The Republic of Iraq

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

Nomination Dossier for Inscription of the Property on the World Heritage list

January - 2014

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Table of Contents

Executive Summary

The State Party
The Republic of Iraq

The Administrative Governorates
The Governorates of Al Muthanna, Dhi Qar, Maysan and Al Basrah

Name of the Nominated Property
The Ahwar of Southern Iraq and the Relict Landscape of the Mesopotamian Cities

Textual Description of the Property

*The Ahwar of Southern Iraq and the Relict Landscape of the Mesopotamian Cities*is a mixed serial heritage property located in the southern region of the Republic of Iraq. The nominated property comprises seven components, four of which are natural with associated cultural values whereas the three other components are cultural. The natural components include the Huwaizah, Central, East and West Hammar Marshes while the cultural components comprise the Archaeological Cities of Uruk and Ur together with Tell Eridu Archaeological Site.

The northern, northeast and northwest areas of the property 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 property is located within theAl Basrah governorate towardsthe Shatt Al Arab River.

With regards to the natural components, the Huwaizah Marshes are located within the governorate of Maysan to the east of the Tigris River. Huwaizah is bordered to the east and southeast by the international boundary with Iran, to the south and southwest by the Al BasrahGovernorate's administrative boundary, and to the north and west by the administrative boundary of Maysan Governorate. The Huwaizah Marshes represent the northeast corner of the property. 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

AlBasrahGovernorate to the east (western Al Qurna sub-district), the city of Al Amarahto the north, and the city of An Nasiriyah to the west. The East Hammar Marshes are entirely located within Al BasrahGovernorate more specifically to the north of Al Basrah City. They are bordered to the east and northeast by the Shatt Al Arab, to the north by the Euphrates, to the northwest by the West Hammar component and to the south and southwest by the Zubair Plateau. The West Hammar Marshes lie fully within the Dhi QarGovernorate southwest of An NasiriyahCity. They are bordered to the north by the Euphrates, to the east by the East Hammar Marshes and to the south by the Zubair Plateau and the General Drainage Channel separating the plateau from the southern desert in the east.

As for the cultural components, the Uruk Archaeological City is located within Al MuthannaGovernorate some 33km east of As SamawahCity. The Ur Archaeological City is located in the Governorate of Dhi Qar 18km southwest of An Nasiriyah. Tell Eridu Archaeological Site is also located in Dhi Qar some 36km southwest of An Nasiriyah.

Coordinates and Size of the Property

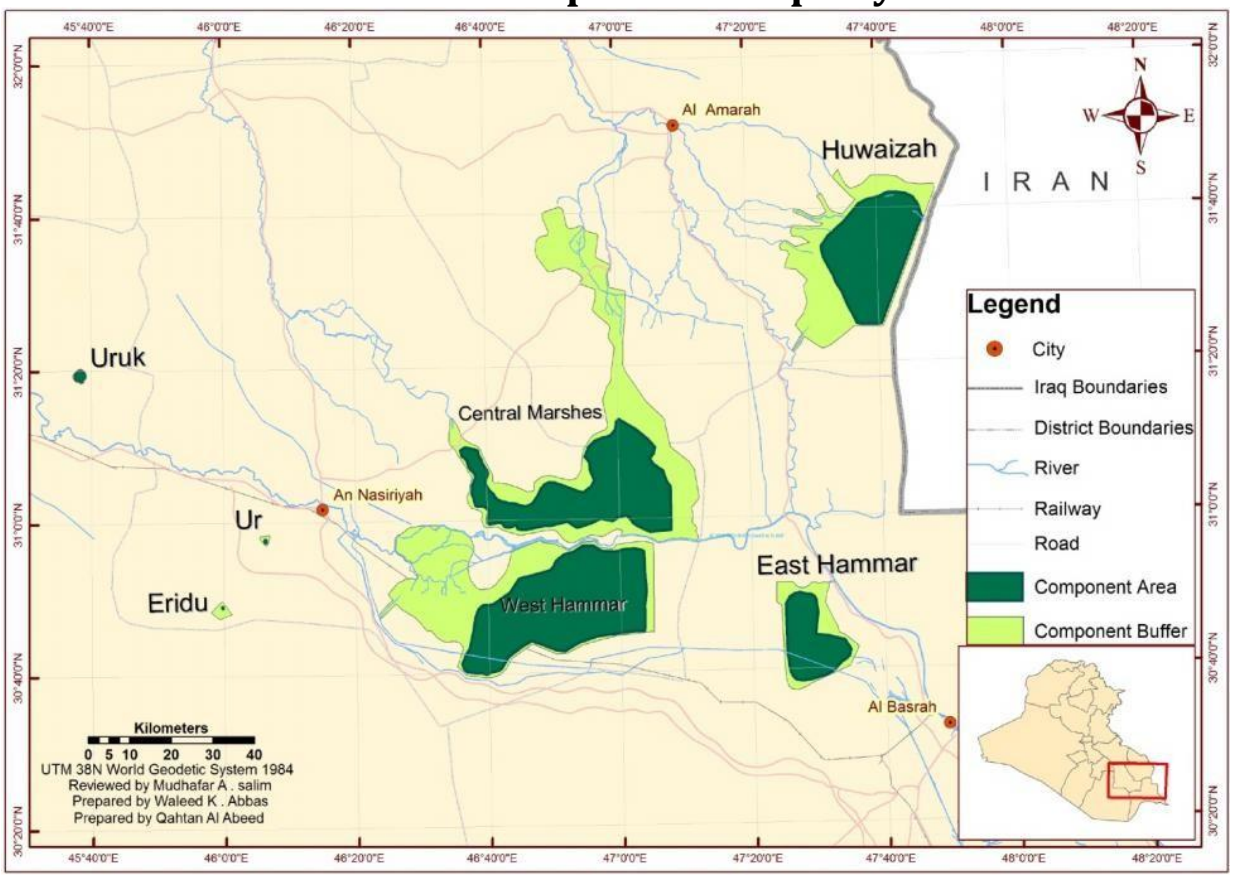
Centre Point Coordinates of the Property Components

ID n°	Name of the component	Governorate(s)	Coordinates of the central point	Map n°
1	The Huwaizah Marshes	Maysan	N 31 33 44 E 47 39 28	1.5
2	The Central Marshes	Dhi Qar, Maysan	N 31 05 07 E 47 03 15	1.6
3	The East Hammar Marshes	Al Basrah	N 30 50 30 E 46 41 03	1.7
4	The West Hammar Marshes	Dhi Qar	N 30 44 21 E 47 26 19	1.8
5	Uruk Archaeological City	Al Muthanna	N 31 19 27 E 45 38 14	1.9
6	Ur Archaeological City	Dhi Qar	N 30 57 47 E 46 6 11	1.10
7	Tell Eridu Archaeological Site	Dhi Qar	N 30 49 01 E 45 59 45	1.11

Size of the Property Components and Their Associated Buffer Zones

Id n°	Name of the component part	Governorate(s)	Area of nominated component of the property (ha)	Area of the buffer zone (ha)	Map n°
1	The Huwaizah Marshes	Maysan	48,131	42,561	1-5
2	The Central Marshes	Dhi Qar , Maysan	62,435	83,958	1-6
3	The East Hammar Marshes	Al Basrah	20342	12,721	1-7
4	The West Hammar Marshes	Dhi Qar	79,991	68,403	1-8
5	Uruk Archaeologica l City	Al Muthanna	541	292	1-9
6	Ur Archaeological City	Dhi Qar	71	317	1-10
7	Tell Eridu Archaeologica l Site	Dhi Qar	33	1,069	1-11
Total area of the property and buffer zones			211,544	209,321	

General Map of the Property



Statement of Outstanding Universal Value

The Ahwar of Southern Iraq and the Relict Landscape of the Mesopotamian Cities is a serial mixed property for natural and cultural heritage. It comprises seven components, four of which are natural and three cultural. The natural components embrace significant cultural values as well. The property extends through the four governorates of Al Basrah, Maysan, Dhi Qar and Al Muthanna within the deltaic alluvial plain of the Tigris and Euphrates Rivers over a total area of 210,898.91 ha. An additional 207,643.04 ha are proposed for inclusion in the buffer zone. The sea level variation and the climatic changes in southern Iraq over the past 7,000 years played a significant role in influencing the geographical location of the Ahwar (or Marshlands) which moved southeastward some 4,000 years ago.

The archaeological sites of Uruk, Ur and Eridu form the three cultural components of the property and were originally situated within the marshy landscape of the deltaic plan. Between the 4th and 3rd millennia BCE, they developed into some of the most significant urban centers of southern Mesopotamia and saw the origin of writing, monumental architecture, and complex technologies and societies. Their remains offer a complete testimony to the growth and achievements of southern Mesopotamia urban centers and societies, and to their outstanding contribution to the history of the Ancient NearEast and mankind as a whole. Topographical and architectural elements, together with archaeological evidence and an important corpus of cuneiform texts, document the economic and symbolic role of the wetland resources and landscape for the cultures of ancient southern Mesopotamia. The regression of the Arabian Gulf and the shifting of the marshes' location contributed to the decline of these cities. Today the mudbrick ruins of Uruk, Ur and Eridu are dominated by the remains of ziggurats towering above the arid but striking landscape of the desiccated plain as testimonies of the antiquity and achievements of southern Mesopotamian cultures and of the impact of the unstable deltaic landscape upon the rise and fall of their large urban centers.

The natural components of the property are the Ahwar of southern Iraq as we know them today and which were formed around 3,000 years ago. Fed by the branches of the Tigris and Euphrates, in addition to extremely low winter rainfall and subsequent floods, the Huwaizah, Central, East and West Hammar Marshes constitute the four natural components of the property. The Ahwar are one of the world's most important freshwater ecosystems situated within an extremely arid environment with some of the highest evaporation and transpiration levels, and some of the lowest levels of rainfall. They can be considered a "wetland island in a vast ocean of desert". The Ahwar embrace a mosaic of habitats critical for a significant number of taxa, including globally threatened and range-restricted species and isolated populations, thus creating a site of global caliber in terms of species of conservation priority. The grand mosaic of the four natural components of the property is an exceptional example of ongoing ecological and biological processes in the development and adaptation of terrestrial, fresh and salt water ecosystems and communities of various taxa of an endemic and restricted range nature. The Ahwar are a vast habitat and refuge for many of the viable populations of taxa of high biodiversity and conservation, particularly bird and fish species. Furthermore, they comprise the last

stopover area for millions of migrating birds before entering the vast Arabian Desert. This testifies to the paramount importance of the Ahwar for biodiversity conservation. Their unique hydrological system is in itself an outstanding natural phenomenon, representing a wetland that fluctuates in size in a seasonal manner. The Ahwar have developed an amazing ecological resilience, particularly after their drastic destruction during the second half of the last century and their re-flooding at the beginning of the new millennium. Furthermore, the property contains highly important and significant habitats for in-situ conservation of biological diversity, including those containing threatened species of high conservation and scientific importance. Finally, three of the natural components of the property include several dozen small archaeological mounds that testify to the history of human occupation in the Ahwar.

On the basis of these qualities, the State Party proposes to inscribe the property under criteria (iii), (v), (ix), and (x).

Eridu, Uruk and Tell Ur are protected under the Iraqi Law of Antiquities and Heritage and designated as archaeological sites. Management plans ensuring the continuous protection and conservation of their outstanding universal values will be implemented as of 2014. All their major archaeological and architectural features are contained within the boundaries of the property, ensuring that each component part bears a complete significance and contributes to expressing the outstanding universal value of the property as a whole. Considering the particulars of mudbrick architecture, the conditions of integrity and authenticity as regards the material and substance are considered to be met by the visible presence of a series of emblematic public buildings, particularly four ziggurats. Authenticity in form and design is also well retained in its relations to the urban layout. As regards location and setting, and considering that the marshes moved southeastward through space and time, the conditions of authenticity are considered to be met by including in the property the ancient cities of Ur and Uruk together with Tell Eridu in conjunction with the Huwaizah, Central, East Hammar and West Hammar Marshes. These bear highly significant ecological, historical and scientific values and, as such, offer the closest living representation of the conditions in which the earliest and longest-lived cities formed in alluvial Mesopotamia.

The four natural components of the property and their associated corridors and buffer zones are of sufficient size to adequately support all key natural values including the ongoing ecological and biological processes occurring in its terrestrial, water and marshland ecosystems. Two of the four natural components have an existing legal designation. Existing legal frameworks in relationship to the Ahwar are well developed with the national nature conservation bylaw endorsed by the government cabinet. The maintenance and improvement of the conservation status of the Ahwar is of high national priority, and the conservation measures (both in place and in preparation) are all geared towards the maintenance and promotion of the outstanding universal value. The key factors addressed in the legal and management frameworks for the four natural components of the property are related to fluctuating water quality and quantity, illegal hunting and fishing, harvesting of vegetation cover, and oil extraction. The evaluation of such challenges is undertaken by the Ministry of Environment and other national and

international partner organizations, and has currently revealed that such constraints are of limited impact on the key natural heritage values and attributes.

World Heritage Criteria and Their Justification

Criterion (iii)

The remains of the Mesopotamian cities of Uruk and Ur together with Tell Eridu offer a complete testimony to the growth and subsequent decline of southern Mesopotamian urban centers and societies from the Ubaid and Sumerian periods until the Babylonian and Hellenistic periods. The three cities were major religious, political, economic and cultural centers which emerged and grew during a period of profound change in human history. They bear witness to the full repertoire of the contribution of southern Mesopotamian cultures to the development of ancient Near Eastern urbanized societies and the history of mankind as a whole: the construction of monumental public works and structures in the form of ziggurats, temples, palaces, city walls, and hydraulic works; a class structured society reflected in the urban layout which included royal tombs and palaces, sacred precincts, public storehouses, areas dedicated to industries, and extensive residential neighborhoods; the centralized control of resources and surplus which gave rise to the first writing system and administrative archives; and conspicuous consumption of imported goods. This exceptionally creative period in human history left its marks across place and time.

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 4th 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. *TheGilgamesh 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.

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.

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.

Criterion (V)

The remains of the ancient cities of Uruk, Ur and 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 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. Architectural elements, archaeological evidence and an important corpus of cuneiform texts further document how the landscape of wetlands – beside providing these urban centers with natural resources used for building, fuel, food and agriculture and with water transportation – contributed to shaping the religious beliefs, cultic practices, and literary and artistic expressions of successive cultures in southern Mesopotamia. As the Arabian Gulf regressed to the south during the 2nd and 1st millennia BCE, the landscape of wetlands moved to the southeast of the deltaic plain where new settlements developed. The contemporary Ahwar of Southern Iraq bear a strong cultural significance as they offer the closest living representation of the environmental context which fostered the development of the first cities and complex societies in the region, and fashioned the worldview of Mesopotamian cultures. The association of the contemporary Ahwar with some of the most prominent and best documented ancient urban centers of southern Iraq allows for understanding the unique ancient cultural landscape of alluvial Mesopotamia where cities were islands embedded in a marshy plain.

Criterion (ix)

Ongoing Ecological Processes: The proposed site contains outstanding examples representing ongoing ecological and biological processes in the evolution and development of terrestrial, fresh and salt water ecosystems and communities of various taxa. The case for the outstanding universal value of the Ahwar under criterion ix is based on four primary arguments:

Inland delta ecosystem functioning in an extremely hot and arid environment

The Ahwar of southern Iraq may be the largest-scale (> 200,000 ha) wetland ecosystem that is located in the most arid environment globally. The grand mosaic of the four natural components of the property is an exceptional example of ongoing ecological processes which reflect this extreme and harsh environment, particularly regarding the following attributes:

- Almost complete dependence on riverine influx and negligible direct contribution of precipitation on-site to the water budget; this contributes to the largely external factor driving this ecosystem and pronounced seasonality.
- Very high water temperatures around or in excess of 30°C in summer with no thermal stratification of the water column.
- High irradiation (>2,000 kWh m^{-2} a^{-1}), which together with high nutrient concentrations (Al-Imarah et al., 2006), leads to very high primary production, high dissolved oxygen concentrations throughout the water column and high overall ecosystem productivity. Primary production occurs mainly by reed, submerged and floating macrophytes.
- Exceptionally high evapotranspiration and an associated trend towards salinization (Al-Saad et al., 2010), which is further aggravated by anthropogenic factors (Al-Maroofi et al. 2012).
- Unusually strong dependence of the surroundings, including the human population, on the regulating (e.g. microclimate regulation, dust storm reduction, water purification), provisioning (e.g. water, reed, pasture, fish and meat) and cultural ecosystem services provided by the Ahwar of southern Iraq .

The Ahwar have been witnessto long term ecological succession dating back to the ice ages, as well as seasonal cyclical succession. Both successions are driven by non-biological processes (mainly hydrological and geomorphological) which create the foundation of an ecological paradise. The Ahwar have acquired the unique capability of sustaining their ecosystems throughout the ages despite successive natural and manmade pressures.

The unique hydrological system of the Ahwar is in itself an outstanding natural phenomenon, representing a wetland that fluctuates in size in a seasonal manner. Each of the four natural components of the property has its own particular hydrological system which stands independent of the others; thus creating a grand mosaic extending from freshwater dominated marshes in the case of the Huwaizah, through the extensive habitats of the Central Marshes, then descending to the brackish low-salt marshes in the East and West Hammar, and finally reaching the highest salt content in proximity to the sea.

Endemic and restricted range species/subspecies and ongoing speciation

The active ecological processes in the Ahwar create a spectrum of ecological habitats for flora and fauna which has specifically led to the adaptation and evolution of a significant number of animal taxa of an endemic and restricted range nature. These include four mammals including the endemic Bunn's Short-tailed Bandicot Rat and a subspecies of the Smooth-Coated Otter, in addition to the restricted range species of Mesopotamian Gerbil and Euphrates Jerboa. Further, the Ahwar harbors five taxa of birds including the endemic species of Basra Reed Warbler and Iraq Babbler, in addition to the three restricted range subspecies of the Little Grebe, the Black Francolin and the Hooded Crow.

Further, the water bodies of the property are a primary habitat for six restricted-range fish species: *Luciobarbus esocinus, L. xanthopterus, L. subquincunciatus, Cyprinion kais, Silurus triostegus* and *Mesopotamechthys sharpeyi.*

In addition, the Ahwar harbor three bird populations that exist here thousands of kilometers away from their core global populations in Africa, including the African Darter, the Sacred Ibis, and the Goliath Heron. These are likely to be relict populations from past periods of much larger range extensions. This testifies to the extraordinary refuge function of the Ahwar in the face of historical range contractions, and hence to their paramount importance for biodiversity conservation. It has also lead to geographically clearly separated populations in place of formerly continuous species ranges. Hence, a first stage of ongoing speciation is represented, complementing later stages such as those represented by species and subspecies that are almost or fully restricted to the Ahwar. In combination, restricted range species, subspecies and isolated populations of various vertebrate taxa can be considered as evidence of active ongoing adaptation and speciation processes in the Ahwar. Finally, the Ahwar also represent a safe refuge for many other endangered species of animals and birds in particular.

Migration, particularly Waterbirds, Fish and Crustaceans

The bird migration and the migration of fish and shrimp species which occur within the property's habitats reflect an adaptation process by these animals to long-term seasonal fluctuations in water levels and other ecological variables. At least 20 of the 44 fish species of the Ahwar are diadromous species from the Arabian Gulf (Coad, 2010). Most of them frequent the West and particularly East Hammar Marshes, which had already resumed an important role as spawning, nursery and foraging grounds for eleven of them in 2009 (Mohamed et al., 2009). Among them are species of paramount economic importance such as the Hilsa Shad (*Tenulosa ilisha)*, which uses the Ahwar as a spawning and nursery area but occurs and is exploited throughout the Arabian Gulf and beyond, where it contributes significantly to overall catches (Al-Dubakel, 2011). A parallel example among the invertebrates is the commercially important Penaeid Shrimp (*Metapenaeus affinis)*, which uses the East Hammar as a nursery area (Salman et al., 1990). These examples show that the Ahwar of southern Iraq not only are an outstanding ecosystem by themselves but also play a leading role to support lifecycles of fauna, ecosystem functioning and provisioning ecosystem services in the downstream Arabian Gulf.

The fact that the Ahwar are the only suitable large-scale wetland system within thousands of kilometers along two primary bird migration routes leads to their recognition as one of the largest West Eurasian-Caspian-Nile staging points and also wintering grounds for ducks. They are also important as a major stopover point for shorebird species flying along the West Asian-East African flyway. As a result, the Ahwar are considered to be a primary and critically located component of cross-continental flyways, particularly for West-Asian migratory water birds from western Eurasia. Historical abundance of migratory waterbirds in the Ahwar numbered into the millions, and currently, increasing numbers of migratory birds are already being recorded on the property as a result of its restoration since 2003.

Ecosystem resilience

The Ahwar have developed an amazing ecological resilience - i.e. an ability to maintain and restore ecological process integrity and ecosystem function in spite of external disturbance. It has always been the case that the Ahwar would come back to life after destructive events. This remarkable adaptive capacity against fluctuations and environmental change, in addition to the velocity of recovery processes, has been a characteristic of the Ahwar for thousands of years. While high ecological resilience is considered a general feature of many wetlands, the Ahwar of southern Iraq are set apart by the fact that the last dramatic recovery process took place very recently, right after the drastic destruction of the Ahwar during the second half of the last century and the re-flooding of the Ahwar at the beginning of the new millennium.

Criterion (x)

Biodiversity: The proposed site contains highly important and significant habitats for in-situ conservation of biological diversity, including those containing threatened species of high conservation and scientific importance.

The Ahwar of southern Iraq are one of the world's most important freshwater ecosystems situated within an extremely arid environment with some of the highest evaporation and transpiration levels, and some of the lowest levels of rainfall. They can be considered a "wetland island in a vast ocean of desert". The Ahwar embrace a mosaic of habitats critical for a significant number of taxa, including globally threatened and range-restricted species and isolated populations, thus creating a site of global caliber in terms of species of conservation priority.

Overall species richness

Recent records from the Ahwar include a wide variety of species from different taxa encompassing 264 bird species and 44 species of fish (24 freshwater and 20 marine). There are also 38 mammal species if historical records from the 20th Century are included. In addition, 18 reptile species, 3 species of amphibians, 25 Odonata species and 371 plant species are known from the area.

Species of global conservation importance

The Ahwar host 12 globally threatened bird species, such as the vulnerable Marbled Teal. More than 40% of their global population spends the winter on the property. Another vulnerable species, the Basra Reed-Warbler, which is a restricted-range species, has more than 70% of its breeding population in the Marshes.

The Ahwar also include critical natural habitats for three threatened mammal species, including the Smooth-coated Otter and the Bunn's Bandicot Rat, with no recent records of the latter subsequent to the drainage that occurred before 2000.

As for reptiles, the Euphrates Soft-shell Turtle is an endangered species that is only known from a few localities in Iraq and Iran, whereas Murray's Comb-fingered Gecko has a restricted range limited to the Ahwar, Shatt Al Arab and the Iranian western shores on the Arabian Gulf. It was recently evaluated as data deficient on the regional level of the Ahwar, which leaves open the possibility that it is also a threatened species globally.

Lastly, a recent regional assessment of 30 taxa (2 plants, 3 fish, 2 mammals, 1 reptile, and 22 birds) revealed the occurrence of 5 critically endangered species, 12 endangered species, and 13 vulnerable species all on the regional level of the Ahwar.

Irreplaceability of the Ahwar for threatened species

The number of threatened species occurring at a site is not the only aspect of its potential OUV with regard to World Heritage criterion (x). Its irreplaceability is another key attribute. 19 endemic taxa (including species and subspecies) occur in the Ahwar, of which 2 species and 3 subspecies are birds, 3 species and 1 subspecies are mammals, 2 species are reptiles, 6 species are fish, and 1 species are from the order Odonata. In addition, the Ahwar harbor globally significant numbers (more than one percent of global population) of 68 waterbirds species. This further underlines the function of this property as a crucial knot in the fabric of bird migration routes, and also its importance for vertebrates in general.

Contact Information

The document was prepared by the National Committee for the Environmental and Cultural Management of the Ahwarand their World Heritage Nomination.

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Chapter One:

Identification

1.a The State Party

The Republic of Iraq

1.b The Administrative Governorates

The Governorates of Al Muthanna, Dhi Qar, Maysan and Al Basrah

1.c Name of the Nominated Property

The Ahwar of Southern Iraq and the Relict Landscape of the Mesopotamian Cities

1.d Geographical Coordinates to the Nearest Second

Id n°	Name of the component	Governorate(s)	Coordinates of the central point	Map n°
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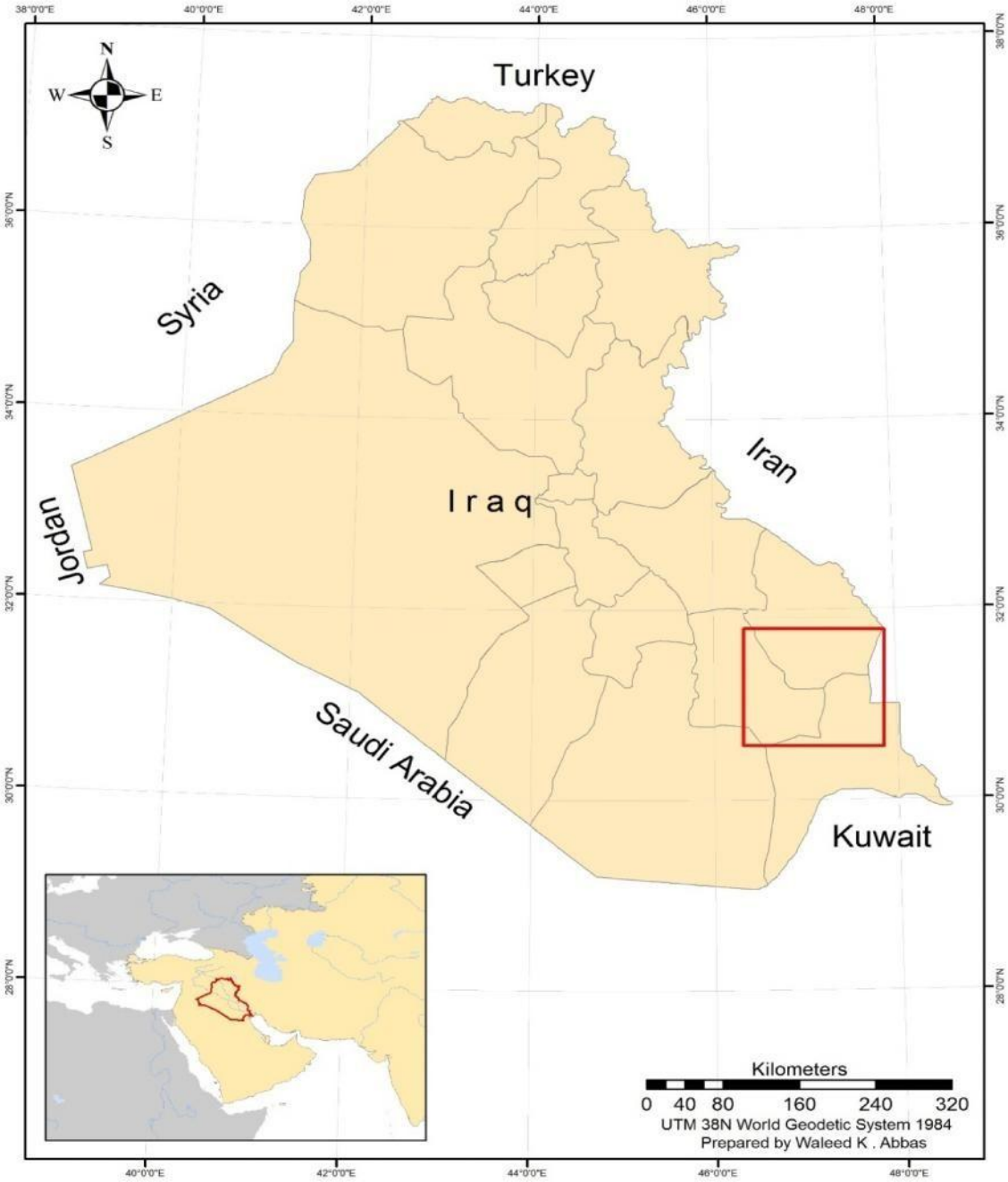
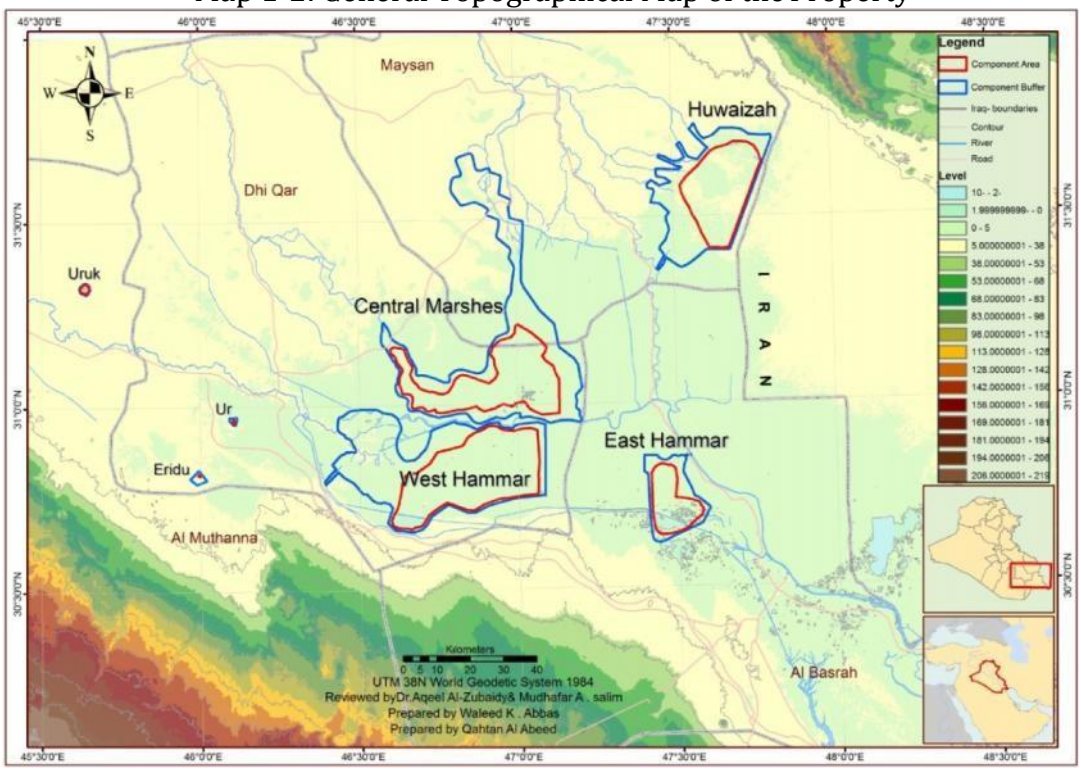
6	Ur Archaeological City	Dhi Qar	N 30 57 47 E 46 6 11	1.10
7	Tell Eridu Archaeological Site	Dhi Qar	N 30 49 01 E 45 59 45	1.11

1.e Maps of the Location and Boundaries of the Property

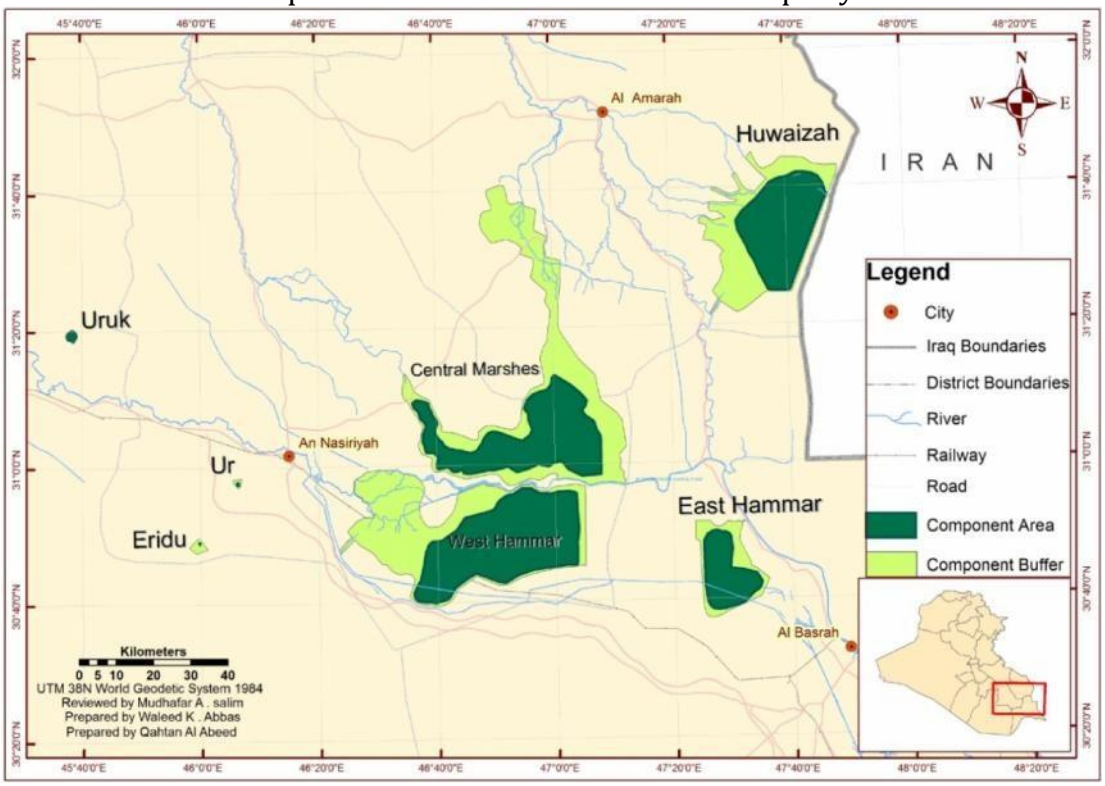
Map 1-1: Property Location in Iraq and Western Asia



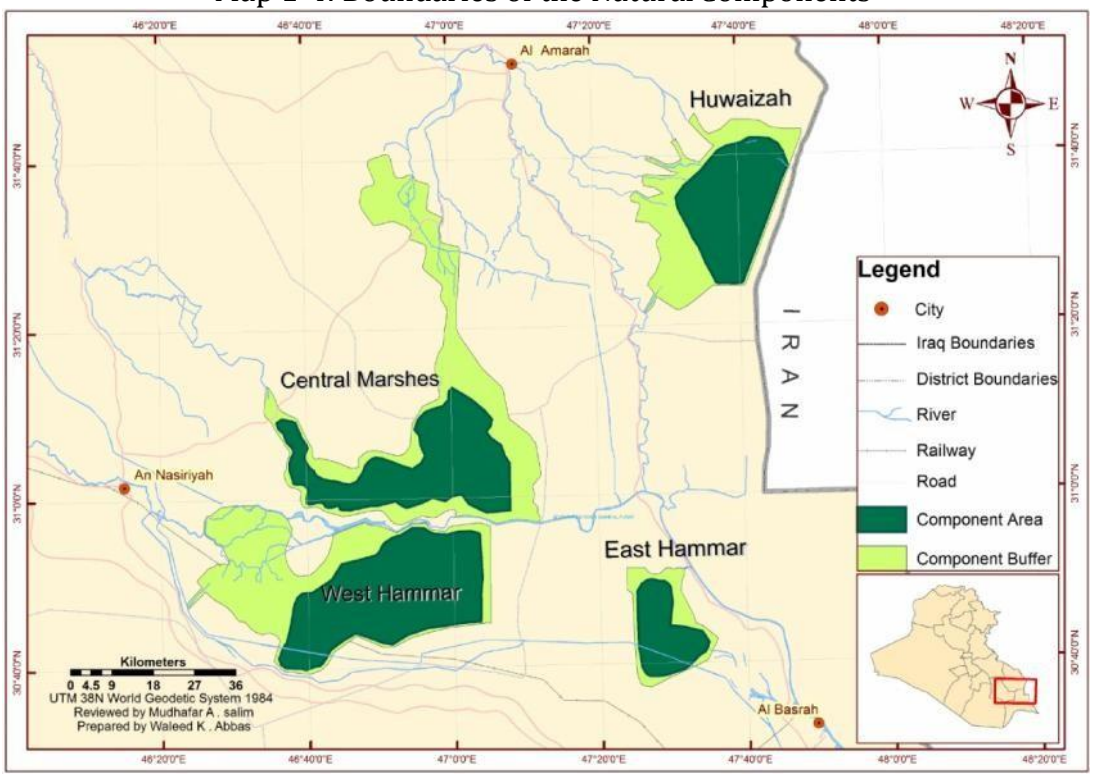
Map 1-2: General Topographical Map of the Property



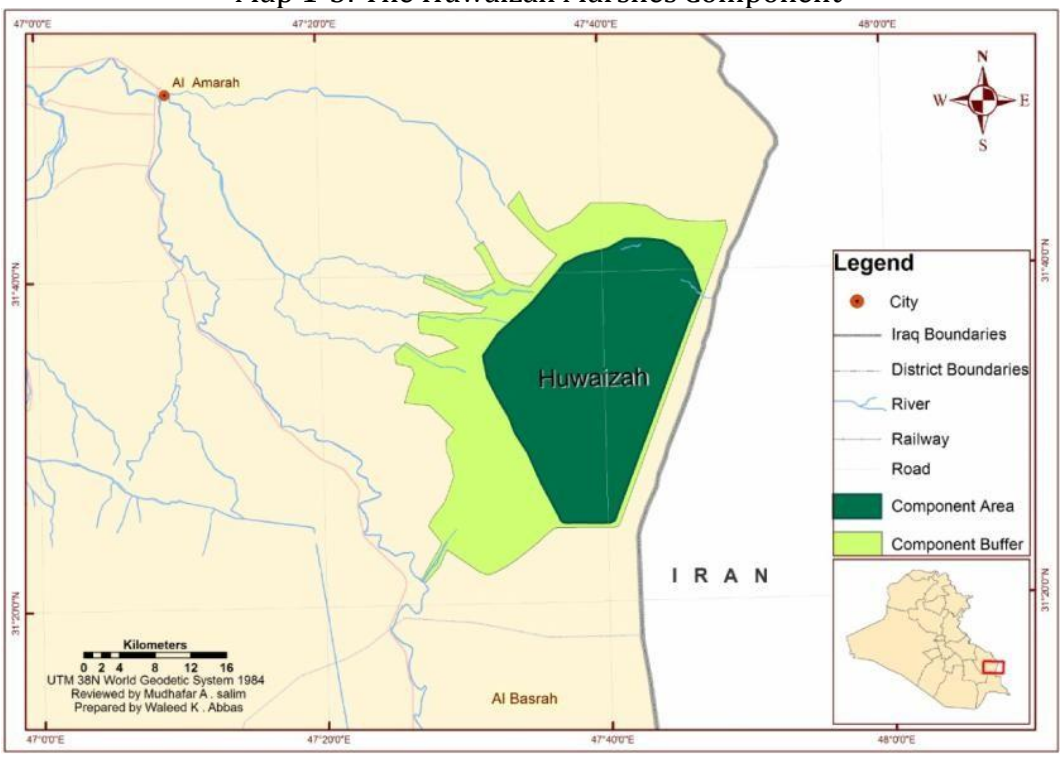
Map 1-3: General Boundaries of the Property



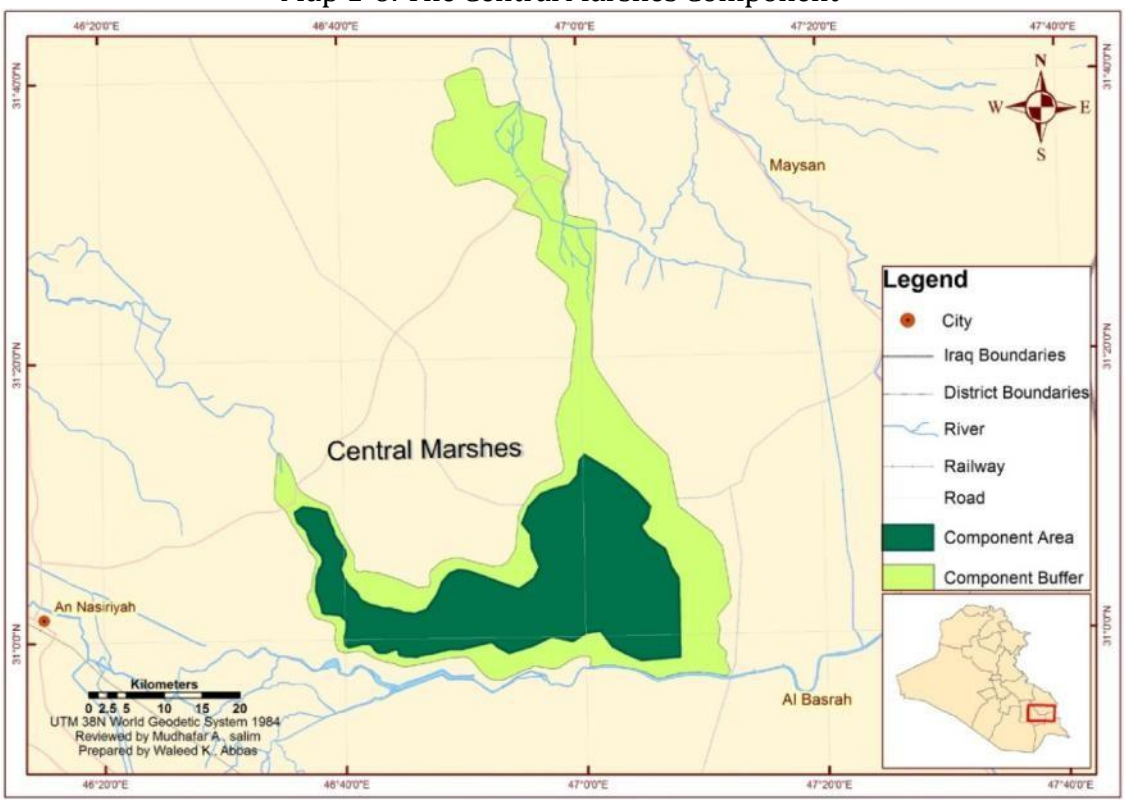
Map 1-4: Boundaries of the Natural Components



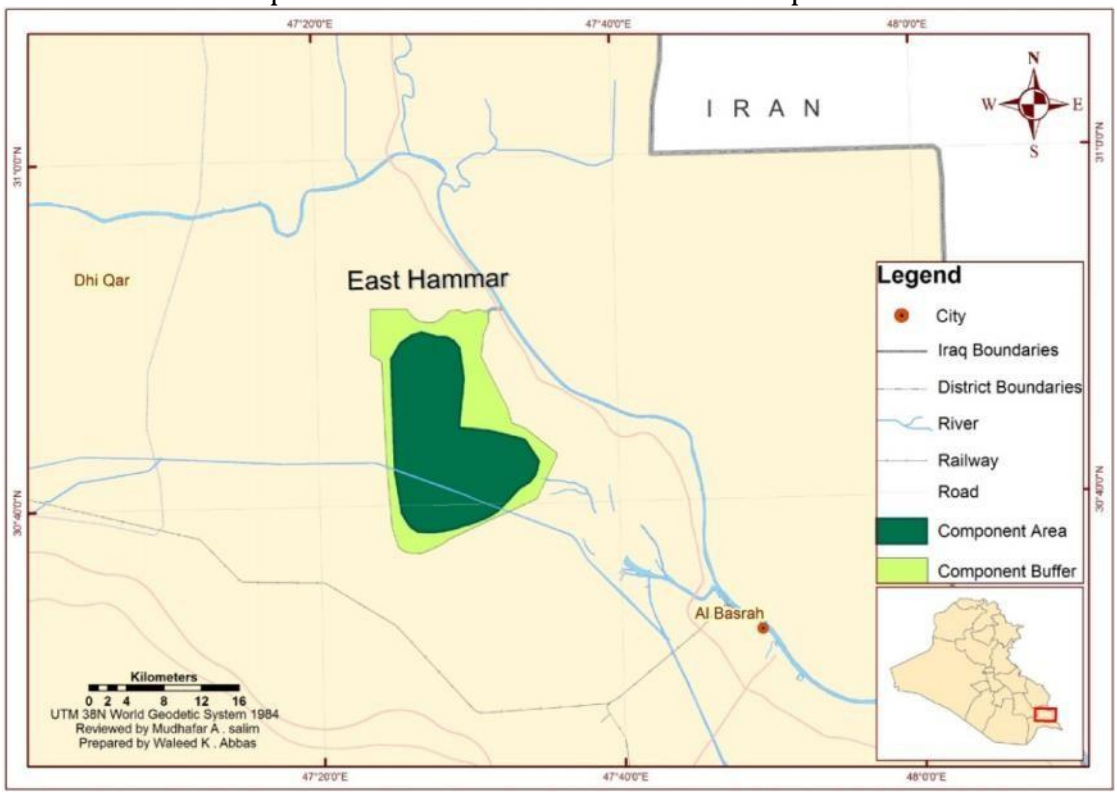
Map 1-5: The Huwaizah Marshes Component



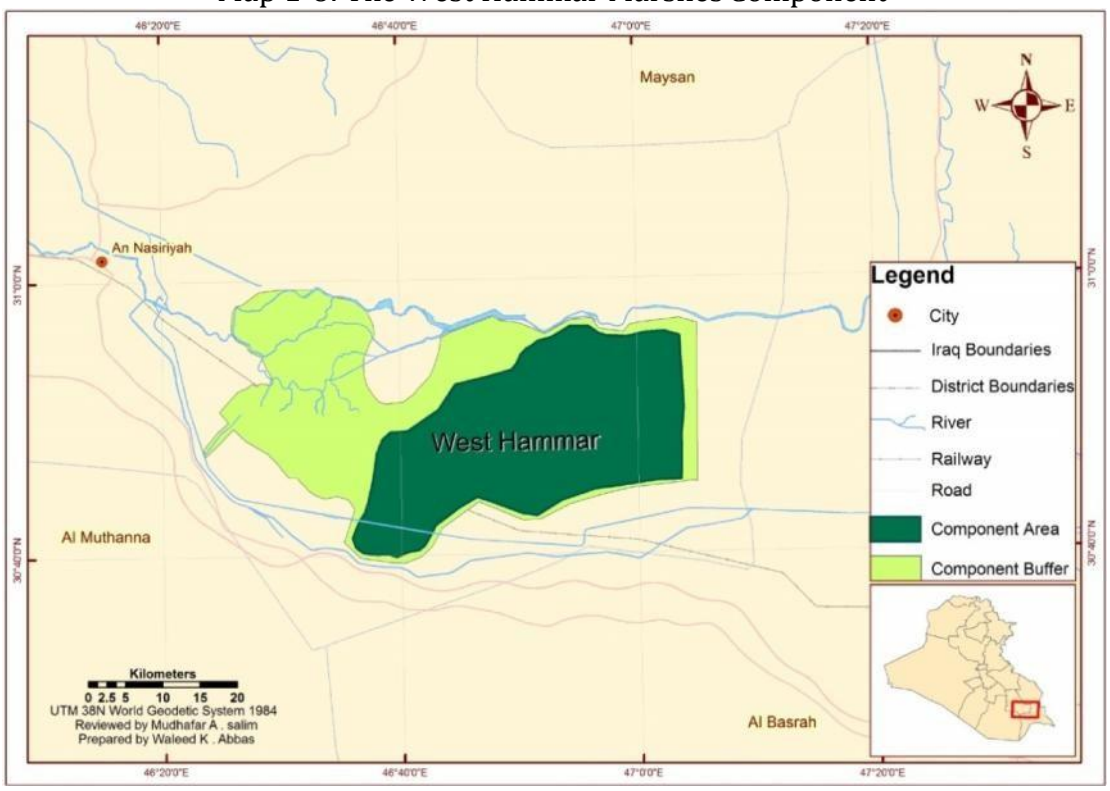
Map 1-6: The Central Marshes Component



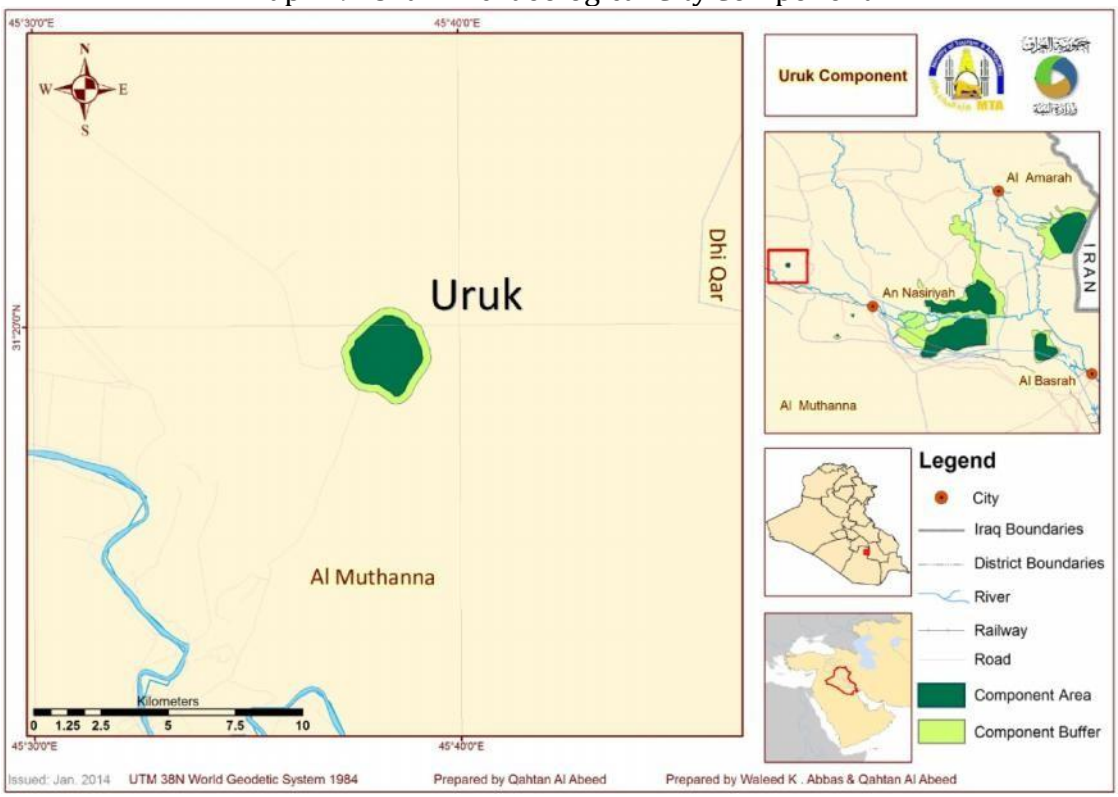
Map 1-7: The East Hammar Marshes Component



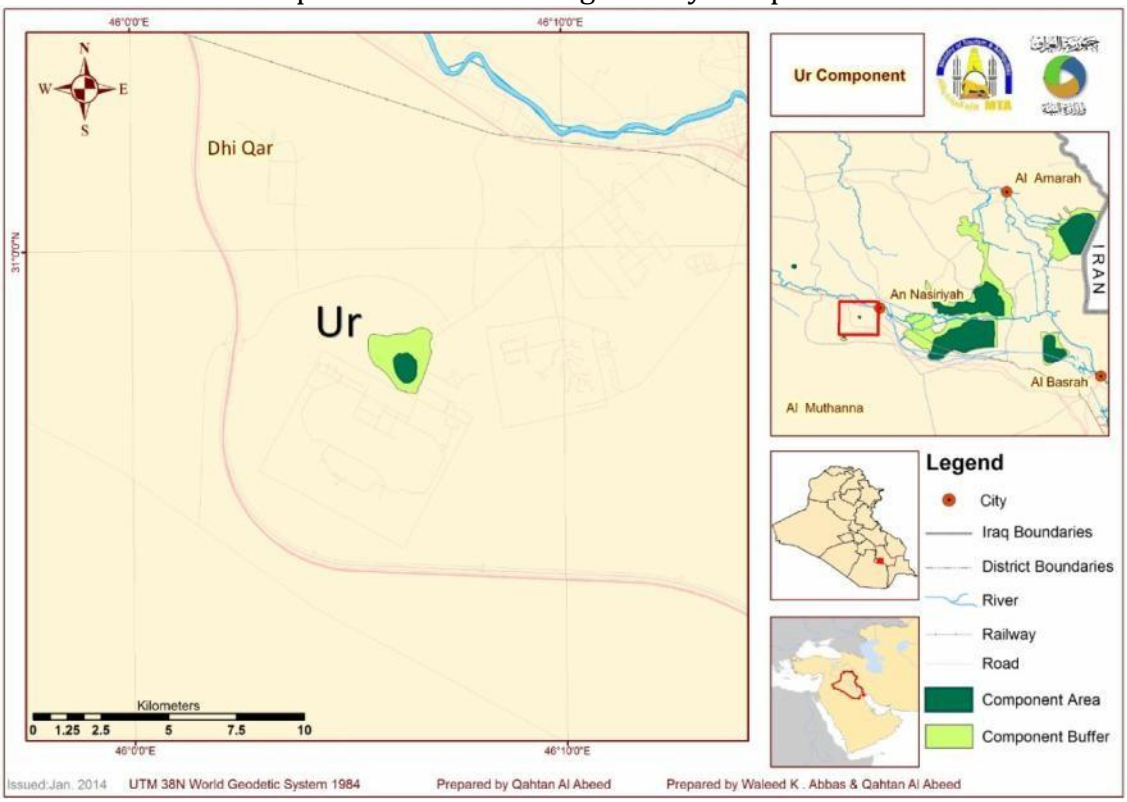
Map 1-8: The West Hammar Marshes Component



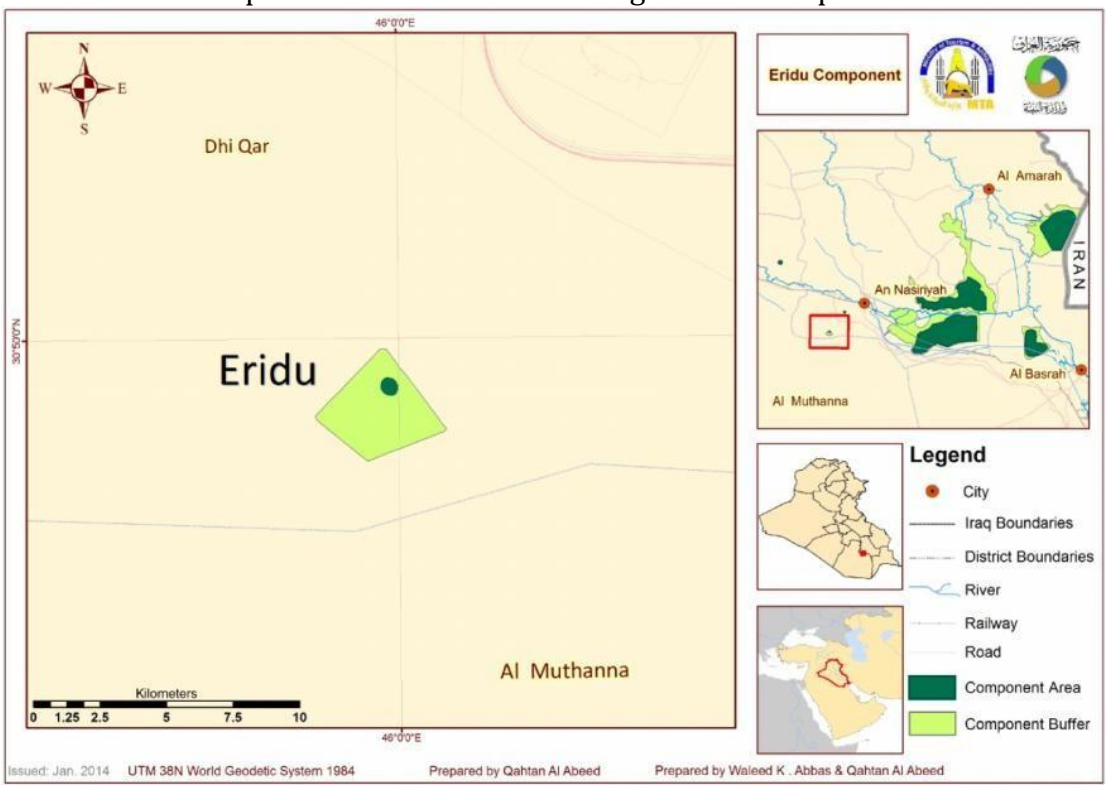
Map 1-9: Uruk Archaeological City Component



Map 1-10: Ur Archaeological City Component



Map 1-11: Tell Eridu Archaeological Site Component



1.f Area of Nominated Property (Components) and Proposed Buffer Zones

Id n°	Name of the component part	Governorate(s)	Area of nominated component of the property (ha)	Area of the buffer zone (ha)	Map n°
1	The Huwaizah Marshes	Maysan	48,131	42,561	1-5
2	The Central Marshes	Dhi Qar, Maysan	62,435	83,958	1-6
3	The East Hammar Marshes	Al Basrah	20342	12,721	1-7
4	The West Hammar Marshes	Dhi Qar	79,991	68,403	1-8
5	Uruk Archaeological City	Al Muthanna	541	292	1-9
6	Ur Archaeological City	Dhi Qar	71	317	1-10
7	Tell Eridu Archaeological Site	Dhi Qar	33	1,069	1-11
Total area of the property and buffer zones			211,544	209,321	

Chapter Two:

Description

2.a Description of the Serial Property

Introduction

The Ahwar of Southern Iraq and the Relict Landscape of the Mesopotamian Cities is a serial mixed natural and cultural heritage property. It comprises seven components, four of which are natural (the Huwaizah, Central, East and West Hammar Marshes) and three cultural (Uruk and Ur Archaeological Cities, and Tell Eridu Archaeological Site).

