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Status of waterbirds in two important sites at East Hammar marshland , Basrah , Iraq

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Abstract

Monitoring birds and their diversity is considered a significant tool in environmental conservation practices. Most bird monitoring and surveys, both globally and in Iraq, have primarily focused on major wetland areas such as marshlands, beaches, lakes, and rivers. This study specifically concentrated on monitoring waterbirds in one of Iraq's largest marshlands, the East Hammar marsh. A total of fifty-seven waterbird species were recorded in two vital sites within this region, encompassing seven orders and twelve families during all monitoring periods. The Sadah and Burgah sites hosted 46 and 56 waterbird species, respectively. In the present study, five species were identified as significant conservation priorities in the East Hammar marshland and have been red-listed by the IUCN. The highest number of waterbird species (51) was documented in March 2023 at the Burgah site, while the lowest number (27) was observed in May 2023 at the same site. The maximum number of individuals (1399) was recorded in February 2023 at the Burgah site, with the lowest count (314) at the Sadah site. In general, the diversity indices at both sites clearly indicated a high biodiversity index, with the distribution of numbers among the recorded species being relatively even, except in some months.

Keywords: East Hammar marsh, waterbird status, Important sites.

Introduction

The marshlands of southern Iraq are the largest and most significant wetlands for avifauna in the Middle East (Habeeb, 2023). The southern part of Iraq considered an important area for bird migration, and this importance comes due to the geographical location of this region, which is located on the migration routes from Siberia to south Africa (Habeeb, 2008). These vast marshes enjoy moderate climatic conditions during the winter season, in addition to their location It is strategically located at the intersection of the flyways of many birds, so large numbers visit these marshes or pass through them, especially waterbirds(Boere and Stroud, 2006; Hahn *et al*., 2009 ; Al-Sheikhly *et al*. 2017) . Many wetland sites in the southern part of Mesopotamia have been included in the list of wetlands of international importance based on criteria set by the Ramsar Convention as an Important Bird Area (Carp, 1980).

The marshes of Mesopotamia in southern Iraq are suitable for birds to rest, feed, and breed (Habeeb *et al*. 2018). Therefore, these areas require special protection measures from human encroachment, such as destruction or fragmentation of these habitats. Moreover, monitoring of birds is considered a precious biological indicator that is used as an instrument to detect any inverse changes in wide-scale habitat changes, fluctuations in ecological conditions, and/or to identify the potential danger of changing abiotic factors (physical and chemical) of the site (Abou-Turab *et al*., 2017). Surveying and monitoring of birds at various spatial and temporal scales can highlight the importance of certain sites and times for bird existence and diversity; therefore, the limitation of whether a particular location is considered a vital site for birds or just a visiting location during a certain temporal scale needs to be taken into account by constructing a network of monitoring programs that aim to highlight the environmental importance of different environments at various spatial scales (Harebottle, 2012).

Study area

Hammar Marshland is one of the largest southern Iraqi marshes. Its length ranges from 120 km, width is approximately 25 km, and depth of water is (1.8-3) meters. Hammar Marshland can be divided into two parts, the western and eastern (Iraq foundation ,2003). The eastern region is affected by the semidiurnal tide of the Arabian Gulf (Hussain and Taher, 2007). Two sites were chosen to conduct the waterbird survey on the East Hammar marshland. First site Sadah (Channel marsh) (N: 30° 36′ 31.3″ ; E: 47° 40′ 10.9″) and second site Burgah(openness marsh) (N: 30° 41′ 27.6″; E: 47° 34′ 25.9″).

