

Full Length Research Paper

Avian species richness and diversity at the Dschang Municipal Lake, Cameroon: Implications of site management for conservation and ecotourism

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This study was carried out to examine avian species richness and diversity at the Dschang Municipal Lake and to determine the effects of ecotourism infrastructural development on the avifauna distribution. The habitat around the lake was stratified into the undeveloped eastern part with natural/farm bush vegetation cover and the infrastructural developed western part with buildings and carpet grass lawns. A total of six transects each of 400 m length were established for bird census by vision and through their calls/songs. Sixty one (61) bird species were observed at the Dschang Municipal Lake amongst which seven were Palearctic migrants, 10 Inter-African migrants and 44 Residents. Two rare and occasional species were observed; the Fulvous Whistling Duck (*Dendrocygna bicolor*) and Intermediate Egret (*Egretta intermedia*). No significant seasonal variation was observed for bird species richness and diversity as our survey seasons were not very distinct. Similarly, species richness did not vary significantly between the undeveloped and the ecotourism infrastructural developed parts but varied in diversity index. Diversity index for water birds was greater in the undeveloped part of the lake while for terrestrial birds it was the reverse. Overall, this landscape heterogeneity at the Dschang Municipal Lake with developed and undeveloped parts provide a variety of habitat types for the diversity of bird species recorded and should be properly managed and conserved from a landscape approach.

Key words: Bird, wetlands, dam, seasonal variations, habitat variations.

INTRODUCTION

Lakes are ecosystems that provide critical habitats for a significant array of plants and animals (IUCN, 2002). They are an important refuge to many migratory birds

that travel long distances in search of food and habitat (Jannert, 2003) and like other wetlands, they serve as critical breeding sites for several species of birds

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(Prasad et al., 2012). Wild birds are an integral part of any ecosystem, providing critical ecosystem services and functions. Birds have been proven to be excellent indicators of water quality (Aynalem and Bekele, 2008) as in the case of assessing the ecological integrity of Prairie Wetlands (Adamus, 1996). The distribution and abundance of many bird species are determined by the composition and structure of the vegetation that forms a major element of their habitats (Aynalem and Bekele, 2008). Seasonality and consequent variations in the abundance of food resources also result in seasonal changes in the species richness and abundance of birds (Williams and Middleton, 2007; Nirmala, 2016).

Amongst the ecosystem, services and functions provided by birds are recreational and cultural which are also valuable to humans as many people derive great pleasure, fulfilment and inspiration from watching and listening to birds (European Commission, 2004).

Inadvertently, lakes equally provide a multitude of uses attracting human settlement and habitation and despite the aforementioned direct and indirect benefits of lakes and birds, human effects on lakes are increasing every day and their negative impacts are strongly being felt as Lake Ecosystem services are continuously being put in jeopardy (Naiman et al., 1995). Many wetlands have been strongly degraded because of human impacts (Verhoeven et al., 2002). Human use of lakes includes drinking and water supply; power generation; navigation; commercial and recreational fisheries; body contact recreation, boating, and other aesthetic recreational uses (Chapman, 1992). This has led to humans creating manmade wetlands which have been reported to attract different types of bird species from those in natural wetland ecosystems (Ismail et al., 2012). Such ecosystems are diverse in nature, warranting the need to understand their influence on avifauna populations (Sriharan and Burgess, 2012). The creation of an artificial wetland area is viewed as a valuable measure since it can provide a new habitat for bird communities if all other factors are suitable (Oindo et al., 2001). Moreover, the presence of an artificial wetland habitat has been found to complement its natural counterpart by allowing more species to use different habitats in different conditions (Kloskowi et al., 2009).

