Global Journal of Engineering and Technology [GJET].
ISSN: **2583-3359** (Online)
Frequency: Monthly
Published By GSAR Publishers
Journal Homepage Link- https://gsarpublishers.com/journal-gjet-home/

DRY SEASON CHECK LIST OF AVIFAUNA SPECIES POPULATION IN DAGONA WATERFOWL SANCTUARY, YOBE STATE, NIGERIA

By

[1]Ya'u, M. A.*, Ali A[2] ., Kwaga B.T[2] ., Mamman B.[3] , Harry H[3] ., Yawale B.A[4] ., Shayibu, A. D[5] .

[1]Department of Forestry and Environmental Technology Yobe State College of Agriculture Science and Technology, Gujba, PMB1104 Damaturu, Nigeria.
[2]Department of Forestry and Wildlife Modibbo Adama University Yola, Adamawa State, Nigeria.
[3]Nigerian Conservation Foundation, Hadejia-Nguru Wetlands, Yobe State, Nigeria.
[4]Department of Agric and Bio-Environmental Engineering, Yobe State College of Agriculture Science and Technology, Gujba, PMB1104 Damaturu, Nigeria.
[5]Department of Agricultural Technology, Yobe State College of Agriculture Science and Technology, Gujba, PMB1104 Damaturu, Nigeria.

Article History

Received: 01/08/2026
Accepted: 08/08/2026
Published: 10/08/2026

Vol – 5 Issue – 8

PP: - 28-36

Abstract

This research titled Dry Season Check list of Avifauna Species Population was carried out in Dagona Waterfowl Sanctuary Yobe State, Nigeria for the period of Three (3) months, from March to May. The aim is to assess the bird population during dry season in the study area. A reconnaissance survey was carried to select study sites and sampling points. Five (5) different points were been selected which comprises of Zemo, Oxbow, Incheduwa, Mariam and Gutsu lakes respectively and Point count census techniques were adopted. In each counting station, bird observation was carried out twice daily; morning between 6:00am and 10:00am and evening between 4:00pm and 6:00pm. Data compilation was done using Microsoft Excel and were analysed using statistical software Past 326b. Bird diversity was calculated using Shanon-Weiner diversity index, some bird species identified in the study area were dominant such as *Philomachus pugnax, Actophilornis africanus*, *Phalacrocorax africanus*, *Dendrocygna viduata*, *Bubulcus ibis* and *Plegadis falcinellus. A total of* 23,284 bird species were identified (Dry Season) and has 1.94 diversity index using Shannon-Weiner Diversity Index. Overgrazing and other anthropogenic activities serve as major threats which affect the population diversity of bird species in the study area. The specific objectives are to identify the types of avifauna species found in the study area and also determine the diversity of avifauna species in the study area. In view of the findings of this study, effective monitoring for conservation to restore the population of bird species should be provided, Deliver community enlightenment to the people around the wetland and advice the significant importance of the wetland in serving as home for resident and migratory bird species.

KeyWords: Season, Checklist, Avifauna, Diversity, Reconnaissance, Survey, Sampling.

INTRODUCTION

Background of Study

Birds are feathered, winged, egg–laying vertebrates. They belong to the Kingdom "Animalia," Phylum "Chordata" and Class "Aves". They have a worldwide distribution, living in and around oceans, rivers, forests and mountains. They are the most noticeable group in the animal kingdom (Stefoff, 2008). Their bright colours, distinct songs and calls, and showy displays add fun to human life. Many people derive great pleasure from watching birds and listening to their beautiful songs. Birds are social animals that communicate with visual signs, calls and songs. They display social behaviours such as cooperative breeding and hunting, flocking and mobbing of predators (Stefoff, 2008). Birds live and breed in most terrestrial habitats and on all the seven Continents (Stefoff, 2008). Nigeria is blessed with many species of birds scattered throughout the different ecological regions (Ibrahim *et al*., 2024). Nigeria is blessed with many species of birds scattered throughout the different ecological regions. As with any natural habitat, wetlands are important in supporting bird