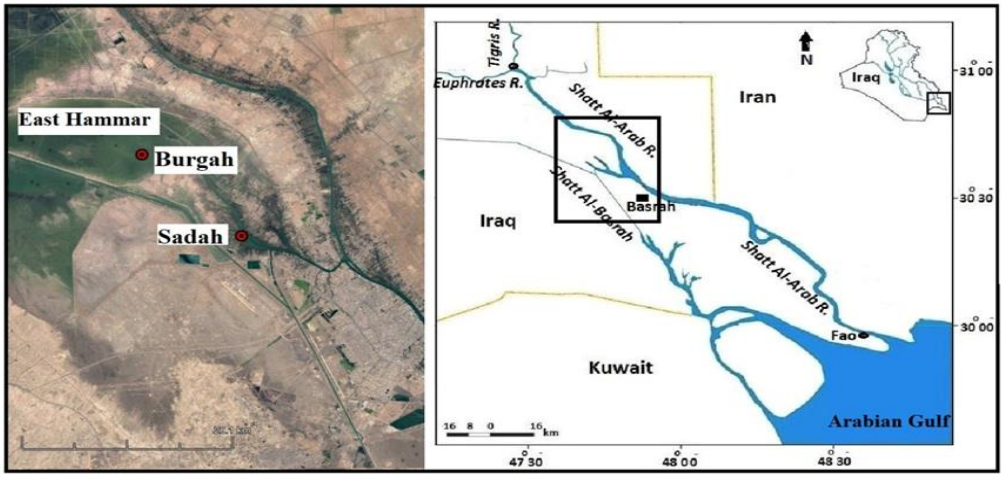

Fig. (1): Map of the study sites

Material and methods

The survey was conducted between November 2022 and May 2023. According to Sutherlan *et al*. (2004), two methods (line transect and point transect) were used to survey different waterbird species. To evaluate the waterbird community, we applied ecological indices such as Simpson's diversity index [$D = 1- \sum (pi)^2$], Margalef's richness index [D= S-1/ Ln N], and Pielou's evenness index [$J = H' / Ln S$].

Results

A total of 57 waterbird species were recorded at two important sites in the East Hammar marshland belonging to seven orders and 12 families in all monitoring periods, with 46 and 56 waterbird species in Sadah and Burgah, respectively (Table 1). In the present study, 16 species were resident and breeding, 33 species were winter visitors or passage migrant, eight species were noted during summer visitor and breeding (Table 1). In current study found five species that are significant protection priorities in the East Hammar marshland and are red listed by the IUCN: The Near Threatened species were Marbled Teal *Marmaronetta angustirostris*, Ferruginous Duck *Aythya nyroca*, Black-tailed Godwit *Limosa limosa* and Curlew Sandpiper *Calidris ferruginea*. In addition, the vulnerable species were the Common Pochard *Aythya ferina* (Table 1).

Table (1): Waterbirds in the East Hammar Marshland sites during the survey period in the IUCN Red List category.

Scientific name	common name	Order	Family	IUCN Red List category	Sadah	Burgah
Tachybaptus ruficollis	Little Grebe	Podicipediformes	Podicipedidae	LC	+	+
Tadorna tadorna	Common Shelduck	Anseriformes	Anatidae	LC	-	+
Marmaronetta angustirostris	Marbled Teal	Anseriformes	Anatidae	NT	+	+
Aythya ferina	Common Pochard	Anseriformes	Anatidae	VU	-	+
A. nyroca	Ferruginous Duck	Anseriformes	Anatidae	NT	-	+
Spatula querquedula	Garganey	Anseriformes	Anatidae	LC	-	+
S. clypeata	Northern Shoveler	Anseriformes	Anatidae	LC	+	+
Anas platyrhynchos	Mallard	Anseriformes	Anatidae	LC	+	+
A. crecca	Common Teal	Anseriformes	Anatidae	LC	+	+
A. penelope	Eurasian Wigeon	Anseriformes	Anatidae	LC	+	+
A. strepera	Gadwall	Anseriformes	Anatidae	LC	+	+
Porphyrio porphyrio	Purple Swamphen	Gruiformes	Rallidae	LC	+	+
Gallinula chloropus	Common Moorhen	Gruiformes	Rallidae	LC	+	+
Fulica atra	Common Coot	Gruiformes	Rallidae	LC	+	+
Ciconia ciconia	White Stork	Ciconiiformes	Ciconiidae	LC	+	+
Plegadis falcinellus	Glossy Ibis	Pelecaniformes	Threskiornithidae	LC	-	+
Ixobrychus minutus	Common Little Bittern	Pelecaniformes	Ardeidae	LC	+	+
Nycticorax nycticorax	Night-heron	Pelecaniformes	Ardeidae	LC	+	+
Ardeola ralloides	Squacco Heron	Pelecaniformes	Ardeidae	LC	+	+
Bubulcus ibis	Cattle Egret	Pelecaniformes	Ardeidae	LC	+	+
Ardea cinerea	Grey Heron	Pelecaniformes	Ardeidae	LC	+	+
A. purpurea	Purple Heron	Pelecaniformes	Ardeidae	LC	-	+
A. alba	Great White Egret	Pelecaniformes	Ardeidae	LC	-	+
Egretta garzetta	Little Egret	Pelecaniformes	Ardeidae	LC	+	+
Pelecanus onocrotalus	Great White Pelican	Pelecaniformes	Pelecanidae	LC	+	+
Microcarbo pygmaeus	Pygmy Cormorant	Suliformes	Phalacrocoracidae	LC	-	+

