG), the very earliest submission date of a possible nomination would be 1 February 2014, with the decision about inscription to be taken in summer 2015 and the final

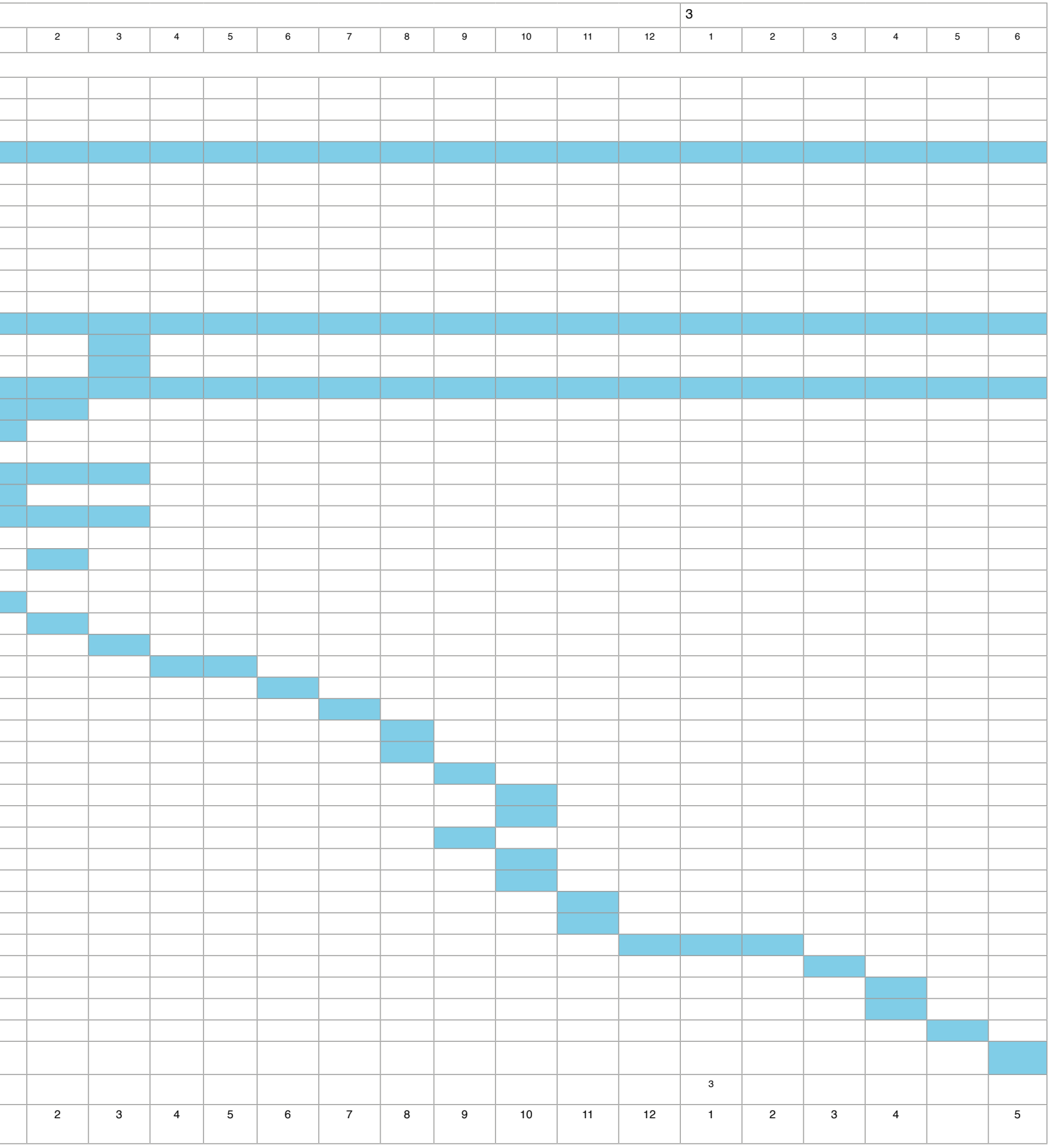
deadline for submission of a complete definite management plan likely to be summer 2017 or even 2018, accor

## Table 8. Gantt Chart showing the indicative sequence of Actions during the mana

| Year | | 1 | | | | | | | | | | | | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 |
| Planning step | Action | | | | | | | | | | | | | |
| 1 (pre-planning) | 1.1 | | | | | | | | | | | | | |
| | 1.2 | | | | | | | | | | | | | |
| | 1.3 | | | | | | | | | | | | | |
| | 1.4 | | | | | | | | | | | | | |
| | 1.5 | | | | | | | | | | | | | |
| | 1.6 | | | | | | | | | | | | | |
| 2 (Data collection) | 2.1 | | | | | | | | | | | | | |
| | 2.2 | | | | | | | | | | | | | |
| | 2.3 | | | | | | | | | | | | | |
| | 2.4 | | | | | | | | | | | | | |
| | 2.5 | | | | | | | | | | | | | |
| | 2.6 | | | | | | | | | | | | | |
| 3 (Evaluation) | 3.1 | | | | | | | | | | | | | |
| | 3.2 | | | | | | | | | | | | | |
| | 3.3 | | | | | | | | | | | | | |
| | 3.4 | | | | | | | | | | | | | |
| | 3.5 | | | | | | | | | | | | | |
| 4 (Constraints and opportunities analysis) | 4.1 | | | | | | | | | | | | | |
| | 4.2 | | | | | | | | | | | | | |
| | 4.3 | | | | | | | | | | | | | |
| | 4.4 | | | | | | | | | | | | | |
| | 4.5 | | | | | | | | | | | | | |
| | 4.6 | | | | | | | | | | | | | |
| 5 (Objective setting) | 5.1 | | | | | | | | | | | | | |
| | 5.2 | | | | | | | | | | | | | |
| | 5.3 | | | | | | | | | | | | | |
| | 5.4 | | | | | | | | | | | | | |
| 6 (Activity setting) | 6.1 | | | | | | | | | | | | | |
| | 6.2 | | | | | | | | | | | | | |
| | 6.3 | | | | | | | | | | | | | |
| | 6.4 | | | | | | | | | | | | | |
| 7 (Compilation of draft plan) | 7.1 | | | | | | | | | | | | | |
| | 7.2 | | | | | | | | | | | | | |
| | 7.3 | | | | | | | | | | | | | |
| | 7.4 | | | | | | | | | | | | | |
| 8 (Consultation of draft plan) | 8.1 | | | | | | | | | | | | | |
| | 8.2 | | | | | | | | | | | | | |
| | 8.3 | | | | | | | | | | | | | |
| | 8.4 | | | | | | | | | | | | | |
| | 8.5 | | | | | | | | | | | | | |
| | 8.6 | | | | | | | | | | | | | |
| | 8.7 | | | | | | | | | | | | | |
| | 8.8 | | | | | | | | | | | | | |
| | 8.9 | | | | | | | | | | | | | |
| | 8.10 | | | | | | | | | | | | | |
| 9 (Approval) | 9.1 | | | | | | | | | | | | | |
| Year | | 1 | | | | | | | | | | | | 2 |
| Month | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 |

rding to general practice and IUCN recommendations (IUCN 2008).

## gement planning process by month.



## 4.2 Budget for the management planning process

An itemized budget for the overall participatory management planning process (see Section 3.3) for a potential natural/mixed World Heritage property in the Marshes is enclosed as a separate Excel file. The overall estimated budget for the process (including closing high-priority knowledge gaps and public consultation) is US$ 431,330 over 30 months. The budget has been compiled based on the following assumptions:

- This budget assumes that the process would be run by the MoE itself, resulting in no additional project management costs for the planning process. If an external organization is be tasked with the implementation of the management planning process, an additional project manager, administrative staff and organizational overhead would need to be budgeted.
- The budget is also based on the assumption that national experts will participate in the expert workshops, and will draft suggestions for objectives and activities on a volunteering basis. Only field and desk studies that require a more long-term and concentrated input from the authors have been budgeted assuming the involvement of paid national consultants.
- This is an indicative estimate only as the exact planning costs depend on the size of the prospective property (yet to be decided) and on some of the component costs which may need verification, such as the national consultant daily rate (assumed as ca. US$ 390), per diem (ca. US$ 195), national travel standard rate (US$ ca. 260 per trip) national workshop cost per day and participant (ca. US$ 45) and similar items. These can be changed in the spreadsheet so as to arrive on a refined budget.
- The MoE may decide to contribute parts of the budget in kind, by tasking its own experts with some of the tasks that are now allocated to national consultants (e.g. for actions 1.12.3 ,1.3-, etc.). In this case, the amount that needs to be raised from external sources will fall accordingly.

In any case, the draft budget provides a framework which will allow the MoE to fine-tune the expected expenses and submit a revised budget once the size of the area and administrative setup has been decided.

# 5 Draft Table of Content of the first 5-year management plan

The suggested Table of Content of the first 5-year management plan is a consequence of the management planning process discussed in Section 3.3, which in turn is based on the international best practice guidance detailed in Section 3.1 – 3.2. Page number are indicative suggestions only.

It will be key to avoid excessive descriptive information as part of the management plan. Instead of including detailed descriptions, the screening study of Garstecki & Amr (or a revised and updated version of it) should be referenced, and additional descriptive information should be put into Appendices.

### Draft Table of Content

Headings marked with an asterisk * are focused on cultural values/criteria within a mixed nomination. Headings marked with an asterisk in brackets (*) may contain information relevant to both natural and cultural values.