The Dschang municipal lake is a manmade wetland in the west region of Cameroon which is increasingly attracting tourists both nationally and internationally. Consequently, infrastructural developments with the introduction of leisure activities such as bird watching and boating are taking precedence at the lake. While ecotourism can provide benefits to local communities and build local and international support for protected areas (Fennell and Weaver, 2005) and contribute to safeguard biodiversity and ecosystem functions in developing countries, meeting the requirements for ecotourism is extremely difficult (Gosling, 1999; Cetin, 2015; Belkayali et al., 2016). Developmental activities including the

promotion of tourism for socio-economic improvement have caused noticeable degradation of natural ecosystems where adequate attention has not been given to environmental conservation (Maharana et al., 2000). Urbanization and recreational activities are two of the major causes of population declines of species (Czech et al., 2000). While the Dschang Municipal Lake seems conducive for the presence of wild bird species, it is situated in a built-up area and currently being developed to promote ecotourism. Previous studies at the Dschang Municipal Lake evaluated the environmental and sanitary factors that valorise tourism (Lacour and Morand, 2006) and the effects of climate change on water resources (Tazen et al., 2013). There is also a checklist of 56 bird species present at the Dschang Municipal Lake that was left behind by a tourist (Mugnier, 2013, unpublished data) but there is no information on the avian species richness, diversity and distribution as well as effects of seasonality. This study was therefore designed to determine bird species richness, diversity and distribution at the Dschang Municipal Lake, to determine effect of seasonality and the impacts of infrastructural development for ecotourism.

METHODOLOGY

Study area

The Dschang Municipal Lake is a man-made Lake, precisely a dam situated at the North-East of Dschang town in the West Region of Cameroon. It covers a surface area of about 40 hectares and stretches between 5° 20' and 5° 25' North and between 9° 56' and 10° 8' East (Figure 1), and altitude ranges between 1,615 to 1,380 m at the Lake outlet (Tazen et al., 2013).

The climate of Dschang is Sudano-Guinean, characterized by two seasons: a dry season that runs from December to mid-March and a rainy season from mid-March to October/November with an annual average rainfall of 1790 mm with peak precipitation in August and September (Tazen et al., 2013). The relative humidity ranges from 75 to 80%. Temperature varies from a mean monthly low of 18.4°C in July to a high of 23.9°C in February and March with an average daily temperature of 20°C (Tazen et al., 2013).

Sampling design

The habitat surrounding the lake was stratified into two broad types. From about midway towards the inlet of the lake in the east is the undeveloped part bordered by a swampy area covered mainly by aquatic macrophytes which are monocotyledonous graminoid flowering plants (*Cyperaceae*) and raffia palms (*Arecaceae*) about 20 m away from the Lake alongside farm bushes with annual and perennial crops, strewn with fruits and *Eucalyptus saligna*, *Musa acuminata* and *Plantago major* trees (personal observations). The western portion has been greatly developed with touristic infrastructure including buildings of the Nautical Base, Artisanal Centre, Civilization Museum and the Franco-Cameroon Alliance and a "Pond de Plaisir" bridge. There are also recreational facilities like public benches, a restaurant, a bar, a volley-ball court and a children's playground. The vegetation here is mainly the neatly kept carpet grass (*Poaceae*) lawns with isolated marigold trees (*Asteraceae*), a few fruit trees and some flowering trees and shrubs.

