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Jadriyah and Umm Al-Khanazeer Island Sites, Baghdad, Iraq: Status and Eligibility as an Important Bird Area

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Abstract

In Baghdad, the site of Jadriyah and Umm Al-Khanazeer Island (JUKI) was the only IBA nominated by the Birdlife International in 1994 (based on data from 1984). Unfortunately, the JUKI site was deleted from the IBA list in 2017 without proper investigation. We compared our 2022 data with two previous surveys and successfully calculated the trend of the site for the first time. JUKI, as compared to 1984 as baseline data, has currently a medium level of threats (land use change and climate change). Status assessment shows that the site in 2022 has 58.9 % of its 1984 potential habitat remaining (poor habitat status). JUKI still has 84 % of its 2011 potential bird population (moderate bird status), keeping 3 of the 6 original key species; half of the key bird species is kept (indicating continuous eligibility as IBA site). The site needs the immediate activation of absent proper site management (response measures) based on the IUCN and Birdlife International criteria. The newly added trend parameter indicated a trend of no change–small deterioration. Our conclusion is that the JUKI site is still eligible as an IBA site and its removal from the IBA list was not based on scientific evidence.

Keywords: Climate change, JUKI, IBA, land use, Remote sensing.

Introduction

Since 2014, more than half of the world's population has been living in cities, and by 2050, this number is projected to rise to 66 percent[1]. Managing urban areas has emerged as one of the world's most pressing development concerns as cities struggle to satisfy the requirements of their expanding urban populations[2]. Throughout the past few centuries, management practices have changed significantly in many parts of the world. The most dangerous factor contributing to the loss and fragmentation of natural vegetation cover is the loss of biological diversity[3]. For example, in Iraq's capital city of Baghdad, there is a problem with the development of urbanization and changes to land use that put stress on the city's animal and plant ecosystems and destroy the balance between urban areas, natural systems, and vegetation[4]. With a rise in population from 3,509.000 in 1984 to 8,126.755 in 2018, the city became flooded by an inflow of people and it is the largest city in terms of population according to officially published numbers[5]. Despite the significance of the city's natural features and vegetation, there is only one location in Baghdad—the Jadriyah and Umm Al-Khanazeer Island (JUKI). Now it is called (Tourist Wedding Island) —was identified by Evans (1994) as an important bird area (IBA) based on data collected in 1984 on the occurrence of a number of important birds species[6]. The JUKI location was a

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green, the natural environment until the University of Baghdad campus was constructed there in 1958. The surrounding lands were sold to individuals for private use at the start of 1980 [7] The location was unexpectedly removed from the Iraqi Key Biodiversity Areas (KBAs) national list of 2017, which was based on surveys conducted during 2005-2011. This has led to the removal of the site from the IBA list on Birdlife International's official website and data zone [8,9]

In addition to the threat of urban expansion and development in construction, there is another danger that affects diversity and wildlife in Iraq, which is climate change. One of the major problems the planet Earth currently faces is climate change or global warming. It is the observed century-scale increase in the Earth's average temperature and its consequences[10]. Severe climatic conditions, such as long freezes and dry periods, can have disastrous consequences for bird populations, even affecting whole groups in the future the effects include increased breeding, altered migratory timing, altered nesting success and egg size, altered population numbers altered population distributions, and altered selection differentials across population components[11]. Due to the situation of climate change today, important steps include preserving natural areas, improving vegetation, and adding green space inside major urban areas. The natural ecosystems of the city are under significant strain from urbanization and climate change, which may limit the capacity of urban planners to adjust to any future scenarios of climate change [12.] . However, according to different studies, the number, distribution, and abundance of bird species vary because of habitat variability. Birds are the best-known group of vertebrates most birds are useful for humans, for example, pollination and control of insect populations in different ecosystems [13]. As the most well-known group of vertebrates, birds serve a variety of purposes for humans, including pollination and controlling insect populations in various habitats[14]. Bird populations and other species have declined significantly because of these changes in land use and management, as well as the resulting losses of resources from the agricultural environment[15]

The hypothesis of the study is to monitor the area and identify the threats that affect birds and give an assessment of them based on approved international foundations and standards. Then compare these results with the results of previous observations carried out in the same area to obtain the result, which is whether the Jadriyah area and Umm al-Khanazeer Island are an important area for birds (IBA).

Materials and Methods

1. Study area

The capital of Iraq, Baghdad is centrally located and the most heavily populated city in the country (about 8.13 million people in 2018) based on estimates made by the Central Statistics Organization[5]. The city has a location that occupies part of the middle sedimentary plain (latitudes: 33.10 ° N, 32.04 ° N; longitudes: 44.77 ° E, 43.29 ° E; altitude: 34 m AMSL), being divided by the Tigris River into western (Al-Karkh) and eastern (Al-Rusafa) parts. The twenty-seven regions of Baghdad include a large number of smaller districts that include areas for residence, roads, industry, and agriculture (Fig. 1). The city has a continental climate that is mainly hot/dry in the summer seasons and cold/rainy in the winter seasons. Summers and winters clearly vary in terms of temperature (36.2 ^{C} in August vs. 10.7 ^{C} in January). The rainy season extends from December to April and the annual precipitation rate is about 150 mm. The dry season extends from May to September with a high evaporation rate. North-western/south-eastern wind trends prevail around the year.