The four natural components embrace significant cultural values as well, which complement the outstanding universal value of the cultural components. The proposed property extends through the four governorates of Al Basrah, Maysan, Dhi Qar and Al Muthanna over a total area of 211,544 ha. An additional 209,321 ha are proposed for inclusion in the buffer zone.

Description of the Natural Components

According to WWF's 2008 Global Terrestrial Eco-regions Scheme, the natural components of the property are technically referred to as the Tigris-Euphrates Alluvial Salt Marsh, while its southern parts overlap with the Arabian Desert and East Saharo-Arabian xeric shrub-lands. As a whole, the area represents a major part of the alluvial plain which covers vast regions of Iraq. Water covers significant parts of the property throughout the year and often seasonally, leading to the emergence of outstanding bio-geographical features. The Ahwarare a natural phenomenon and major fresh water reservoir of outstanding natural beauty where life flourishes on land and in the water.

The surface area of water in the Ahwarfluctuates in size as it depends on the amount of water entering its various basins from a variety of sources, which also depend on the level of rainfall, floods and streams. The Ahwarare categorized as inland wetlands created by riverine marshes, and are characteristic as a lush wetland within a sea of dry desert. This creates a unique environment where biodiversity evolves and adapts in ways that are hardly comparable to other regions of the world. The result of the interaction between the physical and biological components of the Ahwarcreates the outstanding mosaic of the Ahwarecosystem.

Description of the Huwaizah Marshes

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 transnational area with Iran, to the south and southwest by the BasrahGovernorate's administrative boundary, and to the north and west by the administrative borders of MaysanGovernorate. The city of Al Amarah, the capital of the MaysanGovernorate, is located to the west of the component. The Huwaizah Marshes represent the northeast corner of the property with a total surface area of 90,691ha of primarily freshwater marsh. The Huwaizah is the first

national site declared a Ramsar Site for wetlands of international importance. It fulfills five of the nine criteria and its significance is concentrated around its terrestrial biodiversity which supports more than one percent of the world's population of key and threatened species. The Huwaizah Marshes also represent a global refuge for animals and plants and are an important source of nutrition for fish as well as for breeding.

Description of the Central Marshes

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 BasrahGovernorate to the east (western Al Qurna sub-district), the city of Al Amarahto the north, and the city of An Nasiriyah (capital of the Dhi QarGovernorate) to the west. As the name indicates, the Central Marshes are located in the center of the Ahwar with a total area (including the buffer zone) of 146,393ha. The Central Marshes were the first national park to be declared in Iraq in the year 2013.

Description of the East Hammar Marshes

The East Hammar Marshes are completely located within Al BasrahGovernorate to the north of the city of Al Basrah. They are bordered to the east and northeast by the Shatt AlArab, to the north by the Euphrates River, to the northwest by the West Hammar Marshes and to the south and southwest by the Zubair Plateau. The total area of this component is 33,062ha inclusive of the buffer zone .

Description of the West Hammar Marshes

The West Hammar Marshes lie fully within the Dhi QarGovernorate 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. The area of the component is 148,393ha including the buffer zone.

Topography and Geology of the Ahwar

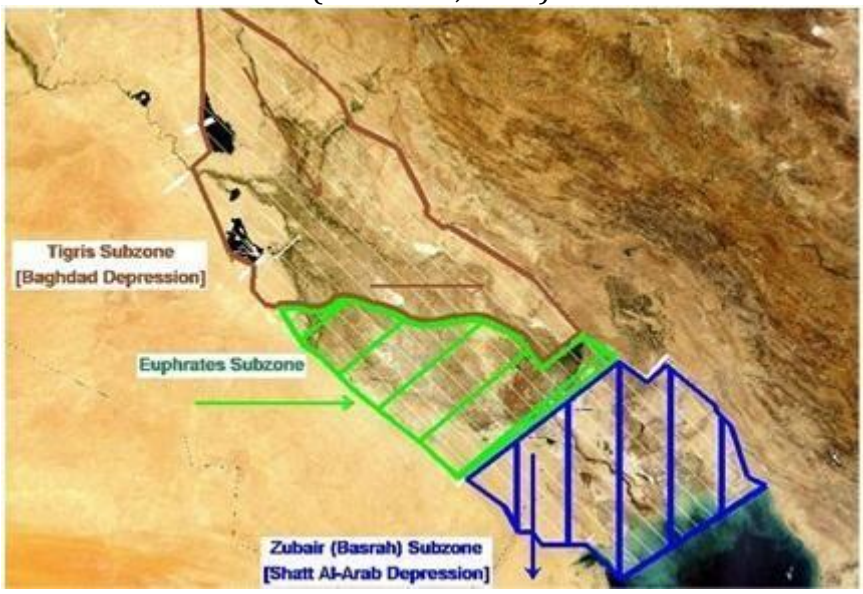
Iraq's topography is subdivided into three zones: the Folds zone, the Alluvial Plain zone and Al Jazirah and Western Desert zone. The Ahwar are located in the southern part of the alluvial plain. The plain is an extensive uniform flat area with minor slopes towards the Arabian Gulf. More specifically, the north-south slope of the Marshes 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 southernmost end of the West Hammar marshes.

The Ahwarare 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 1.4cm every year, concurrent with merely 1.3mm of deposition per year, and in recent years the latter has even declined to 0.4mm per year. The alluvial plain of the Ahwarwas 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)

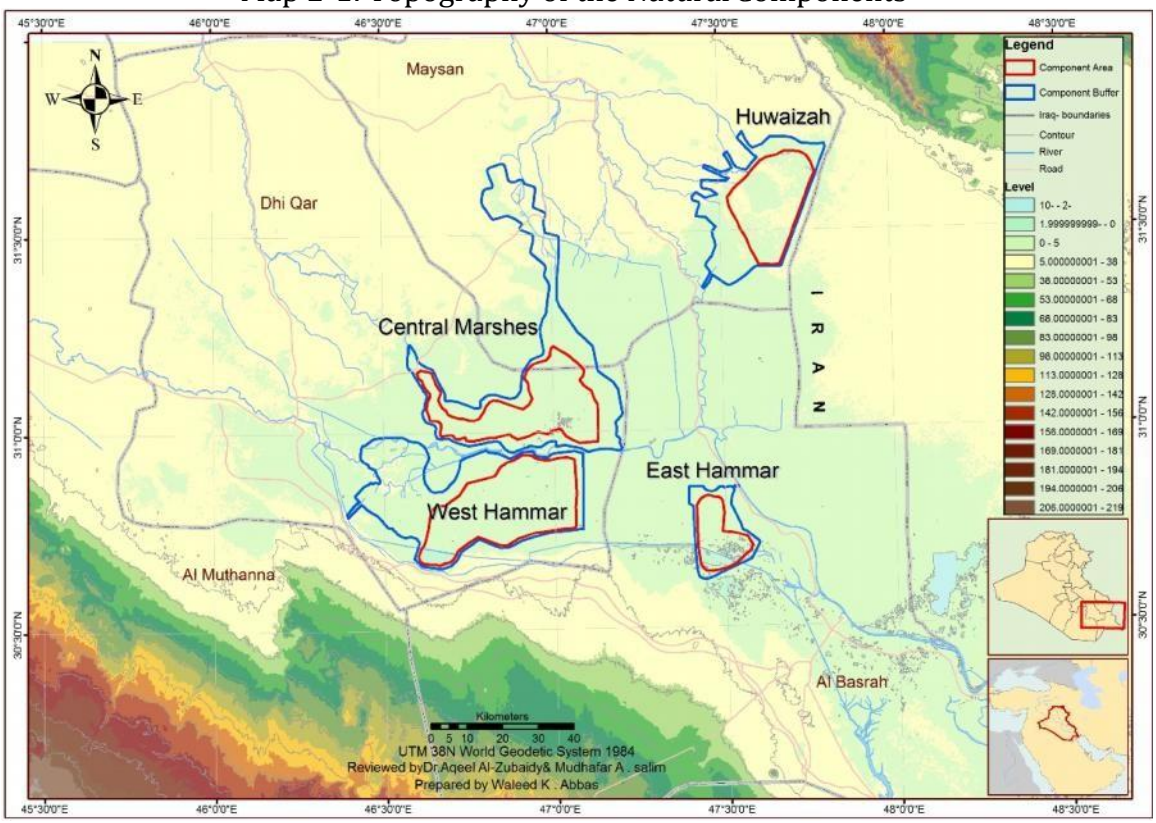


The plain is bordered to the east and northeast by the hills of Hamrin and to the west and southwest by the Arabian Platform comprising high altitude limestone. The geological sequence in the middle and southern regions of Iraq is subdivided, from older to recent as follows: the Paleozoic of 5km in thickness mostly comprised of siliciclastic rocks deposited in shallow sea; the Mesozoic of around 5km 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 comprises 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.

Table2-1: The Geological Timescale of the Ahwar

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 2-1: Topography of the Natural Components



Topography and Geology of the Huwaizah Marshes

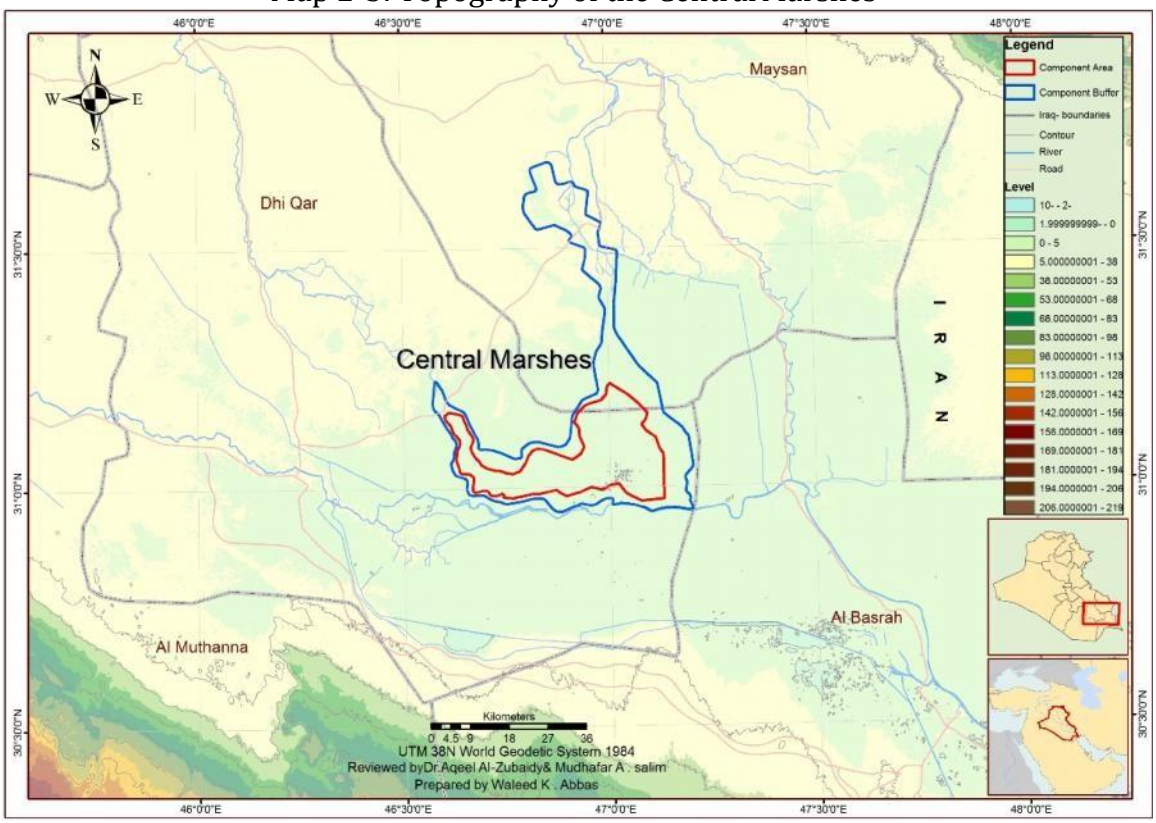
The Huwaizah Marshes are located within the alluvial plain and belong to the quaternary period. They are aligned in the north by the outcrops of the Bai Hassan formation of the Tertiary period. The Pliocene-early Pleistocene outcropping occurs on the southwest flank of the Hamrin fold near AtTib area with an approximate elevation of 100m asl, then gradually declines towards the south and southwest to less than 10m 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 2-2: Topography of the Huwaizah Marshes

Topography and Geology of the Central Marshes

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

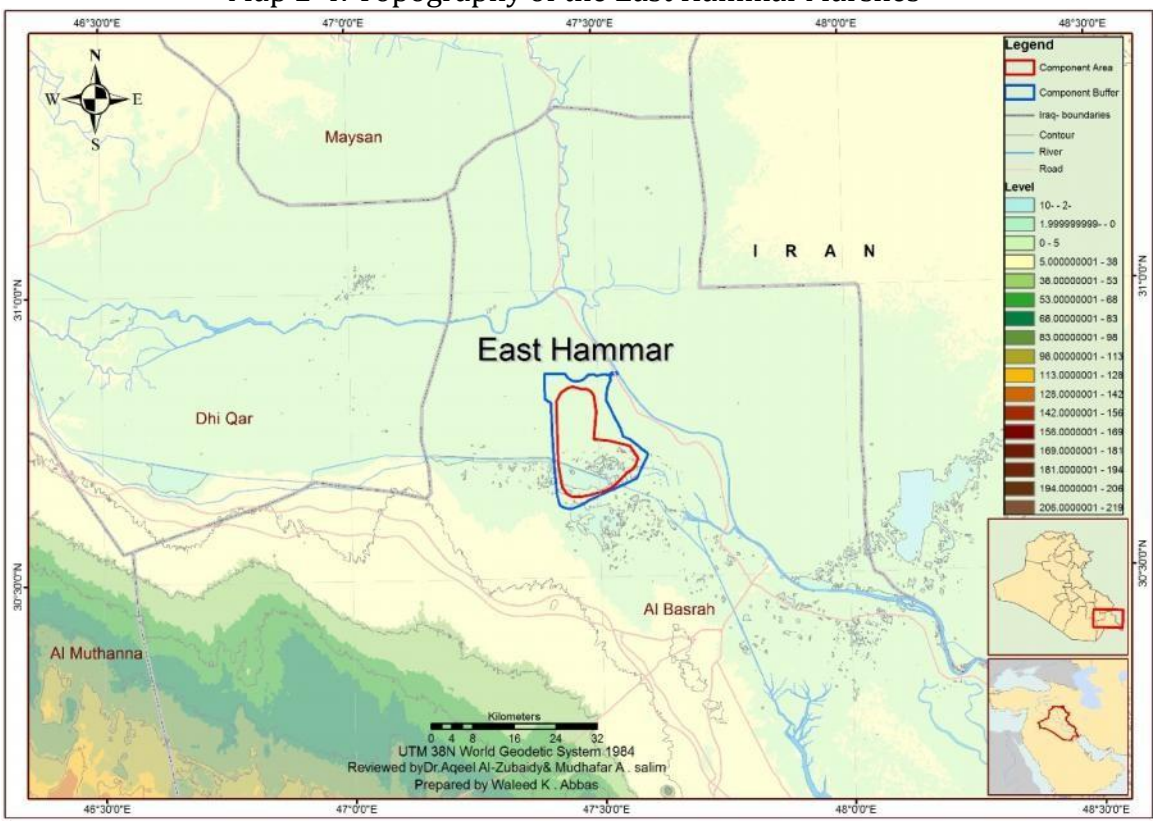
Map 2-3: Topography of the Central Marshes



Topography and Geology of the East Hammar Marshes

The East Hammar Marshes are bordered in the north by the banks of the Euphrates at around 5m in height, in the east by the banks of the Shatt AlArab ranging between 4-6m in height, and in the south by the Zubair Plateau which reaches almost 20m 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.

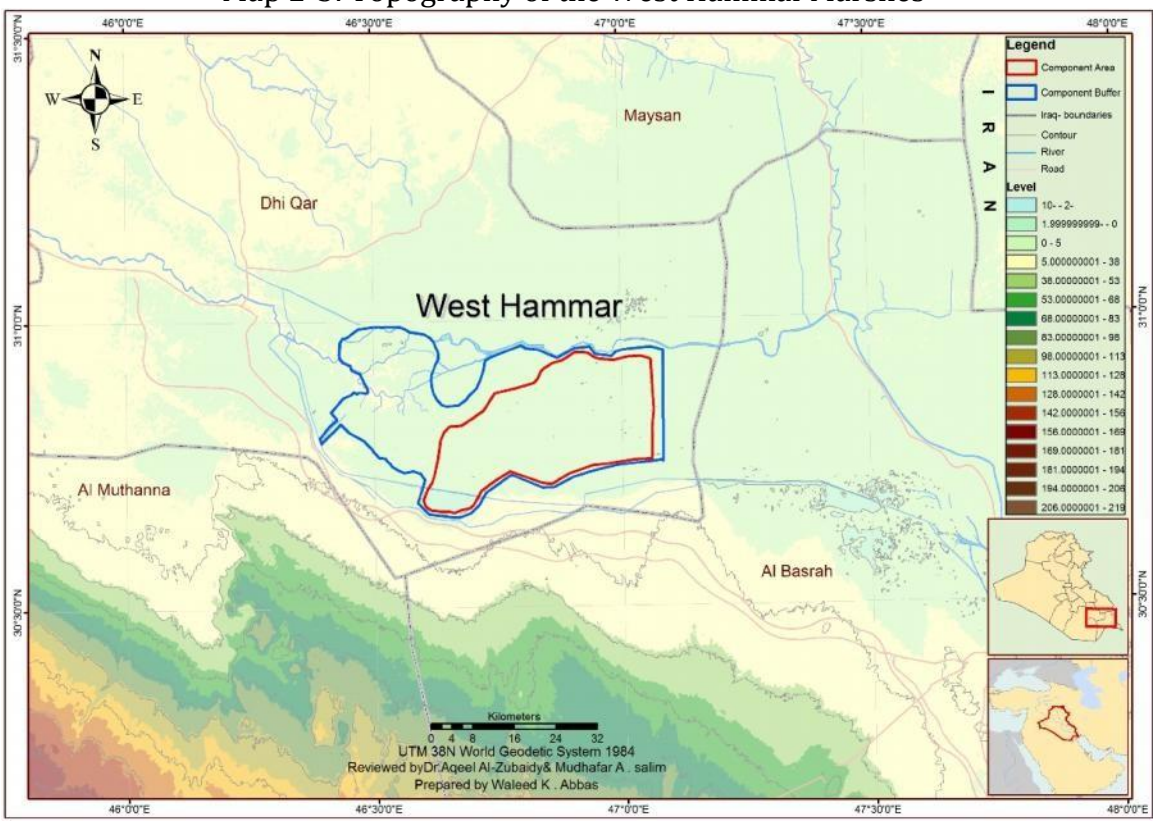
Map 2-4: Topography of the East Hammar Marshes



Topography and Geology of the West Hammar Marshes

The West Hammar extends to the south of the Euphrates River where the banks range from 2-4m in height, and is bordered in the north by the Zubair Plateau with 20m 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 2-5: Topography of the West Hammar Marshes



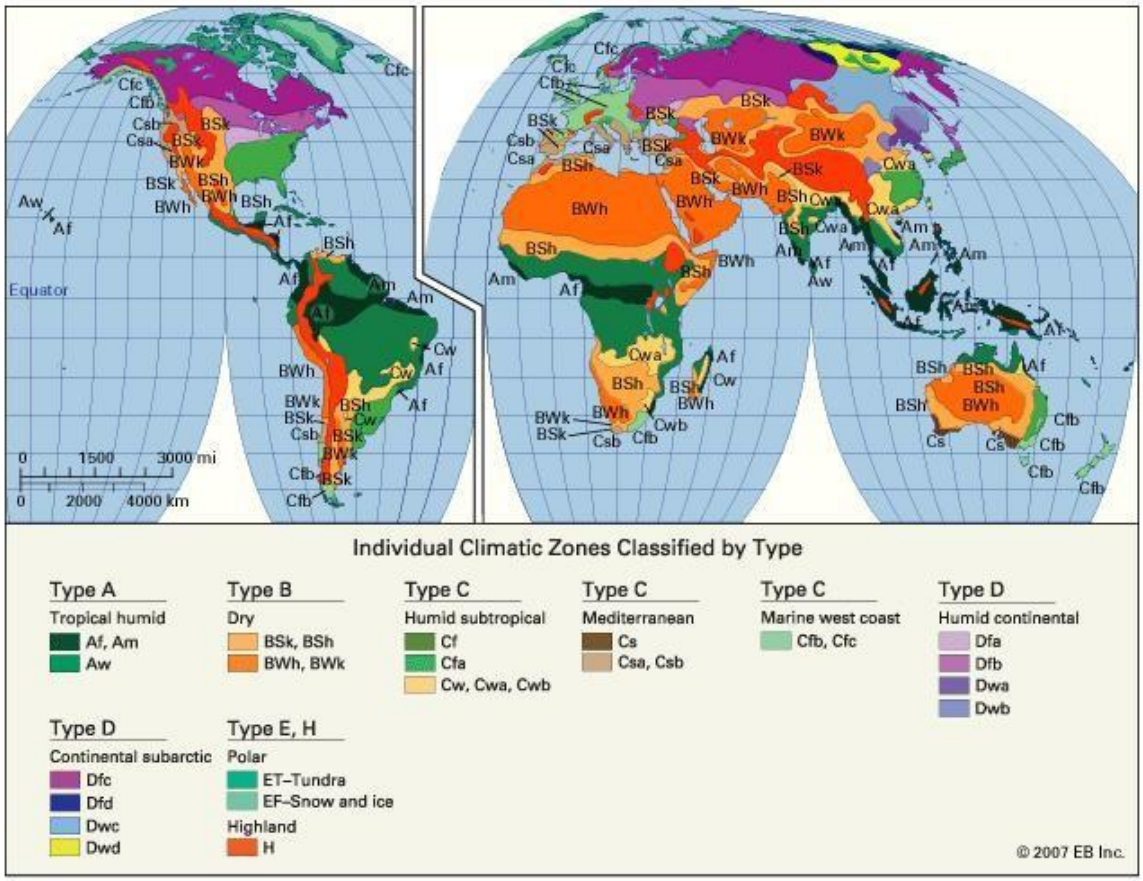
Climate of the Ahwar

According to the Koppen (1936) classification of global climate, the Ahwar 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 Ahwar 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 2-2: Temperatures and Average Rainfall for the Iraqi Governorates Relevant to the Ahwar 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

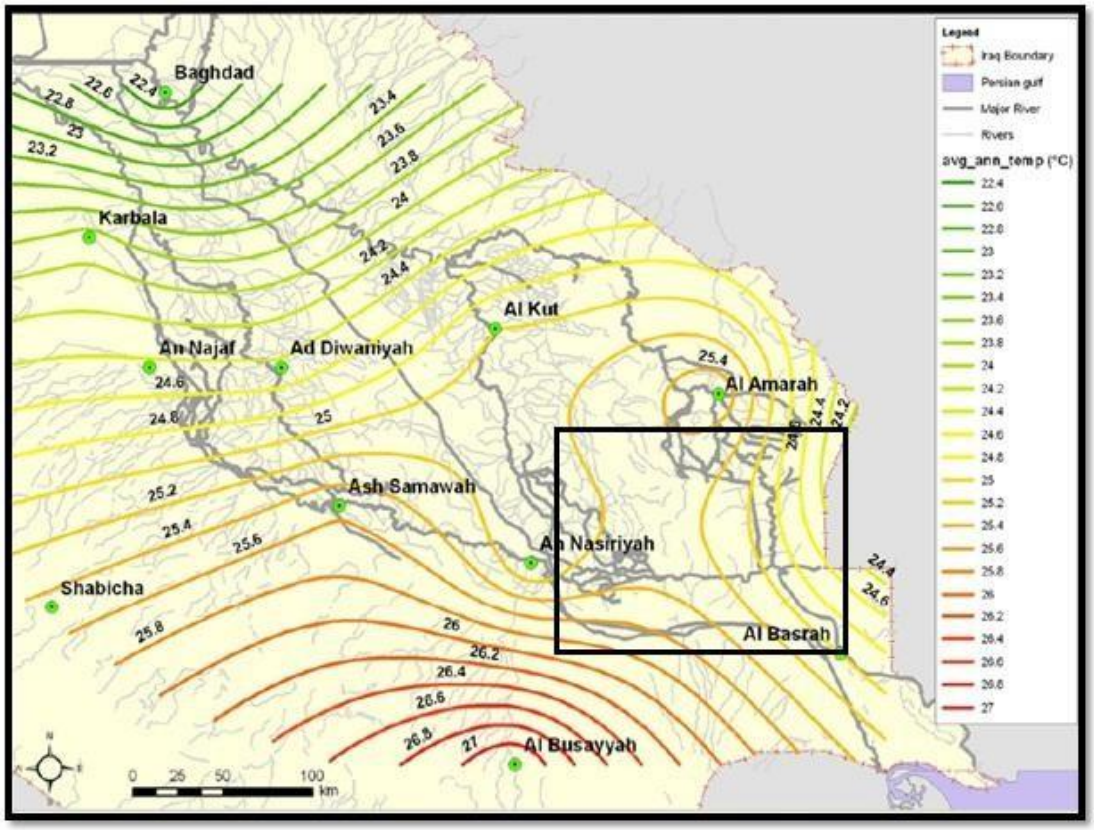
Figure 2-3: Koppen Climate Regions



Low levels of rainfall in the Ahwar, 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 Ahwar, as they have a substantial effect on water availability and level in addition to water quality and distribution. A very particular feature of the Ahwar is the fact that they are embedded within a sea of scorching deserts while still embracing lush biodiversity and highly productive ecosystems .

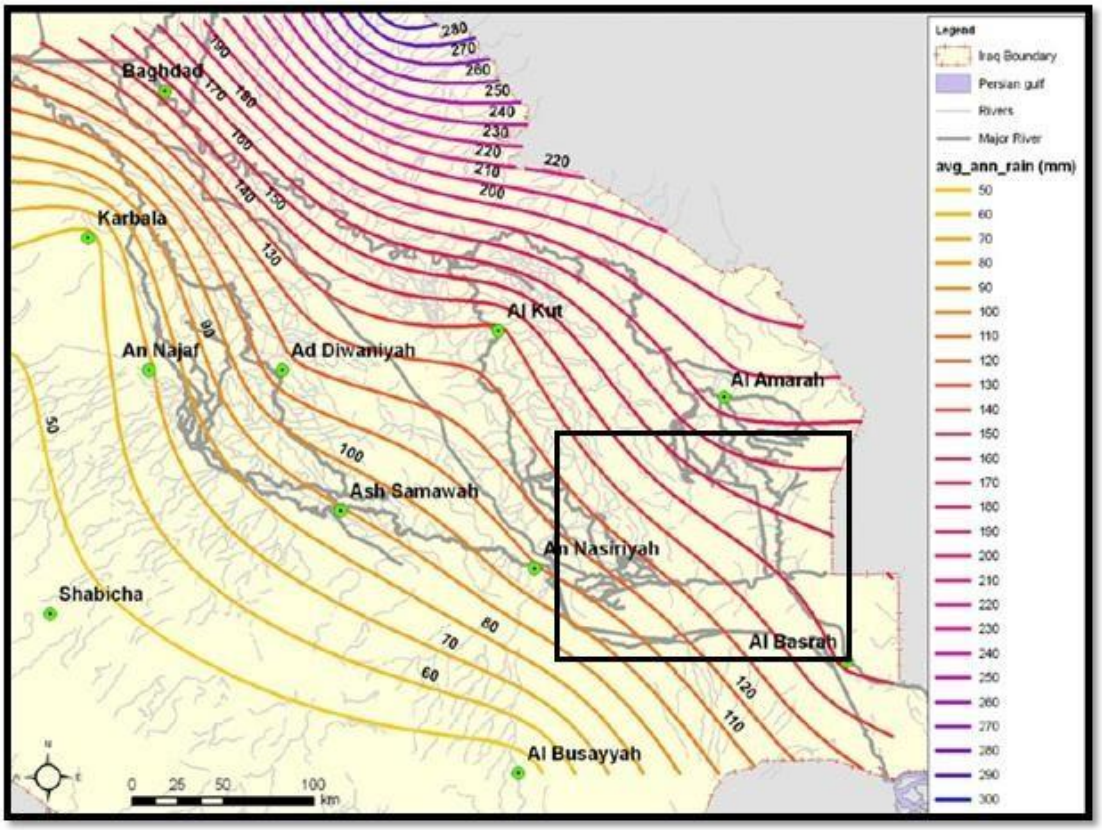
Daily temperature often exceeds 50°C in summer and can drop all the way to below zero on cold dry winter nights. Average temperatures range between 22.2°C and 27.2°C, with the highest average recorded at 36°C and the lowest at 11°C. The hottest months are June through August with monthly averages between 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 Natural Components (Al-Ansari and Knutsson, 2011)



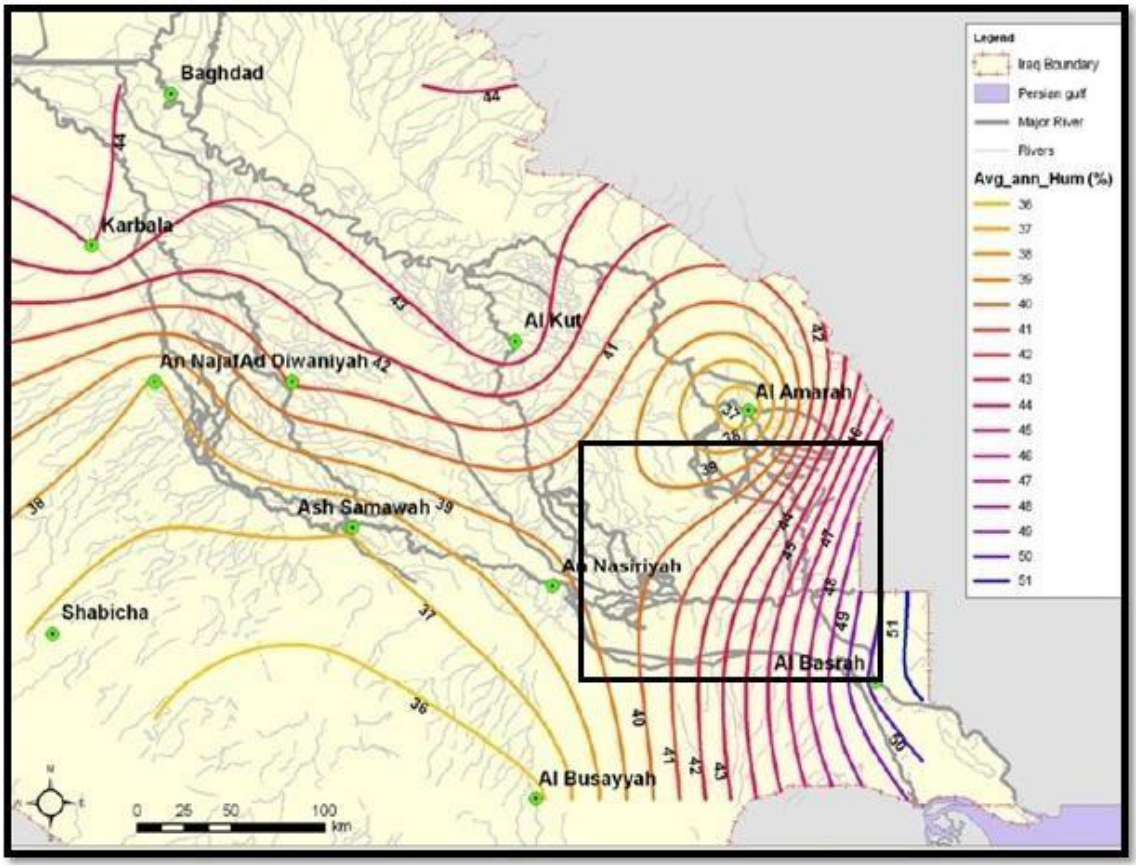
As for rainfall in the Ahwar, it is mainly seasonal with very low averages. Most precipitation takes place from January to March, ranging from 20 to 40 rainy days, with a daily average of 1 to 10mm. Annual average rainfall ranges between 42 and 185mm.

Figure 2-5: Rainfall Distribution within the Natural Components(Al-Ansari and Knutsson, 2011)



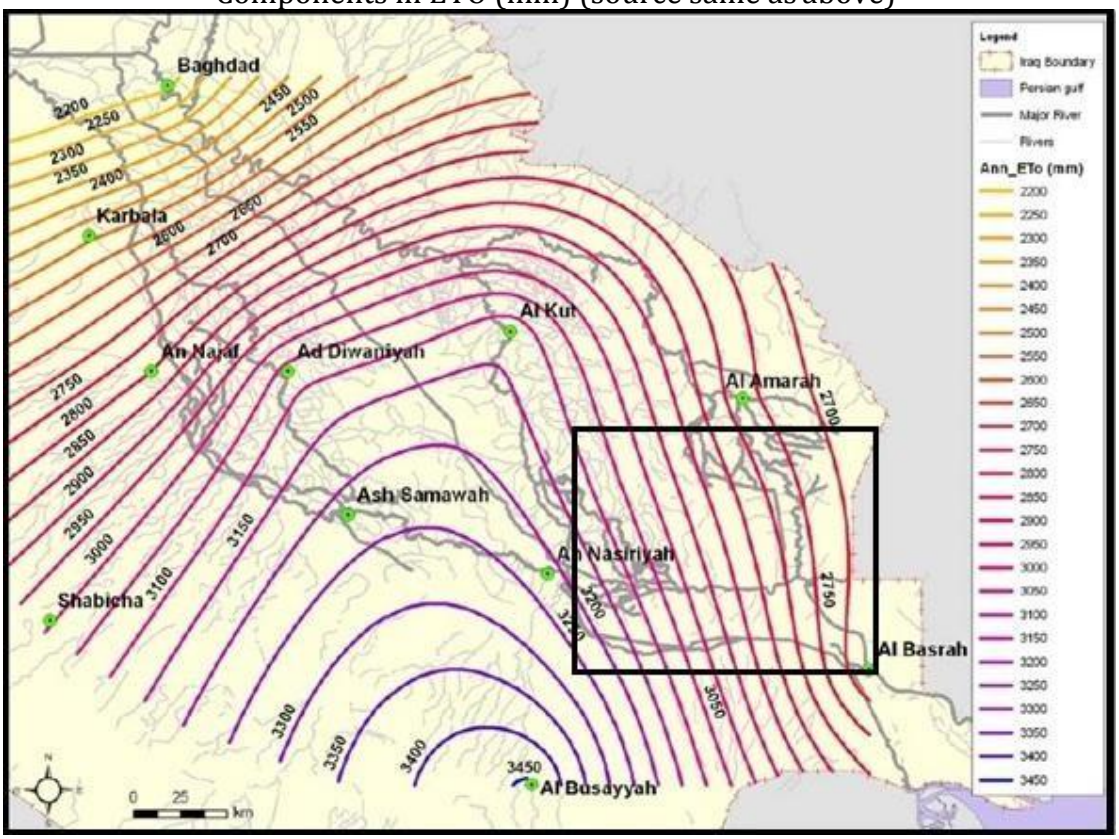
Relative humidity is another key physical characteristic of the Ahwar however there is no discernible uniformity across the region or during the seasons. Average relative humidity is approximately 34.5%, with the highest levels recorded in winter (67-80%) and the lowest in summer (40-45%).

Figure 2-6: Geographic Distribution of Relative Humidity (%) for the Natural Components (Al-Ansari and Knutsson, 2011)



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

Figure 2-7: Geographic Distribution of the Annual Average of Evaporation for the Natural Components in ETO (mm) (source same as above)



As elaborated above, the extreme climatic conditions of the Ahwar in terms of high average temperatures and low rates of precipitation are key factors dictating their biological diversity and its composition. The Ahwar 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 Ahwarrepresent 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

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 116.84mm. Due to high average temperatures, evaporation levels are highest in summer with an average of 1,455.1mm. The lowest records have been

recorded in winter at 155.7mm. Overall average evapotranspiration is approximately 2,536.3mm. 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

Climatic data for the Central Marshes is collected from the meteorological stations of Al Amarah and An Nasiriyah. Seasonal temperatures vary in the 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 55.88mm per annum. Due to high average temperatures, evaporation levels are highest during the summer season with an average ranging between 1,455.1 to 1,451.4mm. The lowest records range between 155.7 and 205.6mm during the winter season. Overall average evapotranspiration ranges between 2,536.3 and 2,856.4mm. 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

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 81.28mm. Due to high average temperatures, evaporation levels are highest during the summer season with an average of 1,251.2mm. The lowest records reach 187.7mm in the winter season. Overall average evapotranspiration is around 2,909.3mm. 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

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 55.88mm. Due to high average temperatures, evaporation levels are highest in the summer season with an average of 1,451.4mm. The lowest records reach 205.6mm 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 2-3: Climatic Parameters of Key Meteorological Stations of the Ahwar

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

Soils of the Ahwar

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

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 50cm 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

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 50cm 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

The deposits of the East Hammar are mainly made of sandy clay silt. The carbonate composition (lime and dolomite) represent the main components 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

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 Ahwargradually transform into salt mudflats towards their southern banks adjacent to the sand dunes covering the Zubair Plateau.

Hydrology of the Ahwar

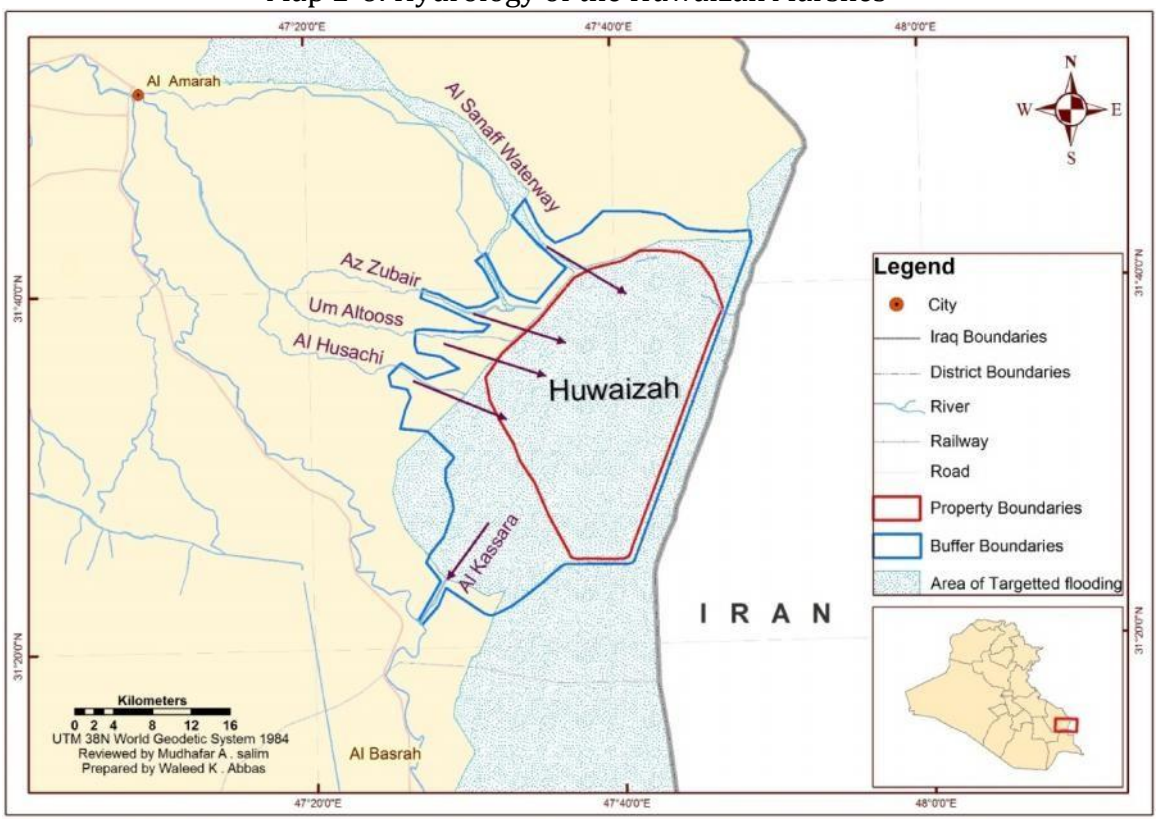
The Ahwar are fed by the branches of the Tigris and Euphrates Rivers, in addition to rain-fed waters during the winter season and its consequent flooding period. The areas covered by water fluctuate yearly and seasonally, however, waters are highest after the winter flooding and the spring snow melting 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 Ahwarare compared to less dynamic water systems.

Hydrology of the Huwaizah Marshes

The size of the Huwaizah Marshesh is 48,131ha 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. The 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 component.

In addition to the fact that the HuwaizahMarshes 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 2-6: 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 component embraces a number of large deep ponds averaging between 4-6m 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 components, 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

The surface area of the Central Marshes is 146,393ha inclusive of the buffer zone. Thesemarshes 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 component is fed by the Euphrates via nine branches: the rivers of Khanziri, Abu Judhea', As Saba', Al Badriah, Hujaylah, Abu Nursi, Abu Sibat, Abu Juwaylanah and Sabagheah. These feeders alternately act as drainage channels for the

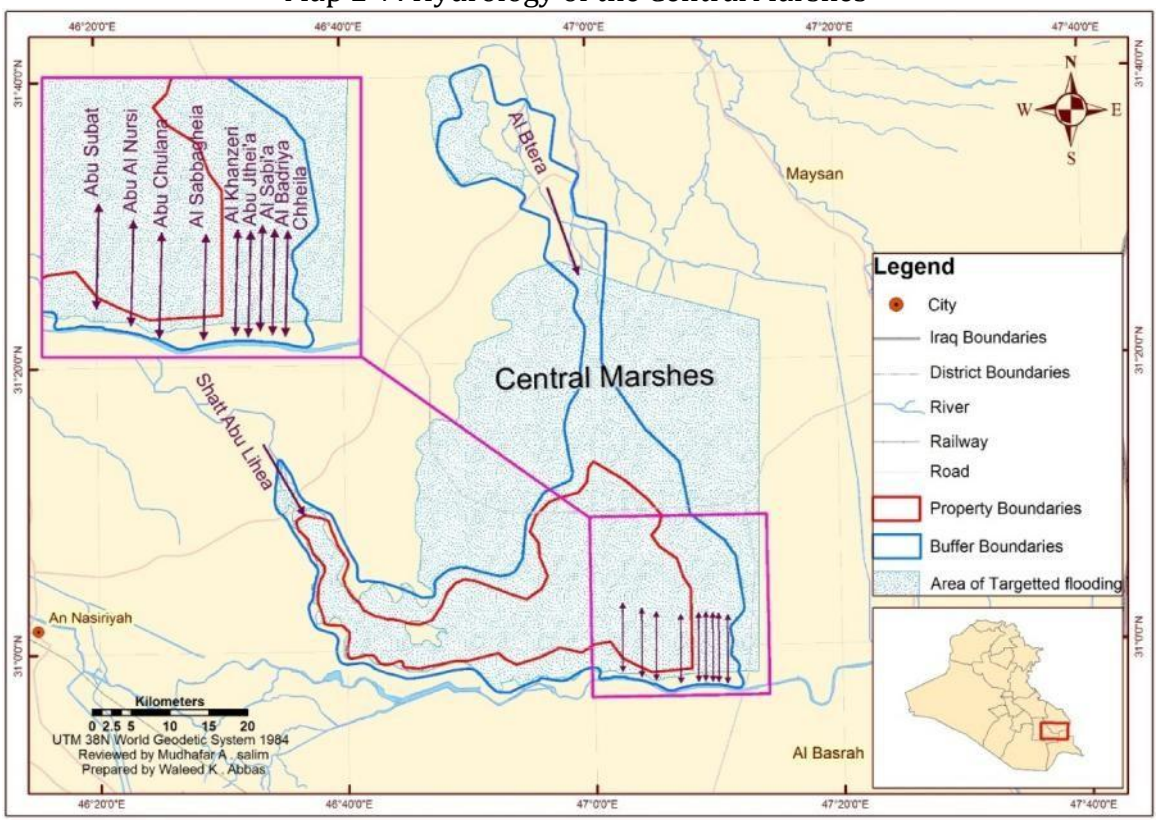
Central Marshesdependent on the water levels in the Euphrates River and the marshes. Gateways have been established at the inlets of all these rivers to control the water levels.

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 anddiversity.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 components, 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 andKubab.

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 2-7: Hydrology of the Central Marshes

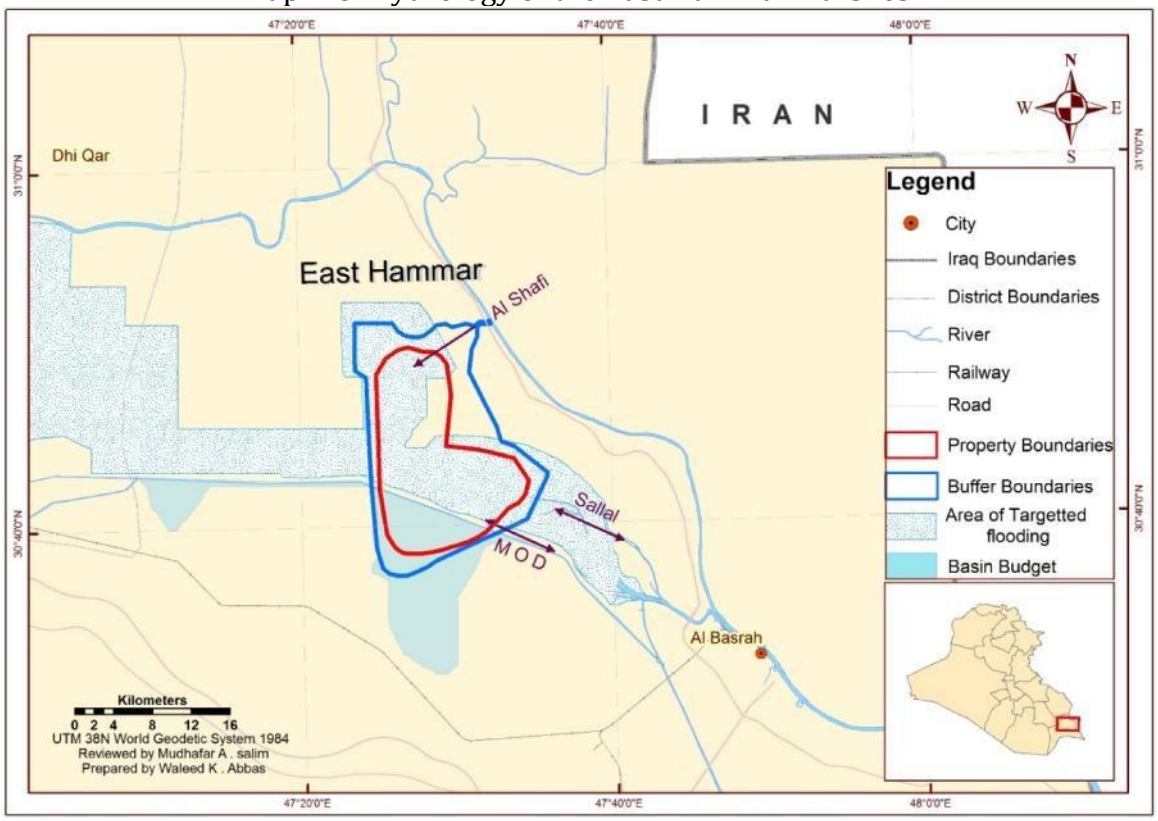


Hydrology of the East Hammar Marshes

The East Hammar Marshes have a particular hydrology, different from that of the other natural components of the property. 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 component 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 component as compared to the other property components. 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 33,062ha inclusive of the buffer zone. Thesemarshes 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 component are fed through the General Drainage Channel which crosses through the southern parts of the component, carrying drained waters from areas far to the west through the Shatt AlBasrah Channel and Al Zubair Lagoon. The Shatt AlBasrah Channel is directly connected to seawater, increasing the effect of tidal movement on the southern parts of the component and allowing the General Drainage Channel to act as both a feeder and a drainage system.

Map 2-8: Hydrology of the East Hammar Marshes



Hydrology of the West Hammar Marshes

As a result of their southern location, the West Hammar Marshes are fed solely by theEuphrates River. The eastern parts of thesemarshes are fed from between the cities of Suq Ash Shuyukh and Ach Chibayish. 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.