Phalacrocorax carbo	Great Cormorant	Suliformes	Phalacrocoracidae	LC	+	+
Recurvirostra avosetta	Pied Avocet	Charadriiformes	Recurvirostridae	LC	+	+
Himantopus himantopus	Black-winged Stilt	Charadriiformes	Recurvirostridae	LC	+	+
Charadrius hiaticula	Common Ringed Plover	Charadriiformes	Charadriidae	LC	+	+
C. dubius	Little Ringed Plover	Charadriiformes	Charadriidae	LC	+	+
C.alexandrinus	Kentish Plover	Charadriiformes	Charadriidae	LC	+	+
Vanellus spinosus	Spur-winged Lapwing	Charadriiformes	Charadriidae	LC	+	+
V. indicus	Red-wattled Lapwing	Charadriiformes	Charadriidae	LC	+	+
V. leucurus	White-tailed Lapwing	Charadriiformes	Charadriidae	LC	+	+
Limosa limosa	Black-tailed Godwit	Charadriiformes	Scolopacidae	NT	-	+
Calidris pugnax	Ruff	Charadriiformes	Scolopacidae	LC	+	+
C. alpina	Dunlin	Charadriiformes	Scolopacidae	LC	+	+
C. minuta	Little Stint	Charadriiformes	Scolopacidae	LC	+	+
C. ferruginea	Curlew Sandpiper	Charadriiformes	Scolopacidae	NT	+	-
Gallinago gallinago	Common Snipe	Charadriiformes	Scolopacidae	LC	+	+
Actitis hypoleucos	Common Sandpiper	Charadriiformes	Scolopacidae	LC	+	+
Tringa ochropus	Green Sandpiper	Charadriiformes	Scolopacidae	LC	-	+
T. totanus	Common Redshank	Charadriiformes	Scolopacidae	LC	+	+
T. nebutaria	Common Greenshank	Charadriiformes	Scolopacidae	LC	+	+
T. glareola	Wood Sandpiper	Charadriiformes	Scolopacidae	LC	-	+
T. stagnatilis	Marsh Sandpiper	Charadriiformes	Scolopacidae	LC	-	+
A. interpres	Ruddy Turnstone	Charadriiformes	Scolopacidae	LC	+	+
Glareola pratincola	Collared Pratincole	Charadriiformes	Glareolidae	LC	+	+
Larus genei	Slender-billed Gull	Charadriiformes	Laridae	LC	+	+
L. ridibundus	Black-headed Gull	Charadriiformes	Laridae	LC	+	+
L. armenicus	Armenian Gull	Charadriiformes	Laridae	LC	+	+
Sterna hirundo	Common Tern	Charadriiformes	Laridae	LC	+	+
Sternula albifrons	Little Tern	Charadriiformes	Laridae	LC	+	+
Hydroprogne caspia	Caspian Tern	Charadriiformes	Laridae	LC	+	+
Chlidonias hybrida	Whiskered Tern	Charadriiformes	Laridae	LC	+	+
C. leucopterus	White-winged Tern	Charadriiformes	Laridae	LC	+	+

+ Recorded –not recorded.

The results of the present study showed that the highest number of waterbirds species 51 were recorded in March 2023 at the Burgah site, while the lowest number (27) was recorded in May 2023 at the same site (figure 2).