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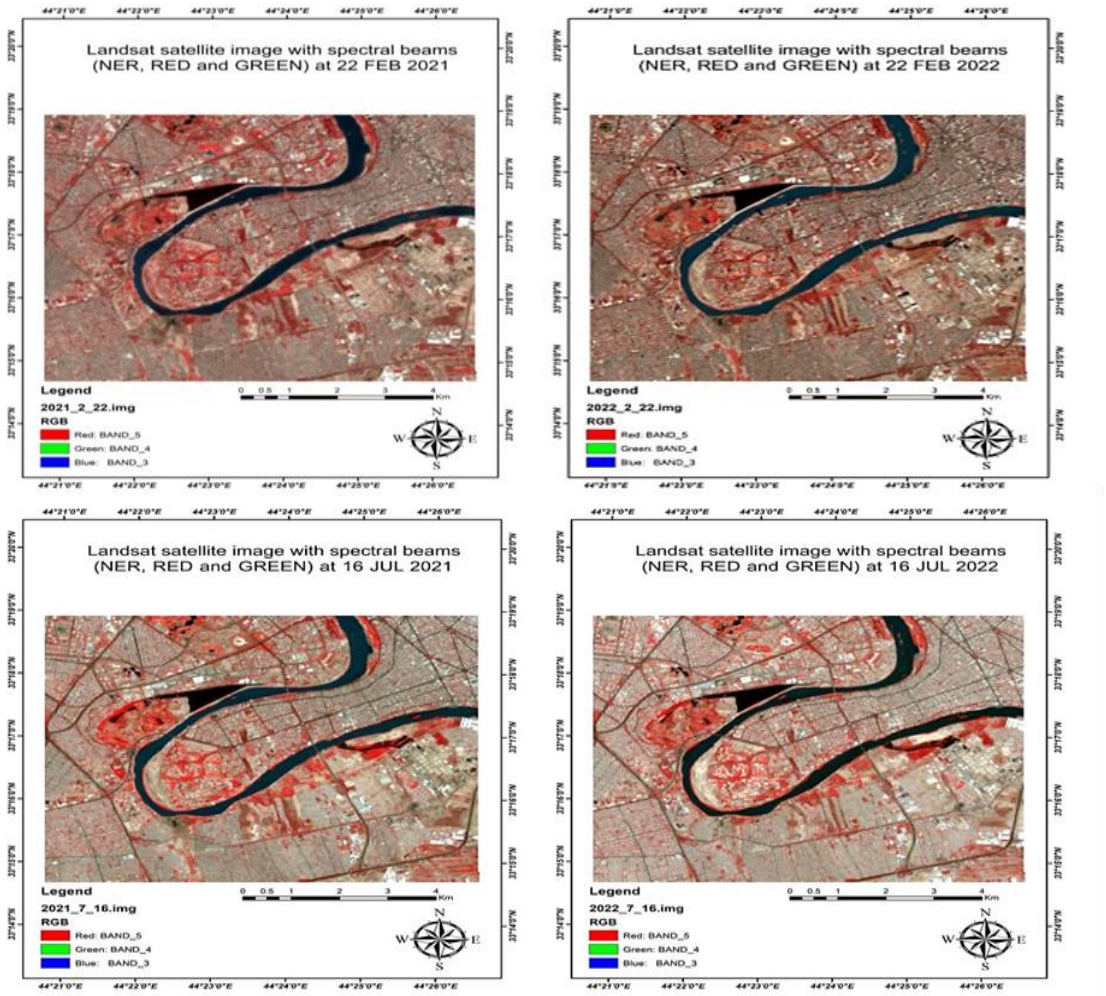

Figure 1. The limits of the research region of the JUKI site in Baghdad city, Jadriyah, are depicted by composite bands of satellite pictures with spectral beams (NER-IR, Red, and Green).

2. Remote sensing

In Baghdad city, changes in land availability and use were assessed using remote sensing.

Evidence of natural resource depletion and urbanization from 2022 to 2023. The approach was the same Used in the JUKI evaluation and to draw attention to areas of natural vegetation in Baghdad Threats from rising temperatures caused by climate change using the Bird Area (IBA) to natural ecosystems are also being assessed using remote sensing. The Landsat 8 thermal bands can be used to compute or estimate the land surface temperature. All you have to do is use a raster image calculator (like ArcMap, ArcGIS Pro, or QGIS) to apply a series of equations. To begin, download a Landsat 8 image from a specific place, unzip it, and verify the metadata for the information required to carry out this process. The Landsat 8 bands may be used to determine Land Surface Temperature (LST), as demonstrated in this lesson. Specifically, bands 4 and 5 compute the Normal Difference Vegetation Index (NVDI), while band 10 is the thermal band. To determine the Land Surface Temperature (LST), utilize the USGS formulae (more details may be found in the article Automated Land Surface Temperature Mapping Using LANDSAT 8 Satellite Data); this example simply performs the calculations without going into detail about the fundamentals.

3. Bird survey method

The whole area of the JUKI site was subjected to systematic seasonal surveys to detect resident and migratory bird species starting from 2022 and ending

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in summer 2023 (six surveys each year; one day every two months; 15-minute observation period at each point). Random surveillance s of point transect within and around the University campus were conducted using directly visual assessments, utilizing a Canon camera (binocular, auto-focus, 75-300mm). An overall number of five points were surveyed; three within the campus, one on the Jadriyah Bridge located on the Tigris River beside the campus, and one on Umm Al Khanazeer Island[12]

4. Site assessment methodology

For the assessment of the pressure (threats), status (conditions), and response (conservation actions) for the JUkI site, the criteria listed in the guidelines published by Birdlife International Framework [15] were applied.