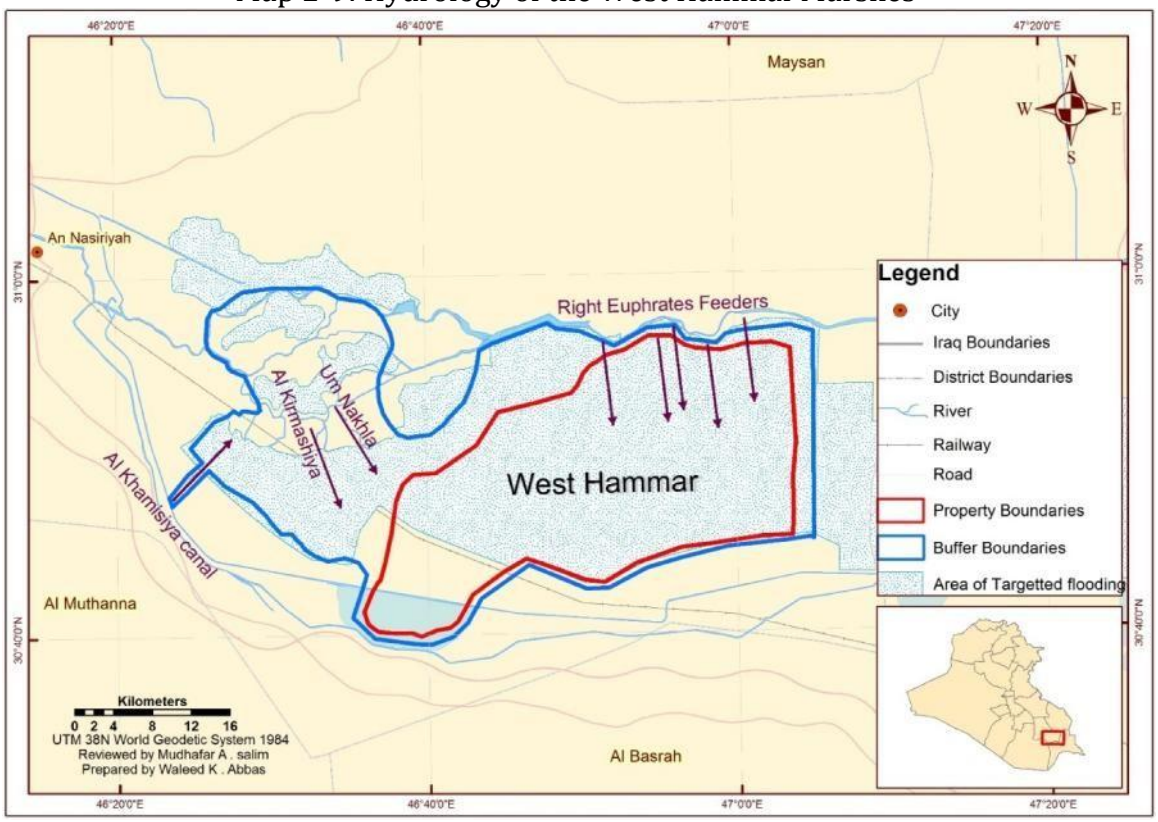
The area of the West Hammar Marshes is 148,393ha inclusive of the buffer zone. The southern and southeastern parts of thesemarshes are fed from a cluster of rivers and channels which originate from the Euphrates. Two important rivers to the West Hammar are Karmasheah and Umm Nakhlah which supply the northwest parts of thesemarshes 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 Khamayseah Canal which supplies an average of 20-50m^3/sec. Despite the fact that the salinity of these marshes is now relatively high, due to the rather saline source, the Khamayseah 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 2-9: Hydrology of the West Hammar Marshes

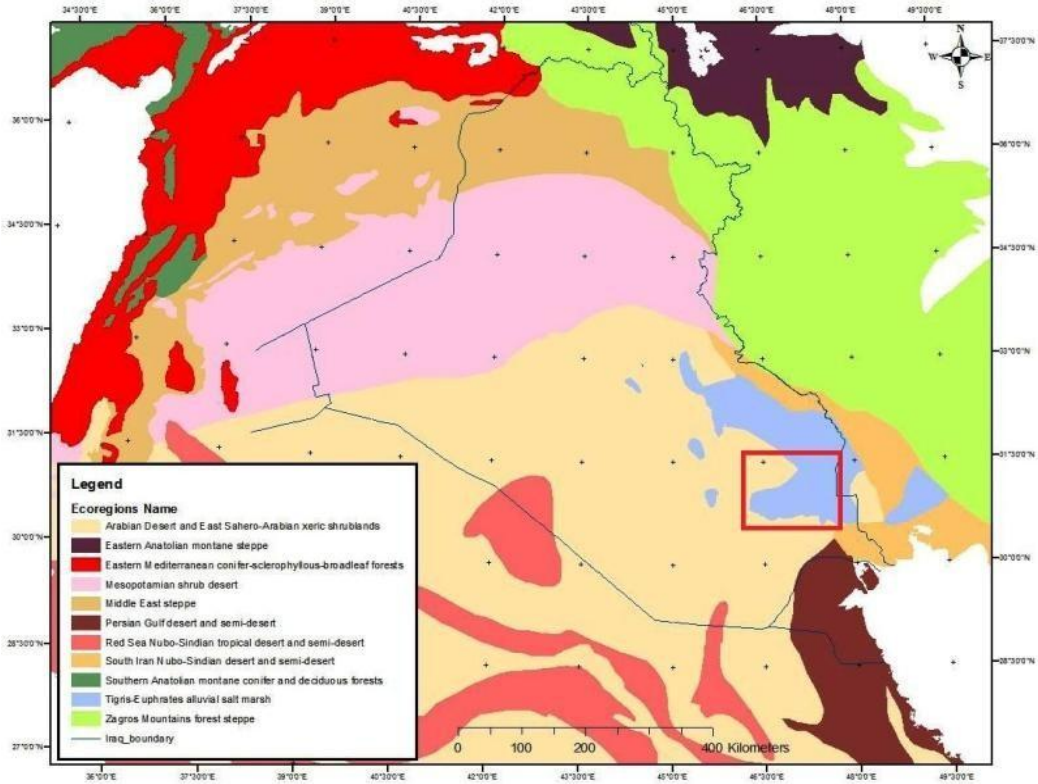


Habitats of the Ahwar

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

The Ahwar 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 2-10: The Location of the Ahwar within the WWF Category System



The habitats of the Ahwar 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

Figure 2-8: Herbaceous Tall Emerged Vegetation (Helophytic Vegetation) and Aquatic Communities. By: Mudhafar Salim

        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

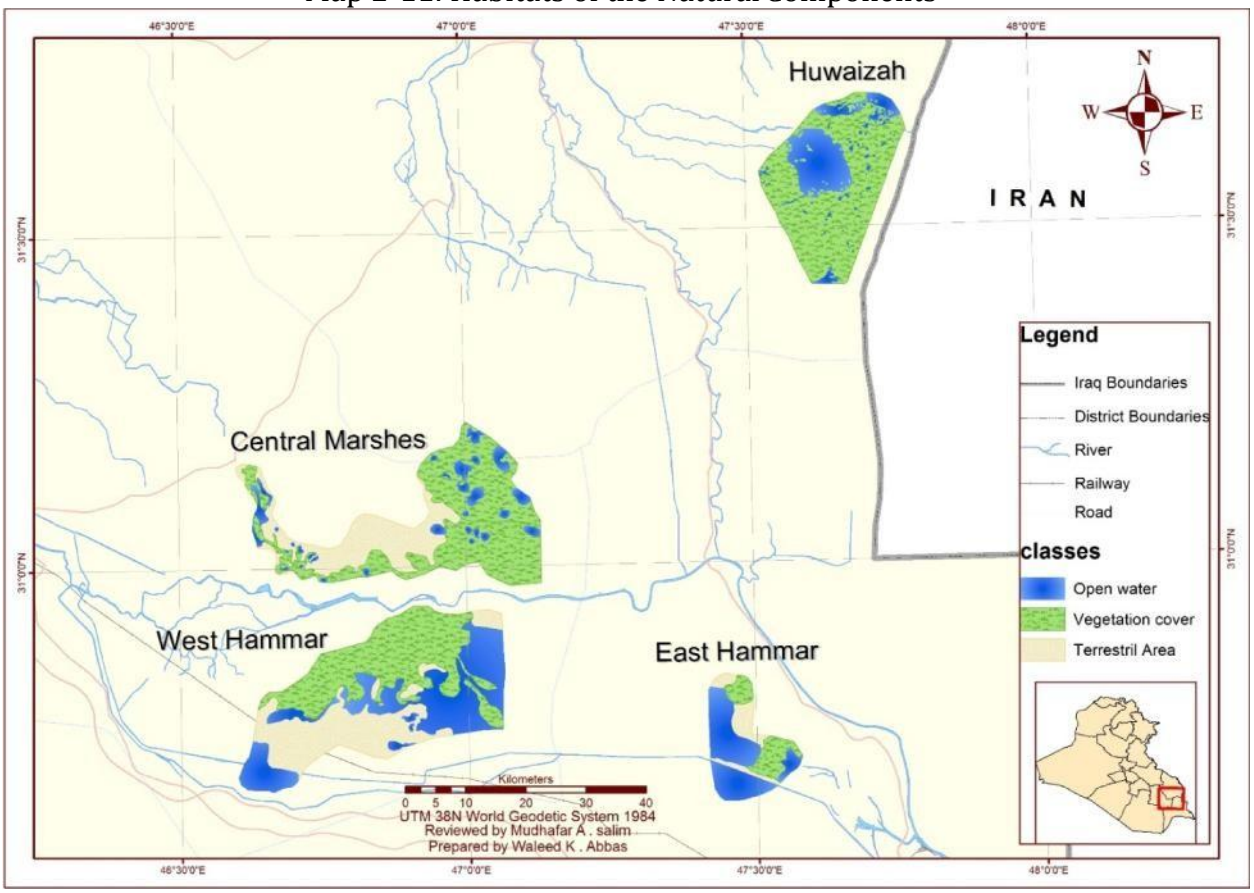
Figure 2-9: Salt Pioneer Swards with Phanerogamic Communities By: Ali Haloob

3. Terrestrial Habitats
    a. Desert
        a.i. Desert shrub
        a.ii. Unvegetated desert
    b. Woodlands
        b.i. Shrubs

Figure 2-10: Shrubs Habitat
By: Ali Haloob

    c. Herbaceous vegetation
        c.i. Sparsely vegetated land

Map 2-11: Habitats of the Natural Components



Habitats of the Huwaizah Marshes

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 HuwaizahMarshes, 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

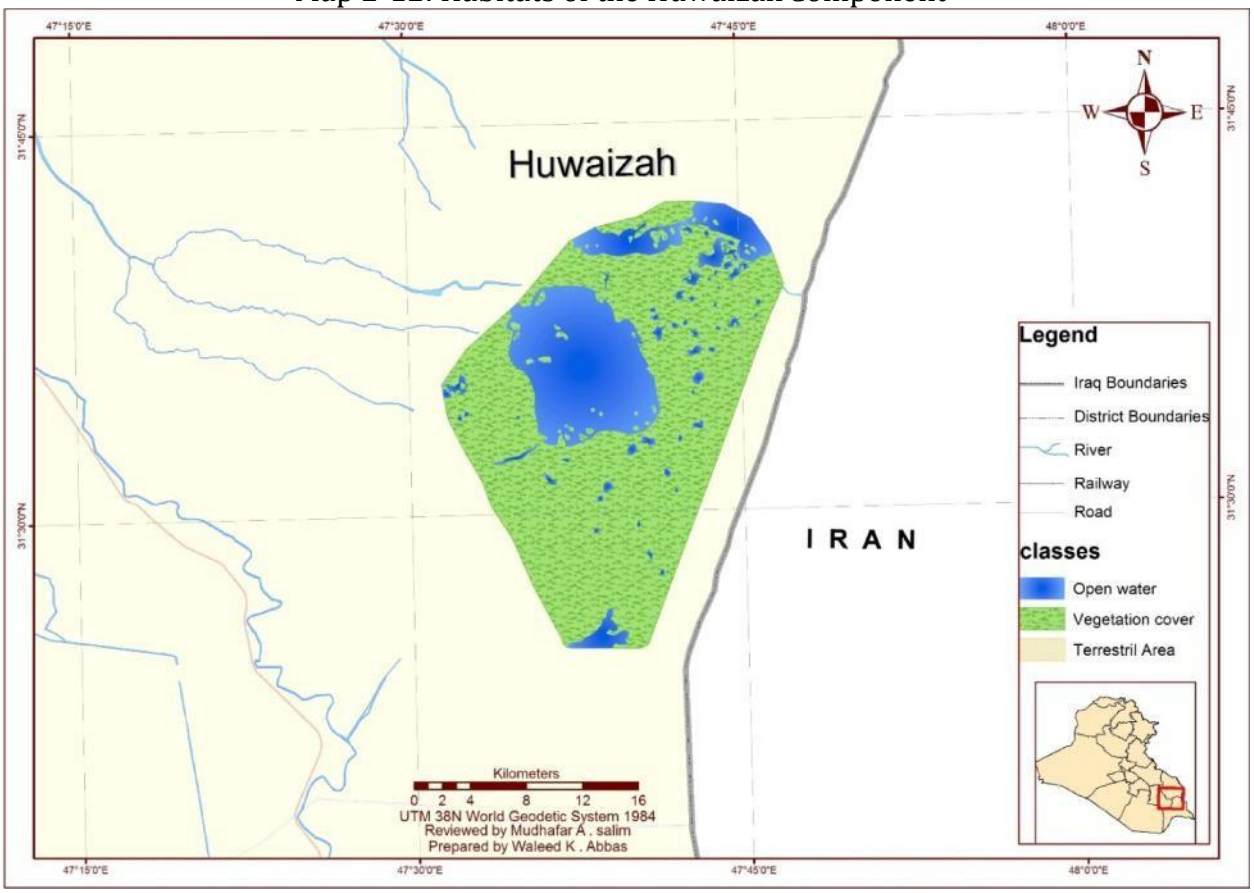
is a seasonal process and is very characteristic of the Ahwar. The transitional areas between the water bodies and the dry lands form a narrow strip of clay deposits which are highly influenced by the amount of water collected. This creates what is known as non-vegetated mudflat habitats. Further, the 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 4m 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 50cm 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 2-12: Habitats of the Huwaizah Component

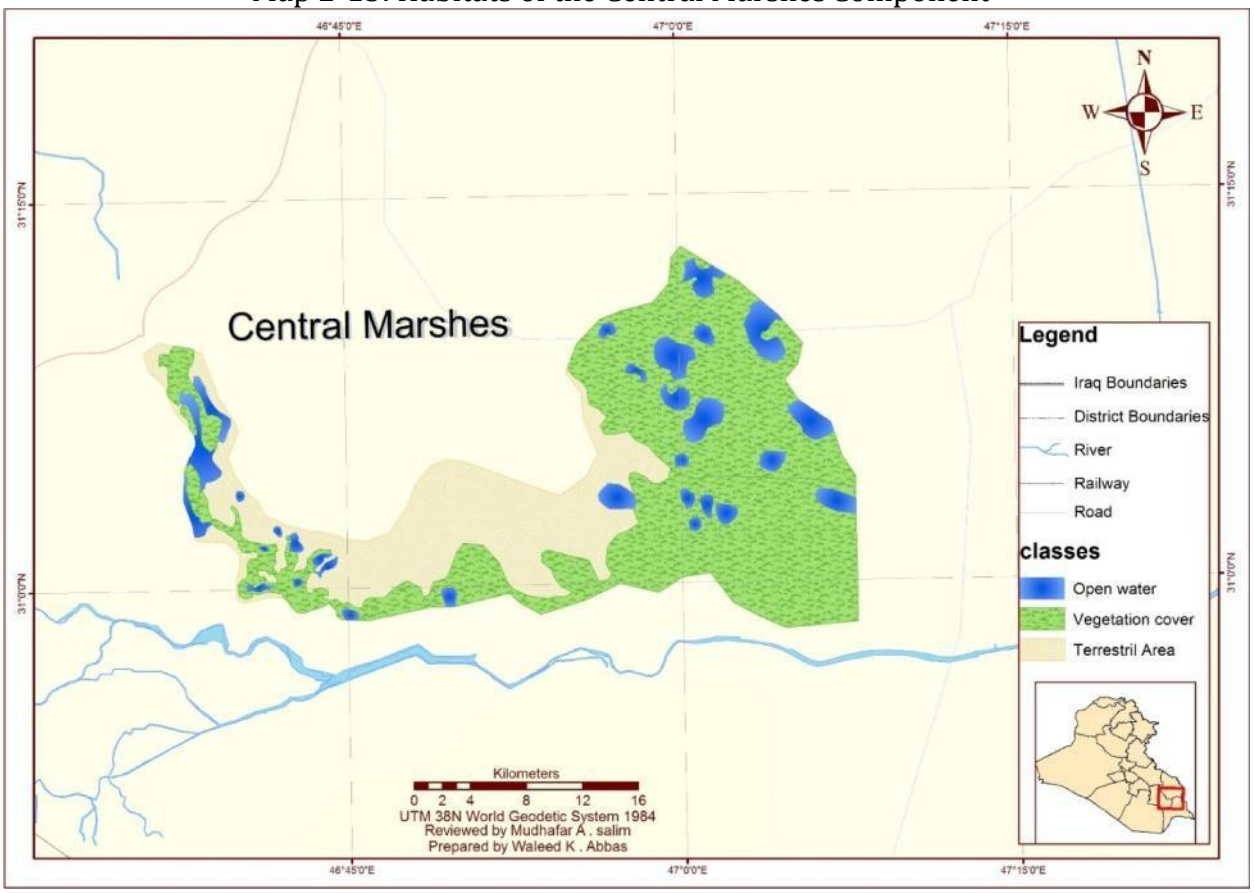


Habitats of the Central Marshes

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 natural components of the property (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 components.

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 2-13: Habitats of the Central Marshes Component

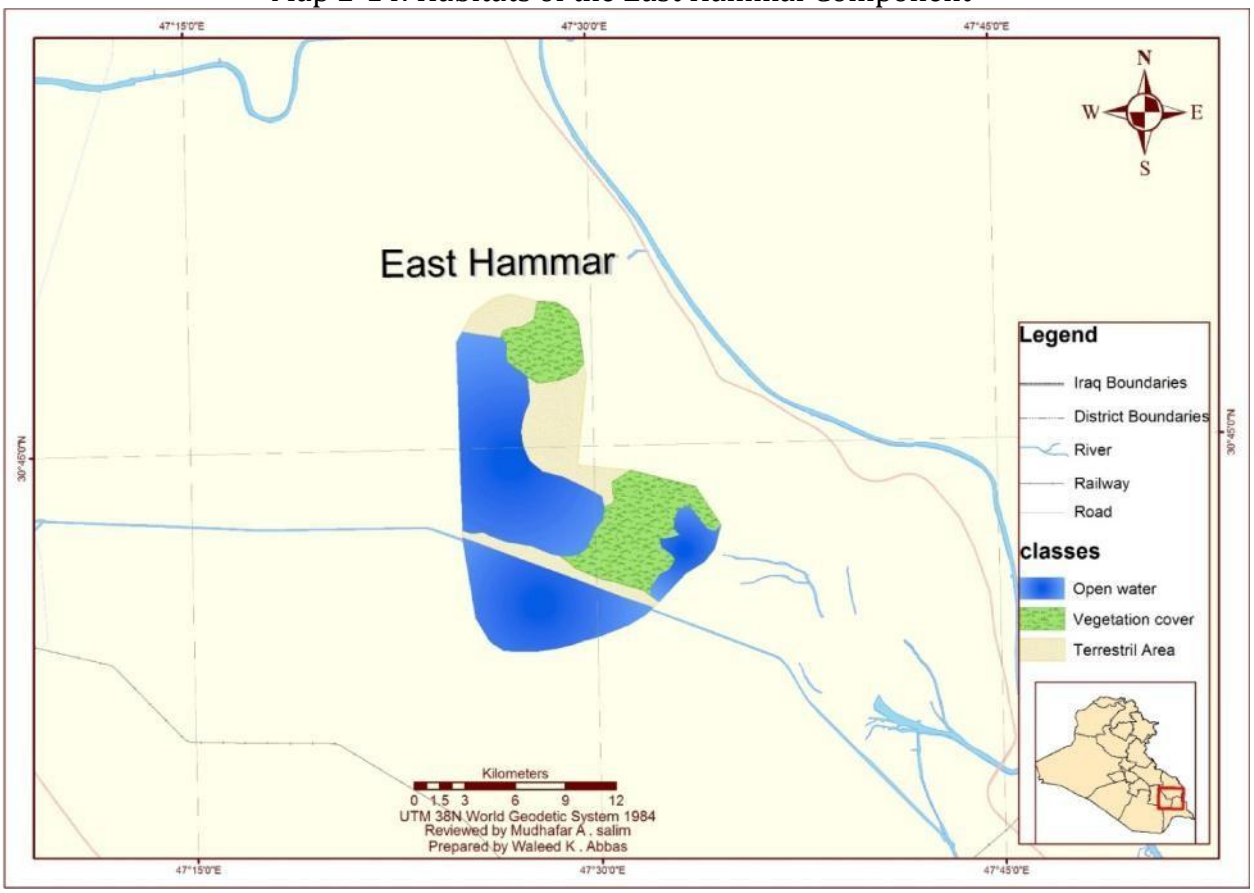


Habitats of the East Hammar Marshes

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 component, 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 habitatsare similar to those of the Central Marshes except that *Lycium barbarum* is present here.

Map 2-14: Habitats of the East Hammar Component



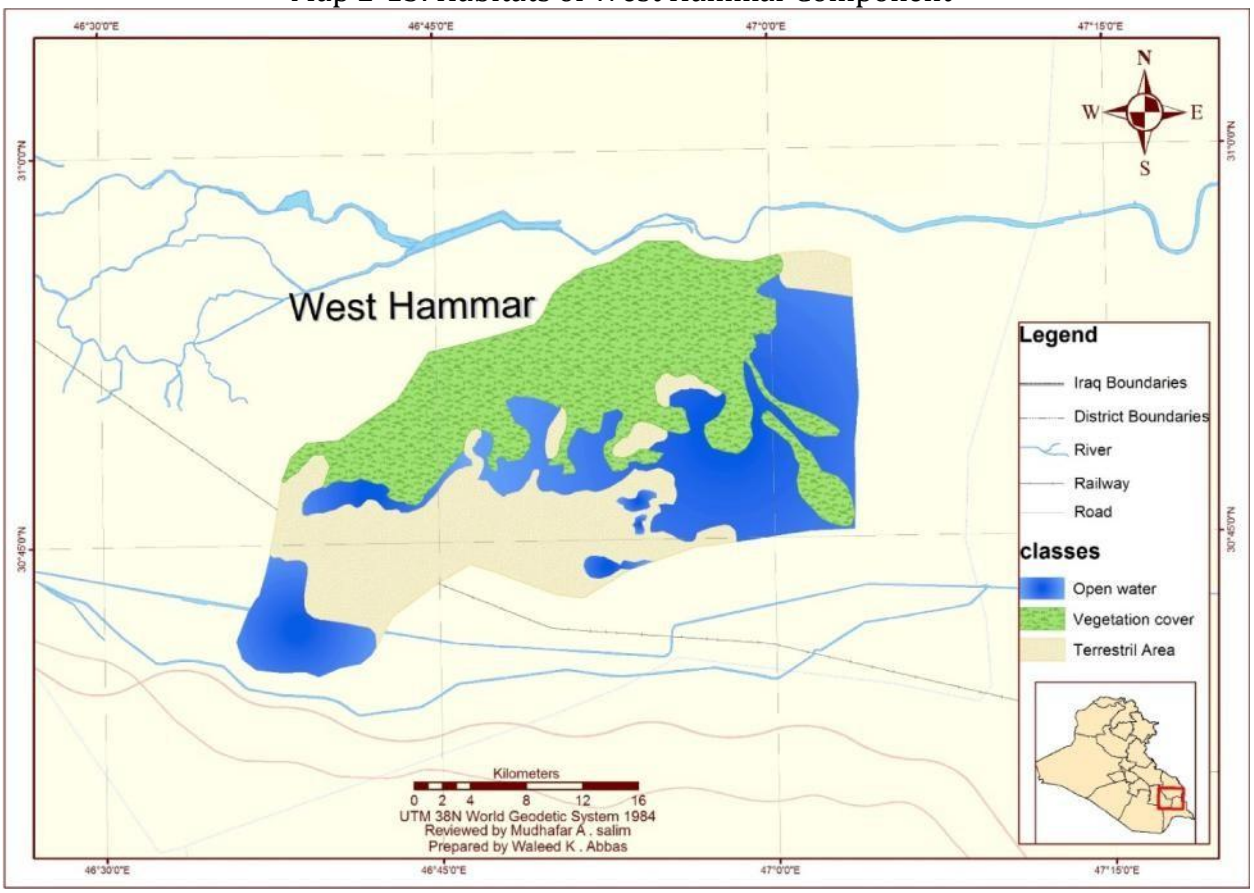
Habitats of the West Hammar Marshes

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 Ar Rashed Marshes.

These marshes' vegetation habitats are also very similar to those of the other components, except for the presence of the 50cm 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 components with no particular mentionable difference.

Map 2-15: Habitats of West Hammar Component



Flora of the Ahwar

The vegetation cover in the aquatic and terrestrial habitats of the Ahwar 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 property. The same is the case with regard to nesting endemic threatened and near-threatened bird species. Alwaan, in his 2006 report on the Ahwar, 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 Ahwar 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 Ahwar, and the species of *Ranunculus sphaerospermus* and *Nymphaea alba* are of regional importance (regionally threatened). There are ten different vegetation types in the Ahwar, 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 property. 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 property. 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 Ahwar, which is reflective of its abundance and significance to the property.
6. Trees (woody vegetation): this vegetation type occurs in various areas of the Ahwar, 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 property.
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 Ahwar:

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 component of the grassland habitat. It manifests itself in patchy green areas and is dominated by *Polypogon monspeliensis*.

Flora of the Huwaizah Marshes

The Huwaizah Marshes are the richest in terms of plant life among the four components. 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

The Central Marshes have historically been the hub of plant diversity in the Ahwar. 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 thesesmarshes 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

17families 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 natural components, and contains seven of the ten vegetation types. A particular characteristic of thesemarshes 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 arealso 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

The West Hammar Marshes embrace 44 species of plants belonging to 25 families, with seven of the species belonging to the Poaceae family. This component 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 thesemarshes. 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*.

The Fauna of the Ahwar

An Overview

The Ahwar 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 Ahwar, 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 Ahwar 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 Ahwar 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 Ahwar are a prime site for wintering water birds in the west of Eurasia. The Ahwar 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 Ahwar. Under the current study, each of the four components of the property represents a main IBA .

Furthermore, the Ahwar 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 property is part of the West Asia-East Africa migration route of waders and shorebirds (see figure 7).

The Ahwar 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 components 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 2-11: Location of the Property (●) 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 Dhading) (Source: Boere & Stroud 2008).

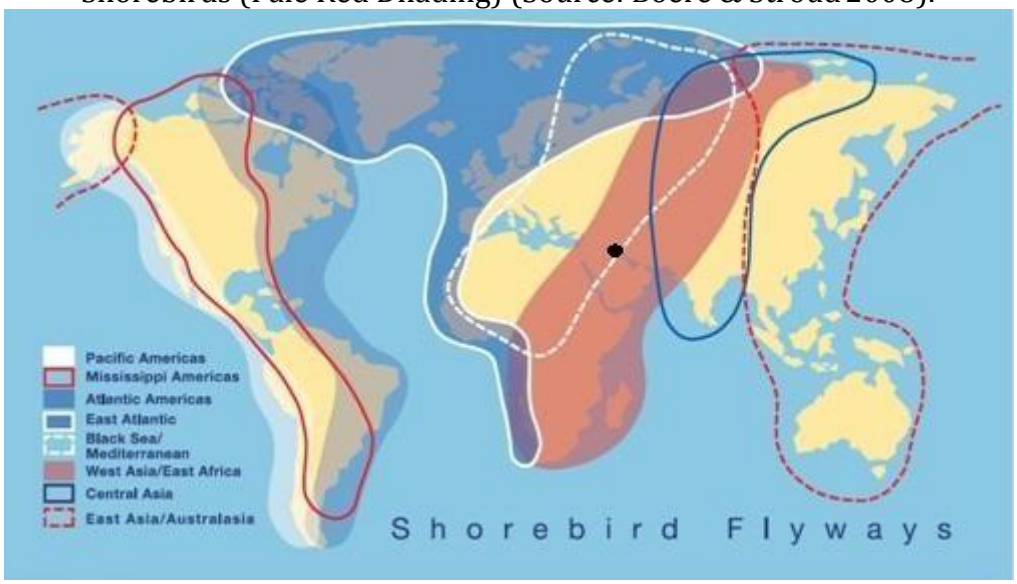
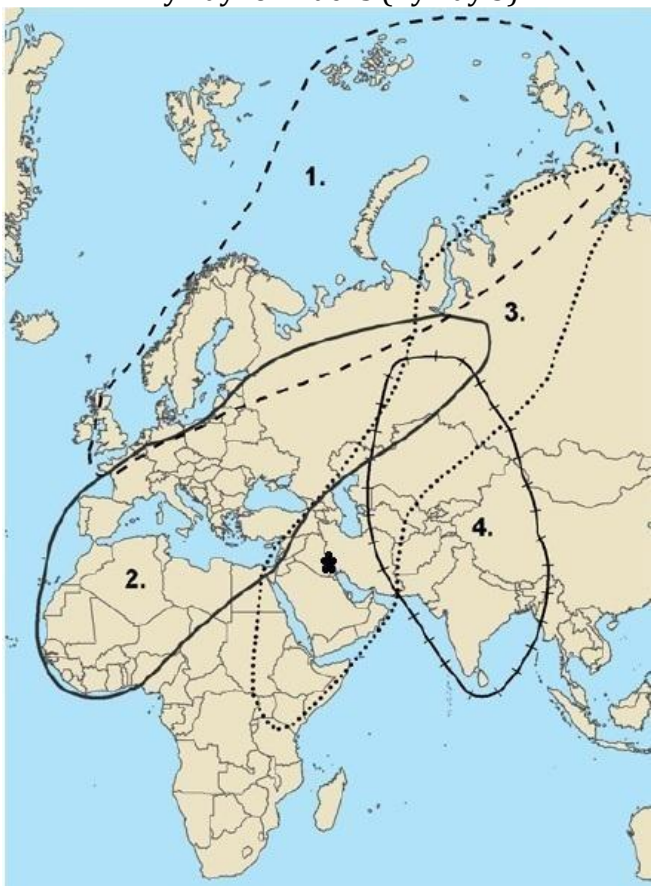


Figure 2-12:Location of the Property (●) in Relation to the West Siberian/Caspian/Nile Flyway for Ducks (flyway 3)



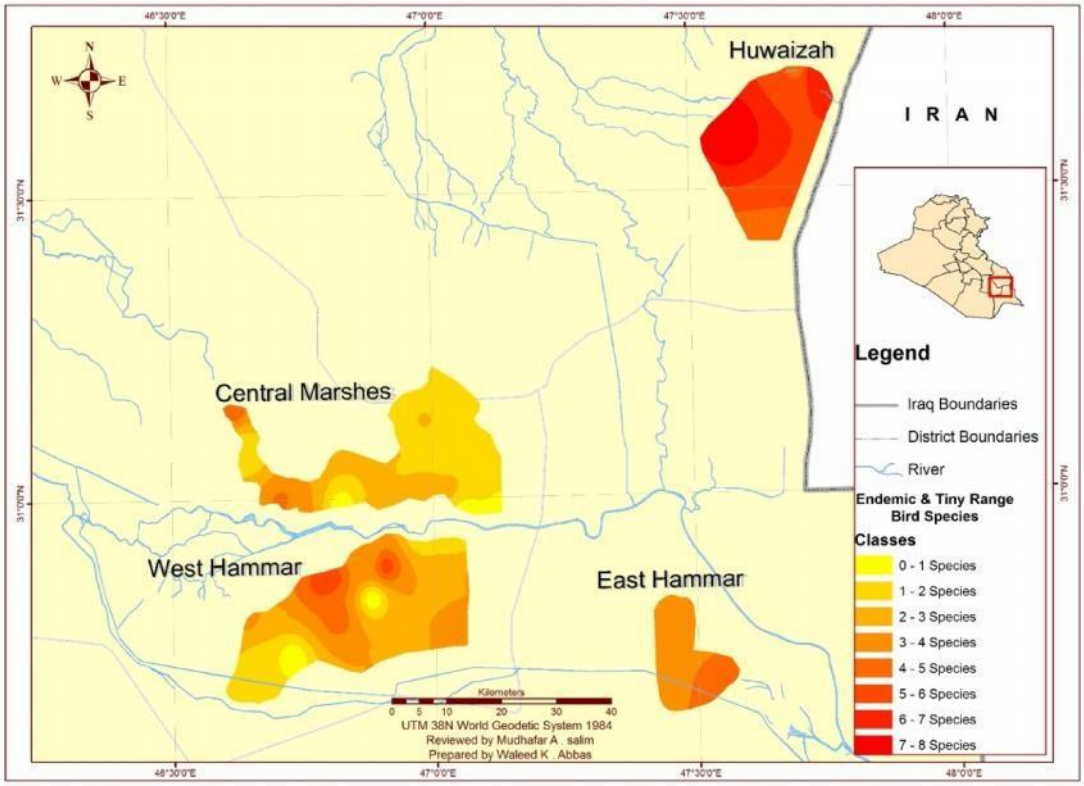
Birds of the Ahwar

The Ahwar 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 Ahwar. Furthermore, the property 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 Ahwar of southern Iraq, representing about 40% of its global population. Another outstanding example is the Basra Reed-warbler (*Acrocephalus griseldis*) for which the Ahwar are the breeding grounds of more than 70% of the maximum estimate of its global population. The Ahwar are also home to twelve globally threatened species and another twelve near threatened bird species.

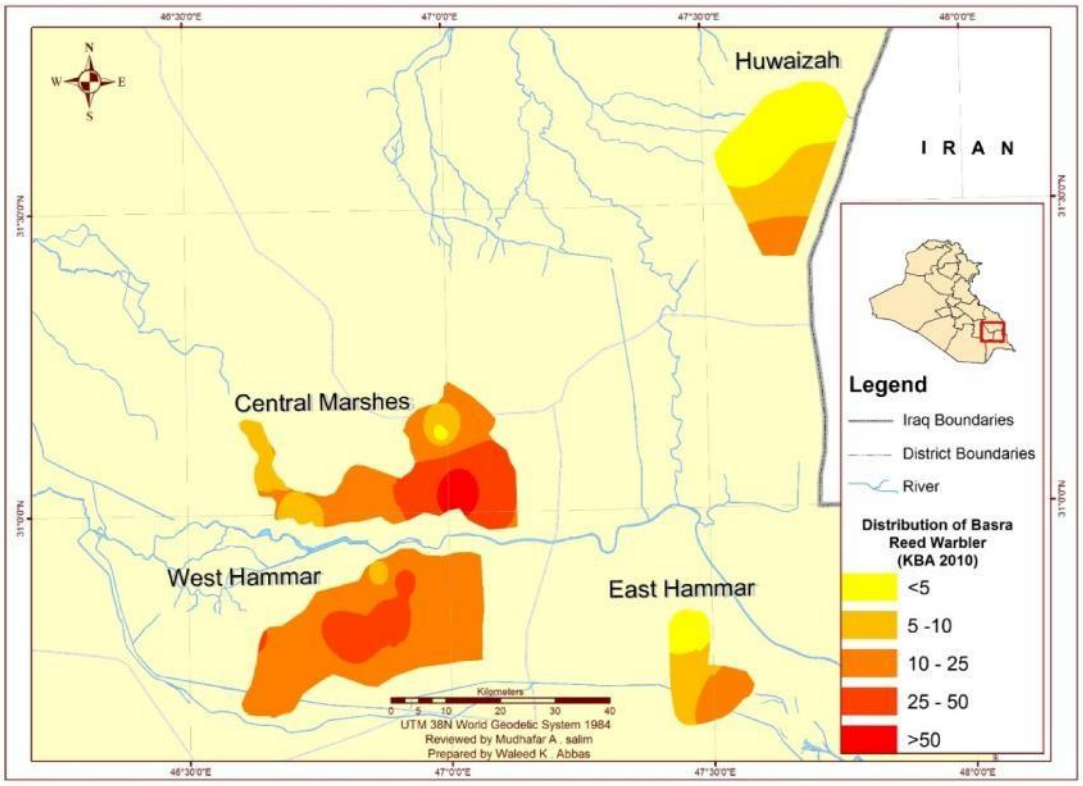
Table 2-4: Threatened and Near-Threatened Species Occurring in the Ahwar

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

Map2-16: Distribution of Endemic Bird Species in the Natural Components



Map 2-17: Distribution of Basra Reed Warbler in the Natural Components



Map 2-18: Distribution of Marbled Duck in the Natural Components

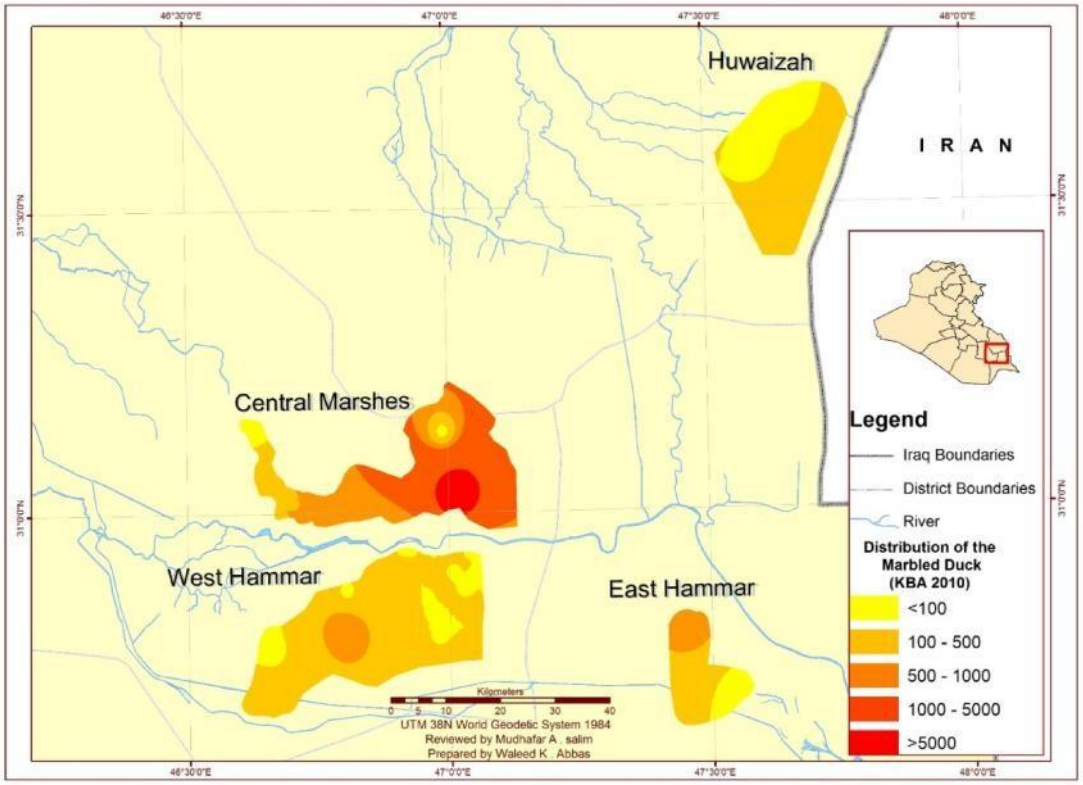


Figure 2-13: *Marmaronetta angustirostris* in the Central Marshes
By: Mudhafar Salim

Figure 2-14: *Acrocephalus griseldis* in the Central Marshes
By: Mudhafar Salim

Table 2-5: List of Regionally Threatened Species and Subspecies Occurring in the Ahwar

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 Ahwar (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 2-6: Endemic Subspecies of the Ahwar

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

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

Figure 2-15: *Anhinga rufa* in the Huwaizah Component
By: Mudhafar Salim

Figure 2-16: *Threskiornis aethiopicus* in the Huwaizah Component
By: Mudhafar Salim

Mammals of the Ahwar

38species of mammals are recorded in the Ahwar 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 Ahwar. 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 Ahwar and have been included in IUCN's Red List.

Table 2-7: Threatened and Near-Threatened Mammal Species Occurring in the Ahwar

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 Ahwar has produced two endangered species; Smooth-coated Otter (*Lutrogale perspicillata*) and Bunn's Short-tailed Bandicoot Rat (*Nesokia bunni*).

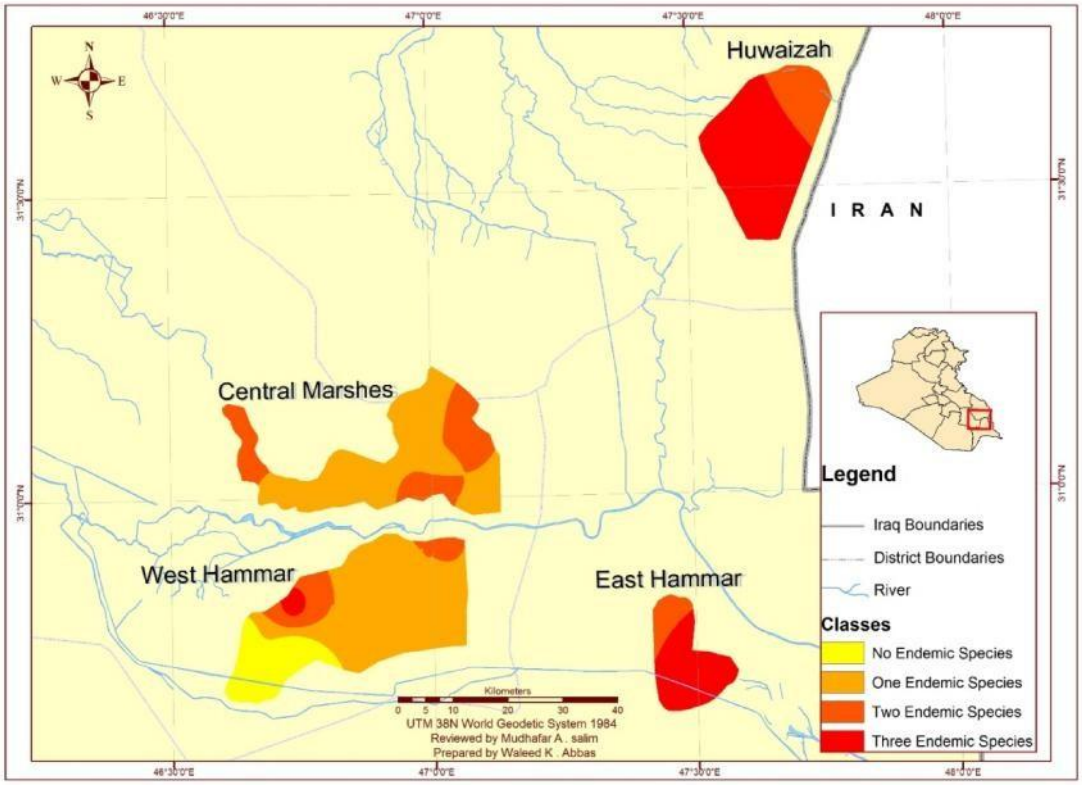
Fish of the Ahwar

The fish of the Ahwar 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 Ahwar. 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 Ahwar, 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 2-19: Distribution of Endemic Fish in the Natural Components



Reptiles and Amphibians of the Ahwar

Records confirm the presence of 21 species of reptiles and amphibians in the natural components of the property and their adjacent areas. The only globally threatened species of reptiles recorded in the Ahwar is the Euphrates Soft-shell Turtle (*Rafetus euphraticus*) which occurs in each of the four components 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 Ahwarlevel) to be data deficient.

Figure 2-12: *Rafetus euphraticus*
By: Mudhafar Salim

Invertebrates of the Ahwar

The number of invertebrate species recorded in the Ahwar 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 Ahwar intertidal areas.

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

Table 2-8: Threatened Odonata Species Occurring in the Ahwar

Scientific Name	Red List Status
Brachythemis fuscopalliata	Vulnerable

Fauna of the Huwaizah Marshes

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. Thesemarshes 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 Marshesare 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 component is the sole refuge for some species such as the African Darter (*Anhinga rufa*). The Huwaizah component 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 Ahwar; the Lesser White-fronted Goose (*Anser albifrons*) and White-headed Duck *(Oxyura leucocephala).*

Regarding mammals, the component 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

The relative richness of the Central Marshes component 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 Ahwar and the country as a whole.

147bird species breed in the Central Marshes, and thesemarshes 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 component of the Ahwar 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 Ahwar. This component also represents a critical habitat for the globally threatened Euphrates Soft-shell Turtle (*Rafetus euphraticus*).

Fauna of the East Hammar Marshes

110bird 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 thesemarshes represent a significant proportion of their breeding area.

The East Hammar Marshes component 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 component 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 component.

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

The West Hammar component is considered to be the richest in the property in number of bird species. 169 bird species have been recorded here, and this component 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 component, this component'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 components, the Euphrates Soft-shell Turtle (*Rafetus euphraticus*) is recorded in the West Hammar Marshes.

Socioeconomic Setting of the Ahwar

This section summarizes socioeconomic information for the four natural components of the property, and reflects the long term relationship between the Ahwar and human communities who have used their natural resources, which in turn influenced the level of services provided by the Ahwar to their inhabitants and the impacts of human presence on the natural values of the property. All four natural components 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 Ahwar, the Marsh Arabs or Ma'adan, today live in several villages and small size towns situated for the most part outside the property and along the rivers that feed into its natural components (as shown in the maps below). The 2007 census indicates approximately 350,000 inhabitants living in the broader area of the Ahwar with approximately 5% of these living within the confines of the property. Another 60% live within the buffer zone.

Table 2-9: *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 Ahwar. 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 Ahwar. 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, perpetuating a practice already is use as early as the 4th millennium BCE when the marshes were situated to the northwest of their present location. These manmade islets could be permanent or temporary and were particularly widespread on lakes in the Huwaizah. In the other components of the property, families or clans also used for settlement the top of archeological tells protruding above the water. 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 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*(large reed buildings) used as guesthouses, were remarkable features of a material culture that had withstood the test of

time: pictorial representations of similar reed buildings were found on Sumerian seals and other artifacts.

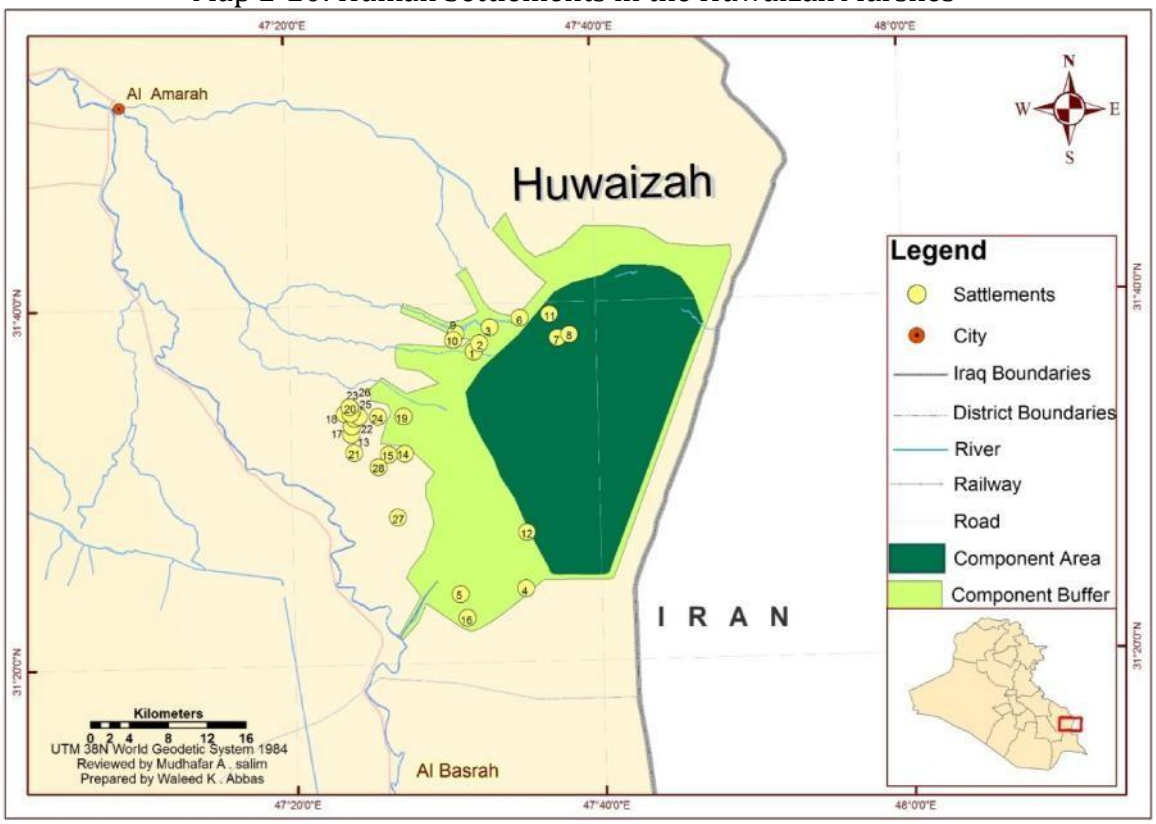
TheAhwar inhabitants experienced a change in lifestyle starting in the 1950s with labor migration to the large urban centers and the introduction of modern devices and materials in the marshes (such as motorboats, rifles, concrete, etc.). The process accelerated in the 1970-90s. During the 2000s, the Ahwarwere drained and the inhabitants brutally forced out for a mix of political, geostrategic and economic reasons. Vast numbers became internally displaced persons (IDPs) in other regions of Iraq. Those who managed to remain close to the Ahwar settled in villages which grew into small towns. Unable to fully rely on their traditional marsh-based activities, the Ma'adan have experienced impoverishment. Furthermore, the towns on the edges of the Ahwar are poorly served by government institutions with few schools or clinics. For the Ma'adan who still livein or around the Ahwar, 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 Ahwar were therefore dramatically affected over the past decades. Following the partial reflooding of the Ahwar 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 Ahwar, it is highly unlikely that settlement patterns will be reverted in the near future as people now aspire to access to services and education for their children, and new habitat styles with basis amenities. Men also tend to seek wage labor whenever possible. This is why communities are today mostly located on the edges of the natural components of the property, although they use the property's resources and some continue to use man-made islets on a temporary or seasonal basis.

The Huwaizah Marshes

Economic activities within the Huwaizah Marshes are limited to the peripheries of the component. Most activities take place outside the property 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. Around 85% of the livestock rearing is of buffalo.

Map 2-20: Human Settlements in the Huwaizah Marshes

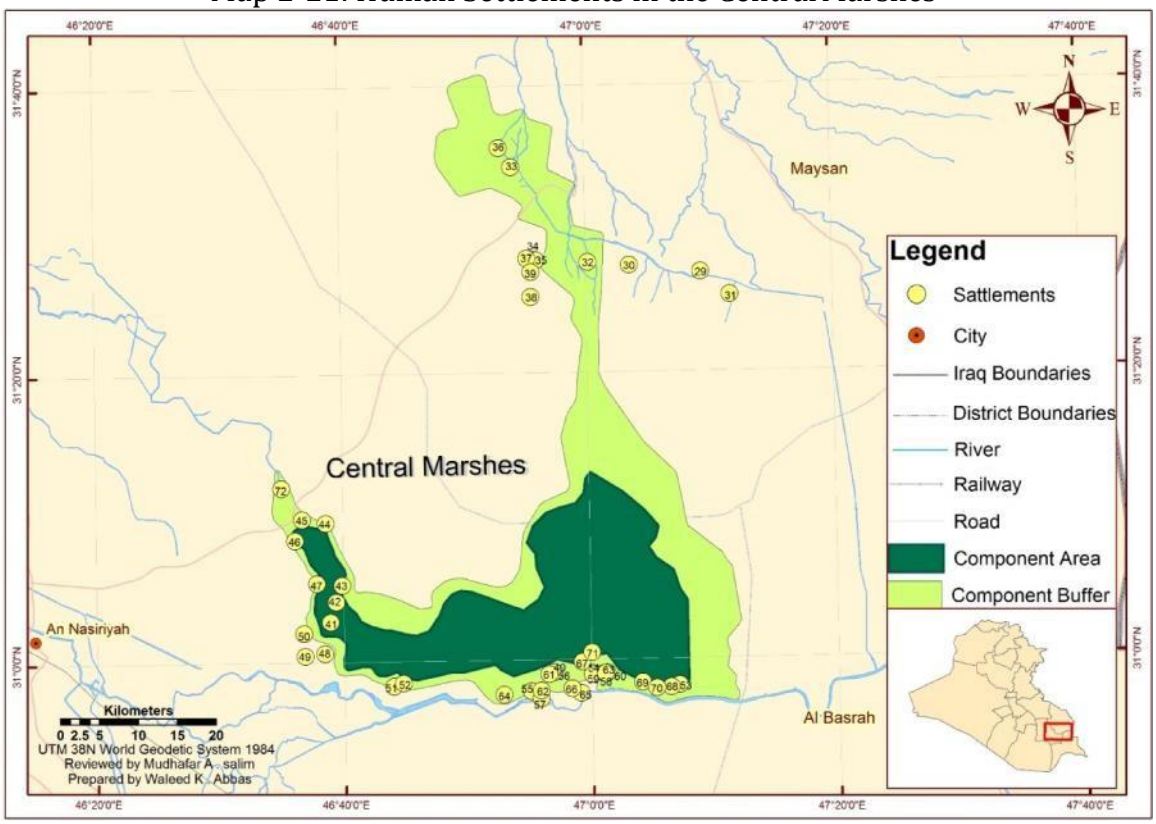


The Central Marshes

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 property 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 (*chibayish*) which are made of mud and reed and are used for temporary residence within the property's water bodies.