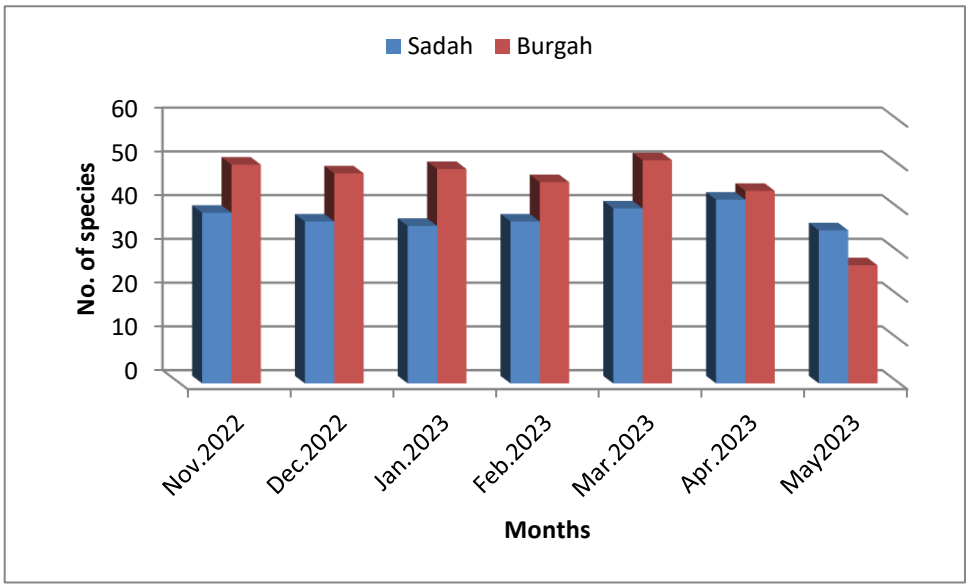

Fig. (2) Variations in the number of waterbird species at two sites in the eastern Hammar marshland.

In general, the highest number of individuals 1399 were recorded in February 2023 in Burgah site, But the lowest number 314 were recorded in Sadah site (figure 3).

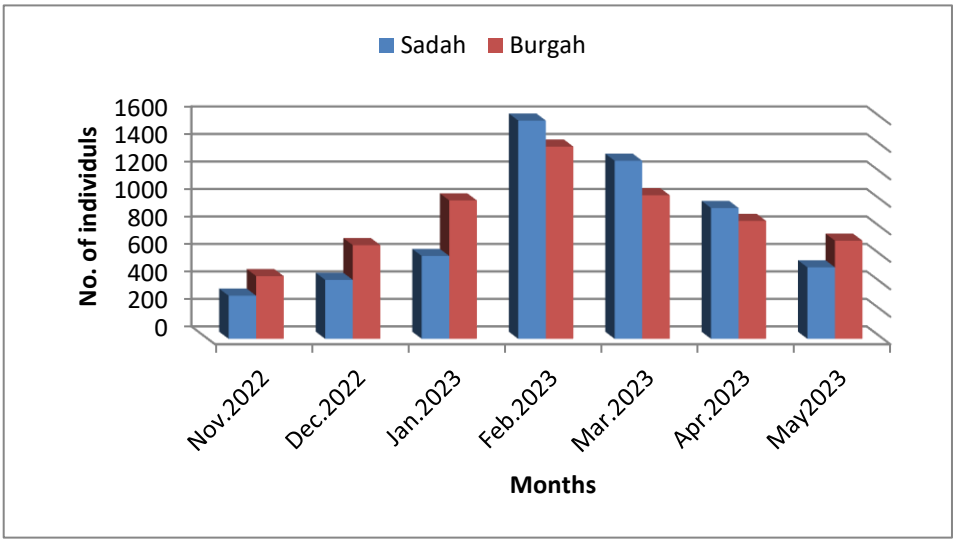

Fig. (3) Variation in the counts of waterbirds in two sites of the East Hammar marshland.

The monthly variations in the richness index (D) of waterbirds examined from November 2022 to May 2023 are shown in Figure 4. However, the highest D value of 8 was recorded in November 2022 at the Burgah site and the lowest D value of 3.957 was recorded in March 2023 at the same site.

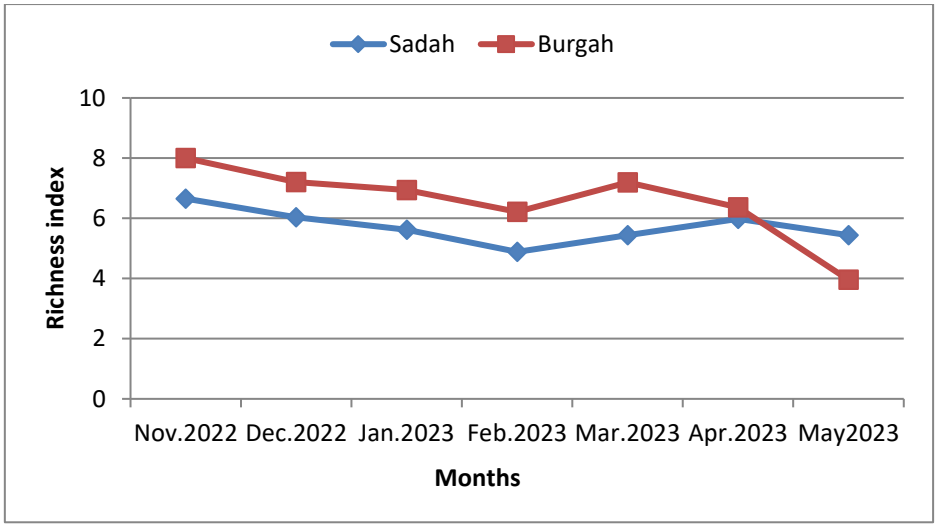

Fig.(4) Monthly variation in the richness values of waterbird communities in East Hammar Marshland.