*Corresponding Author: Ya'u, M. A

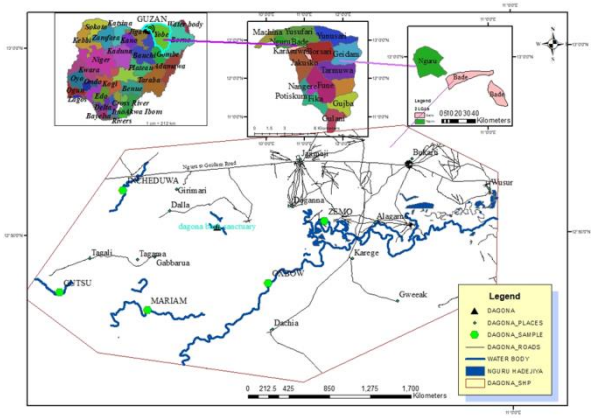
species diversity. Wetlands provide food for birds in the form of plants, vertebrates, and invertebrates. Some birds forage for food in the wetland soils, while some find food in the water column and others feed on the vertebrates and invertebrates that live on submerged and emergent plants. (Labe *et al*., 2018).

The documentation and monitoring of bird species in specific locations provide critical data for biodiversity conservation, ecological assessment, and climate change studies (Sutherland *et al.*, 2006). Several studies have emphasized the importance of avian surveys in understanding species distribution, habitat preferences, and the effects of anthropogenic activities. For instance, Bibby *et al.* (2000) highlight the value of standardized bird monitoring methods in generating reliable datasets for conservation and environmental planning.

MATERIALS AND METHOD

Study Area

This research was carried out at Dagona Waterfowl Sanctuary located in the Sahelian Zone of Nigeria, the wetlands is located within the Bade-Nguru Wetland sector. The sanctuary covers an area of 938sqkm^2 and comprises of the 1966 legislated Bade Native Authority Gogoram and Zurgum Baderi Forest Reserves. It is situated southwest of Bade and Jakusko Local Government Areas of Yobe State. It is located between latitude 12°13'N and 13°00'N and longitude 10°00'E and 11°00'E. Dagona Waterfowl Sanctuary is significant by the internationally assisted conservation effort to protect the Palaearctic migrant birds. It is open Sudan/scrub Sahelian vegetation, though a small part of the wetland is covered with water all year round yielding support for water birds and other wildlife found in that area. However, grazing and collection of wild resource are practiced by the local population illegally, and there is therefore a need for more strict enforcement of laws (Borrow and Demey, 2014).



Map of Dagona Waterfowl Sanctuary showing Sampling Points

Objectives of the Study

The specific objectives are to;

1. identify the types of avifauna species found in the study area
2. determine the diversity of avifauna species in the study area

Research Design

A reconnaissance survey was carryout with the aid of topographic map and personnel assistant to select study sites and sampling points in the field after obtaining permission from the authorities of Dagona Waterfowl Sanctuary. The survey was carried out and five (5) points were been selected namely; Zemo, Oxbow, Incheduwa, Mariam and Gutsu lakes respectively. The survey was carried out for the period of three (3) months in dry season from March to May. Birds' observation was carried out fourth in a month. Birds counted as birds seen and heard around the area and birds in flight were also counted within 100 meters radius to aid data collection. A pair of binoculars with magnification 988,000m Model 750 was used for birds viewing alongside with field guide book "Birds of Western Africa" by Borrow and Demey (2014) for identification of birds (Ramsar Convention Bureau, 2000). A Komery Digital Camera 24MP was also used for taking photographs of birds.

Method of Data Collection

Point count census techniques as outlined by Bibby *et al*. (1992) and Ralph *et al*. (1993) was adapted to count the birds for the study. Five (5) different points were selected randomly from each study sites, namely; Zemo, Oxbow, Incheduwa, Mariam and Gutsu lakes. Data forms were used for ease of recording all the information.

Data Analysis

Compilation and analysis of data was done using Software Package. Data was analysed using statistical software Python.

i. Table was used to present the types of avifauna species identified in the study area for rainy season and dry season according to Lammeed (2011).

ii. Avifauna species diversity was calculated using Shannon-Weiner diversity index, H:

$$H = -\sum_{i=1}^{S} Pi\ 1n\ Pi$$

Where:

H = Shannon-Weiner Diversity Index

S = Total number of species of the community (number seen and heard).

Pi = Proportion of each or individual (1^{th}) species in the Sample.

1nPi = Natural Logarithm of the species proportion. (Lammeed, 2011).