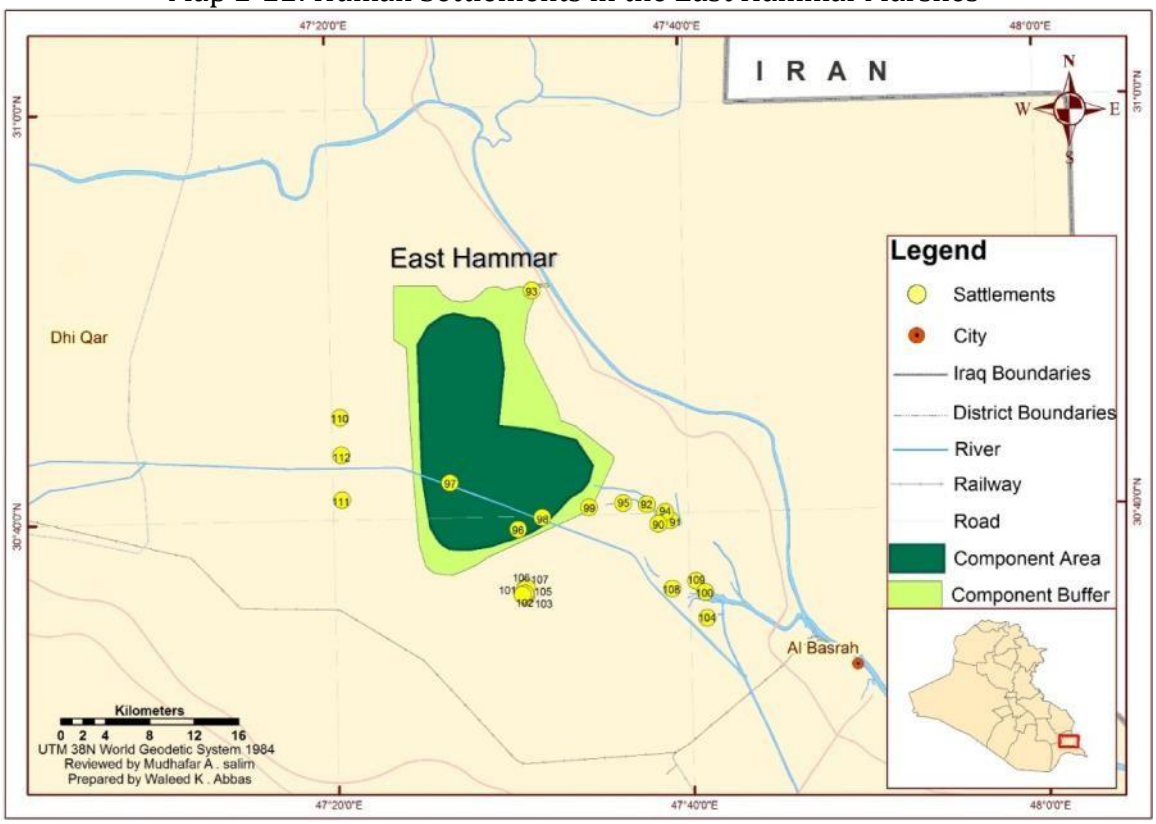
Map 2-21: Human Settlements in the Central Marshes



The East Hammar Marshes

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

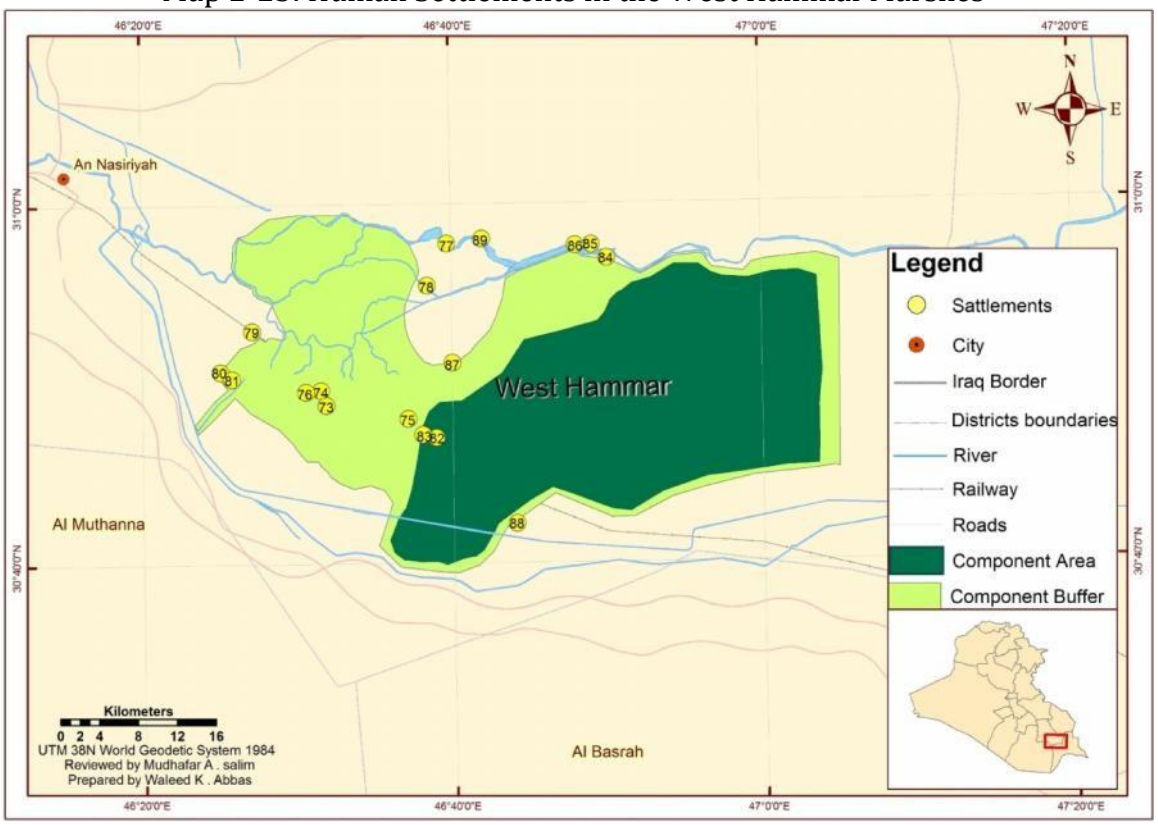
Map 2-22: Human Settlements in the East Hammar Marshes



The West Hammar Marshes

Most inhabitants within and near the West Hammar Marshes are concentrated in the small towns of SuqAsh Shuyukh, Karmat Bani Sa'ad, Okaikah and Hammar, which are actually located outside the property. The West and East Hammar share many of their socio economic specificities, as historically they were considered as one coherent marsh area.

Map 2-23: Human Settlements in the West Hammar Marshes



Ecosystem Services of the Ahwar

The wellbeing of the Ahwar is crucial for the wellbeing of the people living in it. The ecosystem provides several key services for the Ahwar areas in particular, and for the wider Iraqi community in general. These include the provision of food, clean water, and climate control .

The daily life of the Ahwar communities is organically connected to the roles played by the marshes on both natural and cultural levels. Therefore, maintaining a balanced approach towards the development of the area requires a strong recognition for such services and benefits.

The main ecosystem services provided by the Ahwar include:

- The Provision Services: the Ahwar provide a wealth of wild and farmed foods, and freshwater, genetic and biochemical resources. The biodiversity richness of the area has for millennia contributed to the production of these services in support of people and wildlife.
- The Regulating Services: the ecosystems of the Ahwar are important for controlling climate, water flow, water purification, and protection against natural risks such as flooding or drought. The Ahwar also mitigate the impacts of desert sand storms as

well the control of temperatures and humidity, which directly influence agricultural production.

- The Cultural Services: the Ahwar provide unique cultural services which transform into unique ethical, aesthetic and educational values. They exemplify the ancient marshlands where key civilizations developed and agriculture development was pioneered, contain numerous archaeological sites, and represent a long standing source of verbal norms and traditions for local inhabitants. They are thus significant for the tangible and intangible heritage of Iraq.
- The Supporting Services: the Ahwar sustain numerous supporting processes for the services mentioned above. This includes soil formation through organic matter recycling, continuous deposition, and the recycling of phosphorus, sulfur and nitrogen back into air and soil.

Table 2-10: Ecosystem Services Provided by the Ahwar (Source: *Managing Change in the Marshlands: Iraq's Critical Challenge*. United Nations White Paper report for the United Nations Integrated Water Task Force for Iraq. United Nations, 2011)

Provisioning Services - Goods of Products Obtained from the Ahwar Ecosystem		
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 sea beam, 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 animals species
Regulating Services – Benefits Obtained from the Ahwar Ecosystem Control of Natural Processes		
Climate Regulation		Moderation of the national rainfall pattern and control desertification and dust storms
Water Regulation	Hydrological Flows	Storage and retention of water flowing from the 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 rending 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	
Cultural Services – Nonmaterial Benefits that Iraqis Obtain from the Ahwar Ecosystem	
Ethical Values	Customs, oral traditions, knowledge and rituals attached to the use of the land and rivers; tangible and intangible cultural heritage; an area of global importance
Recreation and Tourism	Canoeing, bird and wild-life watching, recreational fishing, archaeological site visitation
Aesthetic	Globally significant natural beauty
Educational	Science, cultural awareness, specialized vocational training, public awareness of national, regional and global importance
Supporting Services - Underlying Processes that are Necessary for the Production of all Other Ecosystem Services	
Soil Formation	Retention of sediment, recycling and support of the health of the ecosystem
Nutrient Cycling	Returning phosphorus, sulfur and nitrogen to Iraq's atmosphere, water and soils

Description of the Cultural Components

Table 2-11: Principal Phases of the Ubaid and Sumerian Cultures

Ubaid 0(c. 6500-5000 BCE), earliest known village settlements.

Ubaid 1, sometimes called Eridu period **(c. 5000–4700 BCE)**, a phase limited to the extreme south of Iraq, on what was then the shores of the Arabian Gulf. This phase saw the establishment of the first permanent settlements south of the 125 mm rainfall isohyet. These people pioneered the growing of grains in the extreme conditions of aridity, thanks to the high water tables of southern Iraq.

Ubaid 2 (c. 4800–4500 BCE) saw the development of extensive canal networks from major settlements. Irrigation agriculture formed the first required collective effort and centralized coordination of labor.

Ubaid 3/4 (c. 4500–4000 BCE) saw a period of intense and rapid urbanization with the Ubaid culture spreading into northern Mesopotamia and along the Arabian littoral.

Uruk period (c. 4000-3000 BCE). The very end of the period sees the first emergence of state formation, the rise of urbanism and complex societies, and the invention of writing in Uruk.

Jamdet Nasr period (c. 3100-2850 BCE) during which the Uruk influence beyond southern Mesopotamia collapsed.

Early Dynastic period (c. 2850–2350 BCE) of warring city-states, with most sources coming from the states of Ur and Lagash.

Old Akkadian or Sargonic period (c. 2350-2200 BCE) during which a new paradigm of kingship and statehood was created in Mesopotamia.

Second Dynasty of Lagash (c. 2200-2120 BCE) also called transitional where a nonindigenous people called the Gutium seen to have taken advantage of a power vacuum.

Third Dynasty of Ur or Ur III (c. 2120-2000 BCE) which left an unprecedented quantity of administrative texts, administrative and legal reforms, and as surge in monumental architecture, particularly ziggurats.

The Marshesas the Landscape of Early Human Settlement

Today, except for the Ahwar, much of southern Iraq appears to be alluvial desert, arid sand flats and belts of sand dunes. However during the 6th to 3rd millennia BCE, the Persian Gulf and the marshes used to extend inland several hundred kilometers to the northwest of their current extent. The current parched landscape was once covered with rivers, verdant marshes and cultivated fields, and provided the setting for the development of the first cities of which remains still scatter the bare plain in the form of archaeological mounds.

A network of sister cities started to emerge in southern Mesopotamia around 5500 BCE within 30 km of each other. The early inhabitants of the region during the Ubaid period are considered the force behind the development of theses first urban centers, developing agriculture and establishing trade networks and industries, such as weaving and metalwork. By 3350 BCE city specialisms and cult identity had developed, and a hierarchy of cities of different sizes grew within this rapidly urbanizing area. The main Sumerian cities were Nippur, Shuruppag, Uruk, Ur, Larsa, Bad-Tibira, Lagash, Girsu, and Umma while Eridu was a major cultic center. There were also numerous smaller towns under the influence of their bigger neighbors. The cities of the late 3rd millennium were among the most sophisticated and prosperous in the world and they marked a remarkable development from the small settlements of the earlier Ubaid. In the alluvial floodplain, cities stood in sight of each other on low mounds above a moving landscape of meandering rivers and distributaries used as waterways connecting settlements, verdant but shifting marshes where reed provided fuel and fodder, cultivated sedimented levees and seasonally inundated plains, lagoons and estuaries where fish was abundant, and finally the sea with its tidal actions offering a natural irrigation and drainage system to coastal fields. Uruk, Ur and Eridu, the three cultural components of the proposed property, are outstanding examples on this process of city formation in the marshlands of ancient Iraq.

The Key Cultural Achievements

The critical invention for the Sumerian and the entire Mesopotamian civilization was writing. The most likely theory suggests that it developed from the use of clay tokens for accounting purposes, a system that was popular throughout the Middle East from the 6th millennium BCE on. The critical evolution took place in the context of Uruk's expansion in the 4th millennium BCE. The growing wealth and complexity of administration in the Eanna, the biggest Urukean temple, created the conditions for the development of three-dimensional tokens into analogical shapes on clay tablets. In the initial phase writing served purely administrative purposes. More elaborate texts appeared around the 2600 BCE. In the Early Dynastic period, writing was applied for the royal inscriptions and brought first accounts of political history. In the latter half of the 3rd millennium writing further developed and was used for literary purposes. Much of the Sumerian literature is known form the later Old Babylonian copies; however, most of the compositions must have originated in the 3rd millennium BCE. The most characteristic genres in the Sumerian

literature were religious hymns to gods or temples, mythological compositions featuring gods and heroes, royal praise poems, lamentations over destroyed cities or debate poems.

Religions of Mesopotamia evolved in time; the most complete picture comes from the latter half of the 3rd millennium BCE. Each city-state had its own pantheon, with a chief deity on its top. This deity was believed to reside in the city's main temple however the most important gods were venerated all over Sumer in secondary temples. The top three Sumerian deities were Enlil, the chief god, leading the divine assembly with his main temple of E-kur in Nippur; An, the god-creator and sky god with his main temple of Kullaba in Uruk; and Enki, the god of wisdom and freshwater with his main temple of E-abzu in Eridu. Inanna was the most important female deity, goddess of love and war, the morning star with her main temple of Eanna in Uruk. Other prominent gods were Nanna, the moon god with his main temple of E-kishnugal in Ur; Utu, the sun god with his main temple of E-babbar in Larsa; Ningirsu, the warrior god with his main temple of E-ninnu in Girsu. Many important Sumerian gods were syncretized with their Akkadian counterparts (Enki with Ea, Inanna with Ishtar, Nanna with Suen, Utu with Shamash etc.). Temples played an important role in the social and economic life of the cities, central to the development of administrative practice and writing.

The three southern Mesopotamian cities included in the proposed property contain outstanding examples for the development of the large religious structure that would be a key feature of Mesopotamian cities for millennia: the ziggurat. Ziggurats were massive religious structures built in ancient Mesopotamia and the western Iranian plateau. The ziggurat was part of the religious architecture found at the center of most Mesopotamian cities after c. 2000 BCE. Nearly thirty ziggurats in the area of Mesopotamia have been discovered by archaeologists. In location, they stretch from Mari and Tell Brak in the northwest (Syria) and Dur-Sharrukin in the north (Iraq), to Ur and Eridu in the south, and to Susa and Tchogha Zanbil in the east (Iran). In time, the span begins perhaps as early as the Ubaid period temples in Eridu (end of the 5th millennium BCE) and extends through the restorations and additions made even in Seleucid times (3rd century BCE). Architectural styles feature stairs in some, ramps in others, and combinations of the two in still others. Ziggurats are of varying sizes with bases ranging from 20 to over 90 m on one side. Frequently the ziggurat is dedicated to the city's patron god or goddess, but cities were not limited to one ziggurat.Ziggurats first appeared in southern Mesopotamia, developing from the need to raise important religious buildings above the flat flood-plain. As mudbrick shrines became too small or old, the disused structure was then incorporated into a platform supporting the next temple; this process of successive structures is best known from excavations at the sites of Eridu and Uruk, two of the cultural components included in the property. The Eridu ziggurat is considered the oldest known example of this building type, while at Uruk, the White Temple sits upon a large mudbrick platform that became a precedent for the ziggurat. The structural form that appears to have developed at Eridu and Uruk, eventually reached maturity at Ur, the third cultural component of the property, with one of the largest and best preserved ziggurats. In Uruk, Ur and Eridu, ziggurats were built of mudbricks with wet mud sealing bricks together. Bricks were laid horizontally and vertically with laid reed-mats between them. Three converging flights of stairs allowed access to the ziggurats.

The Marshes as Resources

Ancient southern Mesopotamia had limited natural resources to offer, little rainfall and scorching summers. The reeds and wildlife of the marshes provided an essential material foundation for the early settlers. Textual and archaeological evidence suggest that the exploitation of the marshlands had a critical impact on social institutions, economy and the development of cities in the region, traditionally associated mainly with the emergence of farming and irrigation. According to some interpretations, the name of the land, KI-EN-GI in Sumerian, means "the Land of Reed Masters". Reeds were omnipresent in the Sumerian material culture. A Sumerian proverb says "Where there is no grain, this is a sign of vengeance turned towards a city. Where there are no reeds, it is the worst of all poverty". Reeds (*phragmites australis*) and cattails or reedmace (*typhadomingensis*) were harvested in bunches as very large quantities were needed for construction material and fodder for large herds of sheep, goats and cattle. Reed-mats used in building between brick layers have been preserved for the archaeological records in the ziggurat of Eridu and Uruk, and some cuneiform tablets show the impressions of the reed mats they were placed on. The importance of this material is further attested from the cuneiform texts, particularly economic ones. A number of reed varieties were differentiated in the Sumerian language, and written records tell of many object made of reed – fences, containers, musical instruments, mats, screens, and even watercrafts. Reed cutters and reed weavers were mentioned in the lists of professions and literature too. Last but not least, the writing stylus, one of the central items for the Mesopotamian civilization, was made of reed.

Figure 2-18: Pictorial Representation of Sheep and a Reedhouse on a Through Found in Uruk. Collection of the Vorderasiatisches Museum, Berlin.By: Qahtan Al Abeed

The inhabitants of southern Mesopotamia dealt with a challenging environment with very high temperatures and very low precipitations. This is why the wetland environment was critical for the development of agriculture which in turn allowed for large scale human settlements. Cultivation was transferred from northern Mesopotamian as a no-tillage system dependent on rain-fall. In southern Mesopotamia, seeds were initially spread on wetlands but this technique was unreliable as floods were unpredictable and susceptible to destroy crops. Furthermore, the very low level of rain-fall did not all for rain-fed agriculture. Cultivation was then performed on levee tops of alluvial soils formed by the dry beds of meandering river branches. Later, draining the marshes and the building of

dams and irrigation canals were major technological breakthrough first introduced under the Ubaid period and further perfected by the Sumerians who later built dams on the Tigris and Euphrates to expand agriculture far inland. Some examples of major centralized hydrological works are recorded in cuneiform tablets and archaeological remains. A tablet from the Ur III period provides details of techniques used for the drainage of the marshes, their protection from flood by vast dikes, and the development of an intricate irrigation system by King Ur-Nammu. This allowed for overcoming a non-conducive water regime by harnessing hydraulic resources and introducing the cultivation of new grains, particularly wheat and mil, ensuring agricultural surpluses. Livestock production (sheep, goat and cattle) also depended largely on the resources available in the marshes, both water and vast quantities of reeds harvested as fodders.

Figure 2-19: Reedmat Between Layers of Mubrick in the Inanna Ziggurat in Uruk.
By: Ayad Kadhum, 2013

Southern Mesopotamian cities were built of mud found locally in abundance. Mud was used as building material to make bricks and plaster. Mud was also used for sun-dried pottery and other small objects, whereas clay was baked to create container, statues, cones, writing tablets and other small object but also rainwater drainage channels and pavements around ceremonial buildings such as ziggurats. The first usage of clay bricks is recorder in the 5thlayer of Uruk. Mud was more plentiful and easily obtained in marshy areas and the composition of the mud used as building material in the cities of the floodplain reflects environmental conditions at the time it was dug. Recent research at Eridu shows that at every level mud is laced with fresh water snail shells of the type living in marshes. There are other indications that reed chaff was used to temper the mud used for bricks in southern Mesopotamia. Dozens of cuneiform texts testify to the importance of mud and clay for material and religious life. Religious rituals accompanied brick cutting and setting, and

mud was believed to be what the chief god had used to create the very first temple at Eridu, and the first man to worship Him in this temple.

Figure 2-20: Assyrian Relief from the Palace of Sennacherib in Niniveh: Fighting Scene in the Southern Marshes.British Museum collection. By: Qahtan Al Abeed

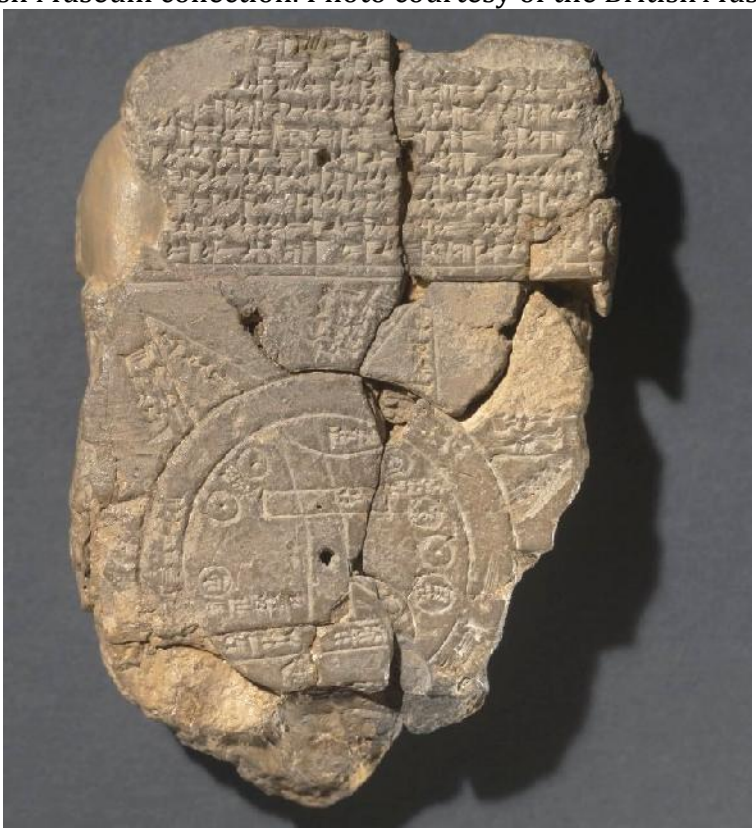
The marshes also provided a rich reservoir of game and fish. Waterfowls and wild boars were abundant; they are often mentioned in cuneiform texts while hunting scenes are depicted on artifacts. Fish was a key export product and primary source of protein for the Sumerians. Bales of fresh water fish were recorded at multiple levels in Ur and Eridu. The written evidence from the 4th millennium BCE on confirm the prominence of fish in the food ratios and testify the presence of professions as "fishermen", "fisheries governors" and "fisheries accountants" and the lexical lists include signs for various fish species, dried fish, fish flour etc. The fisheries and fishermen are mentioned throughout the Sumerian literature along with farmers and shepherds.

The Marshes as Inspiration

The economic importance of the wetlands extended to their religious significance. Fish was among the principal offerings in the temples, particularly in Eridu, while temple interiors were covered with reed mats. Woven reed mats were placed under brick podiums in temples and ziggurats representing source of abundance which radiated upward into the structure. Reeds were also used in religious rituals, serving mostly for purification.

Prominent Mesopotamian deities had strong symbolic relations with the wetland environment. Enki was the Sumerian god of wisdom and freshwater whose principal cult centre was the E-abzu temple in Eridu. He was also a popular character in literary compositions where he appeared as a wise, benevolent god, who created humanity, took care of the living creatures and watched over the world's order. Literary texts presented Enki as the creator of the marshes and all living things in them. The marshes were his natural domain. Nanshe was the goddess of fish and birds, known also as a dream interpreter. Inanna was the most prominent deity in ancient Sumer with her main cultic center in Uruk. Her cuneiform ideogram was derived from a hook-shaped twisted knot of reeds representing the doorpost of the storehouse, and thus fertility and plenty.

Figure 2-21: Babylonian Clay Map.
The world is shown as a circle surrounded by a "bitter river". The Euphrates flows south to a horizontal band marked "marsh" on the right and "outflow" on the left.
British Museum collection. Photo courtesy of the British Museum



The *abzu* (*engur* in Akkadian) was the name for freshwater from underground aquifers that was given a religious fertilizing quality in Sumerian and Akkadian mythology. Lakes, springs, rivers, marshes, wells, and other sources of freshwater were thought to draw their water from the *abzu*. According to the Mesopotamian notion of the Cosmos, the earth was a solid, disc-like expanse within a huge body of water. Below the earth was the *abzu*, above the earth the sky formed a more or less impermeable vault holding back the upper body of water which at certain places and times fell as rain in the sky's ceiling. Enki was believed to have lived in the *abzu* since before human beings were created. His wife Damgalnuna, his

mother Nammu, his advisor Isimud and a variety of subservient creatures, such as the gatekeeper Lahmu, also lived in the *abzu*. The E-abzu temple in Eridu, where Enki-Ea was venerated, was a symbolic representation of the *abzu* materialized by the lagoon surrounding the temple.

The marshes were a major source of inspiration for Sumerian literature. Some compositions focused specifically on the wetland life such as *The Debate between Bird and Fish*, *Heron and Turtle, The Home of the Fish*. They are the earliest recorded texts celebrating nature, testifying appreciation of the beauty and variety of plants and animals in the marshlands. The cycle of literary works related to Enki invariably show marshes as a setting of god's operations. In the laments over decline and destruction of the Sumerian cities, marshlands are pictured as the source of wealth. The Sumerian figurative language is full of images of nature and animals, appearing throughout the epic compositions, religious hymns and proverbs. For instance, in *Lugalbanda and the Anzu Bird*, the hero Lugalbanda is described "Like a pelican emerging from the sacred reedbed, like lahama deities going up from the *abzu*, like one who is stepping from heaven to earth…" Reeds and marshes appear often also in the Gilgamesh cycle. In the *Epic of Gilgamesh*, first written in the 2nd millennium BCE but coming from an earlier tradition, Enlil, responsible for the Flood, recreated the world by building an island made of reed on the surface of water and putting human beings on it.

The lively images of the water life eventually cease to appear in the cuneiform sourcesby the beginning of the 2nd millennium BCE when the Akkadian had most likely replaced Sumerian as a spoken language in Mesopotamia. It largely coincided with the shift of power and intellectual life from the southern cities north, towards Babylon. The Sumerian literature kept being transmitted within scholar circles and it heavily influenced the developing Akkadian literature. However, much of the literary imaginary was lost in this transition. Among others, the Akkadian texts rarely adapted motives related to the marshes and marsh animals.

However echoes of the religious significance of the marshes are still found in the *Enuma Elish*, the Babylonian creation myth, of which one version reads:

When the skies above were not yet named
Nor earth below pronounced by name,
No reedy cottage was furnished
No marshlands appeared
Only Apsu, fresh waters
And maker Tiamat, who bore them all,
Had mixed their waters together,
But had not formed pastures, nor discovered reed-beds;
When yet no gods were manifest,
Nor names pronounced, nor destinies decreed.

Detailed Description of the Cultural Components

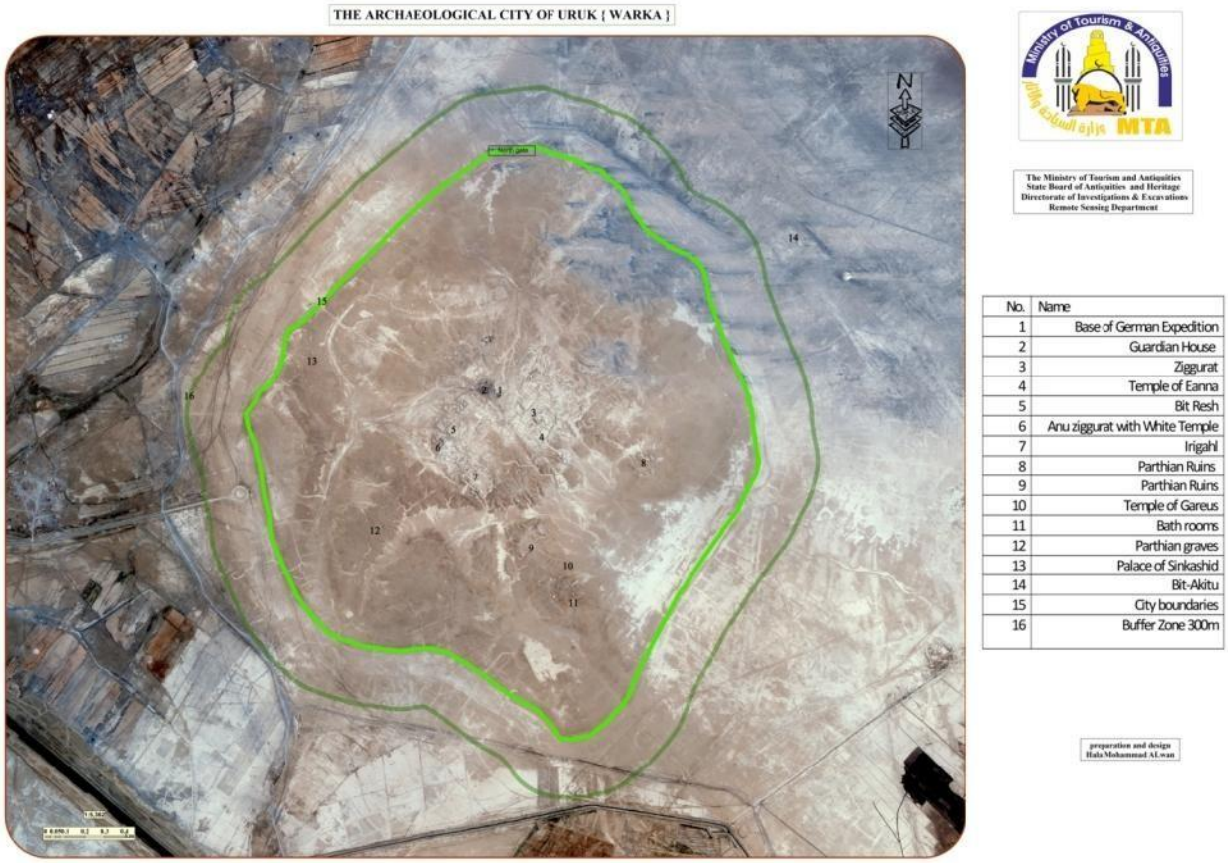
The three cultural components of the property comprise the Archeological Cities of Uruk and Ur, once major political and economic centers of southern Mesopotamia, together with the archaeological site of Tell Eridu, a prominent cultic center that did not develop into a full-fledged metropolis. Originally situated on the margins of freshwater marshes and, for Ur, near the shores of the Arabian Gulf, these three archaeological sites are today well inland and surrounded by an arid landscape.However traces of the ancient environment of marshlands and rivers are still found in the topography and archaeological remains of the sites.

Unlike the Assyrians in the north of Mesopotamia with their magnificent stone wall reliefs, the inhabitants of the south constructed their monumental buildings almost exclusively in mudbrick, which made the retrieval of all but the thickest walls and the largest structures almost impossible when using the crude excavation techniques of the first explorers. In addition much of the material culture was made of perishable materials such as reeds and palm woods which do not survive either. In spite of this the great ziggurats of Uruk, Ur and Eridu persisted through the ages and provide the most ancient and best documented examples of urban and religious architecture in southern Mesopotamia.

The Uruk Archaeological City Component

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 property follow the official boundaries and buffer zone of the archaeological site, which is one of the largest in southern Iraq, 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. The original city of Uruk was situated southwest of the ancient Euphrates River bed, now dry, and on the edges of marshes. Today, the site lies to the northeast of the modern Euphrates. The change in position was caused by a shift in the river in the course of history, and contributed to the decline of Uruk.

Figure 2-22: Aerial Picture of Uruk Archaeological City



No.	Name
1	Base of German Expedition
2	Guardian House
3	Ziggurat
4	Temple of Eanna
5	Bit Resh
6	Anu ziggurat with White Temple
7	Irigahl
8	Parthian Ruins
9	Parthian Ruins
10	Temple of Gareus
11	Bath rooms
12	Parthian graves
13	Palace of Sinkashid
14	Bit-Akitu
15	City boundaries
16	Buffer Zone 300m

Uruk's history covers four millennia from the end of the Ubaid period (c. 3800 BCE) to the late Sassanid period (7rd century CE). However its maximal expansion dates to the end of the 4thmillennium when 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 3rdmillennium, it was surrounded by a double circular mudbrick wall of 9.8 km restored several times. The most outstanding buildings of which remains are still visible today were excavated and recorded by German teams working on the site throughout the 20th century. The legibility of the site is however highly complex because older buildings were recycled into newer ones, thus blurring the layers of different historic periods.

The site is composed of three tells, the Eanna district, the Anu District (or Kullaba), and Irigal, where archaeologists have discovered multiple cities of Uruk built atop each other in the following sequence:

- Uruk XVIII or Eridu period (c. 5000 BCE); the founding of Uruk
- Uruk XVIII-XVI or Late Ubaid period (c. 4800–4200 BCE)
- Uruk XVI-X or Early Uruk period (c. 4000–3800 BCE)
- Uruk IX-VI or Middle Uruk period (c. 3800–3400 BCE)
- Uruk V-IV or Late Uruk period (c. 3400–3100 BCE); The earliest monumental temples ofEanna District are built
- Uruk III or Jamdet Nasr period (c. 3100–290 BCE); The 9.8 km city wall is built

- Uruk II
- Uruk I

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.

Uruk continued as an important city under the Assyrian, neo-Babylonian, Parthian and Persian empires but never again a primary political center. However its role in Mesopotamian culture and religious tradition is constantly acknowledged by subsequent rulers who all felt it important to restore, expand or contribute to cultic architecture in Uruk as part of their priestly duties.

The Eanna District

The Eanna district is historically significant as both writing and the style of Mesopotamian public monumental public architecture emerged here during Uruk periods VI-IV. The combination of these two developments places Eanna as arguably the first true city and civilization in human history. Eanna during period IVa contains the earliest examples of cuneiform writing and therefore the earliest writing in history. Although some of these cuneiform tablets have been deciphered, difficulty with site excavations has obscured the purpose and sometimes even the structure of many buildings.

The Mosaic or Stone-Cone Temple was the first building of Eanna. It was built of mudbrick over a preexisting Ubaid temple and enclosed by a limestone wall with an elaborate system of buttresses. Walls were decorated with mosaic made of colored stone cones which were driven into the mubrick facade to form geometric patterns. The building measured 19.5x 9 m but was ritually demolished in the Uruk IV period. The excavated remained have been purposefully reburied to protect them. About 4 m of the mosaic covered wall has been left visible.

Figure 2-23: Remains of the Stone-Cone Temple. By: Ayad Kadhum, 2013

In the following period, Uruk V, about 100 m east of the Stone-Cone Temple, the Limestone or Stone Temple was built of limestone and bitumen on a 2 m podium of rammed earth and plastered with lime mortar over a preexisting Ubaid temple. The podium itself was built over a woven reed mat. This temple was unprecedented for its size and use of stone, a clear departure from traditional Ubaid architecture. The stone was quarried from an outcrop about 60 km east of Uruk. It is unclear if the entire temple or just the foundation was built of this limestone. The Limestone Temple is probably the first Inanna temple, but it is impossible to know with certainty. Like the Stone-Cone Temple the Limestone Temple was also covered in cone mosaics. Both of these temples were rectangles with their corners aligned to the cardinal directions, a central hall flanked along the long axis flanked by two smaller halls, and buttressed facades; the prototype of all future Mesopotamian temple architectural typology. Channels, tanks, and vessels found there indicate that libation rites might have been performed at the temple. The structure was ritually destroyed, covered with alternating layers of clay and stone, and then excavated filled with mortar sometime later. The foundations of the temple are still visible above ground level .

Between these two monumental structures a complex of buildings (called A-C, E-K, Riemchen, Cone-Mosaic), courts, and walls was built during Eanna IVb. These buildings were built during a time of great expansion in Uruk as the city grew to 250 ha and established long distance trade, and are a continuation of architecture from the previous period. The Riemchen Building, named for the brick shape called *Riemchen* by the Germans, is a memorial with a ritual fire kept burning in the center for the Stone-Cone Temple after it was destroyed. The Riemchen bricks first used in this temple were used to construct all buildings of Uruk IV period Eanna. The use of colored cones as a facade treatment was

greatly developed as well, perhaps used to greatest effect in the Cone-Mosaic Temple. Composed of three parts: Temple N, the Round Pillar Hall, and the Cone-Mosaic Courtyard, this temple was the most monumental structure of Eanna at the time. They were all ritually destroyed and the entire Eanna district was rebuilt in period IVa at an even grander scale. There are no visible remains of this complex of buildings on the site.

Figure 2-24: The Eanna District and the Inanna Ziggurat, Uruk. By: Ayad Kathum, 2013

During Eanna IVa, the Limestone Temple was demolished and the Red Temple built on its foundations. The accumulated debris of the Uruk IVb buildings were formed into a terrace, the L-Shaped Terrace, on which Buildings C, D, M, Great Hall, and Pillar Hall were built. Building E was initially thought to be a palace, but later proven to be a communal building. Also in period IV, the Great Court, a sunken courtyard surrounded by two tiers of benches covered in cone mosaic, was built. A small aqueduct drains into the Great Courtyard, which may have irrigated a garden at one time. The impressive buildings of this period were built as Uruk reached its zenith and expanded to 600 hectares. All the buildings of Eanna IVa were destroyed sometime in Uruk III, for unclear reasons, and there is no visible remains of the Red Temple on the site.

The architecture of Eanna in period III was very different from what had preceded it. The complex of monumental temples was replaced with baths around the Great Courtyard and the labyrinthine Rammed-Earth Building. This period corresponds to Early Dynastic Sumer. 2900 BCE, a time of great social upheaval when the dominance of Uruk was eclipsed by competing city-states. The fortress-like architecture of this time is a reflection of that turmoil. The temple of Inanna continued functioning during this time in a new form. The location of this structure is currently unknown.

The Anu District

The great Anu district is likely older than the Eanna district; however, few remains of writing have been found here .

Figure 2-25: The Anu Ziggurat and the Stone Temple, Uruk. By: Ayad Kadhum, 2013

The Anu Ziggurat began with a massive mound topped by a cella during the Early Uruk period c. 4000 BCE and was expanded through fourteen phases of construction. The earliest phase used typology similar to PPNA cultures in Anatolia; a single chamber cella with a terazzo floor beneath which bucrania were found. In phase E, corresponding to Uruk III period c. 3000 BCE, the White Temple was built. This temple was clearly designed to be seen from a great distance across the plain of Sumer as it was elevated over 25 m. and covered in gypsum plaster which reflected sunlight like a mirror. For this reason, it is believed the White Temple is a symbol of Uruk's political power at the time. In addition to this temple, the Anu Ziggurat also had a monumental limestone paved staircase used in religious processions. A trough running parallel to the staircase was used to drain the ziggurat. Today, the total height of the mound topped with the ziggurat is almost 25 m. The remains of the ziggurat alone are 12 m height.

The City Wall

The 9.8 km long city wall of Uruk has only been investigated through small soundings. It was built in the 3rd millennium BCE and was repeatedly renovated. The last evidence of renovation is from the 18th century BCE. The wall consists at least of two circular walls, the interior one being strengthened by semi-circular towers .

The Late Antiquity Buildings

Uruk was ultimately annexed to the Akkadian Empire and went into considerable decline. Later, in the Neo-Sumerian period, Uruk enjoyed revival as a major economic and cultural center under the sovereignty of Ur. The Eanna District was restored as part of an ambitious building program, which included a new temple for Inanna. This temple included a ziggurat, the “House of the Universe” to the northeast of the Uruk period Eanna ruins. The ziggurat is also cited as Ur-Nammu Ziggurat for its builder Ur-Nammu. The remains of the ziggurat (56x56 m) stand today 14 m above ground level.

Following the collapse of the Ur III state (c. 2000 BCE), the center of power in Mesopotamia shifted north towards Babylon, while Uruk remained an important urban center in the south. Under the Neo-Assyrians and Neo-Babylonians, Uruk regained much of its former glory. By 250 BCE, a new temple complex the "Head Temple" (Akkadian: *Bit Resh*) was added to northeast of the Uruk period Anu district. The Bit Resh was one of the two main centers of Neo-Babylonian astronomy. All of the temples and canals were restored again under King Nabopolassar. Parts of the monumental walls of the Bit Resh are still visible .

Figure 2-26: The Temple of Charyos, Uruk. By: Ayad Kadhum, 2013

To the south of the Bit Resh, the Esagila Temple was erected in 322 BCE under Achaemenid rule, and remains of the foundations are still visible. Uruk, nown as Orchoë to the Greeks, continued to thrive under the Seleucid Empire. During this period, Uruk was a city of 300 hectares.

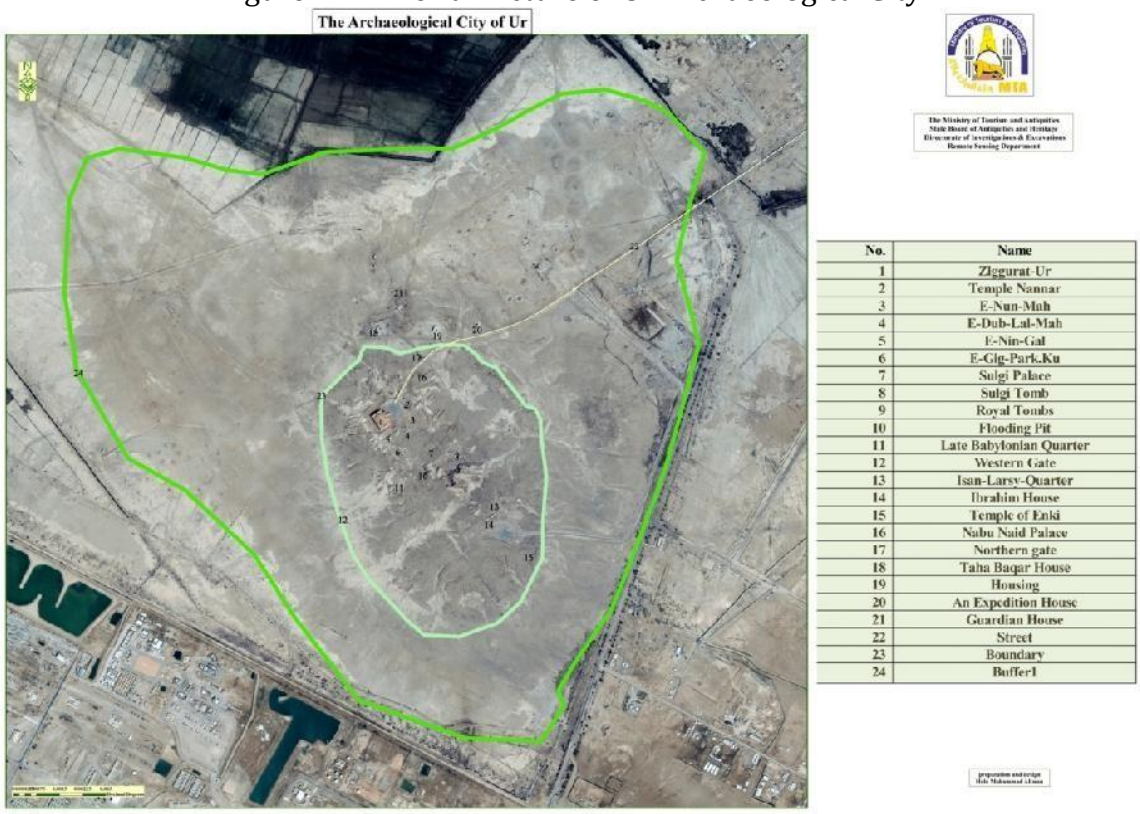
Under Parthian rule (250 BCE to 227 CE), the Temple of Charyos was built in the southern part of the city. It includes distinct architectural elements, including a rectangular wall surrounded by large columns decorated with glazed bricks of which important remains are still visible. The however entered a new period of decline from which it never recovered. The decline of Uruk may have been in part caused by a shift in the Euphrates River. By 300 CE, Uruk was mostly abandoned, and by c. 700 CE at the time of the Islamic conquest of Mesopotamia, it was completely abandoned.

The Ur Archaeological City Component

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 was surrounded by marshes. At the end of the 3rd millennium BCE, it 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.

Figure 2-27: Aerial Picture of Ur Archaeological City



The most significant scientific excavations were conducted at Ur from 1922 to 1934 funded by the British Museum and the University of Pennsylvania and led by Sir Charles Leonard Woolley. A total of about 1,850 burials were uncovered, including sixteen that were described as "royal tombs" containing many valuable artifacts. Most of the royal tombs were dated to about 2600 BCE. Near the ziggurat several temples, residences and public building were also uncovered. Excavations were also made continued the royal tombs layer: a 3.5 m. thick layer of alluvial clay covered the remains of earlier habitation, including pottery from the Late Ubaid period. Woolley later published several articles and books about the discoveries

As of 1960, the then Directorate General of Antiquities started to carry out excavation and conservation work on the site which had been neglected for decades and where some of the areas that were cleared during previous excavations had been sanded over again. Under the direction of Taha Baqir, rebuilding of part of the outer shell of the ziggurat was undertaken: this included the first terrace, the main staircase and the two towers reinforcing the central staircase. What was left of the second level was restored, together with the staircases and the inner walls of the E-dub-lal-mah and the northern, eastern and southern sides of the Royal Palace. Between 1967 and 1982, under the direction Shah Ali Al Siwani, excavation work was carried out in the Royal Cemetery.

Archaeologists have discovered evidence of a prehistoric occupation at Ur during the Late Ubaid period (c. 4000 BCE). These early levels were sealed off with a sterile deposit that was interpreted by excavators of the 1920s as evidence for the Great Flood of the *Book of Genesis* and the *Epic of Gilgamesh*. It is now understood that the south Mesopotamian plain was exposed to regular floods from the Euphrates and the Tigris, with heavy erosion from water and wind. Ur is recorded in written history as a city state from the 26thcentury BCE under the First Dynasty of Ur. Although it must already have been a growing urban center during the 4thmillennium, visible remains date mostly from the 3rdmillennium when the city experienced a renaissance under the Third Dynasty of Ur (c. 2120-2000 BCE).

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 described below (see map of the *temenos* in the Annexes).

Figure 2-28: The Ur Ziggurat. By: Qahtan Al Abeed, 2012

The ziggurat is the most outstanding building with remains clearly visible. It is situated in the northeastern part of the sacred precinct. Dedicated to the moon god Nanna, it was built on a platform 4-5 m height during the reign of Ur-Nammu and his son Shulgi (Ur III period) and reconstructed in the the 6th century BCE by Nabonidus, the last king of the Neo-Babylonian Empire. The ruins cover an area of 1,200 m northwest to southeast by 800 m northeast to southwest and rise up to about 20 m above the present plain level. At present, only the first terrace (62.5x43x11 m) and the second terrace (37x26x5 m) are visible. Only traces of the core of the third terrace still exist. There might have been a small temple over this terrace dedicated to the moon god Nanna. Structurally, the ziggurat is made up of a mudbrick core covered with fired brick walls moved by a sequence of buttresses and niches. The walls of the terraces were not vertical but slightly inclined. The ziggurat has three central perpendicular stairs from the base to the summit, joined at levels one and two by two convergent side stairs. Rectangular holes over the structure helped drain rain water. The Directorate General of Antiquities rebuilt the outer shell in the early 1960s using fired bricks similar to the original ones (see Section 4).

The Royal Palace of Ur-Nammu and Shulgi (known as E-hor-sag/House of the Mountain) is situated near the Royal Cemetery and south-east of the ziggurat and the Gig-par-ku, the high priestess' residence (see below). Construction was initiated by king Ur-Nammu and completed by his son Shulgi. The kings' names are stamped on the fired bricks of the palace. Its square plan (55X55 m) is characterized by a large central courtyard surrounded by rooms, alleyways and service quarters. The Directorate General of Antiquities restored the site in 1963 using fired bricks (40x40x10 cm) similar to the originals.

Figure 2-29: The main entrance of the E-dub-lal-mah in Ur. By: Qahtan Al Abeed, 2011

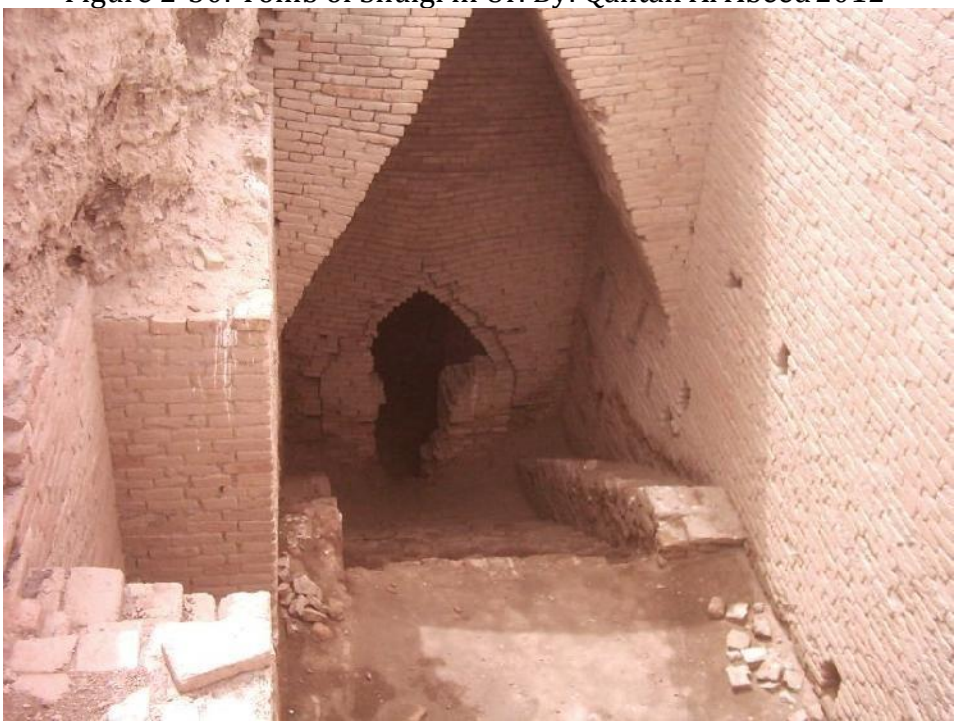
The E-dub-lal-mah (10 X 10.5 m) is a large temple situated in the eastern corner of the holy wall of the ziggurat. The structure was first built under the Ur III dynasty but inscriptions on the fired bricks indicate that several kings restored and enlarged it, among them the

Babylonian kings Nebuchadnezzar (604-562 BCE) and Nabonidus (555-539 BCE). The original arch over its main entrance is considered one of the oldest examples of brick-built arches in the world. The building is composed of two rooms (cella and anti-cella). Stairs allow access to the cella. L. Woolley capped the walls with concrete to protect them from natural phenomena, and conservation work was carried out by the Directorate General of Antiquities in 1962 at the stair inside the temple as well as at its outside and inside walls (see Section 4).

The E-nun-mah temple is square-shaped (47X47 m) and built of fired bricks. It is situated to the east of the E-dub-lal-mah, south-east of the ziggurat. Built during the Ur III period, it was enlarged and/or restored various times until the Neo-Assyrian period (934-609 BCE). Foundations are still visible above the ground.

The Gig-par-ku dates back to King Amar-Sin, the third ruler of of the Ur III dynasty and son of Shulgi. It is situated south-east of the Ziggurat. In its first phase, the residence of the high priestess of Nanna was an approximate square building measuring 56.50x79 m. It comprises two similar rectangular parts, separated by a long east-west path with entries leading to both buildings. Restoration and enlargement works were performed especially in the Kassite and Neo-Babylonian periods. The foundations are still visible at ground level.

Figure 2-30: Tomb of Shulgi in Ur. By: Qahtan Al Abeed 2012



The Royal Cemetery is situated south of the Royal Palace. The major part of the Royal Cemetery belongs to the Early Dynastic period. It comprises sixteen collective royal tombs, organized in several rooms roofed with arches and rich in funerary objects, in addition to 1800/2000 single graves. Most of these graves are situated in the southern part of the Royal Cemetery and few of them in the north-eastern part. One of the most important

tombs for the number of impressive golden finds is that of Queen Puabi, named from a cylinder seal found on her body.

