

The Current Status and Population of the Threatened Bird Species in the Ahwar of Southern Iraq: Conservation and Management Approach

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Abstract: The marshes of Southern Iraq, or 'Ahwar' are vast freshwater wetlands that extend over a fluctuated area of more than 2000 km² in southern Iraq. These wetlands consist of four major components (Huwaiza, West Hammar, Central Marshes, and East Hammar) each of which has its own environmental features and significance. The Ahwar has been selected as a World Heritage property in 2016 for its outstanding universal, cultural, and natural values (OUV). One of the key attributes of the exceptional environmental value of this site is its unique spot containing various freshwater wetland habitats in the middle of an extremely hot and dry region housing a considerable number of birds some of which are threatened on the global level. The current study sheds light on the current status of fourteen globally threatened bird species found in the Ahwar region (breeding or non-breeding species). It also describes the habitats and the current conservation status of these bird species which include nine waterbirds, and five water-related bird species in addition to those found frequently around and within the Ahwar region. The latter group of birds mainly uses the buffer zones along with some dry extensions within the natural components of the Ahwar. In addition, the current research presents, for the first time, a recent population estimation of the migrant and resident bird species in the Ahwar area for the sake of establishing a baseline for their monitoring programs in the future. This work uses the latest version of the IUCN Red List (Version 3.1) for the categorizing of the conservation status of the studied birds. Also, the study provides an assessment on the regional level (Regional RedList Assessment) of the current status

of the fourteen bird species that live inside and around the Ahwar. By presenting these bird species, for the first time, as a key component of the biodiversity of this region, by highlighting the major threats to their survival, and by estimating their numbers, and determining their spatial distribution, this paper hopes to contribute to prioritizing the conservation efforts of the bird species in the unique freshwater ecosystem of the Ahwar.

Keywords: Ahwar World Heritage property, Iraq, Iraqi Marshes, Threatened birds.

Introduction

Wetlands enrich biodiversity by providing a wide range of aquatic habitats for rich lists of flora and fauna species; however, the various human activities have resulted in the destruction and degradation of wetlands worldwide. In fact, a considerable number of key freshwater wetlands housing a lot of habitats and their species suffer from various types of threats (Moser *et.al.*, 1996). The marshes of Southern Iraq (called locally Ahwar), are vast freshwater bodies located in the lower Mesopotamian region within a depression formed at the northeastern parts of the Arabian plate close to the Iranian or Eurasian plate (Figure 1). During peak times in the 1970s, this area has covered around 15,000 to 20,000 square kilometers (IMoEN, 2014). These freshwater marshes are fed by the Euphrates and Tigris rivers and partly by rain at the northern parts (Kubba and Salim, 2011). The Ahwar area is currently divided into four major parts: Western Hammar, Eastern Hammar, the Central Marshes, and Al-Huwaiza Marshes. These four components

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include different types of wetlands such as the open-water lakes, dense reed-beds, vast stripes of mudflats, in addition to the marsh margin habitats (Abdulhassan, *et.al.*, 2009). This wide range of panoramic habitats has magnified the richness and significance of this area as a source of biodiversity (KBA) on the regional (Middle East) level. More importantly, this biodiversity helped recognize the Ahwar region as a Ramsar site on the global level (Scott, 1995). In addition to the significance of the Ahwar area in terms of biodiversity, this area has its own cultural richness being considered once as a central part of the cradle of civilizations on the global level (IMoEN, 2014).

One of the key factors which render the Ahwar region ecologically valuable is that it harbors twenty-five bird species categorized either as globally-threatened or near-threatened species (Salim, *et.al.*, 2021). These natural (four wetland marsh areas) and cultural (three archaeological sites) characteristics, among others, have clearly highlighted the outstanding Universal Value (OUV) of this area, and subsequently helped inscribe it as a mixed Serial World Heritage property in 2016 (IMoEN, 2014; Salim, *et.al.*, 2021).

The habitats and landscape diversity of the Ahwar in addition to its vast area have all contributed to the significance of this area

on the global level for quite a wide range of migrant and resident birds (Kubba and Salim, 2011). It provides an important and crucial ring in the migration routes of the waterfowl and water-related bird species between Eurasian and African regions (Scott and Carp, 1982; Salim, *et.al.*, 2006). A total of 197 species are considered as regular winter visitors or passage migrants from Europe and Asia and further twenty species are considered as rare visitors or vagrants (Salim, *et.al.*, 2021).

The Ahwar area has suffered from serious threats which affected its attributes as a whole in many different ways (Becker, 2014; Al-Yamani, *et.al.*, 2007). The current research assesses the current status of the threatened birds in the Ahwar following the mechanism of the Red List assessment of the species (see the paragraph below). It investigates the different factors facing the threatened birds and their habitats and sheds light on the proposed solutions that have been listed in the recommendations below for the sake of contributing to the effectiveness of the management of this significant area.

