



## DIVERSITY OF BIRD SPECIES IN DAMAGED MANGROVE SWAMP ALONG THE BADAGRY CREEK LAGOS SOUTHWEST NIGERIA

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<p><b>Received:</b> 4<sup>th</sup> April 2021 <b>Accepted:</b> 24<sup>th</sup> April 2021 <b>Published:</b> 6<sup>th</sup> May 2021</p>	<p>Diversity of bird species in a damaged mangrove swamp along Badagry creek Lagos Southwest Nigeria was examined in this study. The study area was divided into three compartments based on their different land use types. A total of 60 transect lines were randomly laid out and 20 transect lines per a compartment. The minimum distance between two transect lines was 200m. The number of transect lines was determined by the site size. Data were collected for six months (Dry and Wet seasons) in 2019. All birds viewed on the ground or in the vegetation as well as birds that are flying ahead were identified and the number in the group recorded. Birds of the same species within 10m of each other were counted in the same group. Human threats to the study area were also examined. Data obtained from the field survey were entered into excel (version 15) spread sheet prior to both descriptive (tables, frequency and percentage frequency, graph, pie and bar charts) and analytical statistics. The computer PAST Model version 3 was used to analyze bird species diversity indices, SHE analysis, and plot generalized linear model graph. A total number of 120 bird species belonging 39 families and 15 orders were enumerated in the study area. The result indicates that Ardeidae has the highest number of bird species (12), this is followed by Ploceidae with 9 bird species. The result of the relative abundance of bird species in the study area indicates that it was higher in the dry season (0.0055) than the wet season 0.0013). The Shannon diversity index showed that it was higher during the dry season (4.53) than the wet season (4.38). The status of the bird species in the study area indicates that resident bird species were highest (87), followed by Intra Africa Migrants (17) and Palearctic migrants (5). The total number of bird species recorded during the dry season was (81%) while the wet season is (19%) SHE analysis of bird species diversity in the study area and plot Generalized Linear Model was used. Checklist of bird species in the study area was also observed. The threats identify in the study area are Deforestation, agricultural intensification, soil excavation for building and road construction, use of herbicides for weeding, use of chemicals fishing, and collection of non-timber products.</p>

**Keywords:** Bird species, diversity, mangrove ecosystem, richness, threats,

### INTRODUCTION

Mangrove ecosystems are among the most threatened habitats in the world (Luther and Greenberg, 2009). They are an important source of primary productivity and perform extremely important ecosystem functions and they harbor high diversity of fauna and flora (Bunt, et al, 1991). Mangroves are variously referred to as coastal woodland, mangals, tidal forest and mangrove forest (Duke, 1992). Mangroves constitute the characteristic vegetation of the intertidal environment on sheltered tropical and subtropical coastlines. The mangrove ecosystem has particular practical and structural characteristics. They consist of rather easy meals containing a combination of marine and terrestrial species, fish nursery grounds and breeding sites for mammals, reptiles and birds, and accumulation sites for sediment, s contaminants, carbon and vitamins (Samant, 1985). Mangrove communities also carry out numerous different critical features in maintaining balance in coastal geomorphology stabilizing coast and estuaries, reclaiming margins, retard tide and cutting-edge erosion impacts (Hogarth, 2007). Notwithstanding the fairly low floral diversity,

plants in mangrove have a extensive range of structural and that make safeguard survival and propagation under the cruel situations of the intertidal quarter (Spalding, et al, 1997, Duke et al., 1998). Mangrove bushes have particular morphological, eco-physiological and reproductive trends, inclusive of aerial roots, viviparous embryos, tidal dispersal of propagules, fast fees of cover production, absence of an understory stratum, wood with narrow densely disbursed vessels, lack of boom earrings, an efficient nutrient retention system, and the capacity to address salt and to maintain water and carbon stability (Duke et al., 1998)

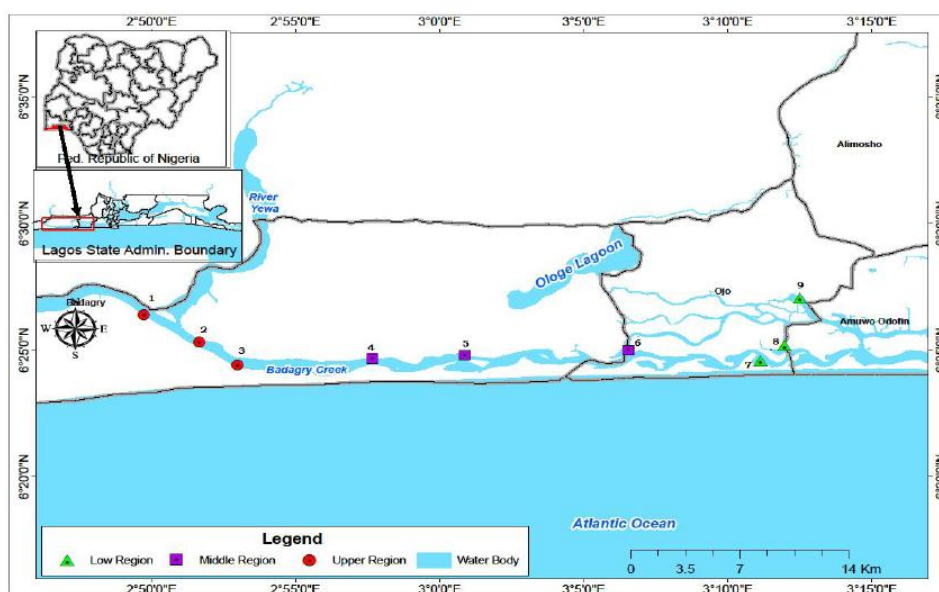
Bird fauna in mangroves have been well studied in Australia (Kutt, 2007), Hutchings, 2008), South America (Acevedo, 2009,Rajpar, and Zakaria, 2010) and Africa (Abuodha, 2001, Kairo, 2004 Okosodo et al, 2018), however, in Nigeria species diversity in this ecosystem have not studied extensively.