**1. Title page (*) (1 p)**
**2. Statement of approval by the Council of Ministers (*) (1-2 pp)**
**3. Acknowledgements (*) (1-2 pp)**
**4. Table of Content (*) (1-2 pp)**
**5. List of Abbreviations (*) (1-2 pp)**
**6. Executive Summary (*) (2 pp)**
**7. Introduction (*) (5 pp)**
- 7.1. Context, prehistory and mandate for the management planning process (*)
- 7.2. Explanation of the management planning process (*)
- 7.3. Target group and use of the management plan (*)

**8. Description of the property (*) (15 pp)**
- 8.1. Exact location of the property including map and coordinates
- 8.2.Geographic, climatic and geological setting
- 8.3. Hydrology
- 8.4. Ecosystems and landscapes
- 8.5. Biodiversity, including threats and pressures and their drivers
- 8.6. Cultural monuments and traditions*
- 8.7. Natural resources and ecosystem services provided by the property

**9. Evaluation of the property (*) (5 pp)**
- 9.1. Statement of potential OUV of the potential natural/mixed World Heritage site (if it is decided to submit a nomination)
  - 9.1.1. Potential OUV under WH criterion v* (if applicable), including status
  - 9.1.2. Potential OUV under WH criterion vii – natural beauty (if applicable), including status
  - 9.1.3. Potential OUV under WH criterion ix – ecosystems (if applicable), including status
  - 9.1.4. Potential OUV under WH criterion x – biodiversity (if applicable), including status
- 9.2. Assessment of other values
  - 9.2.1. Natural values that do not meet the criteria of OUV
  - 9.2.2. Cultural, spiritual and aesthetic values that do not meet the criteria of OUV*
  - 9.2.3. Use values (direct, indirect and optional) including natural resources and regulatory ecosystem services

**10. Analysis of constraints and opportunities for management (*) (5 pp)**
- 10.1. National policy and legal framework (*)
- 10.2. National (including economic) development priorities, plans and projects (*)
- 10.3. Constraints from land and water use interests (*)
- 10.4. Security situation in the Marshes (*)
- 10.5. Constraints arising from the trans-boundary setting of the Marshes
- 10.6. Opportunities arising from existing initiatives and donor programmes focusing on the Marshes (*)
- 10.7. Opportunities arising from existing and planned protected areas in the Marshes
- 10.8. Other constraints and opportunities, including affecting cultural values*

**11. Vision statement and rationale (*) (2 pp)**

11.1. Vision statement (*)

11.2. Rationale of vision (*)

**12. Definition of objectives (*) (10 pp)**

12.1. Objectives regarding the desired conservation status of the property's natural values

12.2. Objectives regarding the desired conservation status of the property's cultural values*

12.3. Objectives regarding the formal establishment of a management regime on the property (*)

12.4. Objectives concerning the establishment of an effective stakeholder participation mechanism (*)

12.5. Objectives regarding specific programmes, policies and activities of the management authority of the property (*)

**13. Activities to meet the objectives of the management plan (*) (25 pp)**

13.1. Activities aimed at reaching a desired conservation status of the property's natural values

13.2. Activities aimed at reaching a desired conservation status of the property's cultural values*

13.3. Activities aimed at the formal establishment of a management regime on the property (*)

13.4. Activities aimed at the establishment of an effective stakeholder participation mechanism (*)

13.5. Activities focused on specific programmes, policies and activities of the management authority of the property (*)

13.6. Timetable of activities (*)

13.7. Budget for the implementation of activities (*)

**14. Monitoring and review (*) (5 pp)**

14.1. Monitoring regime (*)

14.2. Review procedure (*)

**15. References (*) (5 pp)**

**16. Appendixes (*) (20 pp)**

## 6 Methodology for boundary setting

The definition of the boundaries of a potential natural/mixed World Heritage site has been discussed into considerable detail by Garstecki & Amr (2011). This discussion focused on the natural values of the Marshes only. The same focus is taken in this management planning framework. It is likely that the areas with the highest biodiversity values are also the most suitable for a mixed nomination including WH criterion v, because the values under this criterion would be closely connected to the ways of natural resource use traditionally pursued in the Marshes. The same is not true for values under other cultural criteria (e.g. architectural monuments), but the strongest case for a mixed nomination in any case would be to have it based on the actual connection between ecosystem and culture (i.e. focusing on WH criterion v as the main cultural criterion).

The main arguments and conclusions of this discussion can be summarized as follows:

- **Boundaries for a potential World Heritage site primarily need to reflect the distribution of the values of a property:** In contrast to many generic PA gap analysis methodologies like Langhammer et al. (2007), which take into account not only the distribution of values but also that of threats, pressures and manageability, the WHC Operational Guidelines define a very simple principle for boundary setting: Boundaries should primarily be defined by the distribution of the values for which the property shall be inscribed. Paragraph 101 of the OG spells out that "For properties nominated under criteria (vii) - (x), boundaries should reflect the spatial requirements of habitats, species, processes or phenomena that provide the basis for their inscription on the World Heritage List. The boundaries should include sufficient areas immediately adjacent to the area of Outstanding Universal Value in order to protect the property's heritage values from direct effect of human encroachments and impacts of resource use outside of the nominated area". If the aim is indeed to demarcate a potential natural/mixed World Heritage site, then the value distribution needs to be the most important criterion and political, socio-economic or logistical factors can only be of secondary importance.

- The natural values most relevant for boundary setting are those in relation to WH criteria ix and x: Since the success of a possible nomination under WH criterion viii is doubtful according to Garstecki & Amr (2011), and since values under WH criterion vii depend on those under WH criteria ix and x, the key criterion for the boundary setting of the property should be the distribution of values under WH criteria ix and x. This means the distribution and integrity of the three identified ecosystem processes (criterion ix) and of the endemic/near endemic and globally threatened species and subspecies (criterion x) need to be made the basis for the boundary setting.

- **The preliminary assessment of Garstecki & Amr (2011) suggests that the distribution of the identified values relevant to WH criteria ix and x is concentrated in Al-Hawizeh Marsh and – to a lesser extent – East Hammar:** Garstecki & Amr (2011) concluded that most of the confirmed bird and mammal biodiversity is concentrated in Al-Hawizeh Marsh and that the likelihood of the presence of unconfirmed vertebrate biodiversity is also highest there. Fish and invertebrates appeared to also have high biodiversity at East Hammar (partly because of the brackish character of this marsh), but this was not considered sufficient to outweigh the higher bird and mammal biodiversity in the former marsh. Since two of the three ecosystem values relevant to WH criterion ix also depend on biodiversity, the conclusion about the maximum potential for OUV at Al-Hawizeh holds true for this criterion as well.

Based on this preliminary assessment, a potential World Heritage nomination under natural criteria would probably have the highest likelihood of success if it would include Al-Hawizeh Marsh. According to the information available, Al-Hawizeh holds the highest natural values under WH criteria ix, x, and (as a consequence) potentially vii. Additional Marshes (e.g. Al-Hammar and/or Abu Zirig) could be added to this area to widen the representation of ecosystem types and species included in a potential nomination, but it appears unlikely that a nomination focused on those sites exclusively would stand.

However, the management planning team may wish to revisit the preliminary conclusions of Garstecki & Amr (2011) and the corresponding suggested boundaries of the property. In order to do so, the team should address the following questions:

- Where exactly within the marshes are the core values relevant to the chosen World Heritage criteria, and particularly to World Heritage criteria ix and x concentrated?
- Should there be additional areas included in the property, and should there hence be a serial nomination?
- Shall there be buffer zones included in the nomination? If yes, how big and where?

An approach/methodology for addressing each of the above questions in the framework of Objective setting and activity formulation (see Section 3.3, thematic area No. 15) is suggested below.

## 6.1 Site selection methodology

The following criteria should be used sequentially for site selection:

- **Distribution of values:** Where exactly are the values located? This question needs to be answered based on available data (e.g. from Nature Iraq's KBA work) and potentially based on additional field studies (see Section 8). Table 9 can be used as an analytical tool to find out where most of the values of the Marshes are concentrated. This is by far the most important criterion for site selection.
- **Inclusion of (the) entire hydrologically connected area(s):** Wetland ecosystems are defined by their hydrological connectedness, and the same is true for ecosystem level processes with potential relevance to WH criterion ix. Therefore, inclusion of the entire hydrologically connected ecosystem(s) of the Marshe(s) constituting the envisaged property appears to be the most appropriate principle for effective management of the ecosystem values present – and by extension of the biodiversity inhabiting the ecosystem.
- **Political feasibility:** There are also important political considerations to be taken into account. From a long-term perspective, it will be impossible to manage any trans-boundary site without adequate complementary protection of the parts of the ecosystem outside Iraq. This applies to Al-Hawizeh, which on the long run would require some cooperation by the Iranian authorities for effective management. The water allocation to this marsh is currently compromised because of a dam that was constructed along the Iraq-Iran border, and it will be important to gain support from the Iranian site to conduct the necessary engineering works to restore hydrological connectivity. The MoE and the management planning team need to assess to what extent this prerequisite for a successful management of a World Heritage site involving Al-Hawizeh can be met. This issue is discussed into more detail in Garstecki & Amr (2011). The lack of political feasibility would not automatically mean that another Marsh area can be inscribed instead. If nomination of the areas containing the richest biodiversity is politically unfeasible, and if the areas that could feasibly be nominated to not contain the main values of the area relevant to World Heritage criteria ix and x, then this may seriously compromise the chances of success of the nomination.
- **Synergies with existing designations:** From a practical point of view, a demarcation following existing designations may save efforts and create synergies. In the case of Al-Hawizeh, this applies to the existing Ramsar site there, which may offer a good basis for a designation of a potential natural/mixed World Heritage site and has already a draft management plan.

Therefore, the management planning team (1) needs to gain a more detailed picture of the distribution of key ecosystem and biodiversity values and use this knowledge to fill in Table 9. It then needs to (2) check if any part of the Marshes, is both particularly rich in these values and hydrologically sufficiently isolated to warrant nomination (either on its own or as part of a serial nomination).