The results of the present study showed a higher value of diversity index (Simpson's index) of 0.949 in November 2022 at the Sadah site, while a low value of 0.887 was noted in May 2023 at the Burgah site (figure 5).

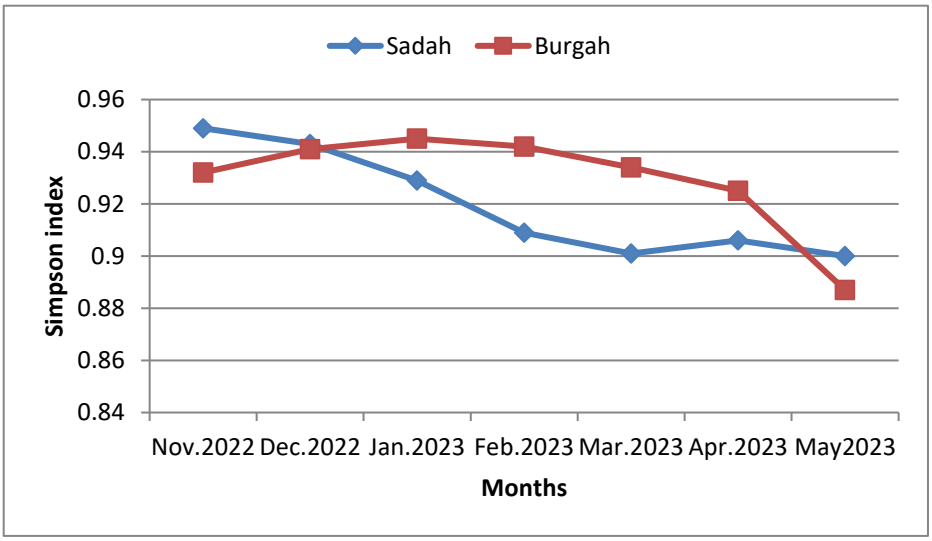

Fig.(5) Monthly variations in diversity values of waterbird communities in the East Hammar Marshland.

On the other hand, the results exhibited the highest value of evenness index of 0.89 in November 2022 at the Sadah site, but the lowest value of 0.767 was observed in April 2023 at the same site (figure 6).

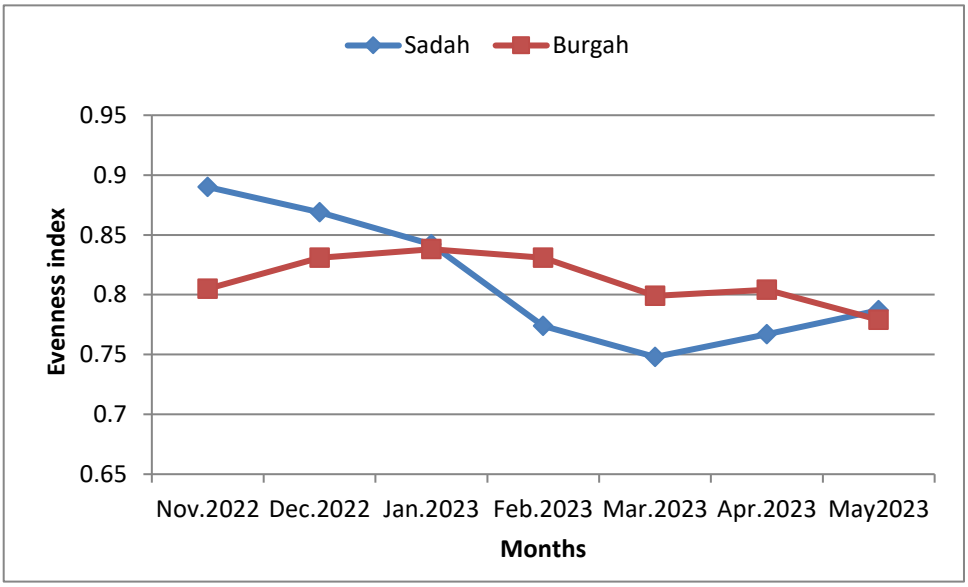

Fig.(6) Monthly variations in evenness values of waterbird communities in the East Hammar Marshland.