Species diversity and abundance in wild birds

According Lameed (2011), the majority of wetland birds observed during his study were resident species, migratory and Palearctic species. Some of the Palearctic species recorded includes the yellow wagtail, the warblers, northern shoveler, the sandpipers and the migrants and residents were also of a considerable number. The bird species found at the Hadejia Nguru wetlands are either Residents like the African grey hornbill, Cattle Egret, Black headed Heron, Vinaceous Dove, Grey-headed Kingfisher; Intra migrants like the Abdim

*Corresponding Author: Ya'u, M. A

stork; Vagrant like the Squacco Heron, Black Night Heron and Palearctic Migrant like the White Stork (Sabo, 2016). The species that are winter migrants used the wetlands area for rest and other activities while waiting for the favorable condition of their home range. They involved in activities that afford them opportunity to store enough fats for the journey back to Europe (Manu, 2000).

Birds were found on the vegetation on the water, observed during the study, also the spur-winged lapwing found on the lake shore scattered. The jacanas were observed in the vegetated part of the lake in the three sites and same for the lily trotters. The bird species found in wetlands need specific areas to carry out reproductive activities especially nesting sites (Hansen *et al*., 2005). This study revealed a positive relationship between percentage ground cover, shrub density and tree density to bird recorded. More birds were observed in areas with higher percentage of ground cover (disturbed sites) and same for shrub density but fewer birds were observed as tree density increased. This observation indicating that some wetland birds used the trees as roosting site, as it was observed with some species such as the egrets, ibises, herons and storks. These species were found during the survey on the bare ground feeding along the mudflats on fishes and other vertebrate. Thus, habitat has long been used as a predictor of bird species abundance, and variety of birds has developed different preferences for habitat (Huston, 1994). Birds select vegetation variables in manner in which an individual habitat may have important effect on its access to food, mates or its vulnerability to predators (Manu, 2000).

According to Osunsina *et al*., (2018) reported that Majority of birds observed during the study were resident species, migratory and Palearctic species. Some of the Palearctic species recorded include *Phylloscopus trochilus* (Willow warbler), and the migrant and resident species are *Tockus nasutus* (African grey hornbill), *Bucorvus abysinnicus* (Ground hornbill), *Crinifer piscator* (Grey Plantain eater), *Lybius dubius* (Bearded barbet).The absence of a proper nesting site may affect the abundance and diversity of bird species. An important observation is that the bird abundance varies across sites (Tracks) and this was influenced by various factors such as availability of food, the types of vegetation, the nesting sites and the need for cover from predators. Birds select vegetation variables in manner in which an individual habitat may have important effect on its access to food, mate or its vulnerability to predators. (Osunsina *et al*., 2018). The level of distribution of bird species in a habitat is normally as a result of an occurrence of plant species that support their population and to variation in species-specific requirements in the choice of habitat (Cody, 1985).

Birds Conservation Statuses

The bird conservation statuses for all bird species recorded in PAs and UPAs was ascertained by comparison with the IUCN conservation status. Results showed that the population of most resident species is on the increase or stable. In contrast, migratory species; intra-African and Palearctic migrants are not, with only two species found in the PAs to be on the increase; the Western Marsh Harrier *Circus aeruginosus* and Osprey *Pandion haliaetus*. In the UPAs, only three species were found to be on the increase; Common Whitethroat *Sylvia communis*, *C. aeruginosus*, and White Stork *Ciconia ciconia*, or stable, e.g. Green Sandpiper *Tringa ochropus*, and Spotted Redshank *Tringa erythropus*. In overall, the population of bird species on the increase were more in UPAs than PAs, which does not supported the hypothesis. But, the population of those on stable occurs more in PAs, as hypothesized (Ringim and Aliyu, 2018).

Anthropogenic activities within the wetland PAs and UPAs such as hunting, exploitation of wetland resources, e.g. illegal hunting of water birds, fuel wood and grazing (Ogunkoya and Dami, 2007; Blench, 2013), which may likely affect bird species. The wetland and birds also face great threats from the on-going global climate change phenomenon due to its negative impacts, such as range constriction and/or expansion, specifically on migratory species (Birdlife International, 2016a). For instance, the population of overwintering Ferruginous goose *Aythya nyroca* has declined in the wetland, presumably, due to changes in the global climate (Birdlife International, 2016b).