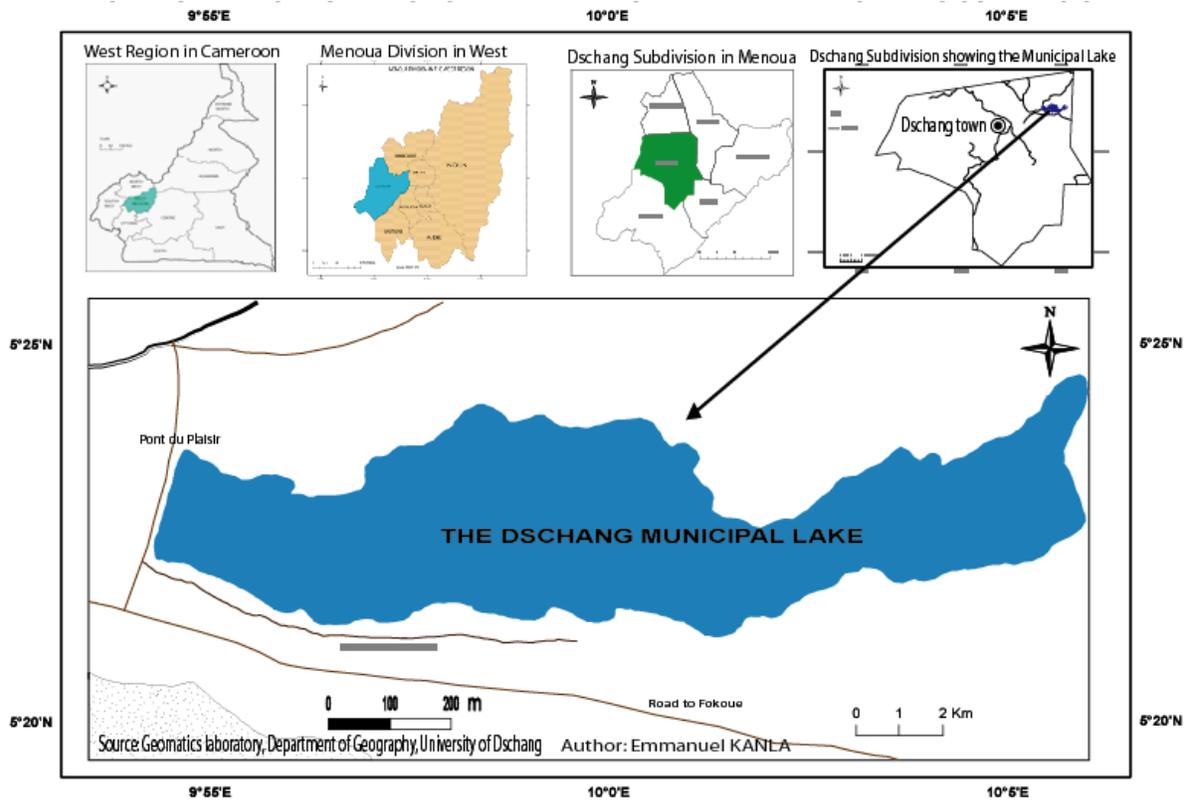


Figure 1. Map of the location of Dschang Municipal Lake, Cameroon.

A total of six transects (three in the undeveloped eastern part and three in the infrastructural developed western part of the Lake) of 400 m each, were established (four on land and two in water). For each part, the two land transects were on opposite sides of the lake (North and south) and the third in water. To avoid double counting, the land transects mainly targeted terrestrial species while the aquatic species were counted from the water transect in the centre of the lake.

Data collection and analysis

Bird census data were collected using established line transects (Bibby et al., 1992; Soka et al., 2013) from October 2013 to March 2014. October and November were the wet season and December to March the dry season. Birds were counted fortnightly by the same observer, between 6 and 11 h, and between 15 and 18 h when activities of birds are prominent.

Each land transect was walked at a constant speed with minimal disturbance in order to minimize bird distraction. Human propelled boats were used for transects in water. Along each transect, bird species were identified by direct observation with the aid of binoculars and cross referenced with bird field guides (Serle and Morel, 1977; Ber Van Perlo, 2002; Borrow and Demey, 2004) for confirmation. All birds observed or heard within a 25 m distance on either side of the transect line (Hostetler and Main, 2013; Soka et al., 2013) were recorded and considered for the analysis. Birds flying over and raptors were excluded from the analysis but included in the final list of birds for Dschang Municipal Lake alongside records from literature.

The Chi-square test at a threshold probability of 5% was used to examine the hypothesis that the area with less human impact (the

undeveloped part of the Lake) would possess higher bird diversity. The tests were carried out with species richness as the dependent variable and season and habitats as the categorical variables and the intimacy of link between the quantitative variables calculated by the coefficient of correlation using the R statistical software, version 2.15.1 (R core Development Team, 2012). The Simpson diversity index was used to compare bird species diversity in the different seasons and habitats. The index was chosen because it is a dominance index that gives more weight to common or dominant species. In this case, a few rare species with only a few representatives will not affect the diversity.