Discussion

Iraq is geographically located within three major flyways (East Asia/East Africa Flyway, Central Asia Flyway, and Mediterranean/Black Sea Flyway); therefore, the Mesopotamian marshlands of southern Iraq have become an important staging/stopover site for migratory waterbirds (Al-Sheikhly *et al*. 2017). Furthermore, the Iraqi marshlands are characterized by huge avifauna, including many waterbirds, as stated in previous surveys (Habeeb, 2014 ; Salim and Porter 2015). Fifty-seven waterbird species were recorded at two important sites in the East Hammar marshland over seven months. This number of species represents approximately 48% of the total number of waterbird species in the Iraqi Mesopotamian marshlands, which reached 122 waterbird species (Salim and Porter, 2015). Five of these species are listed under low protection categories of the IUCN Red List, such as Marbled Teal *M. angustirostris*, Ferruginous Duck *A. nyroca*, Black-tailed Godwit *L. limosa*, and Curlew Sandpiper *C. ferruginea*, which is categorized as a globally threatened species, and Common Pochard *A. ferina*, which is considered a vulnerable species (BirdLife International, 2023). It is clear from the results that the Burgah site recorded the greatest number of species of waterbirds, which reached 56 species, compared to the Sadah site, which reached 46 species, because the Burgah site is an area with open water. At low tide, the area has wide mudflats that attract many species of waterbirds, especially waders(Habeeb *et al.*, 2018). The results showed that the Charadriiformes order was the most common taxon in both locations because of the availability of subsistence requirements for shelter and food. The results showed that the winter months had a greater number of waterbirds owing to the arrival of large flocks of winter visitors. Generally, the biodiversity indices at both sites clearly indicated that the biodiversity index was good and that the distribution of numbers among the recorded species was close, except for some months.

Conclusions

East Hammar marshland boasts remarkable avian biodiversity due to its diverse habitats. These ecosystems serve as crucial stopover points for migrating birds during autumn, winter, and spring. This richness makes it an ideal candidate for conservation and environmental management. However, the region faces significant threats. Hunting, including the use of poison, poses a grave danger to the waterbird community, particularly ducks and coots. Additionally, the cutting of vegetation cover threatens bird shelters. To protect this valuable area, urgent conservation measures must be implemented, including declaring it a nature reserve or another form of protected area.

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واقع الطيور المائية في موقعين مهمين في هور شرق الحمار – البصرة / العراق

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المستخلص

تعد مراقبة الطيور وتنوعها أداة مهمة في ممارسة الحفاظ على البيئة. تركزت معظم عمليات رصد ومسح الطيور على مستوى العالم وفي العراق بشكل رئيسي على مناطق الأراضي الرطبة الرئيسية مثل الأهوار، والشواطئ، والبحيرات، والأنهار. ركزت هذه الدراسة على مراقبة الطيور المائية في أحد أكبر الأهوار العراقية وهو هور شرق الحمار. سجل 57 نوعا من الطيور المائية في موقعين مهمين في هذه المنطقة تابعة لسبعة رتب و12 عائلة خلال فترة المراقبة، وبلغت هذه الأنواع من الطيور المائية (46، 56) في موقعي السدة والبركة على التوالي. وجد في الدراسة الحالية خمسة أنواع تمثل أولويات حماية مهمة في هور شرق الحمار وهي مدرجة في القائمة الحمراء من قبل الاتحاد الدولي لحماية الطبيعة. تم تسجيل أعلى عدد لأنواع الطيور المائية 51 نوعاً في مارس 2023 في موقع البركة، بينما سجل أقل عدد 27 نوعاً في مايو 2023 في نفس الموقع، بالإضافة إلى أن أكبر عدد من الأفراد 1399 تم تسجيله في فبراير 2023 في موقع البركة، وسجل اقل عدد 314 فرداً في موقع السدة. وبشكل عام فإن مؤشرات التنوع في كلا الموقعين تشير بوضوح إلى أن مؤشر التنوع الأحيائي جيد. وأن توزيع الأعداد بين الأنواع المسجلة متقارب إلى حد ما، باستثناء بعض الأشهر.