Avian species distribution

Understanding the processes underlying the extent and limits of species distributions has fascinated scientists since the beginning of ecological research and forms the heart of the field of biogeography (Gaston, 2003). For over a century, biogeography has remained a largely descriptive discipline, but it has now transformed into a much more dynamic field with modern technologies allowing for the collection and analysis of distributional and environmental information in previously unforeseeable ways. Moreover, interest in understanding the distribution of global biodiversity has increased due to pressing need to protect it against the multifaceted threats of climate change, habitat loss, and the appearance of invasive species. One of the main innovations spurring the modern development of biogeography has been the emergence of statistical models that link species occurrence data with spatial environmental information (Gaston, 2003).

Seasonal resource availability results in the varying seasonal distributions of many birds, and the effect of local climate on many species may therefore change throughout the year (Engler *et al*,. 2014; Eyres *et al.*, 2017). This variation is most apparent for long-distance migrants that breed in Arctic or temperate areas and overwinter in tropical or subtropical regions. For such species, the harsh winter conditions in their breeding areas do not directly affect them, and should therefore not be considered in the delimitation of niches. However, local climate might affect other relevant characteristics of a breeding distribution (e.g. habitat, resources, or competing species) so that year round climate can indirectly affect seasonal distributions in birds (Engler *et al*., 2014).

RESULT

Avifauna Species Identified in Dagona Waterfowl Sanctuary in Dry Season

*Corresponding Author: Ya'u, M. A

The result of the avifauna species identified in Dagona Waterfowl Sanctuary for the 1st, 2nd and 3rd visits presented in Table 1. It shown that 4,976 individual bird species were identified in the first visit, 2,991 individual bird species in the second visit while 15,317 birds observed in the third visit (Total = 23,284) belonging to 31 different families in dry season from March to May in the study area. The families of Ciconiidae, Coraciidae, Cuculidae, Hirundinidae, Motacillidae, Muscicapidae, Nectariniidae, Phalacrocoracidae, Phoeniculidae, Psittacidae, Pyconotidae, Recurvirostridae, Sternidae, Threskiornithidae and Upupidae contained only 1 species each, families of Alaudidae, Alcedinidae, Bucerotidae, Charadriidae, Falconidae, Jacanidae, Passeridae and Viduidae contained 2 species each, families of Rallidae, Scolopacidae, and Sturnidae contained 4 species each, families of Accipitridae, and Columbidae contained 5 species each, families of Anatidae and Ploceidae contained 6 different species each, Ardeidae family contained the highest number of 8 birds species in the study area.

Table 1: Avifauna Species Identified in Dagona Waterfowl Sanctuary in Dry Season

S/N	Family	Scientific Name	Common Name	Frequency			otal
				isit	Visit	Visit	
	Accipitridae	*Circus ranivorus*	African Marsh Harrier	6	1	2	9
	" "	*Milvus migrans*	Black Kite	4	7	-	11
	" "	*Elanus caeruleus*	Black-shouldered Kite	3	1	-	4
	" "	*Circus macrourus*	Pallid Harrier	1	-	-	1
	" "	*Milvus aegyptius*	Yellow billed Kite	-	4	69	73
	Alaudidae	*Galerida cristata*	Crested Lark	8	10	-	18
	" "	*Errmopterix leucotis*	Chestnut-backed Sparrow lark	2	5	-	7
	Alcedinidae	*Halcyon leucocephala*	Grey-headed Kingfisher	-	4	-	4
	" "	*Ceryle rudis*	Pied Kingfisher	-	4	20	24
	Anatidae	*Nettapus auritus*	African Pygmy Geese	-	-	28	28
	" "	*Dendrocygna bicolor*	Fulvous Whistling Duck	301	30	-	331
	" "	*Anas querquedula*	Garganey	105	40	-	145
	" "	*Sarkidiornis melanotos*	Knob billed duck	29	21	-	50
	" "	*Plectropterus gambensis*	Spur-winged Geese	38	34	-	72
	" "	*Dendrocygna viduata*	White Face Whistling Duck	830	272	13,450	14,552
	Ardeidae	*Egretta ardesiaca*	Black Heron	114	53	30	167
	" "	*Bubulcus ibis*	Cattle Egret	331	166	460	957
	" "	*Ardea alba*	Greater Egret	11	3	25	39
	" "	*Ardea cinerea*	Grey Heron	39	45	38	122
	" "	*Egretta intermedia*	Intermediate Egret	25	21	26	72
	" "	*Egretta garzetta*	Little Egret	55	30	39	124
	" "	*Ardea purpurea*	Purple Heron	48	43	49	140
	" "	*Ardeola ralloides*	Squacco Heron	230	72	46	348
	Bucerotidae	*Tokus nasutus*	African Grey Hornbill	2	12	2	16
	" "	*Tockus erythrorhynchus*	Red-billed Hornbill	15	21	15	51
	Charadriidae	*Vanellus tectus*	Black-headed Lapwing	28	14	-	42