RESULTS

A total of 45 bird species belonging to 27 families were observed during the count sessions of the study period and an additional 16 species observed either flying over or after the count sessions making the total observed species as 61 (Appendix 1). None of the species observed was globally threatened according to IUCN threat criteria. Of the 45 species observed within the habitats during count sessions, seven were Palearctic migrants, 10 were Inter-African migrants and the remaining 28 were Residents. Two vagrants (Fulvous Whistling Duck, *Dendrocygna bicolor* and Intermediate Egret, *Egretta intermedia*) were observed during the survey. Overall, eight species were recorded uniquely during the rainy season and twelve during the dry season

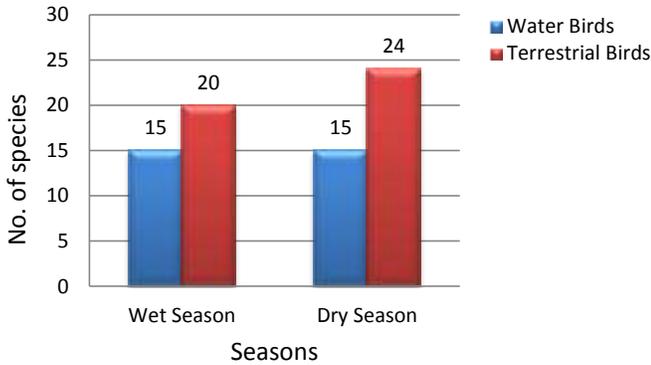


Figure 2. Bird species richness for water and terrestrial birds in relation to season..

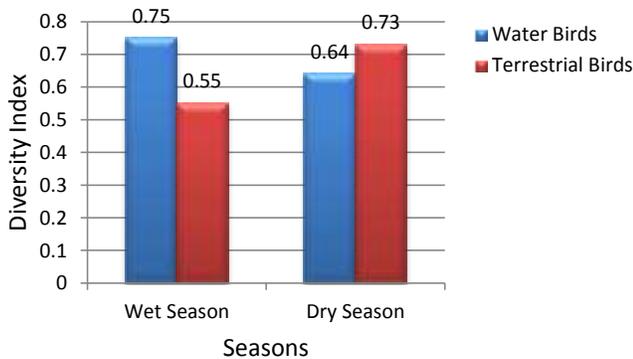


Figure 3. Variations in water and terrestrial bird species diversity index with respect to seasons.

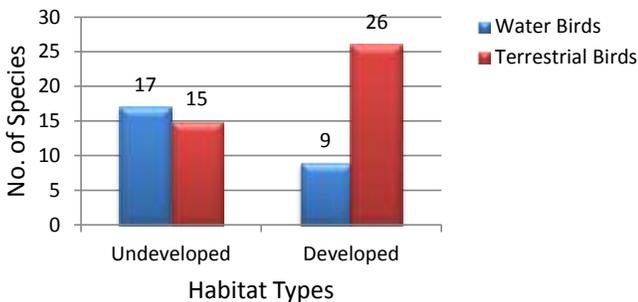


Figure 4. Species richness of water and terrestrial birds in infrastructural developed and undeveloped parts of Dschang Municipal Lake.

with 27 observed during both seasons. With regards to habitat, 12 and 15 species were observed exclusively in the undeveloped area and the infrastructural developed area for ecotourism respectively, while 20 species were common to both habitats.

The most observed species of water birds in terms of relative abundance were the White-Faced Whistling Duck

(29.63%), followed by Cattle Egret (28.78%) and Yellow-billed Duck (22.78%). These species were more abundant in the dry season with the exception of the White-Faced Whistling that was rather more abundant in the wet than in the dry season. The most dominant terrestrial species in terms of relative abundance were the Black-crowned waxbill (41.67%) followed by the village weaver (29.21%). The village weaver was more abundant in the wet than in the dry season while the Black-crowned waxbill was more abundant in the dry season.

Seasonal variations on species richness and diversity

Bird species richness was slightly higher in the dry season (n = 39) as compared to the rainy season (n = 35) but this variation was not significant ($\chi^2 = 0.0217$, df = 1, p-value = 0.8828). Terrestrial birds did not show any significant difference despite the slight increase from wet to dry season ($\chi^2 = 0.3636$, df = 1, p-value = 0.5465) while species richness for water birds remained the same in both seasons (Figure 2).

The Simpson’s diversity index for water birds was greater in the wet season (0.75) than in the dry season (0.64) while for terrestrial birds, it was greater in the dry (0.74) than in the wet season (0.56) (Figure 3). Overall, no significant seasonal effect was observed on bird species richness and diversity at the Dschang Municipal Lake.