The IUCN Red List Categories and Criteria are considered as a useful tool for categorizing the different levels of species worldwide based on the threats they are facing (IUCN, 2021). The Red List is a good practical tool

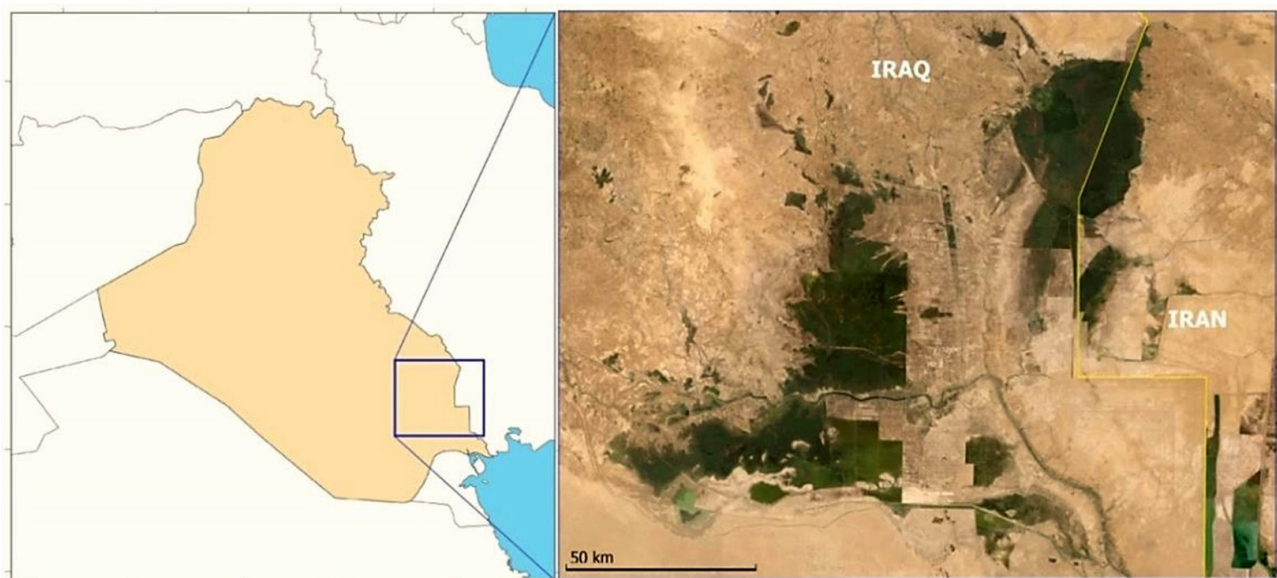


Figure 1. A regional map showing the location of the Ahwar in southern Iraq (left); a general view of southern Iraq's marshes (right).

for dealing with the conservation efforts in a protected area on the national, regional, and global levels. It consists of nine categories: Not Evaluated, Data Deficient, Least Concern, Near-threatened, Vulnerable, Endangered, Critically-endangered, Extinct in the Wild, and Extinct. Among the different levels (categories) of the Red List, the current paper covers the 'Threatened Species' only. Figure 3 shows the different categories of the IUCN Red List and the specific categories used by the current paper.

Materials and Methods

The spatial scope of the current study covers the entire four components of the Ahwar in southern Iraq: Huwaiza, Central Marshes, East Hammar, and West Hammar. These four natural components are situated within the

three Governorates of southern Iraq: Basra, Missan, and Thi-Qar around the central coordinate (31° 6' 14.00" N, 47° 13' 8.00" E) (Figure 2). Different habitats located in the abovementioned components were visited at different times in order to have the best coverage of the bird species that represent the birds communities in these areas. In addition to the previous surveys that were carried out by various technical teams of the Ministry of Environment and other NGOs over the period 2005-2012, seven surveys were planned and conducted by the author (as part of IOC's national surveys scheme) targeting the four components of the Ahwar starting after 2012 until 2021; the IOC surveys have continued beyond this date. The surveys have targeted different habitats inside the Ahwar in addition to the margins of the survey area for the sake of having the