Despite important ecological functions, in common with tropical rainforest, mangroves are being destroyed globally on a large scale through overexploitation (Hartog, 2000, Ellison, 2008). Loses are reported in every country containing mangroves and rates continue to increase rapidly especially in developing countries where more than 90% of the world’s mangroves are located (Duke et al, 2007). In Nigeria the mangroves forest is threatened by population explosion, industrialization and agricultural intensification, hence the need to carry out bird species abundance and diversity in the study are, as this will provide baseline information for other researchers and help conservation measures of bird diversity to be proposed

**MATERIALS AND METHOD**

**Study area**

The Badagry wetland , which is approximately 60 km long and 3 km wide, lies between longitudes 3°0’ and 3°45’ E .and between latitudes 6°25’ and 6°30’ N. It is part of a continuous system of lagoons and creeks along the coast of Nigeria from the border with the Republic of Benin to the Niger Delta. Its water depth ranges from 1 m to 3 m. The area experiences two broad seasons: the dry season (December - May) and the wet season (June - November). The area is characterized by fresh and slightly brackish water (Kusemiju, et al, 1993) The Badagry creek runs across two national boundaries. It directly connects with Nigeria’s 960 km of coastline bordering the Atlantic Ocean in the Gulf of Guinea, a maritime area of 46,500 km2 with depth of up to 50 m and an Exclusive Economic Zone of 210,900 km2 (Akintola, et al, 2012) The lagoon which runs through the area is approximately equidistant from the entrances of Lagos and Cotonou harbors. As a result, it is influenced by tides and floods from the Lagos Lagoon and Cotonou harbor through Lake Nokue and Lake Porto-Novo (Anyanwu, and Ezenwa, 1988). The Yewa River with its tributaries Isalu and Ijomo is the major river emptying into the lagoon. Creeks connected to the lagoon include Bawa and Doforo. The lagoon is surrounded by large areas of swamps covered with mangroves forest. The *Raphia palm* (*Raphia sudanica*), the African oil palm (*Elaeis guineensis*), and the coconut palm (*Cocos nucifera*) are dominant Ajado, and Edokpayi, 2003). This area is soMajor weeds occurring in the lagoon yearly in December and January include the common water hyacinth *Eichhornia crassipes* and *Cerotophyllum* and *Pistia* sp. The lagoon is surrounded by large areas of mangrove swamps covered with vegetation among which the *Raphia palm* (*Raphia sudanica*), the African oil palm (*Elaeis guineensis*), and the coconut palm (*Cocos nucifera*) *Nesogordonia papaverifera*, *Myrianthus preussi*, *Napoleona vogelii* are dominant (Ogunsesan, et al, 2012).



**Figure 1:** Map of the study area (Source: Balogun and Ajani 2015)

## Data Collection

Line transects (Bibby, *et al*, 2000) was used to collect data on bird species diversity, distribution and abundance in the study areas. In all a total of 60 transect lines of 500m long and 200 apart were randomly placed in the study site. At the study site, the programme GPS 2011 Utility (GPSU, 2012) was used to locate the starting and ending points of transects. Transect lines were walked three times a week for three months in both seasons (May, July and September for wet season and November, January and March for dry season) of the year. Survey was conducted between 0.600 hours and 10.00 hours and 1600 hours to 1800 hours. Transects were walked at an average speed of one kilometre per hour, depending on the terrain and the number of bird species recorded. All birds viewed on the ground or in the vegetation as well as birds that are flying ahead were identified and the number in the group recorded. Birds of the same species within 10m of each other were counted in the same group. A pair of binoculars with a magnification 7x 50 was used in identification of bird species. Bird calls were also recorded with a voice recorder and played back later for confirmation. Physical features of birds sighted but could not be identified immediately were taken and field guide book of West African birds (Burrow and Demey, 2014) was used to identify the bird species. Bird species identified were categorized according to (Burrow and Demey, 2014) as follows: LC= resident; M= intra-African migrant; P= palearctic migrant and V= vagrant. These were derived from the season of occurrence of the birds in the study areas. Birds sighted in the wet season and not seen in the dry season were compared with range map of West Africa birds guide as documented by (Burrow and Demey, 2014). Data on the threats to the ecosystem was collected for six months (Ogunjemite, 2005). Field observation of human activities going in the area was collected. It was ranked according to the frequency that the activities were encountered. The activities were, deforestation, agriculture, use of herbicides and chemicals for fishing and soil excavation.

## Data Analysis

Avian species diversity was calculated using Shannon diversity index, (Usher, 1991) which is given as:

$$H^i = - \sum P_i \ln P_i$$

Where:  $H^i$  = diversity index

$P_i$  = is the proportion of the  $i$ th species in the sample

$\ln P_i$  = is the natural logarithm of the species proportion.