A. Pressure (threats)

- **The selected types of threats:**

The Birdlife International guidelines identified 12 overall types of threats that can be used to assess pressures on any IBA site [16,17], two specific threats were selected which belong to two types; these are:

1. Urbanization, which belongs to type 2 of threats listed above (Residential & commercial development).
2. Temperature, which belongs to type 11 of threats listed above (Climate change & severe weather).

- **Threats scoring:**

A clear scoring system that depends on 3 scoring criteria was adopted based on the guidelines, which are the timing, scope, and severity of the selected threat. Each criterion has a score scale of 0, 1, 2, and 3, which was calculated based on the data collected from the site under study (Table 1).

Table 1. Criteria and scoring system for the threats on IBA sites as specified by Birdlife International[15].

Timing of threat	Timing score
Happening now	3
Likely in the short term (within 4 years)	2
Likely in the long term (beyond 4 years)	1
Past (and unlikely to return) and no longer limiting	0
Scope of threat	**Scope score**
Whole population/area (> 90 %)	3
Most of population/area (50-90 %)	2
Some of population/area (10-50 %)	1
Few individuals / small area (< 10 %)	0
Severity of threat	**Severity score**
Rapid deterioration (> 30 % over 10 years or 3 generations , whichever is the longer)	3
Moderate deterioration (10-30 % over 10 years or 3 generations)	2
Slow deterioration (1-10 % over 10 years or 3 generations)	1
No or imperceptible deterioration (< 1 % over 10 years)	0

Then, the overall Impact Score of Threat was calculated by summing the timing score + scope score + severity score. The impact score was then interpreted to describe the final IBA threat status score, as desorption below:

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Highest impact score for any threat	IBA threat status score (description)
0	0 (low)
3-5	-1 (medium)
6-7	-2 (high)
8-9	-3 (very high)

B. Status (condition)

The site status was assessed based on the following two criteria[15]:

1. Population sizes for 'trigger' species.
2. The size and condition of the important habitats that the "trigger" species rely on, serving as a "surrogate" or indirect indicator of population size.

For each criterion, i.e. bird population and key habitats, the remaining percentage in the IBA site was calculated. Status scores of 0 (very poor), 1 (poor), 2 (moderate), and 3 (good) were given to remaining percentage values of 40, 40-70, 70-90, and >90%, respectively.

C. Response (Conservation actions)

The JUKI site has no measures of conservation made by relevant institutions, e.g. the Ministry of Environment or the University of Baghdad, indicating that the "response" element of the assessment of the IBA sites is not fulfilled.

D. Trend

The JUKI site trend for each of the three elements of assessment (threats, status, and response) was calculated by comparing the IBA status scores between the current and previous assessments. For example, for the trend of the status of the site, the following equation was used:

Trend of site status = Assessment 2(IBA status score) – Assessment 1 (IBA status score).

Next, the scoring system described below was employed to interpret the scores acquired by applying the equation shown below:

+3 Large improvements	0 No change	-1 Small deterioration
+2 Moderate improvements		-2 Moderate deterioration
+1 Small improvement		-3 large deterioration

Results and Discussion

Firstly, assessed percentages of current land use patterns in the JUKI site by using remote sensing technology (Figs. 2,3 and 4), and then compared them to previous datasets from the KBA survey of 2005/2011 (for bird populations) and Evans data from -1994 (for land use and climate change based on main data from 1984). We also used datasets collected during 2019 for drawing the trend of the status of the study area.

1. Data collected during the current survey (2021-2022)

- **Residential & commercial development or Land use change (urbanization) JUKI site in 2021-2022**

Based on the results of remote sensing, changes in land use were assessed in this survey during the years 2021-2022 (Table 2 and Fig. 2,3). The results in a

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percentage of covered area demonstrated slight changes in the built-up land (44.17 to 43.75 %), abandoned land (14.68 to 15.13 %), water bodies (5.69 to 3.64 %), dense vegetation (2.86 to 3.86 %), and low vegetation (18.81 to 19.83 %) for the period between February 2021 to July 2022.

Table 2. Land use change (%) in JUKI site during 2021-2022.

Survey Date	Built-up Land (%)	Abandoned Land (%)	Water Bodies (%)	Dense Vegetation (%)	Low Vegetation (%)
22/02/2021	44.17	14.68	5.69	2.86	18.81
16/07/2021	40.35	18.53	4.54	5.86	16.93
22/02/2022	47.87	17.17	4.19	3.17	13.81
16/07/2022	43.75	15.13	3.64	3.86	19.83