*Corresponding Author: Ya'u, M. A

" "	*Vanellus spinosus*	Spur-winged Lapwing	112	11	86	209
Ciconiidae	*Anastomus lamelligerus*	African Openbill Stork	-	-	39	39
Columbidae	*Streptopelia decipiens*	African Mourning Dove	17	21	19	57
" "	*Streptopelia senegalensis*	Laughing Dove	34	38	21	93
" "	*Oena capensis*	Namaqua Dove	16	20	18	54
" "	*Columba guinea*	Speckled Pigeon	27	41	47	115
" "	*Streptopelia vinacea*	Vinaceous Dove	36	24	38	98
Coraciidae	*Coracias abyssinica*	Abyssinian Roller	13	21	28	62
Cuculidae	*Centropus senegalensis*	Senegal Coucal	9	19	25	53
Falconidae	*Falco naumanni*	Common Kestrel	1	1	-	2
" "	*Falco ardosiaceus*	Grey Kestrel	2	-	-	2
Hirundinidae	*Hirundo aethiopica*	Ethiopian Swallow	-	11	-	11
Jacanidae	*Actophilornis africanus*	African Jacana	123	102	179	404
" "	*Microparra capensis*	Lesser Jacana	14	21	38	73
Motacillidae	*Motacilla flava*	Yellow Wagtail	261	355	9	625
Muscicapidae	*Cercotrichas podobe*	Black Scrub Robin	2	2	2	6
Nectariniidae	*Cinnyris pulchellus*	Beautiful Sunbird	4	2	-	6
Passeridae	*Passer griseus*	Northern Grey Headed Sparrow	10	16	-	26
" "	*Passer luteus*	Sudan Golden Sparrow	102	67	80	249
Phalacrocoracidae	*Phalacrocorax africanus*	Longtail/Reed Cormorant	201	78	89	368
Phoeniculidae	*Phoeniculus purpureus*	Green Wood-hoopoe	7	3	-	10
Ploceidae	*Bubalornis albirostris*	Buffalo Weaver	67	14	11	92
" "	*Ploceus luteolus*	Little Weaver	3	-	23	26
" "	*Quelea quelea*	Red-billed Quelea	292	168	30	490
" "	*Sporopipes frontalis*	Speckle Fronted Weaver	4	-	-	4
" "	*Ploceus cucullatus*	Village Weaver	32	45	2	79
" "	*Bubalomis albirostris*	White Billed Buffalo Weaver	-	159	2	161
Psittacidae	*Psittacula krameri*	Rose-ringed Parakeet	27	33	53	113
Pyconotidae	*Pycnonotus barbatus*	Common Bulbul	8	24	19	51
Rallidae	*Amaurornis flavirostris*	Black Crake	1	4	-	5
" "	*Gallinula chloropus*	Common Moorhen	13	13	-	26
" "	*Gallinula angulata*	Lesser Moorhen	-	6	-	6
" "	*Porphyrio madagascariensis*	Purple Swamphen	-	3	-	3
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt	51	17	2	70

*Corresponding Author: Ya'u, M. A

Scolopacidae	*Tringa ochropus*	Green Sandpiper	19	23	-	42
" "	*Philomachus pugnax*	Ruff	250	448	10	708
" "	*Tringa erythropus*	Spotted Red Shank	12	7	-	19
" "	*Tringa glareola*	Wood Sandpiper	5	5	-	10
Sternidae	*Sterna nilotica*	Gull-billed Tern	4	3	-	7
Sturnidae	*Lamprotornis pulcher*	Chestnut Bellied Starling	65	78	2	145
" "	*Lamprotornis chalybaeus*	Greater-blue eared Starling	26	15	54	95
" "	*Lamprotornis caudatus*	Longtail Glossy Starling	49	30	74	153
" "	*Buphagus africanus*	Yellow-bill Oxpecker	6	4	-	10
Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	811	120	16	947
Upupidae	*Upupa epops*	Hoopoe	4	-	2	6
Viduidae	*Vidua orientalis*	Sahel Paradise Whydah	1	3	-	4
" "	*Vidua chalybeata*	Village Indigo	10	3	-	13
Total Number of Species Per Location			**4,976**	**2,991**	**15,317**	**23,284**

Source: Field Survey, 2026

Avifauna Species Diversity in the Study Area

The Species diversity using Shannon Diversity Index was 1.943 for total individual species in Dagona Waterfowl Sanctuary during dry season is shown in Table 2. The result indicated that *Dendrocyna viduata* species (0.29376) having the highest diversity while *Circus macrourus* (0.00043), *Falco ardosiaceus* and *Falco naumanni* (0.0008) respectively have the lowest diversity.