## Species Relative Population Density

The relative population density of bird species at various sites and seasons were determined as outlined by Bibby *et al.*, (1992) as follows:

$$D = \frac{n_1 + n_2 \log_e \left[ \frac{n_1 + n_2}{n_1} \right]}{\pi r^2 m}$$

where: D = density

r = radius of the first zone

$n_1$  = number of birds counted within zone

$n_2$  = number of birds counted beyond zone and m = number of replicate count in such area.

## Statistical Analysis

Data obtained from the field survey were entered into excel (version 15) spread sheet prior to both descriptive (tables, frequency and percentage frequency, graph, pie and bar charts) and analytical statistics. The computer PAST Model version 3 was used to analyze bird species diversity indices, SHE analysis, and plot generalized linear model graph.

## RESULTS

A total number of 120 bird species belonging to 39 families and 15 orders were enumerated in the study area. The result indicates that Ardeidae has the highest number of bird species (12); this is followed by Ploceidae with 9 bird species (Figure 2). The result of the relative abundance of bird species in the study area indicates that it was higher in the dry season (0.0055) than the wet season 0.0013 (Figure 3). The Shannon\_H diversity index showed that it was higher during the dry season (4.53) than the wet season (4.38) (Table 1). The status of the bird species in the study area indicates that resident bird species were highest (87), followed by Intra Africa Migrants (17) and Palearctic migrants (5) (Figure 4). The total number of bird species recorded during the dry season was (81%) while the wet season is (19%) (Figure 5). SHE Analysis of Bird Species Diversity in the Study Area (Figure 6). Bird Species Density and habitat variables land use types in the study area (Figure 6).