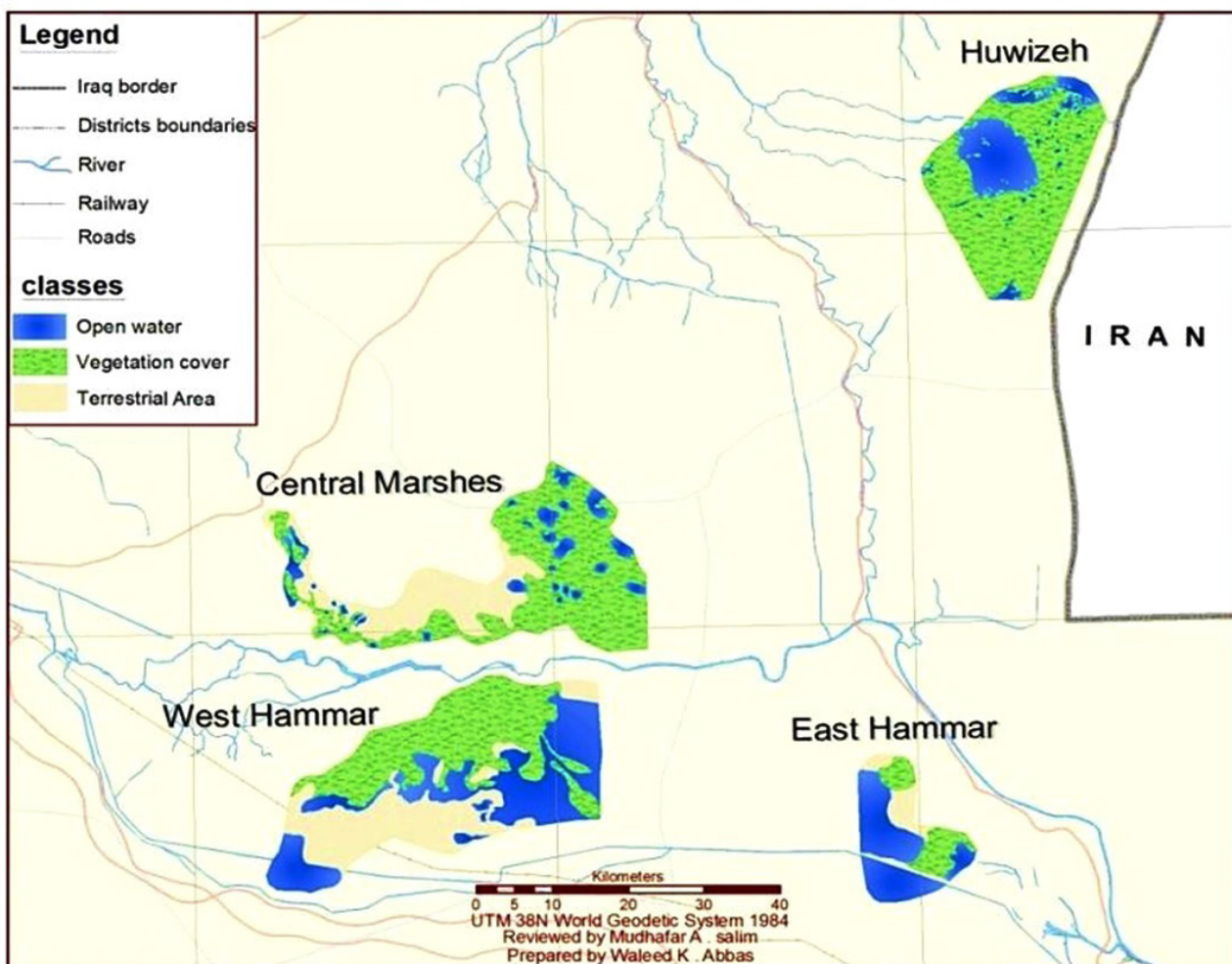


Figure 2. The map shows the study area that includes the four natural components of Ahwar World Heritage property. The map also shows the types and distribution of the different habitats within the four components. (Source of the map: MoEN).

points of these surveys distributed as far as possible.

The surveys were conducted across different seasons (all four seasons included) for each component in order to have a better coverage of the movements of the birds in the Ahwar. Summer surveys were dedicated for the breeding bird species, and the fall and spring surveys were dedicated for the migrant birds, while the winter surveys targeted wintering bird species, mainly waterfowls. Area-count methodology was used during the surveys in order to cover as many areas as possible, in addition, some transect surveys were done at specific habitats, mainly in the areas of Huwaiza, East Hammar, and West Hammar. The counting of birds was conducted either by direct observation during the surveys, or in most cases by estimating the population by extrapolating the numbers for each species observed at the suitable habitat. The areas of unsuitable habitats i.e., polluted habitats or those that suffer from frequent disturbance have been excluded from the extrapolation process. The suitable habitats' areas have been elaborated based on direct field observations, the author's experience in the Ahwar (taking into consideration the

seasonal variation), and by consulting recent satellite images.

The latest version of the IUCN Red List (Version 3.1) has been adopted for the categorizing of the conservation status of the birds in the current paper. Only threatened bird species were tackled in this paper for their important conservation status and to assist the management to take specific action on the ground. The figure below (Figure 3) shows the scope in this paper which involves only the Critically Endangered, Endangered, and Vulnerable bird species that live inside and around the Ahwar.

In order to highlight the specific conditions and the current status of each targeted species, this paper has briefly described the current distribution and the status of these species within the Ahwar as well as the description of their habitats. The current study also briefly describes the current conservation status of each of the twenty-two bird species which have been assessed on the regional level (Regional Assessment) and which live inside and around the Ahwar (IUCN & ARC-WH, 2013). In addition to the results of the field observations, the "Field Guide to the Birds of Iraq" was used to describe the status



Figure 3. the scope of bird species investigated in the current paper according to the different IUCN Red List Categories.

of the birds in Iraq along with the description of their habitats (Salim, et.al., 2006).

Results

The Globally-threatened Bird Species in the Ahwar

The birds accounts below represent those species that have been globally assessed by the IUCN RedList as 'Threatened' species. These bird species include true waterbirds and those that can be found close to the marshes and are dependent on these wetlands either for foraging or roosting.

The estimated population of each species represents the numbers of the individuals or breeding pairs in the Ahwar area.

The White-headed Duck

Oxyura leucocephala. This Endangered duck species winters in the four components of the Ahwar in quite few numbers. They can be mixed with other diving duck species. This species prefers open water surfaces, both, in brackish and fresh waters.

The estimated population of the wintering individuals ranges from 50 to 100 ducks annually but not on a regular basis. Key threats: Habitat destruction (shortage of water), poaching, and disturbance.

Steppe Eagle

Aquila nipalensis. This Endangered species is one of the common raptors found during the migration season soaring over the Ahwar sky, mainly close the edges, but can rarely be found over the depths of the Ahwar. Part of the migrant population remains in the Ahwar area during winter.

The estimated wintering and passing population of this species within the Ahwar area ranges from about 200 to 550 individuals. Key threats: Poaching, electrocution by power lines, and disturbance.

Basra Reed-warbler

Acrocephalus griseldis. This Endangered species is a common breeding summer visitor to the Ahwar. Its nests can be found within the reed-stalks in the water, with more concentration in the shallow areas and those reed-beds close to the margins of the Ahwar. The Ahwar is considered as the most important breeding grounds for this endangered species on the global and national levels (Kubba and Salim, 2011). The estimated breeding pairs ranges nearly from 4,500 to 7,000 in the Ahwar region. Key threats: Habitat destruction (mainly reed-cutting), and disturbance.



Acrocephalus griseldis in the Marshes of Southern Iraq ©Mudhafar Salim.

Lesser White-fronted Goose

Anser erythropus. This Vulnerable goose is an uncommon winter visitor of the seasonal marshes east of the river Tigris, and few of this species winter at other marshes and wetlands in Iraq. This species might be found in quite few numbers in the Huwaiza component, with less possibility of appearance in the other three components. The estimated population of the wintering

birds in the Ahwar's four components ranges from 80 to 150 individuals mixed with other goose species including the Graylag Goose and the white-fronted Goose.

