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Ecological Influences on Bird Aggregation and Migration in Southern Iraq: A Scientific Review

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Abstract: The southern Iraqi wetlands, especially the Hammar, Hawizeh, and Central Marshes, are one of the most ecologically important locations of migratory and resident birds in the Middle East. Forming a part of the largest wetland in Western Eurasia in the past, these territories are currently exposed to the severe danger connected with human operation and alterations of the environment. This paper will focus on assessing the ecological importance of these wetlands to avian biodiversity, acknowledging the major environmental issues afflicting the bird population, and offering practical tips for conservation. It is a study founded on a review and synthesis of earlier published research, reports, and international assessments, the focus of which is the bird migration patterns, the habitat diversity, and environmental effects on the marshes in southern Iraq. The wetlands also act as important stopovers and breeding areas to more than 200 species of birds, including the world's threatened Northern bald Ibis and Marbled Teal. The marsh drainage, dam construction, pollution, poaching, and climate change, however, have led to a reduction in the bird populations. These threats have interfered with migration patterns and the poor wetland ecosystem. Lacking urgent and long-term conservation measures, such as the restoration of habitats, increased control over human actions, and global cooperation, the ecological and cultural significance of the Iraqi marshes of the southern region as an essential part of the international migratory routes will only decline further.

Keywords: Migratory birds, the marshlands of Iraq, biodiversity, and wetlands in southern Iraq.

Introduction:

The significant role of these major wetlands in sustaining the balance of the Middle East and their incredible biodiversity is what differentiates the major wetland ecosystems of the Middle East from those of southern Iraq, such as Maysan, Dhi Qar, and Basra governorates [1]. These marshes had earlier been called the largest wetland in western Asia. They merge the rivers Tigris and Euphrates, creating a singular place of land and water, which has created the most significant and unparalleled biodiversity. The map below shows the geographical position of the southern Iraqi marshes that comprise the Hammar, Hawizeh, and Central Marshes, which are located in the governorates of Maysan, Dhi Qar, and Basra, as reflected in Figure 1**.** The wetlands have a great biological importance along the Asia-Africa flyway as they are visited by migrating birds [2]. Argues that numerous species of birds, seasonal migratory and permanent residents, find the needed feeding and breeding areas in these wetlands. Some of these birds include mallards, pink flamingos, bald ibises, cranes, and herons, as in Figure 2.

Increasing issues that threaten the existence and stability of this fragile ecosystem need interventions. The recent years have seen the project of draining wetlands, river diversion, and, maybe a result of climate change, all of which have led to the reduction of water levels and the drying up of large parts. Agricultural and industrial activities, which have been practiced illegally have, led to a drastic decline in the bird populations through illegal shooting and pollution. According to recent research, there is an ongoing depletion in the population of resident and migratory birds, and this has affected the ecological stability of these birds as well as the ecological importance of these birds [3].

Figure 1: Map of the Mesopotamian Marshes in the south of Iraq. Blue circles indicate the location of the main marsh land in Iraq, Remapped [2].

Figure 2: Shows some types of migratory birds that reach the marshes of Iraq [3].

Also, the marshes in southern Iraq are important in terms of their cultural, economic, and social values since the people residing around the marshes still follow their traditional methods of living and survival tactics. The paper seeks to integrate and review the available literature on the topic of the ecological relevance of the southern Iraqi wetlands, or the Hammar, Hawizeh, and Central Marshes, to migrating bird populations. It identifies the threats caused by climate change and human activity, the key aspects of the environment that influence the diversity of birds, and migration patterns.

Significance of Marshes in Birds' Habits

To permanent and migratory birds, marshes provide a vital natural habitat. These damp habitats are rich in terms of food supply, safe nesting and breeding sites, and resting places of the birds on their long transcontinental migrations. Each year, tens of thousands of birds rely on the marshes and swamps of the southern part of Iraq as a transitory or long-term habitat, offering a biologically distinctive example of such important functions [4]. The ecological nature of marshes is characterized by incredible amounts of flora and water life that support interdependent food chains that include invertebrates, fish, and algae. They are the main source of food for many bird species, such as ducks, geese, herons, and waders[5]. Thick plants and flooded grasses also offer the perfect nesting places, particularly at locations that are not vulnerable to the wind and also in places that are not reachable by predators [6,7]. Additionally, marshland is also important in conservation of endangered and threatened species; there are species that survive in wetlands. The loss of such habitats through drought or human intrusion has been proven to directly cause population decline in such species as the bald ibis (Geronticus eremita) and the coot (Porphyrio porphyroid), which have been recorded in marshes during wet periods [1,2]. Bird

populations can be used to check the environmental alteration, such as water pollution, temperature change, or land disturbances, and as such are considered bio-indicators of healthy ecosystems. The alteration of the quality of the wetland habitat is directly reflected in the changes in the population of birds or their migration patterns [8,9]. The preservation of such ecosystems ensures that natural resources on which the indigenous people depend for their traditional life, including hunting and buffalo herding, are preserved [10, 11]. Wetlands cannot be separated as an essential component of the ecological web, and their loss affects the existence of all birds that rely on them directly. This has placed their preservation as a major consideration in local and global conservation of biodiversity. It has been reported to support more than 200 species of birds, some of which are either rare or endangered throughout the world, such as the Marbled Teal (Marmaronetta angustirostris) and the Northern Bald Ibis (Geronticus eremita). Necessary to breed, rest, and forage, and to avian life cycles [12].