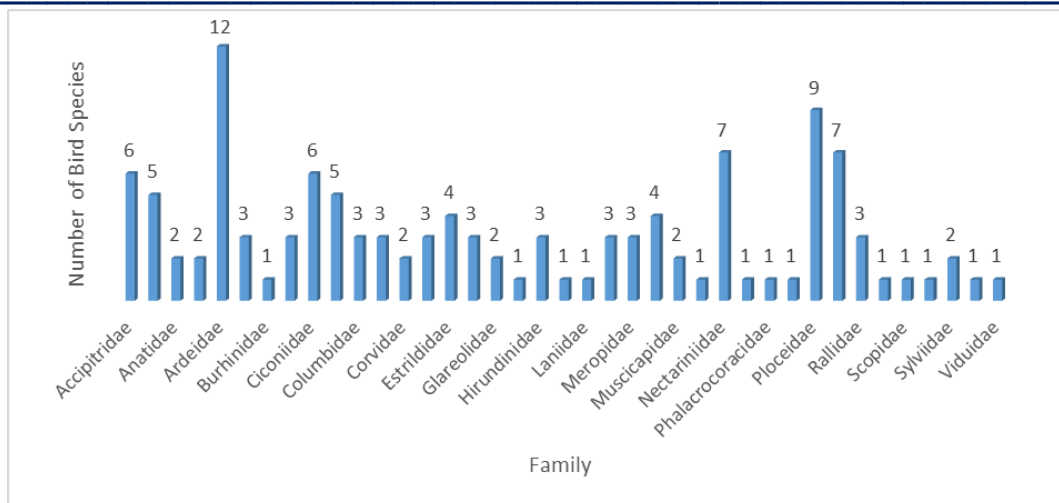


Figure 2: Family Composition of Bird Species in the Study Area

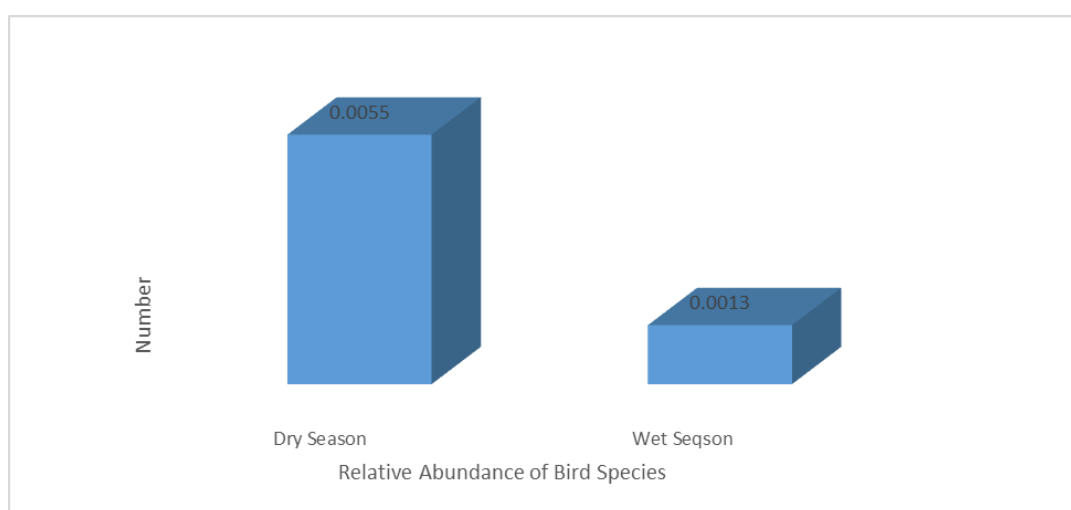
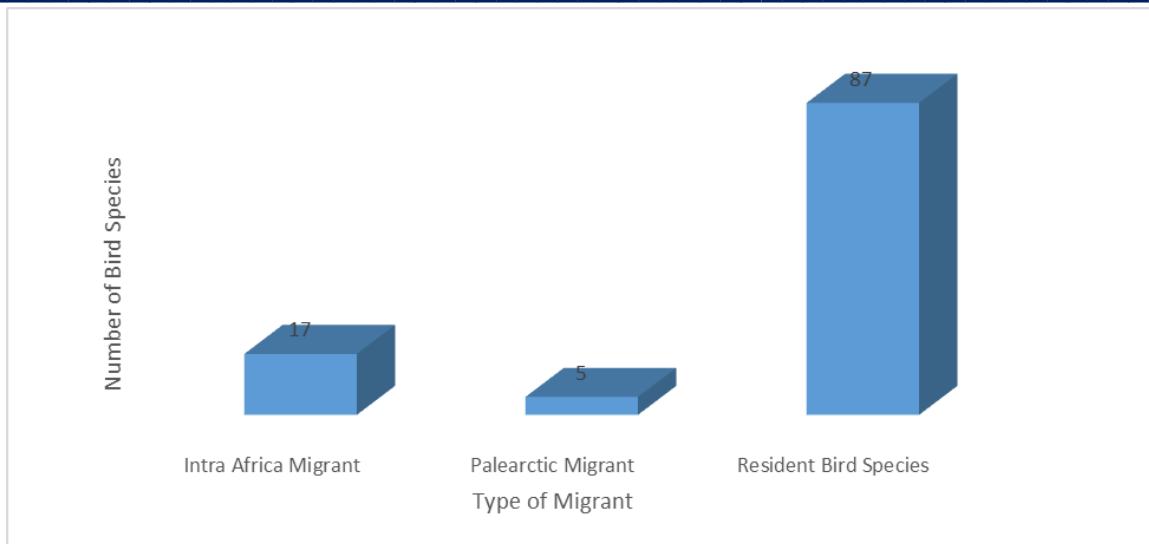


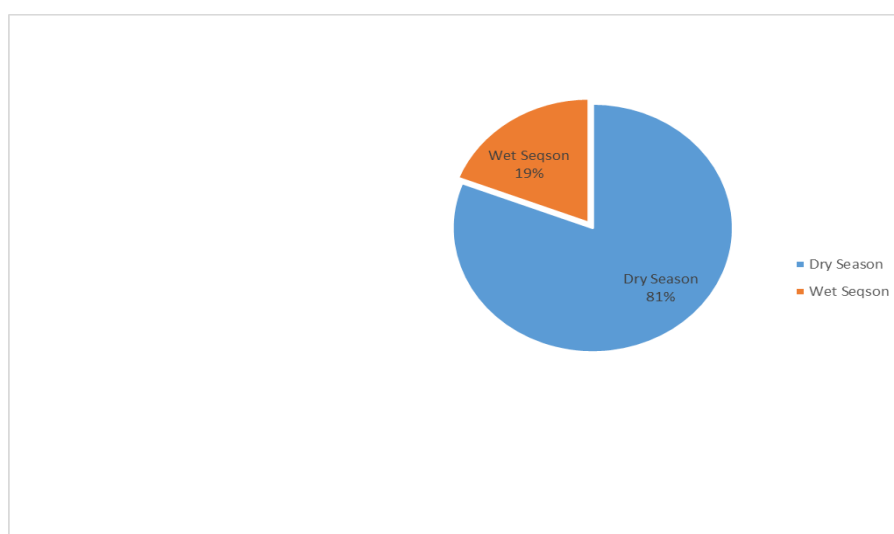
Figure 3: Relative Abundance of Bird Species in the Study Area

Table 1: Diversity Index of Bird Species in the Study Area

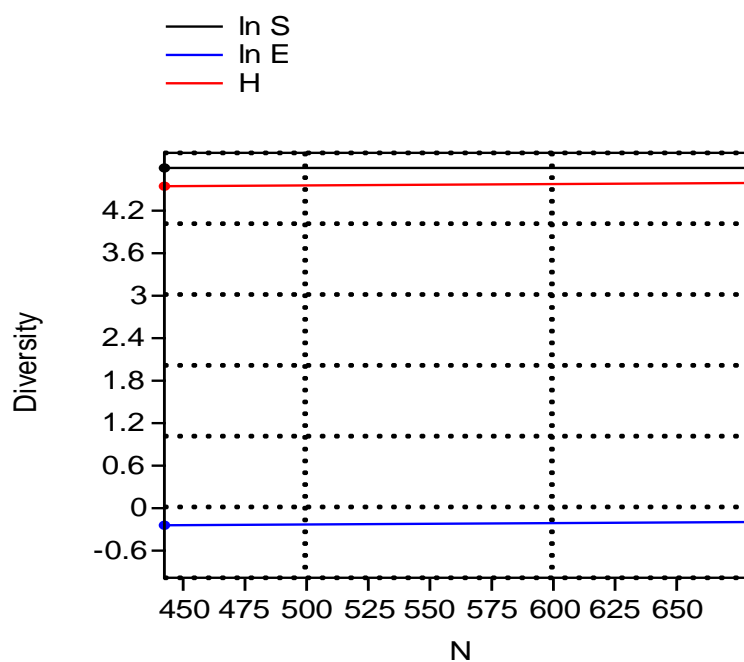
Diversity Index	Dry Season	Lower	Upper	Wet Season	Lower	Upper
Taxa_S	120	119	120	99	96	99
Individuals	443	443	443	238	238	238
Dominance_D	0.0161	0.01406	0.02119	0.01529	0.01434	0.01864
Shannon_H	4.53	4.404	4.537	4.389	4.29	4.411
Evenness_e^H/S	0.773	0.6833	0.7797	0.8136	0.7463	0.8345
Brillouin	4.134	4.021	4.144	3.86	3.778	3.88
Menhinick	5.701	5.654	5.701	6.417	6.223	6.417
Margalef	19.53	19.36	19.53	17.91	17.36	17.91
Equitability_J	0.9462	0.9204	0.948	0.9551	0.9362	0.9606
Berger-Parker	0.08126	0.05643	0.1061	0.04202	0.03361	0.06723