Key threats: Poaching, habitat destruction, and disturbance.

Common Pochard

Aythya ferina. This Vulnerable diving duck is an uncommon winter visitor of the marshes of southern Iraq and other waterbodies. It is usually seen in few numbers mixed with other diving duck species or Coot flocks. This species prefers the open and relatively deep waterbodies. The estimated population of the wintering birds in the Ahwar ranges from 400 to 800 individuals.

Key threats: Poaching, habitat destruction, and disturbance.

Red-breasted Goose

Branta ruficollis. This Vulnerable species can be found in the marshes in quite few numbers, however, old observations were higher than the current observation (Salim, *et.al.*, 2009).

The wintering population of this species is concentrated in the wetlands of northern Iraq. The estimated population of the wintering birds in the Ahwar ranges between 20 and 50 individuals mixed with other goose and duck species. Key threats: Poaching, habitat destruction, and disturbance.

Marbled Teal

Marmaronetta angustirostris. This Vulnerable duck has two populations in Iraq – the breeding, and the non-breeding migrant populations. No studies were conducted to reveal whether the breeding population migrates elsewhere within the Middle East region or stays as resident population(s). Based on long-term observations, it appeared that this species is quite nomadic and showed an unstable distribution (Salim, *et. al.*, 2021; Abed, 2014). It prefers the marshes with a dense reedbed cover, marginal shrubs, and open-water areas. It breeds within the muddy margins of the marshes under dense bushes (Abed, *et. al.*, 2017). The estimated population of the breeding pairs in the Ahwar ranges between 900 and 1500 pairs,



Marmaronetta angustirostris is a breeding species in the Ahwar ©Mudhafar Salim.

and the wintering birds ranges from 2000 to 4000 individuals. Key threats: Poaching, eggs and chicks collecting, habitat destruction, and disturbance.

Greater Spotted Eagle

Clanga clanga. This Vulnerable eagle is relatively one of the common raptors to be found during the migration seasons. It can be found either soaring over the depths of Ahwar waterbodies (especially during migration seasons), or perching on vantage points close to the edges of the marshes. Part of the migrant population winters in the Ahwar area. The estimated wintering and passing population of this species ranges from around 100 to 450 individuals.

Key threats: Poaching, electrocution by power lines, and disturbance.

Eastern Imperial Eagle

Aquila heliaca. This Vulnerable eagle is an uncommon winter visitor and passage migrant in the Ahwar. It passes across the area of southern Iraq in few numbers and can be found in different habitats not only close to the wetlands; however, it can be occasionally found perching on a vantage point within the Ahwar. The estimated wintering and passing population of this species in the Ahwar ranges from around 30 to 70 individuals.

Key threats: Poaching, electrocution by power lines, and disturbance.

The Threatened, Non-waterbirds observed in and around the Ahwar

In addition to the threatened waterfowls, other water birds, and water-related bird species, the non-waterbirds species group have also been included to increase the benefit from the current paper. This group includes those birds that are not closely-dependent on water but have been observed frequently either flying over the Ahwar, or close to the wet margins of the study area. As their distribution might extend far from the Ahwar, no population estimation was made for this group.

Saker Falcon

Falco cherrug. This endangered falcon prefers the dryer habitats but might be found in quite few numbers (or even as a rare bird) around the marshes especially within the dry patches. They might chase their prey (like Sandgrouse and other birds) around their drinking areas. It can be found during the passage and winter seasons. This Endangered bird species is severely wanted by hunters and falconers wherever it can be found. Key threats: Catching by falconers, and disturbance.

Egyptian Vulture

Neophron percnopterus. Despite the lack of studies dedicated to birds' migration, it is clear that the area of southern Iraq might represent a passage area for this vulture; however, these passage individuals might not stay for a long time within this area. This endangered passage vulture can be found soaring around the southern wetlands during their passage from their breeding grounds (the closest is Zagros mountains) heading to their wintering grounds in Africa. Key threats: Poaching, pesticides, electrocution by power lines, and disturbance.



Neophron percnopterus might be considered as a rare/uncommon passage migrant in the Ahwar
©Mudhafar Salim.

Lesser Kestrel

Falco naumanni. This Vulnerable small falcon is considered as a passage migrant in the areas around the Ahwar, however, it can be infrequently found within the margins of the Ahwar especially during the passage season. All of the individuals of this species are migrant, passing over the area of southern Iraq from their breeding grounds. Key threats: Poaching, habitat destruction, pesticides, and disturbance.

European Turtle-dove

Streptopelia turtur. This Vulnerable dove is considered as a passage migrant in Iraq; only a small population remains for breeding in suitable areas. Despite that, this species prefers relatively dryer areas and thorny trees, but it can be found in few numbers around the Ahwar on thorny shrubs. Key threats: Poaching, and habitat destruction.

Asian Houbara

Chlamydotis macqueenii. This Vulnerable species is well-known as the desert dweller, but few individuals or even small groups, can be found close to the wet margins of the Ahwar especially those areas of sandy grounds. This Vulnerable bird species is severely wanted by hunters and falconers wherever it can be found. Key threats: Poaching, catching by falconers, habitat destruction, and disturbance.

The Regionally-assessed Bird Species from the Ahwar

During the capacity-building programme arranged by the Arab Regional Centre for World Heritage (ARC-WH) as part of the preparations for the downstream processing and nomination dossier of the Ahwar as a World Heritage property (IMoEN, 2014), a regional red-list assessment was conducted



Chlamydotis macqueenii found occasionally close to the margins of the Ahwar ©Mudhafar Salim.

to highlight the regionally-threatened bird species. The status of twenty-two bird species inhabiting the Ahwar was also discussed and analyzed in this assessment (IUCN and ARC-WH, 2013). The current paper (through the accounts below) discusses these regionally-assessed birds species with an update of their current status and population estimation based on the results of the recent surveys carried out in the Ahwar area.