Changes in the Environment and their effects on birds:

The alterations in the environment that have taken place in the marshes of the southern part of Iraq and other wetlands influence both the native and migratory birds in large numbers. Some of these transformations include the effects of climate change, human pollution, depleting marshes, and dam construction in the upstream countries. In this part, the factors behind these advances are given in more detail, and their direct impacts on birds [13].

1. Draining the Marshes

Starting a project, which aimed at draining the marshes of the southern part of the country in the 1990s, the Iraqi government left a considerable footprint of destruction of

natural habitats, which were some of the most significant habitats of native and migrating birds [14]. The wetlands act as a stopover that gives the birds a food cover and breeding ground to enable them to fly between Africa and Asia. The water from the wetlands has considerably decreased the biodiversity of the area. Specific species of particular areas have been lost, and the numbers of birds dependent on them have dropped drastically. Some of the most adversely affected animals include the aquatic birds, such as geese and ducks. Even though Iraq had launched the marshland restoration project in 2003, the level of biodiversity has yet to be restored to pre-drainage levels. It has been found that certain species have become locally extinct, and the variety of birds is lower than it was several years ago [15].

2. Dam Construction:

Some of the significant sources of water flow to the Iraqi marshes include dams in the upstream countries such as Turkey and Iran. These dams have reduced water levels, which have led to low water flow to Iraq, as well as poor aquatic environments. Reduced flow of water destroys nesting sites and reduces the success of reproduction in birds. It also minimizes the stopovers of migrating birds, thereby undermining their capability to complete their long journeys [2].

3. Pollution:

The other environmental hazard to the marshlands is pollution caused by human activities such as the use of chemicals in farming and oil production. Pollution promotes the build-up of toxins and degradation of the water quality, and consequently the demise of the avians and reproductive failure. Less food is available because of fertilizers and pesticides. Simultaneously, the heavy metals and hydrocarbons may harm directly the internal organs or the young of the birds [16].

4. Climate Change:

Climate change is also a serious phenomenon that comes with its consequences and contributes to the explanation of temperature changes and the depletion of water surfaces. These factors have an instant effect on the marsh species, bird nesting places, and remnants [17].

The Heterogeneity of Habitat and Ecosystems in Southern Marshlands:

The marshlands in the south of Iraq are described as having a dynamic ecological setup, and as such, they provide a broad range of habitats that change with seasonal changes [18]. Such wetlands include freshwater and brackish areas- such as the Hawizeh Marsh that obtains rather fresh water through the river Tigris. Simultaneously, the Hammar Marsh is generally more salty, as the inflow of freshwater is decreased [17]. The seasonal cycles, like spring flooding, are important in enlarging the available habitats and improving the breeding environment of the animal species such as herons, stilts, and ducks [8]. The vegetation community is also a source of diversity in the habitat: the open water and waders would be found in dense reed beds, which serve as important shelters and nesting sites of the elusive species like the Little Bittern (Ixobrychus minutus) [19]. Also, mudflats and shallow water habitats are significant feeding grounds to migratory shorebirds, such as egrets, sandpipers, and plovers, in particular during their long-distance flight [20]. Comprehensively, the conservation of the bird diversity in the ecologically sensitive area is highly related to the conservation of a range of habitats. This heterogeneity of habitat is critical to the maintenance of species with varying ecological needs, especially in a terrain where water supply varies with the time of the year [21].

Species Migration patterns:

Different groups of birds have varying migration patterns depending on the ecological features of the wetlands [22]. Long-distance migrants between wintering and breeding areas: Species that use marshes as important stopovers include the Black-tailed Godwit (Limosa limosa) and Eurasian Spoonbill (Platalea leucorodia) between wintering areas and breeding areas in Central Asia or Eastern Europe [23]. There are short-distance migrants and winter visitors, among which there are the following birds: Northern Shoveler (Spatula clypeata), Common Teal (Anas crecca), and Lapwing (Vanellus vanellus), which winter in the wetlands, thus take advantage of high temperatures and large supplies [24]. • Endemic and resident species: The Basrah Reed Warbler (Acrocephalus griseldis) can only nest in undamaged reed beds, which are only found in the area [25]. Though the time of migration is often associated with seasonal flooding and food supply, the altering climatic patterns dislodge these cycles [26]. Also, habitat degradation is a threat to the population of birds in the migration routes [27].