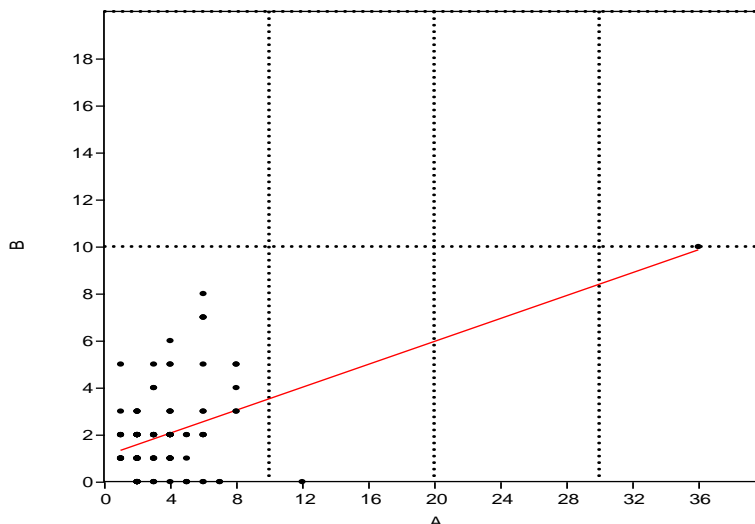
**Figure 4:** Status of Bird Species in the Study Area



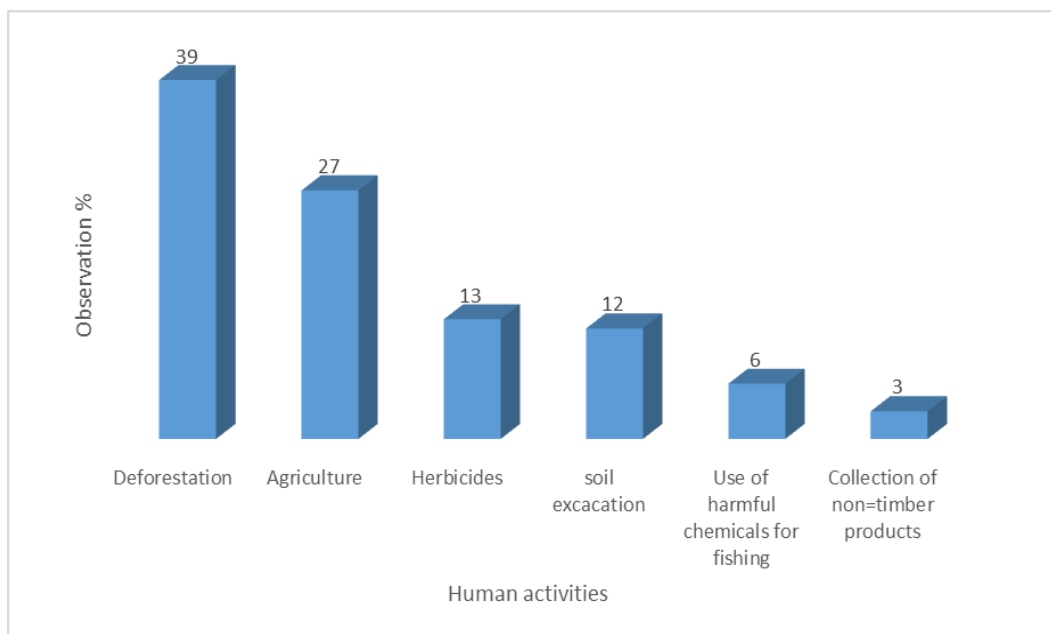
**Figure 5:** Bird species percentage enumerated in both seasons of the year