Lesser White-fronted Goose

Anser erythropus. Based on the regional assessment (the Ahwar area), this bird species was found to be Critically-endangered around the marshes of southern Iraq. As described in the globally-assessed species above, this bird can be found during winter in the Ahwar only in few numbers. The updated estimated population and threats have already been given above along with the key threats.

White-headed Duck

Oxyura leucocephala. This species has been assessed on the regional level (the Ahwar area) as Critically Endangered based on its current conservation status in the Ahwar. It can be found mainly in Huwaiza in addition to other wetlands. The updated estimated population and threats have already been given above along with the key threats.

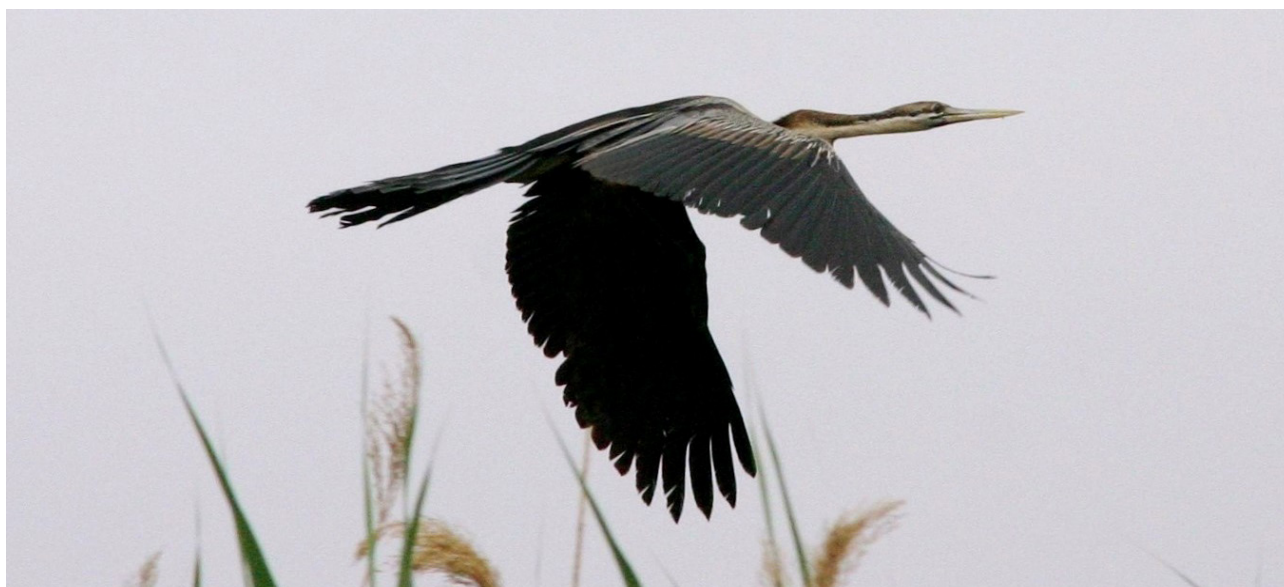
African Darter

Anhinga rufa. Based on the regional assessment (the Ahwar area), this unique bird is a Critically-endangered species based on its current conservation status in the Ahwar. During recent surveys, this species was found only in Huwaiza, specifically around the eastern parts of Huwaiza as a breeder and in quite few numbers. Historically, this species was found in other components of the Ahwar, but the breeding and wintering individuals were only found in Huwaiza based on the recent surveys. It seems that the distribution of this species declined down from its typical range in the Ahwar due to the quantity and the quality of the water. The estimated breeding pairs are less than twenty located in the eastern and northeastern Huwaiza component only, and are not found elsewhere in the Ahwar.

Key Threats: collecting the eggs and chicks, poaching, habitat destruction, and disturbance.

Goliath Heron

Ardea goliath. Based on the regional assessment, this bird species is Critically-endangered in the Ahwar, similar to the previous species. This unique species has been assessed on the regional level (the Ahwar area) based on its current conservation



The Ahwar provides crucial breeding and feeding habitats for *Anhinga rufa* ©Mudhafar Salim.

status in the Ahwar. Few observations confirmed the presence of few individuals of this species in remote areas in the eastern parts of Huwaiza. The estimated breeding pairs are less than ten located in tiny stripes in eastern Huwaiza and are not to be found elsewhere in the Ahwar.

Key Threats: poaching, habitat destruction, and disturbance.

African Scared Ibis

Threskiornis aethiopicus. This species has been assessed on the regional level (the Ahwar area) as Critically Endangered based on its current conservation status in the Ahwar. During recent surveys, this species was found only in few numbers in Huwaiza as a breeder. There has been only one observation of an individual in the Western Hammar, so it might be rare in the other three components of Ahwar. The estimated breeding pairs range from 20 to 70 in the Ahwar. Key Threats: collecting the eggs and

chicks, poaching, habitat destruction, and disturbance.

Greater Spotted Eagle

Clanga clanga. Based on a regional assessment, this bird species is Endangered. In addition to its global assessment (See its account above), this species has been assessed on a regional level (the Ahwar area) based on its current conservation status in the Ahwar. Its status was described above along with the estimated population and the key threats.

Imperial Eagle

Aquila heliaca. In addition to its global assessment (See its account above), this species has also been assessed on the regional level (the Ahwar area) as Endangered based on its current conservation status in the Ahwar. Its status was described above along with the estimated population and the key threats.