**Table 9.** Format for deciding added value of component sites of the Marshes for inclusion in a potential serial property in the Marshes. All the key values of the Marshes of potential OUV as listed by Garstecki & Amr (2011) should be entered in the left-hand column of the Table, and their distribution between the individual Marshes analyzed as shown in the example.

| **Values** (copy-paste key values under World Heritage criteria ix and x from Garstecki & Amr plus additional known values) | E Hammar | W Hammar | Chibayish | Al-Islah | Dawaya | Prosperity R. | Glory R. | Al-Hawizeh | Majnoon | Al-Sanaaf | Others… |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Explanation:** Occurrence or distribution of values of potential OUV in each Marsh | Indicate for each marsh to what extent each identified value occurs there, either using % distribution or a semi-quantitative scoring system (0-5 points for no occurrence to main stronghold of occurrence) | | | | | | | | | | |
| **Example:** Occurrence of diadromous shrimps and fish | - | 5 | 1 | - | - | - | - | - | 1 | - | - |
| **Add additional lines for additional values** | … | … | … | … | … | … | … | … | … | … | … |
| **Sum for overall comparison of Marshes** | x | y | z | … | … | … | … | … | … | … | … |

## 6.2 Single site or serial site?

The following criteria should be used sequentially to answer the question if one site should be demarcated as a single site or as a serial site together with additional Marsh areas:

- **Added value of additional areas:** The key question in to answer in order to decide if a potential natural/mixed World Heritage nomination and corresponding management planning process should be for a single site only or for a serial is whether the addition of those sites would significantly increase the OUV of the site (Engels et al. 2009). This question can be answered with reference to the value description for the entire Marshes as contained in Garstecki & Amr (2011), and again with reference to Table 9 have compared the contribution of individual component sites of a serial World Heritage property to the chapters of a book – each chapter should tell its own part of the overall story, or should be omitted. In the case of the Marshes, a comprehensive representation of the potential OUV could for instance be achieved by including sites of different salinity, such as Al-Hawizeh and East Hammar.

- **Integrity of values in additional areas:** Not only do additional sites need to contribute significantly to the overall OUV of a potential serial property – their values also have to be present at a sufficient level of integrity. In other words, the management planning team needs to be careful not to compromise the overall integrity of the final property by adding sites of poor integrity to a serial nomination.

- **Connectivity:** While not an official requirement of the WHC Operational Guidelines, it would strengthen any serial nomination if the component sites would be functionally connected by the processes that constitute the potential OUV of the overall property. For instance, if the main resting/wintering locations of migratory water birds are distributed between several marshes, or if these birds use one site for feeding and another for sleeping (for instance), then this would strengthen the case for a serial nomination. The same may be true if populations of key species under criterion x are shared between several marsh areas.

- **Practicability and logistical criteria:** Serial sites tend to be more difficult to manage than simple sites (see Engels 2008a, b for a more detailed discussion of potential management setups), and the management planning team may decide that, given the overall challenges to develop capacity for ecosystem and biodiversity management in Iraq, a simple site may be enough of an undertaking for the time being. This reasoning would appear particularly justified if the added value of including several marsh areas into a potential serial property would turn out to be marginal only, upon more in-depth analysis.

Section 6.5.3 of Garstecki & Amr (2911) provides some additional considerations in relation to the possible establishment of a serial property in the Marshes. The easiest approach to a potential serial property would probably be to have one overall management plan, because none of the existing potential component sites currently have effectively implemented management plans, and only coordinated management planning would result in a coherent management regime.

## 6.3 Definition of buffer zones

According to Paragraph 103 of the WHC Operational Guidelines, "wherever necessary for the proper protection of the property, an adequate buffer zone should be provided". Paragraph 104 adds that "for the purposes of effective protection of the nominated property, a buffer zone is an area surrounding the nominated property which has complementary legal and/or customary restrictions placed on its use and development to give an added layer of protection to the property. This should include the immediate setting of the nominated property, important views and other areas or attributes that are functionally important as a support to the property and its protection. The area constituting the buffer zone should be determined in each case through appropriate mechanisms. Details on the size, characteristics and authorized uses of a buffer zone, as well as a map indicating the precise boundaries of the property and its buffer zone, should be provided in the nomination."

Buffer zones are also a standard feature of protected areas in general. This raises the following central question for the planning of a buffer zone for a property in the Marshes.

- **Against which pressures and threats originating outside the property could a buffer zone protect its values, and how would the buffer zone need to be designed to effectively fulfill this protective function?**

In order to answer this question, the known pressures and threats (see Garstecki & Amr 2011) to the site need to be systematically assessed, for instance using a tabulated format as shown in Table 10.

Such an analysis would show, for instance, that the overall quantity of available water as a main pressure on the values of the property cannot be improved by establishing a buffer zone, whereas non-point water

pollution from agricultural areas and domestic sewage could be addressed through a "hydrological buffer zone" with the corresponding restrictions on pesticide/fertilizer use and sewage discharge. Similarly, the aesthetic values of the property (which may be relevant to a potential nomination under WH criterion vii) could be protected by banning major construction projects from the immediate vicinity of the property, where they might impair the visual impression of the property.

From the above reasoning, it is obvious that buffer zones need to designed from a functional point of view, i.e. with an explicit idea against what they should buffer and how. Practically, this means that there may be several overlapping buffer zones with different management prescriptions (even If formally they are all part of one legally designated buffer zone). A hydrological buffer zone will have a different management regime and extent than a "visual" buffer zone prohibiting major construction projects.

Generally, buffer zones only make sense if their conservation regime – and most importantly that of the core property that they surround – is effectively enforced. Therefore, the design of buffer zones needs to go hand in hand with the development of a strong and widely accepted enforcement regime and implementation capacity (see Objectives, thematic areas 18-20) for the overall property.

**Table 10.** Derivation of the need and specifications for a buffer zone from the pressures and threats affecting the property.

| **Identified pressure or threat to the property** | **Potential of the pressure to affect the property from outside** | **Description of need for buffer zone** |
|---|---|---|
| **Explanation:** Use checklist of IUCN-CMP (2010) and Column 2 of Table 6 to identify and enter pressures and threats affecting the property, in order of importance. | Assess if the pressure/ threat could affect the values of the property from its outside. | For those pressures that could have an effect from the outside: Define need for buffer zone (size – "thickness", management prescriptions) necessary to minimize impact on property |
| **Example:** Pressure: 9.3 Agricultural effluents (pesticide contamination and nitrification of property from non-point agriculture sources) | Yes, negative impact of effluents from the entire watershed feeding into the Marsh area in question | 1 km extensive agricultural use zone (grazing and extensive meadows only) around the property and all major tributaries, 100 m uncultivated strip with natural vegetation around property. |
| **Add additional lines for all values..** | … | … |
| **Aggregate need for overall buffer zone** | | Description of buffer zone that consolidates all the pressure-specific needs for buffer zones listed in this column above. |

## 7 Evaluation of baseline information and prioritization of knowledge gaps

Garstecki & Amr (2011) summarized the available baseline information for ecosystem and biodiversity management in the Marshes, and concluded that the values present warrant efforts a establishing a sustainable management regime and a potential nomination as a mixed Word Heritage site involving WH criteria ix and x, and potentially vii, among the natural criteria. They further identified 21 important value related and another 13 management related knowledge gaps with direct relevance to a potential nomination and management planning process in the Marshes.

The question now is to what extent this baseline information needs to be actualized and re-evaluated, particularly from a management planning point of view, and taking into account the information needs for management planning specified in Section 3.3.2 – 3.3.5 of this document. Secondly, the knowledge gaps identified by Garstecki & Amr (2011) need to be compared to information that has become available since, and also need to be re-evaluated from a management planning point of view.

## 7.1 Actualization and re-evaluation of baseline information

The revision process during the finalization of the screening study (Garstecki & Amr 2011) and the results of the workshop on 17 February 2012 with key Iraqi experts did not reveal any major factual mistakes or errors of evaluation in the study. One set of additional comments on the avifauna of the Marshes has since been received by IUCN (Salim 2012) and is provided separately.

While no major errors or misjudgments were identified since the publication of the screening study, it has become obvious that current natural resource use patterns in and around the Marshes including their impact on the identified ecosystem and biodiversity values and their contribution to the livelihoods of the local inhabitants need to be considered more thoroughly, in order to integrate a sustainable NRM component into the overall management regime. This is true for fisheries resources, reed and pasture (including for water buffalo), and hunting on waterfowl. The management methodology in Section 3.3 contains specific guidance on how this issue can be researched into more detail in order to inform the management planning process.

With the exception of this information and the specific knowledge gaps identified below, the already compiled information will be sufficient to initiate a management planning process aimed at sustainable ecosystem and biodiversity management in the Marshes. An additional actualization of this information will remain a continuous task of the management planning team.

## 7.2 Re-evaluation and prioritization of knowledge gaps

The screening study of Garstecki & Amr (2011) put most emphasis on information relevant to the discussion of potential OUV in the Marshes. Although there is considerable overlap between the research needs in preparation of a Statement of Outstanding Universal Value in the context of a possible World Heritage nomination on the one hand and the more general research needs for sustainable ecosystem and biodiversity management on the other hand, there is a need for choosing those knowledge gaps that are most relevant to the management of the property.

Therefore, a re-evaluation and prioritization of key knowledge gaps in relation to the management planning process as identified by Garstecki & Amr (2011) is presented in Table 11 (scientific research needs) and Table 12 (research needs related to the management framework). The criteria for the prioritization are (1) the relevance for management decisions (the more relevant, the higher the priority), (2) the degree to which some information to fill a given knowledge gap is already available (the more is available, the lower the priority), and (3) the potential for better informed management actions to really improve the status of ecosystems and biodiversity.

For the re-evaluation and actualization of knowledge gaps, the participants of the workshop on 16 February 2012 were presented a questionnaire and asked to enter any new information (publications, laws etc.) for each knowledge gap. The results of the planning workshop on 17 February 2012 were also fed into this re-evaluation.