Table 2: Avifauna Species Diversity in Dagona Waterfowl Sanctuary in Dry Season

S/N	Species	Frequency	Pi	lnPi	PilnPi
1.	*Actophilornis africanus*	404	0.017351	4.05411	0.07034
2.	*Amaurornis flavirostris*	5	0.000215	8.44608	0.00181
3.	*Anas querquedula*	145	0.006227	5.07879	0.03163
4.	*Anastomus lamelligerus*	39	0.001675	6.39196	0.01071
5.	*Ardea alba*	39	0.001675	6.39196	0.01071
6.	*Ardea cinerea*	122	0.00524	5.2515	0.02752
7.	*Ardea purpurea*	140	0.006013	5.11388	0.03075
8.	*Ardeola ralloides*	348	0.014946	4.20332	0.06282
9.	*Bubalomis albirostris*	161	0.006915	4.97412	0.03439
10.	*Bubalornis albirostris*	92	0.003951	5.53373	0.02186
11.	*Bubulcus ibis*	957	0.041101	3.19172	0.13118
12.	*Buphagus africanus*	10	0.000429	7.75294	0.00333
13.	*Centropus senegalensis*	53	0.002276	6.08523	0.01385
14.	*Cercotrichas podobe*	6	0.000258	8.26376	0.00213
15.	*Ceryle rudis*	24	0.001031	6.87747	0.00709
16.	*Cinnyris pulchellus*	6	0.000258	8.26376	0.00213
17.	*Circus macrourus*	1	0.000043	10.0555	0.00043
18.	*Circus ranivorus*	9	0.000387	7.8583	0.00304

*Corresponding Author: Ya'u, M. A

19.	*Columba guinea*	115	0.004939	5.31059	0.02623
20.	*Coracias abyssinica*	62	0.002663	5.92839	0.01579
21.	*Dendrocygna bicolor*	331	0.014216	4.2534	0.06047
22.	*Dendrocygna viduata*	14552	0.624979	0.47004	0.29376
23.	*Egretta ardesiaca*	197	0.008461	4.77232	0.04038
24.	*Egretta garzetta*	124	0.005326	5.23524	0.02788
25.	*Egretta intermedia*	72	0.003092	5.77886	0.01787
26.	*Elanus caeruleus*	4	0.000172	8.66923	0.00149
27.	*Errmopterix leucotis*	7	0.000301	8.10961	0.00244
28.	*Falco ardosiaceus*	2	0.000086	9.36237	0.0008
29.	*Falco naumanni*	2	0.000086	9.36237	0.0008
30.	*Galerida cristata*	18	0.000773	7.16515	0.00554
31.	*Gallinula angulata*	6	0.000258	8.26376	0.00213
32.	*Gallinula chloropus*	26	0.001117	6.79743	0.00759
33.	*Halcyon leucocephala*	4	0.000172	8.66923	0.00149
34.	*Himantopus himantopus*	70	0.003006	5.80703	0.01746
35.	*Hirundo aethiopica*	11	0.000472	7.65763	0.00362
36.	*Lamprotornis caudatus*	153	0.006571	5.02508	0.03302
37.	*Lamprotornis chalybaeus*	95	0.00408	5.50164	0.02245
38.	*Lamprotornis pulcher*	145	0.006227	5.07879	0.03163
39.	*Microparra capensis*	73	0.003135	5.76506	0.01807
40.	*Milvus aegyptius*	73	0.003135	5.76506	0.01807
41.	*Milvus migrans*	11	0.000472	7.65763	0.00362
42.	*Motacilla flava*	625	0.026842	3.61777	0.09711
43.	*Nettapus auritus*	28	0.001203	6.72332	0.00809
44.	*Oena capensis*	54	0.002319	6.06654	0.01407
45.	*Passer griseus*	26	0.001117	6.79743	0.00759
46.	*Passer luteus*	249	0.010694	4.53807	0.04853
47.	*Phalacrocorax africanus*	368	0.015805	4.14744	0.06555
48.	*Philomachus pugnax*	708	0.030407	3.49308	0.10621
49.	*Phoeniculus purpureus*	10	0.000429	7.75294	0.00333
50.	*Plectropterus gambensis*	72	0.003092	5.77886	0.01787
51.	*Plegadis falcinellus*	947	0.040672	3.20222	0.13024
52.	*Ploceus cucullatus*	79	0.003393	5.68607	0.01929
53.	*Ploceus luteolus*	26	0.001117	6.79743	0.00759
54.	*Porphyrio madagascariensis*	3	0.000129	8.95691	0.00115
55.	*Psittacula krameri*	113	0.004853	5.32813	0.02586
56.	*Pycnonotus barbatus*	51	0.00219	6.1237	0.01341
57.	*Quelea quelea*	490	0.021044	3.86112	0.08126
58.	*Sarkidiornis melanotos*	50	0.002147	6.1435	0.01319
59.	*Sporopipes frontalis*	4	0.000172	8.66923	0.00149
60.	*Sterna nilotica*	7	0.000301	8.10961	0.00244
61.	*Streptopelia decipiens*	57	0.002448	6.01247	0.01472
62.	*Streptopelia senegalensis*	93	0.003994	5.52292	0.02206