The Ahwar hosts few breeding colonies of *Threskiornis aethiopicus* that are important on the Middle-East level ©Mudhafar Salim.

Eurasian Spoonbill

Platalea leucorodia. This species has been assessed on the regional level (the Ahwar area) as Endangered based on its current conservation status in the Ahwar. During the recent surveys, this species was found breeding only in Huwaiza, specifically in the eastern parts of Huwaiza and in quite few numbers in a mixed breeding colony. Elsewhere, few individuals were found in small groups occasionally within the Ahwar. The estimated breeding population of this species in Ahwar ranges from 50 to 150 breeding pairs. Key threats: collecting the eggs and chicks, poaching, habitat destruction, and disturbance.

Purple Swamphen

Porphyrio porphyria. This species has been assessed on the regional level (the Ahwar area) as Endangered based on its current conservation status in the Ahwar. During

the recent surveys, this species was found breeding all over the Ahwar, specifically at the marshes of dense reedbeds and in quite considerable numbers. It was assessed as Endangered due to the severe hunting pressure in particular during the breeding season. The estimated breeding population of this species in the Ahwar ranges from around 7,000 to 10,000 breeding pairs. Key threats: Poaching, eggs and chicks collecting, habitat destruction, and disturbance.

Black-tailed Godwit

Limosa limosa. This migrant species has been assessed on the regional level (the Ahwar area) as Endangered based on its current conservation status in the Ahwar, and due to habitat destruction – mainly shortage of water on mudflat stripes. This wader prefers the open mudflats and cannot be found in the grassy or reedbed areas; therefore, the majority of its local population is concentrated either in buffer zones or



Platalea leucorodia breeds in Ahwar and migrates within the Middle East region ©Mudhafar Salim.

around them. The estimated wintering and passing population of this species in Ahwar ranges from 4,000 to 8,000 individuals. Key threats: habitat destruction and disturbance.

Basra Reed-warbler

Acrocephalus griseldis. In addition to its global assessment as Endangered species (See its account above), this breeding migrant has been assessed on the regional level (the Ahwar area) as Endangered based on its current conservation status in the Ahwar and due to the habitat destruction factor. It breeds in the Ahwar in quite considerable numbers to the extent that Ahwar is considered as their key breeding grounds on the global level. The conservation status along with their population estimation and the key threats are provided above.

Black Francolin

Francolinus francolinus. Based on the regional assessment, this bird species is Vulnerable. This bird is not considered as a marsh-dweller species, but it might be found in considerable numbers around the Ahwar and within the dryer patches and stripes within the Ahwar. It has been assessed on the regional level (the Ahwar area) as Vulnerable based on its current conservation status and due to the severe hunting pressure especially during the breeding season. Estimating the population of this species might not be possible or feasible because its suitable habitats extend beyond the buffer zones of the Ahwar. Key threats: Poaching, habitat destruction, and disturbance.



Francolinus francolinus is a common breeding species around the Ahwar ©Mudhafar Salim.

Little Grebe

Tachybaptus ruficollis iraquensis. The race of this species (*T. r. iraquensis*) is a breeding sub-species (Salim, *et. al.*, 2021), that has been assessed on the regional level (the Ahwar area) as Vulnerable based on its current conservation status in the Ahwar, and

due to the habitat destruction and disturbance factors. The estimated breeding pairs range from 11,000 to 15,000 in the Ahwar. Key threats: Habitat destruction, disturbance, and the accidental netting by fishnets.



The Iraqi sub-species *Tachybaptus ruficollis iraquensis* breeds in considerable numbers in the Ahwar ©Mudhafar Salim.

Pygmy Cormorant

Phalacrocorax pygmeus. This species has been assessed on the regional level (the Ahwar area) as Vulnerable based on its current conservation status in the Ahwar. During the recent surveys, this species was found breeding only in Huwaiza and in quite considerable numbers, but it was assessed as Vulnerable due to habitat destruction

and disturbance. The estimated breeding population ranges between 2,000 and 4,000 pairs in the Ahwar. However, this population might suffer more decline on the local level due to the expanding of Azim marshes after constructing the border embankment between Iraq and Iran. The wintering population of this species is quite unstable on an annual basis, and this might be due to the increasing availability of suitable habitats at the Iranian



The Ahwar is an important region for the breeding of *Phalacrocorax pygmeus* ©Mudhafar Salim.

neighboring marshes; however, it might range from 3,000 to 5,000 individuals. Key threats: Poaching, habitat destruction, and disturbance.

In addition to the species listed above, there are some additional bird species that were regionally assessed within the same project as vulnerable due to different reasons and factors. These species include the White-tailed Lapwing *Vanellus leucurus*, the Slender-billed Gull *Larus genei*, the Whiskered Tern *Chlidonias hybrid*, the White-winged Tern *Chlidonias leucopterus*, the Pied Kingfisher *Ceryle rudis*, the Graceful Prinia *Prinia gracilis*, the Iraq Babbler *Turdoides altirostris*, and the Mesopotamian Crow *Corvus cornix capellanus*.

The Ahwar provides vital breeding habitats for considerable populations of the water-dweller bird-species, in addition to those that live around this area. This freshwater wetland is considered as the last largest freshwater marsh area for birds that migrate from their breeding grounds in Eurasia, heading to Africa to spend the winter (Salim, *et.al.*, 2009; Salim, *et.al.*, 2021). As far as global significance is concerned, the Basra Reed Warbler is the most important species with Iraq probably holding over 90% of the world breeding population. It is mostly concentrated in the Lower Mesopotamian marshes. In addition, this endangered species breeds in few scattered and fragmented regions in Iran, Kuwait and Palestine (Porter and Aspinall, 2010).