Ten of the scientific research needs and five of the management framework related research needs were characterized as high priority by the re-evaluation (Tables 10 & 11). Among the scientific research needs, the main reasons for prioritization of knowledge gaps were the need to

- understand the values of the property (knowledge gaps 13, 14, 17),
- set meaningful boundaries for the property (knowledge gaps 6, 13, 14, 17),
- define a desired conservation state of ecosystem and hydrological system (knowledge gaps 2, 7, 9),
- develop effective management activities to reach objectives (knowledge gaps 12, 10, 16), and
- develop a sustainable NRM regime for the Marshes jointly with local resource users, including an understanding of acceptable/sustainable use levels and techniques for the main resources of the property (knowledge gaps 12, 16).

Concerning the values of the site, it appears particularly striking that none of the mammal or reptile species highlighted as potentially contributing to the OUV of the property under WH criteria ix and x by Garstecki & Amr (2011) were found during the KBA 2010 site review (NI & MoE 2011). One of the key bird species (Ardea goliath) was apparently also not found. Irrespective of the potential OUV question it is crucial to understand these key elements of the biodiversity of the Marshes, in order to develop a meaningful conservation regime.

In relation to the management framework, the main reasons for prioritization of knowledge gaps were the need to

- understand the legal, policy and planning framework for sustainable ecosystem and biodiversity management in the Marshes (knowledge gaps 1, 3, 4),
- understand potential constraints on the location or management of a future PA in the Marshes (knowledge gaps 10, 11),
- embed the ecosystem and biodiversity management planning process into the wider management and development planning of the Marshes, particular in relation to the water allocation (knowledge gaps 3, 4).

When talking about the requirement to better understand the legal, policy and planning framework for the Marshes, it needs to be kept in mind that part of the limited understanding of this framework is caused by the fact that it is still under development. Since a clear framework is needed as a prerequisite for an effective management regime for a property in the Marshes, this highlights the need to continue the various initiatives aimed at legal, policy and institutional framework development at the national level.

The high priority knowledge gaps should be closed as early as possible during the management planning process. This is reflected in the methodological recommendations below and in section 3.3 on the management planning methodology (plus the budget in Section 4.2), which include actions at filling them.

**Table 11.** Re-evaluation and prioritization of scientific knowledge gaps as identified by Garstecki & Amr (2011) an

| Knowledge gap | Relevance to OUV | Management relevance |
|---|---|---|
| 1. Description/ documentation of development of water level in Marshes since spring 2010 | Integrity of OUV criterion ix | Management baseline for water allocation planning |
| 2. Minimum discharge and hydroperiod to maintain Marsh succession and seasonality | - | Definition DCS for water allocation objective setting |
| 3. Secondary succession of Marsh ecosystem since reflooding (trends, drivers, stable states) | Integrity of OUV criterion ix | Definition DCS for water allocation objective setting |
| 4. Occurrence and status of endemic and globally threatened plant species | OUV criterion x | Definition DCS for criterion x |
| 5. Economic and livelihood value of reed and other plants | - | Participatory sustainable NRM planning |
| 6. Differences between flora, vegetation and plant species richness between individual marshes | Distribution of OUV criteria ix, x | Boundary setting, decision on serial property |
| 7. Tolerance limits for key plant species and vegetation to desiccation, salinization, nutrification, temperature etc.) | OUV criterion ix, x | Definition of DCS for criteria ix, x particularly in terms of acceptable limits of these factors |
| 8. Current status of endemic (to the Euphrates/Tigris system) fish species | OUV, integrity criterion x | Definition DCS for criteria ix, x |
| 9. Habitat requirements and ecological tolerances of Marsh fish | - | Activity setting criteria ix, x |
| 10. Impact of introduced fish species | Integrity criterion x | Definition of DCS, activity setting for criterion x |

d identification of responsible and/or competent entities for filling them.

| New information post-2010 | Possible responsible institution/ person | Priority |
|---|---|---|
| CRIM data, UNAMI-UNCT (2011) | CRIM | Low (development of water level already being monitored by CRIM) |
| - | CRIM (?) | High (important prerequisite for management objective setting) |
| NI & MoE 2011, Salim 2011 | Nature Iraq, Academic institutions | Medium (useful to understand scope and constraints on Marsh recovery but no immediate management implications) |
| NI & MoE 2011, but no specific information on plants found yet | Nature Iraq | Medium (data on Marsh plants not included in NI & MoE 2011 publication, important for objective setting) |
| - | Ministry of Agriculture | Medium (critical for developing sustainable NRM programme, jointly with local stakeholders) |
| NI & MoE 2011, Salim 2011 | Dr. Agab, Thi Qar Uni, Marsh Research Centre; Dr. A. A. Alwan, Basrah Uni | High (important for boundary setting) |
| - | Colleges of Agriculture of Thi Qar and Basrah Uni (?) | High (important for water allocation including water quality objective setting) |
| - | Dr. Brian Coad; Dr. Talib Uqaab (+964 78801202916); Thi Qar Uni Marsh Research Centre; Basrah Uni, Natural History Museum | Low (situation recently summarized by Coad 2010, little added knowledge attainable) |
| | As above | High (important for water allocation including water quality objective setting) |
| | Mr. Hussein Al-Assadi; Marine Science Centre of Basrah Uni | Medium (generally important to know but limited management relevance, as there is little that can be done)<br><br>High (potential threat from species currently in cage aquaculture within Marshes) |

| | | |
|---|---|---|
| **11. Importance of individual marsh areas for diadromous fish species** | Distribution of OUV criteria ix, x | Boundary setting, decision on serial property |
| **12. Role of fisheries in Marsh inhabitants' livelihoods** | OUV criterion v | Participatory sustainable NRM planning, threat assessment |
| **13. Current status and distribution of the Euphrates Soft-shelled Turtle Rafetus euphraticus in the Marshes** | OUV, integrity criterion x | Definition of DCS for criterion x |
| **14. Current status and distribution of globally threatened species, endemic subspecies and isolated populations of birds** | OUV, integrity criterion x | Definition of DCS for criteria ix, x |
| **15. Current quantitative importance of the Marshes as a waterbird resting / wintering area** | OUV criterion ix, x | Definition of DCS for criteria ix, x, boundary setting |
| **16. Current extent of hunting pressure on waterbirds in the Marshes** | Integrity criteria ix, x | Activity planning for criteria ix, x |
| **17. Current status and distribution of Lutrogale perspicillata, Allactagus euphraticus, Nesokia bunnii and Myotis cappacinii** | OUV, integrity criteria ix, x | Definition of DCS for criteria ix, x |
| **18. Current status of insectivorous bats in the Marshes** | OUV, integrity criteria ix, x | Definition of DCS for criteria ix, x |
| **19. Current status of globally threatened dragonfly and butterfly species in the Marshes** | OUV, integrity criterion x | Definition of DCS for criteria ix, x |
| **20. Status and trends of migratory shrimp species in the Marshes** | OUV, integrity criteria ix, x | Definition of DCS for criterion ix |
| **21. Are there important references on the outstanding natural beauty of the Iraqi Marshlands in the Arab literature?** | OUV criterion vii | - |

| | | |
|---|---|---|
| | Marine Science Centre and College of Agriculture of Basrah Uni | Medium (already clear that East Hammar appears most important for diadromous fish – little added knowledge attainable) |
| | Nature Iraq, Thi Qar Uni Marsh Research Centre | High (critical for threat assessment, objective setting e.g. on banning electrofishing, developing sustainable NRM programme, jointly with local stakeholders) |
| NI & MoE 2011, Salim 2011 (but no information on this species) | Nature Iraq; Mr. Salam Al-Hashmi, Basrah Uni Natural History Museum | High (high conservation value species possibly inhabiting Marshes) |
| NI & MoE 2011, Salim 2011 (but no information on some high conservation values species) | Nature Iraq, Dr. Mudhafar Salim | High (high conservation value species possibly inhabiting Marshes) |
| NI & MoE 2011, Salim 2011 | Nature Iraq, Dr. Mudhafar Salim | planning, but some information available already) |
| NI & MoE 2011, Salim 2011 | Nature Iraq, Dr. Mudhafar Salim | High (maybe an important secondary pressure on waterbirds in Marshes, also important for development of sustainable NRM programmes) |
| NI & MoE 2011, Salim 2011 (but no specific information on these species) | Mudhafar Salim, | High (high conservation value species possibly inhabiting Marshes) |
| | Nature Iraq | Medium (poorly known species group, some of high conservation value, but limited management implications) |
| NI & MoE 2011 (?) | Dr. M. S. Abdul-Rassoul (079 01664487), Baghdad Uni, Natural History Museum; Dr. Kadhum Salih, Basrah Uni, Dep. Of Biology | Medium (poorly known species group, some of high conservation value, but limited management implications) |
| | Basrah Uni, Marine Science Centre | Medium (both economic and conservation importance, but small species group only) |
| | ? | Low (very limited management relevance) |

**Table 12.** Re-evaluation and prioritization of management framework related knowledge gaps as identified by C
(where not listed already) and organizations needs to be arranged at the beginning of the management plannin

| Knowledge gap | Relevance to OUV | Management relevance |
|---|---|---|
| 1. Current legal basis for protected areas in Iraq (new legislation since 2009) | Management of OUV | Legal basis of management regime |
| 2. Specific legislation on the establishment of a World Heritage site (or component protected areas thereof) in the Marshes | Management of OUV | Legal basis for WH designation |
| 3. Main national policy/planning documents for ecosystem management and biodiversity conservation in Iraq (changes since 2009) | Management of OUV | Policy basis for introduction of ecosystem/ biodiversity management |
| 4. Main national planning documents for ecosystem management in the Marshes | Management of OUV | As above |
| 5. Existing and planned protected areas in the Marshes and relationship to possible World Heritage site (part of it or not) | Demonstration of ongoing management efforts | Avoidance of duplication of planning efforts |
| 6. Estimated minimum available water quantity for the marshes until 2020 | Integrity outlook | Feasibility of sustainable Marshes management |
| 7. Ongoing hydrological management projects within or affecting the Marshes | Demonstration of already initiated improvement of water allocation | As above, potentially also a threat to hydrological integrity of Marshes |
| 8. Existing plans to remove flood protection dams in the Marsh area | Management of OUV, integrity outlook | Identification of constraints to sustainable hydrological management |
| 9. Ongoing projects on rational use of water in the area | Management of OUV, integrity outlook | Identification of opportunities for sustainable hydrological management |
| 10. Ongoing or planned large infrastructure projects in the Marshes | Integrity of OUV | Identification of constraints to sustainable ecosystem management |
| 11. Ongoing or planned oil exploration/ exploitation projects in the Marshes | Integrity of OUV | Identification of constraints to sustainable ecosystem management |
| 12. Existing or expected regional development plans and spatial land use plans | Management of OUV | Identification of constraints to and/or opportunities for sustainable ecosystem management, potential mainstreaming tool |
| 13. Changes in the institutional responsibilities and mandates for management of the Marshes since 2009 | Management of OUV | Institutional framework for Marshes management |