*Corresponding Author: Ya'u, M. A

63.	*Streptopelia vinacea*	98	0.004209	5.47055	0.02303
64.	*Tockus erythrorhynchus*	51	0.00219	6.1237	0.01341
65.	*Tokus nasutus*	16	0.000687	7.28293	0.005
66.	*Tringa erythropus*	19	0.000816	7.11108	0.0058
67.	*Tringa glareola*	10	0.000429	7.75294	0.00333
68.	*Tringa ochropus*	42	0.001804	6.31785	0.0114
69.	*Upupa epops*	6	0.000258	8.26376	0.00213
70.	*Vanellus spinosus*	209	0.008976	4.71319	0.04231
71.	*Vanellus tectus*	42	0.001804	6.31785	0.0114
72.	*Vidua chalybeata*	13	0.000558	7.49057	0.00418
73.	*Vidua orientalis*	4	0.000172	8.66923	0.00149
	Total	23,284	1		1.94284

Source: Field Survey, 202

Table 3: Shannon-Weiner Indices for Avifauna Species Diversity in Dagona Waterfowl Sanctuary in Dry Season

Indices	Dry Season
Taxa_S	73
Individuals	23284
Dominance_DM	0.3978
Simpson	0.6022
Shannon_H	.943
Evenness_e^H/S	0.0956
Equitability_J	0.4528

Source: Field Survey, 2026

Conclusion and Recommendation

Avifauna species identified in dry season (March to May) was a little bit greater due to the low number of migrants and Palearctic migrants in the study area (Dagoana Waterfowl Sanctuary) in which this is not corresponded with the period some of the migrant species in the area. In view of the findings of this study, effective monitoring for conservation to restore the population of bird species should be provided, Deliver community enlightenment to the people around the wetland and advice the significant importance of the wetland in serving as home for resident and migratory bird species.

Author's Contribution: All the Authors have contributed immensely toward the successful completion of the Research.

ACKNOWLEDGEMENTS

This research work was sponsored by Tertiary Education Trust Fund (TETFund) as part of the Institution-Based Research (IBR) Intervention.