It is important to highlight the significance of the Ahwar for different types of bird groups including endemic species and subspecies. The Basra Reed Warbler has already been mentioned in this work along with the Iraq Babbler. This species lives and breeds within the intensive reed-stalks in quite considerable numbers in the Ahwar area. In addition, the Hypocolius, which is endemic to the Middle East, has a considerable breeding population within the dryer areas around the Ahwar. Some more endemic (locally/regionally important) subspecies are also significant from the conservation point of view; these include: the Black Francolin, the Little

Grebe, the Sacred Ibis, the Goliath Heron, the African Darter, and the Mesopotamian Crow (Salim, *et.al.*, 2009; Kubba and Salim, 2011). The current status and estimated populations of most of these species have been highlighted in the current paper.

Discussion

Different types and categories of threats cause the degradation in the resident and migrant bird populations. In fact, these threats also affect the birds themselves (like poaching), and their breeding, foraging, or roosting habitats (Moser, *et.al.*, 1996; Becker, 2014). Several surveys carried out by the researcher over the period 2005-2020 have included an assessment of the threats targeting the birds' populations as well as their habitats. Additionally, the significant results of the monitoring programs prepared by the technical staff of the Environment HQs in the three Governorates of Basra, Thi-Qar, and Missan have been adopted by this research as well.

The researcher found that mentioning these different types of threats which affect the birds and their habitats in the Ahwar adds to the value of the current paper.

Figure 4 illustrates the thirteen typical factors and threats found across the four natural components in the Ahwar based on recent fieldwork and the results of the surveys. It demonstrates and compares the status and the level of each sort of threat/factor (isolated bar) in each component (color code) so the share of each risk factor gets to be self-evident among the diverse components (IMoEN and ARC-WH, 2018).

Regarding the effects of different types of threats/factors in each of the Ahwar components, the figure below outlines clearly which of the four natural components is more influenced by the diverse threats and factors than the others. It is clear that the Central Marshes component is the most affected due to the seriousness and the pressure of these factors and threats. The West Hammar and Huwaiza components were comparatively

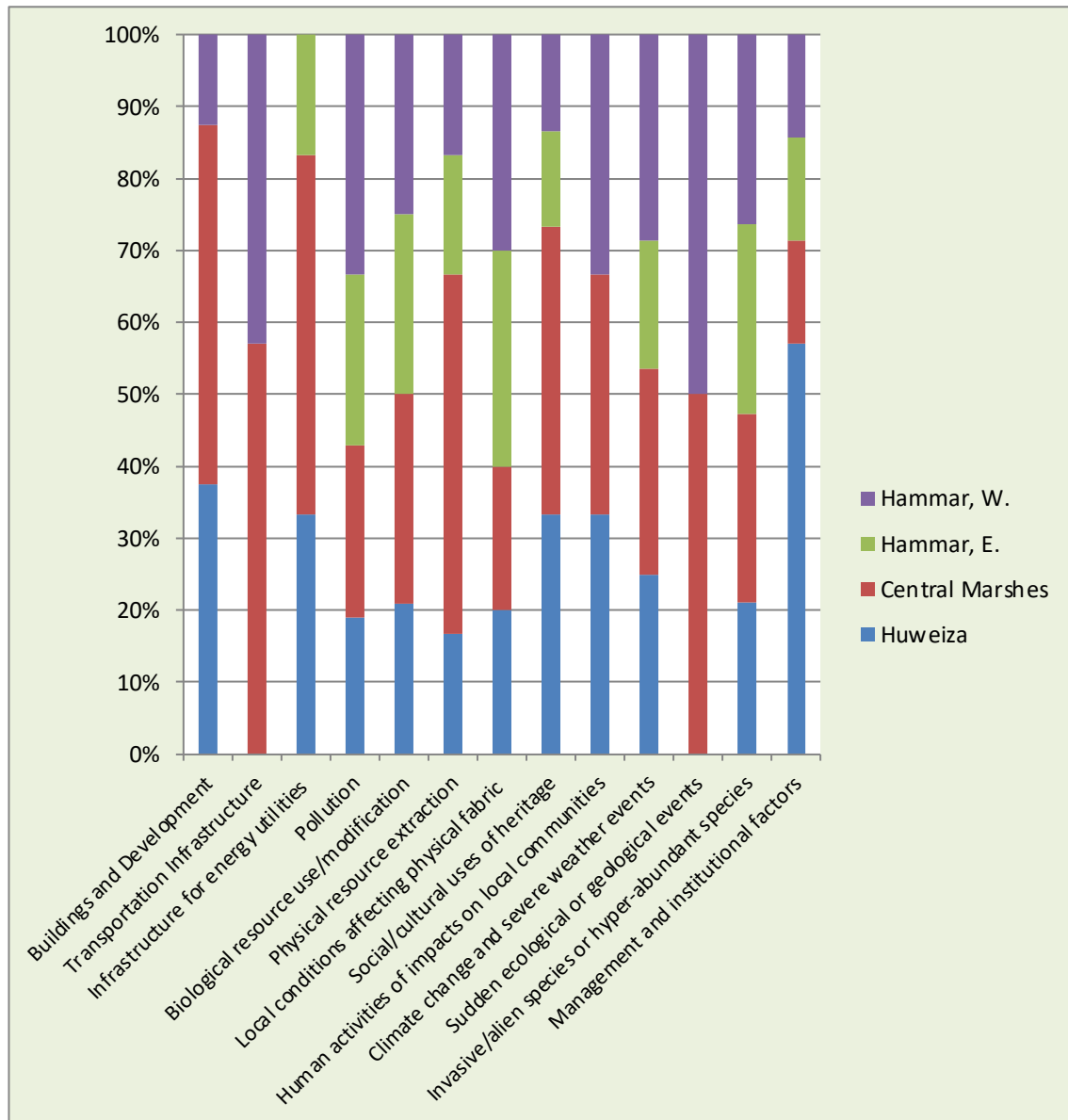


Figure 4. shows the different levels of various kinds of threats in the four components of the Ahwar (showed in four colours).

under a similar level of pressure and threats, whereas the East Hammar was comparatively the least affected among the rest of the natural components of the Ahwar (IMoEN and ARC-WH, 2018).