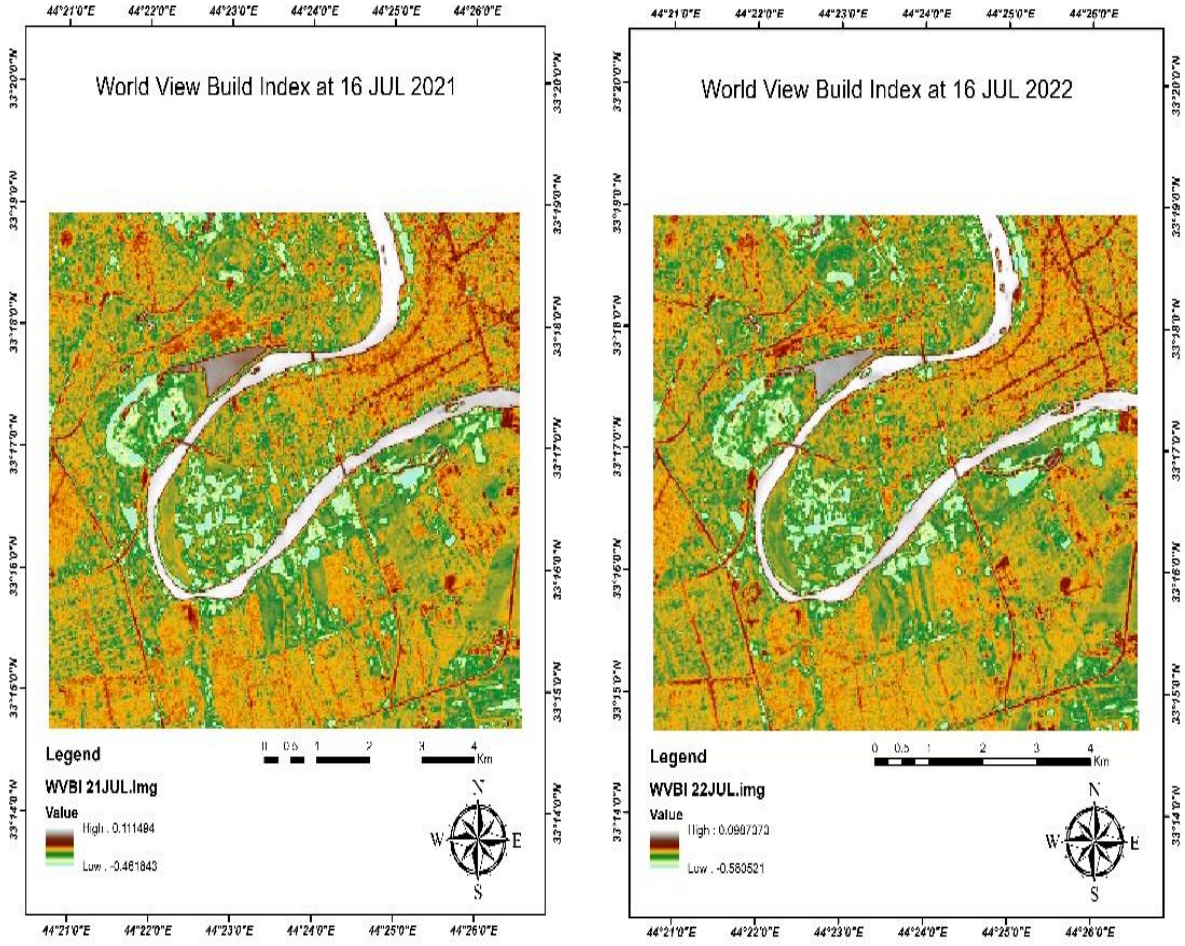

Figure 2. Worldview Build Index: July 2021–2022 Updates for Jadriyah and Umm Al-Khanazeer Island Site (left) (Built-up Land 40.35%, Abandoned Land 18.53%, Water Bodies 4.54 %, Dense Vegetation 5.86%, Low Vegetation16.93 %). (Right) (Built-up Land 43.75% Abandoned Land 15.13%, Water Bodies 3.64 %, And Dense Vegetation 3.86%, Low Vegetation 19.83%).

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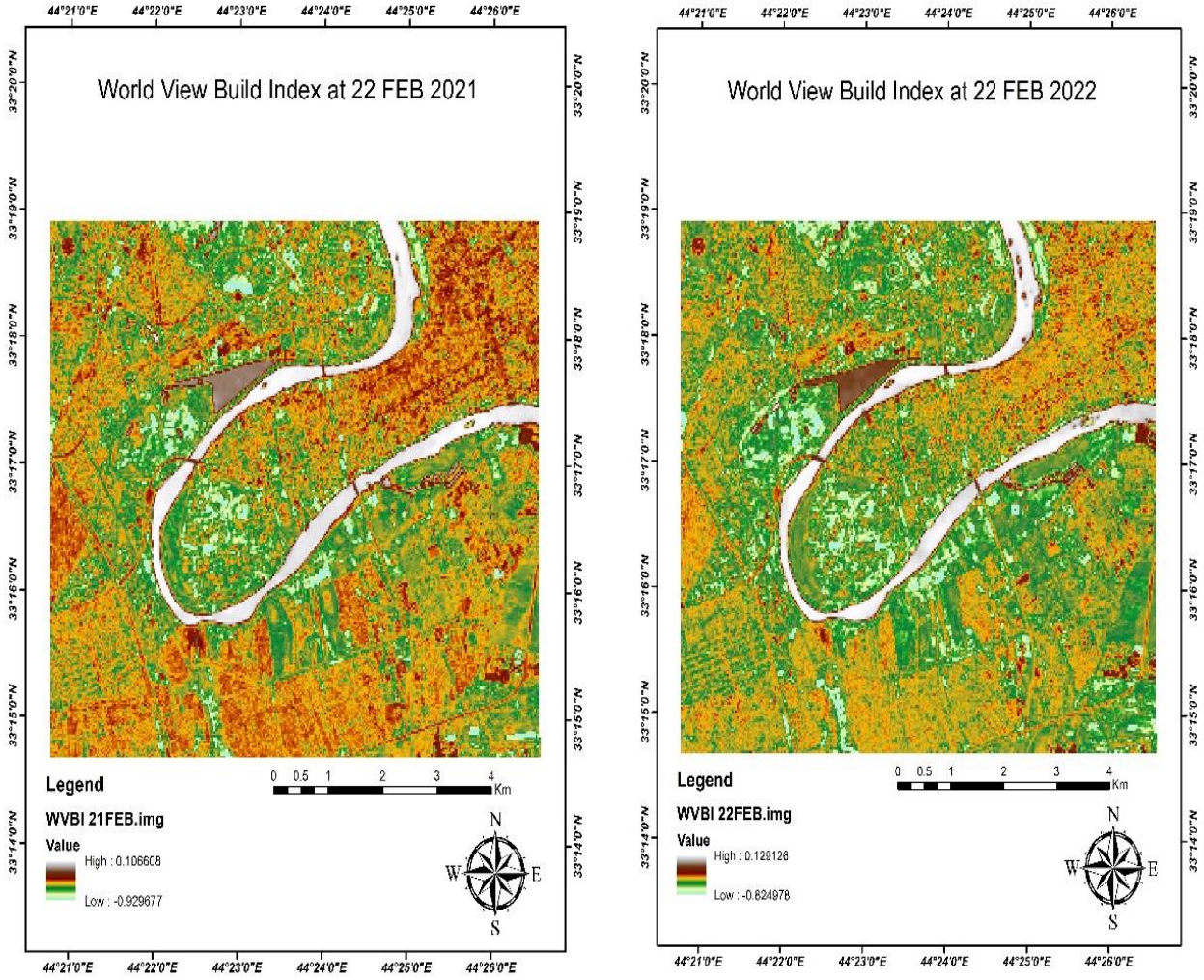