Garstecki & Amr (2011). A more detailed allocation of tasks between specific representatives of the below institutions g process.

| | New information post-2010 | Possible responsible institution/ person | Priority |
|---|---|---|---|
| | Draft PA regulation of MoE | National Committee for Protected Areas | High (effective ecosystem/ biodiversity management regime needs legal basis) |
| | Heritage Law, implemented by Ministry of Heritage and Tourism | National Committee for Protected Areas | Medium (nomination but not management depend on legal basis in relation to World Heritage) |
| | 4th National Report to CBD, NBSAP and National Strategy for PA system development (under preparation) | Dr. Ali Abdul-Zahra Al-Lami, Advisor to the Minister of the Environment | High (consistency with national policy a key prerequisite for establishing effective management regime) |
| | MoWR 25-year water master plan (under preparation) | National Committee for Protected Areas, CRIM | High (ecosystem management depends on water allocation) |
| | Al-Hawizeh Ramsar site and MMNP apparently not actively managed to date; status of Al-Safia PA (Basrah Govt) unclear | National Committee for Protected Areas; Nature Iraq | Medium (some potential synergies but currently reportedly no functioning PAs in the Marshes) |
| | See (4.) above | Mrs. Shaima Obaid Kream, CRIM | Low (estimates of minimum available water quality not likely to be reliable) |
| | UNAMI-UNCT (2011) | Mrs. Shaima Obaid Kream, CRIM, National Committee for Protected Areas | Medium (potential to use lessons learned and integrate into overall hydrological management regime) |
| | ? | Mrs. Shaima Obaid Kream, CRIM | Medium (contribution to realization of hydrological management regime) |
| e | Several CRIM projects | Mrs. Shaima Obaid Kream, CRIM | Medium (contribution to realization of hydrological management regime) |
| | - | Mrs. Aseel Adel Fattah, Ministry of Planning | High (may critically constrain plans to develop ecosystem and biodiversity management regime) |
| | Shell Majnoon project to the South of Al-Hawizeh; CRIM coordinates with MoO | Ministry of Oil | High (may critically constrain plans to develop ecosystem and biodiversity management regime) |
| | - | Mrs. Aseel Adel Fattah, Ministry of Planning; Mrs. Inam Ibrahim Mohammed Ali, Ministry of Municipalities and Public Works | Medium (need to mainstream sustainable ecosystem/biodiversity management into regional development and land use plans, but currently such plans appear to play a limited role only) |
| | Dissolution of State Ministry of the Marshes, now MoWR mainly responsible, trends towards overall stronger decentralization to Governorates | National Committee for Protected Areas | Medium (institutional framework of property crucial, but continuity of MoE leadership in relation to WH nomination/management planning guarantees process sustainability) |

# 8 Methodological suggestions for identified high-priority knowledge gaps

The knowledge gaps identified in Section 7 above will need to be filled by national experts, who in most cases will be the most competent persons to develop an adequate research methodology. However, a general recommendation for the overall approach can be made for closing each knowledge gap:

- **Water allocation (minimum discharge and hydroperiod to maintain Marsh succession and seasonality):** Desk study and options for concrete actions regarding minimum water allocations and hydrological management for the maintenance of key ecosystem and biodiversity values of the Marshes, in accordance with Action 2.5, building on published and existing information and scenarios (e.g. CIMI 2010, New Eden Group 2006) to the extent possible. See Action 2.5 for timeline and budget. Potential implementer: CRIM.

- **Differences between flora and vegetation between individual marshes:** Definition of a characteristic set of plant species for key habitats according to Abdulhasan et al. (2009) and comparison to published data of Alwan (2006), complemented by field surveys to the extent necessary. The research objective would be to identify the smallest set of marsh sites that encompasses all the key vegetation and habitat types, as well as key threatened and endemic species of flora. Timeline and budget: See Action 2.2 (one of four Actions). Potential implementer: Nature Iraq.

- **Tolerance limits for key plant species and vegetation to desiccation, salinization, nitrification, temperature:** Desk study to analyze published correlative and experimental studies including grey literature and unpublished data, complemented by simple field experiments in cooperation with an academic research institution of Iraq (e.g. Thi Qar or Basrah University). Objective is to define an envelope (multifactorial range) of abiotic environmental factors (as above) within which the Marsh vegetation can be expected to remain functional overall. Timeline and budget: See Action 2.2 (one of four Actions). Potential implementer: Thi Qar or Basrah University.

- **Habitat requirements and ecological tolerances of fish:** Desk study by a leading ichthyologist (preferably B. Coad, Canadian Museum of Nature) in cooperation with national experts. Objective is to define an envelope (multifactorial range) of abiotic environmental factors (as above) within which key species of the Marsh ichthyofauna can be expected to remain functional viable and reproductive.

- **Potential impacts of release of fish and other environmental impacts from aquaculture farms (cages):** Collection of information about the species used in aquaculture in and around the Marshes (or the use of which is planned), elaboration of a generic EIA on these fish by a national consultant with backstopping support from an international ichthyological expert (preferably B. Coads, Canadian Museum of Nature). Nutrification and similar effects of fish farms should be addressed by such an EIA as well. Timeline and budget: See Action 2.2 (one of four Actions). Potential implementer: Basrah or Thi Qar University.

- **Ecological and economic role of fisheries:** Socio-economic desk study and field survey on natural resources use and management (fisheries, hunting, grazing, reed harvest etc.) including its livelihood significance and ecological impact in the Marshes, as described in Action 2.4 of Section 3.3.2. Identification of particularly damaging natural resource use methods

(e.g. electro-fishing, use of poisons) and suggestion of alternatives. Participatory elaboration of scenarios for sustainable NRM in the Marshes. See Action 2.4 for timeline and budget. Potential implementer: Nature Iraq.

- **Ecological and economic role of hunting:** See above.
- **Current status and distribution of Euphrates Soft-shell Turtle Rafetus euphraticus:** Field survey by national experts based on a concise habitat/lifestyle profile elaborated by international experts on the species or the genus Rafetus. Objective is to determine if the species occurs in the Marshes or not (and if yes, where exactly). Can be combined with the following two investigations. Timeline and budget: See Action 2.2 (one of four Actions). Potential implementer: Nature Iraq.
- **Current status and distribution of globally threatened species endemic subspecies and isolated populations of birds (including Ardea goliath):** Field survey by national experts based on a concise habitat/lifestyle profile elaborated by international ornithologists. Objective is to determine if the species occurs in the Marshes or not (and if yes, where exactly). Can be combined with the two investigations above and below. Timeline and budget: See Action 2.2 (one of four Actions). Potential implementer: Nature Iraq.
- **Current status and distribution of Lutrogale perspicillata, Allactagus euphraticus, Nesokia bunnii and Myotis cappacinii:** Field survey (also looking for indirect evidence including feces or testimony by local inhabitants) by national experts based on a concise habitat/lifestyle profile elaborated by international experts on these species. Objective is to determine if these species occur in the Marshes or not (and if yes, where exactly). Can be combined with the two investigations above. Timeline and budget: See Action 2.2 (one of four Actions). Potential implementer: Nature Iraq.
- **Legal basis for protected areas:** Analysis of Iraqi legislation other than the draft regulation on PAs for provisions relevant to PA establishment and management (e.g. legislation on land use and tenure, infrastructure development, EIA and SEA etc.). Analysis of draft PA regulation and recommendations for amendments if needed. Can be implemented jointly with the two investigations below – see Action 2.3 for timeline and budget.
- **Main national policy/planning documents for ecosystem management in biodiversity conservation in Iraq:** See above.
- **Main national planning documents for the Marshes:** See above.
- **Ongoing or planned large infrastructure projects in the Marshes:** Enquiry and establishment of regular communication mechanism between the MoE and relevant Ministries (e.g. Ministry of Municipalities and Public Works) and Governorate authorities. Mapping of ongoing and planned large infrastructure projects in the Marshes as an input into management planning.
- **Ongoing or planned large oil exploration/exploitation projects within the Marshes:** Enquiry and establishment of regular communication mechanism between the MoE and the Ministry of Oil, possibly building on existing communication channels between the Ministry of Water Resources and the Ministry of Oil. Mapping of ongoing and planned

oil/exploration/exploitation projects in the Marshes as an input into management planning. Detailed analysis of possible impacts of the operation of Majnoon Oil Field on potential parts of the property (particularly the southern part of Al-Hawizeh) by a national consultant, based on the discussion of the issue in Garstecki & Amr (2011).

The largest of the above investigations have been included as separate actions into the management planning methodology, and budgeted accordingly. Additional knowledge gaps including the high priority ones listed above are covered and budgeted under Action 2.2 of the Management Planning Framework (section 3.3.2).

## 9 Template for draft interim management plan

The Operational Guidelines of the WHC leave open the possibility not to submit a finalized management plan with a possible nomination file, but to delay submission by a limited period (usually up to 2 years, according to IUCN (2008). It is not clear if this could be relevant to a possible nomination of the Marshes, as it appears that there is still sufficient time for a full management planning process for the property, because of the timeline for the finalization and submission of a potential nomination file itself.