The extensive surveys which have been conducted recently by ornithologists show that despite the drainage during the 1980s and 1990s, no breeding bird species have become extinct in the marshes of southern Iraq (Salim, *et. al.*, 2009). Nevertheless, it is clear that noticeable change has occurred in the bird species' population especially after the return of the majority of the dwellers to the marshes following their restoration.

The other factor that might be of crucial influence is the constructing of the soil embankment which has cut the natural flow of the Azim marshes which extending inside the Iranian lands to from the Huwaiza marshes. It becomes clear then that the most critical factor which influences the birds and their habitats in the Ahwar is the shortage and fluctuation of freshwater amounts which feed these marshes (IMoEN and ARC-WH, 2018).

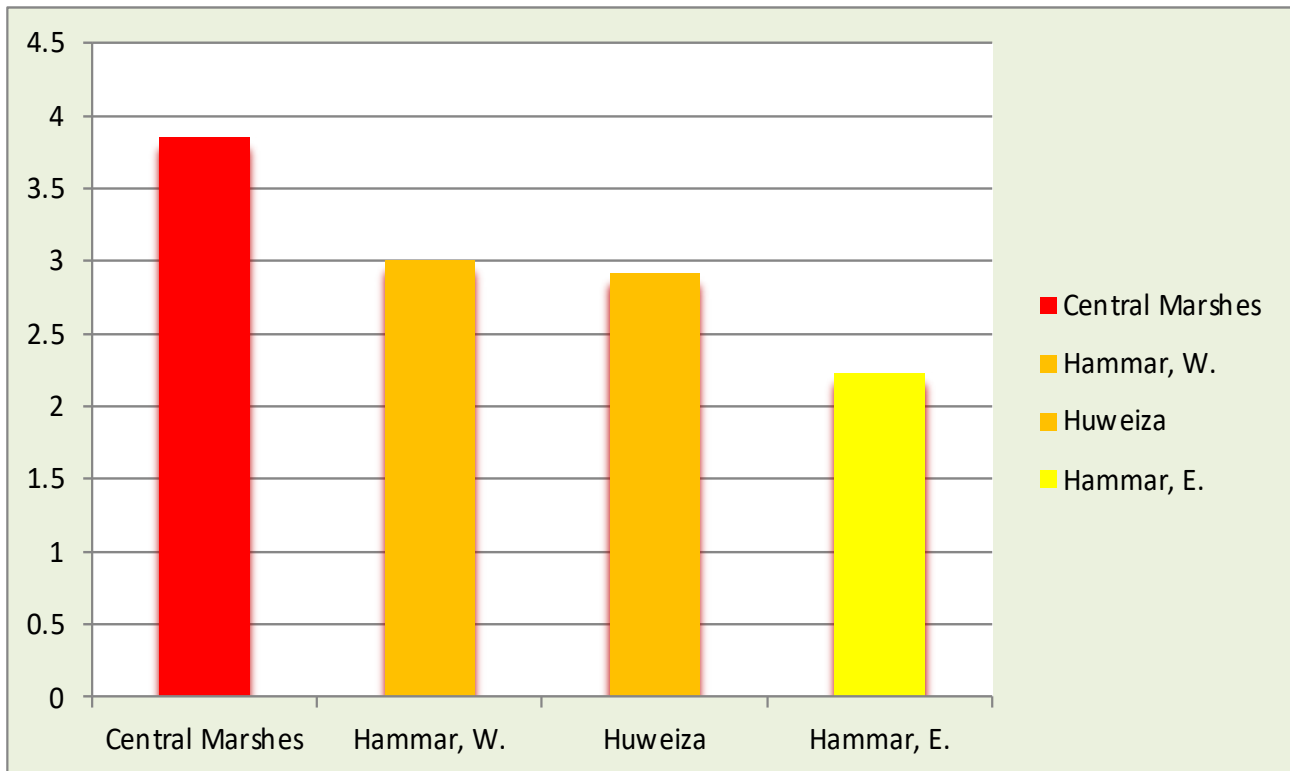


Figure 5. The effects of different kinds of threats and factors on the four components of the Ahwar (showed in four colours).

Recommendations

Based on the results presented in this paper, the researcher would like to present and highlight the following recommendations:

1. The threatened bird species (as part of the entire threatened flora and fauna) of the Ahwar should be dealt with as a priority issue in this environmentally important area, and more attention should be given to update the management plan of the natural components of the Ahwar.
2. There should be a program dedicated to the monitoring of the threatened birds in the Ahwar area, and this should cover both populations: the resident, and the migrant bird species. The updated results of the monitoring program are to be shared with the World Heritage Center (via the formal channels) to acquire the suitable technical advice as quickly as possible.
3. Special efforts should be given to the breeding, roosting, and foraging habitats of the threatened birds mentioned in this paper, in addition to giving more priority to their conservation.
4. More institutional cooperation and coordination on the local and national levels should be established and applied on the ground in order to facilitate the efforts and minimize the required resources for the monitoring and protection activities.
5. Conducting long-term capacity building programmes for the staff directly involved in the monitoring programme with more focusing on bird identification.
6. Long-term awareness and education programmes should be designed and applied on the local and national levels regarding the threatened birds and their habitats in the Ahwar area.

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