Figure 3. Worldview Build Index: February 2021–2022 Updates for Jadriyah and Umm Al-Khanazeer Island Site (left) (Built-up Land 44.17%, Abandoned Land 14.8%, Water Bodies 5.69%, Dense Vegetation 2.86%, and Low Vegetation 18.81%). (Right) (Built-up Land 47.87% Abandoned Land 17.17%, Water Bodies 4.19 %, and Dense Vegetation 3.17%, Low Vegetation 13.81%)

- **Climate change & severe weather (temperature) in JUKI site in 2021-2022**

The remote sensing maps were used to conduct a thermal analysis of the surface temperature at the JUKI site for the year 2021-2022 (Fig. 4). The results demonstrated an overall annual variation in temperature at the site. The range of the average minimum temperature was from 21.1 to 42.0 in 2021 and from 22.1 to 42.9 in 2022. The range of maximum temperature was from 25.7 to 46.8 in 2021 and from 26.7 to 47.1 in 2022.

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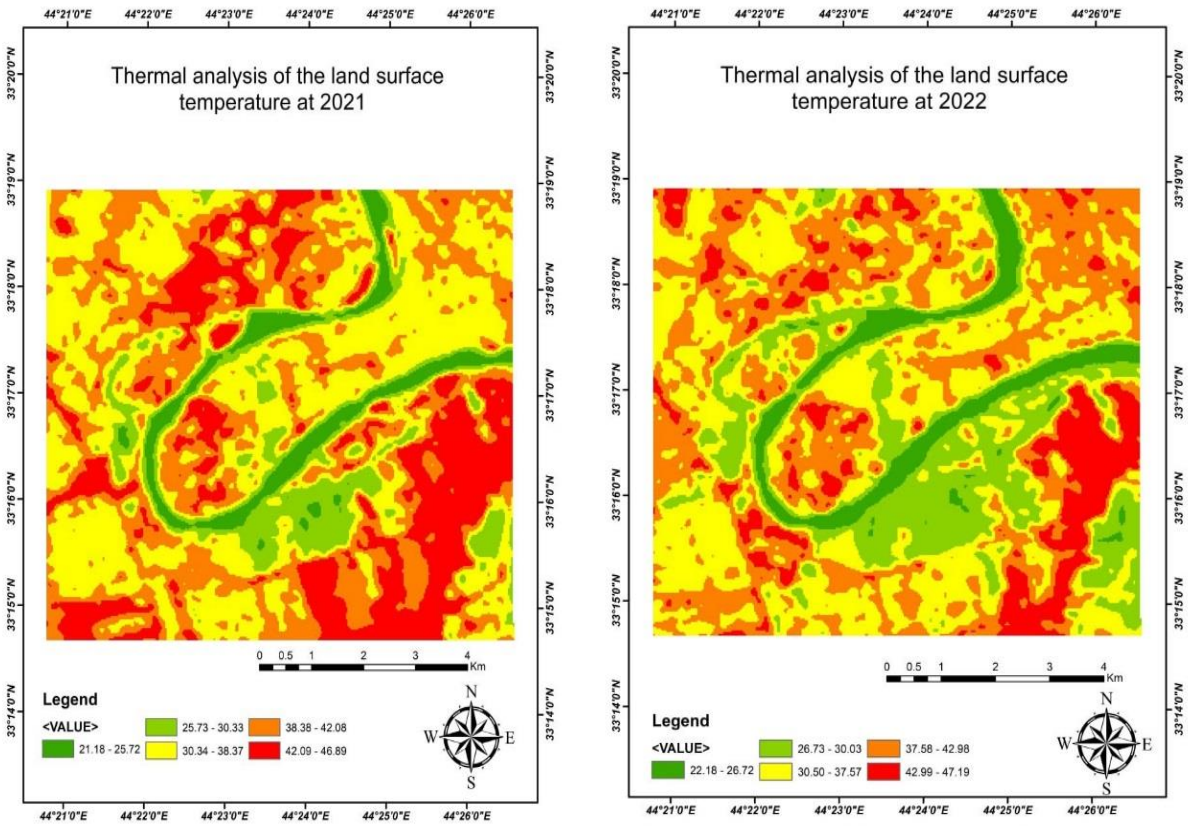

Figure 4. Thermal analysis of the land surface temperature of Jadriyah and Umm Al-Khanazeer Island JUKI site at the summer season of 2021- 2022

2. Assessment of the JUKI site based on a comparison between current and historical data

A. Pressure (Threats)

The way that land use and ecosystem services are changed affects each other and has an impact on people's well-being. As stated in the methods section two threats were selected to evaluate the pressures on the JUKI site in the present study which are the change in land use (urbanization) and the change in temperature over the 3-time points of 1984 as a baseline (taken from Evans, 1994) 2019 (taken from Fazaa, 2022) and the current dataset collected in 2021-2022. The change was assessed by comparing the data from the baseline of 1984 with the data from each of the other 2 more recent time points. The above-described scoring system (Table 1) for each threat was adopted where the scores of 0-3 were assessed based on the three criteria of timing, scope, and severity of the threat.