REFERENCES

1. Bibby, C.J., Burgess, N.D., Hill, D.A., &Mustoe, S. (2000). Bird Census Techniques (2nd ed.). Academic Press. A foundational reference that outlines standardized bird survey methods, including point counts.
2. Bibby, C.J., Burgress, N.D. and Hill, D. (1992). Birds Census Techniques, 2nd Edition. London, Academic Press 24-41.
3. Birdlife International (2016a). Important Bird and Biodiversity Area factsheet: Hadejia-Nguru Wetlands.
4. Birdlife International (2016b). IUCN Red List for birds. Retrieved from *http://www.birdlife.org* (Accessed 28 November, 2016).
5. Blench, R. (2013). An overview of the context of the Jewel project: Access rights and conflict over Common pool resources in the Hadejia-Nguru Wetlands, *report of ITAD*, Cambridge CB1 2AL, United Kingdom. Retrieved from *http://www.rogerblench.info/Pastoralism/PastAf/Nigeria/Hadejia-Nguru%20wetlands%202003.pdf* (Assessed 8 October, 2016).
6. Borrow N. and Demey R. (2014) Field Guide to the Birds of Western Africa. Princeton University Press, United State.
7. Cody, M.L. (1985). An introduction to habitat selection in birds. In Habitat selection in birds (Cody ed.) Academic Press Inc., London, pp. 191-248.
8. Engler, J.O., Rodder, D., Stiels, D. and Forschler, M.I. (2014). Suitable, Reachable but not Colonised: Seasonal Niche Duality in an Endemic Mountainous Songbird. *J. Ornithol.* 155: 657–669.
9. Eyres, A., Bohning-Gaese, K. and Fritz, S.A. (2017). Quantification of Climatic Niches in Birds: Adding the Temporal Dimension. – *J. Avian Biol.doi*:10.1111/jav.01308.
10. Gaston, K.J. (2003). The Structure and Dynamics of Geographic Ranges–Oxford Univ. Press.
11. Hansen, A.J., Knight, R.L., and Marzluff, J.M. (2005). Effects of exurban development on biodiversity: Patterns, mechanism and research needs. *Ecol. Appl*., 15: 1893-1905.
12. Ibrahim, A. B., Ndams, I. S., Gadzama, I. M. K., Tanko, D., Mathew, D. A., Wada, Y., & Chercaoui, S. I. (2024). Avifauna species richness and

*Corresponding Author: Ya'u, M. A

abundance in relation to habitat features in selected areas of Guinea Savanna Zone, Nigeria. *Journal of Research in Forestry, Wildlife and Environment*, *16*(2), 103-110.

13. Labe, L. T., Iwar I. I., Uloko, I. J. (2018). Species diversity and abundance of avifauna in the University of Agriculture, Benue state, north central Nigeria. *Forest Res Eng. Int. J.* 2018; 2(4):198-202. DOI: 10.15406/freij.2018.02.00048
14. Lameed, G.A. (2011). Species diversity and abundance of wild birds in Dagona Waterfowl Sanctuary, Borno State, Nigeria. *African Journal of Environmental Science and Technology*. Vol. 5(10) 855-866.
15. Manu, S.A. (2000). Effects of habitat fragmentation on the distribution of forest birds in south western Nigeria with particular reference to the Ibadan Malimbes and other Malimbes, PhD thesis. University of Oxford, p. 205.
16. Ogunkoya, O. O., and Dami, A. (2007). Information Sheet on Ramsar Wetlands (RIS) – 2006-2008 version: Dagona Sanctuary Lake, Hadejia- Nguru wetlands. Annual report submitted to Ramsar. Gland, Ramsar Conservation Bureau, Switzerland.
17. Osunsina, I. O. O., Ogialekhe P., Adebayo O. A. and Yisau, M.A. (2018). Bird Species Diversity and Abundance in Borgu Sector of Kainji Lake National Park, Nigreria. Nigerian *Journal of Wildlife Management*. 2(2): 41-50
18. Ralph, C.J., Geupel, G.R., Pyle, P., Maetin, T.E. and Desante, D.F. (1993). Handbook of Field Method for MonotoringLandbirds. United State Department of Agriculture for Sero. Gen. Tech. Rep. PSW-GTR 144.
19. Ramsar Convention Bureau, (2000). Background papers on Wetland values and Function. Gland, Switzerland: Ramsar Convention Bureau, http://www.ramsar.org/info/values.
20. Ringim, A.S and Aliyu, D. (2018) Bird species richness, relative abundance and conservation
21. Sabo B.B. (2016) Checklist of Bird Species at the Hadejia-Nguru Wetlands, Nigeria. *Global Advanced Research Journal of Agricultural Science* (ISSN: 2315-5094) Vol. 5(11) Pg.402-412.
22. statuses in protected and unprotected areas of the Hadejia-Nguru Wetlands "*Proceedings of 6th NSCB Biodiversity Conference"* Uniuyo 2018 (Pp.13 -18).
23. Stefoff, R. (2008). *The Bird Class*. Marshall Cavendish.
24. Sutherland, W.J. (2006). Ecological Census Techniques: A Handbook (2nd ed.). Cambridge University Press. Covers a broad range of wildlife survey techniques and analysis.

*Corresponding Author: Ya'u, M. A