Habitat variations

The infrastructural developed part of the Lake had higher overall bird species richness (n = 35) as compared to the undeveloped part (n = 32) but the difference was insignificant ($\chi^2 = 0.1343$, df = 1, p-value = 0.714) (Figure 4). It was observed that the undeveloped part had more species of water birds but not significantly so $\chi^2 = 2.4615$, df = 1, p-value = 0.1167, whereas for terrestrial birds, species richness was higher in the infrastructural developed part as compared to the undeveloped part but not significantly so $\chi^2 = 2.9512$, df = 1, p-value = 0.08581 (Figure 4).

Figure 5 shows that Simpson’s diversity index for water birds is greater in the undeveloped area (0.67) than in the developed part of the Lake (0.35), while for terrestrial birds, diversity is greater in the infrastructural developed part (0.77) as compared to the undeveloped area (0.64).

DISCUSSION

Avian species richness and diversity

With a total of 61 species recorded during this study and

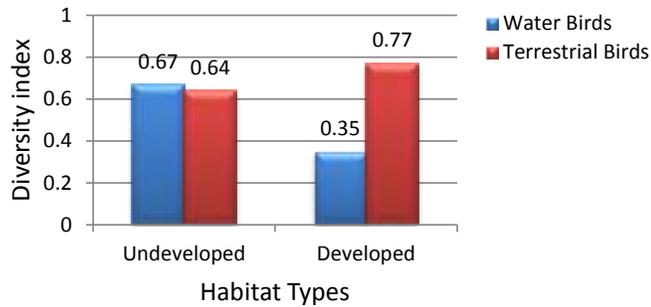


Figure 5. Species diversity index of water and terrestrial birds in infrastructural developed and undeveloped parts of Dschang Municipal Lake.

14 more retrieved from literature and annotated lists left behind by tourists, the total bird species of the Dschang Municipal Lake currently stands at 75. This is indicative that the list is not exhaustive and that with additional surveys, more birds could still be added to the checklist from this study. This census is also the first systematic study to have been carried out on birds of the Dschang Municipal Lake and thus serve as a baseline for future monitoring. Of the 61 bird species observed during this study, 17 were seasonal migrants amongst which 7 were Palearctic migrants, indicating that the site is an important wintering ground for migratory birds, harbouring a total of 17 of the 218 migratory birds so far recorded in Cameroon (Fotso et al., 2001).

While a total of 75 species of birds can be considered relatively low for a country like Cameroon with a bird species richness of 968 (Avibase, 2016), it should be noted that the area has no protected status, it is quite small, heavily impacted by human activities, in an urbanized area and within the Cameroon highlands where bird species are unique but not particularly rich in diversity (Stuart, 1986). Yet, the species richness obtained at the Dschang Municipal Lake can be compared to the 67 species recorded at a similar manmade Hombolo wetland in Central Tanzania (Soka et al., 2013) but less than that than the 135 species recorded at the Dagona waterfowl sanctuary in Nigeria (Lameed, 2011) which is a relatively extensive protected area with a natural wetland. Two rare and occasional species were observed; the Fulvous Whistling Duck (*D. bicolor*) and Intermediate Egret (*E. intermedia*). A separate paper is under preparation for the first record of Fulvous Whistling Duck (*D. bicolor*) in the Dschang Municipal Lake. Overall, a record of 75 species within an urbanized area is probably what makes the Dschang Municipal Lake, a remarkably great destination for bird watching. The most dominant water birds in terms of relative abundance are the White-Faced Whistling Duck (29.63%), followed by Cattle Egret (28.78%) and the Yellow-billed Duck (22.78 %) whereas, for terrestrial birds, it is the Black-crowned waxbill (41.67%) and village weaver (29.21%). This can be explained by the fact that

these species are highly gregarious.