**Figure 6:** SHE analysis of Bird species richness and evenness in the study area



**Figure 7:** Density of bird species against the habitat variables in the study area



**Figure 8:** Threats to the study area

**DISCUSSION**

The relative abundance of bird species estimates was high in the study area in both seasons of the year, though higher during the dry season. This is consistent with the work of other studies which suggested a high volume availability of preferred food in the mangroves forest. The arable land provides essential foraging opportunities to many European farmland birds (Robinson, et al, 2001) .Non-crop vegetation in the study fields provides an important source of seeds, but perhaps as importantly, it recruits insects Marshall, *et al*, (2003) Different groups of bird species seem to respond differently uses land analyzed. Insectivores are known present marked responses to land use (Matlock Jr, *et al*, 2003) change which was for annual agricultural areas were insectivores mean a number of recordings per visit decayed by 50% in relation controls who reported that size of play a major role in determining the number of bird species per km2, that the larger the size of particular area the smaller the bird species per km2 The Shannon diversity index revealed that it was high in both seasons of the year, most resident were present throughout the period of the year. The presence of intra Africa and Palearctic migrants resulted in the slight difference in the diversity index. This is consistent with Lindenmayer, *et al*, (2010) who reported that diversity increases with the number of layers in the vegetation. Pearson (2011) reported that tropical wet evergreen forest support more rare bird species than other habitats. Metcalfe, (2007) reported that birds select vegetation variables according to the manner by which an individual habitat affects access to food, mates or its vulnerability to predators. This is also in agreement with the report that altering habitats and changing population structure affects avian population. This study indicates

that was a positive relationship between bird species recorded and the percentage of land use types. More birds were observed in areas with higher percentage of tree density increased than ground cover as shown in Figure 3. This observation indicated that some wetland birds used the trees as roosting site. This 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 on the mudflats fish and other vertebrate. This findings is supported who Mohd-Azlan, *et, al* (2012) reported that habitat has long been used as a predictor of bird species abundance, and each variety of birds has developed different preferences for habitat. The SHE analysis was used to examines the relationship between richness and the Shannon-Wiener diversity index) and (evenness as measured using the Shannon-Wiener evenness. The result indicates that was positive relationship between the species richness and species evenness in the study area Figure 3

Deforestation such as logging, firewood collection, charcoal making cutting of raffia palm, cutting coco nut, agriculture (bush burning, use of herbicides and destruction of out- growth shrubs) and soil excavation are major activities that caused major changes in the ecosystem. This finding is consist with for, agriculture, farming, drainage destruction of wetlands, human settlement, the building of infrastructures and industries among others have altered lots of habitats (Ajonina, and Usongo, 2001, Manu, (2000)). Myers (2002) reported that the loss of tropical ecosystem is of particular concern because the biome contains over half of the world species. Many studies have examined the impact of habitat loss and fragmentation due to agriculture on tropical bird communities (Hughes et al., 2002, Naidoo, 2004). The problem of forest fragmentation is extremely severe in West Africa due to rapid population growth and land-use changes (Manu *et al.*, 2007). Agricultural encroachment and unsustainable silvicultural practices have been implicated for these losses (Blockhus et al., 1992). This also agrees with previous work Kormar (2006) who reported high abundance of bird species in cultivated areas, which could be due to food availability. This is also consistent with the result obtained by Best et al, (2011) that the extent of change in bird species composition and abundance depends on the specificity of each bird species habitat requirement, in other words the species tolerance to changes to its environment. Species with restricted habitat changes pattern are more occupying a wider variety of environment

### CONCLUSION AND RECOMMENDATION

This research study suggests that Badagry mangroves swamp are rich in bird species although only 42% bird species were hydrophanous species. It is also an important feeding ground for bird species that belong to the following families (*Ardeidae*, *Ciconiidae*, *Threskiornithidae*, *Scopidae*) which although are not water bird species are utilizing the study due to invasion farming that creates a proper habitats for them. Anthropogenic changes due to human activities are severely affecting the floristic composition and the structure of the ecosystem and may lead to bird species decline in the study area. The water parameters of the wetlands in this study were not considered; therefore, it is recommended a proper monitoring of the physicochemical properties to be carried out in order to check pollutant influx that may be harmful to the ecosystem. The deforestation, farming, and soil excavation currently going on in the area should be restricted as this may severely affects fragile mangrove ecosystem.

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**Appendix 1:** Checklist of Bird Species in the Study Area

Name of Bird Species	Scientific Name	Family	Order	Status
Abyssinian Roller	<i>Coracias abyssinica</i>	Coraciidae	Coraciiformes	M
Adim's Stork	<i>Anastomus lamelligerus</i>	Ciconiidae	Ciconiiformes	M
African Crake	<i>Crex egregia</i>	Rallidae	Gruiformes	R
African Cuckoo Hawk	<i>Aviceda culoides</i>	Accipitridae	Accipitriformes	R
African Darter	<i>Anhinga rufa</i>	Phalacrocoracidae	Suliformes	R
African Finfoot	<i>Podica senegalensis</i>	Heliornithidae	Suliformes	R
African Grey Hornbill	<i>Tockus nasutus</i>	Bucerotidae	Bucerotiformes	M
African Harrier Hawk	<i>Polyboroides typus</i>	Accipitridae	Accipitriformes	R
African Hobby	<i>Falco cuvierii</i>	Falconidae	Falconiformes	R
African Jacanna	<i>Actophilornis africana</i>	Jacaniidae	Charadriiformes	R
African Muostached Warbler	<i>Melocichla mentalis</i>	Sylviidae	Passeriformes	R
African Openbilled Stork	<i>Anastomus lamelligerus</i>	Ciconiidae	Ciconiiformes	R
African Palm Swift	<i>Cypsiurus parvus</i>	Apodidae	Caprimulgiformes	R
African Paradise Flycatcher	<i>Terpsiphone vinidis</i>	Musophagidae	Passeriformes	R
African Pied Hornbill	<i>Tockus fasciatus</i>	Bucerotidae	Bucerotiformes	R
African Wattled Lapwing	<i>Vanellus senegallus</i>	Charadriidae	Charadriiformes	M
Amenthyst Sunbird	<i>Chalcnitra amethystinella</i>	Nectariniidae	Passeriformes	R
Bat Hawk	<i>Macheiranphus alanus</i>	Accipitridae	Accipitriformes	R
Black and White Mannikin	<i>Spermestes bicolor</i>	Estrildidae	Passeriformes	R
Black Crake	<i>Amaurornis flavirostra</i>	Rallidae	Gruiformes	R
Black Crowned Heron	<i>Nycticorax nycticoix</i>	Ardeidae	Pelecaniformes	R
Black Crowned Tchara	<i>Tchagara senegalus</i>	Melaenotidae	Passeriformes	R