Impact of anthropogenic and Poaching:

Ecological risks are worsened by the anthropogenic stresses [28].

Hunting: Several species, including the vulnerable ones, are hunted to be consumed, as a game, and as a trade, when the flocks are grouped together, and no control is imposed on the activity [29].

Illegal trapping techniques: Knowledge practices like mist netting and baited traps, which have been declared illegal in the international conservation laws, are still common [30].

• Intrusion and habitat interference: Reed harvesting, fishing, grazing, and agriculture are some of the activities that interfere with feeding and nesting behaviour [31].

Weak enforcement: Although Iraq is signatory to the Ramsar Convention and national laws, the application of the law is weak because of funding and security issues [32].

• Traditions and economic needs: In other cultures, hunting is either a tradition or a need. The awareness and alternative livelihood programs play important roles in minimizing the dependence on these practices [33].

These anthropogenic pressures exert a further negative impact on the impacts of climate and environmental change, and thus they amplify the extinction threat of a large number of bird species [34].

Field Studies:

The field research conducted in the recent past reveals that the population of birds in the southern marshes has significantly reduced, especially during dry seasons. The level of species diversity has reduced significantly relative to the past levels [35].

Local and International Conservation Activities;

The Mesopotamian Marshes have been recognized globally, and this has led to conservation efforts:

Ramsar Convention on Wetlands: The involvement of Iraq in the convention demonstrates the significance of the wetlands in Iraq internationally. Designation of Hawizeh Marsh as a Ramsar site is an international protection [36].

• UNESCO World Heritage Site: the status that was adopted in 2016 supports conservation of cultural heritage and ecological heritage [37].

NGO participation: Some of the NGOs to be involved include BirdLife International and Wetlands International, who have been working with the Iraqi authorities in

monitoring the birds and ecological measures within the country [38].

• Team research: Iraqi universities, IUCN, donors, including UNEP and USAID, are promoting the restoration of marshlands and community-based conservation [4].

• Transboundary water diplomacy: Iraq is also involved with countries upstream to ensure the flow of water, yet there remain geopolitical issues [39].

Such initiatives offer avenues to ecological recovery, yet they will yield only when there is a robust commitment on the national level and the capacity to develop strong local efforts [40].

Conclusion:

The southern marshes of Iraq are essential to the bird migration systems across the world. Science-based conservation policy is therefore required urgently to protect this important ecosystem due to the increasing environmental and human pressures.

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التأثيرات البيئية على تجمع الطيور وهجرتها في جنوب العراق: مراجعة علمية

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ملخص:

تمثل الأراضي الرطبة في جنوب العراق، وخاصةً أهوار الحمار والحويزة والأهوار الوسطى، أحد أهم الموائل البيئية للطيور المهاجرة والمقيمة في الشرق الأوسط. تاريخيًا، كانت هذه المناطق جزءًا من أوسع منظومة أراضي رطبة في غرب أوراسيا، وهي الآن معرضة لتهديدات خطيرة بسبب التدخلات البشرية والتغيرات البيئية. تهدف هذه الدراسة إلى تقييم الأهمية البيئية لهذه الأراضي الرطبة للتنوع البيولوجي للطيور، وتسليط الضوء على التحديات البيئية الرئيسية التي تؤثر على أعداد الطيور، وتقديم توصيات عملية للحفاظ عليها. يستند البحث إلى مراجعة شاملة وتوليف للدراسات والتقارير والتقييمات الدولية المنشورة سابقًا، مع التركيز على أنماط هجرة الطيور، وتنوع الموائل، والآثار البيئية الخاصة بأهوار جنوب العراق. تُعد الأراضي الرطبة محطات توقف وتكاثر حيوية لأكثر من 200 نوع من الطيور، بما في ذلك الأنواع المهددة بالانقراض عالميًا مثل أبو منجل الأصلع الشمالي والبط المرمري. ومع ذلك، انخفضت أعداد الطيور بسبب تجفيف الأهوار، وبناء السدود، والتلوث، والصيد الجائر، وتغير المناخ. وقد أدت هذه التهديدات إلى اختلال أنماط الهجرة وتدهور النظام البيئي للأراضي الرطبة. الخلاصة:بدون جهود عاجلة ومستدامة للحفاظ على البيئة، بما في ذلك استعادة الموائل، وتشديد الرقابة على الأنشطة البشرية، والتعاون الدولي، ستستمر القيمة البيئية والثقافية لأهوار جنوب العراق، باعتبارها حلقات حيوية في مسارات الطيور المهاجرة العالمية، في التدهور.