Seasonal variations

Species richness for water birds was the same in both the wet and dry seasons. This could be explained by the fact that the entire survey duration from October to March coincides with the wintering period for migratory birds in the tropics. Thus, any counts before October or after April should have seen a significant reduction in water birds as most of the water birds were migrants ($n = 11$). Species diversity index was higher in the wet season (0.75) than the dry season (0.64). This reduction in diversity index probably resulted from local movements of some individuals to other nearby wetland locations due to possible pressure and reduction of resources at the Dschang Municipal Lake. These results are similar to those of Giri and Chalise (2008) at the Phewa Lake and can be explained by the fact that many water bird species migrate to either long or short distances to take advantage of global difference of seasonal climate change and optimize the availability of food sources and breeding habitats (Mengesha et al., 2011). With regards to terrestrial birds, both species richness and diversity did not vary significantly from wet to dry season. This could probably be attributed to the fact that riparian sites are associated with water all year round, thus retaining a relatively persistent assemblage resilient to seasonal variations and consequently maintaining stable bird communities as demonstrated by Nimmo et al. (2015) that riparian tree cover enhances the resistance and stability of woodland bird communities during an extreme climatic event. While no seasonal variations in species richness and diversity for both water and terrestrial birds was observed, it cannot be considered conclusive as the entire study period exactly coincided with the migrant wintering period. A better understanding of seasonal effects should consider the wet season survey in July/August.

Habitat variations

The undeveloped part of the lake had more species richness and diversity of water birds than the infrastructural developed area. This difference though random as it was not significant is probably due to the presence of a marshy area there, providing a suitable habitat for most water birds. This area is also dominated by grasses of the Cyperaceae family, which are used as food, nest material and a hide out for the birds. Furthermore, this area is less disturbed and therefore more conducive for water birds. Recreational activities and urbanisation have been proven to be the two major causes of population declines of species (Czech et al., 2000). Contrary to water birds, terrestrial birds had a

higher species richness and diversity in the zone with touristic developments though the difference was equally not significant. However, most of the species in the infrastructural developed area are generalist species attracted to the fruit trees and flowering trees found in this area and perhaps to the food remains left by tourists. This concurs with Mengesha et al. (2011), who demonstrated that disturbed habitat had higher species richness of terrestrial birds. So, while species richness and diversity did not show any significant difference between the developed and undeveloped parts of the lake, a further analysis could show significant variations in species composition which unfortunately was not considered within the scope of this study. Although, tourism has a significant contribution to economic development and conservation of environmental resources, it also has negative impacts on tourist's destination areas (Pavlic et al., 2013; Cetin and Sevik, 2016). Thus, the area with no touristic developments should be preserved for conservation of birds.

Implications for conservation and ecotourism

The Dschang Municipal Lake with a current record of 75 species can be considered rich in bird species and diversity given its location in an urbanised area. The sightings of rare and occasional birds such as Fulvous Whistling Duck and the Intermediate Egret add to the impetus of the site as an important birding destination. The most common water birds in terms of relative abundance are the White-Faced Whistling Duck (*Dendrocygna viduata*), Cattle Egret (*Bubulcus ibis*) and the Yellow-billed Duck (*Anas undulata*). For terrestrial birds, the most abundant are the Black-crowned waxbill (*Estrilda nonnula*) and the village weaver (*Ploceus cucullatus*).

Despite the tourism infrastructural development at the Dschang Municipal Lake, the avian fauna do not seem to suffer extreme impacts, as migratory and vagrant species are present in the area. While tourism could be encouraged as a potential source of income for the Municipality, it has to be thought through and implemented carefully. Habitat management efforts around the Lake should preserve the integrity of the terrestrial ecosystem bordering the undeveloped part of the Lake in the east. The extension of clearing and introduction of carpet grass should be halted and only maintained in its current existing western parts with an addition of shade trees. This landscape heterogeneity at the Dschang Municipal Lake with developed and undeveloped parts provide a variety of habitat types for the diversity of birds observed and should therefore be conserved and properly managed. The lake is essentially managed by the Dschang Municipal Council that should increase publicity of the site to attract more tourists to raise more revenue and consider the development of an ecotourism-zoning/management plan that has strong linkage to the

conservation of its natural resources to ensure long term economic benefits and conservation prospects.

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Conflict of interest

The authors have no conflict of interest to disclose.

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Appendix 1. Checklist of the birds of Dschang Municipal Lake recorded from October 2013 to March 2014.