Black Headed Heron	<i>Ardea melanocephala</i>	Ardeidae	Pelecaniformes	R
Black Heron	<i>Egretta ardesiaca</i>	Ardeidae	Pelecaniformes	R
Black Shouldered Kite	<i>Elanus caerulus</i>	Accipitridae	Accipitriformes	M
Blue Bellied Roller	<i>Coracias cyanogaster</i>	Coraciidae	Coraciformes	R
Blue Billed Malimbe	<i>Malimbus nitens</i>	Ploceidae	Passeriformes	R
Blue Breasted Kingfisher	<i>Halcyon malimbica</i>	Alcedinidae	Coraciformes	R
Blue Headed Wood Dove	<i>Turtur brehmeri</i>	Columbidae	Columbiformes	R
Broad Billed Roller	<i>Eurystomus glaucurus</i>	Coraciidae	Coraciformes	M
Bronze Mannikin	<i>Spermestes cucullatus</i>	Estrildidae	Passeriformes	R
Buff Throated Sunbird	<i>Chalcomitra adeberti</i>	Nectariniidae	Passeriformes	R
Cassin's Flycatcher	<i>Muscicapa cassin</i>	Muscicapidae	Passeriformes	R
Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae	Pelecaniformes	R
Chocolate Backed Kingfisher	<i>Halcyon badia</i>	Alcedinidae	Coraciformes	R
Collard Pratincole	<i>Glareola pratincola</i>	Glareolidae	Charadriiformes	R
Collard Sunbird	<i>Hedydipna collaris</i>	Nectariniidae	Passeriformes	R
Common Bulbul	<i>Pycnonotus barbatus</i>	Pycnonotidae	Passeriformes	R
Common Fiscal	<i>Lanius collaris</i>	Melaconotidae	Passeriformes	R
Common Kestrel	<i>Falco tinnunculus</i>	Falconidae	Falconiformes	R
Common Moorhen	<i>Gallinula chloropus</i>	Rallidae	Gruiformes	R
Compact Weaver	<i>Pachyphantus superciliosus</i>	Ploceidae	Passeriformes	R
Dedric Cuckoo	<i>Chrysococcyx caprius</i>	Cuculidae	Cuculiformes	R
Double Spurred Francolin	<i>Francolinus bicalcaratus</i>	Phasianidae	Galliformes	R
Egyptian Plover	<i>Pluvialis aegypticus</i>	Charadriidae	Charadriiformes	P
Giant Kingfisher	<i>Megaceryle maxima</i>	Alcedinidae	Coraciformes	R
Great Egret	<i>Egretta alba</i>	Ardeidae	Pelecaniformes	R
Green Backed Heron	<i>Butorides striata</i>	Ardeidae	Pelecaniformes	R
Green Combec	<i>Sylvietta virens</i>	Sylviidae	Passeriformes	R
Green Headed Sunbird	<i>Cyanomitra verticalis</i>	Nectariniidae	Passeriformes	R
Green Sandpiper	<i>Tringa ochropus</i>	Scolopacidae	Charadriiformes	P
Grey Backed Camaroptera	<i>Camaroptera brachyura</i>	Cisticionidae	Passeriformes	R
Grey Headead Sparrow	<i>Passer griseus</i>	Passeridae	Passeriformes	R
Grey Headed Firefinch	<i>Nigrita canicapilla</i>	Estrildidae	Passeriformes	R
Grey Heron	<i>Ardea cinerea</i>	Ardeidae	Pelecaniformes	M
Grey Pratincole	<i>Glareola cinerea</i>	Glareolidae	Charadriiformes	P
Grosbeak Weaver	<i>Amblyospiza albifrons</i>	Ploceidae	Passeriformes	R
Hadada Ibis	<i>Bostrychia hagedash</i>	Threskiornithidae	Charadriiformes	R
Harmmerkop	<i>Scopus umbretta</i>	Scopidae	Charadriiformes	R
Honeyguide Greenbull	<i>Baeopogon indicator</i>	Pycnonotidae	Passeriformes	R
Icterine Greenbull	<i>Phyllastrephalus iterinus</i>	Pycnonotidae	Passeriformes	R
Intermediate Egret	<i>Egretta intermedia</i>	Ardeidae	Pelecaniformes	M
Klass Cuckoo	<i>Chrysococcyx klaas</i>	Cuculidae	Cuculiformes	R
Knot Billed Duck	<i>Sarkidiornis melanotos</i>	Anatidae	Anseriformes	M
Lanner Falcon	<i>Falco biarmicus</i>	Falconidae	Falconiformes	R
Laughing Dove	<i>Streptopelia capicola</i>	Columbidae	Columbiformes	R
Lesser Striped Swallow	<i>Hirundo abyssinica</i>	Hirundinidae	Passeriformes	R
Little Bee Eater	<i>Merops pusillus</i>	Meropidae	Coraciformes	R
Little Bittern	<i>Isobrycus minutus</i>	Ardeidae	Pelecaniformes	R