Paragraph115 of the WHC Operational Guidelines states that "In some circumstances, a management plan or other management system may not be fully in place at the time when a property is nominated for the consideration of the World Heritage Committee. The State Party concerned should then indicate when the management plan or system will be fully in place, and how it proposes to mobilize the resources required to achieve this. The State Party should also provide documentation which will guide the management of the site until the management plan or system is finalized fully in place." IUCN (2008) gives further guidance on the scope and content of interim provisional management plans for World Heritage properties.

This Section provides a template showing how the management planning team could meet the above requirements in case the management planning process set out in Section 3 of this framework has not been completed by the time the State Party wishes to submit a nomination. **A complete interim management plan cannot be written at this stage,** because of the following reasons:

- The boundaries of the property have not been defined by the State Party yet. This would be a direct prerequisite for an interim management plan, but it is also crucial in an indirect way as specific management objectives and prescriptions for the management of the property would depend on its exact location,

- There is no legal basis for the legal establishment of a PA at the property yet, and the PA Regulation is currently only at the draft stage. The interim management plan will need to be legally binding and this will only be possible once the exact wording of the PA Regulation has been decided and it has been officially approved,

- Setting a detailed management vision and objectives requires extensive input of national/local knowledge and expertise, which will be made available b bringing together relevant experts during the management planning process only.

However, the existence of the baseline study on a potential World Heritage nomination and a clear

roadmap on how to develop a management plan (this document), together with the fact that there are already management plans for two sites within the Marshes – the Al-Hawizeh Ramsar site (Nature Iraq 2008a, b) and the Mesopotamian Marshes National Park (New Eden Group 2010a, b) – means that construction of an interim management regime would be feasible if indeed the main management planning process is still under way at the time of nomination.

## 9.1 Documentation of the ongoing management planning process

In order to comply with Paragraph 115 of the OG, a documentation of the ongoing management planning process should be submitted with a possible nomination. This should focus on the following evidence:

- **Statement of commitment:** An explicit commitment of the MoE or another appropriate representative of the State Party to produce a full management plan by an explicitly stated date.
- **Documentation of already initiated management planning efforts:** The screening study of Garstecki & Amr (2011 and this document), both of which benefited from the input of the MoE and other key Iraqi stakeholders, both clearly document that the management planning process for the Marshes has been initiated.
- **Documentation of progress with the implementation of this management planning framework:** If implementation of this management planning framework has commenced by the time of a possible nomination, the State Party could submit a progress report which describes the management planning steps that have already been taken by the management planning team.
- **Documentation of resource mobilization:** Any funds mobilized from the State Budget, the World Heritage Fund or other donors, to support this management planning process, should be documented by the State Party as a further indication of its commitment to follow through with the management planning process.

In combination, these four elements will demonstrate sufficiently clearly that the State Party is complying with the first part of Paragraph 116 of the WHC OG (second sentence). What remains to be demonstrated then is how the State Party is complying with the second part of Paragraph 115: "(…) The State Party should also provide documentation which will guide the management of the site until the management plan or system is finalized fully in place."

## 9.2 Reference to existing management plans as an interim solution

Depending on the site(s) that are finally chosen for inclusion in a potential natural/mixed World Heritage nomination, it might theoretically be possible to adapt and use the management plans for Al-Hawizeh Ramsar site (Nature Iraq 2008a, b) and/or the Mesopotamian Marshes National Park (New Eden Group 2010a, b) – one of the two existing management plans mentioned above as an interim management plan.

However, none of these plans were considered fully adequate for guiding sustainable ecosystem and

biodiversity management in the Marshes by Garstecki & Amr (2011). The main weaknesses in these plans as pointed out by the screening study would need to be eliminated, the link to the potential OUV would need to be clarified, and the complex system of goals and recommendations of them would need to be replaced by a clearer logical framework and SMART objectives. While the descriptive sections of the Al-Hawizeh Ramsar site and MMNP management plans may be useful, it would not be practicable to change a few actions in these plans and thereby make them a useful basis for short-term management of these component sites. Therefore, no further efforts have been made to adapt and use these plans.

## 9.3 Elements of the interim management plan

According to IUCN (2008), the following elements are essential for an interim management plan:

- A commitment to implementing the plan to fulfill the obligations of the World Heritage Convention.
- An initial assessment and factual statement of the condition of the property's natural values, including its features of Outstanding Universal Value, and an indication of their relationship to its other characteristics.
- A review of the issues and challenges associated with maintaining the property's values and integrity within its local geographic and socio-economic context.
- The long term ambition for the property, i.e. its vision and objectives.
- The legislative policies and measures provided or to be introduced, and the financial and human resources to be provided in order to prevent the property's integrity from being compromised prior to completion of the complete plan.

The following sections discuss how each of these minimum requirements can be met by an interim management plan.

### 9.3.1 Commitment to implementing the plan to fulfill the WHC

In the case of a potential nomination, the interim management plan should be accompanied by an official statement of commitment to the implementation of the World Heritage Convention and its Operational Guidelines though nomination of a natural/mixed World Heritage site in the Marshes, and the finalization of the management planning process as mapped by this document, as well as the implementation of the resulting plan.

This statement needs to be made by a sufficiently high Government institution (ideally the Council of Ministers in the case of the Iraqi Marshes) and should also be officially endorsed by other key stakeholders, including the Ministry of the Environment and Ministry of Water Resources, and the Governorates on which the property will be situated.

The statement could read like the following: "The **Council of Ministers** of the Republic of Iraq is fully committed to the implementation of the World Heritage Convention and its Operational Guidelines

through the nomination of a natural/mixed World Heritage site in the Iraqi Marshes, and to the full resourcing and finalization of the management planning process as defined by Garstecki (2012) until the year 20XY. The Council of Ministers of the Republic of Iraq is equally committed to the full resourcing and implementation of the resulting management plan in agreement with the Iraqi legislation (particularly the Regulation on Protected Areas management, Establishment and Generation), to safeguard and maintain the Outstanding Universal Value of the site. This commitment is fully shared and particularly supported by the Ministry of Environment, the Ministry of Water Resources, and the Governors of the Governorates of Basrah, Maysan and Thi Qar".

### 9.3.2 Initial assessment of the property's natural values, including its OUV

An **initial** assessment of the property's natural values including its potential OUV is provided by Garstecki & Amr (2011). Section 4 of the screening study could be annexed to the interim management plan. The more of the knowledge gaps as discussed in Sections 7 and 8 of this document can be closed (and the screening study be amended accordingly) the better.

### 9.3.3 Review of the issues and challenges

An initial review of the issues and challenges that the property is facing is also included in Garstecki & Amr (2011) – particularly in Sections 4.3.3, 4.4.2, 4.5.4, 4.6.7, 5, and 6.4. These sections could be updated and annexed to the interim management plan to fulfill this requirement. If the management planning steps described in Sections 3.3.3 (assessment of values including their status) and 3.3.4 (assessment of constraints and opportunities) of this management planning framework have already been completed by the time of submission of a possible nomination, then the outcomes of these sections should be included in the interim management plan.

### 9.3.4 Vision and objectives

In the overall management planning process for the Marshes, the visions and objectives are derived from an actualized and revised version of the screening study of Garstecki & Amr (2011), plus a reevaluation of all the values of the future property and a reappraisal of constraints and opportunities. If these management planning steps have already been taken by the time the nomination and the interim management plan is submitted (e.g. if the draft management plan has already been produced, but not been publicly consulted yet), then the step on vision and objective setting as described in Section 3.3.5 of this planning framework should be brought forward, so that its outcomes can already be included in the interim management plan.

If this is not the case, then the management planning team needs to develop an interim vision and interim objectives for each of the thematic areas included in Section 3.3.5. An interim vision could read as follows:

"In 25 years, the Iraqi Marshes including the area of the property nominated for inscription will have been restored to 75% of their 1973 extent, and will be supported by a water allocation of

XY billion m3 per year on average. The Marsh ecosystem including its ecological succession, function as a resting and wintering area of global importance for migratory waterbirds, role as a hotspot of evolution and speciation, and function as a habitat of endemic and globally threatened biodiversity will have recovered its full functionality within these areas, and the unique Maidan lifestyle that is based on the sustainable use of this ecosystem will have been revived. The Marshes including its ecosystem and biodiversity will be managed in a sustainable way for the benefit of local inhabitants and resource users, the Iraqi people and humankind."

Instructions for the formulation of interim objectives are included in Section 3.3.5.

### 9.3.5 Legislative policies/measures and resources until completion of full plan

This part of the interim management plan will need to prove that the overall legislative, policy and institutional framework for ecosystem and biodiversity management in Iraq and particularly in the Marshes is conducive to safeguarding the identified values of the Marshes even until the full management plan has been finalized and approved and is being implemented. This should be shown on the legislative, policy, institutional and resource level:

- **Legislative level:** The adequate proof of a favorable legislative framework for Marsh conservation will exist once the draft Regulation on PA Management, Establishment and Generation has already been approved and the prospective property has already been legally established under this Regulation by the appropriate Government institution of Iraq. If these requirements have not been met yet, than the progress towards them should be described and other, weaker forms of legal designation should be applied and declared as part of the interim management plan.

- **Policy level:** This section should demonstrate that the conservation and sustainable management of the Marshes is a policy priority of the Government of Iraq. This can be shown first and foremost by highlighting relevant commitments of Iraq under Multilateral Environmental Agreements, such as the Convention on Biological Diversity. Relevant parts of Iraq's Fourth National Report to CBD or of the upcoming National Biodiversity Strategy and Action Plan (NBSAP – in preparation in collaboration with UNEP) would need to be referenced to achieve this. National strategies such as the planned PA system development study of Iraq should also be cited. To show wider Government support beyond the Ministry of Environment, any commitments to water allocations to the Marshes under the Water master Plan of Iraq, which is reportedly being prepared by CRIM currently, should be highlighted in this section.

- **Institutional level:** The establishment of the national Committee for on PAs, which is headed by Dr. Al-Lami, is the most relevant institutional development that should be mentioned in the interim management plan. Any already established PA management bodies in the Marsh area itself should also be listed to show that a favorable institutional framework for the sustainable management of the Marshes is under construction.