S/N	English name	Scientific name	Family	Habitat	Status Category	Red list category
1.	Long-tailed Cormorant	<i>Phalacrocorax africanus</i>	Phalacrocoracidae	W	R	LC
2.	Little Grebe	<i>Tachybaptus ruficollis</i>	Podicipedidae	W	R/P	LC
3.	Grey Heron	<i>Ardea cinerea</i>	Ardeidae	W	R/P	LC
4.	Black-headed Heron	<i>Ardea melanocephala</i>	Ardeidae	W	R/M	LC
5.	Purple Heron	<i>Ardea purpurea</i>	Ardeidae	W	R/P/V	LC
6.	Squacco Heron	<i>Ardeola ralloides</i>	Ardeidae	W	R/P/V	LC
7.	Green-backed Heron	<i>Butioides striata</i>	Ardeidae	W	R	LC
8.	Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae	W	R/M	LC
9.	Intermediate Egret	<i>Egretta intermedia</i>	Ardeidae	W	R/M/V	LC
10.	Little Egret	<i>Egretta garzetta</i>	Ardeidae	W	R/M/P	LC
11.	Little Bittern	<i>Ixobrychus minutus</i>	Ardeidae	W	R/P/V	LC
12.	Hammerkop	<i>Scopus umbretta</i>	Scopidae	W	R	LC
13.	Sacred Ibis	<i>Threskiornis aethiopicus</i>	Threskiornithidae	W	R/M	LC
14.	White-faced Whistling Duck	<i>Dendrocygna viduata</i>	Anatidae	W	R/M	LC
15.	Fulvous Whistling Duck	<i>Dendrocygna bicolor</i>	Anatidae	W	R/M	LC
16.	Yellow-billed Duck	<i>Anas undulata</i>	Anatidae	W	R/M	LC
17.	Spur-winged Plover	<i>Vanellus spinosus</i>	<i>Vanellus spinosus</i>	W	P	LC
18.	Spur-winged goose	<i>Plectropterus gambensis</i>	Anatidae	W	M	LC
19.	Spur-winged Lapwing	<i>Vanellus spinosus</i>	Charadriidae	W	R/V	LC
20.	Purple Swamphen	<i>Porphyrio porphyrio</i>	Rallidae	W	R	LC
21.	Common Moorhen	<i>Gallinula chloropus</i>	Rallidae	W	R/P/V	LC
22.	Black Crane	<i>Amaurornis flavirostris</i>	Rallidae	W	R	LC
23.	Common Snipe	<i>Gallinago gallinago</i>	Scolopacidae	W	P	LC
24.	Wood Sand Piper	<i>Tringa glariola</i>	Scolopacidae	W	P	LC
25.	Common Sand Piper	<i>Actitis hypoleucos</i>	Scolopacidae	W	P	LC
26.	Lesser Flamingo	<i>Phoeniconaias minor</i>	phoenicopteridae	W	M/V	NT
27.	African Jacana	<i>Actophilornis africana</i>	Jacanidae	W	R	LC
28.	Malachite Kingfisher	<i>Corithornis cristata</i>	Alcedinidae	W	R/M	LC
29.	Senegal Kingfisher	<i>Halcyon senegalensis</i>	Alcedinidae	W	R/M	LC
30.	African pigmy kingfisher	<i>Ceyx(ispidina) picta</i>	Alcedinidae	W	R/M	LC
31.	African Giant Kingfisher	<i>Megaceryle maxima</i>	Alcedinidae	W	R	LC
32.	Blue breasted kingfisher	<i>Halcyon malimbica</i>	Alcedinidae	W	R	LC
33.	Black Kite	<i>Milvus migran</i>	Accipitridae	T	R/M/P	LC
34.	Osprey	<i>Pandion haliaetus</i>	Accipitridae	T	R/P	LC
35.	Lizard Buzzard	<i>Kaupifalco monogrammicus</i>	Accipitridae	T	R	LC
36.	Black Sparrow hawk	<i>Accipiter melanoleucus</i>	Accipitridae	T	R	LC
37.	Common Kestrel	<i>Falco tinnunculus</i>	Falconidae	T	R/P/V	LC
38.	Senegal Coucal	<i>Centropus senegalensis</i>	Cuculidae	T	R	LC
39.	Mottled Spinetail	<i>Telacanthura ussheri</i>	Apodidae	T	R	LC
40.	African Palm Swift	<i>Gypsiurus parvus</i>	Apodidae	T	R	LC
41.	White-throated Bee-eater	<i>Merops albicollis</i>	Meropidae	T	M	LC
42.	Grey Woodpecker	<i>Dendropicos goerta</i>	Picidae	T	R	LC
43.	European Swallow	<i>Hirundo rustica</i>	Hirundinidae	B	P	LC
44.	Wire-tailed Swallow	<i>Hirundo smithii</i>	Hirundinidae	B	R/M	LC
45.	Lesser Striped Swallow	<i>Hirundo abyssinica</i>	Hirundinidae	T	R/M	LC
46.	Mosque Swallow	<i>Hirundo senegalensis</i>	Hirundinidae	T	R/M	LC
47.	Snowy-crowned Robin Chat	<i>Cossypha niveicapilla</i>	Turdidae	T	R/M	LC
48.	West African thrush	<i>Turdus pelios</i>	Turdidae	T	R	LC