Little Egret	Egretta garzetta	Ardeidae	Pelecaniformes	R
Little Greenbul	Andropadus virens	Pycnonotidae	Passeriformes	R
Little Palm Swift	Apus affinis	Apodidae	Caprimulgiformes	R
Lizard Buzard	Kaupifalco monogrammicus	Accipitridae	Accipitriformes	R
Malachite Kingfisher	Alcedo cristata	Alcedinidae	Coraciformes	R
Mouse Brown Sunbird	Anthreptes gabonicus	Nectariniidae	Passeriformes	R
Northern Red Bishop	Euplectes franciscanus	Ploceidae	Passeriformes	R
Orange Cheeked Waxbill	Estrilda melpoda	Estrildidae	Passeriformes	R
Piapiac	Ptilostomus afer	Corvidae	Passeriformes	R
Pied Crow	Corvus albus	Corvidae	Passeriformes	R
Pied Kingfisher	Ceryle rudis	Alcedinidae	Coraciformes	R
Pin Tailed Whydah	Vidua macroura	Viduidae	Passeriformes	R
Pipping Hornbill	Ceratogymna fistulator	Bucerotidae	Bucerotiformes	R
Plain Backed Pipit	Anthus leucophrys	Motacillidae	Passeriformes	M
Plain Martin	Riparia paludicola	Hirundinidae	Passeriformes	P
Purple Headed Glossy Starling	Lamprotornis purpureiceps	Sturnidae	Passeriformes	R
Purple Heron	Ardea purpurea	Ardeidae	Pelecaniformes	R
Red Chested Sswallow	Hirundo lucida	Hirundinidae	Passeriformes	M
Red Eyed Dove	Streptopelia semitorquata	Columbidae	Columbiformes	R
Red Headed Malimbe	Malimbus rubricollis	Ploceidae	Passeriformes	R
Red Throated Bee Eater	Merops pusillus	Meropidae	Coraciformes	M
Red Vented Malimbe	Malimbus scutatus Ephippiorhynchus senegalensis	Ploceidae	Passeriformes	R
Saddle Billed Stork		Ciconiidae	Ciconiiformes	P
Senegal Coucal	Centropus senegalensis	Cuculidae	Cuculiformes	R
Senegal Thick Knee	Burhinus senegalensis	Burhinidae	<u>Charadriiformes</u>	R
Simple Leavelove	Chlorocichla simplex	Pycnonotidae	Passeriformes	R
Singing Cisticola	Cisticola cantans	Cisticonidae	Passeriformes	R
Splendid Sunbird	Cinnyris coccinigaster	Nectariniidae	Passeriformes	R
Spur Wing Lapwing	Vanellus spinosus	Charadriidae	<u>Charadriiformes</u>	R
Squacco Heron	Ardeola ralloides	Ardeidae	Pelecaniformes	R
Tawny Flank Prinia	Prinia subflava	Cisticonidae	Passeriformes	R
Tree Pipt	Anthus trivialis	Motacillidae	Passeriformes	P
Variable Sunbird	Cinnyris venustus	Nectariniidae	Passeriformes	R
Veillot Black Weaver	Ploceus cucullatus	Ploceidae	Passeriformes	R
Village Weaver	Ploceus cucullatus	Ploceidae	Passeriformes	R
Western Nicator	Nicator chloris	Pycnonotidae	Passeriformes	R
Whinchat	Saxicola rubetra	Muscicapidae	Passeriformes	M
Whistling Cisticola	Cisticola lateralis	Cisticonidae	Passeriformes	R
White Faced Whistling Duck	Dendrocygna viduata	Ciconiidae	Anseriformes	R
White Stork	Ciconia ciconia	Ciconiidae	Ciconiiformes	P
White Throated Bee Eater	Merops albicollis	Meropidae	Coraciformes	P
Woodchat Shrike	Lanius senator	Laniidae	Passeriformes	M
Woodland Kingfisher	Halcyon senegalensis	Alcedinidae	Coraciformes	M
Woolly Necked Stork	Ciconia episcopus	Ciconiidae	Ciconiiformes	M
Yellow Billed Kite	Milvus migrans	Accipitridae	Accipitriformes	M
Yellow Breasted Apalis	Apalis flavida	Cisticonidae	Passeriformes	R

Yellow Crowned Gononek	Lanius erythrogaster	Melanotidae	Passeriformes	R
Yellow Mantled WindowBird	Ploceus tricolor	Ploceidae	Passeriformes	R
Yellow Throated Longclaw	Macronyx croceus	Motacillidae	Passeriformes	R
Yellow Wagtail	Motacilla flava	Motacillidae	Passeriformes	P
Yellow Whiskered Greenbull	Andropadus latirostris	Pycnonotidae	Passeriformes	R