The cemetery located to the south-east of the Royal Palace is attributed to Shulgi and to his son Amar-Sin, kings of the Ur III Dynasty according to their names stamped on the bricks. Over the burial chambers, a funeral temple with several rooms opened on a central courtyard. The tombs were built up of tar, fired and mudbricks. The tomb of Shulgi measures 35x27 m and that of Amar-Sin 19x17 m.

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. This includes the so-called "House of Abraham" identified as such by L. Woolley in spite of the absence of any scientific evidence. It is situated in an area dated to the Isin-Larsa period (early Paleo-Babylonian). The walls of this complex building composed of many courtyards and rooms have been rebuilt by Qasem Radhi from the State Board of Antiquities and Heritage in 2001-2002.

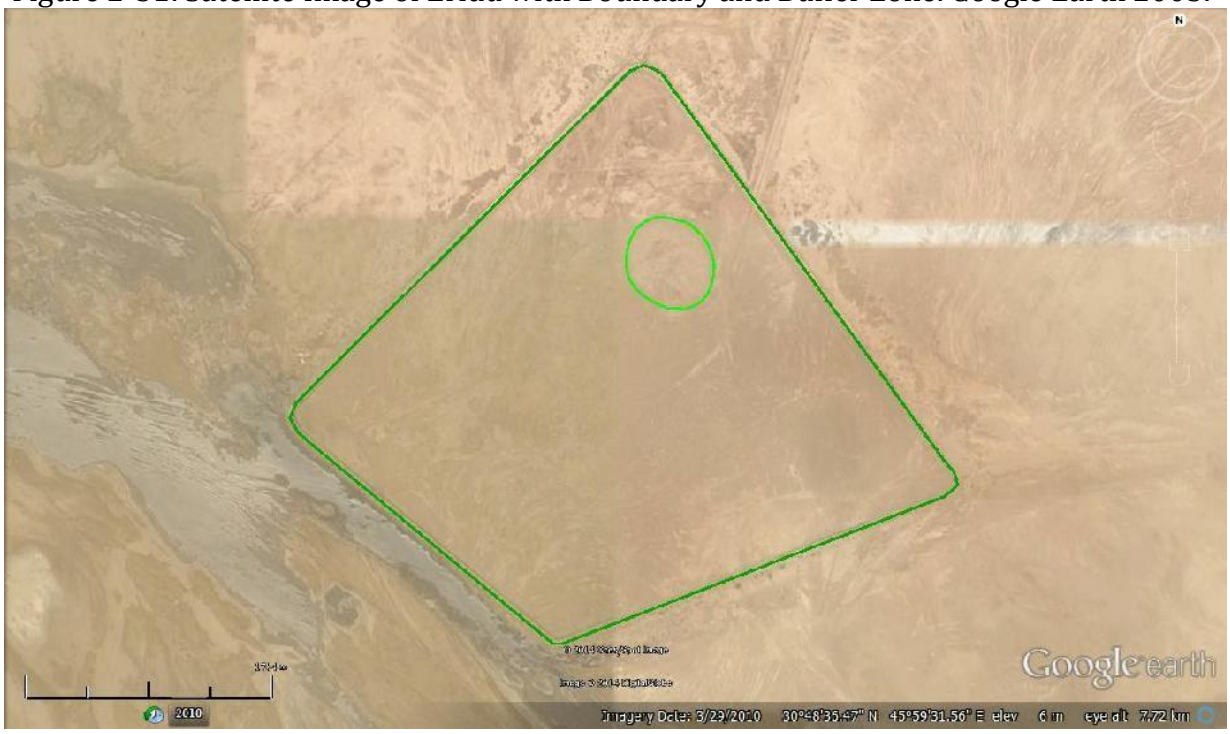
Only one structure in that area of the property is dated to the Sumerian period, the Enki Temple, built by Amar-Sin and dedicated to the god of wisdom and fresh water. Situated to the south-east of the city and inside its external wall, the temple measures 42x32 m and comprise a courtyard containing a platform on which stood the statue of the god Enki. Various rooms and installations overlook the courtyard. However no remains of this building are visible today as excavations damaged the building.

In addition to public buildings, the buffer zone of the property includes two of the three identified harbors of Ur, one on the northern corner of the city wall, and the second along the western wall, none of them excavated yet.

The Tell Eridu Archaeological Site Component

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 was the southernmost of a conglomeration of Ubaid settlements and Sumerian cities that grew about temples, almost in sight of one another. Eridu, today in a desert environment, was surrounded by a marshy lagoon and a canal was connecting it to Ur. 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.

Figure 2-31: Satellite Image of Eridu with Boundary and Buffer Zone. Google Earth 2003.



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.

The ziggurat was briefly excavated by George Taylor in 1855 who described it as consisting of a platform of fine sand enclosed by a sandstone wall, 6 meters high, the corners orientated toward the cardinal points, on the north-western part of which was a pyramidal tower of two stages, constructed of mudbrick, cased with a wall of kiln-burned brick, the whole still standing to a height of about 20 meters above the platform. The summit of the first stage was reached by a staircase on the south-eastern side, 4 to 5 meters wide and 20 meters long, constructed of polished marble slabs, fastened with copper bolts, flanked at the foot by two curious columns. An inclined road led up to the second stage on the north-western side. Pieces of polished alabaster and marble, with small pieces of pure gold and gold-headed copper nails, found on and about the top of the second stage, indicated that a small but richly adorned sacred chamber, apparently plated within or without in gold, formerly crowned the top of this structure. Around the whole tower was a pavement of inscribed fired brick, resting on a layer of clay some 60 cm thick. On the south-eastern part of the terrace were the remains of several edifices, containing suites of rooms. Inscriptions on the bricks identified the site as that of Eridu.

Figure 2-32: The Eridu Ziggurat. By: Ayad Kadhum, 2013

The site was systematically explored and studied by the Directorate General of Antiquities between 1946 and 1949. A sequence of eighteen superimposed mudbrick temples was found underlying the ziggurat, the latter built 3000 years after the city's founding.The earliest temple, dated to the Ubaid I period (5300-4700 BCE), consisted of a small room with a possible cult niche and an offering table. Ever-larger temples were built on the same site, at each level with addition of more sophisticated features such as interior plastering, then an access ramp. A level XIV, the building had much in common with other monumental buildings of the time found in northern Mesopotamia: a spacious central chamber surrounded by smaller rooms, niches and buttresses in the walls, and a symmetrical layout. At level VIII, a complete change in the building's character and plan occurred with a much larger building and thicker walls. At level VI, more than a thousand year after the initial shrine was erected, the building became monumental. Each new building was constructed by leveling the previous one thus forming platforms which most archaeologists see as providing an original pattern for the construction of ziggurats.

Description of the Cultural Values within the Natural Components of the Property

Georges Roux conducted the first informal archaeological reconnaissance of the Ahwar area in the late 1950s at the time of their vast expansion. Using maps and spotting mounds from overhead helicopter flights, he visited eight previously unknown archaeological tells made temporarily accessible by low lake levels. He described them as “littered with copious amounts of pottery”, and made a preliminary ceramic analysis providing evidence for long-term settlement there, from at least the 3rd millennium BCE into the Islamic period. Given that only the uppermost portions of these sites were then exposed above the waterline, and the large quantity of sediment deposited every flood season, Roux postulated that fuller exposure would surely reveal even earlier material.

However, until the drainage and drought of the past decades uncovered dozens of archaeological mounds previously unknown, there had never been a systematic archaeological survey of the region, nor was satellite photography from the 1960s–1970s helpful. This prevented a chronological reconstruction of the settlement history, and accounts for the appearance of an "empty" region on the archaeological maps of Mesopotamia.

Between 2007 and 2010, the State Board of Antiquities and Heritage undertook a systematic survey of the areas uncovered by drainage and drought. Three components of the property – the Central, West and East Hammar – are covered by the survey. Excavation started at five sites in 2011. Results are still unpublished, but information from survey and excavation reports already allow for casting a new light on the settlement history of the contemporary marshes.

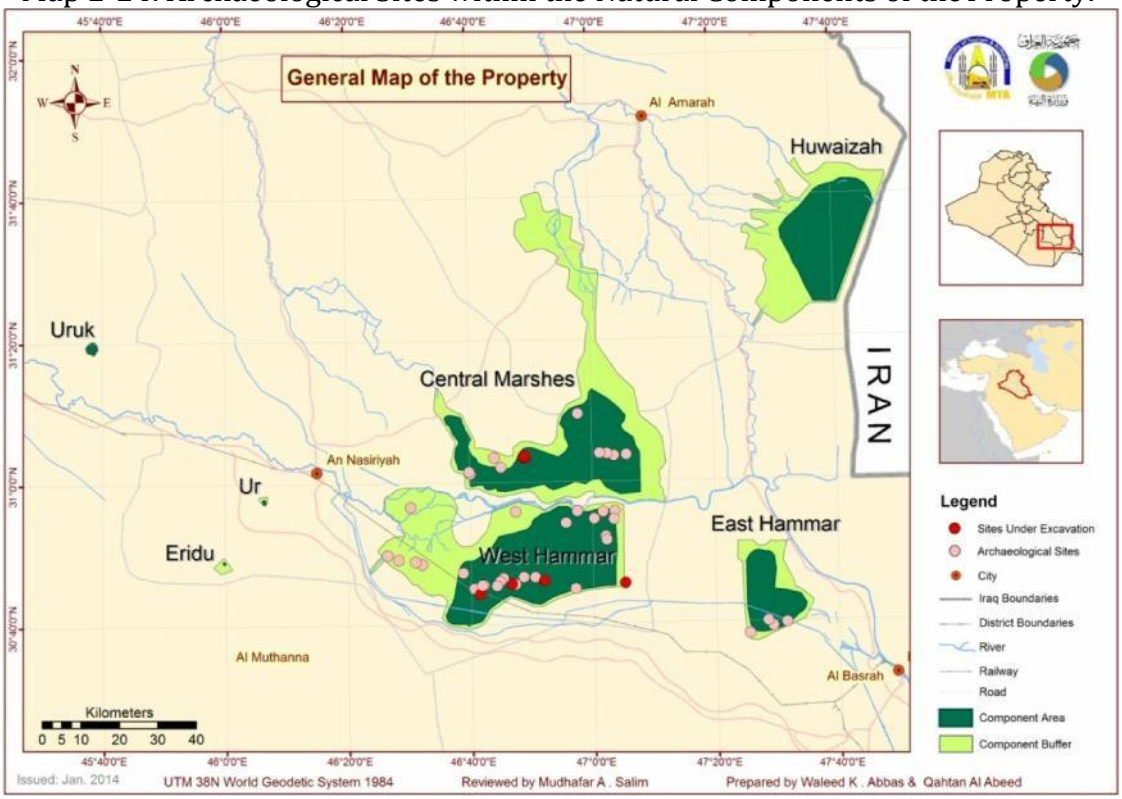
The surface survey led to the identification of forty-five sites inside the property. Of those, twelve are in the Central Marshes and ceramic analysis shows occupation from the Parthian and early Islamic periods. Another four sites are located in the East Hammar Marshes and show occupation from the Parthian, Sassanid and Islamic periods. The West Hammar Marshes, with twenty-nice surveyed sites, is the component part of the property with the highest density of sites and the earliest stages of occupation. Pottery from the 4th millennium BCE was found at four sites (Al-Heway, Ash-Shaty, Hmud and Al-A'ain). There is evidence of later successive settlement on the same mounds. Eighteen additional sites showed pottery from the 3rd and 2nd millennia. Islamic pottery was found at ten sites.

Excavation at five selected sites inside the property started in summer 2011 and is still on-going at the date of the nomination. Two Islamic sites, Msehib and Abu Shu'ayb, are located respectively in the Central Marshes and the buffer zone of the West Hammar Marshes. At three other sites, Tell Abu AdhDhahab, Tell Abu Rabab, and Tell At Tazl, all situated in the West Hammar Marshes, the most ancient occupational level reached so far is Paleo-Babylonian. These last three sites are described below on the basis of the reports of the 2011 excavations.

In 2010, a team of American archaeologists (C. Hritz and J.R. Pournelle) conducted a short preliminary archaeological, geological and landscape investigation in the West Hammar Marshes, however outside the area included in the property. Combining ground survey with high-resolution satellite imagery, they looked for traces of settlements and (possibly associated) relict land use systems visible in the now-desiccated landscape.

Results of the recent excavation and surveys are too preliminary to be conclusive at the time of the nomination. However recent excavation findings at Tell Abu Rabab, the pursuit and intensification of archaeological excavation inside the property in the next few years, and the prospect of additional ground and aerial surveys, are expected to lead to a better understanding the adaptation of human settlement to the evolving environmental and hydrologic context of the southern Mesopotamian plain.

Map 2-24: Archaeological Sites within the Natural Components of the Property.



The Central Marshes

Twelve archaeological sites have been recently surveyed in the Central Marshes. Parthian and Islamic pottery has been found. The Islamic site of Msehib is under excavation.

The West Hammar Marshes

Tell Abu Adh Dhahab (N 30 44 18.72 E 46 41 33.12) lies in the area of al-Maleh, 45 km south-east of Suq Ash Shuyukh. The mound is 5.5 m high and covers an area of almost 7 ha. The top of the tell was already visible before the recent drainage and was registered in the Official Gazette in 1957 as an archaeological site. However it had never been excavated previously. Several building units were uncovered including a large stone structure with walls decorated with niches and twisted columns. According to the 2011 excavation report, so far occupation from the Paleo-Babylonian, Kassite and Middle-Babylonian periods has been identified. A cuneiform inscription discovered on the site (dated to the seventh year of the rule of King Eulmash-shakin-shumi, the founder of the 6th dynasty of Babylon) mentions a main river called Aishiti. It is known from another cuneiform text that the Aishi crossed south of the city of Uruk. It is possible that this river continued till it reached the site of Tell Abu Rabab where another river diverted from it, its name also mentioned (Kar Ninurta) in the inscription found at the site. The topography of the land surrounding the site shows the traces of an old river bed to the its northeast. Satellite images show that there was a river going from the south of Uruk and reaching Khmesiyah in An Nasiriyah

Governorate. This river then splits into several streams which lose themselves in the marshlands, one of them possibly reaching Abu Rabab and other sites.

Figure 2-33: Excavations at Tell Abu AdhDhahab. By: Ayad Kadhum, 2013

Tell Abu Rabab (N 30 45 41.34 E 46 46 41.82) is located in the Abu Ajaj area, 32 km south-east of Suq Ash Shuyukh. It is a rectangular tell made up of small mounds connected to one another. The site culminates at 4.5 m and covers about 30 ha. A first analysis of excavation findings shows a Kassite and Middle-Babylonian occupation.A modern fishing community was known to live on the site until 1969 when the Tell was still surrounded by fresh water. Today, the site lies in the middle of saline waters.

Tell at-Tazl and Tell at-Tawila (N 30 46 04.70 E 46 52 00.30) constitute one single site situated in the Abu Hadida area, 39 Km south-east of Suq Ash Shuyukh. The site covers 3 ha and is 3.20 m high. Excavations at Tell al-Tazl uncovered dwellings dating to the Kassite/Middle Babylonian periods.

Abu Shu'ayb, situated in the buffer zone, is another Islamic sites under excavation.

The East Hammar Marshes

Four archaeological sites were surveyed. All of them showed diagnostic pottery from the Parthian, Sassanid and Islamic periods.

2.b History and Development of the Property

The Evolution of the Natural Phenomenon of the Ahwar

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 Ahwar 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 Ahwar from the main and auxiliary river systems, as well as from sea level changes during different aridity levels.

The dominant theory is that the Indian Ocean 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.

Some 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.

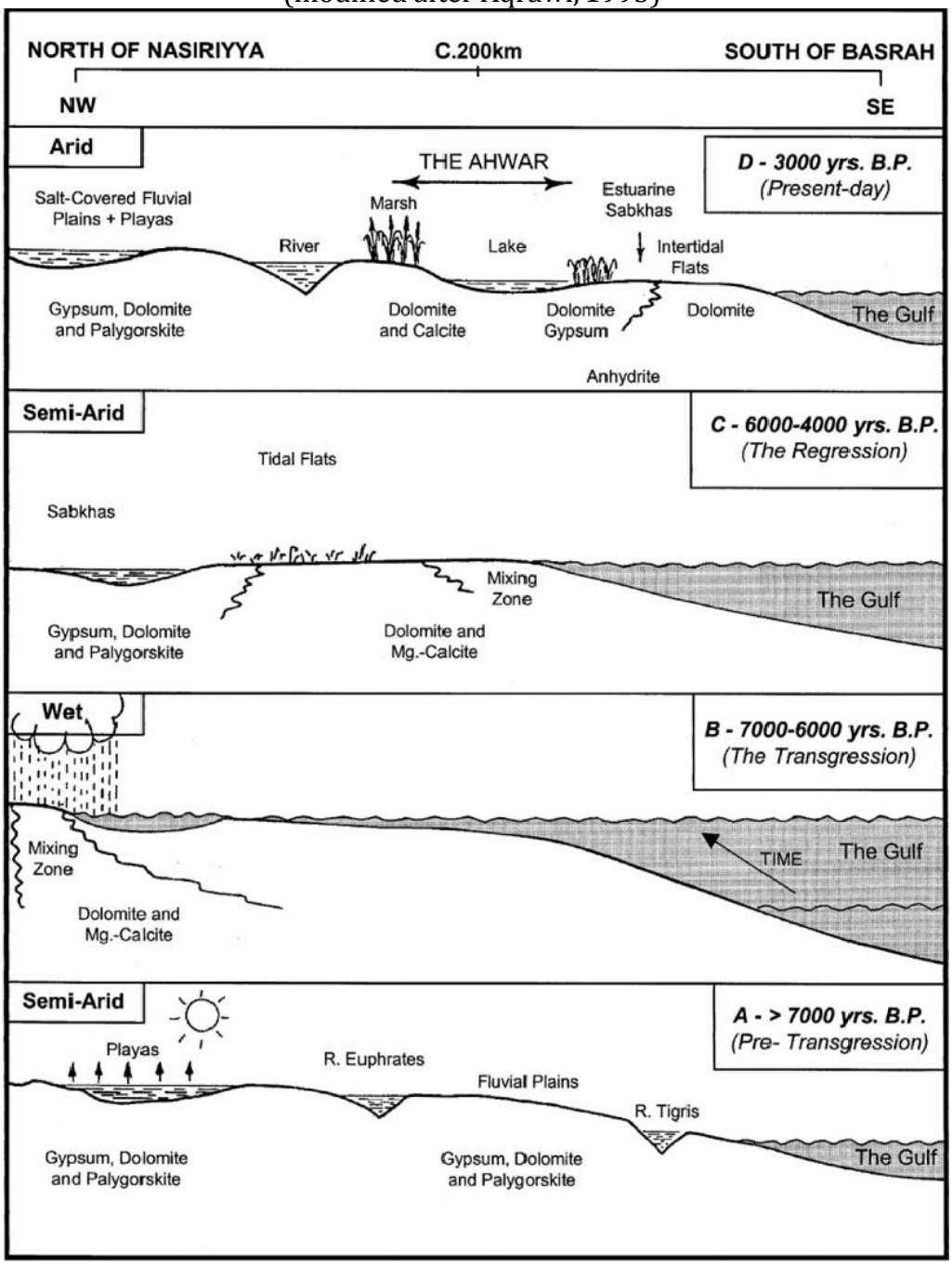
During the Mid-Holocene (7,000 to 6,000 years ago), the transgression of the sea towards land continued to reach the arch between Al Amarah and An Nasiriyah during what is referred to as the 'great flood period'. By then, waters covered the area, hence initiating the formation of the marshlands while 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 components of the Ahwaras we know them today were formed during this period around 3,000 years ago within an arid climate.

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

a. 7,000years 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 – 6,000years ago: a wet period with abundant rains and an increase in marine water levels (the great flood).
c. 6,000 – 4,000years 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 Ahwaras we see them today. (Aqawi 1995).

Figure 2-34: 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)



The Environmental Context of Early Human Settlement

From the early Holocene, after rising at a rate of about 1.8 cm per year for two millennia, by 6150 BCE the head of the Arabian Gulf reached approximately its current level. For the next three centuries, throughout the Ubaid 0 period, that rate slowed. At that time, ancient

marshes extended as far south as Tello (Girsu), and the rivers laid down sediments in the Euphrates Valley from Ur to Fao. For the next four centuries, as sea level rise slowed to a near halt, the delta expanded, and marshes continued to form. By 5450 BCE, sea level rise resumed at a rate of a half-meter for century, and continued to do so for the next millennium. Through the remainder of the Ubaid period, the sea rose another 2-4 m, reaching a highstand of approximately 2.5 m above that of today. By 4550 BCE, the sea had completely swamped the Euphrates Valley and the ancient marshes, and extended as far inland as Ur, that is 200 to 250 km inland of the present coastline near Fao. The Gulf, having halted at its maximum level, the rivers began another round of marsh- and delta-building, stretching inland at least as far as Uruk.

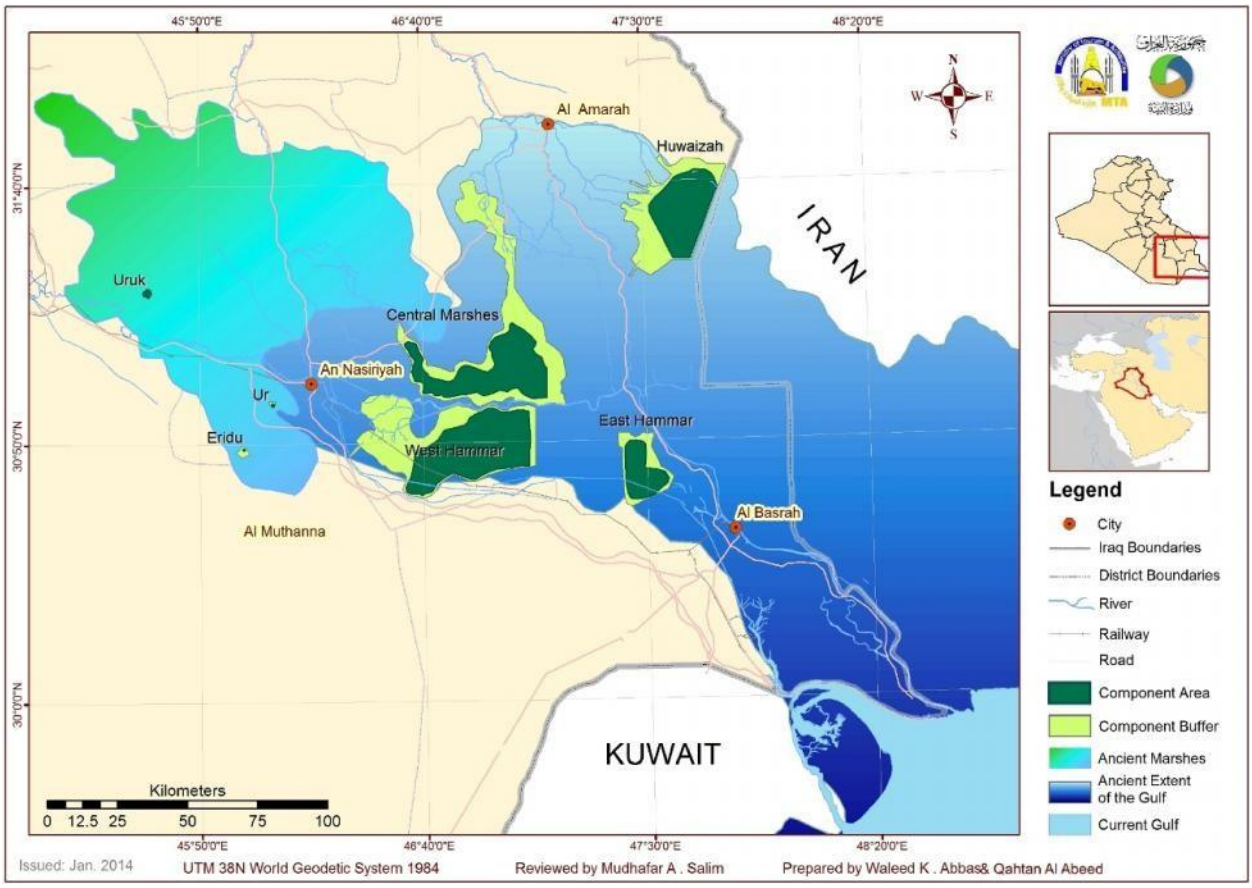
The stability of sea levels over roughly two millennia (Uruk through Early Dynastic period) had profound implications for that area called "the heartland of cities" by Robert McC. Adams in a 1981 study. As early as 1960, J. Oates argued the importance of the marshes for the development of the cities of Ur and Eridu. However, until the 1980s, archaeological research on Mesopotamia remained dominated by an interest in large settlements and public buildings and the prevailing view was that cities arose on the Mesopotamian alluvium because of mastery of irrigation technologies. In recent decades, in large part because of the difficulties, both for national and international teams, of undertaking archaeological work in Iraq, much work has been done in terms of landscape archaeology using modern remote sensing methods. This new approach has led scholars to reconsider many previous assumptions on fundamental issues such as the location of the first major settlements as proto-cities and the movements of the Euphrates and Tigris. The new approach shows that the earliest settlements, dating to the Neolithic Ubaid 0 period (6500-4900 BCE) were concentrated on river levees or overbanks at locations bordering swamps and marshes. Many of these sites continued to be occupied in later Ubaid periods. Others were formed on turtlebacks surrounded by permanent or seasonal marshes, which was the case of Eridu. Still others, like Uruk, developed by straddling bird's foot deltas, or fronting a marsh edge, at times, as is the case with Ur, along the littoral. Larger settlements grew out of the combined exploitation of marsh resources, livestock grazing, and irrigated agriculture together with regional and even long-distance trade for the most dynamics ones such as Uruk and Ur.

In the alluvial floodplain, cities stood in sight of each other on low mounds above a moving landscape of meandering rivers and distributaries used as waterways connecting settlements, verdant but shifting marshes where reed provided fuel and fodder, cultivated sediments levees and seasonally inundated plains, lagoons and estuaries where fish was abundant, and finally the sea with its tidal actions offering a natural irrigation and drainage system to coastal fields.

By 3350 BCE city specialisms and cult identity had developed, and a hierarchy of cities of different sizes developed within this rapidly urbanizing area. The main Sumerian cities were Nippur, Shuruppagm Uruk, Ur, Bad-Tibira, Lagash, Girsu, Umma, whereas Eridu was a major cultic center. There were also numerous smaller towns under the influence of their bigger neighbors. The cities of the late 3rd millennium were among the most sophisticated

and prosperous in the world and they marked a remarkable development from the small settlements of the earlier Ubaid.

Map 2-25: General Map of Southern Iraq Showing the Extent of the Gulf and the Marshes in Different Historical Periods



The City of Uruk

Uruk was founded as an Ubaid settlement c. 3800 BCE and grew into the biggest city in ancient Iraq. Its occupation history is particularly long, stretching down to the 7th century CE and the Arab conquest (with various prominence and occupation extent).

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 4th millennium BCE, the so called Uruk period (c. 4000-3000). It is marked by the rapid growth of the city and its political and economic influence in the whole Mesopotamia and far beyond. The evidence for Uruk's presence (settlements with typical material culture, considered to be colonies or trade factories) were found as far as northern Syria and eastern Iran, marking at least a vast trade network if not political influence. Around 3000 BCE, the population of the city

can be estimated at over 50,000 people (80,000 including the area within 15 km from the main settlement), marking it the largest city in the world at the time.

Geographic factors underpin Uruk's unprecedented growth. The city was located southwest of the Euphrates River and developed on a dune overlooking a small delta on the northern fringes of a marsh where the river discharged. Late Uruk seals, sealings and tablets excavated on the site depict palms, frogs, livestock emerging from reedy byres, and hunting scenes with wild boar stalked among reeds. Many tablets show the clear imprint of the reed mats upon which they lay as their dried. Through the exploitation of the marsh and river natural resources, the eventual domestication of native grains from the Zagros foothills, the development of levee-top and recessional cultivation in the delta and later extensive irrigation techniques, Uruk grew into the largest Sumerian settlement, in both population and area. Agricultural surplus and large population base facilitated processes such as trade, specialization of crafts and the evolution of writing. Evidence from excavations such as extensive pottery and the earliest known tablets of writing, together with geographical studies, support these events.

In addition to being one of the first cities, Uruk was the main force of urbanization during the Uruk period (4000–3200 BCE). This period of 800 years saw a shift from small, agricultural villages to a larger urban center with a full-time bureaucracy, military, and stratified society. Although other settlements coexisted with Uruk, they were generally about 10 hectares while Uruk was significantly larger and more complex. The Uruk period culture exported by Sumerian traders and colonists had an effect on all surrounding peoples, who gradually evolved their own comparable, competing economies and cultures.

The key development of this period is the invention of writing and it came about in Uruk itself. The earliest texts known to humanity were found in the Eanna, the temple precinct of the goddess Inanna in Uruk. Clay tablets have been found at Uruk with Sumerian and pictorial inscriptions that are thought to be some of the earliest recorded writing, dating to c. 3300 BCE.More than 5000 archaic tablets allow tracing the early development of cuneiform writing and the emergence of scribal administration. These tablets include the famous Sumerian King List, a record of kings of the Sumerian civilization .

The *Gilgamesh Epic* originated in Uruk, likely as a reflection of the city's power and influence beyond Mesopotamia. The Sumerian stories about the semi-mythical king of Uruk (*Gilgamesh and Agga, Gilgamesh and Huwawa, Gilgamesh and the Bull of Heaven, Death of Gilgamesh*) are all set – at least partially – in the city and must have been composed there. Less famous, but similarly impressive heroic compositions feature other kings of Uruk, Enmerkar and Lugalbanda .

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. However its role in Mesopotamian culture and religious tradition is constantly acknowledged by subsequent rulers who all felt it important to restore, expand or contribute to cultic architecture in Uruk as part of their priestly duties. The city was finally abandoned shortly before or after the Islamic conquest. By that time, the position of the Euphrates River had

shifted to the northeast of the city, the deltaic marshes had receded, and the main water supply into the city had desiccated after Old Babylonian times. It is likely that this environmental change contributed to the decline of Uruk.

The site was rediscovered by William K. Loftus in 1849; a first brief exploration took place in 1854. After an inspection in 1902 archaeological research was undertaken by German institutions in Uruk starting in 1912. Initially they were carried out under the auspices of the German Orient-Society (1912), then by the German Orient-Society and the Emergency Foundation of the German Sciences (1928-1941), and since 1954 by the German Archaeological Institute. Until 1989 thirty-nine field seasons had been carried out with few exceptions every year. In the years 2002 and 2003 the fieldwork was re-started, but since 2003 it is interrupted again. Despite the continuous engagement of German teams, around 80% of the site remains unexcavated .

The Pergamon Museum in Berlin holds a large collection of artifacts found at Uruk. Other large holdings are in London's British Museum, Paris' Louvre and the Ashmolean Museum in Oxford. In 2012, the Pergamon Museum organized a major exhibition "Uruk – 5,000 Years of the Megacity", marking a century of excavations at Uruk.

The City of Ur

Ur was one of the cities in the settlement system founded by the Ubaid culture in southern Mesopotamia. Beginning from a village based on the exploitation of marsh resources and fishing, by 4000 BCE, Ur's inhabitants were raising cattle, goats and sheep, and cultivating wheat, barley and dates. 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 .

Ur was situated at the edge of great marshes, compared to “a bull standing in the wet reeds” in the Enheduanna’s *Temple hymns*. The city’s location and strong bounds to the wetland environment are repeatedly mentioned in the Sumerian texts, such as the hymn to Ur-Namma, the hymn for Rim-sin mentioning the temple of Ekishnugal in Ur or the hymn to the chief god of Ur-Nanna-Suen.

Ur remained significantly smaller than Uruk but profited from its location as the city closest to the entrance of the Arabian Gulf. Archaeological research shows that Ur was the most important port on the Gulf, which extended much further inland than it does today. All the wealth which came to Mesopotamia by sea had to pass through Ur.

Ur emerged as a key player in the political life of the southern city-state system during the period of the First Ur Dynasty (2670 BCE) when it became one of the most important and wealthy cities under king Mesanepada. 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. They provide very early evidence for the international exchange of semi-precious stones and metals from as far away as India and Afghanistan on an institutional scale.

Ur came under the control of the Akkadian Empire founded by Sargon the Great between the 24th and 22nd centuries BCE. The Third Dynasty of Ur was established when the king Ur-Nammu came to power between c. 2047 BCE and 2030 BCE. During his rule, temples, including the ziggurat, were rebuilt, and agriculture was improved through irrigation. His code of laws, the Code or Ur-Nammu, is one of the oldest such documents known, preceding the code of Hammurabi by 300 years. In the Ur III period Ur was a capital of the vast territorial state that extended far north and east, reaching Syria and the Zagros mountains, exercising influence deep into the Iranian Plateau. The Ur III administration was the most centralized bureaucratic state the world had yet known and used written records on an unprecedented scale; more than 80 000 cuneiform tablets have been uncovered to date, giving unique insights into ancient economy and society. The literature also flourished in this period, with numerous compositions related to the kings of the Third Dynasty, particularly Ur-Nammu and his son Shulgi, who were deified during their reigns. The Ur Empire continued through the reigns of three more kings: Amar-Sin, Shu-Sin, and Ibbi-Sin. It fell around 1940 BCE to the Elamites.

Historical narratives of the Mesopotamian societies of Assyria and Babylonia kept names, events, and mythologies of Ur in remembrance. The city came to be ruled by the first dynasty (Amorite) of Babylonia which rose to prominence in southern Mesopotamia in the 18th century BCE. After the fall of Hammurabi's short lived Babylonian Empire, it later became a part of the native Akkadian ruled Sealand Dynasty for over 270 years, and was reconquered into Babylonia by the successors of the Amorites, the Kassites in the 16th century BCE. During the Kassite Dynastic period Ur came under sporadic control of the Elamites and Middle Assyrian Empire. The city fell to the north Mesopotamian Assyrian Empire from the 10th to late 7th centuries BCE. From the end of the 7th century BCE Ur was ruled by the so-called Chaldean Dynasty of Babylon. In the 6th century BCE there was new construction in Ur under the rule of Nebuchadnezzar II of Babylon. The last Babylonian king, Nabonidus, improved the ziggurat. However the city started to decline from around 550 BCE and was no longer inhabited after about 500 BCE by which time Babylonia had fallen to the PersianAchaemenid Empire.The demise of Ur was perhaps owing to drought, changing river patterns, and the silting of the outlet to the Gulf.

In 1625, the site was visited by Pietro della Valle, who recorded the presence of ancient bricks stamped with strange symbols, cemented together with bitumen, as well as inscribed pieces of black marble that appeared to be seals.

The site was first excavated in 1853 and 1854 by John G. Taylor, British vice consul at Al Basrah from 1851 to 1859. He worked on behalf of the British Museum. All about the city he found abundant remains of burials of later periods. Apparently, in later times, owing to its sanctity, Ur became a favorite place of sepulchers, so that even after it had ceased to be inhabited, it continued to be used as a necropolis. After Taylor's time the site was visited by numerous travelers. After some soundings were made in 1918 by Reginald Campbell Thompson, H. R. Hill worked the site for one season for the British Museum in 1919, laying the groundwork for more extensive efforts to follow. Excavations from 1922 to 1934 were funded by the British Museum and the University of Pennsylvania and led by the

archaeologist Sir Charles Leonard Woolley.A total of about 1,850 burials were uncovered, including 16 that were described as "royal tombs" containing many valuable artifacts, including the Standard of Ur.

As of 1960, the then Directorate General of Antiquities started to carry out excavation and conservation work on the site which had been neglected for decades and where some of the areas that were cleared during previous excavations had been sanded over again. Under the direction of Taha Baqir, rebuilding of part of the outer shell of the ziggurat was undertaken: this included the first terrace, the main staircase and the two towers reinforcing the central staircase. What was left of the second level was restored, together with the staircases and the inner walls of the E-dub-lal-mah and the northern, eastern and southern sides of the Royal Palace. Between 1967 and 1982, under the direction Shah Ali Al Siwani, excavation work in the Royal Cemetery was undertaken.

Between 2003 and 2009, the site fell within the security perimeter of Camp Adder, or Imam Ali Air Base, then under the control of the US Air Force. The proximity of this military base, in use by the Iraqi army since the 1980s, proved a factor threatening the stability of the some of the buildings on the site due to the frequent flights of fighter jets. 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 (see Section 4).

Most of the treasures excavated at Ur are in the British Museum and the University of Pennsylvania Museum of Archaeology and Anthropology. At the UPenn Museum the exhibition “Iraq's Ancient Past”,which included many of the most famous pieces from the Royal Tombs, opened to visitors in late spring 2011.

Tell Eridu

Tell Eridu (modern Tell Abu Shahrain), located 12 km southwest of Ur, is today in a desert environment. The site was initially excavated by John G. Taylor in 1855, R. Campbell Thompson in 1918, and H. R. Hall in 1919. In 1945, the newly created Directorate General of Antiquities in Iraq chose Tell Abu Shahrain for the first full-scale Iraqi excavation project with the aim to produce a comprehensive and systematic exploration of the site using the latest archaeological methods. Excavation was conducted from 1946 to 1949 under Fuad Safar and Seton Lloyd and revealed that the settlement was occupied as early as the Ubaid period till the end of the Achaemenid period. No excavation or restoration work has been undertaken since 1949. Eridu's archaeological remains are today again engulfed with sand with the exception of the ruins of the ziggurat, the oldest known example of such construction.

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.

Several scholars have highlighted the particulars of the city's formation. Communities situated at the confluence of three separate ecosystems supporting three distinct lifestyles – cultivators, fisher-hunters, and pastoralists – came to an agreement about access to freshwater in a desert environment. All three cultures seem implicated in the earliest levels of the city, an agricultural settlement of reed-huts that grew around a mudbrick temple built atop a turtle back surrounded by accumulating water. The marshes and the lagoon surrounding Eridu provided an abundance of water where to raise pigs and cattle, and where to harvest fish consumed, in particular, ritualistically at the temple. 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. There were similar experiments going on at the same time in other place: Al-Ubaid itself, Tell Uqaid and Ur are other cities that grew around temples. But Eridu is exceptionally well documented for the Ubaid period and maintained the myth of its primacy to the subsequent ages of Mesopotamian history.

Eridu always remained relatively small and was never a political power. As early as the Uruk period, Eridu was closely tied to Ur, possibly like a twin city with the former performing religious functions and the latter an administrative and political role, and several rulers of the first and third dynasty of Ur renewed the temple. We know from early cuneiform sources that the Eridu temple was the E-abzu, the House of the Aquifer, a name referring to Enki's realm and to the lagoon that surrounded his temple. Enki in the Sumerian pantheon, or Ea in Akkadian, was the god of wisdom and freshwater. The Assyrians and Babylonians inherited Enki's cult from the Sumerians and possibly from the Ubaid period.

The original temple uncovered by the Iraqi archaeologists was a “primitive chapel” no larger than 3 meters square and was dated from 5,300-4,700 BCE or Ubaid I. It contained a pedestal facing the entrance and a recessed niche. It is noticeable that the building was of mudbrick whereas the village houses were still made of reed. Archaeologists see in late Ubaid temples, like the ones excavated at Eridu under the first ziggurat, an anticipation of later Mesopotamian temples. Their plan, a central chamber franked by side rooms with a free standing podium in the middle, became standard features, as was the facade decorated with pilasters and niches. Most significant perhaps was the idea of sealing the remains of earlier structures and their contents (such as votive offerings, possibly to preserve their sanctity) and then erecting the new building on top of the leveled ruins. This series of platforms most probably provided the template for the architecture of the ziggurats. The finding of extensive deposits of fishbones associated with the earliest levels also shows a continuity of the cult which was associated with Enki-Ea in historical periods. Such

apparent continuity of occupation and religious observance at Eridu is seen by many scholars as providing convincing evidence for the indigenous origin of the Sumerians.

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. Mesopotamian temples enshrined the substance of older temples and the platform they stood on was made venerable by the accumulated sacred debris. As such they became of visible sign of continuity and antiquity. Assyriologist Gwendolyn Leick remarked that in the southern Mesopotamian plains, the features of the landscape were impermanent. The rivers would shift their beds, inundations destroyed cultivate areas, and sand dunes encroached on deserted villages within weeks. Only the cities, and especially the brickwork of the temples persisted through the ages and provided a permanent anchor in the landscape. 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 6th century BCE.

The importance of Eridu in the Mesopotamian tradition cannot be overstated. It was considered the oldest city in the world; the Sumerian King List names it as the first center of authority, in the mythical age before the Flood. The opening line reads "When kingship from heaven was lowered, the kingship was in Eridu." In Sumerian mythology, Eridu was originally the home of Enki, who was considered to have founded the city. Enki was believed to live in the *abzu*, the aquifer from which all life was believed to stem. As home to Enki, Eridu had strong symbolic association with the marshes, praised in several literary compositions such as *Enki's journey to Nibru* or *Enki and the world order.* As power moved north, patron deities of new city-states were said to look to Eridu to gain legitimacy from Enki. The stories of Inanna, goddess of Uruk, describe how she had to go to Eridu in order to receive the gifts of civilization. At first Enki attempted to retrieve these sources of his power, but later willingly accepted that Uruk now was the center of the land. In the Neo-Babylonian period, long after the Sumerian King List was written, Eridu was still conceived as the place of creation, the holy city. The *Enuma Elish*, the Babylonian creation myth, talks of how chief Babylonian god Marduk fashioned a platform of mud on a reed frame to build a mudbrick temple on an island over the waters of the *abzu*, and created man to worship Him in this temple.

As the *abzu* in Eridu was disappearing in the face of inexorable environmental change, the cult of Enki was moved to other cities. At the time of Hammurabi, the sixth king of Babylon,

the whole temple personnel and furniture was moved to Ur where Enki continued to be venerated. Every temple in Mesopotamia had its miniature version of the *abzu*, either a small pool or even a vessel filled with water thus representing the spirit of Eridu. The spiritual aura of Eridu extended in time and place to the court of Assyria where special physicians trained in the ancient lore of Eridu, far to the south, foretold the course of sickness from signs and portents on the patient's body, and offered the appropriate incantations and magical resources as cures. In Mesopotamia, Eridu continuously provided the mythical paradigm for the divine foundation of cities around a temple built over a body of freshwater, for the function of these cities as primarily cultic centers, and for the source of knowledge and wisdom.

Recent Events which Shaped the Contemporary Ahwar

Pre-drainage of the Ahwar

Before 1970, the Ahwar were characterized by a very complicated network of natural water channels which formed the internal delta of the rivers Euphrates and Tigris. The Ahwarembodied 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 Ahwar, 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 Ahwar

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 Ahwar. 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 Ahwardrainage 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 Ahwartotally 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 Ahwardemonstrates the catastrophic impacts of the drainage crisis. In 1970, the area of the Ahwarwould fluctuate between 15,000 to 20,000

sq. kilometers (see figure 8). By the year 2000, the Ahwararea 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 Ahwar; 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 Ahwarand their connectivity across the various components. 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 Ahwarwith no proven records for many years.

Figure 2-35: Ahwar Area in 2002 (source: New Eden Master Plan 2005)

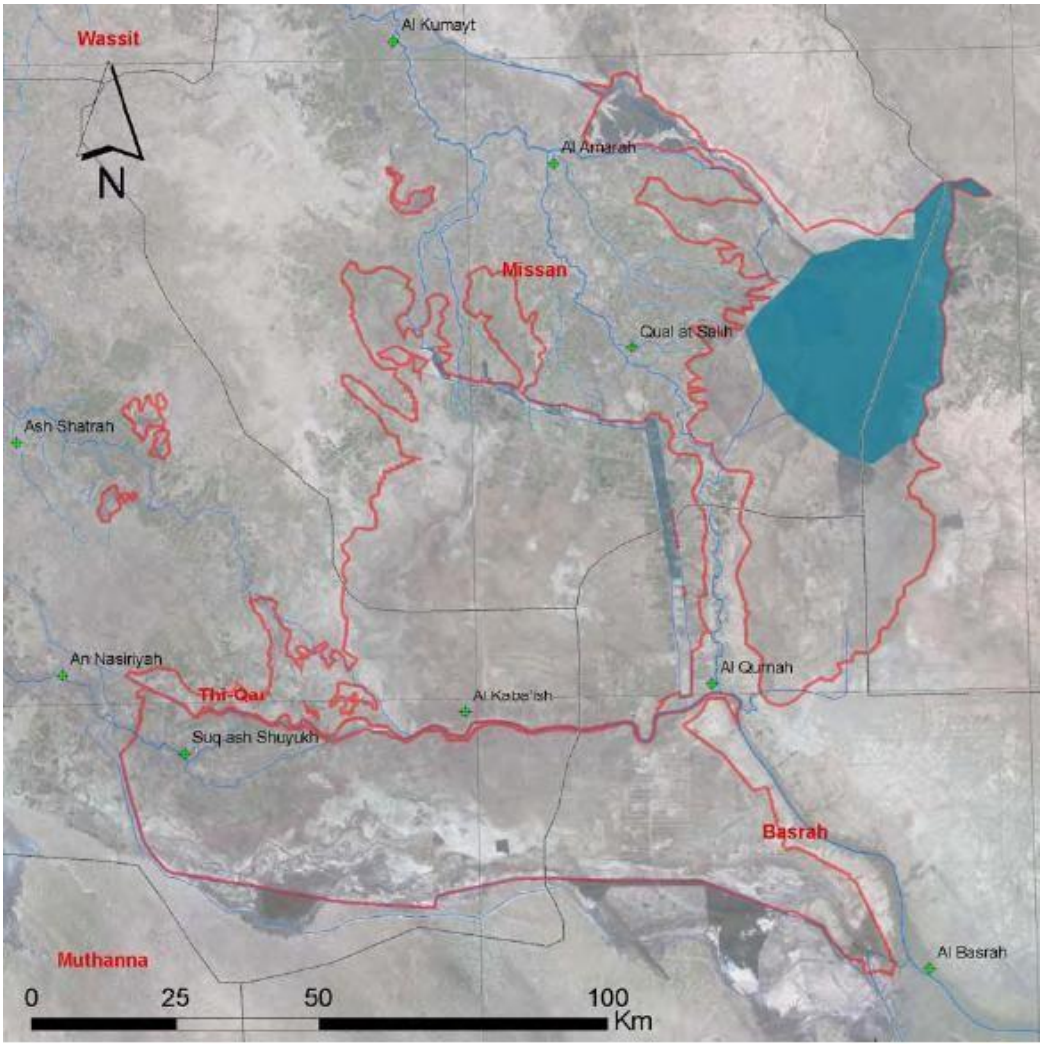
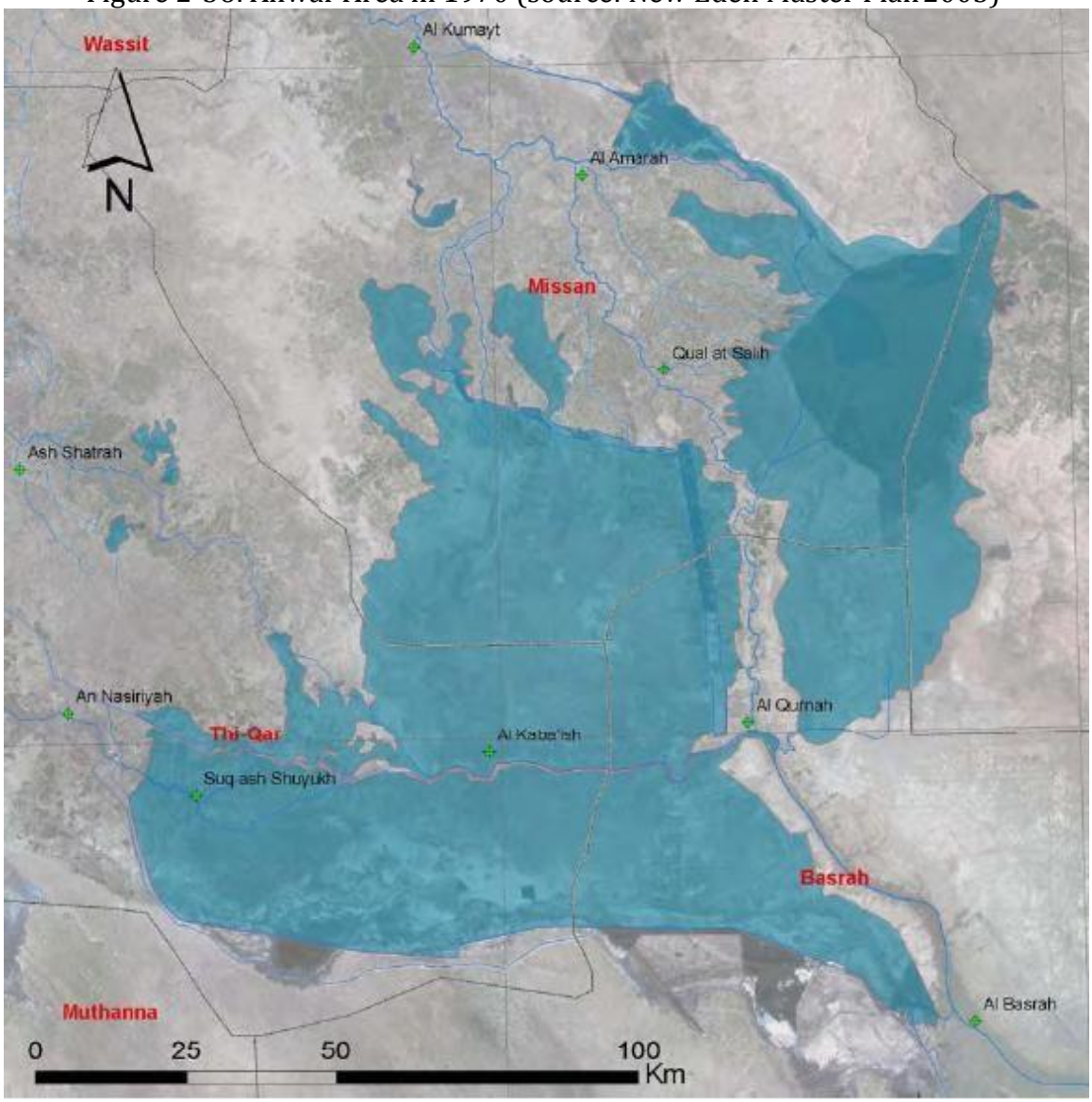


Figure 2-36: Ahwar Area in 1970 (source: New Eden Master Plan 2005)



Re-flooding of the Ahwar

After the political transformation in 2003, communities living in the Ahwar 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 Ahwar. UNEP has estimated an average annual increase of 900 sq. km in the size of the Ahwarsince 2003.

In 2003 alone, the Ahwarregained 10% of their 1970 area, and in 2005 the Huwaizah and Hammar Marshes retained 50% of their 1970 size. The total area of the Ahwarwas

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 Ahwarto 65% of their 1970 size.

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

Chapter Three:

Justification

3.1 Justification for Inscription

3.1.a Brief Synthesis

The Ahwar of Southern Iraq evolved as part of the wider alluvial plain during the final stage of the alpine tectonic movement, which also lead to the evolvement of the Zagros Mountains. This took place during the late Pliocene to early Pleistocene eras. Several factors intertwined to construct the property including; tectonic movements, climatic changes, river hydrology dynamics, precipitation variation, and changes in sea level. The sea level variation and the climatic changes had a significant role in influencing the quantity and quality of water entering the Ahwar through rivers and their branches, in addition to advancement and regression of the sea and intrusion during dry to semi-dry to wet conditions during the last 18,000 years.

Between the 5th and 3rd millennium BCE, the level of the Arabian Gulf reached its maximum extent some 200 km inland of the present coastline with marshes stretching further inland. The marshy and moving landscape of this deltaic plain was the heartland where the first cities flourished. Uruk, Ur and Eridu, the three cultural components of the property, were originally situated on the margins of freshwater marshes and developed into some of the most important urban centers of southern Mesopotamia. These cities saw the origin of writing, monumental architecture in the form of mudbrick temples and ziggurats, and complex technologies and societies. A vast corpus of cuneiform texts and archaeological evidence testifies to the centrality of the marshes for the economy, worldview and religious beliefs of successive cultures in southern Mesopotamia.

Starting in the 2ndmillennium BCE, the sea regressed towards the south. This led to another climatic change towards a more arid environment and the drying up of the ancient marshes. Environmental change contributed to the decline of the great cities of southern Mesopotamia. Today the mudbrick ruins of Uruk, Ur and Eridu are dominated by the remains of ziggurats which still stand high above the arid but striking landscape of the desiccated alluvial plain. With the regression of the Gulf, new marshes formed to the southeast. The main components of the Ahwar as we know them today were formed during this period around 3,000 years ago.

The Ahwar are generally fed by the branches of the Tigris and Euphrates, in addition to extremely low winter rainfall and subsequent floods. These factors collectively determine the surface area covered by water as well as its fluctuations; the peak taking place in the flooding season associated with rainfall upstream in the basin during winter and then affected by the snowmelt during spring, and reaching the lowest levels during the dry summer period. This fluctuation in water levels and surface areas has resulted in highly dynamic and variable ecological conditions.