●Land use change (urbanization)

The land serves as both the stage for human activity and the source of the resources required to carry it out. "Land use" is the term used to describe how humans use land resources. It varies depending on the goals that land serves, such as producing food, housing, recreation, extracting and processing commodities, and so on[17]. The results of the scoring of Threat 1 of land use change (urban expansion) for the 3 selected time points are shown in Table 3. The table shows the assessment results of data collected during 2019 and published in 2022 by Fazaa et al[13] and compares them to the current assessment achieved by the present study during 2021-2022, both based on the baseline year of 1984. Overall, no change is observed in the scoring of each of the three criteria (i.e. timing, scope, and severity) of both the

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land use threat. A score of 1 was recorded for each of the three criteria, with the overall (impact) score being 3, which is similar to that obtained by the Fazaa study. Therefore, the overall IBA threat score for land use change had value of -1 (medium threat) for each of 2019 and 2022, leading to a threat trend score of 0 (no change). Calculations are explained in the methodology section.

Table 3. Assessment of land use change (urban expansion; %) as a pressure (threat) to the Jadriyah area, including the JUKI IBA site, based on 3 scoring criteria (timing, scope, severity) for two-time points (2019, 2022) as compared to the baseline of 1984. The total impact score of the threat was calculated as the sum of the scores of the 3 criteria.

Criteria & Scoring Urban area change	**Criterion 1** **Timing of threat (Score/ scoring category)**	**Criterion 2** **Scope of threat (Score/scoring category)**	**Criterion 3** **Severity of threat (Score/scoring category)**	**Overall impact score of threat(timing score + scope score + severity score)**	**IBA threat score (description)**	**IBA threat trend scorebetween2019 &2022(description)**
From 27.8% in 1984 (baseline) to 57.2 % in 2019	Score 1/ Most likely in a long time (more than four years)	Score 1/ Some of population/area (10-50%)	Score 1/ Slow deterioration (1–10% over 10 years or 3 generations)	3	-1 (Medium)	0 (No change)
From 27.8% in 1984 (baseline) to 43.75 % in 2022	Score 1/ Most likely in a long time (more than four years)	Score 1 Some of population/area (10-50%)	Score 1 Slow deterioration (1–10% over 10 years or 3 generations)	3	-1 (Medium)	0 (No change)

- **Climate (temperature) change**

The results of the scoring of Threat 2 of climate change (temperature) for the 3 selected time points are shown in Table 4. The table shows the assessment results of data collected during 2019 and published in the study of Fazaa[13] and compares them to the current assessment achieved by the present study during 2021-2022, both based on the baseline year of 1984. Overall, no change is observed in the scoring of each of the three criteria (i.e. timing, scope, and severity) of both the temperature threat. A score of 3 was recorded for the first criterion (timing), whereas a score of 1 was given for each of the other two criteria (scope and severity), with the overall (impact) score being 5, which is similar to that obtained by the Fazaa study.

A score of 1 was recorded for each of the three criteria, with the overall (impact) score being 3. Therefore, the overall IBA threat score for climate change had the value of -1 (medium threat) for each of 2019 and 2022, leading to a threat trend score of 0 (no change). Calculations are explained in the methodology section. Numerous research works have been carried out on closely observed bird populations. For instance, compared to resident or short-distance migrant species, long-distance migrants have decreased more[13]. Many reasons have been given for this; however, there is evidence that suggests that at least part of the fluctuation may have been caused by climate change. For instance, long-distance migrants now arrive to the mating grounds later than they once did in relation to spring temperatures, which might have an impact on the population[17]

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Table 4. Assessment of climate change (mean land temperature change) as a threat (pressure) to the Jadriyah area, including the JUKI IBA site, based on 3 scoring criteria (timing, scope, severity) for two-time points (2019, 2022) as compared to the baseline of 1984. The total impact score of the threat was calculated as the sum of the scores of the 3 criteria.

Criteria & Scoring **Temperature (min, max) change**	**Criterion 1** **Timing of threat (Score/scoring category)**	**Criterion 2** **Scope of threat (Score/scoring category)**	**Criterion 3** **Severity of threat (Score/scoring category)**	**Overall impact score of threat (timing score + scope score + severity score)**	**IBA threat status score (description**	**IBA threat trend score between 2019 & 2022 (description)**
From 26.6 – 33.65 °C in 1984 (baseline) to 38.83 – 41.19 °C in 2019 to 38.83 – 41.19 °C	Score 3/ Happening now	Score 1/Some of the population/ Area (10-50%)	Score 1/Slow deterioration (1–10% over 10 years or 3 generations)	**5**	-1 (Medium)	0 (No change)
From 26.6 – 33.65 °C in 1984 (baseline) to 22.18-47.19 in 2022	Score 3/ Happening now	Score 1/Some of the population/ Area (10-50%)	Score 1Slow deterioration (1–10% over 10 years or 3 generations)	**5**	-1 (Medium)	0 (No change)

B. Status

The status of the JUKI site was assessed based on the methodology of Birdlife International described in the methodology section. The assessment was based on the two selected criteria (1) the overall percentage of the avian population that still exists; and (2) the overall percentage of the potential habitat that still exists. The total percentage of birds' habitat was calculated by summing the percentages of vegetation, water bodies, and abandoned areas within the total extension of the studied site. The scoring system depends on finding the percentage of the area's "potential" bird population, or possible habitat for birds, as represented by the following equation:

(Remaining population or area / Estimated Optimal population or area) x 100 = Potential Population or Habitat Remaining %.