- **Resources:** Significant resources have been dedicated to creating the basis for the sustainable management of the Marshes already, including through the UNEP-UNESCO World Heritage Initiative for the Marshlands. These resources plus any additional resources mobilized

by the Ministry of the Environment (be it from donors or the state budget) should be listed to document that the management of the marshes will be sufficiently resourced until the approval and implementation of the final management plan.

In combination, documentation of these ongoing efforts and developments will result in an interim management plan that will be sufficient to bridge the gap until the finalization of the overall management planning process.

In any case, it will be best if the State Party has the full management plan developed by the time a nomination file is submitted for a Marsh property. The interim management plan according to Paragraph 116 of the OG is merely a contingency, and intended more the nomination than for detailed guidance of management actions.

Other than committing a sufficient water allocation to the Marshes (reportedly somewhere in the order of 8 billion m3 annually – see UNAMI-UNCT 2011), the most high-priority immediate measure to improve ecosystem and biodiversity management in the Marshes is the initiation of a broad, participative management planning process as explained in Section 3.3 of this management planning framework.

# 10 Development of a stakeholder engagement strategy

The Marshes present a complex stakeholder environment, ranging from small fishermen and pastoralists to some of the largest private business companies worldwide. These stakeholders need to be addressed in a planned and systematic way, in order to maximize stakeholder ownership and support to sustainable ecosystem and biodiversity management. Without proactive and extensive stakeholder engagement, there is a significant risk that any protected area established in the Marshes (be it a World Heritage site or not) will end up as a "paper park" – a protected area that only exists on paper but not in reality.

The public consultation of the draft management plan for the Marshes will be a key element of the stakeholder engagement for the planned property (see Section 3.3.8), but this needs to be accompanied by a wider communications and participation effort (see Action 1.6 for timing and estimated budget). This effort should involve an in-depth stakeholder analysis, the definition of objectives for informing and involving key stakeholders, and specific activities to meet these objectives, based on an adaptive management approach.

## 10.1 Stakeholder analysis

As a first step, a stakeholder analysis needs to be conducted in order to gain a detailed understanding of who may need to be addressed in relation to the establishment of a PA and/or the initiation of sustainable ecosystem and biodiversity management in the Marshes. This stakeholder analysis needs to pay particular attention to the following categories of stakeholders:

- Municipalities of the areas concerned
- Governorate/provincial governments including planning authorities and those responsible for agriculture and natural resource use

- Informal local organizations, tribal leaders, CBOs
- Associations or other organizations of small scale natural resource users (farmers, pastoralists including water buffalo breeders, fishermen, hunters).
- Other national Ministries and national Government agencies including their branch offices at Governorate level
- Businesses, including agricultural businesses and extractive industry
- Nature conservation, environmental and sustainable development related NGOs with activities or interests in the Marshes

Following a tentative first decision on the area of a future PA in the Marshes, the management planning team needs to establish who/which exactly are the relevant individuals and institutions within each of the above categories, and why they are stakeholders. Institutions or individuals can be stakeholder of the management planning process for the following reasons:

- **Interests** (e.g. natural resource use interests or oil exploration interests).
- **Rights** (e.g. legal rights or competencies for policy and activities affecting the Marshes such as infrastructure development, or traditional use rights of natural resources).
- **Ownership** (e.g. land ownership).
- **Knowledge** (e.g. knowledge that could fill the identified knowledge gaps listed in Section 7 above).
- **Impact or influence** (e.g. impacted by the establishment of a PA though restrictions of access or natural resource use, or impacting the establishment through political influence, financing, public opinion leadership
- **Contributions** (e.g. resources, funding, volunteer contribution of expertise, advocacy support etc.).

The results of this identification process, which should be informed by Section 7 of Garstecki & Amr (2001), previous experience of the planning team and input from existing local and national partners, could be summarized in tabular form as shown in Table 13.

Identified stakeholders will then be mapped on a power-interest grid (Imperial College London 2007) as shown in Table 14. This grid has two dimensions:

- On the interest axis, the strength of the stake (interest, right, knowledge) etc. is mapped. Those stakeholders that depend strongest on the Marshes, or for which the marshes are most important in another way, are mapped furthest on the right on this axis.
- On the power axis, the power of the stakeholders to influence the direction or outcome of the management planning process is mapped. It is important to note that "power" specifically refers to power to practically influence the planning and implementation of the management regime for a future PA, and does not necessarily imply general socio-economic power (although these

are often related). For instance, under weak law enforcement conditions, poor local resource users can have a very powerful impact on PA management, because they might simply continue unsustainable resource use practices.

- This mapping can be refined by mapping stakeholders in a more gradual manner, i.e. by replacing the dichotomy "high/low" with a gradual scale and mapping stakeholders accordingly.

It is also important to map the various stakeholders in relation to the overall management regime including its implementation, and not just the formal management planning process. Many local stakeholders may have only limited power in relation to the formal planning process but considerable power in relation to the implementation of the final plan on the ground (particular under weak enforcement conditions). They need to be engaged as powerful stakeholders from the onset, in order to avoid production of unrealistic plans.

This power-interest grid will be used in the objective setting step in relation to stakeholder's engagement, in order to design specific sets of engagement objectives for each quadrant of the grid.

A preliminary stakeholder analysis at the management planning training workshop on 16 February yielded a wide range of stakeholders and a differentiated yet controversial picture of the relative powers and interests of the various stakeholders (Figure 1). It is obvious that this was only a first snapshot of the stakeholder spectrum affecting the management planning process and that a more in-depth analysis will need to be conducted during the main process.

**Table 13.** Analytical table for identifying and prioritizing stakeholders of the management process for the Marshes.

| Stakeholder | Category | Description of stake | Interest | Power | Priority |
|---|---|---|---|---|---|
| **Explanation: Name identified stakeholder** | List category (national Government, local resource user, etc.), | Verbal description of stake (interest, right, ownership, influence etc.) in the Marshes | Score interest and power on a semi-quantitative scale of 1(low) to 5 (high) | Define priority for stakeholder engagement (very low, low, moderate, high, very high) | |
| **Example: Oil company XY** | business | Interest in large-scale oil exploitation in immediate vicinity of property | 5 | 5 | Very high |
| **Add additional lines for additional stakeholders** | … | … | … | … | … |

**Table 14.** Power-interest grid to map stakeholders in preparation for engagement strategy development.

| Low Power | Low Interest/stake | High Interest/stake |
|---|---|---|
| High Power | | |
| | - stakeholder 1<br>- stakeholder 2<br>.. | - stakeholder 5<br>- stakeholder 6<br>.. |
| Low Power | - stakeholder 3<br>- stakeholder 4<br>.. | - stakeholder 7<br>- stakeholder 8<br>.. |

**Table 15.** Overall engagement approaches for each quadrant of the interest-power grid.

| | Low Interest/stake | High Interest/stake |
|---|---|---|
| High Power | Keep satisfied | Manage intensively |
| Low Power | Monitor (minimum effort only) | Keep informed |


**Figure 1.** Outcome of the preliminary stakeholder analysis by national experts and stakeholder representatives at the management planning training workshop on 16 February 2012. (Explanations of colours: orange – Government organizations; blue – business stakeholders; yellow – local community institutions/organizations; green – NGOs).

## 10.2 Objective setting for stakeholder engagement

The objective setting for stakeholder engagement will be based on the analysis in the previous Section. Table 15 shows the overall generic engagement approach that will be taken for the organizations in each of the quadrants of the grid.

These four overall approaches for stakeholder engagement objectives are explained into more detail below:

- **Low power-low stake:** This stakeholder category will only have a minimum impact on PA management including the planning process and will accordingly not be addressed by major communication efforts. However, it will be important to monitor the status and involvement of the stakeholders in this group as they may transition into another category. Typically, stakeholders of this category can be involved and informed through general communication means (newsletters etc.) and invited to general information events.

- **Low power-high stake:** Stakeholders that have a strong interest in the management planning process but lack the means to affect (low power) it should in any way be kept well informed about this process. This can be through media such as newsletters or regular information events. However, the fact that a stakeholder has limited powers to influence the management planning process does not mean that their legitimate interests (e.g. livelihood dependency on natural resources from the Marshes) can be ignored. Since it is an overarching objective of the World Heritage Initiative to promote sustainable development in the Marshes for the benefit of their inhabitants and the overall population of Iraq, the stakeholder engagement strategy of the management planning process should reflect this. In practice, this may mean including efforts to increase the power of disfranchised stakeholders though socio-economic empowerment activities.

- **High power-low stake:** High power-low stake stakeholders are those stakeholders who might have a strong impact on the management planning process, based on their relevant institutional power, but are unlikely to do so because their interests or rights are only marginally affected by this process. It is often easiest to keep it this way, by satisfying the limited interests of these stakeholders – which should incur only limited costs to the project. Examples are line Ministries that have power but no strong interaction with sustainable ecosystem and biodiversity management in the Marshes. For instance, the Ministry of Health could be kept satisfied and supportive by including management activities that result in reduced bacterial pollution and improved public health in the Marshes.

- **High power-high stake:** This is the most important stakeholder group because it consists of stakeholders who may have both an interest and the ability to influence the management planning process. Examples may be strong national Ministries such as the Ministry of Oil, or strong local stakeholders such as tribal leaders in the Marshes themselves. These stakeholders need to be managed intensely, and the management plan needs to be negotiated with them from as early a stage as possible. All high power-high stake institutions/individuals should also be involved in regular stakeholder participation structures that will be developed according to Action 21 of Section 3.3.5.

Based on this overall differentiation of approaches to the various stakeholder groups, specific objectives can be derived for each stakeholder, and compiled in a stakeholder engagement strategy.

**Each objective needs to formulate the desired state of support of the stakeholder in question**. For the Ministry of Water Resources, for instance, the objective could read: "The Ministry of Water Resources supports, through its policy, planning and specific management actions including those of CRIM, the provision of a water allocation of XY billion cubic meters per year of YZ quality to the Marsh ecosystem."