The **Huwaizah** Marshes component is a unique freshwater system, receiving high water quantities from floods and limited amounts of seasonal rain which descends from the northern and northeastern heights. Concurrently, it is the sole natural component that was

not subject to drastic drought during the man-induced drainage phase in the 1980s and 1990s, leading to the salvation of its key ecological elements. This led it to become the primary refuge for many of the key bird species of African and Indian origin in the Middle East, which have since spread back to other components after the reflooding took place in early 2000s.

By contrast, the **Central Marshes** component comprises today's ecological core of the Ahwar. Being distinctive for its horizontally extensive ecosystems, it provides a vast habitat for many of the viable populations of taxa of high biodiversity and conservation importance.

Moving towards the east and south, the **East and West Hammar Marshes** components embrace a particular ecological phenomenon in contrast with the other components. Here, the salt water from the sea progresses inland affected on one side by tidal movements in the southern-most regions of marshes, while on the other side, pushing its way into the extended desert to the southeast. This creates very specific ecological conditions with fish species from marine origins utilizing the area for reproduction in the East Hammar, while the West Hammar comprises the last stopover area for millions of migrating birds before entering the vast Arabian Desert.

3.1.bCriteria Proposed for Inscription of the Property on the World Heritage List and their Respective Justifications

The State Party proposes to inscribe the property under the following criteria:

Criterion (iii)

The remains of the Mesopotamian cities of Uruk, Ur and Eridu offer a complete testimony to the growth and subsequent decline of southern Mesopotamian urban centers and societies from the Ubaid and Sumerian periods until the Babylonian and Hellenistic periods. The three cities were major religious, political, economic and cultural centers which emerged and grew during a period of profound change in human history. These three components of the property bear witness to the full repertoire of the contribution of southern Mesopotamian cultures to the development of ancient Near Eastern urbanized societies and the history of mankind as a whole: the construction of monumental public works and structures in the form of ziggurats, temples, palaces, city walls, and hydraulic works; a class structured society reflected in the urban layout which included royal tombs and palaces, sacred precincts, public storehouses, areas dedicated to industries, and extensive residential neighborhoods; the centralized control of resources and surplus which gave rise to the first writing system and administrative archives; and conspicuous consumption of imported goods. This exceptionally creative period in human history left its marks across place and time.

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 4th 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.

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.

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. 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.

Criterion (V)

The remains of the ancient cities of Uruk, Ur and 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. 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. Architectural elements, archaeological evidence and an important corpus of cuneiform texts further document how the landscape of wetlands – beside providing these urban centers with natural resources used for building, fuel, food and agriculture and with water transportation – contributed to shaping the religious beliefs, cultic practices, and literary and artistic expressions of successive cultures in southern Mesopotamia. As the Arabian Gulf regressed to the south during the 2nd and 1st millennia BCE, the landscape of wetlands moved to the southeast of the deltaic plain where new human settlements developed on mounds. The contemporary Ahwar of southern Iraq bear a strong cultural significance as they offer the closest living representation of the environmental context which fostered the development of the first cities and complex societies in the region, and fashioned the worldview of Mesopotamian cultures. The association of the contemporary Ahwar with some of the most prominent and best documented ancient urban centers of southern Iraq allows for understanding the unique ancient cultural landscape of alluvial Mesopotamia where cities were islands embedded in a marshy plain.

Criterion (ix)

Ongoing Ecological Processes: The proposed site contains outstanding examples representing ongoing ecological and biological processes in the evolution and development of terrestrial, fresh and salt water ecosystems and communities of various taxa. The case for the outstanding universal value of the Ahwar under criterion ix is based on four primary arguments:

Inland delta ecosystem functioning in an extremely hot and arid environment

The Ahwar of southern Iraq may be the largest-scale (> 200,000 ha) wetland ecosystem that is located in the most arid environment globally. The grand mosaic of the four components of the property is an exceptional example of ongoing ecological processes which reflect this extreme and harsh environment, particularly regarding the following attributes:

- Almost complete dependence on riverine influx and negligible direct contribution of precipitation on-site to the water budget; this contributes to the largely external factor driving this ecosystem and pronounced seasonality.
- Very high water temperatures around or in excess of 30°C in summer with no thermal stratification of the water column.
- High irradiation (>2,000 kWh m^{-2} a^{-1}), which together with high nutrient concentrations (Al-Imarah et al., 2006), leads to very high primary production, high dissolved oxygen concentrations throughout the water column and high overall ecosystem productivity. Primary production occurs mainly by reed, submerged and floating macrophytes.
- Exceptionally high evapotranspiration and an associated trend towards salinization (Al-Saad et al., 2010), which is further aggravated by anthropogenic factors (Al-Maroofi et al. 2012).
- Unusually strong dependence of the surroundings, including the human population, on the regulating (e.g. microclimate regulation, dust storm reduction, water purification), provisioning (e.g. water, reed, pasture, fish and meat) and cultural ecosystem services

provided by the Ahwar of southern Iraq .

The Ahwar have been witness to long term ecological succession dating back to the ice ages, as well as seasonal cyclical succession. Both successions are driven by non-biological processes (mainly hydrological and geomorphological) which create the foundation of an ecological paradise. The Ahwar have acquired the unique capability of sustaining their ecosystems throughout the ages despite successive natural and manmade pressures.

The unique hydrological system of the Ahwar is in itself an outstanding natural phenomenon, representing a wetland that fluctuates in size in a seasonal manner. Each of the four natural components of the property has its own particular hydrological system which stands independent of the others; thus creating a grand mosaic extending from freshwater dominated marshes in the case of the Huwaizah, through the extensive habitats of the Central Marshes, then descending to the brackish low-salt marshes in the East and West Hammar, and finally reaching the highest salt content in proximity to the sea.

Endemic and restricted range species/subspecies and ongoing speciation

The active ecological processes in the Ahwar create a spectrum of ecological habitats for flora and fauna which has specifically led to the adaptation and evolution of a significant number of animal taxa of an endemic and restricted range nature. These include four mammals including the endemic Bunn's Short-tailed Bandicot Rat and a subspecies of the Smooth-Coated Otter, in addition to the restricted range species of Mesopotamian Gerbil and Euphrates Jerboa. Further, the Ahwar harbors five taxa of birds including the endemic species of Basra Reed Warbler and Iraq Babbler, in addition to the three restricted range subspecies of the Little Grebe, the Black Francolin and the Hooded Crow.

Further, the water bodies of the property are a primary habitat for six restricted-range fish species: *Luciobarbus esocinus, L. xanthopterus, L. subquincunciatus, Cyprinion kais, Silurus triostegus* and *Mesopotamechthys sharpeyi.*

In addition, the Ahwar harbor three bird populations that exist here thousands of kilometers away from their core global populations in Africa, including the African Darter, the Sacred Ibis, and the Goliath Heron. These are likely to be relict populations from past periods of much larger range extensions. This testifies to the extraordinary refuge function of the Ahwar in the face of historical range contractions, and hence to their paramount importance for biodiversity conservation. It has also lead to geographically clearly separated populations in place of formerly continuous species ranges. Hence, a first stage of ongoing speciation is represented, complementing later stages such as those represented by species and subspecies that are almost or fully restricted to the Ahwar. In combination, restricted range species, subspecies and isolated populations of various vertebrate taxa can be considered as evidence of active ongoing adaptation and speciation processes in the Ahwar. Finally, the Ahwar also represent a safe refuge for many other endangered species of animals and birds in particular.

Migration, particularly Waterbirds, Fish and Crustaceans

The bird migration and the migration of fish and shrimp species which occur within the property's habitats reflect an adaptation process by these animals to long-term seasonal fluctuations in water levels and other ecological variables. At least 20 of the 44 fish species of the Ahwar are diadromous species from the Arabian Gulf (Coad, 2010). Most of them frequent the West and particularly East Hammar Marshes, which had already resumed an important role as spawning, nursery and foraging grounds for eleven of them in 2009 (Mohamed et al., 2009). Among them are species of paramount economic importance such as the Hilsa Shad (*Tenulosa ilisha)*, which uses the Ahwar as a spawning and nursery area but occurs and is exploited throughout the Arabian Gulf and beyond, where it contributes significantly to overall catches (Al-Dubakel, 2011). A parallel example among the invertebrates is the commercially important Penaeid Shrimp (*Metapenaeus affinis)*, which uses the East Hammar as a nursery area (Salman et al., 1990). These examples show that the Ahwar of southern Iraq not only are an outstanding ecosystem by themselves but also play a leading role to support lifecycles of fauna, ecosystem functioning and provisioning ecosystem services in the downstream Arabian Gulf.

The fact that the Ahwar are the only suitable large-scale wetland system within thousands of kilometers along two primary bird migration routes leads to their recognition as one of the largest West Eurasian-Caspian-Nile staging points and also wintering grounds for ducks. They are also important as a major stopover point for shorebird species flying along the West Asian-East African flyway. As a result, the Ahwar are considered to be a primary and critically located component of cross-continental flyways, particularly for West-Asian migratory water birds from western Eurasia. Historical abundance of migratory waterbirds in the Ahwar numbered into the millions, and currently, increasing numbers of migratory birds are already being recorded on the property as a result of its restoration since 2003.

Ecosystem resilience

The Ahwar have developed an amazing ecological resilience - i.e. an ability to maintain and restore ecological process integrity and ecosystem function in spite of external disturbance. It has always been the case that the Ahwar would come back to life after destructive events. This remarkable adaptive capacity against fluctuations and environmental change, in addition to the velocity of recovery processes, has been a characteristic of the Ahwar for thousands of years. While high ecological resilience is considered a general feature of many wetlands, the Ahwar of Iraq are set apart by the fact that the last dramatic recovery process took place very recently, right after the drastic destruction of the Ahwar during the second half of the last century and the re-flooding of the Ahwar at the beginning of the new millennium.

Criterion (x)

Biodiversity: The proposed site contains highly important and significant habitats for in-situ conservation of biological diversity, including those containing threatened species of high conservation and scientific importance.

The Ahwar of southern Iraq are one of the world's most important freshwater ecosystems situated within an extremely arid environment with some of the highest evaporation and transpiration levels, and some of the lowest levels of rainfall. They can be considered a "wetland island in a vast ocean of desert". The Ahwar embrace a mosaic of habitats critical for a significant number of taxa, including globally threatened and range-restricted species and isolated populations, thus creating a site of global caliber in terms of species of conservation priority.

Overall species richness

Recent records from the Ahwar include a wide variety of species from different taxa encompassing 264 bird species and 44 species of fish (24 freshwater and 20 marine). There are also 38 mammal species if historical records from the 20th Century are included. In addition, 18 reptile species, 3 species of amphibians, 25 Odonata species and 371 plant species are known from the area.

Species of global conservation importance

The Ahwar host 12 globally threatened bird species, such as the vulnerable Marbled Teal. More than 40% of their global population spends the winter on the property. Another vulnerable species, the Basra Reed-Warbler, which is a restricted-range species, has more than 70% of its breeding population in the Marshes.

The Ahwar also include critical natural habitats for three threatened mammal species, including the Smooth-coated Otter and the Bunn's Bandicot Rat, with no recent records of the latter subsequent to the drainage that occurred before 2000.

As for reptiles, the Euphrates Soft-shell Turtle is an endangered species that is only known from a few localities in Iraq and Iran, whereas Murray's Comb-fingered Gecko has a restricted range limited to the Ahwar, Shatt Al Arab and the Iranian western shores on the Arabian Gulf. It was recently evaluated as data deficient on the regional level of the Ahwar, which leaves open the possibility that it is also a threatened species globally.

Lastly, a recent regional assessment of 30 taxa (2 plants, 3 fish, 2 mammals, 1 reptile, and 22 birds) revealed the occurrence of 5 critically endangered species, 12 endangered species, and 13 vulnerable species all on the regional level of the Ahwar.

Irreplaceability of the Ahwar for threatened species

The number of threatened species occurring at a site is not the only aspect of its potential OUV with regard to World Heritage criterion (x). Its irreplaceability is another key attribute. 19 endemic taxa (including species and subspecies) occur in the Ahwar, of which 2 species and 3 subspecies are birds, 3 species and 1 subspecies are mammals, 2 species are reptiles, 6 species are fish, and 1 species are from the order Odonata. In addition, the Ahwar harbor globally significant numbers (more than one percent of global population) of

68 waterbirds species. This further underlines the function of this property as a crucial knot in the fabric of bird migration routes, and also its importance for vertebrates in general.

3.1.c Statement of Integrity and Authenticity

Integrity of the Cultural Components

The three archaeological ensembles included in the property offer a comprehensive picture of the Ubaid and Sumerian urbanization process within their original marshlands environment. All the major archaeological and architectural features of Eridu, Uruk, and Ur are contained within the boundaries of the property ensuring that each component part bears a complete significance and contributes to expressing the Outstanding Universal Value of the property as a whole.

The use of mud as the main building material in southern Mesopotamia creates specific conservation conditions. The toll which the passing of time took on the abandoned southern Mesopotamian cities is heavier than in the case of stone or fired brick architecture found in other regions of the ancient world where remains can be monumental and visually impressive. Yet the remains of the four ziggurats of Eridu, Uruk and Ur, however eroded, still tower over the desert landscape and provide a striking visual testimony of the antiquity and durability of the most emblematic architectural features of Mesopotamian cities.

Layers of sedimentation protected the remains of Uruk, Ur and Eridu until the 20th century when archaeological excavations exposed several buildings anew. Eridu's excavated remains were later reburied except for the ziggurat. In Uruk and Ur there were some instances of incompatible material used to consolidate or protect the remains, whereas others were left exposed with the result that some have become affected by erosion caused mainly by rain and dust storms. This situation is however reversible and being addressed in the management plans developed for the property. Furthermore, large areas of the three cities are still unearthed, leaving room for further study of archaeological and conservation techniques respectful of the property's integrity.

Uruk, Ur and Eridu are protected under the Iraqi Law of Antiquities and Heritage and are provided with personnel to ensure the protection and monitoring of the antiquities. Lastly, only Ur has suffered limited and reversible damages during the recent conflict and remedial measures are introduced under the new management plan.

Integrity of the Natural Components

The four natural components of the property and their associated corridors comprise a vast region of over 210,000 ha, thus being of sufficient size to adequately support all key natural values including the ongoing ecological and biological processes occurring in the terrestrial, water and marshland ecosystems. The large size of the associated buffer zones

around each of the four components, totaling more than 200,000 additional hectares, further serves the long term protection of the property on a whole as well as at the component level.

The four components embrace the vast majority of the breeding grounds of key bird species within different regions of the property. The breeding grounds are areas of low human intervention where reed vegetation is used to build nests on the banks of the small islets abundant in the area which are surrounded with extensive water bodies located in isolation from the dry lands and away from potential predators.

Numerous populations of more than 197 species of migrating water birds associated with the Palearctic region settle on the property and spend winter periods here during their west Eurasia-Caspian-Nile and Eurasian-Africa route migrations. It is evident today that the numbers of landing migrating birds is increasing on the property, paralleling the improving levels of rehabilitation. Further, increasing records of the occurrence of globally threatened species are being documented, hence reflecting positively on the property's ecological integrity. The 1994 report on the IBAs of the Marshes was further enhanced and confirmed in 2009 with evidence of a significant increase in numbers of species and individual birds.

Figure 3-1: Flocks of Marbled Duck in the Central Marsh Component
By: Mudhafar Salim

In contrast, there are several introduced species which occur in the Ahwar and may have potential impacts on native species. A clear example is the introduction of the *Heteropneustes fossilis* fish in the 1950's to combat bilharzia. Further, in the 1990's *Tilapia zillii*, *Carassius carassius*, and several carp species were also introduced. It is, however, important to state that monitoring schemes have revealed negligible impact of these introduced species on the integrity of the ecosystem, particularly how they relate to the status and distribution of native fish species.

The existing legal frameworks in relationship to the Ahwar are well developed with the national nature conservation bylaw endorsement by the government cabinet in late 2013.

The bylaw was developed to reflect Iraq's national strategic outlook in regard to the protection and sustainability of its natural heritage in addition to its long-term commitment and obligation towards the various international treaties and conventions addressing environmental protection, biological conservation and wetland management. The legal framework also recognizes the management plans of the various components and protected areas, in Iraq in general and in the Ahwar in particular, as key legal tools needed for the long term protection of natural heritage.

Two of the four natural components have an existing legal designation. The first is for the Huwaizah Marshes which are Iraq's prime Ramsar Site declared in 2007 and fully recognized by the government of Iraq, and the second is the Central Marshes declared as a national park in 2013 to become the first protected area officially established in the country. The year 2014 will witness the declaration of the Huwaizah, East and West Hammar Marshes as protected areas as well. It is the commitment of the government of Iraq to conclude this declaration by June 2014.

The maintenance and improvement of the conservation status of the Ahwar is of high national priority, and the conservation measures (both in place and in preparation) are all geared towards the maintenance and promotion of the Outstanding Universal Value.

The key factors addressed in the legal and management frameworks for the four marsh components of the property are related to fluctuating water quality and quantity, illegal hunting and fishing, harvesting of vegetation cover, and oil extraction. The evaluation of such challenges is undertaken by the Ministry of Environment and other national and international partner organizations, and has currently revealed that such constraints are of limited impact on the key natural heritage values and attributes.

There is no oil prospecting or extraction within the boundaries of the properties. However, the buffer zone includes several oil concessions of high national priority which are subject to high level restrictions in terms of environment and social impacts and safeguards.

The government of Iraq is fully committed to maintaining the water budget needed for the restoration of 75% of the Ahwar using the 1973 reference point. The upstream challenges and pressures beyond the state boundaries remain a key concern for the water quantity reaching the Ahwar, however, this will be an ongoing challenge assertively addressed through the various legal instruments and technical solutions adopted. Starting from 2003, the waters of the marshes were restored to the majority of their localities as part of a basin-wide master plan developed by a multidisciplinary platform comprising all key interest agencies and groups.

Further, the above mentioned master plan adopted a series of supportive and alternative sources of water to rehabilitate the maximum possible surface area such as the usage of the general drainage canal starting from 2009, and the establishment of soil embankments across the banks of the Euphrates. Both actions led to improved levels of rehabilitation, especially for the Hammar Marshes and the Central Marshes.

There are no main paved roads that cross the key components and sensitive localities within the property. The local populations do utilize some of the natural resources, with the highest levels of use recorded in the Central Marshes. However, all use has been carefully considered within the strategic management framework for the property on a whole, and for the respective management plans of the components.

The buffer zone of the natural components is carefully designed, with the ultimate goal being to maximize the Ahwar restoration and ecosystem rehabilitation with a sustainable long term water flow, and to absorb most of the direct and indirect impacts caused by the various pressure sources on the property. The buffers were developed adopting the following principles:

- The maintenance of the physical continuity of key habitats and ecological corridors for key taxa occurring on the property.
- The minimization of the impacts of the human induced threats and pressures on the property such as oil prospecting and exploration.
- The protection of key upstream water sources within the Iraqi jurisdiction through utilizing the integrated water resource management approach. The water share of the Ahwar is maintained and secured through the approved annual water budget set by the Ministry of Water in close cooperation with the Ministry of Environment.

On the other hand, fishing and hunting of birds and animals does represent a continuing challenge to the property's animals. However, this is currently being fully addressed in the new management planning frameworks developed for the property with emphasis on effective monitoring, awareness raising and the development of alternatives for all uses that pose a threat to the site's values.

Further, the natural components of the property receive a limited numbers of visitors, with most visitation taking place by researchers, university and school students, and journalists. All these together do not represent a significant threat to the site integrity or its conservation.

The archaeological sites located inside the four natural components of the property have been protected against mad-made damage by water levels and difficult access. A limited number of mounds are used periodically by small human communities who pursue non–destructive livelihoods, using light reed structures for dwellings, fishing and breeding water buffaloes.

Statement of Authenticity of the Cultural Components

Considering the particulars of mud architecture, the conditions of authenticity as regards the material and substance are considered to be met by the visible presence of a series of emblematic public buildings in the three cultural components of the property. Previous excavations at Ur and Eridu have concentrated on monumental public buildings and allowed for a good understanding of the spatial organization of the political, administrative and religious sections of the cities. Much less excavation has taken place in peripheral areas, particularly at Uruk, yielding little information as regards residential and industrial

quarters. In Ur, the main harbor, situated outside the boundaries of the property, has yet to be excavated and the boundaries of the property might be extended at a later stage to include it. Existing gaps in the knowledge of the spatial design of the sites are being bridged through the use of remote sensing methods. No major restoration or conservation projects have been carried out with the exception of the 1960s rebuilding of part of the outer shell of the Ur ziggurat using baked brick and limited amounts of cement. These interventions did not affect the original structure and shape of the monument. Cement was also used in the 1930s to ensure the stability of the Temple of E-dub-lal-mah and the Royal Tombs, as was the standard practice at the time. More recent conservation of the site has been done using compatible material as much as possible. The new conservation approach will ensure that non compatible material is replaced by compatible material. No restoration was undertaken at Uruk and Eridu. In all three sites, mud bricks and fired bricks which are characteristic of Mesopotamian cities are still largely preserved on site. As a whole, the property has retained high degrees of authenticity in material and substance. Authenticity in form and design is also well retained in relation to the urban layout.

As regards location and setting, changes in the water regime have modified the hydrological and ecological environment of southern Iraq as the marshes moved southeastward through space and time. The remains of Uruk, Ur and Eridu are today surrounded by a desert landscape and are at a significant distance from the marsh components of the property and the sea. Taking this ecological reality into consideration, the conditions of authenticity are considered to be met by including in the property the ancient cities of Ur, Uruk and Eridu in conjunction with the Huwaizah, Central, East Hammar and West Hammar Marshes, which bear highly significant ecological and scientific values and, as such, offer the closest living representation of the conditions in which the earliest and longest-lived cities formed in alluvial Mesopotamia.

3.1.d Protection and Management Requirements

The Iraqi government has adopted rigorous plans for the protection and sustainability of the property tailored around its World Heritage attributes. The interministerial National World Heritage Committee is the highest national authority ensuring the protection, conservation and management at World Heritage properties. The management plans for the different components of the proposed property provide that guidance will be sought from this Committee to ensure that the protection and management of the property meet World Heritage standards .

Furthermore, the National World Heritage Committee is the overarching body coordinating management arrangements between concerned institutions for the seven components of the property and ensuring sufficient allocation of resources for their protection and conservation.

The cultural components proposed for inscription are public properties protected under the Iraqi Law of Antiquities and Heritage n°55 of 2002. The State Board of Antiquities and Heritage, under the Ministry of Tourism and Antiquities, is the main authority directly responsible for the follow up of the conditions and conservation of these properties. At the

governorate level, Directorates of Antiquities are directly responsible for ensuring the conservation, management and monitoring of archaeological properties inside their respective jurisdiction. They are assisted by the Antiquity and Heritage Police that maintains a permanent presence at Uruk and Ur and regularly patrols the site of Eridu.

The mud architecture of the abandoned southern Mesopotamian cities has been affected by the passing of time and the destructive excavation practices to which they were submitted between the mid-19th and the mid-20th century. These, together with previously accepted but inappropriate conservation measures, have all taken their toll on the buildings and monuments of the great ancient cities of Uruk, Ur and Eridu included in the property. Today, incomplete monuments are generally discernible with the notable exceptions of the remains of the four ziggurats included in the property, which still stand high above the sites and the arid but striking landscape of the desiccated alluvial plain. Erosion caused by wind and rain – much more than any man-made factor such as development pressure or even damages caused by the recent war – is the main factor affecting the conservation of these components of the property. Other issues are related to inappropriate conservation and restoration interventions conducted in the past which caused structural weaknesses in some monuments. Stabilization, consolidation and drainage of the most affected buildings are prioritized in the new management plans developed for Uruk, Ur and Eridu. At a later stage, non-compatible material will be replaced with compatible material, and adequate protective structures will be built above the buildings most affected by erosion.

Management plans for Uruk and Ur are in preparation and will be implemented by the end of 2014. These plans address the issues of the preservation of the components' 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 plans' recommendations. Another management plan is being prepared for Eridu, however focused specifically on conservation, maintenance and monitoring, as the goal is not to encourage visitation at the site which is too remote to ensure suitable protection.

Adequate levels of federal and regional funds are available and already in place for the protection, conservation, management and development of all the cultural components of the property.

To the east of the great cities included in the property, within the Central, West and East Hammar Marshes, are forty-five archaeological mounds that have been recently surveyed (seven of which are under excavation), and only recently emerged from under the protective cover of marshland waters and are now exposed to erosion. The five sites recently excavated in that area face specific conservation issues which are being addressed. One important potential pressure to these sites is seasonal floods and permanent reflooding. The approach adopted is that, in the prospect of a reflooding of the area, rescue excavation at a significant number of sites, together with a ground survey of the surrounding landscape, will need to be completed within the next five years to yield enough scientific data to allow for a comprehensive understanding of the history of human

settlement in the contemporary Ahwar. The protection of these archaeological sites is covered under the management arrangements for the natural components of the property.

Tourism is not currently a pressure factor and is unlikely to become so in the next two to five years as it will take time and effort to improve the image of Iraq as a safe destination for international tourism. However, the power of attraction of the southern Mesopotamian cities, particularly Ur, for international visitors is high. The concerned national and regional authorities are committed to make the best use of the available time by developing suitable visitor infrastructure in Ur and Uruk, including signage and interpretation, together with an adequate visitor management system that will ensure that visitation, even to increased levels, remains responsible. Eridu should remain outside of the visitor's circuit as it is remote and adequate protection would be challenging to ensure in the event of high visitation levels.

The approach to be taken to responsible and sustainable visitation of the cultural 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 components of the property. Uruk will constitute a possible extension with more limited, yet available, interpretation. Access to Eridu and the archaeological sites in the marshes will be reserved for a highly specialized public, for example, as regards marsh sites, as part of tours highlighting the natural values of the property.

The Ahwar are managed primarily by the Ministry of Water Resources and the Ministry of Environment in association with local governments and national civic society organizations (e.g. Nature Iraq and other local NGOs and CBOs). The Iraqi Ministries of Environment and Water Resources play the role of general facilitator in the development and adoption of annual plans addressing the conservation and development of the property. A primary component of the government program focuses on the enhancement of technical and administrative capacities of all personnel and communities associated with the Ahwar.

The government of Iraq has already approved the proposal put forth by the Ministry of Environment on the declarations of the rest of the Marshland components as national parks (in addition to the existing one for the Central Marshes) as well as the endorsement of their respective management plans and their implementation and budget allocations.

The management plans include a comprehensive set of programs and projects addressing the conservation of the sites, development of adequate infrastructures, environmental education awareness raising, and the law enforcement and biodiversity monitoring program; all contributing to the reinforcement of the World Heritage status of the property addressed within an integrated ecosystem-based approach to biodiversity conservation and ecological sustainability.

Several other strategies and conservation-oriented plans have also been adopted for the property. These include the New Eden Plan and the National Biodiversity Strategy and Action Plan. Further, the Iraqi Ministry of Environment has adopted a very clear vision for the active engagement and participation in related international treaties and conventions such as the Convention on Biodiversity, the Convention on International Trade in Endangered Species, the Convention on Migratory Species and the African-Eurasian Water Bird Agreement.

These include extensive training programs in the fields of scientific research and monitoring, protected areas, and wetland management, with the aim to ensure the highest levels of management of the property. Further, international cooperation organizations play a significant role in supporting the national efforts of the site's conservation and protection through the adoption and provision of needed technical and financial support geared towards the effective long-term management of the property, particularly since 2003 when the rehabilitation program started.

It is important to note that the property is owned by the treasury and there are no private ownerships within its seven components. However, in the natural components there are long-established local uses that are considered by the authorities to be part of traditional rights restricted only to the right of sustainable use and that do not entail any authority to convert land or change its tenure. This is supported by legal decrees - both existing ones in the Huwaizah and the Central Marshes, as well as others planned for the East and West Hammar Marshes.

By signing off on the nomination file, the Iraqi government will issue a cabinet legal decree recognizing the special status of all the components as a World Heritage property and will put in place institutional, technical, administrative and logistical measures to ensure its integrated management program within the legal mandates of the Ministry of Environment for the natural components, and the Ministry of Tourism and Antiquities for the cultural components.

3.2 Global Comparative Analysis

3.2.1 The GCA for the Natural Components

Classification of Nominated Property

In terms of general geographical context, the Ahwar of southern Iraq belong to the Anatoli-Iranian Desert biogeographic province of the Palearctic realm (Udvardy, 1975). This ecoregion is characterized by low precipitation, as well as high insulation and aridity. However, the Ahwar of southern Iraq are not typical of this ecoregion but highly intrazonal. They form part of the freshwater ecoregion 441 "Lower Tigris and Euphrates", one of 426 (non-continuously numbered) freshwater ecoregions of the world (Abbell et al., 2008). According to the Ramsar Classification System for Wetland Type (Ramsar Convention Secretariat, 2012), the Ahwarare predominantly a permanent inland delta (wetland type L), with additional elements of estuarine waters (wetland type F - permanent water of estuaries and estuarine systems of deltas) represented particularly at East Hammar. For the Global Comparative Analysis, the consequence of this bio-geographical and ecological classification of the Ahwaris that they need to be compared to other river deltas (particularly permanent and inland deltas) from outside their freshwater ecoregion and biogeographic province, and that at least part of the sites for comparison should be from outside the Palearctic realm.

Screening for Potential Comparable Sites

Based on the classification of the Ahwarof southern Iraq, wetland properties which are already inscribed on the World Heritage list or which are otherwise relevant were screened taking the following stepwise approach (Table 3-1):

1. Comparable World Heritage properties with primary wetland values as listed in Thorsell et al. (1997) - for sites inscribed before 1997 - and in WHC (2013) - for sites inscribed between 1997 and 2013 - were screened for a match with the above class of wetlands. This yielded eight preliminary candidate properties for GCA.
2. Table 11 of Thorsell et al. (1997) on *"Regions with significant wetland and/or marine values that contain areas which may merit consideration for World Heritage nomination"* was also screened for matches, yielding an additional five broadly comparable sites.
3. Rather than screening the sometimes outdated and/or poorly documented tentative lists of State Parties for further sites, the Ramsar sites information service was queried based on the above wetland types, and two additional significant Ramsar sites falling into the same categories as the Ahwarwere included into the preliminary site set. One additional site (Paraná, Argentina) was also considered at this stage.
4. The resulting preliminary site set (16 sites) covers five biogeographic realms including the Palearctic. It was subjected to a second screening for climatic/ecological comparability and data availability. Particular care was taken to reach a good compromise between the suitability of the GCA site set for both World

Heritage criteria and all ecological values and attributes used in the comparison. This meant relaxing some exclusion criteria for some sites. As a result, nine sites were excluded - usually because they had a tropical and much more humid climate than the Ahwar, and in one case each because of other ecological reasons and data availability.

5. The remaining seven sites from three biogeographic realms were included in the GCA. One of them (Doñana National Park) was only included where it was relevant for the comparison in question.

Table 3-1: Screening Results –
Potential Sites for Inclusion in the GCA and Rationale for Final Selection

Source	Site	Comment
Inscribed properties	Everglades National Park (USA)	*Included: Not a delta, but included as a relatively humid site from the neotropical realm*
	Danube Delta (Romania)	*Included*
	Doñana National Park (Spain)	*Included: Not a delta, but included as a coastal wetland in GCA for some processes/attributes*
	Djoudj National Bird Sanctuary (Senegal)	*Included*
	Keoladeo National Park (India)	*Excluded: artificial area sharing too few features with the Ahwar; data availability*
	Kakadu National Park (Australia)	*Excluded: tropical climate*
	Sundarbarns (Bangladesh)	*Excluded: tropical climate*
	Pantanal (Brazil)	*Excluded: tropical climate*
Potential sites (Thorsell et al., 1997)	Okavango Delta (Botswana)	*Included*
	Inner Niger River Delta (Mali)	*Included*
	The Sudd (Sudan)	*Excluded: climate much more humid than the Ahwar*
	Volga Delta (Russian Federation)	*Included*
	Irrawaddy River floodplain and delta (Myanmar)	*Excluded: tropical climate*
Significant Ramsar sites	Macquary Marshes (Australia)	*Excluded: Unlikely to be of OUV, much more humid than the Ahwar*
	Tonle Sap (Cambodia)	*Excluded: tropical climate*
Other sites	ParanáDelta (Argentina)	*Excluded: data availability and climate*

Final Selection of Sites for the GCA

As a result of the above process, the following seven sites were included in the GCA:

- Djoudj National Bird Sanctuary and Senegal River Delta (Senegal): The Djoudj National Bird Sanctuary is situated within the Senegal River Delta and consists of a complex of river channels, streams, ponds, seasonally inundated marshes and a large lake. Djoudj is internationally important for large numbers of numbers of various species of waterbirds that use the site for breeding, staging and wintering. Principal human activities are extensive grazing and ecotourism. Surrounding areas are used for rice cultivation, livestock rearing, and hunting. The Senegal River Delta is strongly altered by artificial waterworks, irrigation works and agriculture. A dam in the estuarine part of the delta prevents any marine salt water intrusion into most of the delta, including Djoudj. This has had negative effects on the vegetation composition of the Djoudj. Other large dams further upstream and irrigation canals for rice cultivation have altered the natural flood pulse of the river and affected the flood plain ecosystems. Water levels in Djoudj are artificially controlled to mimic past flood patterns. Before the artificial flooding, Djoudj was listed as a World Heritage Site in Danger and as a Montreux-listed Ramsar Site (Ramsar 2013, UNEP-WCMC 2013b, UNESCO 2013, World Heritage Committee 2008, Zwarts et al. 2009).

- Okavango Delta (Botswana): The Okavango Delta System is located in northern Botswana and is linked to the Okavango River that originates in the Angolan highlands. The Delta is the largest inland delta in the world and is situated within the Kalahari Desert and Savannah woodland region. It is characterized by a hydrological gradient from permanent streams and swamps to seasonal floodplains, riparian woodlands, and dry woodlands. The Delta System is one of the most diverse ecosystems in Sub-Saharan Africa supporting a large, diverse terrestrial and aquatic species. The high species diversity is considered normal for the southern African region. Very little anthropogenic transformation has taken place so that it is still operating in near natural state. There are no manmade dams and major hydrological infrastructural developments such as canals or water abstraction. The only significant developments are related to limited tourism activities (Junk et al. 2006, Ramberg et al. 2006, UNESCO 2013).

- Inner Niger Delta (Mali): The Inner Niger Delta is one of the few free flowing floodplains in the Sahel in Mali. It is the largest inland wetland in West Africa and the second largest wetland in Africa, after the Okavanga Delta. It supports a high number of animal and plants species and is a refuge for very large numbers of migratory birds, although many of the large mammals, typical for Africa, have disappeared. The human impact on this area is significant as nearly one million people live on the resources of the delta ecosystems, by agriculture, fishing, hunting and tourism. There are several threats: the fishing pressure is very high and the floodplains are grazed by two million cattle and four million sheep and goats. This overgrazing has a severe impact on the natural vegetation and is one of the reasons the once ubiquitous flood forests are on the edge of extinction. Also agriculture (rice cultivation) poses a threat to the natural ecosystems. Finally, water diversion and dams upstream reduced flooding in the Delta (Wymenga et al. 2002, Ramsar 2013, Zwarts et al. 2009).

- Danube Delta (Romania): The Danube Delta is situated at the Black Sea in northeast Romania and adjoining Ukraine, forming the best preserved delta and the largest continuous marshland in Europe. The reserve, situated in Romania only, comprises of numerous freshwater lakes interconnected by channels and includes the largest area of reed marshlands in the world. It constitutes critical habitats for migratory birds and other animals and supports currently endangered flora and fauna. It is a major wetland on the flyway between central and Eastern Europe, the Mediterranean, Middle East and Africa. Major threats are changes in conditions upstream in the Danube as well as changes in the delta itself. Straightened riverbeds and construction of polders occurred during the former communist era, and flood protection dams and groins cut the river from the floodplain, significantly diminishing the amount of available sediments. Other threats are waterway navigation and harbor developments in the region, unsustainable tourism, worsening of water quality during the last fifty years, and agriculture, fish farming and forestry. In spite of this the overall basic hydrological and ecological system of the delta is still intact (Danube Delta Biosphere Reserve Authority 2013, Gâştescu 2012, Ramsar 2013, UNEP-WCMC 2013a, World Heritage Committee 2008, UNESCO 2013).

- Doñana National Park (Spain): The Doñana National Park in Andalusia, southern Spain, occupies the right bank of the Guadalquivir River at its estuary on the Atlantic Ocean. The site is notable for lagoons and pools, marshlands, fixed and mobile dunes, scrub woodland and maquis. The park supports important resident populations of threatened species of birds and animals. It is the most important non-breeding site for waterbirds in Spain and is a major stop-over on the route to and from Africa for migrating Palearctic birds. Doñana faces several threats including drainage of marshes and conversion to agriculture, grazing, fisheries, mineral and salt exploitation, hunting, harvesting of wetland vegetation, forestry plantations, use of pesticides, urban development, road construction, tourism and over-grazing. Although it has been affected by these activities and suffered from toxic pollution by a mining incident further upstream in 1998, Doñana is a resilient system. At present the main threats have been averted and restoration activities are under way (Junta de Andalucía 2005, UNESCO 2013, UNEP-WCMC 2013c, World Heritage Committee 2013, WWF España 2013).

- Everglades National Park (USA): The Everglades National Park in the south of Florida, USA, is the largest sub-tropical reserve on the North American continent. The Everglades are a network of wetlands and forests fed by rivers and streams flowing out of Lake Okeechobee, southwest into Florida Bay. Everglades National Park is part of a large, interconnected freshwater system called the Kissimmee-Lake Okeechobee-Everglades Watershed. From the Bay the water moves through the island and passes into the Florida Keys. It is a shallow basin tilted to the south-west and underlain by extensive Pleistocene limestone. Its juncture at the interface of temperate and sub-tropical America, fresh and brackish water, shallow bays and deeper coastal waters creates a complex of habitats. Major threats are alterations of the hydrological regime, adjacent urban (Miami, among others) and agricultural expansion, invasive exotic species, and tourism. Mainly because of the hydrological situation and the high number

of exotic species, the Everglades were included in the List of World Heritage Sites in Danger in 2010 (Richardson 2010, World Heritage Committee 2013, UNEP 2012, UNEP-WCMC 2013d, UNESCO 2013).

- Volga Delta (Russian Federation): The Volga Delta is one of the largest deltas in the world and characterized by a highly braided morphology, creating over 1,000 channels in the lower delta. The site covers the seaward edge, and is composed of extensive areas of open water, numerous islands, reed beds, and other aquatic plants. 70% of the world catch of sturgeon comes from the Volga tributaries, which are a vital link in the life cycle of other commercially important fish. During mild winters, the delta supports up to 750,000 waterbirds, including swans, geese and ducks, and summer molting ducks reach 400,000 individuals. The delta supports breeding populations of endangered waterbirds and is a major staging area for many species of waterbirds, raptors and songbirds. The rise in the Caspian Sea level has caused a northward retreat of the foredelta (Ramsar 2013).

Table 3-2: Summary of the Seven Sites Included in the GCA

Site	Country	Status	World Heritage Criteria
Ahwarof Southern Iraq	Iraq	Tentative List	ix, x
Danube Delta	Romania	Inscribed	vii, x
Djoudj National Bird Sanctuary*	Senegal	Inscribed	vii, x
Doñana National Park	Spain	Inscribed	vii, ix, x
Everglades National Park	USA	Inscribed	viii, ix, x
Inner Niger Delta	Mali	-	-
Okavango Delta	Botswana	Tentative List	vii, viii, ix, x
Volga Delta	Russian Federation	-	-

* With some additional information from the wider Senegal River Delta (including sites in Mauritania)

A summary of the seven sites included in the GCA – in addition to the Ahwar, is provided in Table 3-2. Not all of the sites are equally relevant to both of the criteria and all processes/attributes under which the Ahwarof southern Iraq are going to be nominated. This has been considered in the detailed comparisons for criteria (ix) and (x) below. Important international designations of the Ahwarand the other sites in the GCA that are generally relevant to the question of OUV in relation to World Heritage criteria (ix) and (x) – without being proof of OUV in themselves – are summarized in Table 3-3.

Approach to the GCA

Whenever possible, global datasets (e.g. from the International Waterbirds Census or from global climatic databases) were consistently used to compare the Ahwarof southern Iraq to the other sites in the GCA. Only when this was not possible, publications or reports about individual sites, or personal communications with individual representatives of individual sites in the GCA were used to collate the necessary information (see Appendix 1 for detailed documentation of data sources and Hoffmann et al. (2013) for a more detailed methodological discussion). The threat status of fauna was consistently derived from the global IUCN Red List, with the exception of a small number of restricted range species and subspecies which have recently been evaluated regionally using standard IUCN methodology. Species that are listed as vulnerable, endangered and critically endangered were considered as "threatened" in this GCA.

GCA for criterion (ix) – ongoing ecological processes: As stated in the justification for inscription under criterion (ix), the Ahwarare a globally outstanding example of a large permanent inland delta system in an extremely arid environment. This extreme environment has led to exceptional and globally outstanding adaptations at the level of both ecosystem functioning and the evolution, composition and interactions within the Ahwarcommunity of flora and fauna.

The GCA with regard to criterion (ix) focuses on four key aspects of the functioning of the Ahwarecosystem and its ecological community:

Evolution and functioning of a large inland delta ecosystem in extremely arid conditions: Table 3-4 compares the seven sites in the comparison with regard to three key parameters of aridity: average annual precipitation, potential evapotranspiration (i.e. the amount of water that could be taken up by the atmosphere if available) and the aridity index. This comparison shows that the Ahwarreceive the least precipitation of all sites in the comparison, and that they are the most arid in terms of their aridity index, jointly with the Inner Niger Delta. Therefore, the Ahwarare one of the – if not the – largest permanent inland deltas worldwide that have evolved and function in the most arid of environments. This conclusion is not limited to the sites in the GCA, as there are no other large inland deltas in environments as or more arid than those in the comparison.

Table 3-3: Important International Designations of the Sites in the GCA: (AZE: Alliance for Zero Extinction sites; CI Hotspots: Conservation International Global Biodiversity Hotspots; CPD: Centers of Plant Diversity; EBA: Endemic Bird Areas; IBA: Important Bird Areas; WWF G200: WWF Global 200 Priority Ecoregions for Global Conservation)

Site	EBA (code)	IBA	WWF G200 (code)	CPD	CI Hotspots	AZE
Data source	BirdLife International (2013)		Olson and Dinerstein (2002)	WWF IUCN (1994-	CI (2013)	AZE (2013)
Ahwar of southern Iraq	119	v[1]	158	-	-	-
Danube Delta	-	v	159	-	-	-
Djoudj National Bird Sanctuary	-	v	-	-	-	-
Doñana National Park	-	v	-	-	v[2]	-
Everglades National Park	-	v	100	Partly	-	-
Inner Niger Delta	-	v	97	-	-	-
Okavango Delta	-	v	98	-	-	-
Volga Delta	-	v	157	-	-	-

[1] All four natural components of the Ahwar are IBAs. [2] Occupies a small part of the Mediterranean Basin Global Biodiversity Hotspot.

The specific functional attributes of the Ahwar that are listed as a consequence of their extreme setting in the justification for inscription under World Heritage criterion (ix) cannot be compared to those of the other sites in the GCA because of a lack of available data. However, it can be inferred that the Ahwar are as extreme - and therefore distinct - in terms of their functional attributes as they are in terms of their peculiar climatic and ecological setting.

Vertebrate and dragonfly endemism and near-endemism and ongoing evolution/speciation, including at the subspecies level: Table X5 compares the number of endemic subspecies and species of various vertebrate groups and dragonflies (Odonata) in the Ahwar and the other large inland deltas of the GCA. It also compares the existence of isolated or satellite populations of birds as these are likely to represent an additional, earlier step of the same process. Table X5 shows that the Ahwar have the highest number of endemic/near-endemic bird species, subspecies and isolated populations (which may also be subspecies at the genetic level) and dragonfly species, as well as among the highest number of endemic/near-endemic mammal subspecies and species of all sites in the GCA. Although this is not restricted to the birds but a recurrent characteristic of several taxonomic groups, it is reflected by the fact that the Ahwar are the only Endemic Bird Area among all sites in the GCA (BirdLife International, 2013).

Table 3-4: Size, Climatic and Aridity Parameters at the Seven Sites Included in the GCA

Site	Size (*1000 ha)	Climate (Köppen-Geiger)	Average Annual Precipitation (mm)	Average Annual PET[1] (mm)	Aridity Index / Categorization[1]
Data source	Hoffmann et al. (2013)		Worldclimate (2013)	ESRI et al. (2013)	FAO (2012)
Ahwar of southern Iraq	1,500 (1973) 330 (current)	BWh Hot desert	149	0-500	0.05 – 0.20 (arid)
Danube Delta	647	Dfa Dry – hot summer	401	250-750	0.20 – 0.50 (semiarid)
Djoudj National Bird Sanctuary	16	BWh/BSh Hot desert/hot semiarid	269-376	0-500	0.05 – 0.20 (arid)
Doñana National Park	112	Csa Hot summer – Mediterranean	534	250-500	0.20 – 0.50 (semiarid)
Everglades National Park	567	Cfa Humid subtropical	1,578	500 - >1,000	>0.65 (humid)
Inner Niger Delta	4,120	BSh Hot semiarid	521	250-750	0.05 – 0.5 (arid – semiarid)
Okavango Delta	5,537	BSh Hot semiarid	558	0-750	0.20 – 0.50 (semiarid)
Volga Delta	800	BSk Cold semiarid	217[2]	n.a.	0.05 - 0.5 (semiarid - arid)

[1] More precise data for average potential annual evapotranspiration and aridity index are in preparation. [2] Precipitation data from NHPF (2008).

These numbers of endemic species/subspecies may not be particularly high in comparison to the level of endemism of much older ecosystems that have already been inscribed as speciation hotspots under criterion (ix), such as the Cape Floral Region Protected Areas (South Africa), but they are truly extraordinary for the extremely young age of the current Ahwar of only a few thousand years, and the fact that the current marsh area was still covered by the Gulf during the postglacial transgression ca. 6,300 years ago (Sanlaville, 2002) are taken into consideration. The high number of endemic species and subspecies, as

well as the existence of isolated populations of bird species of afro-tropical origin, can be interpreted in several ways: On the one hand, particularly the isolated populations are likely to be relicts from times of warmer climate in the Ahwar, which underlines the exceptional refuge function of this property. On the other hand, their occurrence as well as that of endemic species/subspecies is consistent with the notion of the Ahwar as a center of active ongoing evolution and speciation.

Table 3-5: Numbers of Species and Subspecies of Various Vertebrate Groups Recorded as Local Endemics or Near-Endemics at the Seven Sites of the GCA. This includes species restricted to the respective river basins.Data source: Hoffmann et al. (2013), NHPF (2008); (spp: species; sspp: subspecies; pop: isolated populations)

Site	Fish spp.	Mam. spp.	Mam. pop.	Bird spp.	Bird sspp.	Bird pop.	Amph. spp.	Reptile spp.	Drag-onfly spp.
Ahwar of Southern Iraq	6	1 (3)[2]	1	2	3	3	0	1	2
Danube Delta	5	0	0	0	0	0	0	0	0
Djoudj National Bird Sanctuary	9	0	0	0	0	0	n.a.	n.a.	0
Doñana National Park	1	1	0	1	0	0	5	8	0
Everglades National Park	3	0	0	0	2	n.a	0	1	n.a.
Inner Niger Delta	24	n.a.	n.a.	0	0	n.a.	n.a.	n.a.	n.a.
Okavango Delta	1	0	0	0	0	1	0	0	0
Volga Delta	0	0	0	0	0	0	0	0	0

[2] One endemic and two near-endemic species, occurrence of two of them could not be confirmed yet after re-flooding.

Importance for diadromous fish and migratory crustaceans: Detailed data on the diadromous fish and crustacean community are missing for most of the sites in the GCA but some more general comparisons regarding the fish are nevertheless possible. Most of the fish species of the Everglades National Park (208 out of 238) are marine euryhaline species, particularly those of mangrove or coral habitats (Hoffmann et al., 2013). This reflects the coastal location of the Everglades, which is a very different and ultimately uncomparable setting from that of the Ahwar. The Danube Delta (75 out of 134 marine/euryhaline species - Hoffmann et al., 2013) and the Volga Delta (four species of diadromous sturgeons plus a substantial but unspecified number of other diadromous and marine taxa - NHPF, 2008) are also directly discharging into the sea. While the role of the above three properties as spawning, nursery and feeding grounds of marine diadromous fish is at least as important as that of the Ahwar, they differ from the latter as they are directly connected to the respective seas, whereas the Ahwar are separated by the Shatt Al Arab (> 100 km from the

sea to East Hammar). In this respect, the migration aspect is even more pronounced in the Ahwar than in the three sites above. Doñana National Park has only moderate importance for diadromous fish and the inland deltas of the Okavango and Niger have no comparable role, while fish migration at Djoudj National Bird Sanctuary is likely to be cut off by coastal and upstream dams. No recorded reports about crustacean migration similar to that of *Metapeneaus affinis* have come to the attention of the drafting team from any of the other sites.

Importance for waterbirds, particularly migratory waterbirds: Table 3-6 shows the maximum numbers of waterbirds (including migratory waterbirds) species, families and individuals that have been recorded in mid-January in the recent past (since 2006) at the seven sites of the comparison. It shows that both the species richness and abundance of waterbirds in the Ahwar are at the same order of magnitude, but towards the lower end of the range reported for comparable ecosystems: of the five other sites for which data were available, only the Danube Delta had lower species richness and only the Okavango Delta had lower maximum abundances.

However, direct comparison of these figures may lead to the wrong conclusions, for at least three reasons:

1. Observation effort in the International Waterbirds Census has been much less in large, remote and partly less secure wetland areas such as the Ahwar or the Inner Niger Delta then in more accessible and smaller areas such as Doñana, Djoudj or the Danube Delta. This will yield higher estimates of waterbirds in the smaller and better studied areas and lower estimates in the less studied areas including the Ahwar. For instance, > 1 million of waterbirds (ten times the numbers recorded through the ground/boat-based International Waterbirds Census) were counted during aerial surveys in the Inner Niger Delta (Hoffmann et al., 2013). Although no aerial surveys have been conducted in the Ahwar, the underestimation from ground/boat based surveys may be at a similar order of magnitude there.
2. The Palearctic and afrotropical sites in the comparative analysis have different significance for waterbirds in January because they are located at different positions along the flyway. Many passage migrants, for which the Ahwar are of particularly crucial importance, have moved on to their non-breeding areas in southern and eastern Africa already and therefore are not detected anymore, leading to relative underestimations.
3. The recent species richness and abundance data represent snapshots of the recovery process after the draining of the Ahwar and subsequent re-flooding since 2003. Historical figures have been much higher, i.e. 134 wetland dependent bird species (Maltby, 1994) and several millions of individuals of waterbirds in the 1970s (Carp and Scott, 1979). While it is clear that a nomination for inscription on the World Heritage List at the present time can only be based on present or recent data, these historical data illustrate a potential maximum of waterbirds species richness and abundance that can be sustained by the Marsh ecosystem if its restoration continues. The restoration and recovery trajectory of the Ahwar is discussed into more detail in the section on integrity.

Even the minimum abundance estimate of 87,000 exceeds the threshold for internationally important waterbirds concentrations of Ramsar Criterion 5 (20,000) by more than a factor of four. Similarly, sixteen waterbirds populations in the Ahwar have at least once exceeded the criterion of >1% of global population size (Ramsar Criterion 6), which renders the Ahwar internationally important for these species (Hoffmann et al., 2013). An attempt was made during this GCA to compare the number of species meeting Ramsar Criterion 6 among all sites in the analysis, but this attempt was unsuccessful because of the incompleteness of and inconsistencies among available data.

Table3-6: Numbers of Waterbird Species and Maximum Recent (since 2006) Abundances of Migratory Waterbirds at the Seven Sites. Data source: Hoffmann et al. (2013), based on January counts from the International Waterbird Census.

Site	Species Number	Number of Families	Maximum Abundance
Ahwar of Southern Iraq	82	14	87,000
Danube Delta	67	12	202,000
Djoudj National Bird Sanctuary	93(102)	19(20)	463,000
Doñana National Park	97	17	329,000
Everglades National Park	n.a.	n.a.	n.a.
Inner Niger Delta	91	18	102,000
Okavango Delta	100	20	43,000
Volga Delta	23[1]	n.a.	717,000[2]

[1] Higher numbers of 63/115 species (without/with Charadiiformes) in six/seven orders, respectively, have been recorded outside the IWC at this site (NHPF, 2008). [2] Likely to be aerial counts - method not documented.

Exceptionally high ecosystem resilience and regeneration potential: The draining of the Ahwar in the late 20thcentury and their subsequent flooding and ecological restoration have revealed the immense ecological resilience and regeneration potential of this site. This has enabled a partial recovery not only of their extent and hydrology, but more importantly of their flora and vegetation (Hamdan et al., 2009), fauna (Nature Iraq, 2008), function as a waterbird habitat (Abed, 2008), seasonal succession and other ecological attributes.

A relatively strong ecological resilience is a common feature of many wetland ecosystems, but the ongoing self-restoration of the Ahwar is in a class of its own in this regard because it follows large-scale catastrophic disturbance triggered by the draining of the Iraqi marshes in the late 20thCentury. The other sites in the comparative analysis have been spared the cruel experiment of large-scale destruction and partial recovery, and a detailed comparison of their ecosystems' resilience against large scale draining, and recovery potential after partial re-flooding to that of the Ahwar is therefore impossible.