Appendix 1, contd.

49.	Whinchat	<i>Saxicola rubetra</i>	Turdidae	T	P	LC
50.	Yellow Wagtail	<i>Motacilla flava</i>	Motacillidae	T	P	LC
51.	Purple glossy starling	<i>Lamprotonis purpureus</i>	Sturnidae	T	R	LC
52.	Grey-backed camaroptera	<i>Camaroptera brachyura</i>	Sylviidae	T	R	LC
53.	Tawny-flanked Prinia	<i>Prinia subflava</i>	Sylviidae	T	R	LC
54.	Sedge Warbler	<i>Acrocephalus schoenobaenus</i>	Sylviidae	T	P	LC
55.	Great Reed Warbler	<i>Acrocephalus arundinaceus</i>	Sylviidae	T	P	LC
56.	Garden Warbler	<i>Sylvia borin</i>	Sylviidae	T	P	LC
57.	Winding Cisticola	<i>Cisticola galactotes</i>	Sylviidae	T	R	LC
58.	Melodious warbler	<i>Hippolais polyglotta</i>	Sylviidae	T	P	LC
59.	Fiscal Shrike	<i>Lanius collaris</i>	Laniidae	T	R	LC
60.	Pied Crow	<i>Corvus albus</i>	Corvidae	T	R	LC
61.	Olive bellied sunbird	<i>cinneryis chloropygia</i>	Nectarinidae	T	R	LC
62.	Splendid sunbird	<i>Nectarinia coccinigastra</i>	Nectarinidae	T	R	LC
63.	Village Weaver	<i>Ploceus cucullatus</i>	Ploceidae	T	R	LC
64.	White-cheeked Oliveback	<i>Nesocharis capistrata</i>	Estrildidae	T	R	LC
65.	Orange-cheeked Waxbill	<i>Estrilda melpoda</i>	Estrildidae	T	R	LC
66.	Black-crowned Waxbill	<i>Estrilda nonnula</i>	Estrildidae	T	R	LC
67.	Bi-coloured manikins	<i>Spermetes bicolor</i>	Estrildidae	T	R/M	LC
68.	Bronze manikins	<i>Lonchura cucullata</i>	Estrildidae	T	R	LC
69.	Speckled mousebird	<i>Colius striatus</i>	Coliidae	T	R	LC
70.	Common garden bulbul	<i>Pycnonotus barbatus</i>	Pycnonotidae	T	R	LC
71.	Red- eyed dove	<i>Streptopelia semitorquata</i>	Columbidae	T	R	LC
72.	Yellow pendoline tit	<i>Anthoscopus parvulus</i>	Paridae	T	R	LC
73.	African Blue Flycatcher	<i>Elminia longicauda</i>	Muscicapidae	T	R	LC
74.	Grey-headed sparrow	<i>Passer griseus</i>	Ploceidae	T	R	LC
75.	Red-cheeked Cordon-Bleu	<i>Estrilda bengala</i>	Estrildidae	T	R	LC

W: Water bird; B: Water/Terrestrial bird; T: Terrestrial bird; R: Resident; M: Inter African Migrant; P: Palaeartic Migrant; V: Vagrant; LC: Least Concerned; NT: Near Threatened. The bird names written in black are those identified during this study, and those in red are from literature.