For the purpose of the present study, baseline data published by Evans in 1984 (ref) were considered as data for the optimum bird population/area.

- **Population size (Bird population remaining)**

The results show that the total number of bird species in the JUKI site slightly increased from 47 species in 2019 (Fazaa study) to 48 species in 2022, which is the year of the current survey (Annex 1). However, both years reveal a sharp decline as compared to the number of bird species (57 species) recorded in the KBA survey of 2005-2011. This latter year was considered, in the current study, as the year for optimum bird population, since Evans's baseline study in 1984 included only data on key bird species only (Table 5). By applying the equation above, the percentage of the potential bird population remaining in the JUKI site in 2022 is 84 % of the estimated optimum population of 1984, reflecting a decline in the bird population in the area. However, by applying

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the scoring criteria of Birdlife International, this percentage of the remaining bird population results in a score of 2, which puts the site in the category of "moderate" status in 2022 (Table 5) supplement file.

Table 5. Total number of bird species recorded in the JUKI site in the current survey as compared to the two previous surveys. The percentage of potential bird population remaining, as well as the score and the status category, were extracted based on the guidelines of Birdlife International

Year	2005/2011	2019	2022
Total number of bird species	57	47	48
% Potential population remaining			84 %
IBA status score (description)			2 (moderate)

● Area and quality of the key habitats (Habitat remaining)

The results show a sharp decline in the total percentage of potential birds' habitat in the JUKI site from 71.8 % in the baseline year of 1984 to only 42.3 % in 2022, which is the year of the current survey (Table 6). It is also evident that there was no evident decline from 1984 (Evans study) to 2019 (Fazaa survey). By applying the equation above, the percentage of the potential habitat, remaining in the JUKI site in 2022 is only 58.9 % of the estimated optimum area of 1984 reflecting a drastic decline in the habitats for birds in the area. This decline in the percentage of the natural habitat is certainly correlated to the clear expansion in the extension of the urban areas in Al-Jadriyah as mentioned above. The natural environment undergoes several basic modifications because of urbanization. The clearing of trees, the building of infrastructure (such as roads and utility rights-of-way), impact species of plants and avifauna (birds) [2]. By applying the scoring criteria of Birdlife International, this percentage of remaining potential habitat results in a score of 1, which puts the site in the category of "poor" status in 2022 (Table 6) supplement file

Table 6. Percentages of habitat types and total percentage of habitat for birds in the JUKI site in 2022 as compared to 2020 and the baseline of 1984. The percentage of potential bird habitat remaining, as well as the score and the status category, were extracted based on the guidelines of Birdlife International

		Area (% of total site area)		
	Habitat type	**1984 survey**	**2019 survey**	**2022 survey**
Percentage of the potential habitat	**Vegetation**	**52.5 %**	**25%**	**23.6 %**
	Waterbody	**5.9%**	**31%**	**3.6 %**
	Abandoned land	**13.7%**	**32%**	**15.1 %**
	total	**71.8%**	**88%**	**42.3%**
% potential habitat remaining				**58.9 %**
IBA status score (description)				**1(poor)**

C. Response

The JUKI site has no measures of conservation made by relevant institutions, e.g. the Ministry of Environment or the University of Baghdad, indicating that the "response" element of the assessment of the IBA sites is not fulfilled.

D. Trend

After describing the results of the current assessment of the status, threats, and action for the JUKI site, the trend of each of these three elements in the site between the dates of the last two assessments, i.e. the current survey and that of Fazaa in 2019, was made by applying the equation shown in the methodology section. The following trend results were obtained:

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Trend of the pressure (land use change) = score in 2022 (3) – score in 2019 (3) = 0 (No change)

Trend of the pressure (climate change) = score in 2022 (5) – score in 2019 (5) = 0 (No change)

Trend of the status (bird population) = score in 2022 (2) – score in 2019 (2) = 0 (No change)

Trend of the status (habitat) = score in 2022 (1) – score in 2019 (2) = –1 (Small deterioration).

The current research is one of several surveys that have been carried out at the JUKI site since 2019 with two primary objectives; first, to assess the current conservation state of the site and, second, to test whether the site is still meeting the criteria by which it was nominated as an IBA site by Evans in 1984.As for the criterion of the threats facing the JUKI site, the results showed an overall IBA threat score of -1 in 2022 for both the main two types of threats selected (land use change and climate change). This score indicates medium threats to the JUKI site. Since these were the same results for the survey of 2019, the result of the trend score was equal to 0, indicating no change in the site. As for the criterion of the status of the JUKI site,