In general, more specific objective setting will only be possible following the analysis as listed above and supported by the considerable local expertise of the management planning team and its wider network.

## 10.3 Definition of stakeholder engagement activities

Adequate stakeholder engagement activities need to be defined depending on the objectives developed for each of the stakeholder categories above. **These will be summarized as stakeholder engagement campaign, which is scheduled and budgeted as Activity 1.6.** While specific activities depend on the stakeholders and objectives, the general spectrum of stakeholder engagement measures for each category can be summarized as in Table 16. No specific activities are needed for low interest-low power stakeholders.

Another key way of stakeholder participation will be the public consultation of the draft management plan (see Section 3.3.8) and the participatory development of sustainable natural resource management plans in and around the property (see Section 3.3.5).

**Table 16.** Range of possible stakeholder engagement activities for each of the stakeholder categories as identified in Table 15. All the activities relevant to the lower interest/power categories are also relevant to the higher interest/power categories, but not vice versa.

| Stakeholder category | Activities | Comments |
|---|---|---|
| High interest – low power | Circulation of CEPA materials such as newsletters, information events and information boards | These activities are mainly aimed at informing, i.e. a one-way flow of information to stakeholders. |
| | Announcement on MoE website and other relevant websites such as those | |
| | Press releases and media reports | |
| | Public consultation of draft management plan | Aimed at consultation of stakeholders during the management planning process, including the integration and use of stakeholders' views and expertise in the draft management plan. |
| | Townhall meetings | |
| | Involvement (through contract or voluntarily) in specific management planning tasks | |
| | Consultation committees | Aimed at continuous involvement of stakeholders in the practical management of the site and the decision making processes on which it is based. |
| | Delegation of co-management authority to local organizations | |
| Low interest – high power | Bilateral negotiations | Aimed at identifying and fulfilling the typically limited interests of this stakeholder category. These stakeholders are typically not interested in the management planning process itself, where it doesn't touch their specific interest. |
| | Joint planning to satisfy limited specific needs of stakeholders | |
| | Involvement in wider stakeholder consultation activities (e.g. draft management plan) | Only where an interest is explicitly stated by the stakeholder. |
| High interest – high power | Invitation to steering committee of management planning process | Aimed at giving special privileges to Government institutions and other high-power stakeholders (the latter only to the extent foreseen by Iraqi law), the support of which is a prerequisite for the establishment of a successful management regime. |
| | Involvement in internal review of draft management plan prior to public consultation (Government institutions only) | |
| | Involvement in formal approval of management plan by Council of Ministers (Ministries only) | |
| | Engagement to influence policy to promote sustainable Marshes management though policies and practice in respective spheres of authority | Proactive engagement of high power stakeholders to mainstream sustainable ecosystem and biodiversity management in the Marshes into their policies and practice. |
| | Involvement in governing body of PA (to the extent permitted under Iraqi law) | If a decision making body is established for each individual PA, then a limited number of high power stakeholders can be involved in it. |

The stakeholder engagement campaign should be developed early in parallel to the initiation of the management planning process (see Section 4), and should be implemented, monitored and revised (if needed) based on adaptive management principles.

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# 12 Appendices

## Appendix 1: Ramsar and UNAMI-UNCT checklist of wetland ecosystem services

**BOX 1. [A] Indicative list of {ecosystem services} for the evaluation of Socio-economic featuers of wetlands for management planning**

(derived from [Appendix 2] of CBD's [Voluntary guidelines on Biodiversity-inclusive environmental impacts], see Resolution [X.7] [and Handbook 16m in the present series])

**Regulating services** responsible for maintaining natural processes and dynamics

**Biodiversity-related regulating services**

- maintenance of genetic, species and ecosystem composition
- maintenance of ecosystem structure
- maintenance of key ecosystem processes for creating or maintaining biodiversity

**Land-based regulating services**

- decomposition of organic material
- natural desalinization of soils
- development / prevention of acid sulphate soils
- biological control mechanisms
- pollination of crops
- seasonal cleansing of soils
- soil water storage capacity
- coastal protection against floods
- coastal stabilization (against accretion / erosion)
- soil protection
- suitability for human settlement
- suitability for leisure and tourism activities
- suitability for nature conservation
- suitability for infrastructure

**Water related regulating services**

- water filtering
- dilution of pollutants
- discharge of pollutants
- flushing / cleansing
- bio-chemical/physical purification of water
- storage of pollutants
- flow regulation for flood control
- river base flow regulation
- water storage capacity
- ground water recharge capacity
- regulation of water balance
- sedimentation / retention capacity
- protection against water erosion
- protection against wave action
- prevention of saline groundwater intrusion
- prevention of saline surface-water intrusion
- transmission of diseases
- suitability for navigation

**Water related regulating services** (ctd.)

- suitability for leisure and tourism activities
- suitability for nature conservation

**Air-related regulating services**

- filtering of air
- carry off by air to other areas
- photo-chemical air processing (smog)
- wind breaks
- transmission of diseases
- carbon sequestration

**Provisioning services**: harvestable goods

*Natural production*:

- timber
- firewood
- grasses (construction and artisanal use)
- fodder & manure
- harvestable peat
- secondary (minor) products
- harvestable bush meat
- fish and shellfish
- drinking water supply
- supply of water for irrigation and industry
- water supply for hydroelectricity
- supply of surface water for other landscapes
- supply of groundwater for other landscapes
- genetic material

*Nature-based human production*

- crop productivity
- tree plantations productivity
- managed forest productivity
- rangeland/livestock productivity
- aquaculture productivity (freshwater)
- mariculture productivity (brackish/saltwater)

**Cultural services** providing a source of artistic, aesthetic, spiritual, religious, recreational or scientific enrichment, or nonmaterial benefits.

**Supporting services** necessary for the production of all other ecosystem services

- soil formation,
- nutrients cycling
- primary production.
- evolutionary processes

**Source: Ramsar Convention Secretariat 2010b**

**Table 2.1. Ecosystem Services Provided by or Derived from the Iraqi Marshlands**

| Service | Sub-category | Examples |
|---|---|---|
| **Provisioning services – the goods of products obtained from Marshlands' ecosystems** | | |
| **Food** | Crops | Paddy rice, great millet, dates, vegetables and fruits |
| | Livestock | Asian water buffalo, cattle, sheep, water-buffalo milk and yogurt |
| | Capture fisheries | Shrimp, yellowfin seabream, khishni |
| | Aquaculture | Cyprinids, grass carp, shellfish |
| | Wild foods | Wild boar, waterfowl (coot, teal), desert monitor |
| **Freshwater** | | Freshwater for drinking, cleaning, cooling, and transportation (canoeing and boating) |
| **Fiber and fuel** | Fiber | Reeds for housing and mats; date palm wood |
| | Fuels | Reeds, crude oil, cattle dung |
| **Biochemical** | | Potential use of Marsh flora extracts, native herbs for pharmaceuticals and pest control |
| **Genetic materials** | | Resistance and breeding of native plant and animal species |
| **Regulating services – the benefits obtained from the Marshland ecosystems' control of natural processes** | | |
| **Climate regulation** | | Moderation of the national rainfall patterns and control desertification and dust storms |
| **Water regulation** | Hydrological flows | Storage and retention of water flowing from Euphrates-Tigris system upstream and tidal flow downstream; Permeable clay and silt facilitates recharge of the Recent Alluvium aquifer |
| | Water purification and waste treatment | Removal of harmful pollutants from water by trapping metals and organic materials; soil microbes degrade organic waste rendering it less harmful |
| **Erosion regulation** | | Reeds, grasses and estuarine vegetation retain soils and sediments |
| **Natural hazard regulation** | | Marsh areas naturally absorb seasonal floods and tidal surges; moderation of drought at a local scale |
| **Pollination** | | Habitat for bees and birds, the key pollinators of economically important crops |
| **Cultural services – the nonmaterial benefits that Iraqis obtain from Marshlands ecosystems** | | |
| **Ethical values** | | Customs, oral traditions, knowledge and rituals attached to the use of the land and rivers; Iraqi tangible and intangible cultural heritage; an area of global importance |
| **Recreation and tourism** | | Canoeing, bird and wild-life watching, recreational fishing, archaeological site visitation, Marsh communities |
| **Aesthetic** | | Globally significant natural beauty |
| **Educational** | | Science, cultural awareness, specialized vocational training, public awareness of national, regional and global importance |
| **Supporting services – the underlying processes that are necessary for the production of all other ecosystems services** | | |
| **Soil formation** | | Retention of sediment, recycling and supporting the health of the ecosystem |
| **Nutrient cycling** | | Returning phosphorus, sulfur and nitrogen to Iraq's atmosphere, water and soils |

**Appendix 2:** Guidance on the development of management options Thomas & Middleton (2003) p. 38

**Box 11. *Guidelines* for identifying and evaluating management options**

**First**:

Ask these questions:

- In what different ways might the objectives be achieved?
- What possible options exist?
- What combination of options fit together to form coherent plans?

In answering such questions, the planner should:

- repeatedly refer back to, and check options against objectives, to ensure that any option does contribute to achieving what was originally intended; and look forward and work out the interaction of options – and the design and management implications of possible solutions;
- be aware of constraints and evaluate each option to see if it is realistic (inspiration, intuition, lateral thinking and originality have a special place here); and
- develop options to the stage where they have spatial expression and the management implications of each are clear (although it is wasteful to develop each option to detailed design).

**Then**:

Ask these questions:

- Which options represent the best value for money?
- What is the 'best' set of options?
- Which options meet pre-agreed criteria?

In answering such questions, the planner may wish to consider:

- which alternative meets the objective best;
- whether the alternative will work;
- whether each scheme is financially feasible;
- how acceptable the options are to politicians and the wider public; and
- who wins and who loses– that is which groups of society will benefit from the scheme and which will suffer disadvantages.