In spite of the lack of feasibility of a detailed GCA regarding this aspect, the Ahwar remain the only large-scale wetland ecosystem with a *documented* ecological resilience and restoration potential at this scale known to humankind. While this legacy continues to impair aspects of the ecological integrity of the Ahwar and complicates their current management (see Integrity Section for more information on the restoration trajectory of the Iraqi marshes), the past and ongoing regeneration is clearly an unrivalled ongoing ecological and biological process in the evolution and development of this freshwater system.

The overall conclusion of the GCA for criterion (ix) is that the Ahwar of southern Iraq are the large wetland ecosystem functioning in the most arid environment of all those in the comparison (jointly with Djoudj National Bird Sanctuary), have a particularly high incidence of endemic species and subspecies in several taxonomic groups (also considering their very young age) plus a number of interesting isolated populations of species with an otherwise African or Indian distribution, are an internationally important site for migratory waterbirds wintering and staging, and have the highest demonstrated ecological resilience and restoration potential of all sites analyzed. *In combination, the results of these four comparisons support the assertion that the ecosystem of the Ahwarpasses the threshold for OUV under World Heritage criterion (ix).*

GCA for criterion (x) – globally important habitats for in-situ conservation of biological diversity, including of threatened species: The justification for inscription under criterion (x) states that the Ahwar are one of the world's most important wetland habitats in arid desert environments, from the point of view of biodiversity conservation and particularly bird conservation as well as the scientific study of adaptation to extreme environments, speciation and evolution.

Table 3-7 compares the overall species numbers of the Ahwar as discussed in the justification for inscription to those of the other sites in the GCA. According to this comparison, the overall vertebrate and plant species richness of the Ahwar falls short of that of most comparable sites for the plants, fish, amphibians and birds, while it is at a similar level at most comparable sites for the reptiles and mammals. As a result, overall vertebrate species richness in the Ahwar is the lowest of all sites compared.

Different reasons – some relevant to the interpretation of these figures in relation to the OUV of the Ahwar and others not – account for these relatively low species counts. Plant (as well as reptile and mammal) species richness may be underestimated by available information, but is likely to also reflect the extreme abiotic environment and relatively homogeneous habitat composition of the Iraqi marshes, at least in comparison to sites which also comprise more extensive terrestrial habitats, such as the Danube Delta, Doñana National Park and the Everglades (see Table 3-8[1]). The low species richness of amphibians may partly also be a result of underreporting, but is certainly also a product of the highly arid region in which the Ahwar are located. Finally, bird diversity in the Ahwar is still in the

[1] Habitat diversity was not compared systematically between sites as the listing in Table X8 refers to unchecked information provided by the State Parties of the Ramsar Convention, which may be relatively arbitrary/incomplete. However, this information is sufficient to .provide a general context for interpreting the better documented species information on which the GCA for criterion (x) is based

process of recovery, after the re-flooding of this area since 2003. Historical numbers of bird diversity (e.g. Scott and Evans, 1994) would give a very different comparison to the other sites in the GCA, and as a consequence a different picture of relative overall vertebrate species number in the Ahwar.

Nevertheless, the conclusion from the GCA for known or estimated absolute species numbers of the flora and fauna is that the Ahwar fall within the lower range of all sites compared, for most groups. Taken in isolation, these results might be insufficient to demonstrate the OUV in relation to WH criterion (x) unless the extreme nature of the Ahwar as a wetland ecosystem in a highly arid environment is taken into account. This demonstrates the interdependency of the Ahwar's values in relation to criteria (ix) and (x), and the need to consider the ecosystem when comparing the biodiversity, and vice versa.

Table 3-9 lists threatened species numbers of theAhwar as discussed in the justification in comparison to those of the other sites in the GCA. This comparison shows a different picture from that of absolute species numbers (Table 3-7). The Ahwar have the highest number of globally threatened bird and dragonfly species, and the joint second highest number of globally threatened mammal species, of all sites in the comparison. The global Red List status of two additional groups (the plants and fish) have not been assessed in the Ahwar, which leaves open the possibility that they rank similarly high with regard to the richness of threatened representatives of those groups. The total number of threatened species should not be ranked as many species or geographical areas are not yet assessed, making such a generalized comparison hardly conclusive.

Table 3-7: Overall Species Numbers of Various Taxonomic Groups Estimated for the Seven Sites of the GCA.Data source: Hoffmann et al. (2013), NHPF (2008); (n.a: no data available)

Site	Plants	Fish	Amp.	Rep.	Mam.	Bird	All Vertebr.	Odona.
Ahwar of Southern Iraq	371[1]	44	3	18[1]	38[1]	264[5]	364	25[1]
Danube Delta	2,383	134	10	12	54	341	551	35
Djoudj National Bird Sanctuary	121-132	92	6	n.a.	29	327	>448	n.a.
Doñana National Park	1,362	27	12	23	37	224	323	29
Everglades National Park	1,146	238[3]	21	58	36	366	719	40[4]
Inner Niger Delta	189[2]	138	n.a.	n.a.	>14	125	>263	n.a.
Okavango Delta	1,078 – 1,276	71	29	64	123	444	731	94-98
Volga Delta	314	56	4	5	34	279	378	n.a.

[1] Partially based on historical data and likely to be incomplete. [2] Not fully investigated – minimum number. [3] Majority are marine fish species. [4] Estimates of reported species. [5] Recent (post-reflooding) species numbers – historical (pre-drainage) number is 278 (Scott and Evans, 1994).

The richness of endemic species and subspecies of the Ahwar in comparison to the other sites (Table 3-3) shows a similar pattern to that of the richness of globally threatened species, which strengthens their case for OUV in relation to criterion (x). Furthermore, the numbers of globally threatened and endemic species in the Ahwar are not only outstanding in absolute terms, but even more so in relative terms: The proportion of these species within the overall community of the Ahwar is particularly high as overall species numbers in several of the taxonomic groups in question are relatively low.

An additional supporting argument for the exceptional value of the Ahwar is their irreplaceability as the last refuge for species which have gone extinct within a large distance of kilometers of this area: The emergence of several subspecies of birds and the occurrence of three isolated populations in the property is consistent with contractions of the continuous range of other areas for climatic or anthropogenic reasons, which separated the Ahwar populations from their continuous range. The Ahwar populations of African Darter, Sacred Ibis and Goliath Heron are all more than 1,500 km separated from the continuous ranges of these species, while the corresponding distance for the Smooth-coated Otter is approximately 2,500 km. Nothing similar is known from any of the other properties in the comparison.

In summary, overall species numbers of some taxonomic groups (e.g. mammals) fall within the same range as comparable numbers of other sites in the GCA, while those of others are at the lower end of the spectrum of sites analyzed, because of the still ongoing recovery of the Ahwar, their extreme environment and probably also because of understudying. In contrast, the numbers of globally threatened species as well as of endemic species and subspecies in the Ahwar are clearly within the range of other sites in the GCA (both those inscribed and other additional sites). They exceed those of sites already inscribed under criterion (x) for several taxonomic groups (e.g. mammals, birds and Odonata). The Ahwar also have an exceptional degree of irreplaceability for several endemic or near-endemic species, subspecies and isolated populations particularly of birds, which is reflected in their status as one of the very few wetland endemic bird areas (BirdLife International, 2013). *The overall conclusion of the GCA is that, particularly because of the high number of globally threatened and endemic animal taxa and the exceptional irreplaceability of the property for these species, the biodiversity of the Ahwarpasses the threshold of OUV in relation to World Heritage criterion (x).*

Table 3-8: Major Habitats and Vegetation Types at the Seven Sites Included in the GCA, as a Reference for Interpretation of the Observed Species Richness. The full range of Ramsar wetland types per site can be found in Appendix 2. (Source: Hoffmann et al., 2013)

Ahwar
Rivers, streams and artificial canals; freshwater pools and lake; mudflats; brackish and saline ponds and lakes; permanent marsh or reeds (helophytic vegetation); seasonal and intermittent marshes; woody marsh vegetation; salt pioneer swards; deserts; unvegetated saline lands; dry woodlands and shrub; grasslands and steppe (Abdulhasan et al. 2009, Ramsar 2013)
Djoudj
River channels and streams; permanent freshwater lakes and pools; seasonally inundated brackish lakes and pools; various types of reeds or marsh (helophytic vegetation); Sahelian *Tamarix* shrub; savannah. (UNESCO 2013; Ramsar 2013)
Okavango
Rivers and channels; permanent lakes and pools; permanent marshes or swamps with reed and papyrus (helophytic vegetation); seasonally flooded grasslands and savannahs; occasionally flooded grasslands and savannahs; riverine woodlands; dry woodlands; dry savannahs (Junk 2006, Ramberg et al. 2006, UNESCO 2013)
Inner Niger Delta
Rivers and streams; permanent freshwater lakes and pools; seasonal marshes; natural and artificial bourgou (floating grass) fields; low-lying *Cyperus* marshes (helophytic vegetation); wild rice marshes and arable fields; flood forests; dry savannah and grasslands. (Zwarts et al. 2005, Ramsar 2013)
Danube Delta
Rivers and streams; permanent lakes and pools; flooded islets; reed marshes (helophytic vegetation); riverine flood forests of willows and poplars, cane-fields, sandy and muddy beaches; river sandbanks; wet meadows; various dry grasslands and meadows; sandy and rocky areas; non-flooded deciduous forests; marine levees; brackish lagoons (Gâştescu 2008, Ramsar 2013, UNESCO 2013)
Doñana
Rivers and streams; tidal rivers and estuaries; permanent freshwater pools and lakes; mud and sand flats; lagoons (including saltwork basins); helophytic vegetation; salt marshes, salt pastures and salt steppes; fixed and mobile coastal sand dunes; sand beaches; heath; scrub; maquis and garrigue; phygrana; dry grasslands and steppes; deciduous and coniferous woodland; artificial forest monoculture; extensive agriculture (Junta de Andalucía 2005, Ramsar 2013).
Everglades
Permanent ponds and pools; streams and artificial canals; sloughs; wet sawgrass prairies; cypress swamps; periodically flooded and non-flooded tree islands; non-flooded pinelands or pine rocklands; tropical hardwood hammocks; mangroves; coral reefs; seagrass fields; saltwater marshes (Junk 2006, Richardson 2010, UNEP 2012).
Volga Delta
Permanent saline/brackish/alkaline lakes, seasonal/intermittent freshwater lakes over 8 ha (includes floodplain lakes), permanent freshwater lakes (includes large oxbow lakes), permanent rivers/streams/creeks, permanent inland deltas (Ramsar 2013)

Table 3-9: Overall Numbers of Globally Threatened (i.e. vulnerable, endangered and critically endangered) Species in Various Taxonomic Groups at the Seven Sites of the GCA.Data source: Hoffmann et al. (2013), IUCN (2013), NHPF (2008); (n.a: not assessed)

Site	Plant	Fish	Amp.	Rep.	Mam.	Birds	Odon.	Total
Ahwar of Southern Iraq	n.a.	n.a.	0	1	4	12	1	17
Danube Delta	1	11	0	1	3	5	0	21
Djoudj National Bird Sanctuary	n.a.	n.a.	0	0	4	3	0	7
Doñana National Park	8	1	3	4	2	5	0	23
Everglades National Park	n.a.	5	0	3	2	4	0	14
Inner Niger Delta	n.a.	3	n.a.	0	3	6	n.a.	12
Okavang o Delta	7	2	0	0	7	7-8	0	24-25
Volga Delta	0	4	0	0	2	10[6]	n.a.	16

[1] Partially based on historical data and likely to be incomplete. [2] Not fully investigated – minimum number. [3] Majority are marine fish species. [4] Estimates of reported species. [5] Recent (post-reflooding) species numbers – historical (pre-drainage) number is 278 (Scott and Evans, 1994). [6] Including two vagrant species only recorded in the northern periphery of the biosphere reserve (NHPF, 2008).

3.2.2 The GCA for the Cultural Components

The key arguments for the outstanding universal value of the property under criteria (iii) and (v) are that the marshland resources and landscape played a primary role in the development of the cities and cultures in ancient southern Mesopotamia; that the remains of Uruk, Ur and Eridu testify to the outstanding contribution of southern Mesopotamian cities to the history of the Ancient Near East and mankind as a whole; and that they bear witness to the impact of the unstable deltaic landscape upon the rise and fall of large urban centers.

Early urban centres are known to exist in southern Mesopotamia and have been excavated and investigated to varying degrees. The sites of Uruk, Ur and Eridu, however, represent the most intensively investigated early urban sites and therefore the best documented. Other sites such as Al Ubaid, Lagash and Girsu, also key sites for understanding the prehistory and history of southern Mesopotamia, will not be taken in consideration in this context. Al Ubaid has been widely interpreted as a pre-urban centre but has not been sufficiently investigated. Cuneiform texts testify to the importance of Lagash in the Sumerian period but excavations have been limited and none of the archaeological structures found is visible any longer. Ancient Girsu (Tell Tello) was an important city of the state of Lagash, but it was poorly excavated and suffered illegal excavation. The remainder of southern Mesopotamian early urban sites (e.g. Umma) on the edges of the ancient marshes have not yet been sufficiently excavated or extensive looting has irremediably affected their integrity.

The comparative analysis will be developed at four levels, (1) considering first western and eastern Asian societies that developed in wetland environments or along major rivers more or less contemporarily to the Ubaid and Sumerian periods even if nowadays it is believed that evolution is polycentric; (2) specific cultures that developed in wetlands within arid environments spanning different periods and geographical areas; (3) the analysis of relict cultural landscapes affected by environmental and historical changes and of human settlements in deltas on the basis of properties inscribed on the World Heritage list; and (4) the emergence of monumental structures similar to the ziggurat, which is one of the iconic monuments of ancient Mesopotamian architecture, underrepresented in the World Heritage list.

One of the goals of the Government of Iraq in nominating the serial property for inscription is to fill several gaps in the World Heritage list. This is why properties already inscribed will be given priority for the comparison.

Cities in Northern Mesopotamia

The development of cities in southern and northern Mesopotamia was made possible by an ideal combination of circumstances, what some scholars name the "the synergistic caldron": availability of natural resources (as already mentioned in the various sections of this nomination) but also large areas of potential agricultural land, dense population and a

good transportation systems particularly fluvial. Recent research convincingly shows that in the 4th millennium urban life developed in Upper Mesopotamia parallel to Lower Mesopotamia.Howeverat present the interconnections between these two regions are still uncertain due to the methodological differences applied in field research and to problems in the diagnostic pottery chronology. So, even if the two systems started roughly at the same period, differences widened over time and southern Mesopotamia cities attained massive sizes especially in the late 4th and 3rd millennia.

Sites in Ancient Egypt

Since the prehistoric periods and later as a complex stratified society, ancient Egyptian culture emerged and developed through careful exploitation of the resources of the Nile. Ancient Egyptians expressed this relationship through a vast corpus of hieroglyphic and pictorial representations, sophisticated cultic practices, and religious architecture on an unprecedented grand scale. Several symbolic and material features testifying to this relationship have endured across time and space.

Ancient Egypt is already well represented on the World Heritage list, with three Pharaonic sites inscribed: Ancient Thebes with its Necropolis (Middle and New Kingdom), Memphis and its Necropolis (Old Kingdom), and Nubian Monuments from Abu Simbel and Philae. All these cultic ensembles were inscribed for their monumental value and intrinsic religious and political importance for Egyptian ancient civilization. Their nominations, however, do not envision them as embodying the immense legacy of Egyptian culture and its tight relation with the river, nor do they represent the development of urbanization on the same scale as evident in Uruk, Ur and Eridu.

Sites in the Indus Valley

The people of the ancient Indus Valley developed a sophisticated urban culture that spread along the banks of the Indus and Ghaggar-Hakra Rivers and their tributaries in modern Pakistan and neighbouring regions. Unfortunately, the ancient Indus script has not yet been deciphered, which considerably limits our knowledge of the historical and social processes within this region. Occupation in the Indus Valley is attested from the 8th millennium BCE but the emergence of urban centres in the Indus Valley is dated from the 2500 to 1800 BCE, so at least a millennium later than in southern Mesopotamia.

The remains of the vast city of Mohenjo Daro –built of mudbrick and fired bricks in the middle 3rd millennium BCE– in the Indus Valley are inscribed on the World Heritage list under criteria (ii) and (iii) but are presented strictly from the perspective of their monumental architectural and town planning values. The same holds true for the three other urban centres of the Indus Valley that are included on the Tentative List of Pakistan: the Archaeological Site of Harrapa under criteria (ii) and (iv), the Archaeological Site of Rehman Dheri under criteria (i) and (ii) and the Archaeological Site of Mehrgarh under criteria (iii) and (iv). Harrapa (3300-1300 BCE) is described as exhibiting an important interchange of human values however justification of the OUV under criterion (ii) is missing and the site is therefore difficult to compare with the proposed property. The

Archaeological Site of Rehman Dheri (3850-1900 BCE) is an exceptionally preserved example of the beginning of urbanisation in South Asia, but its brief description does not cast light on the interchange between urban development and environment. The description of the site of Mehrgarh (6500-2500 BCE) is similarly vague regarding the site's interchange of human values; nevertheless there is some discussion of the site's influence on the later mature Indus urban society. Mehrgarh was abandoned by the time of the emergence of the literate urbanised phase of Indus society, and therefore does not represent the actual emergence of urban centres (as in the case with Uruk, Ur and Eridu), but rather the contributions of pre-urban society.

Sites in Ancient China

Chinese civilization originated in various regional centers along both the Yellow River and the Yangtze River valleys in the Neolithic era, but the Yellow River is said to be the cradle of Chinese civilization.It is generally accepted that the earliest Chinese urban centres, which are believed to have developed the earliest Chinese writing system, developed around 1500 BCE during the Shang Dynasty, much later than in ancient Sumer.

The property most relevant to early urban communities in China is the archaeological site of Yin Xu, an ancient capital city of the late Shang Dynasty (1300-1046 BCE). This site testifies to the golden age of early Chinese culture, crafts and sciences; a time of great prosperity during the Chinese Bronze Age.Inscribed on the World Heritage List under Criteria (ii), (iii), (iv) and (vi), this site is not, however, inscribed as an example of the urbanisation process but as containing prototypes of architectural and artistic innovations that characterize the later urban culture of the Shang Dynasty.

Another relevant Chinese cultural property is the Liangzhu Archaeological Site (3300 to 2300 BCE), which represents an early agricultural society associated with an extensive wetlands system. It was placed on the Tentative List of China under criteria (ii), (iv) and (vi). The value of this property under Criterion (ii) is in its far-reaching and long-lasting significance for the initial and early stages of Chinese civilization, as the growth of agricultural communities in the Yellow River and Yangtze River basins initiated a 5000-year development in Chinese culture. Despite the obvious importance of this property, it is not clear from the nomination documents what role it played in the development of urban China. Moreover, the property includes a single cultural site and is therefore unlikely to represent the full repertoire of early Chinese urban culture. While it offers a good comparison for the proposed property, it is included on the Tentative List under Criteria (ii), (iv) and (vi) and not Criterion (iii). Nevertheless, Liangzhu highlights the important relationship of early urban societies with a favourable (or fertile) environment; at Liangzhu the local communities' exploitation of the marshlands of the Yangtze River led to sufficient growth in agricultural production to initiate the development of a more complex society and eventually the first urban culture of China.

Tiwanaku culture

The Tiwanaku culture, inscribed on the World Heritage list under Criteria (iii) and (iv), flourished in the Bolivian Andes between 300 and 1000 CE by developing irrigated agriculture, and is recognized as one of the most important precursors of the Inca Empire. It was a complex, yet not literate, society with urban centres surrounded by agricultural settlements. Although the proximity of Lake Titicaca (with is on the Tentative List of Bolivia) for the development of the Tiwanaku culture is well attested, the regional ensemble concerned was placed on the Tentative List on the basis of OUVs which do not emphasize this relationship.

Olmec culture

This first complex pre-Columbian culture developed in modern Mexico between 1600/1500 BCE and c. 400 BCE in the Coatzacoalcos River basin. Because of the wetland environment that allowed the development of agricultural activities, the area is compared with Mesopotamia, the Indus and Egypt, but the major centres were ceremonial and people lived in villages. Also, the societal and political structure of the Olmec society is little known.

Some relict cultural landscape inscribed on the World Heritage list may also offer some analogies with the nominated property. These are:

Mapungubwe Cultural Landscape in South Africa where the first indigenous kingdom in southern Africa developed between 900 and 1300 CE at the confluence of two major rivers. For its position, it controlled trade through the East African ports to India and China. The favourable environmental conditions that allowed agricultural development and, consequently, sustainability shifted to cooler temperatures and a decrease of rainfall that caused the dispersion of the inhabitants. Under Criterion (v), the property illustrates the impact of climate change on the decline of the Kingdom of Mapungubwe.

Ecosystem and Relict Cultural Landscape of Lopé-Okanda in Gabon is inscribed as an unusual interface between dense and well-conserved tropical rainforest and relict savannah environments. Occupation is almost uninterrupted since 400,000 years, from the Palaeolithic to the present. The property is situated on the migration route of Bantu and other population along the River Ogooué valley from West Africa to central east and southern Africa and is therefore significant for the whole of sub-Saharan Africa. The Iron Age sites in the savannah and the forest are evidences for an early transformation of the environment by human communities. Parts of the property represent a relict landscape predating important environmental changes that took place during the Holocene. The cultural value of this mixed site is recognised under Criteria (iii) and (iv).

Saloum Deltain Senegal where shellfish gathering and fishing practices were developed,here and w128 shell mounds, some used as tumuli, and dating from the 4thto the 16th century CE are on the inscribed property, creating an exceptional cultural landscape in a delta.

The **Willandra Lakes Region** in Australia (New South Wales) is a unique landmark in the history of human evolution. Inscribed as a mixed property, it contains a relict lake system from the Pleistocene. The undisturbed stratigraphy has revealed evidence of *Homo sapiens sapiens* in this area from nearly 50,000 years BP, including the earliest known cremation, fossil trackways, early use of grindstone technology and the exploitation of fresh water resources, all of which provide an exceptional testimony to human development during the Pleistocene period, and of interaction between human culture and the changing natural environment.

Except for the Saloum Delta, all the above relict cultural landscapes illustrate in remarkable ways the impact of environmental change on human cultures over a very wide time frame.

It should be noted that the relict cultural landscape of the **Ancient Villages of Northern Syria**, a testimony of a later culture (Byzantine) that developed on a rural scale, is the only property inscribed under this sub-category in the Arab states.

All three nominated cultural components are dominated by at least one ziggurat (two in the case of Uruk). This iconic structure of the monumental Mesopotamian architecture (most probably developed from an earlier form of a temple on a terrace) was common in a number of major ancient cities of northern and southern Mesopotamia and it is still a well identifiable landmark in some archaeological sites of Iraq as in Dur Kurilgalzu, Borsippa, Ashur (on the World Heritage list) and Nimrud. In the context of this nomination and with the goal to fill gaps in the World Heritage list, only the two zigguratswhich are included as parts of a World Heritage property will be taken in consideration.

Tchogha Zanbil

The ancient city of Dur Untash was founded as a religious capital in the Elamite period during the first half of the 13th century BCE in south-west Iran but one century later the religious power shifted already to Susa. The ziggurat dedicated to the Sumerian god Inshushinak was composed of four storeys built one into the other (and not on top of one another as in southern Mesopotamia). The access was made by an internal staircase invisible from the outside. At present only two floors are visible with a high of 25m.

Ashur

This ancient Assyrian capital and religious centre is located in northern Iraq on the Tigris River. It dates from the 3rd millennium BCE and was occupied until the Parthian period. The ziggurat was associated to the Esharra, the temple dedicated to the god Ashur. In its last phase it probably dates to the Neo-Assyrian period in the 7th century. Its typology is different from the southern Iraq ziggurat: it was joining the temple and the access was probably made from the roof of the temple itself.

It is clear from the above that the four ziggurats of Uruk, Ur and Eridu represent an earlier example as they were all built during the Third Dynasty of Ur. Eridu is the oldest known example of this type of building. The ziggurats included in the proposed are also examples of a third construction typology of the ziggurat typical of southern Mesopotamia where the terraces where superposed and a temple was built at the top.

Filling the Gaps

The Government of Iraq is submitting this property for inscription in recognition of gaps in the World Heritage list, as outlined in ICOMOS documentation. In 2002, only 9% of all sites on the World Heritage list were located in Arab states, a trend which has not changed since that date and is unlikely to change rapidly as Arab states are also those with the least number of properties on their national Tentative Lists. In order to ensure a more representative, balanced and credible World Heritage List, *The World Heritage List: Filling the Gaps – An Action Plan for the Future* prepared by ICOMOS (2004) presented a tripartite structural analysis of existing strengths and weaknesses on the World Heritage list.

Chronological Gaps: *WHL Filling the Gaps* (p. 68) highlights the complete absence of Sumerian city states on the World Heritage list. The ancient Near East is often seen as the cradle of humanity, yet many of the major cultures and empires of the ancient world remain under-represented on the list. For example, ancient Mesopotamia is currently represented by only one property, Ashur, the first capital of the Assyrian empire, which was inscribed in emergency in 2004 and is still on the World Heritage List in Danger.

Thematic Gaps: *WHL Filling the Gaps* (Part C) also proposes a thematic framework that represents a concise list of issues considered to have universality, in that they potentially apply to all humanity. While "Religious and Commemorative Architecture" is well-represented under the "Creative Responses and Continuity" theme, no property representing the distinctly southern Mesopotamian ziggurat is on the World Heritage list. Several pyramids, obelisks, minarets and belfries are represented. The proposed property will be the first representing the ziggurat and the development of this architectural form in three locations (Uruk, Ur and Eridu).

Although "Ancient and Indigenous Belief Systems" is the second most-common form of property within the "Spiritual Responses" theme, the ancient and indigenous belief systems of the "Ancient Middle East and Egypt" (p. 77; Section III.A.1) is under-represented with only seven properties on the World Heritage list: two in Egypt (Memphis and Thebes), one in Sudan (Gebel Barkal), one in Oman (Bat), two in Iran (Tahkt-e Soleyman and TchoghaZanbil) and one in Iraq (Ashur).

Typological Gaps: *WHL Filling the Gaps* (Annex 1a, Fig. 6A, p. 57) also indicates that, for the Arab states, only two cultural landscapes are present on the World Heritage list in Lebanon (Qadisha Valley) and in Syria (Ancient Villages of Northern Syria), the second one placed on the List in Danger in 2013.

Implications of the Comparative Analysis

The comparative analysis has revealed a general absence of comparable properties with regard to many of the cultural attributes of the proposed property. The World Heritage list and the Tentative Lists maintained by States Party contain no other property representative of southern Mesopotamian cultures, nor any property representative of the early urbanisation process in the ancient Near East; these lists contain only a small number of relict cultural landscapes and, for the Arab states, no property associated with major civilizational developments of bearing for humanity as a whole; no property on these lists represents the distinctively Mesopotamian architectural form of the ziggurat; and only one site in Iraq (Ashur) is representative of the ancient and indigenous belief systems of ancient Mesopotamia.

Conclusion

The *Ahwar of Southern Iraq and the Relict Landscape of the Mesopotamian Cities* property is a unique representation of the urbanization process and development of social complexity within the ancient Near East and indeed the world. An important advantage of the three cultural components of the property is that taken together they bear witness to the full repertoire of developments associated with the urbanization process at a time of important change in human history. This process is not as well documented for other regions of the world or took place at a later stage.

There is currently no property on the World Heritage list or Tentative Lists with OUVs directly comparable to *The Ahwar of Southern Iraq and the Relict Landscape of the Mesopotamian Cities* under criteria (iii) and (v). While a number of wetland and properties associated with water management systems are present on these lists, they are either not listed under relevant criteria that emphasis the relationship between man and the environment, or the time range, the social complexity and nature of the management system and exploitation of natural resources differs considerably. Inscription of the proposed property on the World Heritage list will bear testimony to the economic and symbolic role of the wetland resources and landscape for the cultures of ancient southern Mesopotamia and to the impact of the unstable deltaic landscape upon the rise and fall of their large urban centers.

Therefore, the proposed property will allow a better representativity of the sub-category of relict cultural landscape -- currently under-represented in the World Heritage list within the overarching category of cultural landscapes – and will further add two specific aspects so far not represented under this sub-category: the influence of environmental and ecological change on the urban cultures of the Ancient Near East,and the unique combination of a mixed property where the values of the natural components under criteria (ix) and (x) allow for understand and visually reconstructing the ancient landscape of the cultural components as proposed under criterion (v).

3.3 Proposed Statement of Outstanding Universal Value

The Ahwar of Southern Iraq and the Relict Landscape of the Mesopotamian Cities is a serial mixed property for natural and cultural heritage. It comprises seven components, four of which are natural and three cultural. The natural components embrace significant cultural values as well. The property extends through the four governorates of Al Basrah, Maysan, Dhi Qar and Al Muthanna within the deltaic alluvial plain of the Tigris and Euphrates over a total area of 210,898.91 ha. An additional 207,643.04 ha are proposed for inclusion in the buffer zone. The sea level variation and the climatic changes in southern Iraq over the past 7,000 years played a significant role in influencing the geographical location of the Ahwar (or marshlands) which moved southeastward some 4,000 years ago.

The archaeological sites of Uruk, Ur and Eridu, which form the three cultural components of the property, were originally situated within the marshy landscape of the deltaic plan. Between the 4th and 3rd millennia BCE, they developed into some of the most significant urban centers of southern Mesopotamia and saw the origin of writing, monumental architecture, and complex technologies and societies. Their remains offer a complete testimony to the growth and achievements of southern Mesopotamia urban centers and societies, and to their outstanding contribution to the history of the Ancient NearEast and mankind as a whole. Topographical and architectural elements, together with archaeological evidence and an important corpus of cuneiform texts, document the economic and symbolic role of the wetland resources and landscape for the cultures of ancient southern Mesopotamia. The regression of the Gulf and the shifting of the marshes' location contributed to the decline of these cities. Today the mudbrick ruins of Uruk, Ur and Eridu are dominated by the remains of ziggurats towering above the arid but striking landscape of the desiccated plain as testimonies of the antiquity and achievements of southern Mesopotamian cultures and of the impact of the unstable deltaic landscape upon the rise and fall of their large urban centers.

The natural components of the property are the Ahwar or Marshlands of southern Iraq as we know them today and which were formed around 3,000 years ago. Fed by the branches of the Tigris and Euphrates, in addition to extremely low winter rainfall and subsequent floods, the Huwaizah, Central, East and West Hammar Marshes constitute the four natural components of the property. The Ahwar are one of the world's most important freshwater ecosystems situated within an extremely arid environment with some of the highest evaporation and transpiration levels, and some of the lowest levels of rainfall. They can be considered a "wetland island in a vast ocean of desert". The Ahwar embrace a mosaic of habitats critical for a significant number of taxa, including globally threatened and range-restricted species and isolated populations, thus creating a site of global caliber in terms of species of conservation priority. The grand mosaic of the four natural components of the property is an exceptional example of ongoing ecological and biological processes in the development and adaptation of terrestrial, fresh and salt water ecosystems and communities of various taxa of an endemic and restricted range nature. The Ahwar are a vast habitat and refuge for many of the viable populations of taxa of high biodiversity and conservation, particularly bird and fish species. Furthermore, they comprise the last

stopover area for millions of migrating birds before entering the vast Arabian Desert. This testifies to the paramount importance of the Ahwar for biodiversity conservation. Their unique hydrological system is in itself an outstanding natural phenomenon, representing a wetland that fluctuates in size in a seasonal manner. The Ahwar have developed an amazing ecological resilience, particularly after their drastic destruction during the second half of the last century and their re-flooding at the beginning of the new millennium. Furthermore, the property contains highly important and significant habitats for in-situ conservation of biological diversity, including those containing threatened species of high conservation and scientific importance.

On the basis of these qualities, the State Party proposes to inscribe the property under criteria (iii), (v), (ix), and (x).

Eridu, Uruk and Ur are protected under the Iraqi Law of Antiquities and Heritage designated as archaeological sites, and management plans ensuring the continuous protection and conservation of their outstanding universal values will be implemented as of 2014. All their major archaeological and architectural features are contained within the boundaries of the property, ensuring that each component part bears a complete significance and contributes to expressing the outstanding universal value of the property as a whole. Considering the particulars of mudbrick architecture, the conditions of integrity and authenticity as regards the material and substance are considered to be met by the visible presence of a series of emblematic public buildings in the three cultural components of the property. Authenticity in form and design is also well retained in its relations to the urban layout. As regards location and setting, and considering that the marshes moved southeastward through space and time, the conditions of authenticity are considered to be met by including in the property the ancient cities of Ur, Uruk and Eridu in conjunction with the Huwaizah, Central, East Hammar and West Hammar Marshes. These bear highly significant ecological and scientific values and, as such, offer the closest living representation of the conditions in which the earliest and longest-lived cities formed in alluvial Mesopotamia.

The four natural components of the property and their associated corridors and buffer zones are of sufficient size to adequately support all key natural values including the ongoing ecological and biological processes occurring in its terrestrial, water and marshland ecosystems. Two of the four natural components have an existing legal designation. Existing legal frameworks in relationship to the Ahwar are well developed with the national nature conservation bylaw endorsement by the government cabinet. The maintenance and improvement of the conservation status of the Ahwar is of high national priority, and the conservation measures (both in place and in preparation) are all geared towards the maintenance and promotion of the outstanding universal value. The key factors addressed in the legal and management frameworks for the four natural components of the property are related to fluctuating water quality and quantity, illegal hunting and fishing, harvesting of vegetation cover, and oil extraction. The evaluation of such challenges is undertaken by the Ministry of Environment and other national and international partner organizations, and has currently revealed that such constraints are of limited impact on the key natural heritage values and attributes.

Chapter 4:

State of Conservation

4.a State of Conservation of the Property

State of Conservation of the Natural Components of the Property

The Rationale for the Size and Boundaries of the Natural Components

Historically, the size of the Ahwar was estimated to be within the range of 1,000,000 to 1,500,000ha. The baseline used to identify the area is the 1973 surface area benchmark defined by the government of Iraq as the target for the long term restoration of the Ahwar. The 1973 benchmark was used because it was the earliest scientific record officially documented before the start of the drastic deterioration of the Ahwarin the 1980s and beyond. The size of the Ahwarat that time was estimated to be around 835,000ha. After a comprehensive review and scenario building by the Government of Iraq and its international partners during the period from 2004 to 2006, the anticipated goal adopted for the Ahwarrestoration was to achieve 75% of the 1973 reference point, hence totaling around 556,000ha of restored areas by the end of the current decade.

The size of the property proposed for World Heritage nomination is 210,899ha supported by a buffer zone of 207,643ha. The size of the property and its buffer zone represent the majority of the area targeted for the maximum restoration of the Ahwar. It is important to note that by the year 2000, the total area of the Ahwarwas less than 10% of the 1973 target. The design of the property was fundamentally based on the national target area, fully coinciding with the protection and sustainability of the majority of the natural values historically known for the Ahwar.

More specifically, the design of the boundaries of the four natural components of the property was based on the following principles:

i. To include the majority of the natural values and attributes associated with its global importance.
ii. To illustrate the best sites which provide optimal habitats needed to achieve the ecological and biological requirements of all key species and their conservation.
iii. To achieve the complementary function of each of the components to the wider serial nomination.
iv. To cover all areas targeted by the national environmental and nature conservation strategies.
v. To avoid, whenever possible, overlap with existing or planned human induced pressures such as oil prospecting, provided that it does not comprise areas of particular importance for the key natural values and attributes.

The boundary design of the property, as well as the buffer zone, was based on extensive field assessments and previously established mappings of the whole of the Ahwarachieved through the key international initiatives that have been implemented since 2004. Clear and simple boundary lines were developed using physical landmarks such as roads and rivers. The stripe of the buffer zone was designed around the main area of the property in order to

ensure better and continuous protection for the property, mainly from existing land uses and possible future developments.

The only remaining task related to the design of the buffer zone is to establish its function to maintain the ecological connectivity through effective ecological corridors. It is well established that the four natural components of the property represent four standalone hydrological systems functioning fully independently from each other. The same could not be stated for the ecological interdependence and interrelatedness. To address this issue, a process has been started by the Ministry of Environment and its partners to finalize the design of the buffer zone in order to ensure the identification and establishment, as well legal endorsement, of a set of ecological corridors ensuring the ecological connectivity of the serial property. The study is expected to be finalized by mid-year 2014 and will be presented to the World Heritage Committee and its advisory bodies as a separate addendum to the dossier.

Integrity of the Natural Values

The Ahwar of southern Iraq are home to large numbers of species of birds, mammals and fishes of global importance, some of which are endemic. There are millions of wintering and passage birds, in addition to the resident species that use the property during the migration season. The Ahwarprovide optimal natural conditions for the breeding of many of these birds and mammals, with particular utilization occurring in the extensive reed beds. The vast majority of the habitats and species are in good and viable condition, especially after ten years of restoration which began in 2003 after a long period of deterioration due to water management actions that occurred mostly during the last quarter of the twentieth century.

The habitats of the Ahwarvary from large areas of open water to lush reed thickets to diverse dry banks and tidal areas, all connected in a continuous spectrum of contiguous habitats and ecosystems. These habitats witness highly dynamic processes of interaction among their associated physical and biological components and across the mosaic-like ecosystems. The presence of people on the peripheries of the four natural components is usually integral to such processes and does not represent a major concern for the viability of their populations.

Although a bit variable across the four natural components, the integrity of the ecosystems and their associated biodiversity is considered high overall, in fact, a very important characteristic is shown in the complementary effect each of the four components has on the others individually and on the property as a whole. The extensive size of the four components allows habitats to remain in their natural status and species in their viable populations, and provides strong grounds for the resilience of the ecosystems against external factors that may have a negative effect.

The current conditions of key species of birds and fishes are dependent on their ability to withdraw to ecological refuges during periods of low water availability or fluctuating levels of water quality, or even at times when a particular human induced pressure is exerted in a

certain locality - historically, they have quickly relocated themselves to abandoned areas soon after a pressure factor is eliminated. This fluctuating, or even vibrant, nature of the Ahwarrepresents a key attribute of its ability to survive in spite of the severe drainage of the previous decades, while at the same time, triggering the adaptive capability of the flora and fauna to survive in harsh conditions and flourish in unexpected areas.

State of Conservation of the Cultural Components

Buildings in southern Mesopotamia were generally of mud brick, and are thus rarely well preserved. The use of mud also creates specific conservation conditions. Bricks hardened by fire and at times glazing were more resistant to erosion and reserved for religious and royal buildings. Even in such monuments fired bricks were generally used as outer layers covering core structures made of mud brick as was systematically the case with the ziggurats. Another technique to extend the life of fired bricks was to use bitumen and gypsum as mortar. Such building materials required regular maintenance against climatic and environmental hazards, particularly rain, floods and dust storms. The toll which the passing of time took on the abandoned southern Mesopotamian cities is heavier than in the case of stone or fired brick architecture found in other regions of the ancient world. Furthermore, well into the 20thcentury, archaeological practices were destructive and sites situated in remote desert areas were largely unprotected. Finally, many of the previously accepted conservation approaches proved to be damaging especially for mud architecture.

In Uruk, Ur and Eridu usually only the foundations of buildings are today discernible. Architectural remains were found in many superimposed strata and early excavations blurred layers. Many buildings have been completely reburied under the sand after being excavated. Notable exceptions are remains of the four ziggurats included in the property, which still stand relatively high above the sites, together with some temples and the Royal Tombs at Ur which have been the objects of conservation intervention.

In Ur, John G. Taylor, who excavated in 1853-54, destroyed information and exposed the tell. Natives used the now loosened bricks and tiles for construction for the next seventy-five years while the site lay unexplored and unprotected. During the excavations conducted by Leonard Woolley between 1922 and 1934, and according to the standard methods of the time, concrete was laid on top of the walls of the E-dub-lal-mah to protect them from natural phenomena. This affected the walls' stability in the longer term. A wooden buttress was set to buckle the walls of the tomb of Shlugi and ensure their stability. It is still in place. After 1934, the site was neglected for several years and recovered by sand dunes. Most of the monuments were buried, their walls and roofs eroded because they were left exposed to heavy rain, strong winds, visitors damage and looting. No restoration, reinforcement or protection measures were undertaken until 1960. In the early 1960s, the Iraqi Department of Antiquities rebuilt part of the outer shell of the ziggurat and the three staircases using locally made fired bricks, tar, reed-mats between layers, and limited amounts of cement to lay the bricks. These interventions did not touch the original structure and shape of the monument although they have affected it in the longer run since the shell prevents the proper drainage of the core structure thus contributing to its erosion. Still in the 1960s,

mud brick, tar and a limited amount of cement were used to rebuild the lower part of the walls of the palace of Ur-Nammu and Shulgi. As was the standard practice at the time, cement was also used to ensure the stability of the E-dub-lal-mah and the Royal Tombs. More recent conservation work has been done using compatible material as much as possible. One exception is the so-called House of Abraham: in the early 2000s, walls were reconstructed in fired bricks capped with cement.

In Uruk, the two ziggurats and the Inanna, Mosaic and Square Temples were the objects of very limited conservation intervention by German archaeological teams and the State Board of Antiquities and Heritage. No incompatible material was used.

Eridu was allowed to be reburied under the sand after the excavations conducted in 1946-49 by the then Directorate General of Antiquities and no conservation was undertaken.

The sites recently excavated in the marsh components of the property are well conserved and not yet affected by erosion.

Structural Issues Requiring Priority Intervention

In Ur, 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 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.

In Uruk, the Mosaic Temple requires consolidation due to missing bricks and mosaic cones whereas the Anu ziggurat displays limited cracks. Conservation interventionsare 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.

4.b Factors Affecting the Property

A. Factors affecting the Integrity of the Natural Components

Today, the Ahwarstill face the challenge of occasional water shortages, often leading to a temporary imbalance in the ecological processes as well as an acute decline in biological diversity. However, such factors and root causes of such constraints are fully addressed in the management frameworks being adopted for the natural components, as well as the whole basin, with the aim to ensure long term and effective management of the property, safeguarding its values and attributes critical for its World Heritage status.

The topic of effective water management is always a primary component of management plans as it signifies the foundation for ecological processes and diversity. It was in 2003 that this integrated management program was initiated with the attempt to restore the majority of the Ahwarand optimize their potential for ecosystem and biodiversity conservation. This integrated approach was adopted by the various government agencies and interest groups with a unified vision of a rehabilitated Ahwarsustainably managed for biodiversity conservation and local development. Some of the key management interventions put in place include water control facilities on the inlets and outlets of the Ahwarand a clear quantitative target for reflooding. The target today is to restore 75% of the original Ahwararea as compared to the 1973 baseline.

The assurance of effective water resource management would entail that the Ahwarreceive the sufficient quantities of water that are minimally needed for the well-being of the ecosystems and species. This is being carried out by various stakeholders' agreements to allocate adequate amounts of water stemming from the rivers of Tigris and Euphrates. Other primary actions are the effective use of the Main Outfall Drain which was established in 2009, as well as a soil embankment on the Euphrates. The latter two actions were of significant importance to the restoration and maintenance of the Central Marshes and West Hammar Marshes.

The pressure of anthropic activities and seasonal fluctuations on the Ahwarvaries across the four components. Some of the local population is directly dependent on the natural resources offered by the property nevertheless human use has never reached threatening levels, even during the periods of water shortage. This is due to the relatively limited number of local people living inside and around the Ahwar, in addition to the extensive size of the Ahwar. In fact, there are no permanent residents living in the Huwaizah component. The existing and proposed management arrangements of the property focus on organizing and controlling the human activities inside the Ahwaras well as in their peripheries.

Further, agriculture activities rarely take place within the Ahwar, mostly occurring outside the natural components. These local agricultural activities have a low impact on the components. Nonetheless, agriculture drainage water is one of the factors considered in the management planning of the sites as it affects water quality, and consequently would have

diverse effects on the property's biodiversity if not properly addressed and maintained. The management of the agricultural drainage systems is a key intervention and aims to maintain effective drainage at all times. There is no trend for any agricultural expansion within the Ahwar, in fact, evidence has been collected that agriculture activities in the property are declining overall.

Pollution of various kinds and sources further presents a challenge to the Ahwarwater quality, habitats and species. This includes sewage water from areas which are still using traditional waste disposal mechanisms (e.g. household septic tanks). Domestic solid waste exerts an additional threat to biodiversity and water quality, especially in areas adjacent to main human settlements and aggregations. Agricultural pollution is not a great impact considering the size of the farmed lands within and immediately surrounding the property, and due to limited advancement of technology and chemicals used for farming activities. The issue of pollution is integral to the management interventions planned for the Ahwarby the various government agencies involved, including the Ministry of Agriculture and the Ministry of Water Resources.

The Ahwarpresently receive low numbers of visitors. Limited groups of journalists, students and researchers arrive to the property in coordination with the management authorities. Ecotourism development, however, represents one of the key activities put under future monitoring as it has a great potential for improvement and development, especially in light of the increasing international recognition and improvement of the management conditions. However, tourism does not presently pose a threat to the Ahwar.

Other factors posing a potential threat are fishing and game hunting however these occur at varying intensities and localities. Fishing in the arshes mainly uses traditional techniques. However, some of the most traditional ones have virtually disappeared, such as the famous spear fishing (*faleh*) which started being used some 3,000-4,000 years ago. As for game bird hunting, it represents a more serious challenge to biodiversity, especially during migration seasons. Various techniques are employed including fire guns and netting. In response, the governmental authorities have adopted hunting and fishing control mechanisms coinciding with programs that promote awareness-raising within local communities and advocate the achievement of stronger local and national support to the conservation of the property. Some of the key management interventions in this regard include the establishment and involvement of fishing, community-based organizations, local leaders and media in the implementation of respective programs and activities.

Further, it is well established that when overfishing takes place, the impact of such an activity goes beyond the direct effect on the fish species involved to its bird and mammal predators as well. A set of management measures in the new management plans address such a problem in an integrated approach, hence adopting solutions which focus on the root causes while exploring alternatives for local communities to ensure sustainability.

The issue of habitat destruction often has specific impacts on key species. A good example is the reed harvesting activity undertaken by local communities which has proven to have a direct negative impact on the Basra Reed Warbler. The management actions taken in

response are to control the reed harvesting in terms of location as well as technique (e.g. the height of the harvested reed, diameter of reed stems, water depth, etc.). The strategy is to provide alternative harvesting areas away from all breeding sites and seasons.

The issue of oil exploration and extraction has always been the center of concern and attention to national and international conservation agencies. Nonetheless, the property boundaries have no existing or planned oil related activities, eliminating the direct impact of such potentially harmful activities from the four components. Specifically, the delineation of the property was done such that existing oil and gas operations will not take place within the property. The buffer zone provides some flexibility to also prevent effects in the future of oil and gas operations outside the property.

The declaration of the Central Marshes as a national park by the Councilof Ministers, with the creation of its management plan, represents a pioneering step towards the completion of a legal system covering all the property components. The recognition of the Huwaizah Marshes as a Ramsar Site is also of key importance to enhance national commitment and action towards the effective management of the property. The Ministry of Environment is currently preparing to designate the Huwaizah, East and West Hammar Marshes as protected areas starting in 2014 so they will also receive legal protection. The Ministry of Environment is also currently working to designate the Central Marshes, the East and West Hammar Marshes as Ramsar Sites in 2013-2014.

The factors affecting the Ahwarpresented above are the key elements affecting the status of conservation of the natural values and attributes of the property. It is in the current plan of the Ministry of Environment to adopt a basin-wide strategic framework which addresses the whole of the Ahwaras one continuous ecological system. The plan will be legally recognized starting in 2014 and will represent overarching strategic direction for the four separate components. This plan will coincide with the process of the nomination of the property for the World Heritage list.

The Ahwarface a number of pressures and threats affecting their outstanding universal values, however, threat levels are variable according to the type of pressure and its locality. Most existing factors are within manageable range. The management plan of the property is fully value-oriented and has been developed to fully address and safeguard the values and attributes related to criteria (ix) and (x).

The following table summarizes the key factors influencing the property:

Table 4-1: Key Documented Threats to the Ahwar

- 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 components individually:

The Huwaizah Marshes Component

- 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 property.
    - 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 1980s and 1990s, 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 component; 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 component, hence the impact on the Marsh is limited.
    - Mining: there are no mining activities within the Huwaizah component; however, to the south of its boundaries exists the Majnun oil field. It has been ratified that this activity has no impact on the Huwaizah component, 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 component.

- Pressures on the Natural Environment:
    - Water Pollution: the Huwaizah component 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 Huwaizahcomponent does not suffer from any indicators of desertification.
    - Hunting and Fishing:
        - Fishing: fishing is a very common activity in the Huwaizah component, 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 components 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 component 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 Component

- Development Pressures:

- Infrastructure Development: this factor does not represent a high concern to the property 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 property. Generally speaking, most of the settlements lie within the center of Ach Chibayish. The master plan of this administrative region does not overlap with the Central Marshes property 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 property 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 component. A good example of this is the Euphrates soil dam which contributes significantly to feeding waters into the southern parts of the component.
  - 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 component (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 property as Al Qurna oil field, but the delineation is such that the activities pose no threat to the property. 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 property.

- 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 components. 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 component 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 property for cattle consumption as fresh fodder. The latter form is dominant in shallow areas on the peripheries of the component 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 AchChibayish. 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 Component

- 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 components, 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 component 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 Ash Shafi and Al Mashab Rivers. Overall, this issue is not of high concern.
    - Mining: all mining and extracting activities are outside the component, however, some major oil extraction industry is taking place to the south of the property 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 components however some water contamination is caused by sewage water from the Shatt Al Arab settlement. Further, the waters received from the 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 natural components. Current fishing levels are not sustainable as they affect numbers of species and their distribution within the component. 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 component, and its resilience to impact must be considered when compared to the other components.

- 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 component. The Ma'adan uses both forms of grazing; free grazing within the Ahwar, and cut and carry of the reeds. This factor is concentrated on the peripheries of the property or within areas of limited water depth.
- Invasive and Exotic Species: the case here is similar to other components, 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 component.

The West Hammar Marshes Component

- 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 property and rarely inside it. There is a potential that such settlements could expand toward the property 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 property however they are mostly in the buffer zone and are not considered a major threat to the property.
    - 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 component 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 Karmasheah and Umm Nakhlah. 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 components.
    - 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 natural components. 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 Ahwarwith little consciousness or awareness of their potential impacts. Game hunting is the highest in West Hammar as compared to the other components. 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.

B. Factors affecting the Integrity of the Cultural Components

Development Pressures

On the archaeological site of Ur, electrical poles and wires run along the paved road from the site main entrance to the foot of the ziggurat. It is planned to bury the wires. 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 of the property is surrounded by villages and agricultural lands belonging to local tribes to the north and west, and by a military base and AlMakir 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.

The archeological site of Uruk is also 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.

Tell Eridu is only accessible through a 10 km dirt road and otherwise surrounded by the desert. Except for a metal observation tower errected 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.

As regards archaeological mounds in the natural components of the property, there is no development pressure affecting the recently excavated sites nor those only surveyed as the property is mostly uninhabited.

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 all the historic remains included in the property.

The five sites recently excavated in the natural components of the property face specific conservation issues. Until recently, they were protected from erosion by the marsh waters that covered them. Excavated areas left uncovered are affected by rain and dust/sand blown by the wind. Besides causing erosion, the sand also buries recent excavations. Temporary protective measures were undertaken by covering excavation sites with thick plastic sheet held in place with sand. Notably, if the waters of the marshes seem to have generally played a protective role for archaeological mounds, the glaze found at Abu Rabab displays defects (cracks and blackening) likely caused by a prolonged stay in the water.

One additional potential pressure to these sites is seasonal floods and permanent reflooding. The approach adopted by the State Board of Antiquities and Heritage is that, in the prospect of a reflooding of the area, rescue excavation at a significant number of sites, together with ground survey of the surrounding landscape, will need to be completed within the next five years to yield enough scientific data allowing for a comprehensive understanding of the history of human settlement in the contemporary marshlands.

Natural Disasters and Risk Preparedness

According to information provided by the Iraqi Seismic Institute, all the component parts of the property are situated outside the seismic zone. As regards specifically Uruk, Ur and Eridu, they are today very distant from any water source that may cause major flood.

Responsible Visitation

At the time of the nomination, Ur is the only archaeological site in the property that receives any 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 and Uruk 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.

At Uruk, even less visitors are currently recorded and there is no visitor facility which will have to be developed together with a visitor management plan.

As regards Eridu and the archaeological sites in the natural components of the property, where visitation levels are insignificant, 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.

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. Uruk will constitute a possible extension with more limited, yet available, interpretation. Access to Eridu and the archaeological sites in the marshes will be reserved for a highly specialized public, for example, as regards marsh sites, as part of tours highlighting the natural values of the property.

Number of inhabitants within the property and buffer zone

In Uruk and Ur, the only inhabitants on the property are the wardens and their families. There are no inhabitants in the buffer zones. Eridu is totally uninhabited. None of the archaeological tells in the marsh components of the property are inhabited permanently, although some are seasonally used by fishermen and their families.

Legislative Frameworks and Strategies Related to the Property

The Natural Components

Several laws, bylaws, regulations and strategies, both in effect and planned,are of relevance for the Ahwar. A primary legislation is the Protected Areas Bylaw currently under cabinet endorsement. The Bylaw aims to conserve the biodiversity values all over Iraq while at the same time minimizing the impacts of pressures and threats.