The results showed an overall IBA status score of 2 (moderate) for the first parameter (bird population) in 2022, which is similar to that found in 2019. However, for the second parameter (habitat), the status score was only 1 (poor), indicating a decline in the habitat status in the JUKI site as compared to 2019 when a score of 2 (moderate) was recorded. In particular, while certain species may become less frequent, numbers of a variety of resident bird species are likely substantially higher now than they would have been in the absence of climate change[17]. Therefore, the overall trend scores indicated a trend of no change – small deterioration. As for the criteria of the response, no change was noticed in the site as compared to 2019, as any kind of response or action is still absent. Based on the occurrence of the following key bird species that meet the IBA/IUCN criteria, Evans selected the JUKI site as an IBA site (1) Globally threatened species Marbled Duck or Marbled Teal (*Marmaronetta angustirostris*). (2) Threatened species whose numbers are declining in the region Iraqi Pheasant (Saturday) Black Francolin (*Francolinus francolinus*). (3) Species that are entirely or largely confined to the Middle East Gray Hypocolius (*Hypocolius ampelinus*) Basra Reed-warbler (*Acrocephalus griseldis*) Iraq Babbler (*Argya altirostris*) Dead Sea Sparrow (*Passer moabiticus*). It is very important to confirm that the present study could reveal that out of the 6 species on which Evans based his inclusion of the site as an IBA area. There are at least 3 species still present at the site according to recent data and these species are:

(1) Iraq babbler (Argya altirostris) It should be noted here that this species is also the only species on which the data of the Ministry of Environment and Nature Iraq (2011; ref) were based on the continuity of considering the site as an IBA area based on quantitative data. (2) Gray Hypocaust (Hypocolius ampelinus) (3) Marbled Duck (Marmaronetta angustirostris).

Based on the results of the present study, it can be concluded that, as compared to 1984 as baseline data, the JUKI site has currently a medium level of threats (land use change and climate change). As a result, the status analysis shows that the JUKI site in 2022 has only 58.9 % of its potential habitat remaining from the optimum habitat of 1984, leaving it with a poor habitat status. However, the analysis of the status of the bird population (number of species) revealed that the site still has 84 % of its potential population remaining from 1984, indicating a moderate bird status. These data imply that despite the remarkable habitat deterioration in the site, as reflected by the loss of over 40 % of the natural habitat, the site has lost only about 16 % of the bird population, keeping 3 out of the 6 key species for the IBA site. Unfortunately, this also implies that half of the key bird species were lost at the site. This certainly needs the immediate activation of proper site management (response) measures based on the IUCN and Birdlife International criteria.

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Conclusion

Urbanization, climate change, and habitat loss are all expected to contribute to rising city mean temperatures and declining resident quality of life in Jadriyah and Umm Al-Khanazeer Island. The results of urban expansion were recorded at a moderate rating, and the results of climate change, i.e. an increase in temperatures, were recorded at a moderate rating, as were the results of monitoring the presence of bird species at a moderate rating, while natural habitat types showed results at a poor rating, and the percentage of habitat types decreased to about 58.9%. However, despite the decrease in the percentage of habitats, 84% of the bird species are still present in the region, and we have lost only about 16% of these species, preserving three main types of birds out of the six main species. The government has to move quickly to emphasize planting trees, improving the vegetation, afforestation, and any other restoration projects in this region of the city. Ultimately, we conclude that the JUKI site is still eligible to be considered as an IBA site and its removal from the list was not based on scientific evidence.

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Authors' Declaration

- Conflicts of Interest: None.
- We hereby confirm that all the Figures and Tables in the manuscript are ours. Furthermore, any Figures and images, that are not ours, have been included with the necessary permission for re-publication, which is attached to the manuscript.
- No animal studies are present in the manuscript.
- No human studies are present in the manuscript.
- Ethical Clearance: The project was approved by the local ethical committee at University of Baghdad.

Authors' Contribution Statement

The majority of the workers writing for this research were done by A. Y. J., who then made the necessary modifications and corrections.

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موقع الجادرية وجزيرة أم الخنازير، بغداد، العراق: مكانتها وأهليتها كمنطقة مهمة للطيور

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الخلاصة

في بغداد، كان موقع جزيرة الجادرية وأم الخنازير (JUKI) هو الموقع الوحيد للطيور المهمة الذي رشحته منظمة Birdlife International في عام 1994 (استنادًا إلى بيانات من عام 1984). لسوء الحظ، تم حذف موقع JUKI من قائمة IBA في عام 2017 دون التحقيق المناسب. قمنا بمقارنة بياناتنا لعام 2022 مع استطلاعين سابقين ونجحنا في حساب اتجاه الموقع لأول مرة. JUKI، مقارنة بعام 1984 كبيانات أساسية، لديها حاليًا مستوى متوسط من التهديدات (تغير استخدام الأراضي وتغير المناخ). يوضح تقييم الحالة أن الموقع في عام 2022 سيحتوي على 58.9% من الموائل المحتملة لعام 1984 المتبقية (حالة الموائل السيئة). لا يزال لدى JUKI 84% من أعداد الطيور المحتملة لعام 2011 (حالة الطيور المعتدلة)، مع الاحتفاظ بثلاثة من الأنواع الرئيسية الستة الأصلية؛ يتم الاحتفاظ بنصف أنواع الطيور الرئيسية (مما يشير إلى الأهلية المستمرة كموقع IBA). يحتاج الموقع إلى التنشيط الفوري لإدارة الموقع المناسبة الغائبة (تدابير الاستجابة) بناءً على معايير الاتحاد الدولي لحفظ الطبيعة وBirdlife International. أشارت معلمة الاتجاه المضافة حديثًا إلى اتجاه عدم التغيير – تدهور طفيف. استنتاجنا هو أن موقع JUKI لا يزال مؤهلاً كموقع IBA وأن إزالته من قائمة IBA لم تكن مستندة إلى أدلة علمية.

الكلمات المفتاحية: التغير المناخي، IBA، JUKI، استخدام الاراضي، التحسس النائي.