Table 4-2: Legislative Frameworks Relevant to the Natural Components of the Property

Pressure Category	Legislative Framework	Relevance of the Framework to the Ahwar
Development Pressures		
Urban expansion	The Environmental Protection and Improvement Law No. 27 of 2009 – Chapter 4, Branch 4: Land Protection	The protection of land from urban expansion or any other land use
Modification of natural systems	The National Environmental Biodiversity Strategy and Action Plan(NESAP) – Strategic Objective: the protection and improvement of water quality of the Ahwar	The protection of freshwater sources and quality for the Ahwar
Agricultural expansion	Draft Protected Areas Bylaw – Section 12 and 13 of Article 9	Assurance of the prevention of land use change or practice of

		unauthorized agricultural activity within the Ahwarboundaries
Mining and extractive industries	The Environment Law No. 37 of 2008 – sections: Environmental pollution, EIA, and Biodiversity	The protection and improvement of the natural resources, biodiversity and protected areas along with securing sustainable development
	The Environmental Protection and Improvement Law no 27 of 2009 – section 7: the protection of the environment from the impacts of pollution caused by mining for oil and natural gas resources	The minimization of impacts caused by the exploration and mining of fuel resources with the aim to protect land and habitats
	The National Environmental Strategy Action Plan (NESAP) S – section: reduction of oil pollution	The protection of water resources form the oil extraction processes
	The draft Protected Areas Bylaw – section 12 and 13 of article 9	The assurance of prohibition of changing the land use or practice of any unauthorized activity within the Ahwarboundaries
Pressures on the Natural Environment		
Pollution	The Environment Law no 37 of 2008 – (articles: environmental pollution, pollution, the environmental impact and the biodiversity)	The protection and improvement of the natural resources and biodiversity and protected areas along with fostering sustainable development
	The Law of Environmental Protection and Improvement no 27 of 2009 – Chapter 2 water protection from pollution	The protection of surface water resources through measures preventing the disposal of all pollutants
	The Water Resources Protection Bylaw No. 2 of 2001 – article 3 and 4	The prevention of the unauthorized disposal of all wastes into water resources along with the enforcement of environmental safeguards
Hunting	The Environmental Law No. 27 of 2008 – article 3	The protection and improvement of the natural resources and biodiversity and protected areas along with securing sustainable development

	The Law of Environmental Protection and Improvement no 37 of 2009 – Chapter 5: Protection of Biodiversity	Ensure the conservation of species and habitats from hunting activities or other practices influencing biodiversity
	The draft Protected Areas Bylaw: section 5 of article 9 and section 8 of article 8	Ensure the prevention of hunting and/or transport and/or forced migration of wildlife both terrestrial and aquatic
	The Wildlife Protection Law No 17 of 2010	Ensure the protection of terrestrial and aquatic wildlife form excessive hunting
	The National Environmental Protection Strategy – strategic objective: the conservation of sustainable utilization of biodiversity, the native species sustainability section	Ensure the conservation of wild species in their native habitats and ecosystems
Grazing	The Environmental Protection and Improvement Law no 27 of 2009	Protection of land from infrastructure encroachment or any other practice affecting the land use
Exotic and invasive species	The Environmental Protection and Improvement Law no 27 of 2009 – chapter 5: protection of biodiversity	Prohibit the introduction of all alien species unless authorized by the relevant authorities
	The draft Protected Areas Bylaw – section 3 of article 9	Prohibit the introduction of all alien species within or near protected areas
Tourism and visitors' pressures	The National Environmental Protection Strategy – strategic objective: the conservation of sustainable utilization of biodiversity, chapter 4: sustaining ecosystems of special importance	The development of adequate areas and facilities for ecotourism and enhancement of voluntary efforts to organize its services including game hunting
Natural catastrophes and risks	The draft protected areas bylaw – section 3 of article 9	Adopt an early warning system for environmental crisis and catastrophes in vulnerable areas and the adoption of adequate response and management measures

The Cultural Components

As regards the cultural components of the property, the effective legislation is the Iraqi Antiquities and Heritage Law No. 55 of 2002 (see Annexes) which 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.

Table 4-3: Legislative Framework Relevant to the Cultural Components of the Property

Pressure Category	Legislative Framework
Development Pressures	The Iraqi Antiquities and Heritage Law,Articles 9 and 15
Environmental Pressure	The Iraqi Antiquities and Heritage Law.
Natural Disasters and Risk Preparedness	The Iraqi Antiquities and Heritage Law.
Responsible Visitation	The Iraqi Antiquities and Heritage Law, Article 1.
Number of inhabitants within the property and buffer zone	The Iraqi Antiquities and Heritage Law,Articles 13 and 14.

Chapter 5:

Protection and Management

5.a Ownership of the Property

The Natural Components

The property is 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 natural components of the property traditional rights are prevalent, noting that the tribal system remains a very strong part of the land governance throughout Iraq. The Ahwarare divided amongst tribes with approximate boundaries and a locally accepted transaction system, but this customary land management regime has not been recognized by government authorities in any official way.Although the latter allow tribes to use the land and ressources according to customary arrangments, they also reserve the right to change the land tenure without acquiring permission from the local population.

The customary local land use system generally extends back in time. 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 or tibal sections 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 custody of a more powerful tribe under a customary protection 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.

The Cultural Components

The cultural components proposed for inscription (Uruk, Ur and Eridu archaeological sites) together with the archaeological sites inside the natural components of the property are under the legal responsibility of the State Board of Antiquities and Heritage. The cultural components of the property are not inhabited and their ownership by the state is not challenged by the traditional system of land use and rights. However traditional rights of use may apply in the archeological mounds situates inside the natural components as their upper parts emerging over the water has long been used by the local people as seasonal settlements and burial grounds.

5.bProtective Designation

The Natural Components

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 components of the property through defining cooperation and coordination mechanisms between relevant agencies.

As regards ecosystem management, he 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 Ahwar. The following summarizes the different legal instruments used in and relevant to the natural components of the property.

Effective Laws with Relationship to the Ahwar

a. The Ministry of Environment Law No.37 of 2008

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 components 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 Ahwar, the law is of primary importance as a foundation to ensure the adequacy of conservation as well as the sound protection of the outstanding universal values, with particular emphasis on biodiversity, protected areas, and reduction of pollution.

b. 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 outstanding universal values of the property 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.

c. 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 natural components of the property 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.

d. The Water Resources Protection Bylaw No.2 of2001

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 outstanding universal values of the property 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.

e. The Ministry of Water Resources Law No.50 of2008

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 Ahwaras a key national water body.

f. The Wildlife Protection Law No.17 of2010

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 outstanding universal values of the property 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.

Relevant International Conventions and Treaties

These include the agreements already signed by the government of Iraq and the ones in consideration. The list included here is limited to the agreements relevant to ecosystem and biodiversity conservation and sustainability.

a. The Biodiversity Convention

This convention targets the conservation of biological diversity and sustainable use. Iraq joined the convention in 2009, and since then has adopted an implementation program which includes building national capacities - with particular focus on the Ahwar.

b. The Ramsar Convention

Iraq joined this treaty in 2007 and under it the Huwaizah Marshes were declared the first national Ramsar Site of global importance. The treaty adopts an implementation mechanism which includes Iraq's participation in the efforts exerted for the conservation and the sound utilization of wetlands. The designation of the Huwaizah is considered a very important preparatory step for its recognition as a World Heritage site. The other natural components are also planned for nomination as Ramsar sites.

c. Membership in the International Union for the Conservation of Nature (IUCN)

The Government of Iraq is a member of IUCN, a prime global organization which represents the knowledge of authority over biodiversity and ecosystem management. By joining IUCN as a government agency member, Iraq anticipates significant contributions to its national technical capacities in the fields of natural resource management and biodiversity conservation, in general and particularly for the Ahwar, as they represent a pioneering site for global biodiversity conservation and host threatened species in need of protection and understanding.

d. The Global Environment Facility (GEF) Membership

The main purpose of this agreement is to enhance national capacities and contribute to the global conservation of biodiversity and effective management of protected areas through the identification of priorities and the implementation of pilot programs in the field. Joining GEF provides an opportunity to access and collaborate with global projects addressing the themes above.

In addition to these agreements, Iraq is in the process of completing the procedures to become a Party to the following conventions:

e. The CITES Convention

This agreement lays a global legal framework with implementation mechanisms to prohibit the international trade of endangered species, and targets the effective control of international trade of other species. By becoming a Party Iraq will acquire a more concrete role in protecting its threatened species while cooperating across borders with neighboring countries.

f. The Convention on Migratory Species (CMS)

This convention addresses the conservation of ecosystems and wildlife, with particular focus on threatened species. It also aims to enhance international measures targeting the protection of migratory species, considering the numerous factors which contribute to their deterioration across borders. The convention further encourages cooperation on research related to migratory species and means of their protection. The Ahwarare a prime site for such migratory taxa, hence the convention would add greatly to Iraq's efforts to enhance their protection and sustainability.

Other Legal Designations Related to theAhwar

a. The designation of the the Huwaizah Marshes as the first Ramsar Site in Iraq paved the way for its recognition as a site of potential outstanding universal value. It also contributes to the national and international efforts targeting their long-term protection and sustainability.

b. The designation of the Central Marshes as a national park represents a key step towards ensuring the effective management and legal protection of a significant component of the property. The protected area designation aims to continue and expand efforts aiming to conserve the biological and aesthetic values of the site along with its associated cultural heritage. It also addresses the programs for sustainable socioeconomic development and local livelihood improvement through their enhanced participation in the planning and implementation of all management measures.

The protected area management plan recognizes and promotes sustainable and traditional land use activities such as fishing, agriculture, and buffalo rearing, with emphasis on the adoption of the principles and guidelines for natural resource utilization within and outside the park. This should lead to achieving the conservation objectives while promoting the area for sustainable economic development, including the development of ecotourism.

In addition to the above, proposals for the declaration of the Central Marshes and the East and West Hammar component as Ramsar Sites are in process.The aim is to achieve the recognition of the whole property as a Ramsar Site, thus enhancing its conservation and sound management in the long term.

Strategies and Projects Related to theAhwar Conservation

a. The National Environmental Protection Strategy and Action Plan for Iraq was launched by the Ministry of Environment in 2013 as a five year plan. The primary goal of the strategy is to develop the policy framework for environmental protection and its implementation modalities. It also handles the environmental monitoring assessments and evaluation.

   In addition to the management systems, it focuses on the sustainable utilization of natural resources and the effective enforcement of guidelines and specifications required for all environment-related activities. The strategy was devised based on a comprehensive analysis of modern legislative tools. It includes ten strategic objectives targeting all environmental fields including conservation of the Ahwar.

b. The Iraqi government is currently in the process of developing the National Biodiversity Strategy and Action Plan and the Fifth National Report for the biodiversity convention. These come as part of the joint cooperation between the Ministry of Environment, the Global Environment Facility, and the UNEP/ROWA office.

   This is a two year process planned for completion in 2014. The Fifth National Report on biodiversity is being prepared in follow up of the fourth report prepared in 2010 which comprised an update on the status of biodiversity and its trends, threats, and interventions.

   Further, the Ministry of Water Resources has currently initiated a program to develop a master strategy for the development of the Ahwar, with particular focus on land use planning. It aims to strike a

balance between conserving the natural resources and organizing human activities within a unified master plan.

Strategies and Projects Related to the Conservation of the Cultural Components of the Property

a. In 2013, the Ministry of Planning has allocated a budget to the Ministry of Tourism and Antiquities to enhance the protection of the cultural components of the property and undertake their conservation.

The Cultural Components

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.

Uruk, Ur and Eridu are registered in the Official Gazette n° 1465 of 17 October 1935 as archaeological sites and protected under article 7 of the Iraqi Law of Antiquities and Heritage n°55 of 2002. Tell AbuAdhDhahab is registered in the Official Gazette n° 3932 on 28 January 1957. Registration in the Official Gazette includes the definition of official boundaries and buffer zones. For all the registered sites, boundaries and buffer zones are larger than those of the nominated component parts of the property.

All other archaeological sites within the natural components of the property, even not yet published in the Official Gazette, are also protected under the Law of Antiquities and Heritage.

Legal and Constitutional Texts Relevant to the Cultural Components of the Property

The Antiquities and Heritage Law n°55 of 2002: The law is the legal instrument that protects the cultural values of the property. It defines antiquities and heritage as national

wealth which it places under the authority of the State Board of Antiquities and Heritage with the mandate to protect, conserve and study antiquities, and designate archaeological sites. By law, designated archaeological sites should include buffer zones.

5.c Means of implementing protective measure

The Natural Components

The National Protected Areas Network Project

This project is planned as part of the technical cooperation between the Ministry of Environment and Nature Iraq from one site and the UNEP/ROWA office on the other. The project focuses on adopting green energy solutions at the national and local levels. Nationally it targets the establishment of a national system plan for protected areas, leading to the long term conservation of ecosystems and fauna and flora. Locally, it will address the protection of the species of global, regional and national significance. In summary, the project aims to:

a. Design the first national network of protected areas in Iraq.
b. Enhance the institutional capacities of Iraq.
c. Adopt a comprehensive plan for the establishment of the protected area network.
d. Raise environmental awareness in Iraq and in the Ahwar. An important component of this project is to achieve national consensus and shared awareness and understanding among government and non-government institutions towards the importance of an effective national protected areas network with its associated socio-economic and local development targets.

The Key Biodiversity Areas Project

This project is considered of particular importance to the Ahwaras it laid an important foundation toward the establishment of the protected area. The research undertaken provided better understanding of Iraq's biodiversity and the pressures it faces in terms of unsustainable development, pollution, habitat degradation, species loss, etc. The project established a comprehensive knowledge base for the Ahwarduring the last several years.

Other Projects and Organizations Relevant to the Natural Components of the Property

There are a number of other organizations and initiatives being implemented which contribute to the conservation and protection of the Ahwaras follows:

A. The monitoring program within the Key Biodiversity Areas Project delivered by Nature Iraq and in cooperation with the Ministry of Environment. The program includes seasonal surveys for a set of areas to be periodically assessed against international biodiversity guidelines such as those from IUCN and BirdLife International, focusing on plants, birds, and mammals.

B. The continuous monitoring programs undertaken by the Ministry of Environment by its field research teams. These teams include the Wetlands and Marshlands Section and the Biodiversity Section, with the latter being mainly responsible for biodiversity of the Ahwar. The sections have adopted an annual work plan which includes, for the year 2014, monitoring of breeding and migrating bird species as well as the assessment of threats facing their habitats in the four components. (see annex eight of chapter 5).

C. The monitoring of water quantity in the Ahwar. This activity takes place under the Ministry of Water Resources which installed hydrological monitoring stations at all inlets of the Ahwar. A monthly report is produced as a result.

D. The flood monitoring program. This is a Ministry of Water Resources activity which adopts remote sensing techniques to assess the percentiles of Ahwarflooding. The program is supported by an advanced geographic information system leading to the development of monthly maps and tables of the reflooding processes. The program was commenced in 2008 and is still active today.

E. A national institutional and technical capacity building project to support the enhancement of the management of the Ahwar. This project is foreseen to be implemented as part of the technical cooperation between the Ministry of Environment and other key national and local partners in Iraq, including the IUCN/ROWA office, Wetlands International, and the Shell Iraq Petroleum Development (SIPD).

The Cultural Components

Institutional Arrangements Relevant to the Protection of the Cultural Components of the Property

The State Board of Antiquities and Heritage, under the Ministry of Tourism and Antiquities, is the main authority directly responsible for the follow up of the conditions and conservation of the archaeological components of the property.

At the governorate level, the Directorates of Antiquities of Dhi Qar, Al Muthanna, and Al Basrah are directly responsible to ensure the conservation, management and monitoring of archaeological properties inside their respective geographical and administrative jurisdiction.

Each 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. This unit has a presence in each governorate and patrols the archaeological sites.

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.

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.

In Eridu, one civilian warden employed by the Dhi Qar Department of Antiquities and living 20 km from the site conducts daily inspection visits. The Antiquity and Heritage Police at Ur (17 Km from Eridu) conducts regular patrols.

5.d Existing Plans Related to Municipality and Region in Which the Proposed Property is Located

The Natural Components

The local governments (from the governorates of Al Basrah, Maysan, and Dhi Qar) have adopted annual plans for the execution of projects within the Ahwarin cooperation with relevant ministries and institutions. The plans include sets of projects, both active and planned, addressing the various fields of development such as infrastructure, roads, and services.

The plans are primarily based on the assessment of local priority needs and adopt mechanisms to ensure their integration with the conservation and protection objectives of

the site. Currently, the local administrations are planning a joint initiative to harmonize and integrate all development planning processes and initiatives with the aim to maximize cooperation.

Further, the Ministry of Environment, through its directorates in Al Basrah, Maysan, and Dhi Qar, and within the context of the Wetlands and Marshlands and Biodiversity Unit, is adopting an integrated annual plan for the year 2013-2014 comprising all the planned projects which target the conservation of the Ahwar. These include the measures used for environmental monitoring, including physical and biological indicators (see annex eight of chapter 5). More recently, the Center for Sustainable Management of Ecosystems was established with the mandate to become the unified platform to handle the conservation and management of the Ahwar.

The Cultural Components

Urban master plans are revised on a yearly basis. The master plan for the city of AnNassiriyah, 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.

5.e Property Management Plan and Other Management System

The nomination file represents a proposal for a national serial nomination. It includes seven separated components, namely the Huwaizah, Central, East Hammar and West Hammar component parts, together with the archaeological sites of Uruk, Ur, and Tell Eridu. The management planning framework of the property includes seven separate management plans for each of the components. The management plans are harmonized through an overall strategic management framework. It is important to note here that the management plans of the natural components of the property include measure to address the conservation of archaeological sites and other cultural values located within them. The following narrative summarizes the eight management planning documents. The full plans of the natural components of the property are attached to this dossier in the annexes.

1. The Strategic Management Framework of the Ahwar

In 2013, an inter-ministerial National World Heritage Committee was created 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 World Heritage properties in Iraq. The National World Heritage Committee will be 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 property. The committee is mandated to set the policies, strategies and action plans needed for the implementation of effective management systems in the property 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 proposed property provides that guidance will be sought from the National World Heritage Committee to ensure that the protection and management of the property 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 component parts of the property under their jurisdiction.

The first assignment of the National World Heritage Committee in 2014 will be to develop and adopt a property-wide strategic management framework with the following aims:

a. Set the overall vision for the management of the property as a World Heritage site.
b. Ensure the effective coordination and cooperation between all parties involved in the management and development of the property.
c. Facilitate the involvement of all key stakeholders, including local communities, in the planning, management and monitoring of the property from environmental, cultural, social and economic perspectives.
d. Coordinate with the international community on the management of the property 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 property.
g. Undertake the overall coordination on the recruitment and operational management of human resources allocated by each of the key institutions involved in the property.

2. The Natural Components

The Huwaizah Component Management Plan

The Huwaizah component 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 Ash Shib 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 component is 48,130ha, surrounded by approximately 42,560ha of buffer zone. The Huwaizah component represents a natural drainage system to the rivers of Tayeb, Duwariq and Karkhah 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 component 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 component
- 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 component 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 Component Management Plan

The Central Marshes component is shared between the Maysan and Dhi Qar governorates within the central area between the rivers Tigris and Euphrates. The southern boundaries of the component follow the river Euphrates drainage system while the river Tigris establishes the eastern boundary. To the east of the component is the Al Basrah governorate (West Qurna). The area of the component is 83,958ha enveloped within 146,393ha of a buffer zone belt. The Central Marshes are fed naturally from the River Tigris through its branches of Batirah, 'Arid, and Majar, as well as Gharaf coming from the city of Kut through the shoreline of Abu Lehyah which is a main feeding source of the Abu Zirq Marshes of the component. 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 component 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 component is 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 component and level of impact on the hydrological conditions achieved by using alternative flooding sources
- The variation and diversity of the water resources supplying the component
- The level of effectiveness of the legislative frameworks and mechanisms, especially after the component'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 component 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 property.

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 Component Management Plan

The East Hammar Component 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 Component to the west, and by Al Zubair Plateau to the south. The area of the component is 79,990ha surrounded by a buffer zone of 68,402ha. The East Hammar Component is considered to be the richest component in terms of number of fish species, especially those of marine origin. Its proximity to the Gulf provides a unique case of the Ahwarinfluenced 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 component 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 component 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 component towards the east until reaching the Shatt Al Arab channel.

Similar to the other components, the East Hammar Component 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 component
- 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 component 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.

The West Hammar Component Management Plan

The West Hammar Component is fully located within the governorate of Dhi Qar some 36km to the west of the city of An Nassiryah. The river Euphrates borders this component in the north near the Central Marshes, the buffer zone of the east Hammar Component 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 Component 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 Ahwarand the Western Desert, hence presenting a distinctive case of transition in ecosystems regarding species adaptation and resilience. This component also includes the largest number of archaeological sites of all the natural components of the property, 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 Component 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 components, the West Hammar Component 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 component
- 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 Component management plan adopts the following key objectives:

i. To ensure the allocation of sufficient water quantities for the component 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 component.
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.

The Cultural Components

Site management plans for Uruk, Ur, and Tell Eridu are in preparation 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.

Management Plans for Uruk and Ur

Management plans for the Uruk and Ur components of the property are 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 two management plans adopt the following key objectives:

A. Ensure that the protection of each site 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 sites and of their values, limiting negative impacts.
E. Encourage the population to be a partner in protecting the sites 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 management strategies, 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.

Eridu Component Management Plan

Another management plan is being prepared for Eridu, however focused specifically on conservation, maintenance and monitoring. It provides for better protection of the site through the permanent presence of wardens working in shifts and more frequent patrols from the Antiquity and Heritage Police. Signage and very limited interpretation at the entrance of the site will also be improved. However no development of infrastructure and facilities are planned as the goal of the management plan is not to encourage visitation.

5.f Sources and Levels of Finance

The Government of Iraq is fully committed to providing adequate funding for the long term effective management of all seven components of the property.

Since 2008, funds for regional development are partly decentralized. Two sources of funding – federal and regional – are therefore available for the protection, conservation, management and development of natural and cultural heritage sites.

Regional funding is available to Departments of Environment, Water Resources, and Antiquities within each governorate on the basis of the submission of a yearly request for activities and funding. The request should be approved first by the Ministry of Environment, Ministry of Water Resources or Ministry of Tourism and Antiquities, then the Contract Department in the governorate, and finally submitted to the Governorate Council that must approve it by vote. It is then submitted for further approval to the federal Ministries of Planning and Finance and should be voted by the Council of Representatives (Parliament). The Parliament can also approve additional regional allocation on an ad hoc basis.

National funding is available through the dedicated budget of the Ministry of Environment, Ministry of Water Resources and Ministry of Tourism and Antiquities. Projects are submitted for approval to the Federal Government on a yearly basis. Staff costs for Directorates of Environment, Water Resources and Antiquities at governorate-level are entirely covered under the budget of the Ministry of Tourism and Antiquities.

In addition, national NGOs such as Nature Iraq deliver on a significant part of the environmental conservation programs and initiatives. However, in this case, funding mostly comes from international organizations which support the overall protection and sustainability of the Ahwar (e.g. New Eden Program in cooperation with the Italian Cooperation Program). Other projects are also channeled through the Ministry of Environment under bilateral and multilateral cooperation agreements.

Generally speaking, the current financing levels are sufficient, however, more funding will be needed to adopt the optimal levels of management and intervention needed for the fulfillment of the requirements of the World Heritage enlistment of the property. There must be an aim to further enhance the good governance and effective management standards needed for such a global recognition. To achieve an improved level of harmonized investment and allocation, stronger cooperation and coordination are needed among key national and international partners engaged in the Ahwar programs.

It is important to note here that the National World Heritage Committee will be a key player in coordinating the process of federal and international funding and resources allocation for the Ahwar, particularly in regard to the implementation of the strategic management framework and the management plans for the components.

5.g Sources of Expertise and Training in Conservation and Management Techniques

The Natural Components

Table 5-1: Key Organizations Involved in the Provision of Expertise and Training for the Human Resources Associated with the Ahwar

No	Organization	Type of Experience and Skills Provided
1	The Ministry of Environment	
	-The Minister's office. -The technical deputy to the Minister / Coordination and Monitoring Section.-The technical advisor to the	Coordination, supervision and follow up are undertaken in regard to the Ahwaras part of the adopted capacity building program which is supported by bilateral cooperation projects such as the New Eden, the Ramsar cooperation, and the Central Marshes Component management plan development projects.

	Minister / Monitoring and Coordination Department.	
2	The Center for the Sustainable Management of Ecosystems, includes the following units: -The Biodiversity Unit. -The Protected Areas Unit. -World Heritage Unit. -CITES Unit. -GIS Unit -Awareness Programs Unit.	Biodiversity Unit: handles the establishment and management of databases on environmental threats, species checklists, conservation status of the property, and socio economic baseline studies and monitoring systems. Protected Areas Unit: handles follow up and implementation of the site's management plans and monitoring of the enforcement of the protected areas bylaw within the property. World Heritage Unit: handles all periodical documentation and reporting related to World Heritage in terms of natural and cultural values, and also reports on the performance of other units. Awareness Raising Unit: handles the planning and implementation of awareness raising activities and events with particular emphasis on the Ahwar's global and national significance, in addition to the development of related publications and materials. GIS Unit: handles the development and updates of needed maps and geographic information including spatial mapping related to the various physical and biological components of the sites. CITES Unit: handles the identification of threatened species and related trade activities and reports on implications of their conservation and viability.
3	The War-mines Department	Addresses the program of involvement of local cadres associated with the daily management of the Ahwarand raises local awareness towards mine hazards and means of avoidance.
4	The Department of Environmental Protection and Improvement and its associated units: -Al Basrah Directorate of Environment – Ecosystems Section. -Maysan Directorate of Environment –	These departments address the involvement of local cadres associated with the Ahwarin capacity building programs of various thematic areas respective of their geographic regions. These include: periodic assessments, protected areas management, biodiversity monitoring, monitoring stations installation and maintenance. Each of the three directorates includes a Marshland and Wetland Monitoring Unit.

	Ecosystems Section. -Dhi Qar Directorate of Environment – Ecosystems Section.	
5	Radiation Prevention Center – Research Unit	Targets the local cadres in the training programs related to the periodic surveys of the Ahwarwaters in regard to radiation and associated pollution.
6	The Ministry of Water Resources	
	The Center for the Rehabilitation of the Marshlands and Wetlands and its associated departments in the three governorates: Al Basrah, Maysan and Dhi Qar.	Ensures the full enrollment of all staff and local stakeholders in the capacity building programs and the direct targeting of their skills and knowledge in regards to periodic assessments, field research, environmental and hydrological monitoring, protected areas management, biodiversity conservation and monitoring stations installation and maintenance.
7	The Ministries of Planning, Municipalities, Public works, Tourism, Antiquities and Culture	Support and facilitate a number of strategic projects addressing the Ahwarin terms of conservation and development. They are also part of the communication and coordination of target groups and platforms established through other projects' participation, outreach and awareness raising initiatives.
8	The AhwarRehabilitation Committees associated with the local governorate councils in Al Basrah, Maysan and Dhi Qar.	The committees' members are integral to all working groups and coordination platforms established by line ministries. They represent a key mechanism for the facilitation of local population involvement and participation programs related to the conservation and development of the Ahwar.
9	The Marshlands Research Center associated with Dhi Qar University and the Sea Science Center of the University of Al Basrah	Mandated to undertake the needed research related to the physical and biological components of the Ahwar. The Centers' scientists provide training to other agency's cadres and often are themselves targeted by specialized capacity building and knowledge management initiatives.
10	The National Committees associated with the Ministry of Environment	
	The National Committee for the Environmental and Cultural Management of the Ahwarand its Inclusion on the World Heritage List	This initiative is the prime program handling the process of nomination of the Ahwaron the World Heritage List for mixed properties. It also includes the national capacity building program for all thematic areas of the World Heritage Convention.
11	The National Committee for the Study of Natural Sites in Iraq	An important part of this committee's mandate is to train and qualify national cadres in the fields of protected areas planning and management. One of the initiatives focuses on the Ahwaras a site of primary importance.
12	The National World	Adopts the training activities targeting the staff involved

	Heritage Committee	in management of the sites after inscription. These include all technical, administrative and monitoring activities.
13	The National Committee for the Institutional and Technical Capacity Building on Enhancing the Management of the Ahwar	Focuses on the development of a sustainable model for the management of the ecosystems and biodiversity of the Ahwarthrough technical support and scientific research.
14	The Health and Environment Committees in the governorates of Al Basrah, Maysan and Dhi Qar.	Adopts annual action plans to support the efforts targeting the conservation and development of the Ahwar. They also facilitate access to national and local funding to finance the adopted actions.

The Cultural Components

Staff members of Directorates of Antiquities are generally graduates from Archaeology Department at Iraqi Universities. Their level of expertise in conservation and management is reinforced by regular training courses either in Iraq at the National Conservation Institute in Erbil, or abroad. The State Board of Antiquities and Heritage also enrolls its staff in training courses (archaeological survey methods, English language, architecture, computer and IT, excavation and conservation methods).

Furthermore, foreign archaeological missions that have resumed work in Iraq in recent years generally offer on-the-job training to Iraqi archaeologists during excavation seasons as is the case with the German mission in Uruk. Some also organize specific training courses. This is the case with the Italian mission in Ur (University of La Sapienze in Rome) which is excavating a site outside the property, and is delivering training in object conservation in An Nassiriyah.

5.h Tourism Infrastructure and Facilities

Tourism activities are still rather limited in numbers and distribution across the property. This is a result of several factors including the current security situation and the lack of proper marketing and promotion of the both the natural and cultural components of the property as a potential tourism destination. Current visitation is merely by domestic short-stay visitors from neighboring areas wishing to enjoy greenery and have an outdoor activity away from crowded city life. Other small numbers of visitors include foreign tourists, journalists and reporters coming mainly for media coverage of the property's cultural and natural values. Currently, tourism does not represent a pressure factor. Rather, it can be viewed as an opportunity (if carefully seized) that would represent a strong tool for local economic development as well as national and international advocacy and

outreach geared towards the sustainable development and long term conservation of the property.

One the piloting initiatives aiming to promote ecotourism development of the property is the creation of mud houses. These are traditionally constructed guesthouses developed by Nature Iraq as general facilities utilized to host visitors for their various purposes and interests.

5.i Policies and Programs Addressing the Presentation and Promotion of the Property

There are various initiatives targeting the enhancement of the property's presentation to various audiences at the local and international levels. Some of these have already been delivered as part of the various programs implemented for the Ahwar, and others are under development and execution.

Table 5-2: Key Initiatives Involved in the Management of the Ahwar

No	The Initiative	Initiative Interventions	Notes
1	The Marshlands World Heritage Nomination Project: delivered by the Ministry of Environment and its international partners	The project purpose is to enhance the effective management of the natural and cultural values of the Ahwaras a mixed World Heritage Site.	Ongoing project
2	The Environmental Caravan Initiative: organized by the Ministry of Environment in cooperation with the Ministries of Water Resources, Health, Education, Tourism and Antiquities in addition to local municipalities and councils	The activity shed light on the significance of the Ahwarand the promotion of their sustainable development, addressing the local socio economic needs and the conservation priorities simultaneously. The initiative also includes a decision makers' outreach component.	Initiated and concluded in 2013
3	The AhwarMuseum Project	The project aims to document and present the outstanding significance of the cultural and natural values of the Ahwar.	The project is under development
4	The Environment and Health Committees in the	These local structures are fundamental mechanisms	Ongoing

	governorates of Al Basrah, Maysan and Dhi Qar	for the direct local promotion of the conservation of the Ahwarand the urgency of actions to ensure their sustainability.	
5	The revival and utilization of traditional tools and techniques (e.g. *Mudhif* guesthouse and *Mashhuf* traditional boat)	The revival of such traditional structures, tools and techniques have great impact on raising local awareness by fostering sustainable utilization of the natural resources. It is also a very attractive tool of tourism promotion and experience enhancement.	Piloted, and more plans are conceived
6	Al Ahwar periodical – issued by the Amar Development Foundation (USA)	The periodical focuses on the publication of all research done on the Ahwarwith particular focus on biodiversity and natural heritage.	Semi-annual
7	Sada Al Ahwar periodical – issued by the University of Dhi Qar Marshlands Center	Started in 2012, and specialized in publishing all scientific research done on the Ahwar. It also focuses on highlighting contemporary issues and challenges facing the Ahwar.	Quarterly
8	The International Day of Wetlands – 2 February (the date of the launch of the International Treaty on Wetlands in 1971)	The festivity is organized every year by the Ministry of Environment and its partners, and focuses on the promotion of the conservation and sustainability of the Ahwaras a prime global and national site needed for humanity.	An annual activity

5.j Number of Staff and Their Expertise

The Natural Components

Numerous cadres are involved in the management of the natural and cultural components of the property representing several government and non-government organizations presented in earlier sections. For the natural components, the national effort was accelerated after the initiation of the reflooding program in 2003. A coordination and communication challenge subsequently emerged as a result of the large number of institutions involved. Nevertheless, the last few years witnessed a major improvement in inter-agency collaboration and coordination in regard to the Ahwarconservation and development programs, which was positively reflected in the collective performance of these agencies in achieving the set objectives and targets for the Ahwar.

Another reference is here made to the establishment of the National World Heritage Committee which will oversee the coordination on human resource deployment and onsite coordination and communication. This is hoped to strengthen the level of management effectiveness at the component and Ahwarlevels.

An extensive series of capacity building and training programs were delivered for the various teams involved in the Ahwarin their respective capacities and interests covering the various technical and managerial fields related to the Ahwar.

The staff categories involved in the Ahwarinclude scientists, experts and practitioners in the fields of biodiversity conservation, protected areas management, natural resource management, water resource management, tourism development, and veterinary services; in addition to support functions such as finance and administration, translation, business planning, and so forth.

The Cultural Components

With regard to the cultural components of the property, the Directorate of Antiquities of Dhi Qar has jurisdiction over Ur, Eridu, and the archaeological sites located in the Central and West Hammar component parts of the property. It is headed by a local officer who holds a BA in Archaeology, and includes forty-one archaeologists, nine administrative staff, and two-hundred-and-five guards.

The Directorate of Antiquities of Al Muthanna has jurisdiction over Uruk. It is headed by a local officer who holds a BA in Archaeology, and includes twenty-nine archaeologists, three administrative staff, and one-hundred and three guards.

The Directorate of Antiquities of Al Basrah has jurisdiction over the archaeological sites in the East Hammar component part of the property. It is headed by a local officer who holds

a BA in Archaeology, and includes twenty-four archaeologists, twelve administrative staff, three engineers, and twenty-eight guards.

The State Board of Antiquities and Heritage reinforces the number of archaeologists and other professionals during excavation or conservation works. On an ad-hoc basis, engineers from Al Basrah can supervise work in Dhi Qar and Al Muthanna.

Chapter 6:

Monitoring

Introduction

The monitoring system of the property represents a primary component of the various management plans for the natural and cultural components. It identifies the key indicators and parameters used to evaluate the conservation status of the components individually and on the property as a whole. In the Ahwar, the monitoring commenced in 2003 and is a multidisciplinary process which involves several key national agencies and institutions such as: the Ministry of Environment, the Ministry of Water Resources, and the Ministry of Higher Education and Scientific Research, in addition to several national and local NGOs, all for the natural components of the property. For the cultural components, the key agency involved is the State Board of Antiquities and Heritage which has been regularly monitoring the archaeological sites included in the property though its local Directorates.

The monitoring programs for the natural components of the property are developed and implemented with technical cooperation with several international organizations concerned with the protection and conservation of the Ahwarecosystems and local communities.

The monitoring system incorporates continuous surveillance utilizing field research teams, monitoring stations and periodic reporting. The monitoring program comprises both physical and biological indicators and processes along with the factors influencing them .

The first of such monitoring programs was initiated in the Huwaizah Component as part of its designation to the Ramsar Convention in 2008. The Central Marshes Component also has a fully-fledged monitoring program as part of its management arrangement within the official recognition as a national park starting in 2014.

The Iraqi government aims to develop and enhance the capacities of all cadres working in or associated with the Ahwar. This is to take place through full engagement and field research, scientific conferences, training workshops in the fields of wetland and marshland management, and monitoring. The New Eden Project carries out many training activities, including those on the topics of identification of ecological indicators. Further, the Key Biodiversity Areas (KBA) project, launched in 2005 as a cooperation between the Ministry of Environment and Nature Iraq, included a comprehensive ecological monitoring system with particular focus on the Ahwar.

As for the cultural components, indicators and periodicity are clearly defined following indications of a qualitative system of observation. Quantitative indicators are addressed in the management plans of the three cultural components of the property.

6.a Key Indicators for the Evaluation of the Conservation Status

In regard to the natural components of the property, table 6-1 below summarizes the key indicators assessed for the conservation status of the values. Further, table 6-2 addresses the arrangements for the cultural components.

Table 6-1: Key Indicators Used for the Assessment of the Conservation Status of the Four Natural Components of the Property

Indicator Type	Period of Monitoring	Documentation and Archiving Location
Water Quantity: The water quantity in the Ahwarfluctuates according to the influx of monthly water allocations and is reflected in the surface area covered by water.	The monitoring of water quantity is done through a network of surveillance stations installed at the inlets of most Marshes	-The Ministry of Water Resources- the Center for Restoration of Iraqi Marshlands and Wetlands (CRIMW) Hydrological Research Unit -The Ministry of Water Resources- the National Center of the Management of Water Resources
Water Quality: Water quality across the Ahwarvaries according to the origin of the water. These water resources are diverse (Tigris, Euphrates, drainage channels, seasonal rain). Key water quality indicators include salinity, calcium and magnesium levels, chloride, and sulfur levels.	The monitoring system started in 2003 and coincided with the reflooding process. Monitoring takes place monthly through the collection and analysis of water samples in the field or in the lab depending on the indicator measured.	-The Ministry of Water Resources- the Center for Rehabilitation of Iraqi Marshlands and Wetlands (CRIMW) Rehabilitation Center-Hydrological Research Unit -Ministry of Environment-Technical Unit-Marshlands Monitoring Section
Flora: -Number of species: the number of species affected by drainage. -Density of vegetation cover: vegetation cover status after flooding and impacts of drainage.	Monitoring takes place on a monthly basis since 2004. It is conducted by field research teams from the Ministry of Environment and Nature Iraq. A set of technical reports were produced under the Key Biodiversity Areas Project.	-Ministry of Environment – World Heritage Unit -Nature Iraq
Endemic fish species: -Number of species: the status of key fish species in the four components. -Density: density is assessed	Monitoring takes place on a monthly basis since 2004. It is conducted by field research teams from the Ministry of Environment and	-Ministry of Environment – World Heritage Unit -Nature Iraq

for each component to reflect its ecological health (more baseline research is required under this heading.(-Distribution: the distribution is a key indicator for ecological health. Records of key fish species were collected from each of the four components.	Nature Iraq. A set of technical reports were produced under the Key Biodiversity Areas Project.	
Reptiles and Amphibians: the Euphrates Soft-shelled Turtle: -The general status: seems to be stable due to the availability of suitable habitat.	Monitoring takes place on a monthly basis since 2004. It is conducted by field research teams from the Ministry of Environment and Nature Iraq. A set of technical reports were produced under the Key Biodiversity Areas project.	-Ministry of Environment – World Heritage Unit -Nature Iraq
Birds: the Ahwarhave witnessed a great recovery in bird populations in terms of species and numbers. A key indicator is the breeding number of bird species and their distribution.	Monitoring takes place on a monthly basis since 2004. It is conducted by field research teams from the Ministry of Environment and Nature Iraq. A set of technical reports were produced under the Key Biodiversity Areas Project.	-Ministry of Environment – World Heritage Unit -Nature Iraq
Mammals: the Smooth-coated Otter: -The general status: scientific records were established on the recovery of this subspecies after reflooding.	Monitoring takes place on a monthly basis since 2004. It is conducted by field research teams from the Ministry of Environment and Nature Iraq. A set of technical reports were produced under the Key Biodiversity Areas Project.	-Ministry of Environment – World Heritage Unit -Nature Iraq

Table 6-2: Key Indicators Used for the Assessment of the Conservation Status of the Three Cultural Components of the Property

Indicator	Periodicity	Location of Records
Percentage of buildings needing major repair in one specific site: On the basis of base-line study and photographic record	Every 6 months (after dry and rainy seasons) and after each heavy rainfall or dust storm	-Directorates of Antiquities -Investigation and Excavation Department, SBAH -World Heritage Section, SBAH -Restoration and Conservation Department, SBAH
Stability of specific buildings (eg. Royal Tombs in Ur, Anu ziggurat in Uruk) using crack monitoring devices	Reading of devices every month by site inspectors	Same as above
Measurement of relative humidity in key buildings (eg. Ur ziggurat) using humidity measuring devices	Reading of devices every month by site inspectors	Same as above
Rate of encroachment of human activities on the archaeological components of the property	On the ground observation (inspectors from Department of Antiquities) and use of satellite images (Director of Antiquities) on a yearly basis	Same as above

6.b Management Arrangements for the Monitoring Program

Table 6-3 below summarizes the main arrangement for the monitoring for the natural components of the property.

Table 6-3: Main Agencies and Institutions Involved in the Monitoring of the Natural Components of the Property, Along with their Respective Monitoring Programs

Institution	Monitoring Programs	Notes
Ministry of Environment: -World Heritage Unit -Address: Arasat Street, Baghdad Tel: 964 771 825 2999 E-mail: ministry_advisor@yahoo.com	-Establishment and maintenance of the water and soil quality database - seasonal report -Social and ecological status assessment of the Hammar Marshes - annual report -Establishment of the	The monitoring programs mentioned here are integral to a monitoring plan devised for the Ahwar, including the proposed property and beyond. The monitoring is conducted by field

	database on environmental threats for areas of key importance to birds - semi-annual report -Update of the database on native and introduced fish species in the Ahwar-semi-annual report -Bird census program at the governorate level with the assessment of threats based on IUCN standards - semi-annual report -Update of the database on plant species for the Huwaizah Marshes - semi-annual report	research teams associated with the biodiversity and Marshlands rehabilitation sections. Annex 6-1 includes the annual plans of the sections above for the period 2013-2014.
Ministry of Water Resources: -the Center for Restoration of the Iraqi Marshlands and Wetlands (CRIMW) Address: Nidal Street,Tayaran Square, Baghdad Tel: 964 790 338 0170 E-Mail: crimbag2004@mowr.go.iq	-Periodic monitoring of water quality within the Ahwarof selected areas - biweekly report -Water quantity monitoring at the inlets of the Ahwarusing hydrological monitoring stations - monthly report -Monitoring flooding levels within the four natural components of the propertyusing satellite imagery. Periodic mapping as a result is developed, supported with detailed tables of areas covered with water - monthly report -Initiation of the selection of two new Ramsar Sites within the Central Marshes and Hammar Marshes. This requires additional social and ecological baseline research.	Monitoring programs are conducted under the supervision of CRIMW (Center for the Restoration of the Iraqi Marshlands and Wetlands) in coordination with field offices at the governorate level. -Water coverage monitoring is undertaken by the Planning and Research section using the analysis of satellite imagery supported by GIS systems.
Non-government organizations : -Nature Iraq Organization Address: Baghdad/	-Based on the results of the key biodiversity area (KBA) baseline surveys which	-The research projects and monitoring programs depend on the available

Slimani/Ach Chibayish Tel: 964 53 329 2007 e-mail: info@natureiraq.org	took place from 2005-2010, focus was given to areas of key significance within the four components. The modality comprises the implementation of short term research projects focusing on key species. They are not necessarily consecutive.	funding from within and outside Iraq.

- Note: The strategy on all new monitoring and research programs includes a desktop analysis and review of all previous activities done in the same areas on the same topics. This represents an important feedback mechanism to improve the effectiveness of the monitoring of various physical and ecological components of the property.

As for the cultural components of the property, under the new management plans for Uruk, Ur and Eriduconcerned Directorates of Antiquities will create monitoring committees mandated to coordinate and oversee the monitoring programs in their respective areas of jurisdiction. In the natural components of the property, Directorates of Antiquities will work in close coordination with other concerned directorates (Environment and Water Resources) at the property level. On the basis of the monitoring exercise conducted by the monitoring committees, concerned Directors of Antiquities will prepare a monthly report addressed to the World Heritage Section of the State Board of Antiquities and Heritage and to the National World Heritage Committee including information about the state of conservation based on the observations made by inspectors during site visits including new damage observed.

6.c Results of Previous Monitoring Related to the Conservation Status of the Property

With regard to the natural components of the property, Table 6-3 below summarizes the main documentation available for previous monitoring programs.

Table 6-4: Key Documentation on Previous Monitoring of the Property

Key Findings	Report
-The development of three future development scenarios for the Ahwarbased on a restoration of the size of the Ahwarduring different historic periods. -The identification of eight factors influencing the size and quality of the Ahwar, hence identifying management objectives for each factor. -The identification of 37 interventions for the achievement of each of the objectives. -The development of a new classification system for the AhwarEnvironmental Health leading to the prioritization of management interventions. -The production of anAhwaratlas comprising a full set of maps supporting the narrative reports.	*Management for Change - The Present and Future of the Marshlands of Southern Iraq*: A report developed by the Canadian Iraq Marshlands Initiative (CIMI) for the rehabilitation of the Ahwar, initiated in 2010; aims to analyze the current development of the Ahwaralong with identification of the key factors influencing their ecological conditions.
-The development of reflooding scenarios in the form of strategies aiming to rehabilitate the Ahwarusing the 1973 baseline. The current target is to re-flood 75% of that baseline. This is to be adopted by the Center for restoration of Iraqi Marshlands and Wetlands. -The design of the hydraulic facilities on the inlets and outlets of the Ahwarwith the aim to establish full control of the Ahwarhydrology. The facilities included in the plan were fully re-established as scheduled. -The production of a full set of topographical maps for the Ahwar. -The adoption of a clear set of results based on the ecological, hydrological and topographical research as well as socioeconomic studies.	*The New Eden Plan for the Integrated Management of Water Resources in the Marshlands*: The report was produced by the Iraqi Italian initiative, in cooperation with the Ministry of Water Resources, Ministry of Environment and Nature Iraq, etc. The report was endorsed in 2006 as a decision support tool aiming to provide technical information and sound analysis techniques leading to the identification of logical choices in regard to the water resources distribution and environmental management decisions, all leading to the rehabilitation of the Ahwar. It is one of the first comprehensive studies undertaken for the marshlands after the reflooding of 2003.
-The collation of a detailed set of	*Huwaizah Marshes Management Plan*

information on the ecological and hydrological status of the Huwaizah Marshes and their habitats. -Undertaking necessary biodiversity baseline research including birds, fishes, mammals and plants. -The adoption of a set of management recommendations in various themes (water resources, ecology, socioeconomic and cultural). -The elaboration of a set of training programs needed for building the capacity of staff of relevant agencies.	(Ramsar). The plan was developed by Nature Iraq with funding from the Italian Ministry of Environment. The counterpart agency was the National Committee for Marshlands and Wetlands at that time. The report was completed in draft form in 2008 and updated in 2010 and aimed to adopt an integrated management plan for the Huwaizah Marshes as a Ramsar site including a set of strategic objectives. (See the full plan in the Annexes).
-The development of future flooding scenarios in the form of strategies aiming to rehabilitate the Central Marshes as a national park. -The adoption of a set of management recommendations in various themes (water resources management, water quality monitoring, wildlife protection, biodiversity related threat analysis).	*The Mesopotamian Protected Area Management Plan*: the document addresses the establishment of a national park within the Central Marshes. The draft plan was prepared by Nature Iraq. It was endorsed by the Iraqi Ministries of Environment and Water Resources in 2010 and the site declared a protected area in September 2013. (See the full plan in the Annexes)
-The achievement of better understanding and assessing of the status of biodiversity in the Ahwaragainst international standard and guidelines. -The identification of key pressure factors for each of the sites.	*The Key Biodiversity Areas Baseline Surveys Report*: this report is part of the Iraqi Italian initiative implemented by the Ministry of Environment and Nature Iraq. It was initiated in 2004 and is still active. The main surveys focused on endangered species and their associated threats.
-The establishment of Marshlands Information Network (MIN). -Establishment of an Iraqi Marshlands Observation System (IMOS) with focus on the reflooding process. -The implementation of a pilot project focusing on the rehabilitation of the wetland ecosystem in select sites within the Ahwaralong with a pilot initiative for assessing the feasibility of the utilization of the water from the main drainage canal. -The implementation of a series of workshops and capacity building activities in various fields related to the Ahwar.	*Marshlands Environmental Management Support Program*: commenced in 2004 and is being implemented by UNEP with the aim to enhance the management processes and exchange information and data related to biodiversity and water quality in addition to the analysis of satellite imagery and the assessment of future options for the management of the Ahwar, leading to the highest possible and most effective ecological management of the target areas.

As regards the cultural components of the property, a systematic monitoring system has not been defined and implemented to date. Monitoring has been conducted on the basis of observation by site inspectors and information included in the monthly reports addressed by Directors of Antiquities to the State Board of Antiquities and Heritage.

Chapter 7:

Documentation

7.aPhotographs and Audiovisual Image Inventory and Authorization Form

Id. No	Format (slide/ print/ video)	Caption	Date of Photo (mo/yr)	Photographer/Director of the video	Copyright owner (if different than photographer/director of video)	Contact details of copyright owner (Name, address, tel/fax, and e-mail)	Non exclusive cession of rights
1	Slide	Aerial image of Uruk	2006		State Board of Antiquities and Heritage		
2	Slide	Aerial image of Ur	2006		State Board of Antiquities and Heritage		
3	Slide	Satellite image of Eridu	2006		Google Earth		

7. b Texts Relating to Protective Designation, Copies of Property Management Plans or Documented Management Systems and Extracts of Other Plans Relevant to the Property

I. Antiquity and Heritage Law No. 55 of 2002.

II. Laws with relationship to the Ahwar:
- The Ministry of Environment Law No.37 of 2008.
- The Protection and Improvement of the Environment Law No.27 of 2009
- The Water Resources Protection Bylaw No.2 of 2001.
- The Ministry of Water Resources Law No.50 of 2008.
- The Wildlife Protection Law No.17 fof 2010.
- The Protected Areas Establishment and Management Bylaw Draft.

III. Related Strategies:
- National Environmental Strategy and Action Plan (NESAP).
- National Biodiversity Strategy and Action Plan (NBSAP).

IV. Management:
- The management plans for the four natural components

- The management plans for monitoring marshlands and wetlandlands section from 2013-2014/Ministry of Environment.
- The management plans for biodiversity unit from 2013-2014/ Ministry of Environment.
- Management Plan for the Huwaizah Marshes Ramsar Site of Iraq , Volume One and Two
- Draft Management Plan for The Mesopotamian Marshlands National Park.

7.c Form and Date of Most Recent Records or Inventory of Property

I. Water qualityand quantity information

- Ministry of Water Resources - The Center for Restoration of the Iraqi Marshlands and Wetlands and the National Center of the Management of Water Resources.
- Ministry of Environment - South Environment Headquarter - Marshlands Monitoring Section

II. Fauna and flora information

- Ministry of Environment – South Environment Headquarter and the Center for the Sustainable Management of Ecosystems
- Nature Iraq Organization.
- Marsh bulletin journal seasonally- The AMAR international charitable foundation in collaboration with college of science and marine science center – university of Basrah.

III. Archaeological and historical information

The State Board of Antiquities and Heritage currently houses all the documentation and information concerning the archaeological sites of Eridu, Uruk, Ur and the sites in the Ahwar. Under the Department of Studies and Research, the Documentation Section houses the reports of Iraqi and international archaeological missions and since the 1960s. Most reports are scanned and conserved digitally and available to researchers. Furthermore, the Department also houses copied of scientific publications about these three sites and of architectural surveys and studies.

All artifacts, including tablets and cylinder seals, found by international missions since 1974 are considered national treasures and cannot be removed from the country.They are deposited at the Iraqi National Museum, which keeps an inventory. However, there exists important collections of artifacts from Eridu, Uruk and Ur in international museum, particularly pieces that were excavated by foreign missions before the 1960s.

The Ur Digitization Project, run by the Penn Museum, was launched in 2013 with the aim to reunite in a digital space all documents and photos are scattered across the globe in private archives, public newspapers, journals and monographs about the site of Ur.

7.d Addresses where Inventory, Records and Archives are Held

Ministry of Environment

Address: Arasat Al Hindiyah Street, Baghdad, Iraq
Tel: + (964) 771 8252999
Email: aaza59@yahoo.com and ministry_advisor@yahoo.com
Website: www.moen.gov.iq

Ministry of Water Resource
Planning and Research Section- Marshlands and Wetlands Rehabilitation Center (CRIMW)

Address: Palestine Street, Baghdad, Iraq
Tel: + (964) 790 3380170
Email: crimbag2004@mowr.go.iq
Website: www.mowr.gov.iq

Nature Iraq Organization

Address: Iraq-Baghdad/Slimani/Ech Chibayish
Tel: 964 53 3292007
Email:info@nature.iraq
Website: www.natureiraq.org

Iraq National Museum

Address: Jamal Abdel Naser Street, Salhiyah, Baghdad, Iraq
Tel: +(964) 7901946977
Email: relations_sbah@yahoo.com
Website: www.iraqmuseum.org

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Chapter 8:

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23

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